Encyclopaedia of Scientific Units, Weights and Measures

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François Cardarelli

Encyclopaedia of Scientific Units, Weights and Measures

Their SI Equivalences and Origins

English translation by M.J. Shields, FIInfSc, MITI

Springer

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Dedication

Encyclopaedia of Scientific Units, Weights and Measures is dedicated to my parents *Antonio* and *Claudine*, to my sister *Elsa*, and to *Louise Saint-Amour*, for their love and support.

François Cardarelli

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1 Introduction

1.1 Why a Conversion Handbook?

Books on the conversion of scientific units into their SI equivalents are relatively rare in scientific literature. There are several specialized treatises (*see Bibliography*) on the subject as applied to certain areas of science and technology, which contain sections on the subject, supported by conversion tables. However, these tables are anything but exhaustive, and it is often necessary to consult sources in several very different areas in order to obtain the desired information.

This practical manual aims to be the most comprehensive work on the subject of unit conversion. It contains more than 20 000 precise conversion factors, and around 5000 definitions of the units themselves. The units included, and their conversions, are grouped into imperial and US units, conventional metric units, older or out-of-date units, ancient units, and SI units. The subject areas involved are: pure and applied science, technology, medicine, and economics. Some examples of individual sciences covered are mechanical, electrical, chemical, and nuclear engineering, civil and mining engineering, chemistry, physics, biology, medicine, economics, and computer sciences. In other words, this book places unit conversion at the disposal of everyone. It saves working time, and should be available in all research libraries and design offices. It has been kept as small as possible in order to facilitate consultation in all circumstances, whether in the office, on the production line, or on the move.

The aim of this book is to ensure rapid and accurate conversion of scientific units to their SI equivalents. However, the reader should be aware that it does not provide rules and advice for writing the names, nor the recommended symbols for physical quantities used in science and technology. Several specialized works already exist for this purpose.[1]

This book is suitable for researchers, scientists, engineers and technologists, economists, doctors, pharmacists, and patent lawyers, but is equally suitable for teachers and students.

Encyclopaedia of Scientific Units, Weights and Measures is the product of many years spent collecting information spread across scientific and technical literature. Each item of information has been carefully checked and verified. Additionally, certain pieces of information have been extracted from books or standards for the most part published by national and international bodies (e.g. ISO, AFNOR, BSI, DIN, IEC, ANSI, NACE, NIST). Every effort has been made to supply conversion factors as precisely as possible to an accuracy of nine decimal places.

[1] Mills, I., Cvitas, T., Homann, K., Kallay, N. and Kuchitsu, K. (eds.), *Quantities, Units and Symbols in Physical Chemistry, 2nd ed.*, IUPAC, Blackwell Scientific Publications, Oxford, 1993.

F. Cardarelli, *Encyclopaedia of Scientific Units, Weights and Measures*

1.2 How to Use This Book

Chapter 2 contains a brief history of the metric system, including the organization and a complete description of SI Units (*Système International d'Unités*).

Chapter 3 gives a detailed description of a considerable number of other systems of measurement. This includes several alternative modern systems of measurement, some of which are still in widespread use (e.g. imperial, US, cgs, MTS, FPS). Finally, there is a description of systems used in antiquity (e.g. ancient Chinese, Indian, Egyptian, Persian, Hebrew, Greek, Roman, Arabic), as well as older national or regional systems (e.g. French, Italian, German, Japanese).

Chapter 4, which forms the most important part of the book, consists of an exhaustive set of conversion tables. This chapter covers the units in alphabetical order. Each unit is fully described as follows: name, symbol(s), physical quantity, dimension, conversion factor, notes and definitions. The section covers some 5000 units, each with a precise conversion factor.

Chapter 5 enables a unit to be identified from its area of application. For this purpose, units are classed in groups. It contains thirty five conversion tables ranging from mass to nuclear quantities.

In order to facilitate use of this manual, several supplementary sections have been added to aid the researcher. These include tables of fundamental mathematical and physical constants to allow very precise calculation of conversions. These form the sixth chapter of the book.

Appendices contain a list of many national and international bodies in the area of standardization, rules of nomenclature for large numbers, notation for times and dates, and a brief French-English glossary of names of units and associated physical quantities.

Finally, a detailed bibliography (e.g. national and international standards, textbooks, specialized engineering handbooks) is presented at the end of the book in order to allow the reader to go further in their investigations.

This practical manual provides rapid answers to all questions concerning the conversion of scientific units. Some examples of the sort of questions that can be answered more rapidly thanks to this manual, along with the chapters where their answers can be found, are given below:

- What is the history of SI units? (2)
- What are the base units of the SI? (2)
- What were the ancient systems of measurement? (3)
- How is the imperial system organized? (3)
- What is a kip? (4)
- Which unit has the abbreviation pcu? (4)
- What are the dimensions of the röntgen? (4)
- What is the conversion factor from spats to steradians? (4)
- What is the conversion factor from density in $lb.ft^{-3}$ to $kg.dm^{-3}$? (4)
- What are the different kinds of units of pressure and stress? (4)
- What is the exact value of the velocity of light in vacuum? (5)
- What are the old symbols for imperial units? (6)
- What are the addresses of standards bodies in the US? (6)
- What are the ISO and AFNOR standards for quantities in nuclear physics? (7)

2 The International System of Units

2.1 History

The origin of the metric system, and of its later version, the International System (*Système International*, SI) of units, goes back a long way into French history. Before that, the old French measures had presented two serious problems:

- units with the same name varied from one region to the next and had to be defined accordingly (e.g., pied de Paris)
- subdivisions were not decimal, which increased the complexity of commercial transactions

As early as 1670, the Abbé Gabriel Mouton proposed one thousandth of a minute of arc (or 1/1000) at the meridian as a rational standard of length. This represents a length of about 1.856 m. He gave this unit the name *milliare*, from the Latin for one thousand, and divided it decimally into three multiple units, named respectively *centuria*, *decuria*, and *virga*, and three submultiples *decima*, *centessima*, and *millesima*. Unfortunately, however, the Abbé died before seeing his ideas adopted.

Over the years, the English mathematician and architect Sir Christopher Wren (1667), the French astronomer Abbé Jean Picard (1671), the Dutch scientist Christiaan Huygens (1673), and the French geodesist Charles Marie de la Condamine (1746) proposed the length of the seconds pendulum as a unit of length. Finally, in 1789, there came a general call for the use of the same measures throughout France.

Soon afterwards, on March 9th, 1790, at the instigation of Charles Maurice de Talleyrand, Bishop of Autun and National Assembly Deputy, the *Constituante*[2] initiated a unification project for weights and measures. The project was adopted on May 8th, 1790, and the Academy of Sciences was given the task of studying the matter. A commission of French mathematicians was made responsible for establishing the base unit; its members were Count Louis de Lagrange, Gaspard Monge, Charles de Borda, and Marie Jean Antoine de Condorcet, plus the astronomer the Marquis Pierre Simon de Laplace. On March 19th, 1791, this commission decided on a unit of length equal to one ten millionth of the distance between the equator and the pole. This unit was called the *mètre*, from the Greek word, *metron*, for measure, and it is of course the origin of the name to the system itself.

In 1795, according to the text of the organic law of 18 Germinal year III (in terms of the revolutionary calendar then in force – equivalent to April 7th, 1795), the Système Métrique

[2] Name of the French Revolutionary Assembly from July 9th, 1789 until September 30th, 1791.

F. Cardarelli, *Encyclopaedia of Scientific Units, Weights and Measures*

Décimal was instituted in France. This decimal metric system established a new set of units, the **are** (Latin *area*) for area, the **litre** (Greek *litra*, a 12-ounce weight) for volume, and for mass the **gram** (Greek *gramma*, the weight of a pea).

In 1795, Jean-Baptiste Delambre and Pierre Méchain, who had spent almost seven years measuring the geodetic distances between Rodez and Barcelona, and Rodez and Dunkerque, respectively, determined the length of the quarter meridian through Paris. The law established the length of the metre at 0.513074 *toises de Paris*, and prototype standards of dense pure platinum for the metre and kilogram, made by Jeannetty from agglomerated platinum sponge, were adopted in June 1799. It is easy to imagine that the substitution of these new metric measures for the old units in use until then was not achieved without a lot of problems and objections.

In 1812, the former units were re-established by the Emperor Napoleon. However, metric units were reinstated by the Law of July 4th, 1837 which declared the Decimal Metric System obligatory in France from January 1840, and instituted penalties for the use of other weights and measures.

After that, the system slowly extended its application beyond the borders of France, and even became legal, though not compulsory, in the United States in 1866. However, the main launching pad for its internationalization was the meeting of the *Commission Internationale du Mètre* (International Metric Commission) in Paris on August 8th–13th, 1872. The treaty known as the *Convention du Mètre* (International Metric Convention) was signed on May 20th, 1875 by an assembly of representatives of 17 countries including the USA. It established the *Conférence Générale des Poids et Mesures* (General Conference on Weights and Measures, CGPM), and the *Bureau International des Poids et Mesures* (International Bureau of Weights and Measures, BIPM). The headquarters of the International Bureau, which is maintained by all the national members, was established at the Pavillon de Breteuil, at Sèvres, near Paris, in consideration of the role of France as the birthplace of the metric system. The first General Conference on Weights and Measures (1st CGPM), held in 1889, organized the distribution of copies of the international standard prototype metre to the 21 member states of the International Metric Convention. The copies of the new standard prototype called *mètre international* were built from platinum-iridium alloy (Pt90-Ir10) which is an outcome of the work of Sainte-Claire Deville et al.[3,4] The secondary standards were a typical bar with X cross-section having a side of 2 cm.

A summary of definitions of the metre is given in ***Table 2-1.***

The *Système International d'Unités* (SI) is the ultimate development of the metric system. Previous versions included the cgs (centimetre-gram-second), the MTS (metre-tonne-second), the MKS (metre-kilogram-force-second), and the MKSA (metre-kilogram-second-ampere) or Giorgi systems.

In 1954, the 10th CGPM adopted a set of base units for the following physical quantities: length, mass, time, electric current, thermodynamic temperature, and luminous intensity. The 11th CGPM, in 1960, by its Resolution 2, adopted the name Système International d'Unités, to be known by its international abbreviation SI. This system established rules for prefixes, for derived units, for supplementary units, as well as an overall control of units of measurement. Since then, the SI has evolved and developed via the various CGPMs.

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[3] Sainte-Claire Deville, H., Broch et Stas, De la règle en forme de X en platine iridié pur à 10 pour cent d'iridium. *Ann. Chim. Phys.*, **22** (1881) 120–144.

[4] Sainte-Claire Deville, H., et Mascart, E., *Ann. École Normale*, **8** (1879) 9.

Table 2-1 Chronology of definitions of the metre since 1795

Standard	Original definition (in French)	Date	Absolute error	Relative error
1/10 000 000 part of the Meridian quarter (measured by Delambre and Méchain)	On appellera mètre la mesure de longueur égale à la dix-millionième partie de l'arc de méridien terrestre compris entre le pôle boréal et l'équateur	April 7th, 1795	0.5–0.1 mm	10^{-4}
First prototype called Mètre des Archives (agglomerated Pt sponge made by Jeannetty)	Le mètre et le kilogramme en platine déposés le 4 Messidor dernier au Corps législatif par l'Institut national des sciences et des arts sont les étalons définitifs des mesures de longueur et de poids dans toute la République	June 22nd 1799	0.05–0.01 mm	10^{-5}
International standard (dense Pt ingot made by Sainte-Claire Deville, Debray, Broch and Stas)	Les 18 Etats signataires de la Convention du mètre . . . sanctionnent à l'unanimité . . . le Prototype du mètre choisi par le Comité international; ce prototype représentera désormais, à la température de la glace fondante, l'unité métrique de longueur.	September 26th, 1889	0.2–0.1 μm	10^{-7}
	L'unité de longueur le mètre, défini par la distance à 0°C, des axes des deux traits médians tracés sur la barre de platine iridié déposée au BIPM, et déclarée Prototype du mètre par la 1ère CGPM, cette règle étant soumise à la pression atmosphérique normale et supportée par deux rouleaux d'au moins un centimètre de diamètre, situés symétriquement dans un même plan horizontal et à la distance de 571 mm l'un de l'autre [7ème CGPM (1927)]	September 30th, 1927	n.a.	n.a.
Hyperfine atomic transition in krypton 86	Le mètre est la longueur égale à 1 650 763.73 longueurs d'onde dans le vide de la radiation correspondante à la transition entre les niveaux $2p^{10}$ et $5d^5$ de l'atome de krypton 86 [11ème CGPM (1960)]	October 14th, 1960	0.01–0.005 μm	10^{-8}
Velocity of light *in vacuo*	Le mètre est la longueur du trajet parcouru dans le vide par la lumière pendant une durée de 1/299 792 458 de seconde [17ème CGPM (1983), Résolution 1]	October 20th, 1983	0.1 nm?	10^{-10}

Data from Giacomo, P., Du platine à la lumière, *Bull. Bur. Nat. Metrologie*, **102** (1995) 5–14.

In France, the SI became mandatory in 1961[5]. The 14th CGPM, in 1972, defined a new unit, the **mole**, for amount of substance, to be adopted as the seventh SI base unit. Figure 2-1 charts the advance of metric usage throughout the world. Table 2-2 gives the dates of adoption and compulsory implementation for individual countries.

The SI possesses several advantages. First, it is both metric and decimal. Second, fractions have been eliminated, multiples and submultiples being indicated by a system of standard prefixes, thus greatly simplifying calculations. Each physical quantity is expressed by one unique unit, and derived SI units are defined by simple equations relating two or more base units. Some derived units have been given individual names. In the interests of clarity, SI provides a direct relationship between mechanical, electrical, nuclear, chemical, thermodynamic, and optical units, thus forming a coherent system. There is no duplication of units for the same physical quantity, and all derived units are obtained by direct one-to-one relationships between base or other derived units. The same system of units can be used by researchers, engineers, or technologists.

2.2 The General Conference on Weights and Measures

The General Conference on Weights and Measures (CGPM) is an international organization made up of the delegates of all member states. In October 1985, the number of member states was 47. The remit of this organization is to take all necessary measures to ensure the propagation and the development of the SI, and to adopt various international scientific resolutions relative to new and fundamental developments in metrology.

Under the authority of the CGPM, the International Committee for Weights and Measures (CIPM) is responsible for the establishment and control of units of measurement. A permanent organization, the International Bureau of Weights and Measures (BIPM) created by the Metric Convention and signed by the 17 nations in Paris in 1875, operates under the supervision of the CIPM. The BIPM, which is located at the Pavillon of Breteuil[6], in the Saint-Cloud Park at Sèvres, has the remit of ensuring unification of measurements throughout the world, specifically:

- to establish fundamental standards and scales of the main physical quantities, and to preserve international prototypes
- to carry out comparisons of national and international standards
- to ensure co-ordination of appropriate measurement techniques
- to carry out and co-ordinate determination of physical constants involved in the above activities

A timetable of the major decisions of the CGPM is given in Table 2-3.

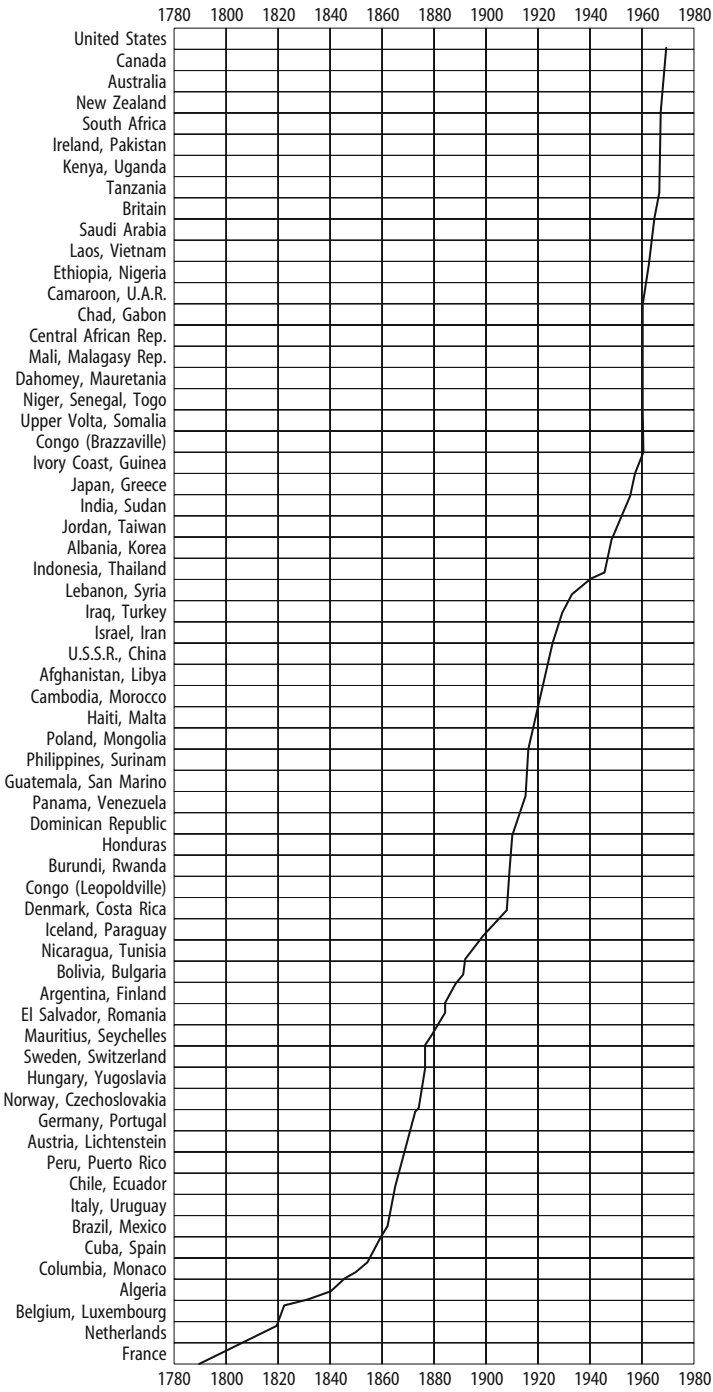
[5] Subsequent to the statutory order no. 61-501 of May 3rd, 1961, which appeared in the *Journal Officiel de la République Française* of May 20th, 1961 (Lois et Décrets, Ministère de l'Industrie, pp 4584–4593).
[6] Le Pavillon de Breteuil at Sèvres is an enclave which has international status.

Table 2-2 Adoption and compulsory implementation dates for the metric system

Acores 1852
Afghanistan 1926
Albany 1951
Algeria 1843
Angola 1905 (1910)
Argentina 1863 (1887)
Australia 1961 ; 1970
Austria 1871 (1876)
Bahrein (1969)
Barbados 1973
Belgium 1816 (1820)
Benin 1884–91
Bermuda 1971
Bolivia 1868 (1871)
Botswana 1969–70 (1973)
Brazil 1862 (1874)
Brunei (1986–91)
Bulgaria 1888 (1892)
Burkina 1884–1907
Cambodia 1914
Cameroun 1894
Canada 1871 (1976)
Cap-Vert 1891
Central African (Rep.) 1884–1907
Chile 1848 (1865)
China 1929 (1930)
Colombia 1853 (1854)
Comores 1914
Congo 1884–1907 (1910)
Costa Rica 1881 (1912)
Cuba 1882 (1960)
Cyprus 1972–74
Czech Republic 1871 (1876)
Denmark 1907 (1912)
Djibouti 1898
Dominican (Rep.) 1849 (1942–55)
Dutch Antilles 1875 (1876)
Ecuador 1865–71
Egypt 1939 (1951–61)
El Salvador 1910 (1912)
Ethiopia 1963
Fiji 1972
Finland 1886 (1892)
France 1795 (1840) (Guadalupe 1844) (French Guyana 1840) (Martinique 1844) Réunion 1839) (New Caledonia 1862) (Polynesia 1847) (St-Pierre-et-Miquelon 1824–39)
Gabon 1884–1907
Gambia 1979
Germany 1871 (1872)
Ghana 1972 (1975)
Gibraltar 1970
Greece 1836 (1959)
Guatemala 1910 (1912)
Guinea 1901–06
Guinea-Bissau 1905 (1910)
Guyana 1971
Haiti 1920 (1922)
Honduras 1910 (1912)
Hungary 1874 (1876)
Iceland 1907
India 1920 (1956)
Indonesia 1923 (1938)
Iran 1933 (1935–49)
Iraq 1931; 1960
Ireland 1897 (1968–69)
Israel 1947 (1954)
Italy 1861 (1863)
Ivory Coast 1884–90
Jamaica 1973
Japan 1893; 1951 (1959–66)
Jordan 1953 (1954)
Kenya 1951; 1967–68
Korea (South) 1949
Korea (Dem Rep of) 1947
Kuwait 1961 (1964)
Lebanon 1935
Lesotho 1970
Libya 1927
Liechtenstein 1875 (1876)
Luxemburg 1816 (1820)
Macao 1957
Madagascar 1897
Madeira 1852
Malawi 1979
Malaysia 1971–72
Mali 1884–1907
Malta 1910 (1921)
Mauritania 1884–1907
Mauritius 1876 (1878)
Mexico 1857 (1896)
Monaco 1854
Morocco 1923
Mozambique 1905 (1910)
Namibia 1967
Nauru 1973–80
Nepal 1963 (1966–71)
New Zealand 1925 (1969)
Nicaragua 1910 (1912)
Niger 1884–1907
Nigeria 1971–73
Norway 1875 (1882)
Pakistan 1967–72
Panama 1916
Papua-New Guinea 1970
Paraguay 1899
Netherlands 1816 (1832)
Peru 1862 (1869)
Philippines 1906 (1973–75)
Poland 1919
Portugal 1852 (1872)
Puerto Rico 1849
Romania 1864 (1884)
Russia 1899; 1918 (1927)
San-Marino 1907
Saudi Arabia 1962 (1964)
Salvador 1910 (1912)
Senegal 1840
Seychelles 1880
Singapore 1968–70
Slovakia 1871 (1876)
Solomon (British Islands) 1970
Somalia 1950 (1972)
South Africa 1922; 1967 (1974)
Spain 1849 (1871)
Sri Lanka 1970 (1974)
Sudan 1955
Surinam 1871 (1916)
Swaziland 1969 (1973)
Sweden 1878 (1889)
Switzerland 1868 (1877)
Syria 1935
Taiwan 1954
Tanzania 1967–69
Tchad 1884–1907
Thailand 1923 (1936)
Timor 1957
Togo 1924
Tonga Islands 1975
Trinidad and Tobago 1970–71
Tunisia 1895
Turkey 1869; 1931 (1933)
Uganda 1950 (1967–69)
United Kingdom 1897 (1995)
United States of America 1866
Uruguay 1862 (1894)
Venezuela 1857 (1912–14)
Vietnam 1911 (1950)
Yugoslavia 1873 (1883)
Zambia 1937 (1970)
Zimbabwe 1969

Important note: In 2002, the remaining non-metric countries are the USA, Myanmar (ex-Burma), and Sierra Leone.

Figure 2.1 Advance of metric usage throughout the world. (© U.S. Metric Association, Inc.)



Note: To the best of our knowledge the dates shown are accurate. Information in the graph is based upon certain indicators which gauge metric usage or upon official government policy regarding usage.

Table 2-3 Timetable of the major decisions of the CGPM

CGPM	Date	Decisions
1st CGPM	1889	Sanction of the international prototypes of the *metre* and the *kilogram*
3rd CGPM	1901	Declaration concerning the definition of the *litre* as the volume occupied by 1 kg of pure water at the temperature of its maximum density (abroged in 1964). Declaration of the *kilogram* as the unit of mass. The weight was defined as a quantity with the dimension of a force. Adoption of the con ventional value of *standard acceleration due to gravity*, i.e., $g_n = 980.665$ cm.s^{-2} (E)
7th CGPM	1927	Definition of the metre by the international Prototype. Definitions of photometric units: the *new candle*, and *new lumen*. Definitions of mechanical units which enter the definitions of electrical units: *joule*, *watt*. Definitions of electric units: *ampere*, *volt*, *ohm*, *coulomb*, *farad*, *henry*, and *weber* (CIPM, 1946).
9th CGPM	1948	Replacement of the melting point of ice by the triple point of water for thermometric reference. Thermodynamic scale with a single fixed point. Adoption of the *joule* as unit of quantity of heat. Adoption of degree Celsius to denote the degree of temperature.
10th CGPM	1954	Definition of the thermodynamic temperature scale by choosing the triple point of water as the fundamental fixed point. Definition of the standard atmosphere: 101 325 N/m^2. Adoption of six base units of the future SI: *metre*, *kilogram*, *second*, *ampere*, *kelvin,* and *candela.* Definition of the unit of time (CIPM, 1956).
11th CGPM	1960	New definitions of the *metre*, and of the second. Adoption of the *Système International d'unités* with the acronym SI. The *litre* is exactly defined as one cubic decimetre (CIPM, 1961).
12th CGPM	1964	Atomic standard of frequency. Standardization of the *curie* to exactly 3.7×10^{10} s^{-1}. Introduction of new SI prefixes *femto* and *atto*.
13th CGPM	1967-68	New definition for the *second*, the *kelvin*, and the *candela*. Abrogation of obsolete units: *micron*, and *new candle*. Multiples and submultiples of the unit of mass (CIPM, 1967). Rules of application of the SI (CIPM, 1969).
14th CGPM	1971	Definition of the SI unit of the amount of a substance: *mole*, and adoption of two new SI derived units: the *pascal* and the *siemens*, International atomic time (TAI).
15th CGPM	1975	Recommended values for the velocity of light in vacuum, and new names and units for ionizing radiation quantities: *becquerel*; *gray*, and two new SI prefixes *peta* and *exa*. Universal coordinated time (UTC).
16th CGPM	1979	New definition of the *candela*. Special name for the SI derived unit of the dose equivalent: *sievert*. The symbol L for *litre* in addition to the lower case letter l. Introduction of two supplementary units: *radian* and *steradian* (CIPM, 1980).
17th CGPM	1983	New definition of the metre as unit of length based on the velocity of light in vacuum. New SI prefixes: *zetta*, *zepto*, *yotta*, and *yocto* (CIPM, 1990).
20th CGPM	1995	Abrogation of the two supplementary units. Hence radian and steradian are now considered as SI derived units with special names.
21st CGPM	1999	Adoption of a new SI derived unit of enzymatic activity: the katal.

2.3 Organization of the SI

The International System of Units (*Système International d'Unités*, SI) consists of three classes of units:

- seven base units
- two supplementary units
- a number of derived units

In total, they form a coherent system of units officially known as **SI units**. Those units which do not form part of this system are known as **out-of-system units**.

It is recommended that only SI units should be used in scientific and technological applications, with SI prefixes where appropriate. The use of some out-of-system units (e.g. nautical mile, hectare, litre, hour, ampere-hour, bar) remains legal and they are temporarily retained because of their importance or their usefulness in certain specialized fields. Nevertheless, they should always be defined in terms of SI units, and SI units should be used wherever possible in order to maintain coherence in calculations.

2.3.1 SI Base Units

The seven SI base units are listed in ***Table 2-4*** below:

Table 2-4 The seven SI base units

Physical quantity	Dimension	Name	Symbol
Mass	M	kilogram	kg
Length	L	metre	m
Time	T	second	s
Temperature	Θ	kelvin	K
Amount of substance	N	mole	mol
Electric current intensity	I	ampere	A
Luminous intensity	J	candela	cd

These seven SI base units are officially and bilingually (French-English) defined as follows:

mètre Le mètre est la longueur du trajet parcouru dans le vide par la lumière pendant une durée de 1/299 792 458 s. [17ème CGPM (1983), Résolution 1].
The metre is the length of the path travelled by light in vacuum during a time interval of 1/299 792 458 s. [17th CGPM (1983), Resolution 1].

kilogramme Le kilogramme est l'unité de masse; il est égal à la masse du prototype international du kilogramme [1ère CGPM (1889), 3ème CGPM (1901)].
The kilogram is the unit of mass; it is equal to the mass of the international prototype of the kilogram [1st CGPM (1889), 3rd CGPM (1901)].

seconde

La seconde est la durée de 9 192 631 770 périodes de la radiation correspondant à la transition entre les deux niveaux hyperfins ($F = 4$, $m_F = 0$ à $F = 3$, $m_F = 0$) de l'état fondamental de l'atome de césium 133 [$13^{ème}$ CGPM (1967)].
The second is the duration of 9 192 631 770 periods of the radiation corresponding to the transition between the two hyperfine levels ($F = 4$, $m_F = 0$ to $F = 3$, $m_F = 0$) of the ground state of the cesium 133 atom [13th CGPM (1967)].

ampère

L'ampère est l'intensité d'un courant électrique constant qui maintenu dans deux conducteurs parallèles, rectilignes, de longueur infinie, de section circulaire négligeable et placés à une distance de 1 mètre l'un de l'autre dans le vide, produit entre ces conducteurs une force égale à 2×10^{-7} newton par mètre de longueur [$9^{ème}$ CGPM (1948), Résolution 2 et 7].
The ampere is that constant current which, if maintained in two straight parallel conductors of infinite length, of negligible circular cross-section, and placed 1 metre apart in vacuum, would produce between these conductors a force equal to 2×10^{-7} newton per metre of length [9th CGPM (1948), Resolution 2 and 7].

kelvin

Le kelvin, unité de température thermodynamique, est la fraction 1/273,16 de la température thermodynamique du point triple de l'eau [$13^{ème}$ CGPM (1967), Résolution 4].
The kelvin, unit of thermodynamic temperature, is the fraction 1/273.16 of the thermodynamic temperature of the triple point of water [13th CGPM (1967), Resolution 4].

mole

(i) La mole représente la quantité de matière totale d'un système qui contient autant d'entités élémentaires que 0,012 kg de carbone 12.
(ii) Lorsque l'on emploie la mole, les entités élémentaires doivent être spécifiées et pêuvent être des atomes, des ions, des électrons, d'autres particules ou des groupements spécifiés de telles particules [$14^{ème}$ CGPM (1971), Résolution 3]. Dans cette définition, il est sous-entendu que les atomes de carbone 12 sont libres, au repos et dans leur état fondamental.
(i) The mole is the amount of substance of a system which contains as many elementary entities as there are atoms in 0.012 kg of carbon 12.
(ii) When the mole is used, the elementary entities must be specified and may be atoms, molecules, ions, electrons, other particules, or specified groups of such particles [14th CGPM (1971), Resolution 3]. In this definition, it is understood that the carbon 12 atoms are unbound, at rest and in their ground state.

candela La candela est l'intensité lumineuse, dans une direction donnée, d'une source qui émet un rayonnement monochromatique de fréquence 540×10^{12} Hz et dont l'intensité énergétique dans cette direction est de 1/683 watt par stéradian. [16ème CGPM (1979), Résolution 3].
The candela is the luminous intensity, in a given direction, of a source that emits monochromatic radiation of frequency 540×10^{12} Hz and that has a radiant intensity in that direction of 1/683 watt per steradian [16th CGPM (1979), Resolution 3].

2.3.2 SI Supplementary Units

In addition to the seven base units, the SI has two supplementary units, the **radian** for plane angle and the **steradian** for solid angle (see ***Table 2-5***). These two units are dimensionless (i.e. in a dimension equation they have the value unity). However, for clarity, they are sometimes included in dimensional equations using an arbitrary dimensional symbol, for example the Greek letter α or a Roman capital 'A' for plane angle, and the Greek capital Ω for solid angle. Equally, because of the non-official nature of this notation, it is possible to omit these symbols from a dimensional equation in cases where this does not cause ambiguity.

As an example, the expression for angular velocity could be equally well be written as either $[\alpha.T^{-1}]$ or $[T^{-1}]$.

However, for physical quantities in specialist areas such as particle transfer in stastistical physics or luminous transfer in photometry, it is usual to include solid angle in dimensional equations in order to avoid confusion.

Example: depending on whether the area of photometric work involves measurement of energy, visible light, or particle emissions, luminous intensity can be defined in three ways (see ***Table 2-6***). It is clear that confusion can be avoided by introduction of a symbol for the steradian in the dimensional equation.

Note: since Resolution 8 from the 20th CGPM (Oct. 1995) the radian and the steradian are defined as common dimensionless SI derived units.

Table 2-5 The two supplementary SI units

Physical quantity	Dimension	Name	Symbol
Plane angle	α	radian	rad
Solid angle	Ω	steradian	sr

Table 2-6 Comparison of dimension equation for several quantities in photometry with and without symbol of solid angle

Photometry	Quantity	Dimensions		SI unit
		without symbol	with symbol	
Energy	Radiant intensity	$[E.T^{-1}]$	$[E.T^{-1}.\Omega^{-1}]$	$W.sr^{-1}$
Visible	Luminous intensity	[J]	[J]	cd
Particle	Photon intensity	$[T^{-1}]$	$[T^{-1}.\Omega^{-1}]$	$s^{-1}.sr^{-1}$

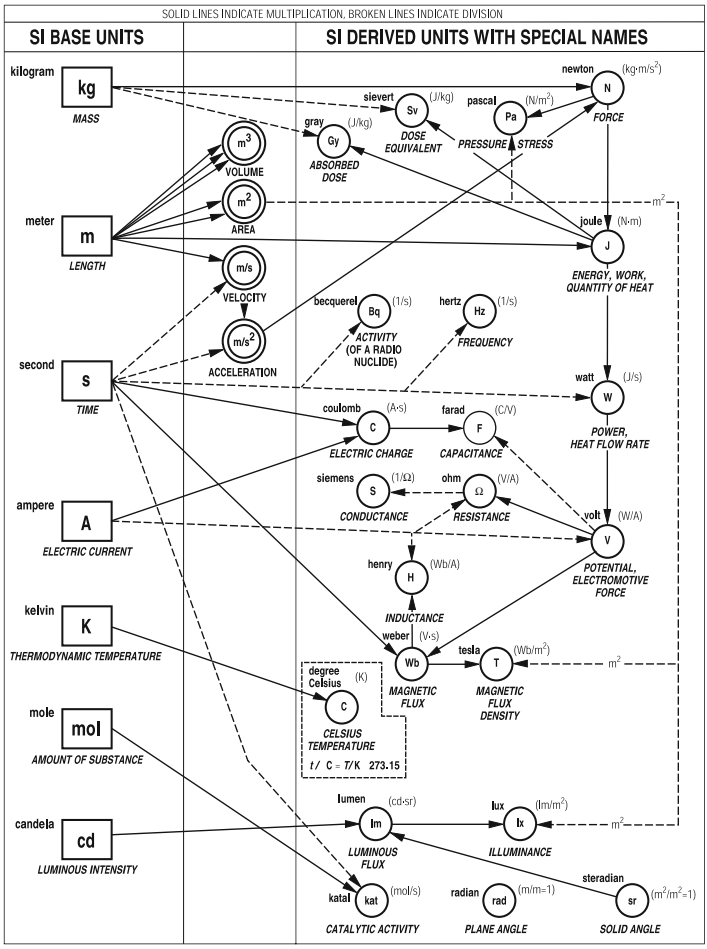
2.3.3 SI Derived Units

The SI derived units are defined by simple equations relating two or more base units. The names and symbols of some derived units may be substituted by special names and symbols. The twenty (since the adoption of the katal) derived units with special names and symbols are listed in ***Table 2-7***. These derived units may themselves by used in combination to form further derived units.

Table 2-7 SI derived units with special names and symbols

Name	Symbol	Physical quantity	Dimension	Equivalent in SI base units
becquerel	Bq	radioactivity	T^{-1}	1 Bq = 1 s^{-1}
coulomb	C	quantity of electricity, electric charge	IT	1 C = 1 A.s
farad	F	electric capacitance	$M^{-1}L^{-2}T^4I^2$	1 F = 1 $kg^{-1}.m^{-2}.s^4.A^2$
gray	Gy	absorbed dose of radiation, kerma, specific energy imparted	L^2T^{-2}	1 Gy = 1 $m^2.s^{-2}$
henry	H	electric inductance	$ML^2T^{-2}I^{-2}$	1 H = 1 $kg.m^2.s^{-2}.A^{-2}$
hertz	Hz	frequency	T^{-1}	1 Hz = 1 s^{-1}
joule	J	energy, work, heat	ML^2T^{-2}	1 J = 1 $kg.m^2.s^{-2}$
katal	kt	enzymatic activity	NT^{-1}	1 kt = 1 $mol.s^{-1}$
lumen	lm	luminous flux	JΩ	1 lm = 1 cd.sr
lux	lx	illuminance	$J\Omega L^{-2}$	1 lx = 1 $cd.sr.m^{-2}$
newton	N	force, weight	MLT^{-2}	1 N = 1 $kg.m.s^{-2}$
ohm	Ω	electric resistance	$ML^2T^{-3}I^{-2}$	1 Ω = 1 $kg.m^2.s^{-3}.A^{-2}$
pascal	Pa	pressure, stress	$ML^{-1}T^{-2}$	1 Pa = 1 $kg.m^{-1}.s^{-2}$
poiseuille (pascal-second)	Po	absolute viscosity, dynamic viscosity	$ML^{-1}T^{-1}$	1 Po = 1 $kg.m^{-1}.s^{-1}$
siemens	S	electric conductance	$M^{-1}L^{-2}T^3I^2$	1 S = 1 $kg^{-1}.m^{-2}.s^3.A^2$
sievert	Sv	dose equivalent, dose equivalent index	L^2T^{-2}	1 Sv = 1 $m^2.s^{-2}$
tesla	T	induction field, magnetic flux density	$MT^{-2}I^{-1}$	1 T = 1 $kg.A^{-1}.s^{-2}$
volt	V	electric potential, electromotive force, potential difference	$ML^2T^{-3}I^{-1}$	1 V = 1 $kg.m^2.s^{-3}.A^{-1}$
watt	W	power, radiant flux	ML^2T^{-3}	1 W = 1 $kg.m^2.s^{-3}$
weber	Wb	induction magnetic flux	$ML^2T^{-2}I^{-1}$	1 Wb = 1 $kg.m^2.s^{-2}.A^{-1}$

Figure 2.2 Relationships of the SI derived units with special names and the SI base units (© NIST)



2.3.4 Non-SI and SI Units Used in Combination

For consistency and clarity, it is a general rule of SI that the use of non-SI units should be discontinued. However, there are some important instances where this is either impracticable or inadvisable. The SI therefore recognizes four categories of out-of-system units which may be used in combination with SI.

2.3.4.1 Commonly Used Legal Non-SI Units

The CIPM (1969) recognized that users of SI would wish to employ certain units that are important and widely used, but which do not properly fall within the SI. The special names and symbols for these units, and their definitions in terms of SI units, are listed in ***Table 2-8.***

2.3.4.2 Non-SI Units Defined by Experiment

This class incorporates units accepted for use, the values of which are obtained by experiment; they are listed in ***Table 2-9*** opposite. These are important units widely used for special problems, and were accepted by the CIPM (1969) for continuing use in parallel with SI units.

Table 2-8 Commonly used non-SI units

Name	Symbol	Physical quantity	Dimension	Equivalent in SI base units
ampere-hour	Ah	electric charge	IT	1 Ah = 3600 C
day	d	time, duration, period	T	1 d = 86 400 s
degree	°	plane angle	α	$1^\circ = \pi/180$ rad
dioptre	d	refractive power	L^{-1}	1 d = 1 m^{-1}
hour	h	time, duration, period	T	1 h = 3600 s
kilowatt-hour	kWh	energy, work, heat	ML^2T^{-2}	1 kWh = 3.6×10^6 J
litre	l, L	capacity, volume	L^3	1 L = 10^{-3} m^3
minute	min	time, duration, period	T	1 min = 60 s
minute of angle	′	plane angle	α	$1' = \pi/10\,800$ rad
second of angle	″	plane angle	α	$1'' = \pi/648\,000$ rad
tex	tex	linear mass density	ML^{-1}	1 tex = 10^{-6} kg.m^{-1}
tonne (metric)	t	mass	M	1 t = 10^3 kg

Table 2-9 Commonly used legal non-SI units defined by experiment

Name	Symbol	Physical quantity	Dimension	Equivalent in SI base units
electronvolt	eV	energy, work	ML^2T^{-2}	1 eV = $\frac{e}{C}$ J
faraday	F	molar electric charge	ITN^{-1}	1 F = eN_A C.mol^{-1}
unified atomic mass unit	u, u.m.a.	mass	M	1 u = $\frac{m_{^{12}C}}{12}$ kg

2.3.4.3 Non-SI Units Temporarily Maintained

In view of existing practice, the CIPM (1978) considered it acceptable to retain for the time being a third class of non-SI units for use with those of SI. These temporarily-maintained units are listed in ***Table 2-10***. The use of any and all of these units may be abandoned at some time in the future. They should not therefore be introduced where they are not already in current use.

2.3.4.4 Non-SI Units Which Must Be Discontinued

These units, listed in ***Table 2-11***, are to be avoided in favour of an appropriate SI unit or decimal multiples using the common SI prefixes listed in ***Table 2-11.***

2.4 SI Prefixes

The SI is a decimal system of units. Fractions have been eliminated, multiples and sub-multiples being formed using a series of prefixes ranging from yotta (10^{24}) to yocto (10^{-24}). The twenty SI prefixes that are to be used for multiples and sub-multiples of an SI unit are shown in ***Table 2-12***. Each prefix beyond $10^{\pm 3}$ represents a change in magnitude of 10^3 (power of 10 notation). Non-SI discontinued prefixes are shown in Table 2-13 (p. 17).

Table 2-10 Temporarily-maintained non-SI units

Name	Symbol	Physical quantity	Dimension	SI base units
ångström	Å	length	L	1 Å = 10^{-10} m
are	a	surface, area	L^2	1 a = 10^2 m^2
bar	bar	pressure	$ML^{-1}T^{-2}$	1 bar = 10^5 Pa
barn	b	surface, area	L^2	1 b = 10^{-28} m^2
curie	Ci	radioactivity	T^{-1}	1 Ci = 3.7×10^{10} Bq
gal	Gal	acceleration	LT^{-2}	1 Gal = 10^{-2} $m.s^{-2}$
hectare	ha	surface, area	L^2	1 ha = 10^4 m^2
hogshead (tonneau de jauge)	–	capacity, volume	L^3	1 tonneau = 2.83 m^3
nautical mile	naut. mi	length	L	1 naut. mi = 1852 m
noeud, knot	kn	linear velocity	LT^{-1}	1 knot = 1852/3600 = 5.14444×10^{-1} $m.s^{-1}$
rad	rad	absorbed dose of radiation, kerma	L^2T^{-2}	1 rad = 10^{-2} Gy
rem	rem	dose equivalent, dose equivalent index	L^2T^{-2}	1 rem = 10^{-2} Sv
röntgen	R	exposure	$M^{-1}TI$	1 R = 2.58×10^{-4} $C.kg^{-1}$

Table 2-11 Non-SI units to be discontinued

Name	Symbol	Physical quantity	Dimension	SI base units
calorie (15°C)	$cal_{15°C}$	energy, heat	ML^2T^{-2}	1 $cal_{15°C}$ = 4.1855 J
calorie (IT)	cal_{IT}	energy, heat	ML^2T^{-2}	1 cal_{IT} = 4.1868 J
calorie (therm.)	cal_{th}	energy, heat	ML^2T^{-2}	1 cal_{th} = 4.1840 J
carat (metric)	ct	mass	M	1 ct = 2×10^{-4} kg
fermi	F	length	L	1 F = 10^{-15} m
gamma (induction)	γ	magnetic induction	$MT^{-2}I^{-1}$	1 γ = 10^{-9} T
gamma (mass)	γ	mass	M	1 γ = 10^{-9} kg
grade (gon)	gr, ^{g}	plane angle	α	1 gon = π/200 rad
kilogram-force	kgf	force	MLT^{-2}	1 kgf = 9.80665 N
lambda	λ	capacity, volume	L^3	1 λ = 10^{-9} m^3
micron	μ	length	L	1 μ = 10^{-6} m
revolution	rev	plane angle	α	1 rev = 2π rad
revolutions per minute	rpm	angular velocity	αT^{-1}	1 rpm = π/30 $rad.s^{-1}$
standard atmosphere	atm	pressure	$ML^{-1}T^{-2}$	1 atm = 101 325 Pa
stère	st	capacity, volume	L^3	1 st = 1 m^3
torr	torr	pressure	$ML^{-1}T^{-2}$	1 torr = (101 325/760) Pa
X-unit	XU	length	L	1 XU = 1.0023×10^{-13} m

Important Note: in Computer Science, the prefixes kilo, mega, and giga are commonly used, although in that context they are only approximations to powers of 10. These multiples of the byte are not equal to the SI prefixes because they are equal to the power of two according to the binary digit numeration. In order to avoid confusion, it is therefore recommended that in this context they are expressed with an initial capital as shown in ***Table 2-13***.

Table 2-12 The twenty SI prefixes

SI prefixes: multiples and submultiples					
Multiple			**Submultiple**		
Prefix (Etymology)	Symbol	Multiply by	Prefix (Etymology)	Symbol	Multiply by
yotta	Y	10^{24}	deci (Latin *decimus* tenth)	d	10^{-1}
zetta	Z	10^{21}	centi (Latin *centum* hundredth)	c	10^{-2}
exa	E	10^{18}	milli (Latin *milli* thousandth	m	10^{-3}
peta	P	10^{15}	micro (Greek *μικρος* small)	μ	10^{-6}
tera (Greek *τεραζ* monster)	T	10^{12}	nano (Greek *νανος* dwarf)	n	10^{-9}
giga (Greek *γιγαζ* giant)	G	10^{9}	pico (Italian *piccolo* small)	p	10^{-12}
mega (Greek *μεγαζ* big)	M	10^{6}	femto (Danish *femten* fifteen)	f	10^{-15}
kilo (Greek *κιλιοι* thousand)	k	10^{3}	atto (Danish *atten* eighteen)	a	10^{-18}
hecto (Greek *εκατον* hundred)	h	10^{2}	zepto	z	10^{-21}
deca (Greek *δεκα* ten)	da	10	yocto	y	10^{-24}

Table 2.13 Non-SI discontinued metric prefixes

Prefix	Symbol	Value
hebdo	H	10^{7}
lacta	L	10^{5}
myria	my	10^{4}
dimi	dm	10^{-4}
micri	mc	10^{-14}

Binary Prefixes: In computing, a custom arose of using the metric prefixes to specify powers of 2. For example, a kilobit is usually equal to $2^{10} = 1024$ bits instead of 1000 bits. This practice led, and still leads, to considerable confusion. In 1998, the *International Electrotechnical Commission* (IEC) approved new prefixes especially dedicated to the powers of 2. These binary prefixes are shown in Table 2-15. Therefore, the metric prefixes should be used in computing just as they are used in other fields. Thus, 5 gigabytes (denoted GB) should mean exactly 5×10^{9} bytes, while 5 gibibytes (denoted GiB) should mean exactly 5 368 709 120 bytes.

Table 2-14 Prefixes for computer science units

Name of unit (English, French)	Symbol	Conversion factor
Kilobyte, Kilooctet	KB, Ko	1 KB = 2^{10} = 1024 bytes
Megabyte, Mégaoctet	MB, Mo	1 MB = 2^{20} = 1 048 576 bytes
Gigabyte, Gigaoctet	GB, Go	1 GB = 2^{30} = 1 073 741 824 bytes

Table 2-15 New binary prefixes for power of two (IEC, 1998)

Name	Symbol	Equivalent
kibi-	Ki	2^{10} = 1 024
mebi-	Mi	2^{20} = 1 048 576
gibi-	Gi	2^{30} = 1 073 741 824
tebi-	Ti	2^{40} = 1 099 511 627 776
pebi-	Pi	2^{50} = 1 125 899 906 842 624
exbi-	Ei	2^{60} = 1 152 921 504 606 846 976

Prefixes and symbols should be printed in roman (upright) type with no space between the prefix and the unit symbol.

Example: 1 millimetre = 1 mm = 10^{-3} m (not m/m or m m)

When a prefix symbol is used with a unit symbol, the combination should be considered as a single new symbol that can be raised to a positive or negative power of 10 without using brackets.

Example: 1 $cm^3 = (10^{-2}\ m)^3 = 10^{-6}\ m^3$ (not $\mu(m^3)$ or $10^{-2}\ m^3$)

Prefixes are not to be combined into compound prefixes.

Example: 1 nm = 10^{-9} m (not mμm)
1 GW = 10^9 W (not MkW)
1 pF = 10^{-12} F (not μμF)

A prefix should never be used alone.

Example: 1 μm = 10^{-6} m (not μ)

Prefixes used with the kilogram (which already has the prefix kilo) are constructed by adding the appropriate prefix to the word gram and the symbol g.

Example: 1 Mg = 10^6 g (not kkg)

The prefixes apply to all standard and associated SI units with the exception of the following: h (hour), d (day), min (minute), rev (revolution), ° (degree), ′ (plane angle minute), and ″ (plane angle second).

If the name of the unit begins with a vowel, the prefix may be fused with it:

Example: 1 MΩ = one me**go**hm rather than megaohm

3 Other Systems of Units

Despite the internationalization of SI units, and the fact that other units are actually forbidden by law in France and other countries, there are still some older or parallel systems remaining in use in several areas of science and technology.

Before presenting conversion tables for them, it is important to put these systems into their initial context. A brief review of systems is given ranging from the ancient and obsolete (e.g. Egyptian, Greek, Roman, Old French) to the relatively modern and still in use (e.g. UK imperial, US customary, cgs, FPS), since a general knowledge of these systems can be useful in conversion calculations. Most of the ancient systems are now totally obsolete, and are included for general or historical interest.

3.1 MTS, MKpS, MKSA

3.1.1 The MKpS System

The former system of units referred to by the international abbreviations MKpS, MKfS, or MKS (derived from the French titles mètre-kilogramme-poids-seconde or mètre-kilogramme-force-seconde) was in fact entitled *Système des Mécaniciens* (Mechanical Engineers' System). It was based on three fundamental units, the **metre**, the **second**, and a weight unit, the **kilogram-force**. This had the basic fault of being dependent on the acceleration due to gravity *g*, which varies on different parts of the Earth, so that the unit could not be given a general definition. Furthermore, because of the lack of a unit of mass, it was difficult, if not impossible to draw a distinction between weight, or force, and mass (see also 3.4). In addition, the mechanical units were not self-consistent, as for example the unit of power, the horsepower, which is equal to 75 $kg.m.s^{-1}$. Finally, there were no links with magnetic, electrical, or thermodynamic units.

3.1.2 The MTS System

The French MTS system was based on the **metre**, the metric **tonne**, and the **second**, and was in fact the only legal system used in France between 1919 and 1961, when SI units were formally adopted. Several derived units with special names were based on these three fundamental units, for example the **sthene** (sn) for force or weight, and the **pieze** (pz) for pressure. Like the MKpS system, it had no links with electrical, magnetic, or thermodynamic units.

F. Cardarelli, *Encyclopaedia of Scientific Units, Weights and Measures*

3.1.3 The MKSA (Giorgi) System

In 1904, the Italian physicist Giovanni L.T. Giorgi proposed a system based on five fundamental units. It was adopted by the IEC during the period 1935–1950. The units of length was to be the **standard metre** maintained at Sèvres, the unit of mass the **standard kilogram**, the unit of time the **second**, plus two new base units, the **ampere** for electric current intensity, and **vacuum magnetic permeability** which was defined as $\mu_0 = 4\pi \times 10^{-7}$ H.m^{-1}. This linkage meant that all units in the system could be used in electromagnetic or electrostatic contexts. The introduction of the factor 4π in the expression for vacuum magnetic permeability meant that all units could be rationalized, i.e. a factor of 2π applied when a system had cylindrical symmetry, and of 4π if it had spherical symmetry.

The advantage – or, for some physicists, the disadvantage – of this system lay in the fact that it made a clear distinction between magnetic field strength H and magnetic flux density B, and similarly between electric field strength E and electric flux density D. This distinction results from the expression for vacuum permittivity and magnetic permeability which is not equal to unity as in the cgs system. The vector equations relating these four quantities are therefore:

$$\mathbf{B} = \mu\mathbf{H} = \mu_0\mu_r\mathbf{H}$$
$$\mathbf{D} = \varepsilon\mathbf{E} = \varepsilon_0\varepsilon_r\mathbf{E}$$

The Giorgi system only became common in electrical engineering from 1948. At that time, the 9th CGPM adopted the modern definition of the ampere. The MKSA system is thus the precursor of the SI, and, perhaps for this reason, there remains some confusion between the two systems among some scientists and engineers.

3.2 Cgs, Gauss, IEUS, a.u.

3.2.1 The cgs System

The cgs (centimetre-gram-second) system has as its three base units the **centimetre**, the **gram**, and the **second**. It was proposed in 1873 by the distinguished British scientists Lord Kelvin and James Clerk Maxwell, and the famous German electrical engineer Ernst Werner von Siemens. As a system, it was outstanding for its consistency and for its clear distinction between force and mass. There are also advantages in the use of equations in four basic dimensions, one of which is electrical, and two fundamental sub-systems came into existence. As a result, the General Assembly of the IUPAP in Copenhagen, 1951, approved via its Resolution 5 the introduction of the following generalized cgs subsystems:

- the *electrostatic cgs system* (centimetre, gram, second, and franklin)
- the *electromagnetic cgs system* (centimetre, gram second, and biot)

The system met with wide acceptance among scientists in many countries and was rapidly extended to every branch of physics. However, many of its units are too small for most scientific and engineering purposes.

Although the use of cgs units is officially discouraged since the introduction of the SI in 1960, practitioners in some fields of physics, such as electricity, magnetism, and optics, have continued to use unofficial derived units (e.g. dyne, erg, poise, stokes, gauss, oersted, maxwell, stilb, phot). The main reason for this is that these units are often of the same order of magnitude as the physical phenomena they define.

The major disadvantage of the cgs system is its inherent subdivision into three subsystems: electromagnetic units (emu or ab units), electrostatic units, (esu or stat units), and the system of practical units for common use. The complications introduced by interconversion of these sub-units were yet another reason for its eventual abandonment in favour of the MKSA system and ultimately the SI.

3.2.1.1 The esu Subsystem

In this cgs subsystem, the electrostatic force **F** between two point charges q_1 and q_2 separated by a distance r in a medium of permittivity ε is given by Coulomb's law, i.e. $\mathbf{F} = \frac{q_1 q_2}{\varepsilon r^2}\mathbf{e}_r$ if F, r, ε, are made equal to unity and $q_1 = q_2 = q$, q_1, and q_2 are unit electric charge. The cgs system of electrostatic units is based on this definition of electric charge. This is the **franklin** (Fr), the cgs unit of electric charge, which is formally defined as follows:

The **franklin** is that charge which exerts on an equal charge at a distance of one centimetre in vacuo a force of one dyne (1941).

All these units are prefixed with the separate acronym **esu** or an international or attached indicator **stat**.

Example: **stat**coulomb or **esu** coulomb (=1 Fr)

3.2.1.2 The emu Subsystem

As with the electrostatic units, the electromagnetic subsystem defines the electromagnetic force **F** between two hypothetical isolated point magnetic poles of strengths m_1 and m_2 separated by a distance r in a medium of magnetic permeability μ by Coulomb's Law for Magnetism, i.e. $\mathbf{F} = \frac{m_1 m_2}{\mu r^2}\mathbf{e}_r$, setting **F**, r, and m equal to unity, and $m_1 = m_2 = m$, m_1 equal to unity, and $m_1 = m_2 = m$, m_1 and m_2 are unit pole strengths. The cgs system of electromagnetic units is based on this definition of pole strength, analogous with the electrostatic system, and has the **biot** (Bi) as the cgs unit of magnetic pole strength, defined as follows:

The **biot** is that constant current which, if maintained in two straight parallel conductors of infinite length, of negligible circular cross-section, and placed one centimetre apart in vacuo, would produce between these conductors a force equal to two dynes per centimetre of length (1961).

All these units are prefixed with the separate acronym **emu**, or attached indicator **ab**.

Example: **ab**ampere or **emu** ampere (=1 Bi)

Important Notes:

(i) The emu and esu are interconnected by the fundamental equation $\varepsilon\mu c^2 = 1$ where c is the velocity of light in vacuum. Thus the ratio of any pair of emu-esu primary units is equal to c or its reciprocal.

$$\textit{Example:}\quad \frac{\text{abampere}}{\text{statampere}} = \frac{\text{statvolt}}{\text{abvolt}} = c$$

For esu or emu derived units, the ab/stat ratio is obtained by considering each of the primary units involved, thus:

$$\textit{Example:}\quad \frac{\text{abfarad}}{\text{statfarad}} = \frac{\text{abcoulomb}}{\text{abvolt}} = \frac{\text{statvolt}}{\text{statcoulomb}} = c^2$$

(ii) Since electromagnetic and electrostatic units vary so enormously, a third cgs subsystem was used for most practical purposes in electrical engineering. Clearly, however, this added considerable complication to its general structure.

(iii) The use of the cgs system in fields other than mechanics involves exact definition of the subsystem concerned, which again adds to the confusion and is a great source of error in conversion computations.

Exact conversion factors for different systems of units are given in ***Table 3-1*** (opposite).

3.2.2 The Gauss System

Gaussian units are a combination of the emu and esu subsystems. With three base units, it uses em units in magnetism and es units in electrostatics. This involves using the constant c (the velocity of light in vacuum) to interrelate these sets of units, resulting in complex and error-prone conversions.

Table 3-2 below gives the classes of units used for equivalent electromagnetic and electrostatic quantities. The equivalence between SI and cgs electromagnetic quantities is shown in ***Table 3-3***.

Table 3-2 Organization of Gaussian units

Electrostatic units (esu)	**Electromagnetic units (emu)**
electric charge Q (Fr)	magnetic mass m
electric current intensity I (Fr.s^{-1})	magnetic flux Φ (Γ.cm^2)
electric field strength **E** (dyne.Fr^{-1})	magnetic field strength **H** (Bi.cm^{-1})
electric displacement **D** (Fr.cm^{-2})	induction field **B** (dyn.Bi^{-1}.cm^{-1})
electric potential V (erg.Fr^{-1})	magnetic potential **A**
polarization **P**	magnetization **M**
electric dipole moment **p** (Fr.cm)	magnetic dipole moment **m** (erg.Γ^{-1})
electric susceptibility χ_e	magnetic susceptibility χ_m
polarizability α	magnetizability ξ

Table 3-1 Exact conversion factors between SI and CGS practical, emu and esu electric and magnetic units

Physical quantity and symbol(s)	Equation	Dimension	SI unit	Practical cgs	emu cgs	esu cgs
admittance (Y)	$Y = 1/Z = G + jB$	$M^{-1}L^{-2}T^{3}I^{2}$	1 S	= 1 mho	$= 10^{-9}$ abmho	$= 10^{-5}c^{2}$ statmho
capacitance (C)	$Q = CU$	$M^{-1}L^{-2}T^{4}I^{2}$	1 F	= 1 farad	$= 10^{-9}$ abfarad	$= 10^{-5}c^{2}$ statfarad
conductivity (s, k)	$G = \sigma A/l$	$M^{-1}L^{-3}T^{3}I^{2}$	1 $S.m^{-1}$	= 10^{-2} $mho.cm^{-1}$	$= 10^{-11}$ emu	$= 10^{-7}c^{2}$ esu
conductance (G)	$G = \sigma A/l$	$M^{-1}L^{-2}T^{3}I^{2}$	1 S	= 1 mho	$= 10^{-9}$ abmho	$= 10^{-5}c^{2}$ statmho
current density (j)	$dI = jdA$	IL^{-2}	1 $A.m^{-2}$	= 10^{-4} $A.cm^{-2}$	= 10^{-5} $Bi.cm^{-2}$	= $(c/1000)$ esu
current intensity (I, i)	$U = RI$	I	1 A	= 1 ampere	= 10^{-1} biot (Bi)	= $(10c)$ Fr/s
elastance (S)	$S = 1/C$	$ML^{2}T^{-4}I^{-2}$	1 F^{-1}	= 1 daraf	= 10^{9} emu	= $(10^{5}/c^{2})$ esu
electric charge (Q, q)	$Q = It$	IT	1 C	= 1 coulomb	= 10^{-1} Bi.s	= $(10c)$ franklin
electric dipole moment (p)	$p = Q \times r$	ITL	1 C.m	= 100 C.cm	= 10 Bi.cm	= 1000c Fr.cm
electric displacement (D)	$D = \varepsilon_0\varepsilon_r E$	ITL^{-2}	1 $C.m^{-2}$	= 10^{-4} $C.cm^{-2}$	= 10^{-5} $Bi.cm^{-2}$	= $(c/1000)$ esu
electric field strength (E)	$E = U/d$	$MLT^{-3}I^{-1}$	1 $V.m^{-1}$	= 10^{-2} $V.cm^{-1}$	= 10^{6} emu	= $(10^{4}/c)$ esu
electric potential (U, V)	$U = (Q/4\pi\varepsilon_0\varepsilon_r r^{2})$	$ML^{2}T^{-3}I^{-1}$	1 V	= 1 volt	= 10^{8} abvolt	= $(10^{6}/c)$ statvolt
electromotive force (*e.m.f.*, e)	$e.m.f = U_a - U_c$	$ML^{2}T^{-3}I^{-1}$	1 V	= 1 volt	= 10^{8} abvolt	= $(10^{6}/c)$ statvolt
energy (W)	$dW = UdQ$	$ML^{2}T^{-2}$	1 J	= 10^{7} erg	= 10^{7} erg	= 10^{7} erg
force (F)	$F = QE$	MLT^{-2}	1 N	= 10^{5} dyne	= 10^{5} dyne	= 10^{5} dyne
Frequency (f, ν)	$f = 1/T$	T^{-1}	1 Hz	= 1 $cycle.s^{-1}$	= 1 $cycle.s^{-1}$	= 1 $cycle.s^{-1}$
impedance (Z)	$Z = R + j(X_L - X + C)$	$ML^{2}T^{-3}I^{-2}$	1 Ω	= 1 ohm	= 10^{9} abohm	= $10^{5}/c^{2}$ statohm
length (l)	l	L	1 m	= 10^{2} cm	= 10^{2} cm	= 10^{2} cm
magnetic dipole moment (m)	$E_p = -m.B$	IL^{2}	1 $A.m^{2}$	= 10^{4} $A.cm^{2}$	= 10^{3} $Bi.cm^{2}$	= $10^{5}c$ $Fr.cm^{2}$
magnetic field (H)	$H = B/\mu_o\mu_r$	IL^{-1}	1 $A.m^{-1}$	= $4\pi 10^{-3}$ oersted	= $4\pi \times 10^{-3}$ Oe	= $4\pi c \times 10^{-1}$ esu
magnetic flux (Φ)	$\Phi = Bn.dA$	$ML^{2}T^{-2}I^{-1}$	1 Wb	= 10^{8} maxwell	= 10^{8} Mx	= $(1/10c)$ esu
magnetic induction (B)	$F = QV \times B$	$MT^{-2}I^{-1}$	1 T	= 10^{4} gauss	= 10^{4} G	= $(100/c)$ esu
magnetic potential vector (A)	$B = \nabla \times A$	$MLT^{-2}I^{-1}$	1 $Wb.m^{-1}$	= 10^{6} $Mx.cm^{-1}$	= 10^{6} $Mx.cm^{-1}$	= $(10^{4}/c)$ esu

(continued overleaf)

Table 3-1 Exact conversion factors between SI and CGS practical, emu and esu electric and magnetic units *(continued from page 23)*

Physical quantity and symbol(s)	Equation	Dimension	SI unit	Practical cgs	emu cgs	esu cgs
magnetic susceptibility (χ_m)	$M = \chi_m \mathrm{H}$	1	1	$= 4\pi$	$= 4\pi$	$= 4\pi$
magnetization (M, J)	$M = \chi_m \mathrm{H}$	IL^{-1}	1 $\mathrm{A.m^{-1}}$	$= 4\pi 10^{-3}$ oersted	$= 4\pi \times 10^{-3}$ Oe	$= 4\pi c \times 10^{-1}$ esu
magnetomotive force (F)	$F = NI$	I	1 A-turn	$= 4\pi 10^{-1}$ gilbert	$= 4\pi \times 10^{-1}$ Gb	$= 4\pi c \times 10^{9}$ esu
mass (m)	m	M	1 kg	$= 10^3$ grams	$= 10^3$ g	$= 10^3$ g
period (T)	$T = 1/f$	T	1 s	= 1 second	= 1 second	= 1 second
permeability (μ)	$B = \mu H = \mu_0 \mu_r H$	$\mathrm{MLT^{-2}I^{-2}}$	1 $\mathrm{H.m^{-1}}$	$= (10^7/4\pi)$ $\mathrm{G.Oe^{-1}}$	$= (10^7/4\pi)$ $\mathrm{G.Oe^{-1}}$	$= (1000/4\pi c^2)$ esu
permeance (P)	$P = \mu_o \mu_r A/l$	$\mathrm{ML^2T^{-2}I^{-2}}$	1 H	= 1 henry	$= 10^9$ abhenry	$= 10^5/c^2$ esu
permittivity (ε)	$C = \varepsilon A/l = \varepsilon_0 \varepsilon_r A/l$	$\mathrm{M^{-1}L^{-3}T^4I^2}$	1 $\mathrm{F.m^{-1}}$	$= 10^{-2}$ $\mathrm{F.cm^{-1}}$	$= 4\pi \times 10^{-11}$ emu	= 1 esu
polarizability (α)	$p = \alpha \varepsilon_0 E$	$\mathrm{L^3}$	1 $\mathrm{m^3}$	$= 10^6$ $\mathrm{cm^3}$	$= 10^6$ $\mathrm{cm^3}$	$= 10^6$ $\mathrm{cm^3}$
polarization (P)	$P = \chi \varepsilon_0 E$	$\mathrm{ITL^{-2}}$	1 $\mathrm{C.m^{-2}}$	$= 10^{-4}$ $\mathrm{C.cm^{-2}}$	$= 10^{-5}$ $\mathrm{Bi.cm^{-2}}$	$= (c/1000)$ esu
pole strength (Q_m)	$Q_m = Fl/NI\mu_0\mu_r$	IL	1 A.m	$= 10^{-2}$ A-turn.cm	$= 4\pi \times 10^{-3}$ Gb	$= 4\pi c \times 10^{7}$ esu
power (P)	$P = W/t = UI\cos\phi$	$\mathrm{ML^2T^{-3}}$	1 W	$= 10^7$ $\mathrm{erg.s^{-1}}$	$= 10^7$ $\mathrm{erg.s^{-1}}$	$= 10^7$ $\mathrm{erg.s^{-1}}$
pulsatance (ω)	$\omega = 2\pi f$	$\mathrm{\alpha T^{-1}}$	1 $\mathrm{rad.s^{-1}}$	= 1 $\mathrm{rad.s^{-1}}$	= 1 $\mathrm{rad.s^{-1}}$	= 1 $\mathrm{rad.s^{-1}}$
reactance (inductive) (X_C)	$X_C = 1/(2\pi fC)$	$\mathrm{ML^2T^{-3}I^{-2}}$	1 Ω	= 1 ohm	$= 10^9$ abohm	$= 10^5/c^2$ statohm
reactance (inductive) (X_L)	$X_L = 2\pi fL$	$\mathrm{ML^2T^{-3}I^{-2}}$	1 Ω	= 1 ohm	$= 10^9$ abohm	$= 10^5/c^2$ statohm
reactive power (P)	$P = UI\sin\phi$	$\mathrm{ML^2T^{-3}}$	1 VA	= 1 VA	$= 10^7$ emu	$= 10^7$ emu
reluctance (R)	$R = l/\mu_0\mu_r A$	$\mathrm{M^{-1}L^{-2}T^2I^2}$	$1\ \mathrm{H^{-1}}$	= 1 yrneh	$= 10^{-9}$ emu	$= (c^2/10^5)$ esu
reluctivity (ρ)	$\rho = 1/\mu_0\mu_r$	$\mathrm{M^{-1}L^{-1}T^2I^2}$	$1\ \mathrm{H^{-1}.m}$	= 100 yrneh.cm	$= 10^{-7}$ emu	$= (c^2/10^3)$ esu
resistance (R, r)	$R = U/I$	$\mathrm{ML^2T^{-3}I^{-2}}$	1 Ω	= 1 ohm	$= 10^9$ abohm	$= 10^5/c^2$ statohm
resistivity (ρ)	$R = \rho l/A$	$\mathrm{ML^3T^{-3}I^{-2}}$	1 Ω.m	= 100 ohm.cm	$= 10^{11}$ emu	$= 10^7/c^2$ esu
self-inductance (L)	$e = -L\,\mathrm{d}I/\mathrm{d}t$	$\mathrm{ML^2T^{-2}I^{-2}}$	1 H	= 1 henry	$= 10^9$ abhenry	$= 10^5/c^2$ esu
susceptance (B)	$Y = G + \mathrm{j}B$	$\mathrm{M^{-1}L^{-2}T^3I^2}$	1 S	= 1 mho	$= 10^{-9}$ abmho	$= 10^{-5}c^2$ statmho

Notes: $c = 2.997\,924\,58 \times 10^8$ $\mathrm{m.s^{-1}}$ (E).

Table 3-3 Equivalence between SI and CGS electric and magnetic quantities

Physical quantity	SI symbol	cgs (esu and emu) symbol
Electric field strength	E	E
Magnetic induction	B	B/c
Electric displacement	D	$D/4\pi$
Magnetic field strenght	H	$Hc/4\pi$
Dielectric permittivity	ε	$\varepsilon/4\pi$
Magnetic permeability	μ	$4\pi\mu/c^2$
Charge density	ρ	ρ
Current density	j	j
Vector potential	A	A/c
Hertz vector	π	π/c
Capacitance	C	$C/4\pi$
Inductance	L	L/c

$\zeta = 1$ (SI) and $\zeta = 4\pi$ (cgs esu)
$\xi = 1$ (SI) and $\xi = 1/c$ (cgs emu)

3.2.3 International Electrical Units

This separate system of electrical units was used by US electrical engineers, and was adopted internationally until 1947, when it was declared obsolete and replaced first by the MKSA and then by SI, with which it should not be confused. Its base units are defined in concrete terms, as shown by the examples in ***Table 3-4***.

Table 3-4 Basic IEUS units

ampere (int. mean)	One ampere (int. mean) is equal to the unvarying electric current intensity which deposits, in one second, by electrolysis from an aqueous silver nitrate solution, 0.00111800 g of silver metal at the cathode (IEC, 1881)
ohm (int. mean)	One ohm (int. mean) is equal to the electric resistance, measured at the temperature of melting ice (0°C), of a mercury column of 106.300 cm length which has a mass equal to 14.4521 g (IEC, 1908)
volt (int. mean)	One volt (int. mean) is equal to the electromotive force *(e.m.f.)*, measured at 20°C, of a Weston electrochemical cell. It is equal exactly to 1.0183 int. volt (IEC, 1908)

3.2.4 Atomic Units (a.u.)

The system of atomic units with the international acronym **a.u.** was proposed by D.R. Hartree in 1927 with a view to simplifying calculations in problems involving the basic structures of the atom and molecule, as well as in computations in quantum mechanics. The system was based on units of four fundamental quantities, mass, length, time, and electric charge.

The fundamental units of this system were based on five universal constants: the **electron rest mass** (m_0) represented the unit of mass, the **elementary electrostatic charge** (e) was the unit of electric charge, the **first orbit Bohr radius** (a_0) was the unit of length, the first ionizing energy of the hydrogen atom in its ground state, or **rydberg** (Ry) was the unit of energy, and the **rationalized Planck constant** ($\hbar$) was the unit of angular momentum.

In 1959, Shull and Hall proposed a new unit of energy which was approximately equal to two rydbergs, to be called the **hartree** in honour of the inventor of the system.

The importance of this system of units lay in the fact that the numerical results of calculations were expressed as combinations of fundamental atomic constants. The a.u. system is therefore regarded as 'natural units' for calculations involving electronic structure in quantum chemistry. For clarity, they are usually set in *italic* type to distinguish them from other units which should be set in roman type.

It is also usual in specialized litreature (e.g. quantum chemistry, mathematical physics, nuclear and molecular physics) to find the acronym **a.u.** in place of the appropriate unit irrespective of the physical quantity involved. This of course leads to considerable confusion in identification and conversion.

Table 3-5 (opposite) summarizes the main units employed in the system.

3.3 British and American Systems of Units

Despite the increasing importance of SI units, the systems of units developed in the UK and USA are still commonly used or referred to in the British Isles (England, Ireland, Scotland, and Wales), North America (USA and Canada), and in some Commonwealth countries such as Australia and New Zealand. These systems are not only non-metric, but also non-decimal, which increased the complexity of calculations and proved a powerful argument against their continued use, especially in science and technology. However, a counter-argument, that was perhaps more cogent before the age of the electronic calculator, is that their quantities were evenly divisible by a greater number of basic prime factors, and did not so often result in lengthy or recurring decimals.

Preliminary notes for number writing:

- **Cardinal number writing**: in France, Italy and other European countries, the space ( ) or the point (.) is used to separate hundreds from thousands. In Britain and North America, either the comma is used (sometimes omitted in four-figure numbers) or the space (usually omitted in four-figure numbers). The latter is used in this book.

  Example: 1,657 or 1657 instead of 1 657.

- **Decimal number writing**: in France, Italy and other European countries, the comma (,) is used to separate integer from decimal. In Britain and North America the point is used.

  Example: 3.14159 instead of 3,14159.

3.3.1 Imperial Units

The British system of units, known as imperial units, was established by the *Weights and Measures Act* (WMA, 1824) of June 17th, 1824. Its three base units are the **pound avoirdupois**, the **yard**, and the **second**. The yard was defined in 1878 as the distance at 62°F between a pair of lines etched in gold plugs set in a bronze bar. Earlier in 1856, the pound avoirdupois was defined in terms of the mass of a platinum cylinder, known as the Imperial Standard Pound, and both were kept in the Standards Department of the Board of Trade in London. The imperial unit of capacity was the **gallon**, which was defined as the

Table 3-5 Base and derived units of the a.u. system

a.u. quantity	Dimension	SI conversion factor	Equation
angular momentum, action	ML^2T^{-1}	$= 1.054571596\,(82) \times 10^{-34}$ J.s	$\hbar = h/2\pi$
charge density	ITL^{-3}	$= 1.08120228 \times 10^{12}$ C.m^{-3}	$e/{a_0}^3$
electric charge	IT	$= 1.602176462\,(63) \times 10^{-19}$ C	e
electric current intensity	I	$= 6.6236175327 \times 10^{-3}$ A	$eE_h/\hbar$
electric dipole moment	LTI	$= 8.47835267325 \times 10^{-30}$ C.m	ea_0
electric field gradient	$MT^{-3}I^{-1}$	$= 9.71689777437 \times 10^{21}$ V.m^{-2}	$E_h/e{a_0}^2 = e/4\pi\varepsilon_0{a_0}^3$
electric field strength	$MLT^{-3}I^{-1}$	$= 5.14196083758 \times 10^{11}$ V.m^{-1}	$E_h/ea_0 = e/4\pi\varepsilon_0{a_0}^2$
electric potential	$ML^2T^{-3}I^{-1}$	$= 27.2113834433$ V	$E_h/e = e/4\pi\varepsilon_0 a_0$
electric quadripole moment	L^2TI	$= 4.4865509982 \times 10^{-40}$ C.m^2	$e{a_0}^2$
energy (hartree)	ML^2T^{-2}	$= 4.35974381\,(34) \times 10^{-18}$ J	$E_h = \hbar^2/m_0{a_0}^2$
force	MLT^{-2}	$= 8.23872180407 \times 10^{-8}$ N	E_h/a_0
induction magnetic field, magnetic flux density	$MT^{-2}I^{-1}$	$= 2.350517349 \times 10^5$ T	$\hbar/e{a_0}^2$
length (1st Bohr radius)	L	$= 5.291772083(19) \times 10^{-11}$ m	$a_0 = 4\pi\varepsilon_0\hbar^2/m_0e^2$
linear momentum	MLT^{-1}	$= 1.99285150505 \times 10^{-24}$ N.s	$\hbar/a_0$
magnetic dipole moment	L^2I	$= 1.8548017980 \times 10^{-23}$ J.T^{-1} (A.m^2)	$e\hbar/m_0 = 2\mu_B$
magnetizability	$M^{-1}T^2L^2I^2$	$= 7.89103640682 \times 10^{-29}$ Am^{2}T^{-1}	$e^2{a_0}^2/m_0$
mass (electron rest mass)	M	$= 9.10938188\,(72) \times 10^{-31}$ kg	m_0
polarizability	$M^{-1}I^2T^4$	$= 1.6487772491 \times 10^{-41}$ J^{-1}.C^2.m^2	$e^2{a_0}^2/E_h$
time	T	$=2.41888432749 \times 10^{-17}$ s	$\hbar/E_h = m_0{a_0}^2/\hbar$

volume of 10 pounds avoirdupois of distilled water, weighed in air against brass[7] weights at a temperature of 62°F and atmospheric pressure of 30 inches of mercury. These legal measures were then used in all countries of the British Commonwealth. To a close approximation, the metric equivalents of these imperial pound and yard standards are 0.45359243 kg and 0.91443992 m respectively.

However, the WMA of 1963 modified the nature of these standards, and redefined the units in terms of the kilogram and metre standards maintained in Paris (at the Pavillon de Breteuil, Sèvres). These new precise definitions of the pound and yard are respectively 0.45359237 kg and 0.9144 m. The unit of time, the second, has always been the same in both systems and was redefined by the 13th CGPM in 1968.

In 1980, Parliament approved a Statutory Instrument (1980/1070) which began the progressive phasing out of the imperial system by withdrawing authorization of a substantial number of units, such as the **British thermal unit** (Btu), the **cran**, the **furlong**, the **horsepower** (HP), the **hundredweight** (cwt), the **ton** and the **Fahrenheit degree** (°F). In 1985, the **curie**, **rem**, and **rad** were discarded in favour of the **becquerel**, **sievert**, and **gray** respectively, although the legal status of the pound and yard was reaffirmed by the WMA of 1985.

However, from November 1995, the United Kingdom officially adopted metric units for general use and business transactions. As a result, the metre and kilogram are now compulsory in place of the yard and pound avoirdupois.

There have been three major Weights and Measures Acts (WMA) in recent times (1963, 1976 and 1985) all gradually abolishing various units, as well as redefining the standards. All the apothecaries' and troy weights and measures are no longer used in the UK system. Currently legislation has decreed that from October 1st, 1995, for economic, public health, public safety and administrative purposes, only metric units are allowed except for the following, which may be used until December 31st, 1999:

- pounds and ounces for weighing of goods sold in bulk;
- pints and fluid ounces for alcoholic beverages such as beer and cider, waters, lemonades and fruit juices in returnable containers;
- therms for gas supply;
- fathoms and nautical miles for marine navigation.

The following may continue to be used without time limit:

- statute miles, yards, feet and inches for road traffic signs and related measurements of speed and distance;
- pints for dispensing draught beer and cider, and for milk in returnable containers;
- acres for land registration purposes and surveyors' measurements;
- troy ounces for transactions in gold and other precious metals.

3.3.1.1 Imperial Units of Length

The many units of length used at various times in the UK fall into several categories, depending on area of application.

[7] For official comparison between standard organizations through the UK, the density of bras alloy was taken as being equal to 8413 kg m^{-3}.

3.3.1.1.1 UK Linear Measure

Current linear units are the **line**, the **inch**, the **foot**, the **yard**, the **statute mile**[8] (or **land mile**) and the **statute league** (or **land league**). They are employed for measuring distance, length, width, depth, height, and thickness, and are listed fully in ***Table 3-6*** (overleaf).

Other units of length which have been used in the UK are:

1 lea (UK)	= 360 ft
1 skein (UK)	= 360 feet
1 wrap (UK)	= 240 ft
1 bolt (UK)	= 120 feet
1 shackle (UK)	= 90 feet
1 rope (UK)	= 20 feet
1 ell (UK)	= 45 inches
1 pace (UK)	= 30 inches
1 span (UK)	= 9 inches
1 nail (UK)	= 9/4 inches
1 finger (UK)	= 7/8 inch
1 barleycorn (UK)	= 1/3 inch
1 button (UK)	= 1/12 inch
1 iron (UK)	= 1/48 inch
1 calibre (UK)	= 1/100 inch
1 point (UK)	= 1/144 inch
1 mil	= 1/1000 inch
1 mil	= 1 thou

3.3.1.1.2 UK Nautical Measure

The units of length used in navigation are the **fathom**, and the **nautical mile**. The **cable length** and the **nautical league** are now obsolete.

Table 3-7 UK nautical measures of length
[1 mile (UK naut.)=1853.184 m (E)]

UK nautical league (UK, naut. lg)	**UK nautical mile** (UK, naut. mi)	**UK cable length** (UK, naut. cbl)	**UK nautical chain**	**Fathom** (fath)	**Yard** (yd)	**Foot** (ft)	**Inch** (in)
1	**= 3**	= 30	= 1216	= 3040	= 6080	= 18 240	= 218 880
	1	**= 10**	= 1216/3	= 3 040/3	= 6080/3	= 6080	= 72 960
		1	**= 608/15**	= 304/3	= 608/3	= 608	= 7296
			1	**= 5/2**	= 5	= 15	= 180
				1	**= 2**	= 6	= 72
					1	**= 3**	= 36
						1	**= 12**

[8] The mile derived from Roman 'mille passus', 5000 ft, but later it took 5280 ft to accomodate exactly 8 furlongs, the most popular length measure at the time.

Table 3-6 UK linear measures [1 foot=0.3048 m (E)]

UK stat. league (st. lg)	**UK stat. mile** (st. mi)	**Pole** (rd)	**Yard** (yd)	**Pace** (pc)	**Cubit** (cu)	**Foot** (ft,′)	**Span** (sp)	**Hand** (hd)	**Palm** (plm)	**Inch** (in,″)	**UK line** (line)	**Point** (pt)
1	**= 3**	= 960	= 5280	= 6336	= 10 560	= 15 840	= 21 120	= 47 520	= 63 360	= 190 080	= 2 280 960	= 27 371 520
	1	**= 320**	= 1760	= 2112	= 3520	= 5280	= 7040	= 15 840	= 21 120	= 63 360	= 76 0320	= 9 123 840
		1	**= 11/2**	**= 33/5**	= 11	= 16. 5	= 22	= 49.5	= 66	= 198	= 2376	= 28 512
			1	**= 6/5**	**= 2**	= 3	= 4	= 9	= 12	= 36	= 432	= 5184
				1	= 5/3	= 5/2	= 10/3	= 15/2	= 10	= 30	= 360	= 4320
					1	**= 3/2**	= 2	= 9/2	= 6	= 18	= 216	= 2592
						1	**= 4/3**	= 3	= 4	= 12	= 144	= 1728
							1	**= 9/4**	= 3	= 9	= 108	= 1296
								1	**= 4/3**	= 4	= 48	= 576
									1	**= 3**	= 36	= 432
										1	**= 12**	= 144
											1	= 12

1 rod = 1 perch = 1 pole
1 land = 1 statute mile

3.3.1.1.3 UK Surveyors' Measure

Some other units of length were once used by UK land surveyors, the main ones being the **link**, the **chain** (**Gunter's chain**), the **rod**, and the **furlong**. All these units are now obsolete, except for the **furlong (i.e., furrow long)**, which is still commonly used to define distances in a UK horse-race.

Table 3-8 UK surveyors' measures of length
[1 chain (Gunter's) = 20.1168 m (E)]

Statute mile (st. mi)	**Furlong** (fur)	**Gunter's chain** (ch)	**Rod** (rd)	**Yard** (yd)	**Foot** (ft)	**Gunter's link** (lk)
1	= 8	= 80	= 320	= 1760	= 5280	= 8000
	1	= 10	= 40	= 220	= 660	= 1000
		1	= 4	= 22	= 66	= 100
			1	= 5.5	= 16.5	= 25
				1	= 3	= 50/11
					1	= 50/33

1 rod = 1 perch = 1 pole
1 land = 1 statute mile

3.3.1.2 Imperial Units of Area

As with linear measures, units of surface area fall into groups based on their application.

Notes

- It is important to note that in North America and Britain, the prefix *sq.* (an abbreviation of the word *square*) is sometimes used before an area unit instead of raising the unit to the power of two.

  Example: 1666.66 sq. ft = 1666.66 ft^2

- In some technical reports or scientific textbooks written before the 1960s, the term 'square' is represented by a square symbol drawn before the unit (thus □″ should be read as 'square inch').

  Example: 2.56 □′ = 2.56 ft^2 (obsolete)

3.3.1.2.1 UK Measures of Area

The conventional imperial units of surface area are the **square inch**, the **square foot**, the **square yard**, and the **square mile**. They are related as follows:

Table 3-9 UK measures of area
[1 $ft^2 = 9.290304 \times 10^{-2}$ m^2 (E)]

Square mile (sq. mi)	Square rod (sq. rd)	Square yard (sq. yd)	Square foot (sq. ft)	Square inch (sq. in)
1	**= 102 400**	= 3 097 600	= 27 878 400	= 4 014 489 600
	1	**= 121/4**	= 1089/4	= 39 204
		1	**= 9**	= 1296
			1	**= 144**

1 square rod = 1 square perch = 1 square pole

3.3.1.2.2 UK Surveyors' Measure

The now obsolete units of area once used by surveyors are listed below. The **square foot** and the **acre** are the only measures to survive into recent times.

Table 3-10 UK surveyors' measure
[1 $ft^2 = 9.290304 \times 10^{-2}$ m^2 (E)]

Section of land (sq. mi)	Acre (ac)	Rood (ro)	Square chain (sq. ch)	Square rod (sq. rd)	Square foot (sq. ft)	Square link (sq. lk)
1	**= 640**	= 2560	= 6400	= 102 400	= 27 878 400	= 64 000 000
	1	**= 4**	= 10	= 160	= 43 560	= 100 000
		1	**= 5/2**	= 40	= 10 890	= 25 000
			1	**= 16**	= 4356	= 10 000
				1	**= 1089/4**	= 625
					1	**= 2500/1089**

1 rod = 1 perch = 1 pole
1 section of land = 1 square statute mile
1 virgate = ¼ hide = 30 acres

3.3.1.2.3 Circular Units

Very rarely, so-called 'circular' units have been used, mainly for wire sizes and then only as the **circular mil** in the USA. In an analogy to square measure, circular units represent the area of a disc of a diameter equal to the equivalent linear unit. A circular mil is the area of a disc one mil (0.001 in) in diameter, and hence equal to $7.85398163398 \times 10^{-7}$ in^2 or 5.067×10^{-10} m^2. Circular units should not be confused with **circular measure**, which refers to the expression of angle in radians.

Table 3-11 Circular units
[1 cin = 5.067074791 × 10^{-4} m^2]

Circular inch (cin)	**Circular millimetre** (cmm)	**Circular mil** (cmil)
1	**= 645.16**	= 1 000 000
	1	**= 1550**

3.3.1.3 Imperial Units of Volume and Capacity

As with the UK units of length and area, units of volume and capacity are often associated with specific trades or fields of application. They do however, in common with many older systems, fall into three categories: geometric measure, expressed in cubic linear units (e.g. **cubic foot**), dry measure, and liquid measure. The latter two categories are known as units of capacity and consist of arbitrary volumes given specific names (e.g. **bushel**, **gallon**), with the same name sometimes being used for measuring solids or liquids.

Note

- It is important to note that in North America and Britain, the prefix *cu.* (an abbreviation of the word *cubic*) is sometimes used before a volume unit instead of raising the unit to the power of three.

Example: 33.75 cu. ft = 33.75 ft^3

3.3.1.3.1 UK Measures of Volume

The volumetric units chiefly used in the UK are the **cubic inch**, **cubic foot**, **cubic yard**, and **cubic statute mile**. They are used for volumes of containers, tanks, boxes, etc. as well as for solids such as stone, concrete, woods, etc. and are summarized in the following table.

Table 3-12 UK geometric measures of volume
[1 ft^3 = 2.831684659 × 10^{-2} m^3 (E)]

Cubic mile (cu. st. mi)	**Rod**	**Register ton**	**Cubic yard** (cu. yd)	**Cubic foot** (cu. ft)	**Cubic inch** (cu. in)
1	**= 147 197 95.2**	= 147 197 952	= 5 451 776 000	= 1.47197952 × 10^{11}	= 2.54358061056 × 10^{14}
	1	**= 10**	= 1000/27	= 1000	= 1 728 000
		1	**= 100/27**	= 100	= 172 800
			1	**= 27**	= 46 656
				1	**= 1728**

1 ocean-ton = 40 ft^3
1 stupping ton = 42 ft^3

3.3.1.3.2 UK Liquid Measure

Practical commercial measurement of liquids meant that vessels of a common size had to be used, with the result that certain standard (if arbitrary) volumes came into use. Of those listed in ***Table 3-13***, the fluid ounce, pint, quart, and gallon are still in common use.

The British imperial gallon was defined in 1824 to be the volume of water which weighed 10 pounds at 62°F and 30 in Hg. In 1963 it was defined by the WMA to be the volume occupied by 10 pounds of distilled water of density 998.859 $kg.m^{-3}$ weighed in air of density 1.217 $kg.m^{-3}$ against brass weights of density 8136 $kg.m^{-3}$. This gives the old value of 4.5459645 dm^3. In 1976, the definition was changed to exactly 4.546092 dm^3 based on the new definition of the litre (i.e., l dm^3)

Although the litre is now official in the UK, it is likely that the pint will continue in use for some time because of its popularity as a measure of alcoholic beverages, chiefly beer.

3.3.1.3.3 UK Dry Measure

Over the years, British trades and professions developed standard measures of dry volume for commercial purposes. They were based on liquid measures and are now identically equal to them. The measures in the ***Table 3-14*** are all either obsolete or becoming so, with the exception of the register ton used to specify the size (gross register tonnage) of cargo ships.

Other UK capacity units are as follows:

1 last (UK)	= 640 gallons (UK)
1 butt (UK)	= 108 gallons (UK)
1 puncheon (UK)	= 70 gallons (UK)
1 seam (UK)	= 64 gallons (UK)
1 hogshead (UK)	= 63 gallons (UK)
1 quarter (UK)	= 1 seam (UK)
1 coomb (UK)	= 32 gallons (UK)
1 kilderkin (UK)	= 18 gallons (UK)
1 strike (UK)	= 16 gallons (UK)
1 firkin (UK)	= 9 gallons (UK)
1 chopine (UK)	= 1 pint (UK)
1 demiard (UK)	=1/2 pint (UK)
1 roquille (UK)	= 1 gill (UK)
1 noggin (UK)	= 1 roquille (UK)
1 quartern (UK)	= 1 gill (UK)
1 drop (UK)	= 1 minim (UK)

3.3.1.4 Imperial Units of Weight

3.3.1.4.1 UK Avoirdupois Weight

About AD 1300, London merchants adopted a system of weights known as 'avoirdupois', from the Old French *aver de peis* (goods of weight). This system, used for wholesale weighing, was based on a pound of 7000 grains. The **pound avoirdupois** was established under the WMA of 1856 (see note under yard above) and until 1963 was defined as the mass of the Imperial Standard Pound, a platinum cylinder kept in the Standards Department of the Board of Trade in London. Over that period, it was imposed and used in all countries of the British Commonwealth.

Table 3-13 UK liquid measures of capacity

[1 gallon (UK) = 4.546092×10^{-3} m^3 (E)]

Wey (UK wy)	**Chaldron** (UK chal)	**Bag** (UK bg)	**Bucket** (UK bk)	**Gallon** (UK gal)	**Pottle** (UK pot)	**Quart** (UK qt)	**Pint** (UK pt)	**Gill** (UK gi)	**Fluid ounce** (UK fl. oz)	**Fluid dram** (UK fl. dr)	**Minim** (UK min)
1	**= 10/9**	= 40/3	= 80	= 320	= 640	= 1280	= 2560	= 10 240	= 51 200	= 409 600	= 24 576 000
	1	= 12	= 72	= 288	= 576	= 1152	= 2304	= 9216	= 46 080	= 368 640	= 22 118 400
		1	= 6	= 24	= 48	= 96	= 192	= 768	= 3840	= 30 720	= 1 843 200
			1	= 4	= 8	= 16	= 32	= 128	= 640	= 5120	= 307 200
				1	= 2	= 4	= 8	= 32	= 160	= 1 280	= 76 800
					1	= 2	= 4	= 16	= 80	= 640	= 38 400
						1	= 2	= 8	= 40	= 320	= 19 200
							1	= 4	= 20	= 160	= 9600
								1	**= 5**	= 40	= 2400
									1	**= 8**	= 480
										1	**= 60**

1 ocean ton = 40 ft^3
1 shipping ton = 42 ft^3
1 register ton = 100 ft^3
1 rod = 1000 ft^3
1 chopine = 1 pint
1 demiard = 1/2 pint
1 sack = 1 bag

Table 3-14 UK dry measures

[1 gallon (UK) = 4.546092×10^{-3} m^3 (E)]

Last (UK ls)	**Wey (load)** (UK wy)	**Chaldron** (UK chal)	**Sack** (UK sk)	**Bushel** (UK bu)	**Bucket** (UK bk)	**Peck** (UK pk)	**Gallon** (UK gal)	**Quart** (UK qt)	**Pint** (UK pt)
1	= 2	= 20/9	= 80/3	= 80	= 160	= 320	= 640	= 2560	= 5120
	1	**= 10/9**	= 40/3	= 40	= 80	= 160	= 320	= 1280	= 2560
		1	**= 12**	= 36	= 72	= 144	= 288	= 1152	= 2304
			1	**= 3**	= 6	= 12	= 24	= 96	= 192
				1	= 2	= 4	= 8	= 32	= 64
					1	**= 2**	= 4	= 16	= 32
						1	**= 2**	= 8	= 16
							1	**= 4**	= 8
								1	**= 2**
									1

1 sack = 1 bag
1 seam = 8 bushels
1 coomb = 4 bushels
1 strike = 2 bushels
1 chopine = 1 pint

Table 3-15 UK avoirdupois weight

[1 lb av. (WMA, 1963) = 0.45359237 kg (E)]

Ton (UK ton)	**Wey, Load** (wy av.)	**Hundredweight** (cwt)	**Cental** (CH)	**Quarter** (qr av.)	**Stone** (st av.)	**Clove** (cv av.)	**Pound** (lb av.)	**Ounce** (oz av.)	**Dram** (dm av.)	**Grain** (gr av.)
1	**= 80/9**	= 20	= 112/5	= 80	= 160	= 280	= 2240	= 35 840	= 573 440	= 15 680 000
	1	**= 9/4**	= 63/25	= 9	= 18	= 63/2	= 252	= 4032	= 64 512	= 1 764 000
		1	**= 28/25**	= 4	= 8	= 14	= 112	= 1792	= 28 672	= 784 000
			1	= 25/7	= 50/7	= 25/2	= 100	= 1600	= 25 600	= 700 000
				1	= 2	= 7/2	= 28	= 448	= 7168	= 196 000
					1	= 7/4	= 14	= 224	= 3584	= 98 000
						1	**= 8**	= 128	= 2048	= 56 000
							1	= 16	= 256	= 7000
								1	= 16	= 1750/4
									1	**= 875/32**

1 barrel (salt) = 280 lb
1 barrel (cement) = 376 lb
1 bag (cement) = 94 lb
1 clove = 1 customary stone
1 flask (mercury) = 76 lb

Now, most countries are converting to metric units and the avoirdupois system is being phased out. It was however very widely used and there is still considerable resistance to its replacement. Its base unit is the pound of 16 oz, which under the WMA of 1963 was defined as 0.45359237 kg. A standard New Imperial Pound was created in the form of a platinum cylinder maintained at the Standards Office, Westminster, but, from 1995, Britain officially adopted metric units for all general and business purposes. The avoirdupois units of mass were indicated by the abbreviation avoir., avdp. or av.

Of the units listed in ***Table 3-15***, only the **ounce**, **pound**, **stone**, **hundredweight**, and **ton** have been in anything like regularly use in recent years.

3.3.1.4.2 UK Apothecaries' Weight

The units of weight of the apothecaries' system were formerly used by pharmacists for drugs and medicinal preparations, presumably because their small magnitudes better represented the quantities used in this profession. In this system, the base unit was the **apothecaries' ounce** and was equal to the Troy ounce (see below). The units were indicated by the abbreviation *ap.* or *apth.* These units were legalized by the *Medical Education Acts* of 1858 and 1862, but are now completely obsolete and their use is prohibited by the British and American Pharmacopoeia.

Table 3-16 UK apothecaries' weight
[1 lb apoth. = 0.3732417216 kg]

Pound (lb apoth.)	**Ounce** (oz apoth.)	**Drachm** (dr apoth.)	**Scruple** (scr apoth.)	**Grain** (gr apoth.)
1	= 12	= 96	= 288	= 5760
	1	= 8	= 24	= 480
		1	= 3	= 60
			1	= 20

Note: There was also apothecaries' measure, for liquid quantities, which can be adequately covered by the following brief statement regarding its units. The parallel system of apothecaries' measure was used for liquid quantities. In this system, analogous to imperial capacity measure, 60 minims was equal to one fluid drachm, which was one eighth of a fluid ounce.

3.3.1.4.3 UK Troy Weight

The troy system was formerly the UK legal system for weighing precious metals and gems. The name is derived from the town of Troyes in Northern France, famous in medieval times for its commercial fairs. It is now obsolete except in the USA. Its base unit is the **troy pound** of 5760 grains defined as 0.3732417216 kg, with other units as in the table below. The troy grain is identical to the grain avoirdupois.

Table 3-17 UK troy weight
[1 lb troy = 0.3732417216 kg (E)]

Pound (lb troy)	Ounce (oz troy)	Pennyweight (dwt)	Grain (gr troy)
1	**= 12**	= 240	= 5760
	1	**= 20**	= 480
		1	**= 24**

Note: Another unit still in common use in jewellery for weighing gems is the **carat** the old version of this unit of weight was equal to about 205 mg (about 3.16436 grains). The **metric carat** was standardized at 200 mg (about 3.086471671 grains) in 1932. The **carat** (occasionally **karat**) is also a unit of purity of gold and other precious metal, with 24 carats as 100% wt pure, and other measures in proportion (e.g. 18 carat gold is 75% wt pure).

3.3.2 The American System of Measures (US Customary Units)

This system is substantially the same as the imperial system, the main differences being mentioned below, and the same criticisms of inconsistency and complexity of calculations apply. These units are however still fully legal in the USA and Canada. Where there are differences between them and imperial units, the designation (US) is normally applied.

American weights and measures are based on units used in Britain prior to 1824, when the imperial system was officially established. The US law of 1866 established a relationship with the metric system by defining the metre as equal to 39.37 in, and, in 1883, the yard was also defined in terms of the metre (= 3600/3937 m). Under the *Mendenhall Order* of 1893, the **US yard**, **pound**, and all other derived units were redefined in terms of metric units of length and mass, so that from then on there was no longer a direct relationship with UK units, though the differences were often minute. In 1959, an agreement between English-speaking countries unified metric definitions of units for scientific and technical uses, with the yard defined as 0.9144 m and the pound as 0.45359237 kg. In order to accommodate data from the US geodetic surveys, however, the old standard of 1 ft = 1200/3937 m was retained with the name **US survey foot**. It has the following relationships with other units:

1 rod (perch) = 16.5 ft
1 chain = 66 ft
1 US mile = 5280 ft

3.3.2.1 US Customary Units of Length

As with their British equivalents, the many units of length used at various times in the USA fall into several categories depending on area of application.

3.3.2.1.1 US Linear Measure

Current linear units are the **inch**, the **foot**, the **yard**, and the **statute mile** (or **land mile**). They are employed for measuring distance, length, width, depth, height, and thickness, and are listed fully in the table overleaf.

Table 3-18 US linear measure
[1 ft = 0.3048 m (E)]

Statute league (US st. leag)	Statute mile (US st. mi)	Pole (rd)	Yard (yd)	Foot (ft)	Inch (in)	Line (US line)
1	**= 3**	= 960	= 5280	= 15 840	= 190 080	= 7 603 200
	1	**= 320**	= 1760	= 5280	= 63 360	= 2 534 400
		1	**= 5.5**	= 16.5	= 198	= 7920
			1	**= 3**	= 36	= 1440
				1	**= 12**	= 480
					1	**= 40**

1 rod = 1 perch = 1 pole
1 land = 1 statute mile
1 mil = 1/1000 in
1 bolt = 120 ft
1 hand = 4 in
1 span = 9 in

3.3.2.1.2 US Nautical Measure

US nautical measures are substantially the same as those of the UK, and are summarized in ***Table 3-19***.

Table 3-19 US nautical measure
[1 mile (US naut.) = 1853.184 m (E)]

US nautical league (US naut. leag)	US nautical mile (US naut. mi)	US cable length (US cbl)	Fathom (fath)	Yard (yd)	Foot (ft)	Inch (in)
1	**= 3**	= 76/3	= 3040	= 6080	= 18 240	= 218 880
	1	**= 76/9**	= 3040/3	= 6080/3	= 6080	= 72 960
		1	**= 120**	= 240	= 720	= 8640
			1	**= 2**	= 6	= 72
				1	**= 3**	= 36
					1	**= 12**

1 cannon shot = 3 miles

3.3.2.1.3 US Surveyors' Measure

Units of length in the US Customary system are the **link**, the **chain** (**Ramsden's chain**), the **rod**, and the **furlong**, and are shown in Table 3-20.

3.3.2.2 US Customary Units of Area

As with linear units, US square measure is virtually identical to the British system.

3.3.2.2.1 US Measures of Area

The conventional US units of area are directly related to the linear measures on which they are based, thus the **square inch**, **square foot**, **square yard**, and **square mile**. They are related as in ***Table 3-21***.

Table 3-20 US surveyors' measure
[1 chain (Ramsden's or Engineer's) = 30.48 m (E)]

Statute mile (mi)	**Furlong** (fur)	**Ramsden's chain** (ch)	**Rod** (rd)	**Foot** (ft)	**Ramsden's link** (lk)
1	**= 8**	= 52.8	= 320	= 5280	= 5280
	1	**= 6.6**	= 40	= 660	= 660
		1	= (1000/165) = (200/33)	= 100	= 100
			1	**= 16.5**	= 16.5
				1	**= 1**

1 rod = 1 perch = 1 pole
1 land = 1 statute mile

Table 3-21 US measures of area
[1 $ft^2 = 9.290304 \times 10^{-2}$ m^2 (E)]

Square mile (sq. st. mi)	**Square rod** (sq. rd)	**Square yard** (sq. yd)	**Square foot** (sq. ft)	**Square inch** (sq. in)
1	**= 102 400**	= 3 097 600	= 27 878 400	= 4 014 489 600
	1	**= 121/4**	= 1089/4	= 39 204
		1	**= 9**	= 1296
			1	**= 144**

1 rod = 1 perch = 1 pole
1 section of land = 1 square statute mile

3.3.2.2.2 US Surveyors' Measure

The now obsolete units of area once used by surveyors are listed below in relation to the **square foot** and the **acre**, the only two such measures to survive into relatively recent times.

Table 3-22 US surveyors' measure
[1 $ft^2 = 9.290304 \times 10^{-2}$ m^2 (E)]

Square mile (sq. mi)	**Square chain** (sq. yd) (Ramsden's)	**Square rod, perch, pole** (sq. rd)	**Square foot** (sq. ft)	**Square link** (sq. lk) (Ramsden's)
1	**= 69 696/25**	= 102 400	= 27 878 400	= 27 878 400
	1	$= (\mathbf{100}/\mathbf{16.5})^2$ $= (\mathbf{200}/\mathbf{33})^2$	= 10 000	= 10 000
		1	**= 1089/4**	= 1089/4
			1	**1**

1 rood = 3630 ft
1 rod = 1 perch = 1 pole
1 section of land = 1 square statute mile
1 acre = 4840 square yards
1 township = 36 square statute miles
1 homestead = 160 acres and 1 sq. mile = 640 acres

3.3.2.2.3 Circular Units

Very rarely, so-called 'circular' units have been used, mainly for wire sizes and then only as the **circular mil** in the USA (see also ***Table 3-11***). In an analogy to square measure, circular units represent the area of a circle of a diameter equal to the equivalent linear unit. A circular mil is the area of a circle one mil (0.001 in) in diameter, and hence equal to $7.853981634 \times 10^{-7}$ in^2 or $5.067074791 \times 10^{-10}$ m^2. Circular units should not be confused with *circular measure*, which refers to the expression of angle in radians.

3.3.2.3 US Units of Volume and Capacity

As with the UK units of length and area, units of volume and capacity are often associated with specific trades or fields of application. They do however, in common with many older systems, fall into three categories: geometric measure, expressed in cubic linear units (e.g. **cubic foot**), dry measure, and liquid measure. The latter two categories are known as units of capacity and consist of arbitrary volumes given specific names (e.g. **bushel**, **gallon**), with the same name sometimes being used for measuring solids or liquids and thus having different volumes (e.g. the US dry pint $\approx$ 0.550610471 l, while a US liquid pint $\approx$ 0.473176473 l).

3.3.2.3.1 US Measures of Volume

The volumetric units chiefly used in the US are the **cubic inch**, **cubic foot**, **cubic yard**, and **cubic statute mile** identical to imperial units.

Table 3-23 US measures of volume
[1 ft^3 = $2.831684659 \times 10^{-2}$ m^3 (E)]

Cubic mile (cu. mi)	Cubic yard (cu. yd)	Cubic foot (cu. ft)	Cubic inch (cu. in)
1	= 5 451 776 000	= $1.471\,979\,52 \times 10^{11}$	= $2.543\,580\,610\,56 \times 10^{14}$
	1	= 27	= 46 656
		1	**= 1728**

3.3.2.3.2 US Liquid Measure

Liquid measures in the USA are based on the old wine measures in use in Britain before 1824 and differ considerably from their imperial equivalents. The fluid ounce is identical, but there are only 16 to the pint as compared with 20 in the UK system. Thus the US quart, and gallon, both of which are still in common use, are 20% smaller than their British equivalents. The most important multiple is the **barrel** (US, oil) (= 42 US gallons, 35 imperial gallons, 0.158987294928 m^3) which is extensively used in the international oil industry (***Table 3-24*** opposite).

3.3.2.3.3 US Dry Measure

US measures of dry volume are related to liquid measures but differ from them in some respects. They are used for measuring the volume of powdered or granular materials (e.g. flour, sand, grain, powdered ore, etc.). The base unit was the Winchester bushel defined as 268.8025 in^3 exactly 2150.42 in^3 and equal to 8 gallons dry.

Table 3-24 US fluid measure

[1 gallon (US, liquid) = $3.785411784 \times 10^{-3}$ m^3 (E) = 231 in^3 (Def.)]

Tun (US tu)	**Hogshead** (US hhd)	**Barrel (wine)** (US bbl)	**Gallon** (US gal)	**Quart** (US qt)	**Pint** (US pt)	**Gill** (US gi)	**Fluid ounce** (US fl oz)	**Fluid dram** (US fl dr)	**US minim** (US min)
1	**= 4**	= 8	= 252	= 1008	= 2016	= 8064	= 32 256	= 258 048	= 15 482 880
	1	**= 2**	= 63	= 252	= 504	= 2016	= 8064	= 64 512	= 3 870 720
		1	**= 31.5**	= 126	= 252	= 1008	= 4032	= 32 256	= 1 935 360
			1	= 4	= 8	= 32	= 128	= 1024	= 61 440
				1	= 2	= 8	= 32	= 256	= 15 360
					1	= 4	= 16	= 128	= 7680
						1	= 4	= 32	= 1920
							1	= 8	= 480
								1	**= 60**

1 gal (US) = 231 in^3 (E) (def.)
1 bbl (US, oil) = 42 gal (US) (E)

Table 3-25 US dry measure
[1 gallon (US, dry) = 4.40488377086 × 10^{-3} m^3 (E)]

Bushel (US bu)	**Peck** (US pk)	**Gallon** (US gal)	**Dry quart** (US dr. qt)	**Dry pint** (US dr. pt)
1	**= 4**	= 8	= 32	= 64
	1	**= 2**	= 8	= 16
		1	**= 4**	= 8
			1	**= 2**

1 barrel = 26.25 gal
1 firkin = 9 gal
1 chaldron = 36 gal
1 Winchester bushel = 2150.42 in^3
1 chopine = 1 dry pint

3.3.2.3.4 US Apothecaries' Measures of Capacity

The US Customary Units commonly used to measure volumes of medicinal liquids are the **tablespoon** and the **teaspoon**. They are defined as in ***Table 3-26***.

Table 3-26 US apothecaries' measures of capacity
[1 US fl. oz = 29.57352956 × 10^{-6} m^3]

Fluid ounce (US fl. oz)	**Tablespoon**	**Teaspoon**	**Tablespoon** (metric)	**Teaspoon** (metric)	**Cubic centimetre** (cm^3)
1	**= 2**	= 6	**1**	**= 3**	= 15
	1	**= 3**		**1**	**= 5**

3.3.2.4 US Customary Units of Weight

3.3.2.4.1 US Avoirdupois Weight

The US pound avoirdupois was defined by Act of Congress in 1866 as 1/2.2046 kg, but was more accurately related to its metric equivalent in 1895 as 0.45359224277 kg. Today, for engineering purposes, the US and British pounds can be regarded as identical, defined as equal to 0.45359237 kg by the WMA, 1963 in Britain, and in North America by the *US Metric Board* in 1959 (USMB, 1959).

Now, when most countries are converting to metric units and the avoirdupois system is being phased out, there is pressure in the US for alignment with the rest of the world. So far, however, the pressure has been resisted on the grounds of economic and social upheaval.

See *Table **3-27*** opposite.

3.3.2.4.2 US Apothecaries' Weight

As with the UK units, these are now completely obsolete and their use is prohibited by the American Pharmacopoeia (USP). See *Table **3-28*** opposite.

Table 3-27 US avoirdupois weight
[1 lb av. (USMB, 1959) = 0.45359237 kg (E)]

Long ton (US ton)	**Short ton** (US ton)	**Long hundredweight** (lg cwt)	**Short hundredweight** (sh cwt)	**Pound** (lb av)	**Ounce** (oz av.)	**Dram** (dram av.)	**Grain** (gr av.)
1	= 28/25	= 20	= 112/5	= 2240	= 35 840	= 573 440	= 15 680 000
	1	**= 250/14**	= 20	= 2000	= 32 000	= 512 000	= 14 000 000
		1	**= 28/25**	= 112	= 1792	= 28 672	= 784 000
			1	**= 100**	= 1600	= 25 600	= 700 000
				1	**= 16**	= 256	= 7000
					1	**= 16**	= 875/2
						1	**= 875/32**

1 quintal (US) = 100lb

Table 3-28 US apothecaries' weight
[1 lb apoth. = 0.3732417216 kg]

Pound (lb apoth.)	**Ounce** (oz apoth.)	**Drachm** (dr apoth.)	**Scruple** (scr apoth.)	**Grain** (gr apoth.)
1	**= 12**	= 96	= 288	= 5760
	1	**= 8**	= 24	= 480
		1	**= 3**	= 60
			1	= 20

3.3.2.4.3 US Troy Weight

The troy system was formerly the UK legal system for weighing precious metals and gems. The name is derived from the town of Troyes in Northern France, famous in medieval times for its commercial fairs. It is now obsolete except in the USA. Its base unit is the **troy pound** of 5760 grains defined as 0.3732417216 kg, with other units as in the table below. The troy grain is identical to the grain avoirdupois.

Table 3-29 US troy weight
[1 lb troy = 0.3732417216 kg (E)]

Pound (lb troy)	**Ounce** (oz troy)	**Pennyweight** (dwt)	**Grain** (gr troy)
1	**= 12**	= 240	= 5760
	1	**= 20**	= 480
		1	**= 24**

Note: Another unit still in common use in jewellery for weighing gems is the **carat**; the old version of this unit of weight was equal to about 205 mg (3.164 grains). The **metric carat** was standardized at 200 mg (= 3.086 grains) in 1932. The **carat** (occasionally **karat**) is also a unit of purity of gold and other precious metal, with 24 carats as 100% wt pure, and other measures in proportion (e.g. 18 carat gold is 75% wt pure).

3.3.3 Obsolete Weight and Capacity Measures

In both the UK and the USA, some old measures of weight and capacity survive in a few specialized areas, chiefly with regard to beer, wines, and spirits, and agricultural products, though most are replaced by metric measures. The summary below is given mainly for historical interest.

3.3.3.1 UK Units of Weight for Butter and Cheese

Table 3-30 UK units of weight for butter and cheese
[1 lb (avdp.) = 0.453 592 37 kg (E)]

Wey (Suffolk)	**Whey** (Essex)	**Barrel**	**Dutch cask**	**Tub**	**Firkin**	**Clove**	**Pound** (avdp.)
1	**= 89/59**	= 89/56	= 89/28	= 178/42	= 89/14	= 89/2	= 356
	1	**= 59/56**	= 59/28	= 472/147	= 236/49	= 236/7	= 236
		1	**= 2**	= 64/21	= 32/7	= 32	= 224
			1	**= 32/21**	= 16/7	= 16	= 112
				1	**= 3/2**	= 10.5	= 84
					1	**= 7**	= 56
						1	**= 8**

1 roll = 24 oz

3.3.3.2 UK Units for Beer, Wines, and Spirits

Table 3-31 UK units for alcohols and spirits

Unit (alcohol)	**Approx. volume** (UK gal)	**Approx. volume** (dm^3)
octave (whisky)	16	73
quarter	17–30	77–136
aum (hock)	30–32	136–145
hogshead	44–60	200–273
hogshead (madeira)	45–48	205–218
hogshead (brandy)	56–61	255–277
puncheon	70–120	318–546
pipe	90–120	409–546
butt	108–117	491–532
tonneau, tun	190–200	864–909
stuck (hock)	260–265	1182–1205

Units especially applied to measures of beer are given in ***Table 3-32*** opposite.

Table 3-32 UK units of capacity for beer and ale measures (1803–1824)
[1 gallon (UK, beer) = 4.62115205 $dm^3 \equiv 282\ in^3$]

Tun	Butt	Puncheon	Hogshead	Barrel	Firkin	Pin	Gallon
1	**= 2**	= 3	**= 4**	= 6	= 24	= 48	= 216
	1	**= 3/2**	= 2	= 3	= 12	= 24	= 108
		1	**= 4/3**	= 2	= 8	= 16	= 72
			1	**= 3/2**	= 6	= 12	= 54
				1	**= 4**	= 8	= 36
					1	**= 2**	= 9
						1	**= 9/2**

Some bottle sizes, once used for wines in general, are now exclusively reserved for champagne, and then only in general parlance.

Table 3-33 UK units of capacity for wine

French name (English word)	**Reputed quarts** (No. of bottles)	**Volume** (UK gal)	**Volume** (dm^3)
1 salomon (solomon)	**24**	**4**	17.824368
1 nabuchodonosor (nabuchadnezzar)	**20**	**10/3**	15.153640
1 balthazar or balthasar (belshazzar)	**16**	**8/3**	12.122912
1 salmanazar (salmarazd)	**12**	**2**	9.092184
1 mathusalem (methuselah)	**9**	**3/2**	6.819138
1 rèhoboam (rehoboam)	**6**	**1**	4.546092
1 jèroboam (jeroboam)	**4**	**2/3**	3.030728
1 magnum (magnum)	**2**	**1/3**	1.515364
1 bouteille champenoise (reputed quart)	**1**	**1/6**	0.757682

3.3.3.3 UK Units of Weight for Coal

See ***Table 3-34*** overleaf for UK units of weight for coal.

3.3.3.4 UK Units for Clothes

Table 3-35 UK units of length for clothes

Quarter yard	**Nail** (UK)	**Inch**
1	= 4	= 9
	1	= 9/4

1 inch = 2.54×10^{-2} m (E)

Table 3-34 UK units of weight for coal

[1 pound (avdp.) = 0.45359237 kg (E)]

Ship load	**Keel**	**Room**	**Ton** (long)	**Sack** (large)	**Sack** (sck)	**Hundredweight** (cwt)	**Quarter** (qtr)	**Stone** (st)	**Pound** (lb)
1	**= 20**	= 424/7	= 424	= 4240	= 8480	= 8480	= 33920	= 67840	= 949760
	1	**= 106/35**	= 106/5	= 212	= 424	= 424	= 1696	= 3392	= 47488
		1	**= 7**	= 70	= 140	= 140	= 560	= 1120	= 15680
			1	**= 10**	= 20	= 20	= 80	= 160	= 2240
				1	**= 2**	= 2	= 8	= 16	= 224
					1	**= 1**	= 4	= 8	= 112
						1	**= 4**	= 8	= 112
							1	**= 2**	= 28
								1	**= 14**

3.3.3.5 UK and US Hay and Straw Weights

Measures of agricultural fodder formerly used are:

Table 3-36 UK and US hay and straw weights
[1 lb (UK, straw) = 0.453592338 kg]

Load	Truss	Pound (straw)	Pound (old hay)	Pound (new hay)
1	**= 36**	= 1296	= 2016	= 2160
	1	**= 36**	= 56	= 60
		1	**= 14/9**	= 5/3
			1	**= 15/14**

3.3.3.6 UK Weight for Wool

Table 3-37 UK weight for wool
[1 wey (UK, wool) = 114.30527724 kg (E)]

Load	Sack	Wey	Stone	Pound	Ounce
1	**= 108/13**	= 12	= 216	= 3024	= 48 384
	1	**= 13/9**	= 26	= 364	= 5824
		1	**= 18**	= 252	= 4032
			1	**= 14**	= 224
				1	= 16

1 sarpler = 2 sacks
1 tod = 28 lb
1 clove = 8 lb

3.3.3.7 US Units of Capacity Used in Food Recipes

See ***Table 3-38*** overleaf for US units of capacity used in food recipes.

3.3.3.8 US Units of Capacity for Wine

Table 3-39 US units of capacity for wine
[1 gallon (U.S., wine) = 231 in^3 (E) = $3.785411784 \times 10^{-3}$ m^3 (E)]

Tun	Pipe	Puncheon	Hogshead	Tierce	Anker	Gallon
1	**= 2**	= 3	= 4	= 6	= 126/5	= 252
	1	**= 3/2**	= 2	= 3	= 63/5	= 126
		1	**= 4/3**	= 2	= 42/5	= 84
			1	**= 3/2**	= 63/10	= 63
				1	**= 21/5**	= 42
					1	**= 10**

Table 3-38 US units of capacity used in food recipes

[1 fluid ounce (U.S.) = 29.573 529 5625 × 10^{-6} m^3]

Water glassful	Breakfast cup (tumblerful)	Cup	Teacupful (tcf)	Wine glassful	Fluid ounce (fl.oz.)	Coffee measure	Tablespoon (tbsp, tls, Tsp)	Dessertspoon (dst)	Teaspoon (tsp)	Dash	Coffee spoon (csp)	Salt spoon (ssp)	Drop (drp., gtt)
1	**= 8/5**	= 2	= 16/5	= 32/5	= 16	= 16	= 32	= 48	= 96	= 160	= 192	= 384	= 960
	1	**= 5/4**	= 2	= 4	= 10	= 10	= 20	= 30	= 60	= 100	= 120	= 240	= 600
		1	**= 8/5**	= 16/5	= 8	= 8	= 16	= 24	= 48	= 80	= 96	= 192	= 480
			1	**= 2**	= 5	= 5	= 10	= 15	= 30	= 50	= 60	= 120	= 300
				1	**= 5/2**	**= 5/2**	= 5	= 15/2	= 15	= 25	= 30	= 60	= 150
					1	**= 1**	= 2	= 3	= 6	= 10	= 12	= 24	= 60
						1	**= 2**	= 3	= 6	= 10	= 12	= 24	= 60
							1	**= 3/2**	= 3	= 5	= 6	= 12	= 30
								1	**= 2**	= 10/3	= 4	= 8	= 20
									1	**= 5/3**	= 2	= 4	= 10
										1	**= 6/5**	= 12/5	= 6
											1	**= 2**	= 5
												1	**= 5/2**

1 pinch = $\frac{1}{48}$ fluid ounce

3.3.3.9 Modern UK and US Dimensionless Units for Numbers of Paper Sheets

Table 3-40 Modern UK and US dimensionless units for numbers of paper sheets

Bale	Bundle	Ream	Quires	Sheet
1	**= 5**	= 10	= 200	= 5000
	1	**= 2**	= 40	= 1000
		1	**= 20**	= 500
			1	**= 25**

3.3.3.10 Old UK and US Dimensionless Units for Numbers of Paper Sheets

Table 3-41 Old UK and US dimensionless units for numbers of paper sheets

Bale (old)	**Bundle** (old)	**Ream** (old)	**Quires** (old)	**Sheet (old)**
1	**= 5**	= 10	= 200	= 4800
	1	**= 2**	= 40	= 960
		1	**= 20**	= 480
			1	**= 24**

1 perfect ream = 516 sheet

3.3.3.11 Old US Units for Measuring the Volume of Stacked Firewood

US units of volume for stacked firewood are shown in ***Table 3-42*** overleaf.

3.3.3.12 UK and US Dimensionless Counting Units

UK and US dimensionless counting units are shown in ***Table 3-43*** on page 53.

3.4 The Foot-Pound-Second (FPS) System

In parallel with the development of the cgs system (see 3.2.1 above) came what was seen as its imperial equivalent, the foot-pound-second system, proposed by W. Stroud in 1880 and sometimes called the Stroud system in commemoration. It became very widely employed in all branches of engineering, and most technical papers written in Britain, the USA, and other parts of the English-speaking world before about 1960 would have used these units, although scientific papers tended to use cgs units.

Its popularity in engineering was due not only to the use of imperial units as its base, but also because the pound and the foot were felt to be more convenient for engineers than the too-small centimetre and gram, and the too-large metre and kilogram. Although it was, strictly speaking, a non-decimal system, this was technically irrelevant since quantities could be expressed in decimals of feet, pounds, etc., so that the criticism of complexity in calculations usually aimed at the imperial system did not necessarily apply. It must be admitted, however, that, engineers being what they are, measures such as tons-feet and inches per second were not uncommon.

Table 3-42 US units of volume for stacked firewood

[1 cubic foot = 28.316 8465 920 × 10^{-3} m^3]

Standard (St. Petersburg, Pittsburgh)	**Cord** (cd.)	**Stack** (stk.)	**Load** (squared)	**Load** (unhewn)	**Cord-foot (cd-ft)**	**Cubic foot or timber foot (cu.ft, ft^3)**	**Faggot** (fgt)	**Board foot measure (bfm, fbm)**
1	**= 165/128**	= 55/36	= 55/14	= 99/16	= 165/16	= 165	= 55π	= 1980
	1	**= 32/27**	= 64/21	= 24/5	= 8	= 128	= 128π/3	= 1536
		1	**= 54/21**	= 81/20	= 27/4	= 108	= 36π	= 1296
			1	**= 63/40**	= 21/8	= 42	= 14π	= 504
				1	**= 5/3**	= 80/3	= 80π/9	= 320
					1	**= 16**	= 16π/3	= 144
						1	**= π/3**	= 12
							1	**= 36/π**

1 face cord = 1/2 cord (E)
1 house cord = 1/3 cord (E)
1 deal (UK) = 7ft x 6 ft x 5/2 in. (E)
1 deal (US) = 12 ft x 11 in. x 3/2 in. (E)
1 whole deal = 12 ft x 11 in. x 5/8 in. (E)
1 split deal = 12 ft x 8 ft x 16 in. (E)
1 rick = 4 ft x 8 ft x 16 in. (E)

Table 3-43 UK and US dimensionless counting units

Great gross (dozen gross)	Thousand	Gross	Great hundred	Hundred	Shock	Flock	Score	Baker's dozen	Dozen	Decade (dicker)	Hat trick (nest)	Pair (brace, yoke	Point (unity)	Half	Quart	Tithe
1	**= 216/125**	= 12	= 72/5	= 432/25	= 144/5	= 216/5	= 432/5	=1728/13	= 144	= 864/5	= 576	= 864	= 1728	= 3456	= 6912	= 17 280
	1	**= 125/18**	= 25/3	= 10	= 50/3	= 25	= 50	=1000/13	= 250/3	= 100	= 1000/3	= 500	= 1000	= 2000	= 4000	= 10 000
		1	**= 6/5**	=36/25	= 12/5	= 18/5	= 36/5	= 144/13	= 12	=72/5	= 48	= 72	= 144	= 288	= 576	= 1440
			1	**= 6/5**	= 2	= 3	= 6	= 120/13	= 10	= 12	= 40	= 60	= 120	= 240	= 480	= 1200
				1	**= 5/3**	= 5/2	= 5	= 100/13	=25/3	= 10	=100/3	= 50	= 100	= 200	= 400	= 1000
					1	**= 3/2**	= 3	= 60/13	= 5	= 6	= 20	= 30	= 60	= 120	= 240	= 600
						1	**= 2**	= 40/13	=10/3	= 4	= 40/3	= 20	= 40	= 80	= 160	= 400
							1	**= 20/13**	=5/3	= 2	=20/3	= 10	= 20	= 40	= 80	= 200
								1	**= 13/12**	= 13/10	= 13/3	= 13/2	= 13	= 26	= 52	= 260
									1	**= 6/5**	= 4	= 6	= 12	= 24	= 48	= 120
										1	**=10/3**	= 5	= 10	= 20	= 40	= 100
											1	**= 3/2**	= 3	= 6	= 12	= 30
												1	**= 2**	= 4	= 8	= 20
													1	**= 2**	= 4	= 10
														1	**= 2**	= 5
															1	**= 5/2**

Its main problem was that the *pound* had long been in common use as a unit of both *weight* and *mass*. This makes no difference in general and commercial usage, since, because of Earth's gravity, a mass of one pound weighs exactly one pound. For the non-technical reader, the difference may be illustrated by considering the same mass taken to another planet such as the Moon. Because the Moon's gravitational force is about one-sixth that of the Earth, the one-pound mass would weigh only one-sixth of a pound, although the mass itself would not have changed. Weight, therefore, is the *force* with which a mass is attracted by gravity, and, since it is an entirely different quantity, it requires a different unit.

Force was defined by Newton as *mass* × *acceleration*. In a coherent system of units, any derived unit must interrelate one-to-one with the system's base units, so that one force unit equals one mass unit times one acceleration unit. In the FPS system, with the pound as the unit of mass, one force unit is required to impart one acceleration unit (1 $ft.s^{-2}$) to a mass of one pound. The acceleration due to gravity is approximately 32 $ft.s^{-2}$, so that *weight* of one pound *mass* is in fact equal to 32 force units, and the force unit must therefore be 1/32 pounds (to be accurate, since g is 32.1740486 $ft.s^{-2}$, it is 1/32.17 or 0.031081 lbf, = 0.138255 N). This is termed the **poundal**.

However, because in general use the pound had always been appreciated as a unit of weight, there was a tendency among engineers to continue to use it in this way. In a variant of the FPS system, usually termed *technical*, *gravitational* or *engineers' units*, the **pound-force** (lbf) was taken as a base unit, and a unit of mass was derived from it by a reversal of the above considerations. This unit was named the *slug*, and was the mass which when acted upon by one pound-force experienced an acceleration of $1ft.s^{-2}$, so was equal to 32.17 lb. This version of the FPS system was more commonly used in the United States than anywhere else.

The FPS system was never made fully coherent by the incorporation of electrical or molar units. It did however have derived units which were for the most part expressed clearly in terms of their base units and not given separate names as in the SI. It is true that in practice they were often abbreviated (e.g. *psi* for $lbf.in^{-2}$), and that they were often used in a non-standard way, or in a way that confused the two subsystems. The example just quoted shows this quite clearly: the 'p' is intended to mean 'pounds-force', the abbreviation should be written $lbf.in^{-2}$, and the correct FPS pressure unit should have been poundals per square foot ($pdl.ft^{-2}$). In fact, the pound-force and pound-weight were often used quite indiscriminately, with the acceleration due to gravity, '*g*', being used so commonly as a correction factor that it was humorously referred to as the 'engineers' constant'.

Abbreviations of derived units often became acronymic in that engineers spoke of *pee-ess-eye* or *ar-pee-em* rather than pounds force per square inch or revolutions per minute. Among the non-standard abbreviations were sq. ft and cu. ft for square and cubic feet respectively, with sometimes a small square being used with an abbreviation (e.g. □ft) in drawings and calculations. A selection of FPS derived units is given in ***Table 3-44*** opposite.

With its various inconsistencies, inherent and imposed, and with the increasing internationalization of the metric system culminating in the creation of the SI, it was inevitable that the FPS system would become obsolete. Yet, in concluding this brief survey of the FPS system, it is worth noting that there was nothing inherently inconsistent in a system based on the foot and the pound in themselves. Decimalized, with a single set of force and mass units, and integrated with electrical and molar quantities, it could have been just as consistent and international as the metric-based SI. And, as the considerations of the following section on ancient units will show, there is a feeling among human beings that units based on the human body are somehow more comprehensible than those derived from the circumference of the Earth, or referred to the energy level of an atom.

Table 3-44 FPS derived units in common use

Quantity	FPS unit	Abbreviation (other units)	Conversion factor in SI unit
acceleration	foot per square second	$ft.s^{-2}$	1 $ft.s^{-2} = 0.3048\ m.s^{-2}$ (E)
angular velocity	revolutions per second	$rev.s^{-1}$ (also rps, rev/min, rpm)	1 rps $= 2\pi\ rad.s^{-1}$ (E)
area	square foot	ft^2, sq. ft	1 $ft^2 = 9.290304 \times 10^{-2}\ m^2$
energy, work	foot-poundal	ft.pdl	1ft.pdl $= 4.21401101 \times 10^{-2}$ J
force	poundal	pdl	1 pdl = 0.138254954376 N
frequency	cycles per second	$cycle.s^{-1}$ (cps)	1 cps = 1 Hz
heat	foot-poundal	ft.pdl (also British thermal unit, Btu)	1 ft.pdl $= 4.21401101 \times 10^{-2}$ J 1 Btu = 1055.06 J
power	foot-poundal per second	$ft.pdl.s^{-1}$ (also horsepower, hp)	1 $ft.pdl.s^{-1} = 4.21401101 \times 10^{-2}$ W 1 hp = 745.699871582 W
pressure, stress	poundal per square foot	$pdl.ft^{-2}$ (also pound-force/sq. in, psi)	1 $pdl.ft^{-2} = 1.48816394357$ Pa 1 psi = 6894.75729 Pa
velocity	foot per second	$ft.s^{-1}$ (also miles/hr, mph)	1$ft.s^{-1} = 0.3048\ m.s^{-1}$ (E)
volume	cubic foot	ft^3, cu. ft	1$ft^3 = 2.83168465920 \times 10^{-2}\ m^{-3}$

Note that psi, rpm, mph, Btu, and hp, although in common use in engineering calculations, were not derived FPS units.

3.5 Ancient and Obsolete Systems of Weights and Measures

From the very earliest times, human beings have found it necessary to weigh and measure the world around them, and the most ancient records include references to units of measurement. Most of these ancient units are now entirely obsolete. Our knowledge of them comes from texts and inscriptions which have survived, but the values of many have been quite reliably determined. This presentation of ancient systems of measurement is mainly for historical and general interest. Nevertheless, they illustrate the development of our modern systems, and the associated conversion tables could be of use to engineers and others reconstructing or evaluating ancient machinery, ships, or buildings.

Many early units, with an anthropocentrism which has persisted up to the present day, were based on the human body or its attributes. Units such as the **finger**, **hand**, **palm**, and **foot** are self-explanatory, while the **span** was the maximum width, thumb-tip to small fingertip, of the spread hand. The **inch** was the distance from the tip to the first joint of the thumb, and the surviving French word *pouce* in fact means 'thumb'. As a matter of incidental interest, the English word 'inch' comes from the Old German for 'one-twelfth', and has the same derivation as the word 'ounce'. The **cubit** was the distance from elbow to

fingertips (from the Latin *cubitum*, elbow), and is also sometimes known as the *ell* from the Germanic word for 'forearm' ('elbow' being derived from Old German *elnboga*, arm-bend). Together with the **fathom**, derived from the span of the arms or the height of a man, these ancient units can still be seen in use today when builders, woodworkers, or other tradespeople make rough estimates of quantities.

Units of length greater than the human body itself were usually expressed in terms of walking distances. The yard was about the length of a pace, and one thousand paces was a **mile** (Latin *milia passum*). Other units which expressed distance in terms of human activity were rough periods of time such as an **hour's walking**, or a **day's sailing**.

Measures of area and volume using square or cubic units are relatively recent inventions. Areas were first thought of in terms of reasonable-sized fields, that could be ploughed in a given time, and indeed the word acre is ultimately derived from the Sanskrit for 'field' (*ajra*). Likewise, volumes were thought of in terms of containers such as churns or barrels, or of human-sized portable units such as bundles of wood, bales of hay, sacks of grain, or pails of milk. The parallel between liquids and granular or powered solids was also noted, with the same measures being used for both. Sometimes, however, to equalize the 'feel' of measured quantities, a smaller measure was used for heavier materials, resulting in different sized 'pints', for example, in dry and liquid measures.

Weight units arose from these capacity measures, and there is a unit more or less equal to, and often called, a **pound** (Latin *pondus*, weight), in many ancient and obsolete systems. The relationship remains clear even in modern times. A pint of wine weighs about a pound, and a gallon of water weighs ten pounds. The word **ton** is from the same root as the name of the older unit, tun, a large wine cask of some 250 gallons, which would therefore weigh about 2000 pounds when full.

One of the oldest units of measurement is the **degree of arc**, which is usually supposed to have been invented by the Babylonians over 4000 years ago. It is curious that they should have chosen to divide the circle into 360 degrees: the simplest way would have been to divide it into halves, quarters, and so on, giving 256, or another multiple of 2, degrees in the circle. It has been suggested that the number 360 arose in an early attempt to guess the number of days in the year, but this is unlikely, since accurate astronomical data were known before recorded history began. However, the lunar month of approximately 30 days, the division of the solar year into 12 months, and the solar day into 12 hours, cannot fail to be related to the Babylonian number base of 60 and the division of the circle into 360 degrees.

Finally, of course, it should be remembered that these early units were connected with measuring time and constructing a calendar. In this respect it is interesting to consider that the second, determined by the Babylonians, is still the fundamental unit of time in all current systems of measurement, even the SI itself. It is therefore the unit in longest continuous official use, and, with the degree of arc, one of only two to have been in use throughout recorded history.

3.5.1 Systems from Antiquity

In this section, only the more important and the best known of these ancient systems have been included. It is also important to bear in mind that these systems were not consecutive, but were in a constant state of evolution and overlapped with one another to a large extent. It is therefore impossible to establish a time-scale over which any one system was used.

3.5.1.1 The Chinese System

3.5.1.1.1 Old Chinese Units of Length

These are shown in ***Table 3-45.***

3.5.1.1.2 Old Chinese Units of Area

Table 3-46 Old Chinese units of area
[1 meou = 614.4 m^2 = 6000 square tchi (E)]

Ching	King	Meou	Kish	Fen	Lyi	Kung (sq. pou)	Hao
1	**= 10**	= 100	= 400	= 1000	= 10 000	= 24 000	= 100 000
	1	**= 10**	= 40	= 100	= 1000	= 2400	= 10 000
		1	**= 4**	= 10	= 100	= 240	= 1000
			1	**= 5/2**	= 25	= 60	= 250
				1	**= 10**	= 24	= 100
					1	**= 12/5**	= 10
						1	**= 25/6**

3.5.1.1.3 Old Chinese Units of Weight

Table 3-47 Old Chinese units of weight
[1 jin = 0.596816 kg]

Dan (shih)	Tan	Jun (kwan)	Jin (tchin)	Liang	Zhu	Shu
1	**= 6/5**	= 4	= 120	= 1920	= 46 080	= 4 608 000
	1	**= 10/3**	= 100	= 1600	= 38 400	= 3 840 000
		1	**= 30**	= 480	= 11 520	= 1 152 000
			1	**= 16**	= 384	= 38 400
				1	**= 24**	= 2400
					1	**= 100**

1 jin = 1 catty
1 hao = 1/10000 liang (E)
1 lii = 1/1000 liang (E)
1 fen = 1/100 liang
1 tsouen = 1/10 liang

3.5.1.1.4 Old Chinese Units of Capacity

These are shown in ***Table 3-48*** (p. 59).

Table 3-45 Old Chinese units of length

[1 tchi = 0.32 m]

Tou	Thsan	Poû	Li	Kyo	fen	Yin (Yan)	Zhang	Pou	Tchi	Cun (tsouen)	Fen	Lî	Hao	Su	Hoé
1	= 25/8	= 25	= 250	= 1 500	= 3750	= 4500	= 45 000	= 90 000	= 450 000	= 4.5×10^6	= 4.5×10^7	= 4.5×10^8	= 4.5×10^9	= 4.5×10^{10}	= 4.5×10^{11}
	1	= 8	= 80	= 480	= 1200	= 1440	= 14 400	= 28 800	= 144 000	= 1.44×10^6	= 1.44×10^7	= 1.44×10^8	= 1.44×10^9	= 1.44×10^{10}	= 1.44×10^{11}
		1	= 10	= 60	= 150	= 180	= 1800	= 3600	= 18 000	= 1.8×10^5	= 1.8×10^6	= 1.8×10^7	= 1.8×10^8	= 1.8×10^9	= 1.8×10^{10}
			1	= 6	= 15	= 18	= 180	= 360	= 1800	= 1.8×10^4	= 1.8×10^5	= 1.8×10^6	= 1.8×10^7	= 1.8×10^8	= 1.8×10^9
				1	= 5/2	= 3	= 30	= 60	= 300	= 3×10^3	= 3×10^4	= 3×10^5	= 3×10^6	= 3×10^7	= 3×10^8
					1	= 6/5	= 12	= 24	= 120	= 1.2×10^3	= 1.2×10^4	= 1.2×10^5	= 1.2×10^6	= 1.2×10^7	= 1.2×10^8
						1	= 10	= 20	= 100	= 10^3	= 10^4	= 10^5	= 10^6	= 10^7	= 10^8
							1	= 2	= 10	= 10^2	= 10^3	= 10^4	= 10^5	= 10^6	= 10^7
								1	= 5	= 50	= 5×10^2	= 5×10^3	= 5×10^4	= 5×10^5	= 5×10^6
									1	= 10	= 10^2	= 10^3	= 10^4	= 10^5	= 10^6
										1	= 10	= 10^2	= 10^3	= 10^4	= 10^5
											1	= 10	= 10^2	= 10^3	= 10^4
												1	= 10	= 10^2	= 10^3
													1	= 10	= 10^2
														1	= 10

Table 3-48 Old Chinese units of capacity

[1 cheng = 1.03544 dm^3]

Ping	Chei	Hou	To	Cheng	Yo	Khô	Chao	Ço	Quei
1	**= 5**	= 10	= 50	= 500	= 2500	= 5000	= 50 000	= 500 000	= 5 000 000
	1	**= 2**	= 10	= 100	= 500	= 1000	= 10 000	= 100 000	= 1 000 000
		1	**= 5**	= 50	= 250	= 500	= 5000	= 50 000	= 500 000
			1	**= 10**	= 50	= 100	= 1000	= 10 000	= 100 000
				1	**= 5**	= 10	= 100	= 1000	= 10 000
					1	**= 2**	= 20	= 200	= 2000
						1	**= 10**	= 100	= 1000
							1	= 10	= 100
								1	= 10

Table 3-50 Indian units of weight

[1 pala = 47×10^{-3} kg]

Achita	Bara	Hara	Tuba	Pala	Kharsha	Tola	Kona	Dharana	Tank-sala	Masha	Retti (ratica)	Yava
1	**= 10**	= 100	= 200	= 20 000	= 200 000/3	= 80 000	= 400 000/3	= 200 000	= 3 200 000/9	= 3 200 000/3	= 6 400 000	= 64 000 000
	1	**= 10**	= 20	= 2000	= 20 000/3	= 8000	= 40 000/3	= 20 000	= 320 000/9	= 320 000/3	= 640 000	= 6 400 000
		1	**= 2**	= 200	= 2000/3	= 800	= 4000/3	= 2000	= 32 000/9	= 32 000/3	= 64 000	= 640 000
			1	**= 100**	= 1000/3	= 400	= 2000/3	= 1000	= 16 000/9	= 16 000/3	= 32 000	= 320 000
				1	**= 10/3**	= 4	= 20/3	= 10	= 160/9	= 160/3	= 320	= 3200
					1	**= 6/5**	= 2	= 3	= 16/3	= 16	= 96	= 960
						1	= 5/3	= 5/2	= 40/9	= 40/3	= 80	= 800
							1	**= 3/2**	= 8/3	= 8	= 48	= 480
								1	**= 16/9**	= 16/3	= 32	= 320
									1	**= 3**	= 18	= 180
										1	**= 6**	= 60
											1	**= 10**

3.5.1.2 The Indian System

3.5.1.2.1 Old Indian Units of Length

Table 3-49 Indian units of length
[1 hasta = 0.457 m]

Yodjana	Gavyuti	Crosa	Dhanush (orgyla)	Hasta (cubit)	Vistati (span)	Angula (finger)
1	**= 2**	= 4	= 8000	= 32 000	= 64 000	= 768 000
	1	**= 2**	= 4000	= 16 000	= 32 000	= 384 000
		1	**= 2000**	= 8000	= 16 000	= 192 000
			1	**= 4**	= 8	= 96
				1	**= 2**	= 24
					1	**= 12**

3.5.1.2.2 Indian Units of Weight

See ***Table 3-50*** (overleaf).

3.5.1.2.3 Indian Units of Capacity

See ***Table 3-51*** (p. 62).

3.5.1.3 The Egyptian System

3.5.1.3.1 Egyptian Units of Length

The earliest known unit of length was the **cubit**, which is the distance between the elbow and the tip of the middle finger. It was used by the Sumerians, Babylonians, Israelites, and Egyptians as a base unit. The Egyptian system of linear measure, sometimes called *Pharaonic measurements*, included two kinds of cubit, as shown in ***Table 3-52*** (p. 63).

3.5.1.3.2 Egyptian Units of Area

Table 3-53 Egyptian units of area
[1 pekeis = 27.405 225 m^2 = 100 sq. derah (E)]

Setta	Aurure	Rema (sq. senus)	Ten	Sû	Pekeis	Square derah
1	**= 10**	= 20	= 100	= 160	= 1000	= 100 000
	1	**= 2**	= 10	= 16	= 100	= 10 000
		1	= 5	= 8	= 50	= 5000
			1	**= 8/5**	= 10	= 1000
				1	**= 25/4**	= 625
					1	**= 100**

Table 3-51 Indian units of capacity (measured by weight)
[1 drona = 13.2 kg]

Baha	Cumbha	Shari	Cumbha short	Drona	Adhaka	Prastha	Cudava	Musti (pala)
1	= 10	= 25/2	= 100	= 200	= 800	= 3200	= 6400	= 51 200
	1	= 5/4	= 10	= 20	= 80	= 320	= 640	= 5120
		1	= 8	= 16	= 64	= 256	= 512	= 4096
			1	= 2	= 8	= 32	= 64	= 512
				1	= 4	= 16	= 32	= 256
					1	= 4	= 8	= 64
						1	= 2	= 16
							1	= 8

Table 3-52 Egyptian units of length (System of the Pharaon)

[1 derah (Royal cubit) = 0.5235 m]

Royal atour	**Parasange**	**Shoëme**	**Atour**	**Mille** (mile)	**Stade** (stadium)	**Senus**	**Canne**	**Orgye** (fathom)	**Xilon**	**Long cubit**	**Derah** (Royal cubit)	**Pigon**	**Zereth** (Royal foot)
1	= 3/2	= 5/3	= 2	= 6	= 50	= 200	= 18 000/7	= 5 000	= 20 000/3	= 15 000	= 20 000	= 24 000	= 30 000
	1	= 10/9	= 4/3	= 4	= 100/3	= 400/3	= 12 000/7	= 10 000/3	= 40 000/9	= 10 000	= 40 000/3	= 16 000	= 20 000
		1	= 6/5	= 18/5	= 30	= 120	= 10 800/7	= 3000	= 4000	= 9000	= 12 000	= 14 400	= 18 000
			1	= 3	= 25	= 100	= 9000/7	= 2500	= 10 000/3	= 7500	= 10 000	= 12 000	= 15 000
				1	= 25/3	= 100/3	= 3000/7	= 2500/3	= 10 000/9	= 2500	= 10 000/3	= 4000	= 5000
					1	= 4	= 360/7	= 100	= 400/3	= 300	= 400	= 480	= 600
						1	= 90/7	= 25	= 100/3	= 75	= 100	= 120	= 150
							1	= 35/18	= 70/27	= 35/6	= 70/9	= 28/3	= 35/3
								1	= 4/3	= 3	= 4	= 24/5	= 6
									1	= 9/4	= 3	= 18/5	= 9/2
										1	**= 4/3**	= 8/5	= 2
											1	= 6/5	= 3/2
												1	= 5/4

Table 3-52 Egyptian units of length *(continued)*

[1 derah (Royal cubit) = 0.5235 m]

Orgye (fathom)	**Xilon**	**Long cubit**	**Derah** (Royal cubit)	**Pigon**	**Zereth** (Royal foot)	**Spithame** (span)	**Dichas**	**Choryos** (palm)	**Thebs** (finger)	**Digits**
1	**= 4/3**	= 3	= 4	= 24/5	= 6	= 8	= 12	= 24	= 96	= 192
	1	**= 9/4**	= 3	= 18/5	= 9/2	= 6	= 9	= 18	= 72	= 144
		1	**= 4/3**	= 8/5	= 2	= 8/3	= 4	= 8	= 32	= 64
			1	**= 6/5**	= 3/2	= 2	= 3	= 6	= 24	= 48
				1	**= 5/4**	= 5/3	= 5/2	= 5	= 20	= 40
					1	**= 4/3**	= 2	= 4	= 16	= 32
						1	**= 3/2**	= 3	= 12	= 24
							1	**= 2**	= 8	= 16
								1	**= 4**	= 8
									1	**= 2**

3.5.1.3.3 Egyptian Units of Weight

Table 3-54 Egyptian units of weight
[1 deben = 13.65 × 10^{-3} kg]

Talent (kikkar)	Mine	Kedet	Deben (sicles)	Sep	Grain	Gerah (obol)
1	**50**	= 300	3000	30 000	45 000	= 60 000
	1	= 6	= 60	=600	= 900	= 1200
		1	= 10	= 100	= 150	= 200
			1	= 10	= 15	= 20
				1	= 3/2	= 2
					1	= 4/3

3.5.1.3.4 Egyptian Units of Capacity

Table 3-55 Egyptian units of capacity (measured by weight)
[1 khar = 34 kg]

Letech	Artabe	Metretes of Heron	Khar (keramion)	Apt	Hecte	Maân (mine)	Outen
1	**= 45/16**	= 27/8	= 135/32	= 135/8	= 135/2	= 675/4	= 675
	1	**= 6/5**	= 3/2	= 6	= 24	= 60	= 240
		1	**= 5/4**	= 5	= 20	= 50	= 200
			1	**= 4**	= 16	= 40	= 160
				1	**= 4**	= 10	= 40
					1	**= 5/2**	= 10
						1	**= 4**

3.5.1.4 The Assyrio-Chaldean-Persian System

3.5.1.4.1 Persian Units of Length

These are shown in ***Table 3-56*** (opposite).

3.5.1.4.2 Persian Units of Area

Table 3-57 Persian units of area
[1 gar = 14.7456 m^2 = 1 sq. qasab (E)]

Gur	Gan	Ten	Gar	Square zereth
1	**= 10**	= 100	= 1000	= 144 000
	1	= 10	= 100	= 14 400
		1	**= 10**	= 1440
			1	**= 144**

Table 3-56 Persian units of length

[1 foot (Persian) = 1 zereth (persian) = 0.320 m]

Mansion (stathmos)	**Schoëme**	**Parasang**	**Mille** (mile)	**Ghalva** (stadion)	**Chebel**	**Qasab** (cane)	**Pace**	**Cubit** (long)	**Zereth** (foot)	**Palm**	**Finger**
1	**= 100/27**	= 4	= 400/27	= 1000/9	= 1000	= 20 000/3	= 40 000/3	= 40 000	= 80 000	= 320 000	= 1 280 000
	1	**= 27/25**	= 4	= 30	= 270	= 1800	= 3600	= 10 800	= 21 600	= 86 400	= 345 600
		1	**= 100/27**	= 250/9	= 250	= 5000/3	= 10 000/3	= 10 000	= 20 000	= 80 000	= 320 000
			1	**= 15/2**	= 135/2	= 450	= 900	= 2700	= 5400	= 21 600	= 86 400
				1	**= 9**	= 60	= 120	= 360	= 720	= 2880	= 11 520
					1	**= 20/3**	= 40/3	= 40	= 80	= 320	= 1 280
						1	**= 2**	= 6	= 12	= 48	= 192
							1	**= 3**	= 6	= 24	= 96
								1	**= 2**	= 8	= 32
									1	**= 4**	= 16
										1	= 4

3.5.1.4.3 Persian Units of Weight

Table 3-58 Persian units of weight
[1 talent = 32.6 kg]

Talent	Mine	Drachm
1	100	10 000
	1	100

3.5.1.4.4 Persian Units of Capacity

Table 3-59 Persian units of capacity (measured by weight)
[1 amphora = 32.60 kg]

Gariba	Long amphora	Long artaba	Short artaba	Amphora	Woëbe (modius)	Makuk	Cados
1	**= 8/3**	= 4	= 16/3	= 8	= 16	= 64	= 256
	1	**= 3/2**	= 2	= 3	= 6	= 24	= 96
		1	**= 4/3**	= 2	= 4	= 16	= 64
			1	**= 3/2**	= 3	= 12	= 48
				1	**= 2**	= 8	= 32
					1	**= 4**	= 16
						1	**= 4**

1 subit = 1.5 feet

3.5.1.5 The Hebrew System

3.5.1.5.1 Hebrew Units of Length

Table 3-60 Hebrew units of length
[1 sacred cubit = 0.640 m]
[1 cubit = 0.555 m]

Cubit (long)	Zereth (foot)	Palm	Finger
1	**= 2**	= 6	= 24
	1	**= 3**	= 12
		1	**= 4**

3.5.1.5.2 Hebrew Units of Weight (Sacred System)

Table 3-61 Hebrew units of weight (sacred system)
[1 mina = 0.850 kg]

Talent of Moses	Mina	Shekel	Bekah	Rabah	Gerah (Obol)
1	**= 50**	= 3000	= 6000	= 12 000	= 60 000
	1	**= 60**	= 120	= 240	= 1200
		1	**= 2**	= 4	= 20
			1	**= 2**	= 10
				1	**= 5**

3.5.1.5.3 Hebrew Units of Weight (Talmudic or Rabbinical System)

Table 3-62 Hebrew units of weight (Talmudic or Rabbinical system)
[1 mina = 0.3542 kg]

Talent	Mina	Shekel	Zuzah (Drachm)	Mehah (Obol)	Pondiuscule
1	**= 60**	= 1500	= 6000	= 36 000	= 72 000
	1	**= 25**	= 100	= 600	= 1200
		1	**= 4**	= 24	= 48
			1	**= 6**	= 12
				1	**= 2**

3.5.1.5.4 Hebrew Units of Capacity (Dry)

Table 3-63 Hebrew units of capacity (measured by weight)
(Dry products)
[1 ephah (Old) = 29.376 kg]
[1 ephah (New) = 21.420 kg]

Cor	Ephah	Sath (modius)	Gomor	Cab	Log
1	**= 10**	= 100/3	= 100	= 180	= 720
	1	**= 10/3**	= 10	= 18	= 72
		1	**= 3**	= 27/5	= 108/5
			1	**= 9/5**	= 36/5
				1	**= 4**

3.5.1.5.5 Hebrew Units of Capacity (Liquids)

Table 3-64 Hebrew units of capacity (measured by weight) (Liquids)
[1 bath (Old) = 29.376 kg]
[1 bath (New) = 21.420 kg]

Cor	Bath	Hin	Log
1	**= 10**	= 60	= 720
	1	**= 6**	= 72
		1	**= 12**

3.5.1.6 The Greek System (Attic)

3.5.1.6.1 Greek Units of Length

These are shown in ***Table 3-65*** (opposite).

Table 3-65 Greek (Attic) units of length

[1 pous = 0.30856 m]

Mile	Stadion	Plethron	Amma (cord)	Akaina	Orguia (fathom)	Bema (pace)	Long cubit	Pous (foot)	Spithane (span)	Dichas	Palestra (palm)	Condylos	Daktylos (finger)
1	**= 15/2**	= 45	= 75	= 500	= 750	= 1800	= 2250	= 4500	= 6000	= 9000	= 18 000	= 36 000	= 72 000
	1	**= 6**	= 10	= 200/3	= 100	= 240	= 300	= 600	= 800	= 1200	= 2400	= 4800	= 9600
		1	**= 5/3**	= 100/9	= 50/3	= 40	= 50	= 100	= 400/3	= 200	= 400	= 800	= 1600
			1	**= 20/3**	= 10	= 24	= 30	= 60	= 80	= 120	= 240	= 480	= 960
				1	**= 3/2**	= 18/5	= 9/2	= 9	= 12	= 18	= 36	= 72	= 144
					1	**= 12/5**	= 3	= 6	= 8	= 12	= 24	= 48	= 96
						1	**= 5/4**	= 5/2	= 10/3	= 5	= 10	= 20	= 40
							1	**= 2**	= 8/3	= 4	= 8	= 16	= 32
								1	**= 4/3**	= 2	= 4	= 8	= 16
									1	**= 3/2**	= 3	= 6	= 12
										1	**= 2**	= 4	= 8
											1	**= 2**	= 4
												1	**= 2**

1 stathmos = 80 000 pous
1 dolichas = 6 diaulos
1 diaulos = 2 stadia
1 xylon = 4.5 pous
1 pechya = 24 digits
1 pygon = 20 digits
1 cubit = 1.5 pous

3.5.1.6.2 Greek Units of Weight

Table 3-66 Greek (Attic) units of weight
[1 talent = 25.920 kg]

Talent	Mine	Drachma	Diobol	Obol	Chalque
1	**= 60**	= 6000	= 18 000	= 36 000	= 288 000
	1	**= 100**	**= 300**	**= 600**	= 4800
		1	**= 3**	= 6	= 48
			1	**= 2**	= 16
				1	= 8

3.5.1.6.3 Greek Units of Capacity (Dry)

The Greek system of capacity measures, which was divided into two sub-systems, one for dry substances and one other for liquids, was the following:

Table 3-67 Greek (Attic) units of capacity (Dry products)
[1 cotyle = 0.27 dm^3]

Medimnos	Hektos (modius)	Chenica	Sexte	Cotyle	Oxybaphon	Cyanthos
1	**= 6**	= 48	= 96	= 192	= 768	= 1152
	1	**= 8**	= 16	= 32	= 128	= 192
		1	**= 2**	= 4	= 16	= 24
			1	**= 2**	= 8	= 12
				1	**= 4**	= 6
					1	**= 3/2**

3.5.1.6.4 Greek Units of Capacity (Liquids)

Table 3-68 Greek (Attic) units of capacity (Liquids)
[1 cotyle = 0.27 dm^3]

Metretes	Amphora	Maris	**Khous** (congius)	Cotyle
1	**= 2**	= 6	= 12	= 144
	1	**= 3**	= 6	= 64
		1	**= 2**	= 24
			1	**= 12**

3.5.1.7 The Roman System

The Roman system of weights and measures was among the many customs adopted by the peoples conquered by the Romans throughtout Europe and western Asia.

3.5.1.7.1 Roman Units of Length

These are shown in ***Table 3-69*** (overleaf).

3.5.1.7.2 Roman Units of Area

See ***Table 3-70*** (p. 71).

Table 3-69 Roman units of length

[1 pes (common) = 0.2944 m]
[1 pes (Druisian) = 0.3196 m]
[1 pes (legal, 1st) = 0.2962 m]
[1 pes (legal, 2nd) = 0.2967 m]

Milliarum (mile)	**Actus** (chain)	**Decempeda** (perch)	**Passus** (double pace)	**Gradus** (simple pace)	**Cubitus** (cubit)	**Palmipes**	**Pes** (foot)	**Palmus** (span)	**Uncia** (inch)	**Digitus** (finger)
1	**= 125/3**	= 500	= 1000	= 2000	= 10 000/3	= 4000	= 5000	= 20 000	= 60 000	= 80 000
	1	**= 12**	= 24	= 48	= 80	= 96	= 120	= 480	= 1440	= 1920
		1	**= 2**	= 4	= 20/3	= 8	= 10	= 40	= 120	= 160
			1	**= 2**	= 10/3	= 4	= 5	= 20	= 60	= 80
				1	**= 5/3**	= 2	= 5/2	= 10	= 30	= 40
					1	**= 6/5**	= 3/2	= 6	= 18	= 24
						1	**= 5/4**	= 5	= 15	= 20
							1	**= 4**	= 12	= 16
								1	**= 3**	= 4
									1	**= 4/3**

1 palmipes = 1 pes + 1 palmus (E)
1 cubitus = 1 palmipes + 2 palmus
1 gradus = 2 pes + 2 palmus (E)
1 stadium = 625 pes (E)
1 schoenus = 20 000 pes (E)
1 legua = 7500 pes (E)

Table 3-70 Roman units of area

[1 quadratus pes (legal, 1st) = 8.773444×10^{-2} m^{-2}]

[1 quadratus pes (common à levoil) = 8.667136×10^{-2} m^2]

Saltus	Centurium	Heredium	Jugerum	Actus	Versum	Clima	Short actus	Decempeda quadrata	Quadratus pes
1	**= 4**	= 400	= 800	= 1600	= 2304	= 6400	= 57 600	= 230 400	= 23 040 000
	1	**= 100**	= 200	= 400	= 576	= 1600	= 14 400	= 57 600	= 5 760 000
		1	**= 2**	= 4	= 144/25	= 16	= 144	= 576	= 57 600
			1	**= 2**	= 72/25	= 8	= 72	= 288	= 28 800
				1	**= 36/25**	= 4	= 36	= 144	= 14 400
					1	**= 25/9**	= 25	= 100	= 10 000
						1	= 9	= 36	= 3 600
							1	**= 4**	= 400
								1	**= 100**

3.5.1.7.3 Roman Units of Weight

See ***Table 3-71*** (p. 74).

3.5.1.7.4 Roman Units of Capacity (Dry)

Table 3-72 Roman units of capacity (Dry materials)
[1 modius = 8.788480 dm^3]

Quadrantal	**Modius** (muid)	**Semodius**	**Sextarius** (setier)	**Hemina**
1	**= 3**	= 6	= 48	= 96
	1	**= 2**	= 16	= 32
		1	**= 8**	= 16
			1	**= 2**

3.5.1.7.5 Roman Units of Capacity (Liquids)

See ***Table 3-73*** (p. 75).

3.5.1.8 The Arabic System

3.5.1.8.1 Arabic Units of Length

See ***Table 3-74*** (p. 76).

3.5.1.8.2 Arabic Units of Area

See ***Table 3-75*** (p. 77).

3.5.1.8.3 Arabic Units of Weight (System of the Prophet)

See ***Table 3-76*** (p. 77).

3.5.1.8.4 Arabic Units of Capacity

See ***Table 3-77*** (p. 78).

3.5.2 Obsolete National and Regional Systems

3.5.2.1 Western and Southern Europe

3.5.2.1.1 Old French System (Ancien Régime)

In France, under the *Ancien Régime* (i.e., before the French Revolution of 1789), the old measures derived from the system of Charlemagne. However, units varied from one region to another; subdivisions were irregular and also suffered regional variations, which tended to complicate business transactions.

The international metric system has been compulsory since 1794.

Table 3-71 Roman units of weight

[1 uncia = 0. 02725 kg]

Libra (podium)	Deunx	Dextans	Dodrans	Bes	Septunx	Semis	Quicunx	Triens	Quadrans	Sextans	Uncia (ounce)	Semuncia	Scripulum
1	= 12/11	= 6/5	= 4/3	= 3/2	= 12/7	= 2	= 12/5	= 3	= 4	= 6	= 12	= 24	= 288
	1	**= 11/10**	= 11/9	= 11/8	= 11/7	= 11/6	= 11/5	= 11/4	= 11/3	= 11/2	= 11	= 22	= 264
		1	**= 10/9**	= 5/4	= 10/7	= 5/3	= 2	= 5/2	= 10/3	= 5	= 10	= 20	= 240
			1	**= 9/8**	= 9/7	= 3/2	= 9/5	= 9/4	= 3	= 9/2	= 9	= 18	= 216
				1	**= 8/7**	= 4/3	= 8/5	= 2	= 8/3	= 4	= 8	= 16	= 192
					1	**= 7/6**	= 7/5	= 7/4	= 7/3	= 7/2	= 7	= 14	= 168
						1	**= 6/5**	= 3/2	= 2	= 3	= 6	= 12	= 144
							1	**= 5/4**	= 5/3	= 5/2	= 5	= 10	= 120
								1	**= 4/3**	= 2	= 4	= 8	= 96
									1	**= 3/2**	= 3	= 6	= 72
										1	**= 2**	= 4	= 48
											1	**= 2**	= 24
												1	**= 12**

1 centum podium = 100 libra
1 mina = 5/3 libra
1 sescuncia = 1/2 uncia

Table 3-71 Roman units of weight *(continued)* [1 uncia = 0.02725 kg]

Libra (podium)	**Uncia** (ounce)	**Semuncia**	**Duella**	**Sicilium**	**Miliaresium**	**Solidus** (sextula)	**Denarius**	**Denier**	**Scripulum**
1	= 12	= 24	= 36	= 48	= 60	= 72	= 84	= 96	= 288
	1	= 2	= 3	= 4	= 5	= 6	= 7	= 8	= 24
		1	= 3/2	= 2	= 5/2	= 3	= 7/2	= 4	= 12
			1	= 4/3	= 5/3	= 2	= 7/3	= 8/3	= 8
				1	= 5/4	= 3/2	= 7/4	= 2	= 6
					1	= 6/5	= 7/5	= 8/5	= 24/5
						1	= 7/6	= 4/3	= 4
							1	= 8/7	= 24/7
								1	= 3

Table 3-73 Roman units of capacity (liquids) [1 sextarius = 0.54928 dm^3]

Culleus (dolium) (hogshead)	**Amphora** (metrete)	**Urna** (urn)	**Congius** (gallon)	**Sextarius** (setier)	**Hemina**	**Quartus**	**Acetabulum**	**Cyathus**
1	= 20	= 40	= 160	= 960	= 1920	= 3840	= 7680	= 11 520
	1	= 2	= 8	= 48	= 96	= 192	= 384	= 576
		1	= 4	= 24	= 48	= 96	= 192	= 288
			1	= 6	= 12	= 24	= 48	= 72
				1	= 2	= 4	= 8	= 12
					1	= 2	= 4	= 6
						1	= 2	= 3
							1	= 3/2

1 cochlearia = 1/48 sextarius (e)

1 chenica = 3/2 sextarius (E)

Table 3-74 Arabic units of length

[1 foot (Arabic) = 0.320 m]

Marhala	**Barid** (veredus)	**Parasang**	**Mille**	**Ghalva**	**Seir** (stadion)	**Qasab**	**Orgye** (pace)	**Cubit** (hachemic)	**Cubit** (new)	**Foot**	**Cabda** (palm)	**Assbaa** (finger)
1	**= 2**	= 8	= 24	= 200	= 240	= 12 000	= 24 000	= 72 000	= 96 000	= 144 000	= 576 000	= 2 304 000
	1	**= 4**	= 12	= 100	= 120	= 6000	= 12 000	= 36 000	= 48 000	= 72 000	= 2 88 000	= 1 152 000
		1	**= 3**	= 25	= 30	= 1500	= 3000	= 9000	= 12 000	= 18 000	= 72 000	= 288 000
			1	**= 225/27**	= 10	= 500	= 1000	= 3000	= 4000	= 6000	= 24 000	= 96 000
				1	**= 6/5**	= 60	= 120	= 360	= 480	= 720	= 2880	= 11 520
					1	**= 50**	= 100	= 300	= 400	= 600	= 2400	= 9600
						1	**= 2**	= 6	= 8	= 12	= 48	= 192
							1	**= 3**	= 4	= 6	= 24	= 96
								1	= 4/3	= 2	= 8	= 32
									1	**= 3/2**	= 6	= 24
										1	**= 4**	= 16
											1	**= 4**

Table 3-75 Arabic units of area

[1 feddan = 5898.24 m^2]

Feddan	**Djarib**	**Daneq**	**Qirat**	**Cafiz**	**Habbah**	**Qamha**	**Qasaba** (Achir)	**Square cubit** (Hachemic)
1	**= 4**	= 6	= 24	= 40	= 72	= 96	= 400	= 14 400
	1	**= 3/2**	= 6	= 10	= 18	= 24	= 100	= 3600
		1	= 4	= 20/3	= 12	= 16	= 200/3	= 2400
			1	**= 5/3**	= 3	= 4	= 50/3	= 600
				1	**= 9/5**	= 12/5	= 10	= 360
					1	**= 4/3**	= 50/9	= 200
						1	**= 25/6**	= 150
							1	**= 36**

Table 3-76 Arabic units of weight (so-called *System of the Prophet*)

[1 rotl = 0.340 kg]

Kikkar	**Quanthar** (talent)	**Ocque** (oka)	**Man** (mine)	**Rotl** (rotolo)	**Oukia**	**Nasch**	**Nevat**	**Dihrem**
1	**= 5/4**	= 125/4	= 125/2	= 125	= 375	= 750	= 3000	= 15 000
	1	**= 25**	= 50	= 100	= 300	= 600	= 2400	= 12 000
		1	**= 2**	= 4	= 12	= 24	= 96	= 480
			1	**= 2**	= 6	= 12	= 48	= 240
				1	**= 3**	= 6	= 24	= 120
					1	**= 2**	= 8	= 40
						1	**= 4**	= 20
							1	**= 5**

Table 3-77 Arabic units of capacity (measured by weight)

[1 cafiz = 32.640 kg]

Gariba (den)	**Artabe** (amphora)	**Modius**	**Cafiz** (talent)	**Khoull** (woëbe)	**Ferk**	**Makuk**	**Sâa**	**Caphite** (kist, kiladja)	**Mudd**
1	**= 4**	= 32/5	= 8	= 16	= 32	= 64	= 96	= 192	= 384
	1	**= 8/5**	= 2	= 4	= 8	= 16	= 24	= 48	= 96
		1	**= 5/4**	= 5/2	= 5	= 10	= 15	= 30	= 60
			1	**= 2**	= 4	= 8	= 12	= 24	= 48
				1	= 2	= 4	= 6	= 12	= 24
					1	= 2	= 3	= 6	= 12
						1	**= 3/2**	= 3	= 6
							1	= 2	= 4
								1	**= 2**

3.5.2.1.1.1 Old French Units of Length

Table 3-78 Old French units of length
[1 pied (de Paris) = 1 pied du Roi (Charlemagne) = 0.3248394167 m]
[1 toise (de Perou) = 1.9490365 m (E)]

Lieue (league)	**Perche** (perch)	**Toise**	**Aune** (ell)	**Pied** (foot)	**Pouce** (inch)	**Ligne** (line)	**Point** (point)
1	**= 380/3**	= 2 280	= 6840	= 13 680	= 161 160	= 1 969 920	= 23 639 040
	1	**= 3**	= 9	= 18	= 216	= 2592	= 31 104
		1	**= 3**	**= 6**	= 72	= 864	= 10 368
			1	**= 2**	= 24	= 288	= 3456
				1	**= 12**	= 144	= 1728
					1	= 12	= 144
						1	= 12

1 lieue (Gauloise) = 2222 m
1 lieue (de Paris) = 1666 toises (1674)
1 lieue (de Paris) = 2000 toises (1674–1737)
1 lieue (de Paris) = 2280 toises (1737–1794)
1 perche (ordinaire) = 20 pieds
1 perche (eaux & forêts) = 22 pieds

Table 3-79 Old French nautical units of length
[1 pied (de Paris) = 0.3248394167 m]
[1 toise (de Perou) = 1.9490365 m (E)]

Lieue marine (nautical league)	**Mille marin** (nautical mile)	**Encablure** (cable length)	**Toise**	**Brasse** (fathom)	**Pied** (foot)
1	= 3	= 30	= 3000	= 3600	= 18 000
	1	= 10	= 1000	= 1200	= 6000
		1	= 100	= 120	= 600
			1	= 6/5	= 6
				1	**= 5**

3.5.2.1.1.2 Old French Units of Area

Table 3-80 Old French units of area
[1 pied carré (de Paris) = 0.105520646642 m^2]

Arpent (Eaux et Forêts)	**Arpent** (de Paris)	**Perche** (Eaux et Forêts)	**Perche** (de Paris)	**Toise carrée**	**Pied carré**
1	**= 121/81**	**= 100**	= 12 100/81	= 12 100/9	= 48 400
	1	**= 8100/121**	= 100	= 900	= 32 400
		1	**= 121/81**	= 121/9	= 484
			1	**= 9**	= 324
				1	**= 36**

1 journal = 40 ares
1 vergé = 1/4 arpent
1 quartier = 25 perches
1 acre = 160 perches

Definition of the journal: surface labourable par un homme en une journée d'été.

Bordeaux	1 journal = 31.9 ares
Saint–Brieuc	1 journal = 40 ares
Mamers	1 journal = 44 ares
Nord de la Mayenne	1 journal = 50 ares
Domfront	1 journal = 50 ares

Table 3-81 Old French units of area (regional variations)

Region	Unit of area	Other Units
Normandie	Acre	1 acre = 160 perches (for land) 1 quartier = 25 perches (for forest)
Bourgogne	Journal	1 journal = 360 perches de 9 pieds et demi (aire que 8 hommes peuvent bécher par une journée d'été) 1 arpent = 440 perches
Dauphiné	Sestérée	1 sestérée = 900 cannes quarrées 1 sestérée = 4 cartelées 1 cartelée = 4 civadiers 1 civadier = 4 picotins
Provence	Saumée	1 saumée = 1500 cannes quarrées 1 saumée = $2\frac{1}{2}$ cartelées 1 cartelée = 4 civadiers 1 civadier = 4 picotins
Languedoc	Saumée	1 saumée = 1600 cannes quarrées 1 canne = 8 pans 1 pan = 8 pouces et 9 lignes
Bretagne	Journal	1 journal = $22\frac{1}{3}$ seillons 1 seillon = 6 raies 1 raie = $2\frac{1}{2}$ gaules 1 gaule = 12 pieds
Tourraine	Arpent	1 arpent = 100 chaines 1 chaine = 25 pieds 1 pied = 12 pouces
Lorraine	Journal	1 journal = 250 toises quarrées 1 toise = 10 pieds 1 pied = 10 pouces
Orléanais	Arpent	1 arpent = 100 perches quarrées 1 perche = 20 pieds 1 pied = 12 pouces

3.5.2.1.1.3 Old French Units of Capacity

Units of capacity for liquids are shown in ***Table 3-82*** (opposite).

Table 3-83 Old French units of capacity (Dry materials)
[1 sétier = 151.68 dm^3]

Muid	Setier	Mine	Minot	Boisseau	Quart	Litron
1	**= 12**	= 24	= 48	= 144	= 576	= 2304
	1	**= 2**	= 4	= 12	= 48	= 192
		1	= 2	= 6	= 24	= 96
			1	**= 3**	= 12	= 48
				1	**= 4**	= 16
					1	**= 4**

1 voie (de Paris) = 1.920 m^3 (for wood)
1 voie (de Paris) = 4 pieds × 4 pieds × 3 pieds 6 pouces
1 corde (Eaux et Forêts) = 8 pieds × 4 pieds × 3 pieds 6 pouces

3.5.2.1.1.4 Old French Units of Weight

These are shown in ***Tables 3-84*** and ***3-85*** (opposite).

Table 3-82 Old French units of capacity (Liquids)

[1 pinte (de Paris) = 0.952146258475 dm^3] = 48 pouches cubes (Def. 1742)

Muid	Feuillette	Quartaut	Velte	Pot (quade, cade)	Pinte (pint)	Chopine (sétier)	Demi-setier	Posson	Demi-posson	Roquille
1	**= 2**	= 4	= 36	= 144	= 288	= 576	= 1152	= 2304	= 4608	= 9216
	1	**= 2**	= 18	= 72	= 144	= 288	= 576	= 1152	= 2304	= 4608
		1	**= 9**	= 36	= 72	= 144	= 288	= 576	= 1152	= 2304
			1	**= 4**	= 8	= 16	= 32	= 64	= 128	= 256
				1	**= 2**	**= 4**	**= 8**	**= 16**	**= 32**	**= 64**
					1	**= 2**	= 4	**= 8**	**= 16**	**= 32**
						1	**= 2**	= 4	**= 8**	**= 16**
							1	**= 2**	= 4	**= 8**
								1	**= 2**	= 4
									1	**= 2**

1 pipe = 1.5 muid
1 tonneau de jauge = 2.83 m^3
1 tonneau de mer = 1.44 m^3
1 muid = 1 tonneau

Table 3-84 Old French units of weight

[1 livre (de Paris) = 0.48950585 kg]

Tonneau de mer	Millier (thousand)	Quintal (quintal)	Livre (pound)	Marc (mark)	Quarteron	Once (ounce)	Lot	Gros (drachm)	Denier (scruple)	Grain (grain)
1	**= 2**	= 20	**= 2000**	**= 4000**	= 8000	**= 32 000**	**= 64 000**	**= 256 000**	**= 768 000**	**= 18 132 000**
	1	**= 10**	= 1000	**= 2000**	= 4000	**= 16 000**	**= 32 000**	**= 128 000**	**= 384 000**	**= 9 216 000**
		1	**= 100**	= 200	= 400	**= 1600**	**= 3200**	**= 12 800**	**= 38 400**	**= 921 600**
			1	**= 2**	= 4	**= 16**	**= 32**	**= 128**	**= 384**	**= 9216**
				1	**= 2**	= 8	**= 16**	**= 64**	**= 192**	**= 4608**
					1	**= 4**	= 8	= 32	= 96	= 2304
						1	**= 2**	= 8	= 24	= 576
							1	**= 4**	**= 12**	**= 288**
								1	**= 3**	**= 72**
									1	**= 24**

1 marc = 160 esterlin
1 esterlin = 2 oboles (mailles)
1 obole = 2 filins
1 grain = 24 primes

Table 3-85 Old French units of weight (Charlemagne)

[1 livre du Roi (Charlemagne) = 0.367128 kg]

Livre	Sol	Denier	Obole	Grain
1	= 20	= 240	= 480	= 5760
	1	= 12	= 24	= 288
		1	= 2	= 24
			1	**= 12**

3.5.2.1.2 Old French System (1812–1840)

In 1812, the old weights and measures used before 1789 were restored by the French Emperor Napoleon Bonaparte. These pseudo-metric units were as follows:

3.5.2.1.1.2 Old French Units of Length (Metric)

Table 3-86 Old French units of length (metric)
(period 1812–1840)
[1 pied (metric) = 0.333 m = 1/3 m (E)]

Lieue (metric)	**Mille** (metric)	**Toise** (metric)	**Pied** (metric)	**Pouche** (metric)	**Ligne** (metric)
1	**= 3**	= 2000	= 12 000	= 144 000	= 1 728 000
	1	**= 2000/3**	= 4000	= 48 000	= 576 000
		1	**= 6**	= 72	= 864
			1	**= 12**	= 144
				1	**= 12**

3.5.2.1.1.2 Old French Units of Weight (Metric)

Table 3-87 Old French units of weight (metric)
[1 livre (metric) = 1 kg (E)]

Millier (metric)	**Quintal** (metric)	**Livre** (metric)	**Once** (metric)	**Gros** (metric)	**Denier** (metric)	**Grain** (metric)
1	**= 10**	= 1000	= 1000	= 10 000	= 100 000	= 1 000 000
	1	**= 100**	= 100	= 1000	= 10 000	= 100 000
		1	**= 10**	= 100	= 1000	= 10 000
			1	**= 10**	= 100	= 1000
				1	**= 10**	= 100
					1	**= 10**

However, the Law of July 4th, 1837 reinstated the metric system, making it obligatory in France from January 1st, 1840, and banning the use of other weights and measures from that date.

3.5.2.1.3 Old Belgian System

Metric system adopted in 1816 and compulsory since 1820. Old units derived from both French, and German systems.

3.5.2.1.3.1 Old Belgian Units of Length

Table 3-88 Old Belgian units of length
[1 perche (Belgian) = 6.497 m]

Perche	**Pied**
1	**= 20**

Note: 1 arpent = 100 square perches (E)

3.5.2.1.3.2 Old Belgian Units of Weight

Table 3-89 Old Belgian units of weight
[1 livre (Belgian) = 0.4895 kg]

Charge	Shiffpfund	Balle	Chariot	Quintal	Stein	Livre	Marc	Once	Loth
1	= 4/3	= 2	= 80/33	= 4	= 50	= 400	= 800	= 6400	= 12 800
	1	= 3/2	= 20/11	= 3	= 75/2	= 300	= 600	= 4800	= 9600
		1	= 40/33	= 2	= 25	= 200	= 400	= 3200	= 6400
			1	= 33/20	= 165/8	= 165	= 330	= 2640	= 5280
				1	= 25/2	= 100	= 200	= 1600	= 3200
					1	= 8	= 16	= 128	= 256
						1	= 2	= 16	= 32
							1	= 8	= 16
								1	= 2

3.5.2.1.4 Old Swiss System

Metric system adopted in 1868 and compulsory since 1877.

3.5.2.1.4.1 Old Swiss Units of Length

Table 3-90 Old Swiss units of length
[1 fuss (Swiss) = 0.30 m]

Lieue	Perche	Ruthe (toise)	Elle (aune)	Fuss (pied)	Zoll (pouce)	Linie (ligne)
1	= 1000	= 8000/3	= 8000	= 16 000	= 192 000	= 2 304 000
	1	= 8/3	= 8	= 16	= 192	= 2304
		1	= 3	= 6	= 72	= 864
			1	= 2	= 24	= 288
				1	= 12	= 144
					1	= 12

3.5.2.1.4.2 Old Swiss Units of Weight

Table 3-91 Old Swiss units of weight (ordinary)
[1 livre (Swiss) = 0.500 kg]

Livre	Once	Loth
1	= 16	= 32
	1	= 2

3.5.2.1.4.3 Old Swiss Units of Weight (Apoth.)

Table 3-92 Old Swiss units of weight (Apothecary)
[1 livre (Swiss, Apothecary) = 0.375 kg]

Livre (ordinary)	Livre (apothecary)	Once	Drachme	Scruple	Grain
1	= 4/3	= 16	= 128	= 384	= 7680
	1	= 12	= 96	= 288	= 5760
		1	= 8	= 24	= 480
			1	= 3	= 60
				1	= 20

3.5.2.1.5 Old Scottish System

Scottish measures in use in Scotland before the adoption of *Imperial Weights and Measures Act* of 1824.

3.5.2.1.5.1 Old Scottish Units of Length

Table 3-93 Old Scottish units of length (before the *Imperial Weights and Measures Act* of 1824)

[1 foot (Scottish) = 0.306446084592 m]

Mile	Furlong	Chain	Fall	Ell	Foot	Inch
1	**= 8**	= 80	= 320	= 1920	= 5920	= 71 040
	1	**= 10**	= 40	= 240	= 740	= 8880
		1	**= 4**	= 24	= 74	= 888
			1	**= 6**	= 37/2	= 74
				1	**= 37/12**	= 37
					1	**=12**

3.5.2.1.5.2 Old Scottish Units of Surface Area

Table 3-94 Old Scottish units of surface area (before the *Imperial Weights and Measures Act* of 1824)

[1 square foot (Scottish) = 0.0939092027605 m]

Nook	Acre	Rod	Square fall	Square foot
1	**= 20**	= 80	= 3200	= 1 095 200
	1	**= 4**	= 160	= 54 760
		1	**= 40**	= 13 690
			1	**= 1369/4**

3.5.2.1.5.3 Old Scottish Units of Capacity

Table 3-95 Old Scottish units of capacity (Liquids) (before the *Imperial Weights and Measures Act* of 1824)

[1 gallon (Scottish, liquid) = 827.232 in^3 = 13.555 903 726 8 dm^3]

Barrel	Gallon	Quart	Pint (jug)	Choppin	Mutchkin	Gill
1	**= 8**	= 32	= 64	= 128	= 256	= 1024
	1	**= 4**	= 8	= 16	= 32	= 128
		1	**= 2**	= 4	= 8	= 32
			1	**= 2**	= 4	= 16
				1	**= 2**	= 8
					1	**= 4**

Table 3-96 Old Scottish units of capacity (Dry) (before the *Imperial Weights and Measures Act* of 1824)

[1 lippy (Scottish, Dry) = 137.333 in^3 (wheat, peas, beans, rice, salt) = 2.25048466031 dm^3]

[1 lippy (Scottish, Dry) = 200.345 in3 (oat, barley, malt) = 3.28306633708 dm3]

Chalder	Boll	Firlot	Peck	Lippy
1	**= 16**	= 64	= 256	= 1024
	1	**= 4**	= 16	= 256
		1	**= 4**	= 64
			1	**= 4**

3.5.2.1.5.4 Old Scottish Units of Weight

Table 3-97 Old Scottish units of weight (before the *Imperial Weights and Measures Act* of 1824)

[1 pound (Scottish) = 9520 grains = 0.616 885 623 200 kg]

Stone	Pound	Ounce	Drop	Grain
1	**= 16**	= 320	= 5120	= 152 320
	1	**= 20**	= 320	= 9520
		1	**= 16**	= 476
			1	**= 119/4**

3.5.2.1.6 Old Irish System

Irish measures in use in Ireland before the adoption of *Imperial Weights and Measures Act* of 1824.

3.5.2.1.6.1 Old Irish Units of Length

Table 3-98 Old Irish units of length (before the *Imperial Weights and Measures Act* of 1824)

[1 foot (Irish) = 0.3048 m]

Mile	Furlong	Chain	Perch, pole	Fathom	Link	Yard	Cubit	Foot	Inch
1	**= 8**	= 80	= 320	= 480	= 800	= 2240	= 4480	= 6720	= 80 640
	1	**= 10**	= 40	= 60	= 100	= 280	= 560	= 840	= 10 080
		1	**= 4**	= 6	= 10	= 28	= 56	= 84	= 1008
			1	**= 3/2**	= 5/2	= 7	= 14	= 21	= 252
				1	**= 5/3**	= 14/3	= 28/3	= 14	= 168
					1	**= 14/5**	= 28/5	= 42/5	= 504/5
						1	**= 2**	= 3	= 36
							1	**= 3/2**	= 18
								1	**= 12**

1 palm (Irish) = 3 inch (Irish) (E)
1 span (Irish) = 3 palm (Irish) (E)
1 pace (Irish) = 5 feet (Irish) (E)

3.5.2.1.6.2 Old Irish Units of Capacity

Table 3-99 Old Irish units of capacity (Liquids) (before the *Imperial Weights and Measures Act* of 1824)

[1 gallon (Irish) = 217.6 in^3 (E) = 3.565 825 126 40 dm^3]

Pipe	Tun	Hogshead (Puncheon)	Tierce	Barrel	Rundlet	Gallon	Pottle	Quart	Pint
1	**= 2**	= 4	= 8	= 32/3	= 56/3	= 504	= 1008	= 2016	= 16 128
	1	**= 2**	= 4	= 16/3	= 28/3	= 252	= 504	= 1008	= 8064
		1	**= 2**	= 8/3	= 14/3	= 126	= 252	= 504	= 4032
			1	**= 4/3**	= 7/3	= 42	= 84	= 168	= 1344
				1	**= 7/4**	= 63/2	= 63	= 126	= 1008
					1	**= 18**	= 36	= 72	= 576
						1	**= 2**	= 4	= 32
							1	**= 2**	= 16
								1	**= 8**

1 noggin (Irish) = 1/4 pint (Irish) (E)

3.5.2.1.7 Old Italian System

These units were in use before the adoption of the metric system. Their definition varies geographically, and some units have changed over the years. The metric system became compulsory in Italy in 1861, but it was adopted in Milan as early as 1803.

3.5.2.1.7.1 Old Italian Units of Length

Table 3-100 Old Italian units of length

[1 piede liprando = 0.51377 m]

Miglio (mile)	**Trabucco**	**Canna**	**Piede** (foot)	**Oncia** (inch)	**Punto** (point)
1	**= 6500/9**	= 3250/3	= 13 000/3	= 52 000	= 624 000
	1	**= 3/2**	= 6	= 72	= 864
		1	**= 4**	= 48	= 576
			1	**= 12**	= 144
				1	**= 12**

3.5.2.1.7.2 Old Italian Units of Weight

Table 3-101 Old Italian units of weight

[1 libbra = 0.307 kg]

Cantaro	**Rubbo**	**Libbra** (pound)	**Oncia** (ounce)	**Ottavo** (drachm)	**Denaro** (scruple)	**Grano** (grain)
1	**= 6**	= 150	= 1800	= 14 400	= 43 200	= 3 110 400
	1	**= 25**	= 300	= 2400	= 7200	= 172 800
		1	**= 12**	= 96	= 288	= 6912
			1	**= 8**	= 24	= 576
				1	**= 3**	= 72
					1	**= 24**

3.5.2.1.7.3 Old Italian Measures (Regional Variations)

Table 3-102 Old Italian measures (regional variations)

City	Measures of weight	Measures of length	Measures of capacity
Venezia (Venice)	1 libbra grossa = 12 once = 0.477 kg 1 libbra sottile = 0.301 kg	1 braccio = 0.683 m 1 piede = 0.348 m	1 moggio = 8 mezzeni = 333.3 l
Milano (Milan)	1 libbra grossa = 28 once = 0.763 kg	1 braccio = 12 once = 0.595 m 1 trabucco = 6 piedi	1 moggio = 8 staia = 146.2 l 1 brenta = 96 boccali = 75.6 l
Torino (Turin)	1 libbra = 12 once = 0.369 kg	1 trabucco = 6 piedi liprandi = 3.096 m 1 raso = 0.6 m 1 piede = 0.293 m	1 sacco = 5 mine = 115.3 l 1 carro = 10 brente = 493.11 l
Bologna	1 libbra mercantile = 12 once = 0.362 kg	1 braccio = 0.64 m 1 piede = 0.38 m	1 corba = 2 staia = 60 boccali = 78.6 l
Firenze (Florence)	1 libbra = 12 once = 0.3395 kg	1 braccio = 2 palmi = 0.583 m	1 moggio = 8 sacca = 584.7 l 1 barile (vino) = 20 fiaschi = 45.6 l 1 barile (olio) = 16 fiaschi = 33.43 l
Genova (Genoa)	1 libbra = 12 once = 0.317 kg	1 palmo = 0.248 m	1 mina = 116.5 l 1 barile = 70 l
Roma (Rome)	1 libbra = 12 once = 0.339 kg	1 canna = 10 palmi = 2.234 m	1 rubblo = 22 scorzi = 294.5 l 1 barile = 32 boccali = 75.5 l
Napoli (Naples)	1 rotolo = 0.861 kg 1 libbra = 12 once = 0.321 kg	1 canna = 10 palmi = 2.646 m	1 botte (vino) = 12 barili = 523.5 l 1 tomolo = 55.54 l
Palermo	1 cantaro = 100 rotoli = 79.34 kg 1 libbra = 12 once = 0.317 kg	1 canna = 10 palmi = 2.065 m	1 salma = 4 bisace = 16 tomoli = 275 l

3.5.2.1.8 Old Spanish System (Castillian)

The metric system has been compulsory since 1860.

3.5.2.1.8.1 Old Spanish Units of Length

These are shown in ***Table 3-103***.

3.5.2.1.8.2 Old Spanish Units of Area

Table 3-104 Old Spanish units of area
[1 square vara = 0.698737169025 m^2]

Yugada	Fanegada	Aranzada	Calemin	Cuartilla	Square vara
1	**= 50**	= 72	= 600	= 18 432	= 460 800
	1	**= 36/25**	= 12	= 9216/25	= 9216
		1	**= 25/3**	= 256	= 6400
			1	= 768/25	= 768
				1	= 25
					1

1 cahizada = 2058.5 m^2

Table 3-103 Old Spanish units of length

[1 vara = 0.835905 m]

Legua (league)	**Milla** (mile)	**Estadal** (perch)	**Estado** (fathom)	**Passo** (pace)	**Vara** (yard)	**Codos** (cubit)	**Pie** (foot)	**Palma** (palm)	**Sesma**	**Pulgada** (inch)	**Diedo** (finger)	**Linea** (line)	**Punto** (point)
1	**= 3**	= 1250	= 2500	= 3000	= 5000	= 10 000	= 15 000	= 20 000	= 30 000	= 180 000	= 240 000	= 2 880 000	= 34 560 000
	1	**= 1250/3**	= 2500/3	= 1000	= 5000/3	= 10 000/3	= 5000	= 20 000/3	= 10 000	= 60 000	= 80 000	= 960 000	= 11 520 000
		1	**= 2**	= 12/5	= 4	= 8	= 12	= 16	= 24	= 144	= 192	= 2 304	= 27 648
			1	**= 6/5**	= 2	= 4	= 6	= 8	= 12	= 72	= 96	= 1 152	= 13 824
				1	= 5/3	= 10/3	= 5	= 20/3	= 10	= 60	= 80	= 960	= 11 520
					1	= 2	= 3	= 4	= 6	= 36	= 48	= 576	= 6912
						1	**= 3/2**	= 2	= 3	= 18	= 24	= 288	= 3546
							1	**= 4/3**	= 2	= 12	= 16	= 192	= 2304
								1	**= 3/2**	= 9	= 12	= 144	= 1728
									1	= 6	= 8	= 96	= 1152
										1	= 4/3	= 16	= 192
											1	**= 12**	= 144
												1	= 12

1 legua (royal) = 24 000 pie

3.5.2.1.8.3 Old Spanish Units of Weight

These are shown in ***Table 3-105*** (opposite).

3.5.2.1.8.4 Old Spanish Units of Capacity (Liquids)

See ***Table 3-106*** (p. 92).

3.5.2.1.8.5 Old Spanish Units of Capacity (Dry)

Table 3-107 Old Spanish units of capacity (Dry materials)
[1 fanega = 55.501 dm^3]

Cahiz	Fanega	Cuartilla	Almude (calemin)	Medio	Cuartillo	Racion	Ochavillo
1	**= 12**	= 48	= 144	= 288	= 576	= 2304	= 9216
	1	**= 4**	= 12	= 24	= 48	= 192	= 768
		1	**= 3**	= 6	= 12	= 48	= 192
			1	**= 2**	= 4	= 16	= 64
				1	**= 2**	= 8	= 32
					1	**= 4**	= 16
						1	**= 4**

3.5.2.1.9 Old Portuguese System

The metric system has been compulsory since 1872.

3.5.2.1.9.1 Old Portuguese Units of Length

These are shown in ***Table 3-108*** (p. 92).

3.5.2.1.9.2 Old Portuguese Units of Area

Table 3-109 Old Portuguese units of area
[1 sq. vara = 1.199025 m^2]

Geira	Ferrado	Sq. vara
1	= 8	= 4840
	1	= 605

Table 3-105 Old Spanish units of weight

[1 libra = 0.460093 kg]

Tonnelada	Quintalmacho	Quintal	Barril	Arroba	Libra (pound)	Marco	Onza (ounce)	Escrupolo (scruple)	Ochava (caracter)	Adarme (drachm)	Dinero	Tomin	Arienzo	Grano (grain)
1	**= 40/3**	= 20	= 40	= 80	= 2000	= 4000	= 32 000	= 128 000	= 256 000	= 512 000	= 768 000	= 1 536 000	= 4 608 000	= 18 432 000
	1	**= 3/2**	= 3	= 6	= 150	= 300	= 2400	= 9600	= 19 200	= 38 400	= 57 600	= 115 200	= 345 600	= 1 382 400
		1	**= 2**	= 4	= 100	= 200	= 1600	= 6400	= 12 800	= 25 600	= 38 400	= 76 800	= 230 400	= 921 600
			1	**= 2**	= 50	= 100	= 800	= 3200	= 6400	= 12 800	= 19 200	= 38 400	= 115 200	= 460 800
				1	**= 25**	= 50	= 400	= 1600	= 3200	= 6400	= 9600	= 19 200	= 57 600	= 230 400
					1	**= 2**	= 16	= 64	= 128	= 256	= 384	= 768	= 2304	= 9216
						1	**= 8**	= 32	= 64	= 128	= 192	= 384	= 1152	= 4608
							1	= 4	= 8	= 16	= 24	= 48	= 144	= 576
								1	= 2	= 4	= 6	= 12	= 36	= 144
									1	= 2	= 3	= 6	= 18	= 72
										1	= 3/2	= 3	= 9	= 36
											1	= 2	= 6	= 24
												1	= 3	= 12
													1	= 4

Table 3-106 Old Spanish units of capacity (Liquids) [1 arroba (water) = 15.643162 dm^3] [1 arroba (wine) = 16.133 dm^3] [1 arroba (oil) = 12.563 dm^3]

Bota	**Pipa**	**Moio**	**Arroba** (cantarra)	**Cuartilla**	**Azumbre**	**Cuartillo** (libra)	**Panilla** (quarterone)	**Copas**
1	**= 10/9**	= 15/8	= 30	= 120	= 240	= 960	= 3000	= 3840 × 10^8
	1	**= 27/16**	= 27	= 108	= 216	= 864	= 2700	= 3456 × 10^8
		1	**= 16**	= 64	= 128	= 512	= 1600	= 2048 × 10^8
			1	**= 4**	= 8	= 32	= 100	= 128
				1	**= 2**	= 8	= 25	= 32
					1	**= 4**	= 25/2	= 16
						1	= 25/8	= 4
							1	**= 32/25**

Table 3-108 Old Portuguese units of length [1 pe = 0.3285 m]

Legoa (league)	**Milha** (mile)	**Estadio** (stade)	**Vara** (yard)	**Covada**	**Pe** (foot)	**Palmo** (palm)	**Pollegada** (inch)	**Linha** (line)
1	**= 3**	= 24	= 5664	= 9440	= 18 800	= 28 320	= 226 560	= 2 178 720
	1	**= 8**	= 1888	= 9440/3	= 18 800/3	= 9440	= 75 520	= 906 240
		1	**= 236**	= 1180/3	= 2360/3	= 1180	= 9440	= 113 280
			1	**= 5/3**	= 10/3	= 5	= 40	= 480
				1	**= 2**	= 3	= 24	= 288
					1	**= 3/2**	= 12	= 144
						1	**= 8**	= 96
							1	**= 12**

1 legoa (naut.) = 16910 pe

1 milha (naut.) = 5637 pe

3.5.2.1.9.3 Old Portuguese Units of Weight

Table 3-110 Old Portuguese units of weight
[1 libra = 0.459 kg]

Quintal	Arroba	Libra (arratel)	Meio (marco)	Onca (ounce)	Outava (drachm)	Escrupolo (scruple)	Grao (grain)
1	**= 4**	= 128	= 256	= 2048	= 16 384	= 49 152	= 1 179 648
	1	**= 32**	= 64	= 512	= 4096	= 12 288	= 249 912
		1	= 2	= 16	= 128	= 384	= 9216
			1	= 8	= 64	= 192	= 4608
				1	= 8	= 24	= 576
					1	= 3	= 72
						1	= 24

3.5.2.1.9.4 Old Portuguese Units of Capacity (Dry)

Table 3-111 Old Portuguese units of capacity (Dry)
[1 fanga = 54 dm^3]

Moio	Fanga	Alqueira	Meio	Quarto	Outava
1	**= 15**	= 60	= 120	= 240	= 480
	1	**= 4**	= 8	= 16	= 32
		1	**= 2**	= 4	= 8
			1	**= 2**	= 4
				1	**= 2**

3.5.2.1.9.5 Old Portuguese Units of Capacity (Liquids)

Table 3-112 Old Portuguese units of capacity (Liquids)
[1 almude = 16.5 dm^3]

Tonnelada	Bota (pipa)	Almude	Alqueira	Canada	Meio	Quartillo
1	**= 2**	= 52	= 312	= 624	= 1248	= 2496
	1	**= 26**	= 156	= 312	= 624	= 1248
		1	**= 6**	= 12	= 24	= 48
			1	**= 2**	= 4	= 8
				1	**= 2**	= 4
					1	**= 2**

3.5.2.1.10 Old Maltese System

Metric system adopted in 1910 and compulsory since 1921.

3.5.2.1.10.1 Old Maltese Units of Length

Table 3-113 Old Maltese units of length
[1 canna (Maltese) = 2.088 m]

Canna	Palmo
1	**= 8**

3.5.2.1.10.2 Old Maltese Units of Capacity

Table 3-114 Old Maltese units of capacity (Liquids)

1 salma (Maltese) = 290.944 m^3
1 baril (Maltese) = 43.162 m^3
1 caffiso (Maltese) = 20.457 m^3

3.5.2.1.10.3 Old Maltese Units of Weight

Table 3-115 Old Maltese units of weight
[1 rottolo (Maltese) = 0.79379 kg]

Cantaro	Rottolo	Libra	Ounce	Parto
1	**= 100**	= 175	= 2800	= 44 800
	1	**= 7/4**	= 28	= 448
		1	**= 16**	= 256
			1	**= 16**

3.5.2.1.11 Old Balearic Islands System

3.5.2.1.11.1 Old Balearic Units of Length

Table 3-116 Old Balearic units of length
[1 canna (Balearic) = 1.564 m]

Canna	Palmos
1	**= 8**

3.5.2.1.11.2 Old Balearic Units of Capacity (Liquids)

Table 3-117 Old Balearic units of capacity (Liquids)
[1 quartera (Balearic, liq.) = 71.97 dm^3]

Quartera	Barcella	Almude
1	**= 6**	= 36
	1	**= 6**

3.5.2.1.11.3 Old Balearic Units of Capacity (Dry)

Table 3-118 Old Balearic units of capacity (Dry)
[1 quartin (Balearic, dry) = 27.14 dm^3]

Quartin	Quarte	Almude
1	**= 13/2**	= 26
	1	**= 4**

3.5.2.1.11.4 Old Balearic Units of Weight

Table 3-119 Old Balearic units of weight
[1 rottolo (Balearic) = 0.408 kg]

Cargo	Cantaro	Cantaro barbaresco	Misura	Arroba	Quartano (Corta)	Libra mayor	Rottolo
1	**= 27**	= 1404/50	= 78	= 12	= 104/3	= 104	= 312
	1	**= 52/50**	= 26/9	= 4	= 104/9	= 104/3	= 104
		1	**= 100/36**	= 50/13	= 100/9	= 100/3	= 100
			1	**= 36/26**	= 4	= 12	= 36
				1	**= 26/9**	= 26/3	= 26
					1	= 3	= 9
						1	**= 3**

3.5.2.1.12 Old Greek System

Metric system adopted in 1836 and compulsory since 1922.

3.3.2.1.12.1 Old Greek Units of Length

Table 3-120 Old Greek units of length
[1 piki (Greek, short) = 0.648 m]
[1 piki (Greek, long) = 0.669 m]
[1 piki (Greek, mansonry) = 0.750 m]

3.5.2.1.12.2 Old Greek Units of Capacity

Table 3-121 Old Greek units of capacity
[1 oka (Greek, liquid) = 1.333 to 1.340 dm^3]
[1 baril (Greek, liquid) = 74.236 dm^3]

3.5.2.1.12.3 Old Greek Units of Weight

Table 3-122 Old Greek units of weight
[1 oka (Greek) = 1.280 kg]

Talanton	Stater	Mina	Oka	Pound	Dramme
1	**= 3**	= 100	= 120	= 300	= 46 875
	1	**= 100/3**	= 600/15	= 100	= 15 625
		1	**= 6/5**	= 3	= 1875/4
			1	**= 5/2**	= 3125/8
				1	**= 625/4**

3.5.2.1.13 Old Cypriot System

3.5.2.1.13.1 Old Cypriot Units of Length and Area

Table 3-123 Old Cypriot units of length and area

1 pic (Cypriot) = 2 foot (Cypriot) = 0.6096 m

1 scala (Cypriot) = 1 donum (Cyprus) = 1337.803776 m^2

3.5.2.1.13.2 Old Cypriot Units of Capacity

Table 3-124 Old Cypriot units of capacity
[1 oke (Cypriot) = 1.27855 dm^3]

Gomari	Medimno	Kile	Kouza	Kartos	Cass	Oke
1	**= 9/4**	= 9/2	= 63/4	= 63/2	= 1280/37	= 128
	1	**= 2**	= 7	= 14	= 560/37	= 56
		1	**= 7/2**	= 7	= 280/37	= 28
			1	**= 2**	= 80/37	= 8
				1	**= 40/37**	= 4
					1	**= 37/10**

3.5.2.1.13.3 Old Cypriot Units of Weight

Table 3-125 Old Cypriot units of weight
[1 oke (Cypriot) = 1.270058636 kg]

Ton	Aleppo	Kantar	Stone	Mussa	Oke (Uqqa)	Rottolo	Drachme
1	**= 40/9**	= 200/11	= 20	= 160	= 800	= 20 000/11	= 320 000
	1	**= 45/11**	= 9/2	= 36	= 180	= 4500/11	= 72 000
		1	**= 11/10**	= 44/5	= 44	= 100	= 17 600
			1	**= 8**	= 40	= 1000/11	= 16 000
				1	**= 5**	= 125/11	= 2000
					1	**= 25/11**	= 400
						1	**= 176**

3.5.2.1.14 Old Turkish System

Metric system adopted in 1869 and compulsory since 1933.

3.5.2.1.14.1 Old Turkish Units of Length

Table 3-126 Old Turkish units of length
[1 pic (Turkish) = 0.755397246487 m]

Nul	Pic	Urumb	Parmack	Hatt	Nocktat
1	**= 4000/3**	= 32 000/3	= 32 000	= 384 000	= 4 608 000
	1	**= 8**	= 24	= 288	= 3456
		1	**= 3**	= 36	= 432
			1	**= 12**	= 144
				1	**= 12**

3.5.3.1.14.2 Old Turkish Units of Area

Table 3-127 Old Turkish units of area
[1 square pic (Turkish) = 0.570625 m^2]

Djeril	Dunum	Square pic
1	**= 10 000/913**	= 16 000 000/913
	1	**= 1600**

Note: The 'dunum' or 'donum' was the unit of surface area used before 1933 for land measurements and originally imposed by Turkey on the Ottoman Empire including the Middle East and the Balkans. It was defined as the amount a pair of oxen can plough in one day.þ Its value varies with location, and it was later standardized as 1210 square yards, or a quarter of an acre. Sometimes, in Mesopotamia and Arabia, it corresponds to 3600 square yards, and hence was the equivalent of the journal. The Turkish Government stated in 1939 that a dunum was equal to a decare (i.e., one thousand square meters).

3.5.2.1.14.3 Old Turkish Units of Capacity

Table 3-128 Old Turkish units of capacity
[1 cubic zira (Turkish) = 1000 dm^3]

Cubic zira	Fortin	Kile	Chinik
1	**= 5/2**	= 10	= 40
	1	**= 4**	= 16
		1	**= 4**

3.5.2.1.14.4 Old Turkish Units of Weight

See ***Table 3-129*** overleaf.

Table 3-129 Old Turkish units of weight

[1 oka (Turkish) = 1.283 kg]

Tcheki	Kantar	Batman	Oka	Rottel	Yusdrum (cequi)	Miskal	Dirham (drachm)	Denke	Karat
1	**= 4**	= 88/3	= 176	= 400	= 704	= 140 800/3	= 70 400	= 281 600	= 1 126 400
	1	**= 22/3**	= 44	= 100	= 176	= 35 200/3	= 17 600	= 70 400	= 281 600
		1	**= 6**	= 300/22	= 24	= 1600	= 2400	= 9600	= 38 400
			1	**= 25/11**	= 4	= 800/3	= 400	= 1600	= 6400
				1	**= 44/25**	= 352/3	= 176	= 704	= 2816
					1	**= 200/3**	= 100	= 400	= 1600
						1	**= 3/2**	= 6	= 24
							1	**= 4**	= 16
								1	**= 4**

3.5.2.2 Central and Northern Europe

3.5.2.2.1 Old Austrian System

Metric system adopted in 1871 and compulsory since 1876. Older units derived from Prussian and German systems.

3.5.2.2.1.1 Old Austrian Units of Length

Table 3-130 Old Austrian units of length
[1 fuss (Austrian) = 0.316 08 m]
[1 ell (Austrian) = 0.779 2 m]

Meile	Ruthe	Klafter	Fuss	Zoll	Linie	Punkt
1	**= 2000**	= 4000	= 24 000	= 288 000	= 3 456 000	= 41 472 000
	1	**= 2**	= 12	= 144	= 1728	= 20 736
		1	**= 6**	= 72	= 864	= 1068
			1	**= 12**	= 144	= 1728
				1	**= 12**	= 144
					1	**= 12**

3.5.2.2.1.2 Old Austrian Units of Surface Area

Table 3-131 Old Austrian units of surface area
[1 joch (Austrian) = 5754.61822464 m^2]

Joch	Metze	Square klafter
1	**= 3**	= 1600
	1	**= 1600/3**

3.5.2.2.1.3 Old Austrian Units of Capacity (Liquids)

Table 3.132 Old Austrian units of capacity (Liquids)
[1 mass (Austrian, liq.) = 1.4151 dm^3]

Fuder	Dreiling	Fass	Eimer	Viertel	Mass	Halbe	Seidel	Pfiff
1	**= 32/30**	= 16/5	= 320	= 1280	= 1280	= 2560	= 5120	= 10 240
	1	**= 3**	= 30	= 120	= 1200	= 2400	= 4800	= 9600
		1	**= 10**	= 40	= 400	= 800	= 1600	= 3200
			1	**= 4**	= 40	= 80	= 160	= 320
				1	**= 10**	= 20	= 40	= 80
					1	**= 2**	= 4	= 8
						1	**= 2**	= 4
							1	**= 2**

3.5.2.2.1.5 Old Austrian Units of Capacity (Dry)

Table 3-133 Old Austrian units of capacity (Dry)
[1 metzel (Austrian, dry) = 61.489 dm^3]

Muth	Metzel	Viertel	Achtel	Muthmassel	Futtermassel	Becher	Probmetze
1	**= 30**	= 120	= 240	= 480	= 960	= 3840	= 30720
	1	**= 4**	= 8	= 16	= 32	= 128	= 1024
		1	**= 2**	= 4	= 8	= 32	= 256
			1	**= 2**	= 4	= 16	= 128
				1	**= 2**	= 8	= 64
					1	**= 4**	= 32
						1	**= 8**

3.5.2.2.1.5 Old Austrian Units of Weight (Ordinary)

See ***Table 3-134*** opposite.

3.5.2.2.1.6 Old Austrian Units of Weight (Apothecary)

Table 3-135 Old Austrian units of weight (Apothecary)
[1 pfund (Austrian, apothecary) = 0.4200075 kg]

Pfund (ordinary)	Pfund (apothecary)	Unze	Drachme	Scrupel	Gran
1	**= 4/3**	= 16	= 128	= 384	= 7680
	1	**= 12**	= 96	= 288	= 5760
		1	**= 8**	= 24	= 480
			1	**= 3**	= 60
				1	**= 20**

3.5.2.2.2 Old German System (Prussian)

The metric system has been compulsory since 1872.

3.5.2.2.2.1 Old German Units of Length

These Old German units were employed under the Prussian system.

Table 3-136 Old German units of length
[1 fuss (Rheinlandischer) = 0.313857 m]

Meile (mile)	Ruthe (yard)	Elle	Fuss (foot)	Zoll (inch)	Linie (line)
1	**= 2000**	= 192 000/17	= 24 000	= 288 000	= 3 456 000
	1	**= 96/17**	= 12	= 144	= 1728
		1	**= 17/8**	= 51/2	= 306
			1	**= 12**	= 144
				1	**= 12**

1 faden (fathom) = 6 fuss (E)

3.5.2.2.2.2 Old German Units of Weight

These are shown in Table 3.137 (on page 102).

Table 3-134 Old Austrian units of weight (Ordinary)

[1 pfund (Austrian) = 0.56001 kg]

Karch	Saum	Zentner	Stein	Pfund	Mark	Vierding	Unze	Loth	Quentchen	Denat (Pfenig)
1	**= 16/11**	= 16	= 20	= 400	= 800	= 1600	= 6400	= 12 800	= 51 200	= 204 800
	1	**= 11/4**	= 55/4	= 275	= 550	= 1100	= 4400	= 8800	= 35 200	= 140 800
		1	**= 5**	= 100	= 200	= 400	= 1600	= 3200	= 12 800	= 51 200
			1	**= 20**	= 40	= 80	= 320	= 640	= 2560	= 10 240
				1	**= 2**	= 4	= 16	= 32	= 128	= 512
					1	**= 2**	= 8	= 16	= 64	= 256
						1	**= 4**	= 8	= 32	= 128
							1	**= 2**	= 8	= 32
								1	**= 4**	= 16
									1	**= 4**

Table 3-137 Old German units of weight

[1 pfund = 0.467711 kg (E)]

Schiffspfund	Doppelzentner	Zentner (quintal)	Stein (stone)	Pfund (pound)	Loth	Quentchen	Quint	Pfennig	Gran
1	**= 3/2**	= 3	= 15	= 330	= 10 560	= 31 680	= 42 240	= 168 960	= 2 534 400
	1	**= 2**	= 10	= 220	= 7040	= 21 120	= 28 160	= 112 640	= 1 689 600
		1	**= 5**	= 110	= 3520	= 10 560	= 14 080	= 56 320	= 844 800
			1	**= 22**	= 704	= 2112	= 2816	= 11 264	= 168 960
				1	**= 32**	= 96	= 128	= 512	= 7680
					1	**= 3**	= 4	= 16	**= 240**
						1	= 4/3	= 16/3	= 80
							1	= 4	= 60
								1	= 15

1 mark = 1/2 pfund
1 unze = 1/16 pfund

3.5.2.2.2.3 Old German Units of Capacity (Dry)

Table 3-138 Old German units of capacity (Dry)
[1 metzen = 37.0596 dm^3]

Scheffel	Metzen	Mässel	Dreissiger
1	**= 6**	= 48	= 192
	1	**= 8**	= 32
		1	**= 4**

3.5.2.2.2.4 Old German Units of Capacity (Liquids)

Table 3-139 Old German units of capacity (Liquids)
[1 quart = 1.14506909541 dm^3 = 64 cubic zoll (E)]

Fuder	Oxhoft	Ohm	Eimer	Anker	Quart
1	**= 4**	= 6	= 12	= 24	= 720
	1	**= 3/2**	= 3	= 6	= 180
		1	**= 2**	= 4	= 120
			1	**= 2**	= 60
				1	**= 30**

3.5.2.2.3 Old Yugoslavian System

Metric system adopted in 1873 and compulsory since 1883.

3.5.2.2.3.1 Old Yugoslavian Units of Length

Table 3-140 Old Yugoslavian units of length
[1stopa (Yugoslavian) = 0.316 m]

Kvat	Archine	Stopa	Palaz	Linia
1	**= 7/3**	= 6	= 261/5	= 870
	1	**= 9/4**	= 783/40	= 1305/4
		1	**= 87/10**	= 145
			1	**= 50/3**

3.5.2.2.3.2 Old Yugoslavian Units of Surface Area

Table 3-141 Old Yugoslavian units of surface area
[1 square stopa (Yugoslavian) = 0.099856 m^2]

Lanatz	Dan oranja	Raliza	Motyka	Dunum (Donum)	Square kvat	Square stopa
1	**= 5760/3597**	= 288/125	= 36/5	= 288/35	= 1600	= 57 600
	1	**= 3597/2500**	= 3597/800	= 3597/700	= 5995/6	= 35 970
		1	**= 25/8**	= 25/7	= 6250/9	= 25 000
			1	**= 8/7**	= 2000/9	= 8000
				1	**= 1750/9**	= 7000
					1	**= 36**

3.5.2.2.3.3 Old Yugoslavian Units of Weight

Table 3-142 Old Yugoslavian units of weight
[1 oka (Yugoslavian) = 1.280 kg]

Tovar	Akov	Oka	Litra (Satlijk)	Dramm
1	**= 5/2**	= 100	= 400	= 40 000
	1	**= 40**	= 160	= 16 000
		1	**= 4**	= 400
			1	**= 100**

3.5.2.2.4 Old Czechoslovakian System

Metric system adopted in 1871 and compulsory since 1876.

3.5.2.2.4.1 Old Czechoslovakian Units of Length

Table 3-143 Old Czechoslovakian units of length (Bohemia, Silesia, Moravia, and Praha)
[1 stopa (Bohemian) = 0.296 m]
[1 stopa (Praha) = 0.2965 m]
[1 stopa (Moravian) = 0.284 m]
[1 stopa (Silesian) = 0.2895 m]

Mile	Latro	Sah	Loket	Stopa (Strevic)
1	**= 3660**	= 7869/2	= 23 607/2	= 23607
	1	**= 129/120**	= 129/40	= 129/20
		1	**= 3**	= 6
			1	**= 2**

3.5.2.2.4.2 Old Czechoslovakian Units of Surface Area

Table 3-144 Old Czechoslovakian units of surface area
[1 merice = 2000 m^2]

Lan	Jitro	Korec (strych, mira)	Merice
1	**= 30**	= 60	= 4317/50
	1	**= 2**	= 1439/500
		1	**= 1439/1000**

3.5.2.2.4.3 Old Czechoslovakian Units of Capacity

Table 3-145 Old Czechoslovakian units of capacity
[1 merice = 70.6 dm^3]

Korec (Strych)	Merice
1	**= 53/40**

3.5.2.2.5 Old Hungarian System

Metric system adopted in 1874 and compulsory since 1876.

3.5.2.2.5.1 Old Hungarian Units of Length

Table 3-146 Old Hungarian units of length
[1 Faust (Hungarian) = 0.10536 m]

Mertföld (Meile)	Faust (Marok)
1	**= 79 286.25**

3.5.2.2.5.2 Old Hungarian Units of Surface Area

Table 3-147 Old Hungarian units of surface area
[1 square meile (Hungarian) = $6.97826212650 \times 10^6$ m^2]

Square meile	Joch (Hold)
1	**= 16 168.355**

3.5.2.2.5.3 Old Hungarian Units of Capacity

Table 3-148 Old Hungarian units of capacity
[1 eimer (Hungarian) = 54.30 dm^3]

Metzen (Ako)	Eimer	Halbe (Itcze)
1	**= 23/20**	= 368/5
	1	**= 64**

3.5.2.2.6 Old Romanian System

Metric system adopted in 1864 and compulsory since 1884

3.5.2.2.6.1 Old Romanian Units of Length

Table 3-149 Old Romanian units of length
[1 halibiu (Romanian) = 0.701 m]

Stringene	Halibiu	Endere
1	**= 1960/701**	= 1960/662
	1	**= 701/662**

3.5.2.2.6.2 Old Hungarian Units of Capacity

Table 3-150 Old Romanian units of capacity (Liquids)
[1 viacka (Romanian) = 14.15 dm^3]

Viacka	Oke
1	**= 10**

Table 3-151 Old Romanian units of capacity (Dry)
[1 dimerla (Romanian) = 24.6 dm^3]

Kilo	Mirze	Dimerla	Oke
1	**= 2**	= 16	= 256
	1	**= 8**	= 128
		1	**= 16**

3.5.2.2.6.3 Old Romanian Units of Weight

Table 3-152 Old Romanian units of weight
[1 cantar (Romanian) = 56 kg]

Cantar	Oke
1	**= 44**

3.5.2.2.7 Old Dutch System

The metric system has been compulsory since 1820.

3.5.2.2.7.1 Old Dutch Units of Length

Table 3-153 Old Dutch units of length
[1 voeten (Amsterdam) = 0.2830594 m]

Uren	Myl	Roeden	Elle	Voeten	Duime	Lyne
1	**= 5**	= 17 665/13	= 35 330/5	= 17 665	= 211 980	=2 543 760
	1	**= 3533/13**	=7066/5	= 3533	= 42 396	= 508 752
		1	**= 26/5**	= 13	= 156	= 1872
			1	= 5/2	= 30	= 360
				1	**= 12**	= 144
					1	**= 12**

3.5.2.2.7.2 Old Dutch Units of Weight

Table 3-154 Old Dutch units of weight
[1 pond (Amsterdam) = 0.49409032 kg]
[1 pond (ordinary) = 0.49216772 kg]
[1 pond (apothecary) = 3/4 pond (ordinary) = 0.369125790 kg]

Pond (pound)	Mark	Unze (ounce)	Drachme (drachm)	Engel	Vierling	Grein (grain)
1	**= 2**	= 16	= 128	= 320	= 1280	= 7680
	1	**= 8**	= 64	= 160	= 640	= 3840
		1	**= 8**	= 20	= 80	= 480
			1	= 5/2	= 10	= 60
				1	= 4	= 24
					1	**= 6**

3.5.2.2.7.3 Old Dutch Units of Capacity (Dry)

Table 3-155 Old Dutch units of capacity (Dry)
[1 schepel = 27.26 dm^3]

Last	Mud	Zak	Schepel	Vierd	Kop
1	**= 27**	= 36	= 108	= 432	= 3456
	1	**= 4/3**	= 4	= 16	= 128
		1	**= 3**	= 12	= 96
			1	**= 4**	= 32
				1	**= 8**

3.5.2.2.7.4 Old Dutch Units of Capacity (Liquids)

These are shown in ***Table 3-156*** (overleaf).

3.5.2.2.8 Old Danish System

Metric system adopted in 1907 and compulsory since 1912.

3.5.2.2.8.1 Old Danish Units of Length

Table 3-157 Old Danish units of length [1 fod (Danish) = 0.313857 m]

Miil	Ruthe	Favn	Aln	Fod	Tomme	Linie
1	**= 2000**	= 4000	= 12 000	= 24 000	= 288 000	= 3 456 000
	1	**= 2**	= 6	= 12	= 144	= 1728
		1	**= 3**	= 6	= 72	= 864
			1	**= 2**	= 24	= 288
				1	**= 12**	= 144
					1	**= 12**

3.5.2.2.8.2 Old Danish Units of Surface Area

Table 3-158 Old Danish units of surface area
[1 square ruthe (Danish) = 144 square fod (E) = 14.1848951687 m^2]
[1 tondelande (Danish) = 5516.2 m^2]

Pflug	Tonde	Skiepper	Fjerdingar	Album	Penge	Square ruthe
1	**= 32**	= 256	= 1024	= 3072	= 11 136	= 64 000
	1	**= 8**	= 32	= 96	= 348	= 2000
		1	**= 4**	= 12	= 87/2	= 250
			1	= 3	= 87/8	= 125/2
				1	= 29/8	= 125/6
					= 1	= 500/87

Table 3-156 Old Dutch units of capacity (Liquids)
[1 mingelen = 1.200 dm^3]

Vat	Oxhooft	Aam	Anker	Steekan	Stoop	Mingelen	Pint	Mutsje
1	= 4	= 6	= 24	= 48	= 384	= 768	= 1536	= 6144
	1	**= 3/2**	= 6	= 12	= 96	= 192	= 384	= 1536
		1	**= 4**	= 8	= 64	= 128	= 256	= 1024
			1	**= 2**	= 16	= 32	= 64	= 256
				1	**= 8**	= 16	= 32	= 128
					1	**= 2**	= 4	= 16
						1	**= 2**	= 8
							1	**= 4**

3.5.2.2.8.3 Old Danish Units of Capacity

See ***Table 3-159*** overleaf.

Table 3-160 Old Danish units of capacity (Dry)
[1 korntonde (Danish, dry) = 4.5 cubic fod (E) = 139.125895095 dm^3]

Last	Korntonde	Fjerdingkar	Cubic fod	Ottingkar (skieppe)	Viertel	Achtel	Pott
1	**= 22**	= 88	= 99	= 176	= 396	= 792	= 1782
	1	**= 4**	= 9/2	= 8	= 32	= 64	= 144
		1	**= 9/8**	= 2	= 8	= 16	= 36
			1	**= 16/9**	= 64/9	= 128/9	= 32
				1	**= 4**	= 8	= 18
					1	**= 2**	= 9/2
						1	= 9/4

3.5.2.2.8.4 Old Danish Units of Weight

See ***Table 1-161*** (p. 111).

3.5.2.2.9 Old Polish System

Metric system compulsory since 1919.

3.5.2.2.9.1 Old Polish Units of Length

Table 3-162 Old Polish units of length
[1 stopa (Polish, new) = 0.2880 m]
[1 stopa (Polish, Warsaw) = 0.2978 m]
[1 stopa (Polish, Cracow) = 0.23564 m]

Pret	Sazen	Stopa	Lokiec	Cal	Linja
1	**= 15/6**	= 15	= 24	= 144	= 1728
	1	**= 6**	= 12	= 72	= 864
		1	**= 2**	= 12	= 144
			1	**= 6**	= 72
				1	**= 12**

3.5.2.2.9.2 Old Polish Units of Surface Area

Table 3-163 Old Polish units of surface area
[1 square stopa (Polish, new) = 0.082944 m^2]
[1 square stopa (Polish, Warsaw) = 0.08868484 m^2]
[1 square stopa (Polish, Cracow) = 0.0555262096 m^2]

Wloka	Morga	Square pret	Square stopa
1	**= 30**	= 9000	= 2 025 000
	1	**= 300**	= 67 500
		1	**= 225**

Table 3-159 Old Danish units of capacity (Liquids)

[1 pott (Danish, liquid) = 1/32 cubic fod (E) = 0.966152049250 dm^3]

Fuder	Pipe	Oxhoft	Ohm	Anker	Cubic fod	Viertel	Stubchen	Kande	Pott	Paegel
1	**= 2**	= 4	= 6	= 24	= 30	= 120	= 240	= 480	= 960	= 3840
	1	**= 2**	= 3	= 12	= 15	= 60	= 120	= 240	= 480	= 1920
		1	**= 3/2**	= 6	= 15/2	= 30	= 60	= 120	= 240	= 960
			1	**= 4**	= 5	= 20	= 40	= 80	= 160	= 640
				1	**= 5/4**	= 5	= 10	= 20	= 40	= 160
					1	**= 4**	= 8	= 16	= 32	= 128
						1	**= 2**	= 4	= 8	= 32
							1	**= 2**	= 4	= 16
								1	**= 2**	= 8
									1	**= 4**

Table 3-161 Old Danish units of weight

[1 pund (Danish) = 0.500 kg (E)]

Skyplast	Skippund	Centner	Waag	Lispund	Bismerpund	Pund	Mark	Unze	Loth	Quintin	Ort	Es
1	= 65/4	= 52	= 1300/9	= 325	= 1300/3	= 5200	= 10 400	= 83 200	= 166 400	= 665 600	= 2 662 400	= 47 590 040
	1	= 16/5	= 80/9	= 20	= 80/3	= 320	= 640	= 5120	= 10 240	= 40 960	= 163 840	= 2 928 640
		1	= 25/9	= 25/4	= 25/3	= 100	= 200	= 1600	= 3200	= 12 800	= 51 200	= 915 200
			1	= 9/4	= 3	= 36	= 72	= 576	= 1152	= 4608	= 18 432	= 329 472
				1	= 4/3	= 16	= 32	= 256	= 512	= 2048	= 8192	= 146 432
					1	= 12	= 24	= 192	= 384	= 1536	= 6144	= 109 824
						1	= 2	= 16	= 32	= 128	= 512	= 9152
							1	= 8	= 16	= 64	= 256	= 4576
								1	= 2	= 8	= 32	= 572
									1	= 4	= 16	= 286
										1	= 4	= 143/2
											1	= 143/8

3.5.2.2.9.3 Old Polish Units of Capacity

Table 3-164 Old Polish units of capacity
[1 kwarta (Polish) = 1 dm^3(E)]

Korzec	Cwierc	Garniec	Kwarta	Kwarterka
1	**= 4**	= 32	= 128	= 512
	1	**= 8**	= 32	= 128
		1	**= 4**	= 16
			1	**= 4**

3.5.2.2.9.4 Old Polish Units of Weight

Table 3-165 Old Polish units of weight
[1 funt (Polish) = 0.405504 kg]

Centnar	Kamian	Funt	Uncja	Lut	Drachma	Skrupul	Gran
1	**= 4**	= 100	= 1600	= 3200	= 12 800	= 38 400	= 921 600
	1	**= 25**	= 400	= 800	= 3200	= 9600	= 230 400
		1	**= 16**	= 32	= 128	= 384	= 9216
			1	**= 2**	= 8	= 24	= 576
				1	**= 4**	= 12	= 288
					1	**= 3**	= 72
						1	**= 24**

3.5.2.2.10 Old Swedish System

The metric system has been compulsory since 1889.

3.5.2.2.10.1 Old Swedish Units of Length

See ***Table 3-166*** (opposite).

3.5.2.2.10.2 Old Swedish Units of Area

See ***Table 3-167*** (p. 113).

3.5.2.2.10.3 Old Swedish Units of Weight

See ***Table 3-168*** (p. 114).

3.5.2.2.10.4 Old Swedish Units of Capacity

See ***Table 3-169*** (p. 115).

Table 3-166 Old Swedish units of length (decree of 1665) [1 fot = 0.29690 m]

Mil (mile)	**Fjärdingsväg**	**Ref**	**Alnar** (ell)	**Stang**	**Famn, fanen** (fathom)	**Aln** (Alen)	**Fot** (foot)	**Kvarter**	**Tum** (inch)	**Linje** (line)
1	**= 4**	= 225	= 2000	= 2250	= 6000	= 9000	= 18 000	= 36 000	= 216 000	= 2 592 000
	1	**= 225/4**	= 500	= 1125/2	= 1500	= 4500	= 9000	= 18 000	= 108 000	= 1 296 000
		1	**= 80/9**	= 10	= 80/3	= 80	= 160	= 320	= 1920	= 23 040
			1	**= 9/8**	= 3	= 9	= 18	= 36	= 216	= 2592
				1	**= 8/3**	= 8	= 16	= 32	= 192	= 2304
					1	**= 3**	= 6	= 12	= 72	= 864
						1	**= 2**	= 4	= 24	= 288
1 steg = 1/2 famn							**1**	**= 2**	= 12	= 144
1 tvärhand = 4 tum								**1**	**= 6**	= 72
1 fingerbredd = 3/4 tum									**1**	**= 12**

Table 3-167 Old Swedish units of area (decree of 1665) [1 kvadratfot = $0.088149610 \times 10^{-3}$ m^2]

Pundland	**Spannland**	**Tunnland** (acre)	**Fjårdingsland**	**Kappland**	**Kvardratfot** (sq. foot)	**Kvadrattum** (sq. inch)
1	**= 2**	**= 4**	**= 8**	= 128	= 224 000	= 32 256 000
	1	**= 2**	**= 4**	= 64	= 112 000	= 16 128 000
		1	**= 2**	**= 32**	= 56 000	= 8 064 000
			1	**= 16**	= 28 000	= 4 032 000
				1	**= 1750**	= 252 000
					1	**= 144**

Table 3-168 Old Swedish units of weight (decree of 1665)

[1 skålpund = 0.4250797024 kg]

Nyläst	Skeppsund	Waag	Centner	Sten	Liespund	Skålpund (pound)	Uns	Lod	Ort	Qvintin (kvintin)	Korn	Ass
1	**= 30**	= 800/11	= 120	= 375	= 600	= 12 000	= 192 000	= 384 000	= 1 200 000	= 1 536 000	= 12 000 000	= 106 176 000
	1	**= 80/33**	= 4	= 25/2	= 20	= 400	= 6400	= 12 800	= 40 000	= 51 200	= 400 000	= 3 539 200
		1	**= 33/20**	= 165/32	= 33/4	= 165	= 2640	= 5280	= 16 500	= 21 120	= 165 000	= 1 459 920
			1	**= 25/8**	= 5	= 100	= 1600	= 3200	= 10 000	= 12 800	= 100 000	= 884 800
				1	**= 8/5**	= 32	= 512	= 1024	= 3200	= 4096	= 32 000	= 283 136
					1	**= 20**	= 320	= 640	= 2000	= 2560	= 20 000	= 176 960
						1	**= 16**	= 32	= 100	= 128	= 1000	= 8848
							1	**= 2**	= 25/4	= 8	= 125/2	= 553
								1	**= 25/8**	= 4	= 125/4	= 553/2
									1	**= 32/25**	= 10	= 2212/25
										1	**= 125/16**	= 553/8
											1	**= 1106/125**

Table 3-169 Old Swedish units of capacity (Dry) (decree 1665)
[1 kanna = 2.6171619 209 dm^3 = 1/10 kubikfot (E)]

Kolläst	Koltunna	Tunna	Spanna	Fjerdingar	Kappar	Kanna	Stop	Quarter	Junkfra (ort)
1	**= 12**	= 27/2	= 27	= 108	= 432	= 756	= 1512	= 4536	= 24 192
	1	**= 9/8**	= 9/4	= 9	= 36	= 63	= 126	= 378	= 2016
		1	**= 2**	= 8	= 32	= 56	= 112	= 336	= 1792
			1	**= 4**	= 16	= 28	= 56	= 168	= 896
				1	**= 4**	= 7	= 14	= 42	= 224
					1	**= 7/4**	= 7/2	= 21/2	= 56
						1	**= 2**	= 6	= 32
							1	**= 3**	= 16
								1	**= 16/3**

1 kanna = 1/10 kubikfot (E)
1 halvspanna = 1/2 spanna

Table 3-170 Old Swedish units of capacity (Liquids)
[1 kanna = 2.6171619 209 dm^3 = 1/10 kubikfot (E)]

Fuder	Oxhoft	Am (fat, ohm)	Eimer	Ankar	Kanna	Stop	Kvarter (quarter)	Jungfru (ort)
1	**= 4**	= 6	= 12	= 24	= 360	= 720	= 2880	= 11 520
	1	= 3/2	= 3	= 6	= 90	= 180	= 720	= 2880
		1	**= 2**	= 4	= 60	= 120	= 480	= 1920
			1	**= 2**	= 30	= 60	= 240	= 960
				1	**= 15**	= 30	= 120	= 480
					1	= 2	= 8	= 32
						1	= 4	= 16
							1	= 4

1 pipe = 180 kanna
1 tunna = 48 kanna
1 fjärding = 12 kanna

3.5.2.2.11 Old Norwegian System

Metric system adopted in 1875 and compulsory since 1882.

3.5.2.2.11.1 Miscellaneous Old Norwegian Units

Table 3-171 Miscellaneous old Norwegian units

1 fod (Norwegian) = 0.3137 m
1 mal (Norwegian) = 1000 m^2
1 pot (Norwegian, liquid) = 0.9651 dm^3
1 skjeppe (Norwegian, liquid) = 17.3718 dm^3
1 korntonde (Norwegian, dry) = 138.97 dm^3
1 skaalpund (Norwegian) = 0.4981 kg

3.5.2.2.12 Old Finnish System

Metric system adopted in 1886 and compulsory since 1892.

3.5.2.2.12.1 Old Finnish Units of Capacity

Table 3-172 Old Finnish units of capacity
[1 tunna (Finnish) = 163.49 dm^3]

Tunna	Ottingar	Sextingar	Kannor
1	**= 21/2**	= 21	= 63
	1	**= 2**	= 6
		1	**= 3**

3.5.2.2.13 Old Icelandic System

Metric system adopted and compulsory since 1907, in many points similar to the Danish system.

3.5.2.2.13.1 Old Icelandic Units of Length

Table 3-173 Old Icelandic units of length
[1 fet (Icelandic) = 0.313857 m]

Mila a landi	Faomur	Alin	Fet	Pumlungur	Lina
1	= 4000	= 12 000	= 24 000	= 288 000	= 3 456 000
	1	**= 3**	= 6	= 72	= 864
		1	**= 2**	= 24	= 288
			1	**= 12**	= 144
				1	**= 12**

3.5.2.2.13.2 Old Icelandic Units of Area

See ***Table 3-174*** overleaf.

3.5.2.2.13.3 Old Icelandic Units of Capacity (Dry)

See ***Table 3-175*** overleaf.

3.5.2.2.13.4 Old Icelandic Units of Weight

Table 3-176 Old Icelandic units of weight
[1 pund (Icelandic) = 0.500 kg]

Skippund (Batt)	Tunna smjors	Liespund	Fierding	Fisk	Mark	Pund
1	**= 20/14**	= 5	= 8	= 40	= 160	= 320
	1	**= 7/2**	= 28/5	= 28	= 122	= 224
		1	**= 8/5**	= 8	= 32	= 64
			1	**= 5**	= 20	= 40
				1	**= 4**	= 8
					1	**= 2**

3.5.2.2.14 Old Estonian System

3.5.2.2.14.1 Old Estonian Units of Length

Table 3-177 Old Estonian units of length
[1 arshine (Estonian) = 0.7112 m (E)]

Faden	Arshine	Foute	Elle
1	**= 3**	= 7	= 28/3
	1	**= 7/3**	= 28/9
		1	**= 4/3**

Table 3-174 Old Icelandic units of area

[1 ferfaomur (Icelandic) = 3.54622379216 m^2]

Fermila	Engjateigur	Tundagslatta	Ferfaomur	Feralin	Ferfet	Ferpumlungur
1	**= 10 000**	= 160 000/9	$= 1.6 \times 10^7$	$= 1.44 \times 10^8$	$= 5.76 \times 10^8$	$= 8.2944 \times 10^{10}$
	1	**= 16/9**	= 1600	= 14 400	= 57 600	= 8 294 400
		1	**= 900**	= 8100	= 32 400	= 4 665 600
			1	**= 9**	= 36	= 5184
				1	**= 4**	= 576
					1	**= 144**

Table 3-175 Old Icelandic units of capacity (Dry)

[1 pottar (Icelandic) = 0.966152049250 dm^3]

Korntunna	öltunna	Almen tunna	Anker	Cubic fet	Kornskeppa	Pottar
1	**= 18/17**	= 6/5	= 18/5	= 9/2	= 8	= 144
	1	**= 17/15**	= 17/5	= 17/4	= 68/9	= 136
		1	**= 3**	= 15/4	= 20/3	= 120
			1	**= 5/4**	= 20/9	= 40
				1	**= 16/9**	= 32
					1	= 18

3.5.2.2.14.2 Old Estonian Units of Surface Area

Table 3-178 Old Estonian units of surface area

1 lofstelle (Reval) = 1855 m^2
1 lofstelle (Livonian) = 3710 m^2
1 tonnland (Reval) = 5462.7 m^2
1 tonnland (Livonian) = 5194 m^2

3.5.2.2.14.3 Old Estonian Units of Capacity

Table 3-179 Old Estonian units of capacity
[1 hulmit (Estonian) = 11.48 dm^3]

Tonne	Lof (Livonian)	Lof (Reval)	Hulmit
1	**= 2**	= 4	= 12
	1	**= 2**	= 6
		1	**= 3**

3.5.2.2.14.4 Old Estonian Units of Weight

Table 3-180 Old Estonian units of weight
[1 pfund (Estonian) = 0.460 kg]

Schiffs-pfund	Ton	Centner	Lies-pfund	Pfund	Loth	Quent
1	**= 5/3**	= 10/3	= 20	= 400	= 12 800	= 51 200
	1	**= 2**	= 12	= 240	= 7680	= 30 720
		1	**= 6**	= 120	= 3840	= 15 360
			1	**= 20**	= 640	= 2560
				1	= 32	= 128
					1	**= 4**

3.5.2.2.15 Old Latvian System

3.5.2.2.15.1 Old Latvian Units of Length

Table 3-181 Old Latvian units of length
[1 elle (Latvian) = 0.537 m]

Meile	Verste	Elle	Quartier
1	**= 7**	= 7 467 600/537	= 29 870 400/537
	1	**= 10 668/5370**	= 21 336/2685
		1	**= 4**

3.5.2.2.15.2 Old Latvian Units of Area

Table 3-182 Old Latvian units of area
[1 kapp (Latvian) = 148.64 m^2]

Tonnstelle	Loofstelle (pourvette)	Kapp
1	**= 7/5**	= 35
	1	**= 25**

3.5.2.2.15.3 Old Latvian Units of Capacity

Table 3-183 Old Latvian units of capacity
[1 stoof (Latvian) = 1.2752 dm^3]
[1 faden = 4.077 m3]

Tonne	Loof (poure)	Anker	Kulmet	Kanne	Stoof
1	**= 2**	= 54/15	= 108/9	= 54	= 108
	1	**= 27/15**	= 54/9	= 27	= 54
		1	**= 30/9**	= 15	= 30
			1	**= 9/2**	= 9
				1	**= 2**

3.5.2.2.15.4Old Latvian Units of Weight

Table 3.184 Old Latvian units of weight
[1 pfund (Latvian) = 0.419 kg]

Schiffspfund	Ton	Centner	Liespfund	Pfund	Loth	Quent
1	**= 5/3**	= 10/3	= 20	= 400	= 12 800	= 51 200
	1	**= 2**	= 12	= 240	= 7680	= 30 720
		1	**= 6**	= 120	= 3840	= 15 360
			1	**= 20**	= 640	= 2560
				1	= 32	= 128
					1	**= 4**

3.5.2.16 Old Russian System

All the following units were used before the 1917 Revolution and are now obsolete, although they will be encountered in 19th century Russian literature. The metric system was formally adopted as the national standard of measurement by the Soviet government in 1927.

3.5.2.2.16.1Old Russian Units of Length

These are shown in ***Table 3-185*** (opposite).

Table 3-185 Old Russian units of length

[1 foute = 0.3048 m (E)]

Vyorst (verst)	Saaschen	Arshin	Foute (foot)	Tchevert	Vershok	Duîme	Sotka	Pal′ets	Line	Totchka
1	**= 500**	= 1500	= 3500	= 6000	= 24 000	= 42 000	= 50 000	= 84 000	= 420 000	= 4 200 000
	1	**= 3**	= 7	= 12	= 48	= 84	= 100	= 168	= 840	= 8400
		1	**= 7/3**	= 4	= 16	= 28	= 100/3	= 56	= 280	= 2800
			1	**= 12/7**	= 48/7	= 12	= 100/7	= 24	= 120	= 1200
				1	**= 4**	= 7	= 25/3	= 14	= 70	= 700
					1	**= 7/4**	= 25/12	= 7/2	= 35/2	= 175
						1	**= 25/21**	= 2	= 10	= 100
							1	**= 42/25**	= 42/5	= 84
								1	**= 5**	= 50
									1	**= 10**

3.5.2.2.16.2 Old Russian Units of Weight (Ordinary)

Table 3-186 Old Russian units of weight (Ordinary)
[1 funt = 0.409517179246 kg]

Berkovets	**Pood**	**Funt** (pound)	**Lana**	**Once** (ounce)	**Loth** (lot)	**Solotnik** (denier)	**Doli** (grain)
1	**= 10**	= 400	= 4 800	= 6400	= 12 800	= 38 400	= 3 686 400
	1	**= 40**	= 480	= 640	= 1280	= 3840	= 368 640
		1	**= 12**	= 16	= 32	= 96	= 9216
			1	**= 4/3**	= 8/3	= 8	= 768
				1	**= 2**	= 6	= 576
					1	**= 3**	= 288
						1	**= 96**

3.5.2.2.16.3 Old Russian Units of Weight (Apothecary)

Table 3-187 Old Russian units of weight (Apothecary)
[1 doli = 44.4349403 mg]

Pound	**Once**	**Drachme**	**Scrupule**	**Grain**	**Doli** (grain)
1	= 12	= 96	= 288	= 5760	= 8064
	1	**= 8**	= 24	= 480	= 672
		1	**= 3**	= 60	= 84
			1	**= 20**	= 28
				1	= 7/5

3.5.2.2.16.4 Old Russian Units of Capacity (Dry)

These are shown in ***Table 3-188*** (opposite).

3.5.2.2.16.5 Old Russian Units of Capacity (Liquids)

See ***Table 3-189*** (p. 124).

3.5.2.3 Africa

3.5.2.3.1 Old Moroccan System

Metric system compulsory since 1923.

3.5.2.3.1.1 Old Moroccan Units of Length

Table 3-190 Old Moroccan units of length
[1 pic (Moroccan) = 0.610 m]

Pic	**Canna** (cubit)	**Tonni**
1	**= 8/7**	= 8
	1	**= 7**

Table 3-188 Old Russian units of capacity (Dry)
[1 garnetz = 3.279842 dm^3]

Tchevert	Osmini	Lof	Payok	Tcheverik	Vedro	Garnetz	Polou-garnetz	Krushky	Tchast
1	**= 2**	= 120/37	= 4	= 8	= 16	= 64	= 128	= 160	= 1920
	1	**= 60/37**	= 2	= 4	= 8	= 32	= 64	= 80	= 960
		1	**= 37/30**	= 37/15	= 74/15	= 296/15	= 592/15	= 148/3	= 592
			1	**= 2**	= 4	= 16	= 32	= 40	= 480
				1	**= 2**	= 8	= 16	= 20	= 240
					1	**= 4**	= 8	= 10	= 120
						1	= 2	= 5/2	= 30
							1	**= 5/4**	= 15
								1	**= 12**

Table 3-189 Old Russian units of capacity (Liquids)

[1 vedro = 12.29941 dm^3]

Botchka (fass)	Pipe	Anker	Stekar	Vedro	Shtoff	Krouchka	Bottle (wine)	Bottle (vodka)	Tcharka	Chkalik
1	**= 10/9**	= 40/3	= 80/3	= 40	= 320	= 400	= 640	= 800	= 4000	= 8000
	1	**= 12**	= 24	= 36	= 288	= 360	= 576	= 720	= 3600	= 7200
		1	**= 2**	= 3	= 24	= 30	= 48	= 60	= 300	= 600
			1	**= 3/2**	= 12	= 15	= 24	= 30	= 150	= 300
				1	**= 8**	= 10	= 16	= 20	= 100	= 200
					1	**= 5/4**	= 2	= 5/2	= 25/2	= 25
						1	**= 8/5**	= 2	= 10	= 20
							1	**= 5/4**	= 25/4	= 25/2
								1	**= 5**	= 10
									1	**= 2**

3.5.2.3.1.2 Old Moroccan Units of Capacity (Liquid and Dry)

Table 3-191 Old Moroccan units of capacity
[1 mud (Moroccan) = 14×10^{-3} m^3]

Saah (Fanega)	Mud (Almude)
1	**= 4**

3.5.2.3.1.3 Old Moroccan Units of Weight

Table 3-192 Old Moroccan units of weight
[1 rotal or artal (Moroccan) = 507.5×10^{-3} kg]

Kantar	Kula	Gerbe	Rotal (artal)
1	**= 50/11**	= 50/3	= 100
	1	**= 11/3**	= 22
		1	**= 6**

3.5.2.3.2 Old Algerian System

Metric system compulsory in Algeria since 1843.

3.5.2.3.2.1 Old Algerian Units of Length

Table 3-193 Old Algerian units of length
[1 pic (dzera a torky) = 0.623 m]
[1 pic (dzera a raby) = 0.467 m]

Pic	Nus	Rebia	Termin
1	**= 2**	= 4	= 8
	1	**= 2**	= 4
		1	**= 2**

3.5.2.3.2.2 Old Algerian Units of Capacity

Table 3-194 Old Algerian units of capacity
[1 khoul (Algerian) = 16.666×10^{-3} m^3]
[1 metalli (Algerian, oil) = 17.90×10^{-3} m^3]

Caffiso (calisse)	Saah (ssah)	Tarri (tarie)	Khoul (kolleh)
1	= 3805/576	= 761/48	= 761/40
	1	**= 12/5**	= 72/25
		1	**= 6/5**

3.5.2.3.2.3 Old Algerian Units of Weight

Table 3-195 Old Algerian units of weight
[1 ukkia (Algerian) = 34.13×10^{-3} kg]

Cantar (kebyr)	Cantar (khaldary)	Cantar (thary)	Rottolo (kebyr)	Rottolo (khaldary)	Rottolo (thary)	Ukkia (ounce)	Metical (metsquat)
1	**= 4/3**	= 3/2	= 100	= 400/3	= 150	= 2400	= 17400
	1	**= 9/8**	= 75/2	= 100	= 225/2	= 1800	= 13050
		1	**= 200/3**	= 800/9	= 100	= 1600	= 11600
			1	**= 4/3**	= 3/2	= 24	= 174
				1	**= 9/8**	= 18	= 261/2
					1	**= 16**	= 116
						1	**= 29/4**

1 gyral = 207 mg

3.5.2.3.3 Old Tunisian System

In Tunisia the metric system is compulsory since 1895.

3.5.2.3.3.1 Old Tunisian Units of Length

Table 3-196 Old Tunisian units of length
[1 pic (Tunisian) = 0.488 m to 0.637 m^2]
[1 pic (Endezian) = 0.673 m]

3.5.2.3.3.2 Old Tunisian Units of Capacity

Table 3-197 Old Tunisian units of capacity
[1 cafisso (Tunisian) = 496×10^{-3} m^3]

Cafisso	Millerole	Whiba	Saah
1	**= 31/4**	= 16	= 129
	1	**= 64/31**	= 516/31
		1	**= 129/16**

3.5.2.3.3.3 Old Tunisian Units of Weight

Table 3-198 Old Tunisian units of weight
[1 uckir (Tunisian) = 31.495×10^{-3} kg]

Cantaro (khaddari)	Cantaro (sucki)	Cantaro (attari)	Rottolo (khaddari)	Rottolo (sucki)	Rottolo (attari)	Uckir (once)
1	**= 10/9**	= 5/4	= 100	= 1000/9	= 250/2	= 2000
	1	**= 9/8**	= 90	= 100	= 225/2	= 1800
		1	**= 80**	= 800/9	= 100	= 1600
			1	**= 10/9**	= 5/4	= 20
				1	**= 9/8**	= 18
					1	**= 16**

3.5.2.3.4 Old Libyan System

Metric system compulsory since 1927.

3.5.2.3.4.1 Old Libyan Units of Length

Table 3-199 Old Libyan units of length
[1 pic (Libyan) = 0.680 m]

Pic	Draa	Palmo
1	**= 3/2**	= 3
	1	**= 2**

3.5.2.3.4.2 Old Libyan Units of Area

Table 3-200 Old Libyan units of area
[1 square pic (Libyan) = 0.4624 m^2]

Jabia	Denum	Square pic
1	**= 9/8**	= 1800
	1	**= 1600**

3.5.2.3.4.3 Old Libyan Units of Capacity (Liquids)

Table 3-201 Old Libyan units of capacity (Liquids)
[1 barile (Libyan) = 62.4975 × 10^{-3} m^3]

Barile	Giarra	Gorraf	Bozze
1	**= 71/50**	= 5	= 24
	1	**= 250/71**	= 1200/71
		1	**= 24/5**

Note: giarra and gorraf were usually measured by weight, i.e., 1 gorraf = 39/4 oka of water (E).

3.5.2.3.4.4 Old Libyan Units of Capacity (Dry)

Table 3-202 Old Libyan units of capacity (Dry)
[1 orba (Libyan) =7.692 × 10^{-3} m^3]

Ueba	Temen	Kele	Marta	Orba	Nufsorba
1	**= 4**	= 16/3	= 8	= 16	= 32
	1	**= 4/3**	= 2	= 4	= 8
		1	**= 3/2**	= 3	= 6
			1	**=2**	= 4
				1	**= 2**

Note: kele and marta were usually measured by weight, i.e., 1 marta = 12 oka of water (E).

3.5.2.3.4.5 Old Libyan Units of Weight

Table 3-203 Old Libyan units of weight
[1 rottolo (Libyan) = 0.5128 kg]

Cantar	Mattaro	Oka	Rottolo	Uckin	Termino	Dram	Kharouba
1	**= 50/21**	= 40	= 100	= 1600	= 12 800	= 16 000	= 256 000
	1	**= 84/5**	= 42	= 672	= 5376	= 6720	= 107 520
		1	**= 5/2**	= 40	= 320	= 400	= 6400
			1	**= 16**	= 128	= 160	= 2560
				1	**= 8**	= 10	= 160
					1	**= 5/4**	= 20
						1	**= 16**

3.5.2.3.5 Old Egyptian System

Metric system compulsory since 1891.

3.5.2.3.5.1 Old Egyptian Units of Length

Table 3-204 Old Egyptian units of length
[1 diraa (Egyptian) = 0.58 m]

Farsakh	Mil hachmi	Kassabah	Gasab	Diraa (pic)	Kadam	Abdat	Kirat
1	**= 3**	= 500	= 750	= 3000	= 6000	= 18 000	= 72 000
	1	**= 500/3**	= 250	= 1000	= 2000	= 6000	= 24 000
		1	**=3/2**	= 6	= 12	= 36	= 144
			1	**= 4**	= 8	= 24	= 96
				1	**= 2**	= 6	= 24
					1	**= 3**	= 12
						1	**= 4**

3.5.2.3.5.2 Old Egyptian Units of Area

Table 3-205 Old Egyptian units of area
[1 feddan masri (Egyptian) = 4200.08 m^2]

Feddan masri	Kirat kamel	Sahme
1	**= 24**	= 576
	1	**= 24**

3.5.2.3.5.3 Old Egyptian Units of Capacity

See ***Table 3-206*** opposite.

Table 3-206 Old Egyptian units of capacity

[1 keddah (Egyptian) = 2.0625×10^{-3} m^3]

Daribah	Ardeb	Keila	Rob	Maloua	Keddah	Nisf keddah	Robhah	Toumnah	Khanoubah	Kirat
1	**= 8**	= 96	= 192	= 384	= 768	= 1536	= 3072	= 6144	= 12 288	= 24 576
	1	**= 12**	= 24	= 48	= 96	= 192	= 384	= 768	= 1536	= 3072
		1	**= 2**	= 4	= 8	= 32	= 64	= 128	= 256	= 512
			1	**= 2**	= 4	= 8	= 16	= 32	= 64	= 128
				1	**= 2**	= 4	= 8	= 16	= 32	= 64
					1	**= 2**	= 4	= 8	= 16	= 32
						1	**= 2**	= 4	= 8	= 16
							1	**= 2**	= 4	= 8
								1	**= 2**	= 4
									1	**= 2**

3.5.2.3.5.4 Old Egyptian Units of Weight

Table 3-207 Old Egyptian units of weight
[1 oke (Egyptian) = 1.248 kg]

Helm	Kantar	Oke	Rotoli	Okieh	Miskal	Dirhem	Kirat
1	**= 50/9**	= 200	= 5000/9	= 20 000/27	= 20 000/9	= 80 000/9	= 1 280 000/9
	1	**= 36**	= 100	= 400/3	= 400	= 1600	= 25 600
		1	**= 25/9**	= 100/27	= 100/9	= 400/9	= 6400/9
			1	**= 4/3**	= 4	= 16	= 256
				1	**= 3**	= 12	= 192
					1	**= 4**	= 64
						1	**= 16**

3.5.2.3.6 Old Abyssinian System

3.5.2.3.6.1 Old Abyssinian Units of Length

Table 3-208 Old Abyssinian units of length
[1 pic (Abyssinian) = 0.686 m]

Farsang	Berri	Pic
1	**= 3**	= 7391
	1	= 6/5

3.5.2.3.6.2 Old Abyssinian Units of Capacity

Table 3-209 Old Abyssinian units of capacity
[1 madega (Abyssinian) = 0.44×10^{-3} m^3]

Ardeb (long)	Ardeb (short)	Kuba	Madega
1	**= 12/5**	= 240/23	= 24
	1	**= 100/23**	= 10
		1	**= 23/10**

3.5.2.3.6.3 Old Abyssinian Units of Weight

Table 3-210 Old Abyssinian units of weight
[1 rottolo (Abyssinian) = 0.311 kg]

Rottolo (pound)	Mocha	Wakea (ounce)	Derime (drachm)
1	**= 10**	= 12	= 120
	1	**= 6/5**	= 12
		1	**= 10**

3.5.2.3.7 Old Eritrean System

3.5.2.3.7.1 Old Eritrean Units of Length

Table 3-211 Old Eritrean units of length
[1 cubi (Eritrean) = 0.32 m]

Emmet (derah)	**Cubi**
1	**= 23/16**

3.5.2.3.7.2 Old Eritrean Units of Capacity

Table 3-212 Old Eritrean units of capacity
[1 messe (Eritrean) = 1.50×10^{-3} m^3]

Entelam	**Ghebeta**	**Tanica**	**Cabaho**	**Messe**
1	**= 8**	= 32/3	= 32	= 128
	1	**= 4/3**	= 4	= 16
		1	**= 3**	= 12
			1	**= 4**

3.5.2.3.7.3 Old Eritrean Units of Weight

Table 3-213 Old Eritrean units of weight
[1 rotolo (Eritean) = 0.448 kg]

Gisla	**Rottolo** (pound)	**Okia** (ounce)
1	**= 364**	= 5824
	1	**= 16**

3.5.2.3.8 Old Ethiopian System

Metric system adopted and compulsory since 1963.

3.5.2.3.8.1 Old Ethiopian Units of Length

Table 3-214 Old Ethiopian units of length
[1 kend (Ethiopian) = 0.490 m]

Kend	**Sinzer**	**Gat**	Tat
1	**= 49/16**	= 49/8	= 98/5
	1	**= 2**	= 32/5
		1	**= 16/5**

3.5.2.3.8.2 Old Ethiopian Units of Weight

See ***Table 3-215*** opposite.

3.5.2.3.9 Old Somalian System

Metric system adopted in 1950 and compulsory since 1972.

3.5.2.3.9.1 Old Somalian Units of Length

Table 3-216 Old Somalian units of length
[1 top (Somalian) = 3.92 m]

Top	Cubito
1	**= 7**

3.5.2.3.9.2 Old Somalian Units of Capacity

Table 3-217 Old Somalian units of capacity
[1 chela (Somalian) = 1.359×10^{-3} m^3]

Gisla	Tabla	Chela	Caba
1	**= 8**	= 120	= 360
	1	**= 15**	= 45
		1	**= 3**

3.5.2.3.9.3 Old Somalian Units of Weight

Table 3-218 Old Somalian units of weight
[1 rotolo (Somalian) = 0.448 kg]

Gisla	Frasla	Rottolo (pound)	Okia (ounce)
1	**= 10**	= 360	= 5760
	1	**= 36**	= 576
		1	**= 16**

3.5.2.3.10 Old Guinean System

Metric system adopted in 1906.

3.5.2.3.10.1 Old Guinean Units of Length

Table 3-219 Old Guinean units of length
[1 pic (Guinean) = 0.578 m]

Jacktan	pic
1	**= 18986/3000**

3.5.2.3.10.2 Old Guinean Units of Weight

See ***Table 3-220*** (p. 134).

Table 3-215 Old Ethiopian units of weight

[1 farasula (Ethiopian, ivory) = 13.4784 kg]
[1 farasula (Ethiopian, coffee) = 16.848 kg]
[1 farasula (Ethiopian, rubber) = 17.9712 kg]

Farasula (rubber)	**Farasula** (coffee)	**Farasula** (ivory)	**Neter**	**Wogiet**	**Alada**	**Mutagalla**	**Kasm**
1	**= 16/15**	= 4/3	= 18 720/35	= 576	= 1152	= 2304	= 4608
	1	**= 5/4**	= 3510/7	= 540	= 1080	= 2160	= 4320
		1	**= 1404/35**	= 432	= 864	= 1728	= 3456
			1	**= 140/13**	= 280/13	= 560/13	= 1120/13
				1	**= 2**	= 4	= 8
					1	**= 2**	= 4
						1	**= 2**

Table 3-220 Old Guinean units of weight

[1 benda (Guinean) = 0.0642 kg]

Kantar	Gammell	Benda	Offa	Seron	Uzan (piso)	Quinto	Aguirage	Mediatabla	Akey
1	**= 5**	= 15 218	= 30 436	= 243488/3	= 121 744	= 486 976/3	= 24 3488	= 486 976	= 973 952
	1	**= 15 218/5**	= 30 436/5	= 243488/15	= 121 744/5	= 486 976/15	= 243 488/5	= 486 976/5	= 973 952/5
		1	**= 2**	= 16/3	= 8	= 32/3	= 16	= 32	= 48
			1	**= 8/3**	= 4	= 16/3	= 8	= 16	= 32
				1	**= 3/2**	= 2	= 3	= 6	= 12
					1	**= 4/3**	= 2	= 4	= 8
						1	**= 3/2**	= 3	= 6
							1	**= 2**	= 4
								1	**= 2**

3.5.2.4 Middle East and Asia

3.5.2.4.1 Old Saudi-Arabian System

Metric system adopted in 1962 and compulsory since 1964.

3.5.2.4.1.1 Old Saudi-Arabian Units of Length

Table 3-221 Old Saudi-Arabian units of length
[1 farsakh (Arabian) = 4830 m]

Marhala	Baryd	Farsakh	Cassaba	Guz	Covid
1	**= 2**	= 8	= 4025/4	= 772 800/127	= 9 660 000/241
	1	**= 4**	= 4025/8	= 386 400/127	= 4 830 000/241
		1	**= 4025/32**	= 96 600/127	= 2 415 000/241
			1	**= 3840/635**	= 1920/241
				1	**= 635/482**

1 busa = 2.54 cm

3.5.2.4.1.2 Old Saudi-Arabian Units of Capacity (Liquids)

Table 3-222 Old Saudi-Arabian units of capacity (Liquids)
[1 nusfiah (Arabian, liq) = 0.95×10^{-3} m^3]

Ardabb (ardebb)	Zudda	Cuddy	Nusfiah	Vakia
1	**= 208**	= 416	= 1664	= 26 624
	1	**= 2**	= 8	= 128
		1	**= 4**	= 64
			1	**= 16**

3.5.2.4.1.3 Old Saudi-Arabian Units of Capacity (Dry)

Table 2-223 Old Saudi-Arabian units of capacity (Dry)
[1 teman (Arabian, dry) = 85×10^{-3} m^3]

Teman	Kella	Mecdema
1	**= 12/5**	= 240/23
	1	**= 100/23**

3.5.2.4.1.4 Old Saudi-Arabian Units of Weight

Table 3-224 Old Saudi-Arabian units of weight
[1 maund (Arabian) = 1.350 kg]

Bokard (bahar)	**Kantar** (buhar)	**Farzil** (farcella)	**Maund**	**Ratl**	**Tukeas** (vakias)	**Coffilas**
1	**= 3**	= 15	= 150	= 450	= 6000	= 60 000
	1	**= 5**	= 50	= 150	= 2000	= 20 000
		1	**= 10**	= 30	= 400	= 4000
			1	**= 3**	= 40	= 400
				1	**= 40/3**	= 400/3
					1	**= 10**

3.5.2.4.2 Old Persian System

Metric system adopted in 1933 and compulsory in Iran since 1949.

3.5.2.4.2.1 Old Persian Units of Length

Table 3-225 Old Persian units of length
[1 farsakh (Persian) = 5486.40 m]

Farsakh (parasang)	**Zar**	**Gez** (guerze)	**Charak**	**Urub**	**Gireh**
1	**= 5275**	= 6000	= 24 000	= 48 000	= 96 000
	1	**= 240/211**	= 211/60	= 211/30	= 211/15
		1	= 4	= 8	= 16
			1	**= 2**	= 4
				1	**= 2**

3.5.2.4.2.2 Old Persian Units of Capacity

Table 3-226 Old Persian units of capacity
[1chenica (Persian) = 1.32×10^{-3} m^3]

Artaba	**Legana**	**Colluthun**	**Sabbitha**	**Capichas**	**Chenica**	**Sextario**
1	**= 5/3**	= 8	= 100/11	= 25	= 50	= 200
	1	**= 24/5**	= 60/11	= 15	= 30	= 120
		1	**= 25/22**	= 25/8	= 25/4	= 25
			1	**= 11/4**	= 11/2	= 22
				1	**= 2**	= 8
					1	**= 4**

3.5.2.4.2.3 Old Persian Units of Weight

See ***Table 2-227*** opposite.

Table 3-227 Old Persian units of weight

[1 rottel (Persian) = 0.460 kg]

Karvar	Batman (shirez)	Batman (tauris)	Saddirham	Tcheirek	Rottel	Abbassi	Danar	Pinar	Sir	Dirhem	Miskal	Dartung	Dung	Makhod (carat)
1	**= 100**	= 200	= 400	= 800	= 6400/5	= 1600	= 3200	= 6400	= 8000	= 64 000	= 128 000	= 57 600	= 76 800	= 4 096 000
	1	**= 2**	= 4	= 8	= 64/5	= 16	= 32	= 64	= 80	= 640	= 1280	= 5760	= 7680	= 40 960
		1	**= 2**	= 4	= 32/5	= 8	= 16	= 32	= 40	= 320	= 640	= 2880	= 3840	= 15 360
			1	**= 2**	= 16/5	= 4	= 8	= 16	= 20	= 160	= 320	= 1440	= 1920	= 7680
				1	**= 8/5**	= 2	= 4	= 8	= 10	= 80	= 160	= 720	= 960	= 3840
					1	**= 5/4**	= 5/2	= 5	= 25/4	= 50	= 100	= 450	= 600	= 2400
						1	**= 2**	= 4	= 5	= 40	= 80	= 360	= 480	= 1920
							1	**= 2**	= 5/2	= 20	= 40	= 180	= 240	= 960
								1	**= 5/4**	= 10	= 20	= 90	= 120	= 480
									1	**= 8**	= 16	= 72	= 96	= 384
										1	**= 2**	= 9	= 12	= 48
											1	**= 9/2**	= 6	= 24
												1	**= 4/3**	= 16/3
													1	**= 4**

3.5.2.4.3 Old Syrian System

Metric system adopted in 1931.

3.5.2.4.3.1 Old Syrian Unit of Length

Table 3-228 Old Syrian unit of length

1 pic (Syrian) = 0.582 m

3.5.2.4.3.2 Old Syrian Units of Capacity

Table 3-229 Old Syrian units of capacity [1 rotl (Syrian) = 3.2×10^{-3} m^3]

Garava	Makuk	Rotl
1	**= 9/5**	= 450
	1	**= 250**

3.5.2.4.3.3 Old Syrian Units of Weight

Table 3-230 Old Syrian units of weight [1 rottolo (Syrian) = 1.785 kg]

Cantar	Cola	Zurbo	Rottolo	Once	Mitcal (metecali, drachme)	Pesi
1	**= 20/7**	= 40/11	= 100	= 6000	= 40 000	= 60 000
	1	**= 14/11**	= 35	= 2100	= 14 000	= 21 000
		1	**= 55/2**	= 1650	= 11 000	= 16 500
			1	**= 60**	= 400	= 600
				1	**= 20/3**	= 10
					1	**= 3/2**

3.5.2.4.4 Old Turkmenian System

3.5.2.4.4.1 Old Turkmenian Units of Length

Table 3-231 Old Turkmenian units of length

1 hasch (Turkmenian) = 0.7112 m
1 altschin (Turkmenian) = 0.7112 m

3.5.2.4.4.1 Old Turkmenian Units of Weight

Table 3-232 Old Turkmenian units of weight [1batman (Turkmenian) = 125 to 128 kg]

Batman	Sir	Tscharik	Mimtscha
1	**= 8**	= 64	= 256
	1	**= 8**	= 32
		1	**= 4**

3.5.2.4.5 Old Indian System

Metric system adopted in 1920 and compulsory since 1956.

3.5.2.4.5.1 Old Indian Units of Length

See ***Table 3-233*** overleaf.

3.5.2.4.5.2 Old Indian Units of Area

Table 3-234 Old Indian units of area
[1 square guz (Indian, Bombay) = 0.470321640 m^2]
[1 square guz (Indian, Calcutta) = 0.837225 m^2]

Tenab	Biggah	Cottah	Chattack	Square guz
1	**= 25/16**	= 125/4	= 500	= 2500
	1	**= 20**	= 320	= 1600
		1	**= 16**	= 80
			1	**= 5**

1 ground = 20.3 m^2
1 kani = 307.5 m^2
1 cawnie = 540 m^2
1 chahar = 29620 mm^2

3.5.2.4.5.3 Old Indian Units of Capacity

See ***Table 3-235*** (page 141).

3.5.2.4.5.4 Old Indian Units of Weight

See ***Table 3-236*** (page 142).

3.5.2.4.6 Old Burmese System

3.5.2.4.6.1 Old Burmese Units of Length

Table 3-237 Old Burmese units of length
[1 sandong (Burma) = 0.5588 m]

Dain	Oke thapal	Dha (bamboo)	Lan	Sandong	Taim	Palgat
1	**= 50**	= 1000	= 1750	= 7000	= 77 000/9	= 38 500
	1	**= 20**	= 35	= 140	= 1540/9	= 770
		1	**= 7/4**	= 7	= 77/9	= 77/2
			1	**= 4**	= 44/9	= 22
				1	**= 11/9**	= 11/2
					1	**= 9/2**

Table 3-233 Old Indian units of length

[1 guz (Indian, Bombay) = 0.6858 m]
[1 guz (Indian, Calcutta) = 0.915 m]

Coss	Niranga	Danda	Guz	Covid	Span	Moot	Tassoos	Unglee	Jow (jaob)
1	**= 200**	= 1000	= 2000	= 4000	= 8000	= 24 000	= 48 000	= 96 000	= 288 000
	1	**= 5**	= 10	= 20	= 40	= 120	= 240	= 480	= 1440
		1	**= 2**	= 4	= 8	= 24	= 48	= 96	= 288
			1	**= 2**	= 4	= 12	= 24	= 48	= 144
				1	**= 2**	= 6	= 12	= 24	= 72
					1	**= 3**	= 6	= 12	= 36
						1	**= 2**	= 4	= 12
							1	**= 2**	= 6
								1	**= 3**

Table 3-235 Old Indian units of capacity

[1 parah (Indian) = 0.1101 m^3]

Garce	Khahoon	Candy	Parah (soally)	Adoulie	Pally	Seer	Raik	Tipree	Kunk	Khoonke	Chattack
1	**= 5**	= 10	= 80	= 1280	= 1600	= 5120	= 6400	= 10 240	= 25 600	= 102 400	= 128 000
	1	**= 2**	= 16	= 256	= 320	= 1024	= 1280	= 2048	= 5120	= 20 480	= 25 600
		1	= 8	= 128	= 160	= 512	= 640	= 1024	= 2560	= 10 240	= 12 800
			1	**= 16**	= 20	= 64	= 80	= 128	= 320	= 1280	= 1600
				1	**= 5/4**	= 4	= 5	= 8	= 20	= 80	= 100
					1	**= 16/5**	= 4	= 32/5	= 16	= 64	= 80
						1	**= 5/4**	= 2	= 5	= 40	= 50
							1	**= 8/5**	= 4	= 16	= 20
								1	**= 5/2**	= 10	= 25/2
									1	**= 4**	= 5
										1	**= 5/4**

Table 3-236 Old Indian units of weight

[1 seer (Indian) = 0.93304 kg]

Candy	Maund (bazar)	Dhurra (pally)	Raik	Seer	Powa	Chittak	Parah (pince)	Tank	Tolah (sicca)	Masha	Ruttee
1	**= 20**	= 160	= 640	= 800	= 3200	= 12 800	= 24 000	= 57 600	= 64 000	= 768 000	= 6 144 000
	1	**= 8**	= 32	= 40	= 160	= 640	= 1200	= 2880	= 3200	= 38 400	= 307 200
		1	**= 4**	**= 5**	= 20	= 80	= 150	= 360	= 400	= 4800	= 38 400
			1	**= 5/4**	= 5	= 20	= 75/2	= 90	= 100	= 1200	= 9600
				1	**= 4**	= 16	= 30	= 72	= 80	= 960	= 7680
					1	**= 4**	= 15/2	= 18	= 20	= 240	= 1920
						1	**= 15/8**	= 9/2	= 5	= 60	= 480
							1	**= 12/5**	= 8/3	= 32	= 256
								1	**= 10/9**	= 40/3	= 320/3
									1	**= 12**	= 96
										1	**= 8**

3.5.2.4.6.2 Old Burmese Units of Capacity

Table 3-238 Old Burmese units of capacity
[1 byee (Burma) = 0.505×10^{-3} m^3]

Kwai	Seit	Zayoot	Byee	Zalay	Lamany
1	**= 2**	= 4	= 8	= 32	= 64
	1	**= 2**	= 4	= 16	= 32
		1	**= 2**	= 8	= 16
			1	**= 4**	= 8
				1	**= 2**

3.5.2.4.6.3 Old Burmese Units of Weight

Table 3-239 Old Burmese units of weight
[1 catty (Burma) = 0.544 kg]

Candy	Viss	Catty	Tical	Mat	Moo	Pai	Ruay
1	**= 150**	= 450	= 15 000	= 60 000	= 120 000	= 240 000	= 960 000
	1	**= 3**	= 100	= 400	= 800	= 1600	= 6400
		1	**= 100/3**	= 400/3	= 800/3	= 1600/3	= 6400/3
			1	**= 4**	= 8	= 16	= 64
				1	**= 2**	= 4	= 16
					1	**= 2**	= 8
						1	= 4

3.5.2.4.7 Old Ceylonese and Madrasian System

3.5.2.4.7.1 Old Ceylonese and Madrasian Units of Length

Table 3-240 Old Ceylonese and Madrasian units of length
1 covid (Ceylon) = 0.464 m
1 covid (Madras) = 0.472 m

3.5.2.4.7.2 Old Ceylonese and Madrasian Units of Weight

Table 3-241 Old Ceylonese and Madrasian units of weight
[1 seer (Ceylon and Madras) = 0.283495 kg]

Candy	Maund	Vis	Seer	Powa	Pollam (varahan)	Pagoda	Fanam
1	**= 20**	= 160	= 800	= 3200	= 6400	= 64 000	= 2 304 000
	1	**= 8**	= 40	= 160	= 320	= 3200	= 115 200
		1	**= 5**	= 20	= 40	= 400	= 14 400
			1	**= 4**	= 8	= 80	= 2880
				1	**= 2**	= 20	= 720
					1	= 5	= 180
						1	= 36

3.5.2.4.8 Old Annamese System

3.5.2.4.8.1 Old Annamese Units of Length

Table 3-242 Old Annamese units of length
[1 thuoc moc (Annam) = 0.425 m]
[1 thuoc de ruong (Annam) = 0.470 m]
[1 thuoc vai (Annam) = 0.644 m]

Gon	Mao	That (chai vai)	Sao	Truong	Tam (ngu)	Thuoc	Tat	Phan	Ly
1	**= 2**	= 10	= 20	= 30	= 60	= 300	= 3000	= 30 000	= 300 000
	1	**= 5**	= 10	= 15	= 30	= 150	= 1500	= 15 000	= 150 000
		1	**= 2**	= 3	= 6	= 30	= 300	= 3000	= 30 000
			1	**= 3/2**	= 3	= 15	= 150	= 1500	= 15 000
				1	**= 2**	= 10	= 100	= 1000	= 10 000
					1	**= 5**	= 50	= 500	= 5000
						1	**= 10**	= 100	= 1000
							1	**= 10**	= 100
								1	**= 10**

3.5.2.4.8.2 Old Annamese Units of Area

Table 3-243 Old Annamese units of area
[1 square ngu (Annam) = 5.5225 m^2]

Quo	Mau	Sao	Thuoc	Square ngu
1	**= 2**	= 20	= 300	= 1800
	1	**= 10**	= 150	= 900
		1	**= 15**	= 90
			1	**= 6**

3.5.2.4.8.3 Old Annamese Units of Capacity

Table 3-244 Old Annamese units of capacity
[1 hao (Annam) = 28.26×10^{-3} m^3]

Toa	Hao (Shita)
1	**= 2**

3.5.2.4.8.4 Old Annamese Units of Weight

See ***Table 3-245*** opposite.

3.5.2.4.9 Old Cambodian System

Metric system compulsory since 1914.

Table 3-245 Old Annamese units of weight

[1 dong (Annam) = 3.775×10^{-3} kg]

Kwan	Ta (Picul)	Binh	Yen	Can	Neu	Luong	Dong	Fan	Li	Hao
1	**= 9/8**	= 9/4	= 45/4	= 225/2	= 180	= 1800	= 18 000	= 180 000	= 1 800 000	= 18 000 000
	1	**= 2**	= 10	= 100	= 160	= 1600	= 16 000	= 160 000	= 1 600 000	= 16 000 000
		1	**= 5**	= 50	= 80	= 800	= 8000	= 80 000	= 800 000	= 8 000 000
			1	**= 10**	= 16	= 160	= 1600	= 16 000	= 160 000	= 1 600 000
				1	**= 8/5**	= 16	= 160	= 1600	= 16 000	= 160 000
					1	**= 10**	= 100	= 1000	= 10 000	= 100 000
						1	**= 10**	= 100	= 1000	= 10 000
							1	**= 10**	= 100	= 1000
								1	**= 10**	= 100
									1	**= 10**

3.5.2.4.9.1 Old Cambodian Units of Length

Table 3-246 Old Cambodian units of length
[1 muoi (Cambodian) = 1 m]

Yoch	Sen	Phyeam	mot thuoc (muoi)
1	**= 20**	= 400	= 16 000
	1	**= 20**	= 40
		1	**= 2**

3.5.2.4.9.2 Old Cambodian Units of Capacity

Table 3-247 Old Cambodian units of capacity
[1 sesep (Cambodian) = 40 dm^3]

Sesep (vuong mot gia)	Thang	Tao	Kantang	Muoi (vuong mot bat tay)
1	**= 4/3**	= 8/3	= 16/3	= 40
	1	**= 2**	= 4	= 30
		1	**= 2**	= 15
			1	**= 15/2**

3.5.2.4.9.3 Old Cambodian Units of Weight

See ***Table 3-248*** opposite.

3.5.2.4.10 Old Thai System

Metric system adopted in 1923 and compulsory since 1936.

3.5.2.4.10.1 Old Thai Units of Length

See ***Table 3-249*** (page 148).

3.5.2.4.10.2 Old Thai Units of Area

Table 3-250 Old Thai units of area
[1 square wah (Thai) = 4 m^2]

Rai	Ngan	Square wah
1	**= 4**	= 400
	1	**= 100**

3.5.2.4.10.3 Old Thai Units of Capacity

See ***Table 3-251*** (page 149).

3.5.2.4.10.4 Old Thai Units of Weight

See ***Table 3-252*** (page 150).

Table 3-248 Old Cambodian units of weight

[1 neal (Cambodian) = 0.600 kg]

Hap (picul)	**Chong**	**Pram roi** (mot can tay)	**Neal**	**Tael**	**Chin**	**Muoi** (mot dong can tay)	**Hun**	**Lin**
1	**= 2**	= 60	= 100	= 1600	= 16 000	= 60 000	= 160 000	= 1 600 000
	1	**= 30**	= 50	= 800	= 8000	= 30 000	= 80 000	= 800 000
		1	**= 5/3**	= 80/3	= 800/3	= 1000	= 8000/3	= 8000/3
			1	**= 16**	= 160	= 600	= 1600	= 16 000
				1	**= 10**	= 75/2	= 100	= 1000
					1	**= 15/4**	= 5/2	= 25
						1	**= 8/3**	= 80/3
							1	**= 10**

Table 3-249 Old Thai units of length

[1 wah (Thai) = 2 m]

Yote	Roeneng	Sen	Wah	Ken	Sawk	Keup	Niou	Kabiet	Anukabiet
1	**= 4**	= 400	= 8000	= 16 000	= 32 000	= 64 000	= 768 000	= 3 072 000	= 6 144 000
	1	**= 100**	= 2000	= 4000	= 8000	= 16 000	= 192 000	= 768 000	= 1 532 000
		1	**= 20**	= 40	= 80	= 160	= 1920	= 7680	= 15 360
			1	**= 2**	= 4	= 8	= 96	= 384	= 768
				1	**= 2**	= 4	= 48	= 192	= 384
					1	**= 2**	= 24	= 96	= 192
						1	**= 12**	= 48	= 96
							1	**= 4**	= 8
								1	**= 2**

Table 3-251 Old Thai units of capacity

[1 tanan (Thai) = 0.9 to 1.2 dm^3]

Cohi	Koyan (kwien)	Ban	Seste	Tamlaum	Tang	Sat	Tanan (kanahm)	Changawn (laang)	Kam meu	Chai meu	Niou
1	**= 10**	= 20	= 40	= 80	= 800	= 1600	= 32 000	= 64 000	= 256 000	= 1 024 000	= 3 200 000
	1	**= 2**	= 4	= 8	= 80	= 160	= 3200	= 6400	= 25 600	= 102 400	= 320 000
		1	**= 2**	= 4	= 40	= 80	= 1600	= 3200	= 12 800	= 51 200	= 160 000
			1	**= 2**	= 20	= 40	= 800	= 1600	= 6400	= 25 600	= 80 000
				1	**= 10**	= 20	= 400	= 800	= 3200	= 12 800	= 40 000
					1	**= 2**	= 40	= 80	= 320	= 1280	= 4000
						1	= 20	= 40	= 160	= 640	= 2000
							1	**= 2**	= 8	= 32	= 100
								1	**= 4**	= 16	= 50
									1	**= 4**	= 25/2
										1	**= 25/8**

Table 3-252 Old Thai units of weight

[1 tchang (Thai) = 1.2 kg]

Bara	Hap	Doon	Tchang	Tamlung	Baht	Salung	Fuang	Sompay (grani)	Pai	Klam	Klom
1	**= 8**	= 20	= 400	= 8000	= 32 000	= 128 000	= 256 000	= 512 000	= 1 024 000	= 2 048 000	= 4 096 000
	1	**= 5/2**	= 50	= 1000	= 4000	= 16 000	= 32 000	= 64 000	= 128 000	= 256 000	= 512 000
		1	**= 20**	= 400	= 1600	= 6400	= 12 800	= 25 600	= 51 200	= 102 400	= 204 800
			1	**= 20**	= 80	= 320	= 640	= 1280	= 2560	= 5120	= 10 240
				1	**= 4**	= 16	= 32	= 64	= 128	= 256	= 512
					1	**= 4**	= 8	= 16	= 32	= 64	= 128
						1	**= 2**	= 4	= 8	= 16	= 32
							1	**= 2**	= 4	= 8	= 16
								1	**= 2**	= 4	= 8
									1	**= 2**	= 4
										1	**= 2**

3.5.2.4.11 Old Indonesian System

Metric system adopted in 1923 and compulsory since 1938.

3.5.2.4.11.1 Old Indonesian Units of Length

Table 3.253 Old Indonesian units of length
[1 depa (Indonesian) = 1.70 m]

Depa	Hasta	Kilan
1	**= 4**	= 8
	1	**= 2**

3.5.2.4.11.2 Old Indonesian Units of Capacity

Table 3-254 Old Indonesian units of capacity
[1 kan (Indonesian) = 1.5751×10^{-3} m^3]

Kojang	Picul	Takar	Kit	Koelak	Kan
1	**= 30**	= 78	= 663/5	= 2652/5	= 12 597/10
	1	**= 13/5**	= 221/50	= 442/25	= 41 99/100
		1	**= 17/10**	= 34/5	= 323/20
			1	**= 4**	= 19/2
				1	**= 19/8**

3.5.2.4.11.3 Old Indonesian Units of Weight

See ***Table 3-255*** overleaf.

3.5.2.4.12 Old Philippine System

Metric system adopted in 1906 and compulsory since 1975.

3.5.2.4.12.1 Old Philippine Units of Area

Table 3-256 Old Philippine units of area
[1 balita (Philippine) = 2795 m^2]

Quignon	Balita	Loan
1	**= 10**	= 100
	1	**= 10**

3.5.2.4.12.2 Old Philippine Units of Capacity

Table 3-257 Old Philippine units of capacity
[1 kaban (Phillipian) = 99.90×10^{-3} m^3]

Kaban	Ganta	Chupa	Apatan
1	**= 25**	= 25 000	= 100 000
	1	**= 1000**	= 4000
		1	**= 4**

Table 3-255 Old Indonesian units of weight

[1 picul (Indonesian) = 61.7613025 kg]

Kojang (Soera-baya)	**Kojang** (Sema-rang)	**Kojang** (Batavia)	**Timbang**	**Bahar** (long)	**Bahar** (short)	**Amat**	**Picul**	**Catty**	**Tael**	**Real**	**Soekoe**	**Tali**	**Wang**
1	**= 15/14**	= 10/9	= 6	= 20/3	= 10	= 30/2	= 30	= 3000	= 48000	= 96000	= 384 000	= 768 000	= 2 304 000
	1	**= 28/27**	= 28/5	= 56/9	= 28/3	= 14	= 28	= 2800	= 44800	= 89600	= 358 400	= 716 800	= 2 150 400
		1	**= 27/5**	= 6	= 9	= 27/2	= 27	= 2700	= 43200	= 86400	= 345 600	= 691 200	= 2 073 600
			1	**= 10/9**	= 5/3	= 5/2	= 5	= 500	= 8000	= 16000	= 64 000	= 128 000	= 384 000
				1	**= 3/2**	= 9/4	= 9/2	= 450	= 7200	= 14400	= 57 600	= 115 200	= 345 600
					1	**= 3/2**	= 3	= 300	= 4800	= 9600	= 76 800	= 153 600	= 460 800
						1	**= 2**	= 200	= 3200	= 6400	= 25 600	= 51 200	= 153 600
							1	**= 100**	= 1600	= 3200	= 12 800	= 25 600	= 76 800
								1	**= 16**	= 32	= 128	= 256	= 768
									1	**= 2**	= 8	= 16	= 48
										1	**= 4**	= 8	= 24
											1	**= 2**	= 6
												1	**= 3**

For opium trade:
1 tji = 1/100 thail (E)
1 hoen = 1/1000 thail (E)

3.5.2.4.12.3 *Old Philippine Units of Weight*

Table 3-258 Old Philippine units of weight
[1 catty (Philippine) = 600 × 10^{-3} kg]

Pecul	Caban	Lachsa	Chinanta	Catty	Punto
1	**= 100/97**	= 25/12	= 10	= 100	= 300
	1	**= 97/48**	= 97/10	= 97	= 291
		1	**= 24/5**	= 48	= 144
			1	**= 10**	= 30
				1	**= 3**

3.5.2.4.13 *Old Japanese System*

3.5.2.4.13.1 *Old Japanese Units of Length*

These are shown in ***Table 3-259*** (overleaf).

3.5.2.4.13.2 *Old Japanese Units of Area*

Table 3-260 Old Japanese units of area (land measures)
[1 tsubo = 100/30.25 = 3.30578512 m^2]

Square ri	Chô	Tan	Se	Tsubo	Gô
1	**= 1555.2**	= 15 552	= 1 55 520	= 4 665 600	= 46 656 000
	1	**= 10**	= 100	= 3000	= 30 000
		1	**= 10**	= 300	= 3000
			1	= 30	= 300
				1	**= 10**

3.5.2.4.13.3 *Old Japanese Units of Capacity*

Table 3-261 Old Japanese units of capacity
[1 sho = (2401/1331) = 1.803906837 dm^3 = 64 827 bu^3]

Koku	To	Sho	Gô	Shaku
1	**= 10**	= 100	= 1000	= 10 000
	1	**= 10**	= 100	= 1000
		1	**= 10**	= 100
			1	**= 10**

3.5.2.4.13.4 *Old Japanese Units of Weight*

These are shown in ***Table 3-262*** (p. 155).

Table 3-259 Old Japanese units of length

[1 shaku = 10/33 m]

Ri	Chô	Jô	Ken	Hiro	Yabiki	Shaku	Sun	Bu	Rin	Mô	Shi
1	**= 36**	= 1296	= 2160	= 2592	= 5184	= 12 960	= 129 600	= 1 296 000	= 12 960 000	= 120 960 000	= 1 209 600 000
	1	**= 36**	= 60	= 72	= 144	= 360	= 3600	= 36 000	= 360 000	= 3 600 000	= 36 000 000
		1	= 5/3	= 2	= 4	= 10	= 100	= 1000	= 10 000	= 100 000	= 1 000 000
			1	= 6/5	= 12/5	= 6	= 60	= 600	= 6000	= 60 000	= 600 000
				1	= 2	= 5	= 50	= 500	= 5000	= 50 000	= 500 000
					1	**= 5/2**	= 25	= 250	= 2500	= 25 000	= 250 000
						1	**= 10**	= 100	= 1000	= 10 000	= 100 000
							1	**= 10**	= 100	= 1000	= 10 000
								1	**= 10**	= 100	= 1000
									1	**= 10**	= 100
										1	**= 10**

Table 3-262 Old Japanese units of weight

[1 kwan = (15/4) kg = (3.75) kg]

Komma-ichi-da	Karus hiri-ichi-da	Kiyak-kin	Ninsoku-ichi-nin	Kwan	Kin	Hyaku-mé	Niyo	Mommé	Candareen (fun)	Rin	Mô	Shî
1	**= 20/9**	= 5/2	= 40/7	= 40	= 250	= 400	= 10 000	= 40 000	= 400 000	= 4 000 000	= 40 000 000	= 400 000 000
	1	**= 9/8**	= 18/7	= 18	= 225/2	= 180	= 4500	= 18 000	= 180 000	= 1 800 000	= 18 000 000	= 180 000 000
		1	**= 16/7**	= 16	= 100	= 160	= 4000	= 16 000	= 160 000	= 1 600 000	= 16 000 000	= 160 000 000
			1	**= 7**	= 175/4	= 70	= 1750	= 7000	= 70 000	= 700 000	= 7 000 000	= 70 000 000
				1	= 25/4	= 10	= 250	= 1000	= 10 000	= 100 000	= 1 000 000	= 10 000 000
					1	= 8/5	= 40	= 160	= 1600	= 16 000	= 160 000	= 1 600 000
						1	= 25	= 100	= 1000	= 10 000	= 100 000	= 1 000 000
							1	= 4	= 40	= 400	= 4000	= 40 000
								1	**= 10**	= 100	= 1000	= 10 000
									1	**= 10**	= 100	= 1000
										1	**= 10**	= 100
											1	**= 10**

3.5.2.5 Central and South America

3.5.2.5.1 Old Cuban System

Metric system adopted in 1882 and compulsory since 1960.

3.5.2.5.1.1 Old Cuban Units of Area

Table 3-263 Old Cuban units of area
[1 cabaliera (Cuban) = 134202 m^2]

Caballiera	Fanega	Cordele
1	**= 12**	= 324
	1	**= 27**

3.5.2.5.1.2 Old Cuban Units of Capacity

Table 3-264 Old Cuban units of capacity
[1 bocoy (Cuban) = 136.27 × 10^{-3} m^3]

Bocoy	Barrile
1	**= 6**

3.5.2.5.2 Old Haitian System

Metric system adopted in 1920 and compulsory since 1922. Old units derived from both French and Spanish system.

3.5.2.5.2.1 Old Haitian Units of Length

Table 3-265 Old Haitian units of length
[1 toise (Haitian) = 1.9488 m]

Toise	Aune
1	**= 1624/99**

1 carreau = 1292.3 m^2

3.5.2.5.2.2 Old Haitian Units of Capacity

Table 3-266 Old Haitian units of capacity
[1 baril (Haitian) = 100 × 10^{-3} m^3]

Toise cube	Corde	Baril
1	**= 25/12**	= 80
	1	**= 192/5**

3.5.2.5.3 Old Honduran, Costa-Rican, Nicaraguan, Salvadoran, and Guatemalan System

In these five central American states the metric system was adopted in 1910 and has been compulsory since 1912 by a joint convention. Older units from Spanish Castillian system.

3.5.2.5.3.1 Old Honduran, Costa-Rican, Nicaraguan, Salvadoran, and Guatemalan Units of Length

Table 3-267 Old Honduran, Costa-Rican, Nicaraguan, Salvadoran, and Guatemalan units of length
[1 vara (Costa-Rican) = 0.8393 m]
[1 vara (Guatemalan) = 0.8359 m]
[1 vara (Honduran) = 0.8128 m]

Mecate	Vara	Tercia	Cuarta	Pulgada
1	**= 24**	= 72	= 96	= 864
	1	**= 3**	= 4	= 36
		1	**= 4/3**	= 12
			1	**= 9**

3.5.2.5.3.2 Old Honduran, Costa-Rican, Nicaraguan, Salvadoran, and Guatemalan Units of Area

Table 3-268 Old Honduran, Costa-Rican, Nicaraguan, Salvadoran, and Guatemalan units of area
[1 manzana (Costa-Rican) = 7044.2449 m^2]
[1 manzana (Guatemalan) = 6987.2881 m^2]
[1 manzana (Honduran) = 66064.384 m^2]

Caballiera	Manzana	Square vara
1	**= 64**	= 640 000
	1	**= 10 000**

3.5.2.5.3.3 Old Honduran, Costa-Rican, Nicaraguan, Salvadoran, and Guatemalan Units of Capacity

Table 3-269 Old Honduran, Costa-Rican, Nicaraguan, Salvadoran, and Guatemalan units of capacity
[1 botella = 0.63 to 0.67 × 10^{-3} m^3]

Cajuella	Botella	Cuartillo
1	**= 25**	= 32
	1	**= 32/25**

3.5.2.5.3.4 Old Honduran, Costa-Rican, Nicaraguan, Salvadoran, and Guatemalan Units of Weight

Table 3-270 Old Honduran, Costa-Rican, Nicaraguan, Salvadoran, and Guatemalan units of weight
[1 fanega = 92 kg]

Carga	Fanega	Caja
1	**= 7/4**	= 161/16
	1	**= 23/4**

3.5.2.5.4 Old Venezuelan System

Metric system adopted in 1857 and compulsory since 1914. Old units derived from Spanish Castillian system.

3.5.2.5.4.1 Old Venezuelan Units of Length

Table 3-271 Old Venezuelan units of length
[1 vara (Venezuelan) = 0.800 m]

Legua	Vara	Pie	Cuarta	Pulgada
1	= 6280	= 6280/3	= 25 120/9	= 25 120
	1	**= 3**	= 4	= 36
		1	**= 4/3**	= 12
			1	**= 9**

3.5.2.5.4.2 Old Venezuelan Units of Weight

Table 3-272 Old Venezuelan units of weight
[1 libra (Venezuelan) = 0.500 kg]

Tonelada	Carga	Saco	Quintal	Arroba	Libbra	Onza
1	**= 8**	= 16	= 20	= 80	= 2000	= 32 000
	1	**= 2**	= 5/2	= 10	= 250	= 4000
		1	**= 5/4**	= 5	= 125	= 2000
			1	**= 4**	= 100	= 1600
				1	**= 25**	= 400
					1	**= 16**

3.5.2.5.5 Old Colombian System

Metric system adopted in 1853 and compulsory since 1854. Older units derived from Spanish Castillian system.

3.5.2.5.5.1 Old Colombian Units of Length

Table 3-273 Old Colombian units of length
[1 vara (Colombian) = 0.800 m]

Legua	Cuadra	Vara	Pie	Cuarta	Pulgada
1	**= 125/2**	= 6250	= 18 750	= 25 000	= 225 000
	1	**= 100**	= 300	= 400	= 3600
		1	**= 3**	= 4	= 36
			1	**= 4/3**	= 12
				1	**= 9**

3.5.2.5.5.2 Old Colombian Units of Weight

Table 3-274 Old Colombian units of weight
[1 libbra (Colombian) = 0.500 kg]

Tonelada	Carga	Saco	Quintal	Arroba	Libbra	Onza
1	**= 8**	= 16	= 20	= 80	= 2000	= 32 000
	1	**= 2**	= 5/2	= 10	= 250	= 4000
		1	**= 5/4**	= 5	= 125	= 2000
			1	**= 4**	= 100	= 1600
				1	**= 25**	= 400
					1	**= 16**

3.5.2.5.6 Old Brazilian System

Metric system adopted in 1862 and compulsory since 1874.

3.5.2.5.6.1 Old Brazilian Units of Length

Table 3-275 Old Brazilian units of length
[1 pe (Brazilian) = 1/3 m (E)= 0.33333 m]

Legoa (league)	**Braca** (fathom)	**Passo geometrico**	**Vara** (yard)	**Pe** (foot)	**Palmo** (palm)	**Pulgado** (inch)
1	= 3000	= 4000	= 6000	= 20 000	= 30 000	= 240 000
	1	**= 4/3**	= 2	= 20/3	= 10	= 80
		1	**= 3/2**	= 5	= 15/2	= 60
			1	**= 10/3**	= 5	= 40
				1	**= 3/2**	**= 12**
					1	**= 8**

3.5.2.5.6.2 Old Brazilian Units of Capacity

Table 3-276 Old Brazilian units of capacity
[1 alquiera (Brazilian) = 5.324×10^{-3} m^3]
[1 alquiera (Brazilian, salt) = 4.076×10^{-3} m^3]
[1 alquiera (Brazilian, common) = 3.626×10^{-3} m^3]
[1 alquiera (Brazilian, Bahia) = 3.524×10^{-3} m^3]

Tonel	Pipa	Moio	Almude	Alquiera	Canada
1	**= 2**	= 3	= 30	= 180	= 360
	1	**= 3/2**	= 15	= 90	= 180
		1	**= 10**	= 60	= 120
			1	**= 6**	= 12
				1	**= 2**

3.5.2.5.6.3 Old Brazilian Units of Weight

Table 2-277 Old Brazilian units of weight
[1 libra (Brazilian) = 0.45905 kg]

Tonelada	Quintal	Arroba	Libra	Marco	Onza
1	**= 27/2**	= 54	= 1728	= 3456	= 27 648
	1	**= 4**	= 128	= 256	= 2048
		1	**= 32**	= 64	= 512
			1	**= 2**	= 16
				1	**= 8**

3.5.2.5.7 Old Paraguayan System

Metric system adopted in 1899.

3.5.2.5.7.1 Old Paraguayan Units of Length

Table 3-278 Old Paraguyan units of length
[1 vara (Paraguayan) = 0.866 m]
[1 vara (Paraguayan, old) = 0.83856 m]

Legua	Cuadra	Cuerda	Vara	Piede	Pulgada	Linea
1	**= 50**	= 180	= 5000	= 1500	= 18 000	= 216 000
	1	**= 18/5**	= 100	= 300	= 3600	= 43 200
		1	**= 250/9**	= 250/3	= 1000	= 12 000
			1	**= 3**	= 36	= 432
				1	**= 12**	= 144
					1	**= 12**

Note: only one unit of surface area 1 lino = 100 square vara (E)

3.5.2.5.7.2 Old Paraguayan Units of Capacity

Table 3-279 Old Paraguayan units of capacity
[1 fanega (Paraguayan) = 288 dm^3]

Pipe	Fanega	Baril	Almude	Frasco	Cuarta
1	**= 2**	= 6	= 24	= 192	= 768
	1	**= 3**	= 12	= 96	= 384
		1	**= 4**	= 32	= 128
			1	**= 8**	= 32
				1	**= 4**

3.5.2.5.7.3 Old Paraguayan Units of Weight

Table 3-280 Old Paraguyan units of weight
[1 libbra (Paraguayan) = 0.459 kg]
[1 libbra (Paraguayan, Old) = 0.46008 kg]

Tonnelada	Quintal	Arrobe	Libbra	Once
1	**= 20**	= 80	= 2000	= 32 000
	1	**= 4**	= 100	= 1600
		1	**= 25**	= 400
			1	**= 16**

3.5.2.5.8 Old Argentinian System

Metric system adopted in 1863 and compulsory since 1887. Older system derived from Spanish Castilian.

3.5.2.5.8.1 Old Argentinian Units of Length

Table 3-281 Old Argentinian units of length
[1 vara (Argentinian) = 0.8666 m]

Legua	Cuadra	Braza	Vara	Pie	Pulgada	Linea
1	**= 40**	= 3000	= 6000	= 18 000	= 2 160 000	= 2 592 000
	1	**= 75**	= 150	= 450	= 5400	= 64 800
		1	**= 2**	= 6	= 72	= 864
			1	**= 3**	= 36	= 432
				1	**= 12**	= 144
					1	**= 12**

3.5.2.5.8.2 Old Argentinian Units of Capacity (Liquids)

Table 2-282 Old Argentinian units of capacity (Liquids)
[1 frasco (Argentinian, liquid) = 2.375×10^{-3} m^3]

Pipa	Cuerta	Baril	Frasco	Cuarta	Octava
1	**= 4**	= 6	= 192	= 768	= 1536
	1	**= 3/2**	= 48	= 192	= 384
		1	**= 32**	= 128	= 256
			1	**= 4**	= 8
				1	**= 2**

3.5.2.5.8.3 Old Argentinian Units of Capacity (Dry)

Table 3-283 Old Argentinian units of capacity (Dry)
[1 fanega (Argentinian, Dry) = 137.1977×10^{-3} m^3]

Lastre	Tonelada	Fanega	Cuartilla
1	**= 30/14**	= 15	= 60
	1	**= 7**	= 28
		1	**= 4**

3.5.2.5.8.4 Old Argentinian Units of Weight

Table 3-284 Old Argentinian units of weight
[1 libra (Argentinian) = 0.4594 kg]

Tonelada	Quintal	Arroba	Libra	Onza	Adarme	Granos
1	**= 20**	= 80	= 2000	= 32 000	= 512 000	= 18 432 000
	1	**= 4**	= 100	= 1600	= 25 600	= 921 600
		1	**= 25**	= 400	= 6400	= 230 400
			1	**= 16**	= 256	= 9216
				1	= 16	= 576
					1	**= 36**

3.5.2.5.9 Old Chilean System

Metric system adopted in 1848 and compulsory since 1865.

3.5.2.5.9.1 Old Chilean Units of Length

Table 3-285 Old Chilean units of length
[1 bara (Chilean) = 0.836 m]

Legua	Cuadra	Bara	Pie	Pulgada	Linea
1	**= 36**	= 5400	= 16 200	= 194 400	= 2 332 800
	1	**= 150**	= 450	= 5400	= 64 800
		1	**= 3**	= 36	= 432
			1	**= 12**	= 144
				1	**= 12**

3.5.2.5.9.2 Old Chilean Units of Capacity

Table 3-286 Old Chilean units of capacity
[1 almude (Chilean)= 8.083×10^{-3} m^3]

Fanega	Arroba	Almude	Cuartillo
1	**= 3**	= 12	= 48
	1	**= 4**	= 32
		1	**= 8**

3.5.2.5.9.3 Old Chilean Units of Weight

Table 3-287 Old Chilean units of weight
[1 libra (Chilean) = 0.460093 kg]

Quintale	Arroba	Libbra	Onza	Castellano	Adarme	Granos
1	**= 4**	= 100	= 1600	= 10 000	= 25 600	= 921 600
	1	**= 25**	= 400	= 2500	= 6400	= 230 400
		1	**= 16**	= 100	= 256	= 9216
			1	**= 25/4**	= 16	= 576
				1	**= 64/25**	= 2304/25
					1	**= 36**

3.5.2.5.10 Old Peruvian System

Metric system adopted in 1862 and compulsory since 1869. Older units derived from Spanish Castillian system.

3.5.2.5.10.1 Old Peruvian Units of Length and Area

Table 3-288 Old Peruvian units of length and area

1 vara (Peruvian) = 0.83598 m
1 pie (Peruvian) = 0.27866 m
1 fanegada (Peruvian) = 4500 square vara (E)
1 topo (Peruvian) = 3872 square vara (E)

3.5.2.5.10.2 Old Peruvian Units of Weight

Table 3-289 Old Peruvian units of weight
[1 libra (Peruvian) = 0.46009 kg]

Fanega	Quintal	Arroba	Libbra
1	**= 7/5**	= 28/5	= 140
	1	**= 4**	= 100
		1	**= 25**

3.5.2.6 North America

3.5.2.6.1 Old Mexican System

The metric system adopted in 1857 and compulsory since 1896.

3.5.2.6.1.1 Old Mexican Units of Length

Table 3-290 Old Mexican units of length
[1 vara (Mexican) = 0.838 m]

Legua	Milla	Vara	Pie	Pulgada	Linea
1	**= 3**	= 5000	= 15 000	= 180 000	= 2 160 000
	1	**= 5000/3**	= 5000	= 60 000	= 720 000
		1	**= 3**	= 36	= 432
			1	**= 12**	= 144
				1	**= 12**

3.5.2.6.1.2 Old Mexican Units of Area

Table 3-291 Old Mexican units of area
[1 fanega (Mexican) = 35662.759296 m^2]

Sitio	Labor	Caballiera	Fanega	Square vara
1	**= 12307/450**	= 12307/300	= 12307/25	= 24 999 947.52
	1	**= 3/2**	= 18	= 914 112
		1	**= 12**	= 609 408
			1	**= 50 784**

3.5.2.6.1.3 Old Mexican Units of Capacity (Liquids)

Table 3-292 Old Mexican units of capacity (Liquids)
[1 cuartillo (Mexican, wine) = 0.456264×10^{-3} m^3]
[1 cuartillo (Mexican, oil) = 0.506162×10^{-3} m^3]

Jarra	Cuartillo
1	**= 18**

3.5.2.6.1.4 Old Mexican Units of Capacity (Dry)

Table 3-293 Old Mexican units of capacity (Dry)
[1 cuartillo (Mexican, Dry) = 1.8918×10^{-3} m^3]

Carga	Fanega	Almude	Cuartillo
1	**= 2**	= 24	= 96
	1	**= 12**	= 48
		1	**= 4**

3.5.2.6.1.5 Old Mexican Units of Weight

Table 3-294 Old Mexican units of weight
[1 libra (Mexican) = 0.46024634 kg]

Tercio	Quintal	Arroba	Libbra	Onza	Ochava	Adarme	Tomin
1	**= 8/5**	= 32/5	= 160	= 2560	= 20 480	= 40 960	= 122 880
	1	**= 4**	= 100	= 1600	= 12 800	= 25 600	= 76 800
		1	**= 25**	= 400	= 3200	= 6400	= 19 200
			1	**= 16**	= 128	= 256	= 768
				1	**= 8**	= 16	= 48
					1	**= 2**	= 6
						1	**= 3**

4 Conversion Tables

4.1 Units in Alphabetical Order

In this conversion table, the units are listed in alphabetical order. Each unit is completely described as follows: name, symbol, physical quantity, dimension, conversion factor, and notes and definitions. The table includes about 5000 units with accurate conversion factors. The main abbreviations used in the table are listed below:

(E)	Exact numerical value
@	Astronomical units
a.u.	Atomic system of units
apoth., ap.	UK and US apothecaries' weights
avdp., av.	UK and US avoirdupois weights
BIH	Bureau International de l'Heure
BIPM	Bureau International des Poids et Mesures
CAN	Canadian units
CGPM	Conférence Générale des Poids et Mesures
cgs	Centimetre-gram-second units
FPS	Foot-pound-second units
INT	International use
MKpS	MKpS or MKfS units
MTS	MTS units
SI	SI units
IEUS	IEUS units
troy	UK and US troy weights
UK	UK imperial units
US	US customary units
USMB	US Metric Board
WMA	Weights and Measures Act
Abyssinian	Old Abyssinian units
Algerian	Old Algerian units

F. Cardarelli, *Encyclopaedia of Scientific Units, Weights and Measures*

Annamese	Old Annamese units
Arabic	Old Arabian units (used in ancient times)
Argentinan	Old Argentinan units
Attic	Old Greek units (used in ancient times)
Austrian	Old Austrian units
Balearic	Old Balearic units
Belgian	Old Belgian units
Brazilian	Old Brazilian units
Burmese	Old Burmese units
Cambodian	Old Cambodian units
Ceylonese	Old Ceylonese units
Chilean	Old Chilean units
Chinese	Old Chinese units (used in ancient times)
Colombian	Old Colombian units
Costa-Rican	Old Costa-Rican units
Cuban	Old Cuban units
Cypriot	Old Cypriot units
Czechoslov	Old Czechoslovakian units
Danish	Old Danish units
Dutch	Old Dutch units
Egyptian	Old Egyptian units (used in ancient times)
Eritrean	Old Eritrean units
Estonian	Old Estonian units
Ethiopian	Old Ethiopian units
Finnish	Old Finnish units
French	Old French units
German	Old German (Prussian) units
Greek	Old Greek units
Guatemalan	Old Guatemalan units
Guinean	Old Guinean units
Haitian	Old Haitian units
Hebrew	Old Hebrew units (used in ancient times)
Honduran	Old Honduran units
Hungarian	Old Hungarian units
Icelandic	Old Icelandic units
Indian	Old Indian units

Indonesian	Old Indonesian units
Irish	Old Irish units
Italian	Old Italian units
Japanese	Old Japanese units
Latvian	Old Latvian units
Libyan	Old Libyan units
Maltese	Old Maltese units
Mexican	Old Mexican units
Mozambican	Old Mozambican units
Moroccan	Old Moroccan units
Nicaraguan	Old Nicaraguan units
Norwegian	Old Norwegian units
Paraguayan	Old Paraguayan units
Persian	Old Persian units
Peruvian	Old Peruvian units
Philippine	Old Philippine units
Polish	Old Polish units
Portuguese	Old Portuguese units
Puerto-Rican	Old Puerto-Rican units
Roman	Old Roman units (used in ancient times)
Romanian	Old Romanian units
Russian	Old Russian (pre-Revolutionary) units
Salvadoran	Old Salvadoran units
Saudi Arabian	Old Saudi Arabian units
Scottish	Old Scottish units
Somalian	Old Somalian units
Spanish	Old Spanish units
Swedish	Old Swedish units
Swiss	Old Swiss units
Syrian	Old Syrian units
Thai	Old Thai units
Tunisian	Old Tunisian units
Turkish	Old Turkish units
Turkmenian	Old Turkmenian units
Venezuelan	Old Venezuelan units
Yugoslavian	Old Yugoslavian units

Important Note

A precise conversion between two units needs first of all an exact knowledge of the unit's origin (see Chapters 2 and 3) and secondly numerical data from laboratory experiments. These basic values are given below, but the reader is also referred to Chapter 5 of this book where more information on fundamental constants may be obtained.

- the ***density of pure water at 4°C (39.2°F)***[9] $\rho^{w}_{4^\circ C} = 999.972\ \mathrm{kg.m^{-3}}$
- the ***density of pure water at 15.56°C (60°F)***[10] $\rho^{w}_{60^\circ F} = 999.022\ \mathrm{kg.m^{-3}}$
- the ***density of mercury at 0°C (32°F)***[1] $\rho^{Hg}_{0^\circ C} = 13\,595.08\ \mathrm{kg.m^{-3}}$
- the ***density of mercury at 15.56°C (60°F)*** $\rho^{Hg}_{60^\circ F} = 13\,558.14\ \mathrm{kg.m^{-3}}$
- the ***standard acceleration of gravity*** $g_n = 9.80665\ \mathrm{m.s^{-1}}$
- the ***velocity of light in vacuum*** $c_0 = 2.99792458 \times 10^8\ \mathrm{m.s^{-1}}$
- the ***permeability of vacuum*** $\mu_0 = 4\pi \times 10^{-7}\ \mathrm{H.m^{-1}}$

A general equation for the density of pure water is:

$$\rho(\text{water}) = \big[(999.83952 + 16.945176t - 7.9870401 \times 10^{-3}t^2 - 46.170461 \times 10^{-6}t^3 + 105.56302 \times 10^{-9}t^4 - 280.54253 \times 10^{-12}t^5)/(1 + 16.879850 \times 10^{-3}t)\big]\ \mathrm{kg.m^{-3}}$$

at 101 325 Pa (t expressed in °C).[12]

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[9] This temperature has been accepted because the maximum density of water is measured at 3.98°C with $\rho^{w}_{3.98^\circ C} = 999.973\ \mathrm{kg.m^{-3}}$.

[10] From 'Density of water from 0 to 100°C' in Perry, R.H. and Green, D.W. (Eds.), *Perry's Chemical Engineer's Handbook*, 6th ed., McGraw-Hill Book Company, New York, 1984, pp. 3–75 to 3-76.

[11] From 'Density of mercury from 0 to 350°C' in Perry, R.H. and Green, D.W. (Eds.), *Perry's Chemical Engineer's Handbook*, 6th ed., McGraw-Hill Book Company, New York, 1984, pp. 3–77.

[12] From Kell, G.S., *J. Chem. Eng. Data*, **20** (1975) 97.

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
a.u. of action	a.u.	action, angular momentum	ML^2T^{-1}	1 a.u. of action $= 1.054571596(82) \times 10^{-34}$ J.s	1 a.u. of action $= \hbar = h/2\pi$	a.u.
a.u. of angular momentum	a.u.	action, angular momentum	ML^2T^{-1}	1 a.u. of angular momentum $= 1.054571596(82) \times 10^{-34}$ J.s	1 a.u. of angular momentum $= \hbar = h/2\pi$	a.u.
a.u. of charge	a.u., e	quantity of electricity, electric charge	IT	1 a.u. of charge $= 1.602176462(63) \times 10^{-19}$ C	1 a.u. of charge $= e$	a.u.
a.u. of charge density	a.u.	electric charge density	ITL^{-3}	1 a.u. of charge density $= 1.08120228445 \times 10^{12}$ C.m^{-3}	1 a.u. of charge density $= e/{a_0}^3$	a.u.
a.u. of electric current	a.u.	electric current intensity	I	1 a.u. of current $= 6.62361753268 \times 10^{-3}$ A	1 a.u. of current $= eE_h/\hbar$	a.u.
a.u. of electric dipole moment	a.u.	electric dipole moment	LTI	1 a.u. of electric dipole moment $= 8.47835267365 \times 10^{-30}$ C.m	1 a.u. of electric dipole moment $= ea_0$	a.u.
a.u. of electric field strength	a.u.	electric field strength	$MLT^{-3}I^{-1}$	1 a.u. of electric field strength $= 5.14220624337 \times 10^{11}$ V.m^{-1}	1 a.u. of electric field strength $= E_h/a_0e = e/4\pi\varepsilon_0{a_0}^2$	a.u.
a.u. of electric potential	a.u.	electric potential, electric potential difference, electromotive force	$ML^2T^{-3}I^{-1}$	1 a.u. of electric potential $= 27.2113834437$ V	1 a.u. of electrical potential $= E_h/e = e/4\pi\varepsilon_0a_0$	a.u.
a.u. of electric quadrupole moment	a.u.	electric quadrupole moment	L^2TI	1 a.u. of electric quadrupole moment $= 4.4865509982 \times 10^{-40}$ C.m^2	1 a.u. of electric quadrupole moment $= e{a_0}^2$	a.u.
a.u. of energy (hartree)	E_h	energy, work, heat	ML^2T^{-2}	1 a.u. of energy $= 4.35974381(34) \times 10^{-18}$ J	The unit is named after D.R. Hartree (1897–1958). 1 a.u. of energy = 1 hartree (E) 1 a.u. of energy = 2 rydbergs (E) 1 a.u. of energy $= \hbar^2/m_0{a_0}^2$	a.u.
a.u. of force	a.u.	force, weight	MLT^{-2}	1 a.u. of force $= 8.23872181496 \times 10^{-8}$ N	1 a.u. of force $= E_h/a_0$	a.u.
a.u. of gradient of electric field strength	a.u.	gradient of electric field strength	$MT^{-3}I^{-1}$	1 a.u. of gradient of electric field strength $= 9.71736152413 \times 10^{21}$ V.m^{-2}	1 a.u. of gradient of electric field strength $= E_h/e{a_0}^2 = e/4\pi\varepsilon_0{a_0}^3$	a.u.

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
a.u. of length (1st Bohr radius, Bohr)	a_0, b, a.u.	length, distance	L	1 a.u. of length $= 5.291772083(19) \times 10^{-11}$ m	Fundamental physical constant. Base unit of length in the a.u. system. 1 a.u. of length $= 4\pi\varepsilon_0\hbar^2/m_0e^2$	a.u.
a.u. of linear momentum	a.u.	linear momentum, momentum	MLT^{-1}	1 a.u. of linear momentum $= 1.99285150505 \times 10^{-24}$ N.s	1 a.u. of linear momentum $= \hbar/a_0$	a.u.
a.u. of magnetic dipole moment	a.u.	magnetic dipole moment	L^2I	1 a.u. of magnetic dipole moment $= 1.8548017980 \times 10^{-23}$ J.T^{-1}(A.m^2)	1 a.u. of magnetic dipole moment $= e\hbar/m_0 = 2\mu_B$	a.u.
a.u. of magnetic flux density	a.u.	magnetic flux density	$MT^{-2}I^{-1}$	1 a.u. of magnetic flux density $= 2.350517349 \times 10^5$ T	1 a.u. of magnetic flux density $= \hbar/ea_0{}^2$	a.u.
a.u. of magnetizability	a.u.	magnetizability	$ML^2T^2I^2$	1 a.u. of magnetizability $= 7.89103640682 \times 10^{-29}$ J.T^{-2}	1 a.u. of magnetizability $= e^2a_0{}^2/m_0$	a.u.
a.u. of mass (electron rest mass)	m_0, m_e	mass	M	1 a.u. of mass $= 9.10938188(72) \times 10^{-31}$ kg	Mass base unit in the a.u. system. 1 a.u. of mass $= m_0$	a.u.
a.u. of polarizability	a.u.	polarizability	MI^2T^4	1 a.u. of polarizability $= 1.64877724911 \times 10^{-41}$ J^{-1}.C^2.m^2	1 a.u. of polarizability $= e^2a_0{}^2/E_h$	a.u.
a.u. of time	a.u.	time, period, duration	T	1 a.u. of time $= 2.41888432749 \times 10^{-17}$ s	1 a.u. of time $= \hbar/E_h = m_0a_0{}^2/\hbar$	a.u.
aam (Dutch)	–	capacity, volume	L^3	1 aam (Dutch) $= 153.600 \times 10^{-3}$ m^3	Obsolete Dutch unit of capacity used for liquid substances. 1 aam (Dutch) = 128 Mingelen (E)	Dutch
abampere (emu of electric current intensity)	aA, Bi	electric current intensity	I	1 abampere = 10 A (E)	Obsolete cgs unit of electric current in the emu subsystem. 1 abampere = 1 Bi (E) = 1 biot (E)	cgs
abbassi (Persian)	–	mass	M	1 abbassi (Persian) = 0.368 kg	Obsolete Persian traditional unit of mass used before 1933. 1 abbassi (Persian) = 40 dirhem (Persian) (E)	Persian

abbe	–	linear frequency, spatial frequency	$L^{-1}T^{-1}$	1 abbe = 10^3 Hz.m^{-1} (E)	The unit is named after Ernst Abbe (1840–1901). It was suggested in 1973 as the unit of linear spatial frequency. 1 abbe = 1 Hz.mm^{-1} (E)	
abcoulomb (emu of charge)	aC	quantity of electricity, electric charge	IT	1 abcoulomb = 10 C (E)	Obsolete cgs unit of electric charge in the emu subsystem.	cgs
abdat (Egyptian)	–	length, distance	L	1 abdat (Egyptian) = $9.6666666667 \times 10^{-2}$m	Obsolete Egyptian traditional unit of length used before 1891. 1 abdat (Egyptian) = 1/6 diraa (Egyptian) (E)	Egyptian
abfarad (emu of electric capacitance)	aF	electric capacitance	$M^{-1}L^{-2}T^4I^2$	1 abfarad = 10^9 F (E)	Obsolete cgs unit of electric capacitance in the emu subsystem.	cgs
abhenry (emu of electric inductance)	aH	electric inductance	$ML^2T^{-2}I^{-2}$	1 abhenry = 10^{-9} H (E)	Obsolete cgs unit of electric inductance in the emu subsystem.	cgs
abmho (emu of conductance)	aS, $(a\Omega)^{-1}$	electric conductance	$M^{-1}L^{-2}T^3I^2$	1 abmho = 10^9 S (E)	Obsolete cgs unit of electric conductance in the emu subsystem.	cgs
abohm (emu of resistance)	aΩ	electric resistance	$ML^2T^{-3}I^{-2}$	1 abohm = 10^{-9} Ω (E)	Obsolete cgs unit of electric resistance in the emu subsystem.	cgs
abvolt (emu of electric potential)	aV	electric potential, electric potential difference, electromotive force	$ML^2T^{-3}I^{-1}$	1 abvolt = 10^{-8} V (E)	Obsolete cgs unit of electric potential in the emu subsystem.	cgs
abwatt (emu of power)	aW	power	ML^2T^{-3}	1 abwatt = 10^{-7} W (E)	Obsolete cgs unit of power in the emu subsystem. 1 abwatt = 1 erg.s^{-1}(E)	cgs
acetabulum (Roman)	–	capacity, volume	L^3	1 acetabulum (Roman) = 68.660×10^{-6} m^3	Obsolete Roman unit of volume employed in ancient times. It was used for capacity measurements of liquids. 1 acetabulum (Roman) = 1/8 sextarius (E)	Roman

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
achir (qasaba)	–	surface, area	L^2	1 achir (qasaba) = 14.7456 m^2	Obsolete Arabic unit of area used in ancient times. 1 achir (qasaba) = 1/400 feddan (E)	Arabic
achita (Indian)	–	mass	M	1 achita (Indian) = 940 kg	Obsolete Indian unit of mass used in ancient times. 1 achita (Indian) = 20 000 pala (E)	Indian
achtel (Austrian, dry)	–	capacity, volume	L^3	1 achtel (Austrian, dry) = $7.686125 \times 10^{-3} m^3$	Obsolete Austrian unit of capacity used for dry substances. 1 achtel (Austrian, dry) = 1/8 metzel (E)	Austrian
achtel (Danish, dry)	–	capacity, volume	L^3	1 achtel (Danish, dry) = $2.17384211081 \times 10^{-3}$ m^3	Obsolete Danish traditional unit of capacity used for dry substances before 1912. 1 achtel (Danish, dry) = 9/4 pott (Danish, dry) (E)	Danish
acidity number	–	dimensionless index for measuring the free acidity of fatty acids	nil	1 acidity number = 10^{-3} kg KOH/kg fatty acid (E) (see note)	Old dimensionless index used in the food industry for measuring the free acidity of fatty acids, i.e., the number of car boxylic functions (–COOH) present in fatty acids. It corresponds to the mass of potassium hydroxide (KOH) expressed in milligrams (mg) required to neutralize one gram of fatty acid. 1 acidity number = 1 mg KOH/g fatty acid (E)	INT
acoustic ohm (cgs)	–	acoustic impedance	$ML^{-4}T^{-1}$	1 cgs acoustic ohm = 10^5 $Pa.m^{-3}.s$ (E)	Obsolete cgs unit of acoustic impedance. An acoustic impedance (including acoustic resistance and reactance) has a magnitude of 1 cgs acoustic ohm when a sound pressure of 1 barye produces a volume velocity of 1 cm^3/s. 1 cgs acoustic ohm = 1 $dyne.s.cm^{-5}$ (E) 1 cgs acoustic ohm = 1 $barye.s.cm^{-3}$ (E)	cgs

acoustic ohm (SI)	–	acoustic impedance	$ML^{-4}T^{-1}$	1 SI acoustic ohm = 1 Pa.s.m^{-3} (E)	SI unit of acoustic impedance. An acoustic impedance (including acoustic resistance and reactance) has a magnitude of 1 SI acoustic ohm when a sound pressure of 1 Pa produces a volume velocity of 1 $m^3.s^{-1}$. 1 SI acoustic ohm = 1 N.s. m^{-5} (E)	SI
acre	ac, acre	surface, area	L^2	1 acre = 4.0468564224×10^3 m^2	Obsolete British unit of area employed in surveyor's measurements. It was first defined in England in the reign of Edward I (1272–1307) and is reputed to be the area which a yoke of oxen could plough in a day. 1 acre = 1/640 square mile (E) 1 acre = 4 roods (E) 1 acre = 10 square chains (Gunter's) (E) 1 acre = 160 square rods (E) 1 acre = 4840 square yards (E)	UK, US, CAN
acre (Cunningham)	ac, acre	surface, area	L^2	1 acre (Cunningham) = $5.18827746462 \times 10^3$ m^2	Obsolete British unit of area employed in surveyor's measurements. 1 acre (Cunningham) = (1/0.78) acres (E)	UK
acre (Ireland)	ac, acre	surface, area	L^2	1 acre (Ireland) = $6.52718777806 \times 10^3$ m^2	Obsolete Irish unit of area employed in surveyor's measurements. 1 acre (Ireland) = (1/0.62) acres (E)	UK, Ireland
acre (Plantation)	ac, acre	surface, area	L^2	1 acre (Plantation) = $5.18827746462 \times 10^3$ m^2	Obsolete British unit of area employed in surveyor's measurements. 1 acre (Plantation) = (1/0.78) acres (E)	UK
acre (Scotland)	ac, acre	surface, area	L^2	1 acre (Scotland) = $4.93519075902 \times 10^3$ m^2	Obsolete Scottish unit of area employed in surveyor's measurements. 1 acre (Scotland) = (1/0.82) acre (E)	UK, Scotland

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
acre (Scottish)	ac.	surface area	L^2	1 acre (Scottish) = 5142.46794315 m^2	Obsolete traditional Scottish unit of surface area used in land measurements before the Imperial Weights and Measures Act of 1824. 1 acre (Scottish) = 54 760 square feet (Scottish) (E)	Scottish
acre (US, Survey)	ac (US, Surv.)	surface, area	L^2	1 acre (US, Survey) = $4.04687260987 \times 10^3$ m^2	Obsolete American unit of area used in geodetic measurements. 1 acre (US, Survey) = 4840 square yards (US, Survey) (E)	US
acre-foot	ac-ft, acre-ft	capacity, volume	L^3	1 acre-foot = $1.23348183754 \times 10^3$ m^3	Obsolete British unit of capacity employed to express volume of water in surveyor's measurements. It is equal to the product of covered area in acres multiply by depth in feet. 1 ac-ft =43 560 ft^3 (E)	UK
acre-foot (US, Survey)	ac.-ft (US, Surv.)	capacity, volume	L^3	1 acre-foot (US, Survey) = $1.23348923847 \times 10^3$ m^3	Obsolete American unit of capacity employed to express volume of water in surveyor's measurements. It is equal to the product of covered area in acres multiplied by depth in feet. 1 ac-ft (US, Survey) = 43 560.2613609 ft^3 (E) 1 ac-ft (US, Survey) = $3.25853383688 \times 10^5$ gal (US, lig.)	US
acre-inch	ac-in	capacity, volume	L^3	1 acre-inch = 102.7901531 m^3	Obsolete British unit of capacity employed to express volume of water in surveyor's measurements. It is equal to the product of covered area in acres multiplied by depth in inches. 1 acre-inch = 3630 cu. ft (E)	UK

actus (Roman) [Roman chain]	–	length, distance	L	1 actus (Roman) = 35.328 m	Obsolete Roman unit of length employed in ancient times. 1 actus (Roman) = 120 pes (E)	Roman
actus (Roman)	–	surface, area	L^2	1 actus (Roman) = 1248.067584 m^2	Obsolete Roman unit of area employed in ancient times. 1 actus (Roman) = 14400 quadratus pes (E)	Roman
adarme (Argentinian)	–	mass	M	1 adarme (Argentinian) = $1.79453125 \times 10^{-3}$ kg	Obsolete Argentinian traditional unit of mass used before 1887. 1 adarme (Argentinian) = 1/256 libra (Argentinian) (E)	Argentinian
adarme (Chilean)	–	mass	M	1 adarme (Chilean) = $1.79723828125 \times 10^{-3}$ kg	Obsolete Chilean traditional unit of mass used before 1865. 1 adarme (Chilean) = 1/256 libbra (Chilean) (E)	Chilean
adarme (Mexican)	–	mass	M	1 adarme (Mexican) = $1.79783726562 \times 10^{-3}$ kg	Obsolete Mexican traditional unit of mass used before 1896. 1 adarme (Mexican) = 1/256 libbra (Mexican) (E)	Mexican
adarme (Spanish)	–	mass	M	1 adarme (Spanish) = $1.797238281125 \times 10^{-3}$ kg	Obsolete Spanish unit of mass. 1 adarme (Spanish) = 1/256 libra (E)	Spanish
adhaka (Indian)	–	capacity, volume	L^3	1 adhaka (Indian) = 3.300×10^{-3} m^3 (of water)	Obsolete Indian unit of capacity used in ancient times. Measured by weight. 1 adhaka (Indian) = 1/4 drona (E)	Indian
adoulie (Indian)	–	capacity, volume	L^3	1 adoulie (Indian) = 6.88125×10^{-3} m^3	Obsolete Indian traditional unit of capacity used before 1920. 1 adoulie (Indian) = 5 raik (Indian) (E)	Indian
agate (French, modern)	–	length, distance	L	1 agate (French, modern) = $2.06784350909 \times 10^{-3}$ m	Obsolete French typographical unit of length used in printing. 1 agate (French, modern) = 11/144 pouces (de Paris) (E) 1 agate (French, modern) = 5.5 points (de Paris) (E)	French

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
agate (French, old)	–	length, distance	L	1 agate (French, old) = $1.93356795656 \times 10^{-3}$ m	Obsolete French typographical unit of length used in printing and originally defined as 14 lines per pouce (de Paris). 1 agate (French, old) = 1/14 pouces (de Paris) (E) 1 agate (French, old) = 36/7 points (de Paris) (E)	French
aguirage (Guinean)	–	mass	M	1 aguirage (Guinean) = 4.0125×10^{-3} kg	Obsolete Guinean traditional unit of mass used before 1906. 1 aguirage (Guinean) = 1/16 benda (Guinean) (E)	Guinean
air watt	AW	power	ML^2T^{-3}	1 air watt = 0.999205452202 W	American HVAC engineering unit of power used to express the effective cleaning power of a vacuum cleaner or central vacuum system. Usually is computed from US customary units using the following formula established by the American Society for Testing and Materials (ASTM): the power expressed in air watts is equal to 8.5 times the air volume flow rate in the system expressed in cubic feet per minute (cfm or ft^3/min) times the suction head expressed in inches of water column ($inH_2O(39°F)$). 1 air watt = $8.5in_{water}.ft^3.min^{-1}$ (E).	US
akaina (Greek, Attic)	–	length, distance	L	1 akaina (Greek, Attic) = 2.777040 m	Obsolete Greek unit of length employed in ancient times. 1 akaina (Attic) = 9 pous (E)	Attic
akey (Guinean)	–	mass	M	1 akey (Guinean) = 1.3375×10^{-3} kg	Obsolete Guinean traditional unit of mass used before 1906. 1 akey (Guinean) = 1/48 benda (Guinean) (E)	Guinean

ako (Hungarian)	–	capacity, volume	L^3	1 ako (Hungarian) $= 62.445 \times 10^{-3}$ m^3	Obsolete traditional Hungarian unit of capacity used before 1876. 1 ako (Hungarian) = (23/20) eimer (Hungarian) (E)	Hungarian
akov (Yugoslavian)	–	mass	M	1 akov (Yugoslavian) = 51.20 kg	Obsolete traditional Yugoslavian unit of mass used before 1883. 1 akov (Yugoslavian) = 40 oka (Yugoslavian) (E)	Yugoslavian
alada (Ethiopian)	–	mass	M	1 alada (Ethiopian) $= 15.6 \times 10^{-3}$ kg	Obsolete Ethiopian traditional unit of mass used before 1963. 1 alada (Ethiopian) = 4 kasm (Ethiopian) (E)	Ethiopian
albert	Alb	radiation photosynthetic activity	$MT^{-3}N^{-1}$	(see note) 1 Alb = $3.99031269082 \times 10^{-16}$ ν (Hz) $m^{-2}.s^{-1}$	Unit of radiation photosynthetic activity proposed by Lewis in 1985. The unit is named after Albert Einstein. 1 Alb = 1 $\mu E.m^{-2}.s^{-1}$ (E)	
album (Danish)	–	surface area	L^2	1 album (Danish) $= 295.518649347$ m^2	Obsolete Danish traditional unit of surface area used in land measurements before 1912. 1 album (Danish) = (125/6) square ruthe (Danish) (E)	Danish
aldan	–	length, distance	L	1 aldan = 1.6 m	Obsolete Mongolian unit of length.	Mongolian
aleppo (Cypriot)	–	mass	M	1 aleppo (Cypriot) = 100.5886440 kg	Obsolete Cypriot traditional unit of mass used before 1972. 1 aleppo (Cypriot) = 180 rottolo (Cypriot) (E)	Cypriot
alin (Icelandic)	–	length, distance	L	1 alin (Icelandic) = 0.627714 m	Obsolete Icelandic traditional unit of length used before 1907. 1 alin (Icelandic) = 2 fet (Icelandic) (E)	Icelandic
almen tunna (Icelandic)	–	capacity, volume	L^3	1 almen tunna (Icelandic) $= 115.93824591 \times 10^{-3}$ m^3	Obsolete Icelandic traditional unit of capacity used for dry substances before 1907. 1 almen tunna (Icelandic) =15/4 cubic fet (Icelandic) (E)	Icelandic

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
almude (Balearic, dry)	–	capacity, volume	L^3	1 almude (Balearic, dry) $= 1.04384615385 \times 10^{-3}$ m^3	Obsolete Balearic traditional unit of capacity used for dry substances. 1 almude (Balearic, dry) = 1/26 quartin (Balearic, dry) (E)	Balearic
almude (Balearic, liq.)	–	capacity, volume	L^3	1 almude (Balearic, liq.) $= 1.9991666667 \times 10^{-3}$ m^3	Obsolete Balearic traditional unit of capacity used for liquids. 1 almude (Balearic, liq.) = 1/36 quartera (Balearic, liq.) (E)	Balearic
almude (Brazilian)	–	capacity, volume	L^3	1 almude (Brazilian) $= 31.944 \times 10^{-3}$ m^3	Obsolete Brazilian traditional unit of capacity used before 1874. 1 almude (Brazilian) = 6 alquiera (Brazilian) (E)	Brazilian
almude (Brazilian, Bahia)	–	capacity, volume	L^3	1 almude (Brazilian, Bahia) $= 21.144 \times 10^{-3}$ m^3	Obsolete Brazilian traditional unit of capacity used before 1874. 1 almude (Brazilian, Bahia) = 6 alquiera (Brazilian, Bahia) (E)	Brazilian
almude (Brazilian, common)	–	capacity, volume	L^3	1 almude (Brazilian, common) $= 21.756 \times 10^{-3}$ m^3	Obsolete Brazilian traditional unit of capacity used before 1874. 1 almude (Brazilian, common) = 6 alquiera (Brazilian, common) (E)	Brazilian
almude (Brazilian, salt)	–	capacity, volume	L^3	1 almude (Brazilian, salt) $= 24.456 \times 10^{-3}$ m^3	Obsolete Brazilian traditional unit of capacity used before 1874. 1 almude (Brazilian, salt) = 6 alquiera (Brazilian, salt) (E)	Brazilian
almude (Chilean)	–	capacity, volume	L^3	1 almude (Chilean) $= 8.083 \times 10^{-3}$ m^3	Obsolete Chilean traditional unit of capacity used before 1865. 1 almude (Chilean) = 8 cuartillo (Chilean) (E)	Chilean

almude (Mexican, dry)	–	capacity, volume	L^3	1 almude (Mexican, dry) $= 7.567 \times 10^{-3}$ m^3	Obsolete Mexican traditional unit of capacity used for dry substances before 1896. 1 almude (Mexican, dry) = 4 cuartillo (Mexican, dry) (E)	Mexican
almude (Paraguayan)	–	capacity, volume	L^3	1 almude (Paraguayan) $= 24 \times 10^{-3}$ m^3	Obsolete Paraguayan traditional unit of capacity used before 1899. 1 almude (Paraguayan) = 32 cuarta (Paraguayan) (E)	Paraguayan
almude (Portuguese)	–	capacity, volume	L^3	1 almude (Portuguese) $= 16.5 \times 10^{-3}$ m^3	Obsolete Portuguese unit of capacity used for liquid substances.	Portuguese
almude (Spanish, dry) (calemin)	–	capacity, volume	L^3	1 almude (Spanish, dry) $= 4.6250833333 \times 10^{-3}$ m^3	Obsolete Spanish unit of capacity used for dry substances. 1 almude (Spanish, dry) = 1/12 fanega (E)	Spanish
aln (Danish)	–	length, distance	L	1 aln (Danish) = 0.6277140 m	Obsolete Danish traditional unit of length used before 1912. 1 aln (Danish) = 2 fod (Danish) (E)	Danish
aln (Swedish) (alen)	–	length, distance	L	1 aln (Swedish) = 0.5938 m	Obsolete Swedish unit of length. 1 alm = 2 fot (E)	Swedish
alpha tocopherol equivalent	alpha TE, ATE	specific enzymatic activity	$NM^{-1}T^{-1}$	1 ATE = 25×10^{-6} $mol.kg^{-1}s^{-1}$	Unit of catalytic activity used to measure the amount of vitamin E used in nutrition. The activity, or potency, of vitamin E in a food or food supplement is measured by the quantity expressed in milligrams of alpha tocopherol which would be equivalent to the compounds present in the food or supplement. 1 ATE = 1.5UI.mg^{-1} 1 ATE = 25µmol.$kg^{-1}s^{-1}$	INT
alquiera (Brazilian)	–	capacity, volume	L^3	1 alquiera (Brazilian) $= 5.324 \times 10^{-3}$ m^3	Obsolete Brazilian traditional unit of capacity used before 1874. 1 alquiera (Brazilian) = 1/6 almude (Brazilian) (E)	Brazilian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
alquiera (Brazilian, Bahia)	–	capacity, volume	L^3	1 alquiera (Brazilian, Bahia) $= 3.524 \times 10^{-3}$ m^3	Obsolete Brazilian traditional unit of capacity used before 1874. 1 alquiera (Brazilian, Bahia) = 1/6 almude (Brazilian, Bahia) (E)	Brazilian
alquiera (Brazilian, common)	–	capacity, volume	L^3	1 alquiera (Brazilian, common) $= 3.626 \times 10^{-3}$ m^3	Obsolete Brazilian traditional unit of capacity used before 1874. 1 alquiera (Brazilian, common) = 1/6 almude (Brazilian, common) (E)	Brazilian
alquiera (Brazilian, salt)	–	capacity, volume	L^3	1 alquiera (Brazilian, salt) $= 4.076 \times 10^{-3}$ m^3	Obsolete Brazilian traditional unit of capacity used before 1874. 1 alquiera (Brazilian, salt) = 1/6 almude (Brazilian, salt) (E)	Brazilian
alqueira (Portuguese, dry)	–	capacity, volume	L^3	1 alqueira (Portuguese, dry) $= 13.50 \times 10^{-3}$ m^3	Obsolete Portuguese unit of capacity used for dry substances. 1 alqueira (Portuguese, dry) = 1/4 fanga (E)	Portuguese
alquiera (Portuguese)	–	capacity, volume	L^3	1 alquiera (Portuguese) $= 2.75 \times 10^{-3}$ m^3	Obsolete Portuguese unit of capacity used for liquid substances. 1 alquiera (Portuguese) = 1/6 almude (E)	Portuguese
altschin (Turkmenian)	–	length, distance	L	1 altschin (Turkmenian) = 0.7112 m	Obsolete Turkmenian traditional unit of length used before 1920.	Turkmenian
amagat	amagat	molar density	NL^{-3}	1 amagat = 44.615906 $mol.m^{-3}$ (1 atm = 101 325 Pa) 1 amagat = 44.032476 $mol.m^{-3}$ (1 bar = 100 000 Pa)	It is the reciprocal of the molar volume. The unit is used sometimes to express molar volume and molar density. Its value changes according to the nature of gas. This variation results from the behaviour of gas versus the ideal gas in the standard T and P conditions. The unit is named after E.H. Amagat (1841–1915).	

amagat	amagat	molar volume	L^3N^{-1}	1 amagat $= 22.413531 \times 10^{-3} m^3.mol^{-1}$ (1 atm = 101 325 Pa) 1 amagat $= 22.710511 \times 10^{-3} m^3.mol^{-1}$ (1bar = 100000Pa)	It is the molar volume of an ideal gas in the standard T and P conditions. Its value changes according to the nature of gas. This variation results from the behaviour of gas versus the ideal gas in the standard T and P conditions. The unit is named after E.H. Amagat (1841–1915).	
amat (Indonesian)	–	mass	M	1 amat (Indonesian) = 123.522605 kg	Obsolete Indonesian traditional unit of mass used before 1923. 1 amat (Indonesian) = 2 picul (Indonesian) (E)	Indonesian
amber (UK, dry)	–	capacity, volume	L^3	1 amber (UK, dry) $= 145.47494400 \times 10^{-3}$ m^3 (E)	Obsolete British unit of capacity used for dry goods (e.g., flour, sugar). 1 amber (UK, dry) = 4 bushels (UK, dry) (E) 1 amber (UK, dry) = 32 gallons (UK) (E) 1 amber (UK, dry) = 256 gallons (UK) (E)	UK
American run	–	specific length	$M^{-1}L$	1 American run $= 3225.45108067$ $m.kg^{-1}$	Obsolete American unit employed in the textile industry. 1 American run = 100 yd/oz (US) (E)	US
amma (Greek, Attic) [Greek cord]	–	length, distance	L	1 amma (Greek, Attic) = 18.513600 m	Obsolete Greek unit of length employed in ancient times. 1 amma (Attic) = 60 pous (E)	Attic
amma (Greek) [Greek nautical chain, Greek shacle]	–	length, distance	L	1 amma (Greek) = 21 m	Greek unit of length still in use in marine navigation. Plural ammata.	Greek
ammonia degree	$^\circ NH_3$	specific gravity of liquids, hydrometer index, hydrometer degree,	nil	$^\circ NH_3 = (1000 - D)/3$	Obsolete dimensionless unit used in determining the densities of aqueous ammonia solutions and ranging between 0° and 40°. It corresponds to the specific gravity (D) of ammonia solution substracted from 1000 and divided by 3.	

ampere	A	electric current intensity	I	**SI base unit**	The ampere is that constant current which, if maintained in two straight parallel conductors of infinite length, of negligible circular cross-section, and placed one metre apart in vacuum, would produce between these conductors a force equal to 2×10^{-7} newton per metre of length [9th CGPM (1948), Resolution 2 and 7]. The unit is named after A.M. Ampère (1775–1836).	SI, MKSA
ampere (int. mean)	–	electric current intensity	I	1 A (int. mean) = 0.99985 A	Obsolete (IEUS) unit of electric current intensity. It was defined in 1881. It is equal to current intensity which permits to deposit, in one second, by electrolysis from an aqueous silver nitrate solution, 0.00111800 grams of silver metal at the cathode (IEC, 1881).	IEUS, INT
ampere (int. US)	–	electric current intensity	I	1 A (int. US) = 0.999835 A	Obsolete IEUS unit	IEUS, US
ampere per metre	$A.m^{-1}$	magnetic field strength, lineic current density	IL^{-1}	**SI derived unit**	The ampere per metre is the magnetic field strength which is created tangentially at a distance of one metre from a straight conductor, of infinite length and with negligible cross section, by a circulating current of one ampere.	SI
ampere per square centimetre	$A.cm^{-2}$	electric current density	IL^{-2}	1 $A.cm^{-2} = 10^4$ $A.m^{-2}$ (E)	Unit of electric current density employed in electrochemical engineering. 1 $A.cm^{-2} = 10$ $kA.m^{-2}$ (E)	
ampere per square decimetre	$A.dm^{-2}$	electric current density	IL^{-2}	1 $A.dm^{-2} = 100$ $A.m^{-2}$ (E)	Unit of electric current density employed in electrochemical engineering.	
ampere per square inch	$A.in^{-2}$ (A/sq.in)	electric current density	IL^{-2}	1 $A.in^{-2} = 1.555000310 \times 10^3$ $A.m^{-2}$	British and American unit of electric current density. 1 $A.in^{-2} \cong 1.5550003$ $kA.m^{-2}$	UK, US

ampere per square metre	$A.m^{-2}$	electric current density	IL^{-2}	**SI derived unit**	The ampere per square metre is the electric current density which is equal to an electric current of one ampere which circulates in a homogeneous conductor having a cross section area of one square metre.	SI
ampere-hour	Ah	quantity of electricity, electric charge	IT	1 Ah = 3600 C (E)	Non-SI unit used in electrical engineering in common use with the SI. It is a practical unit of electric charge equal to the charge flowing in one hour through a conductor passing one ampere.	
ampere-square metre	$A.m^2$	magnetic dipole moment	IL^2	**SI derived unit**	1 $A.m^2 = 1\ J.T^{-1}$ (E)	SI
ampere (thermal)	$W.K^{-1}$	entropy flow	$ML^2T^{-3}\Theta^{-1}$	1 ampere (thermal) = $1W.K^{-1}$ (E)	SI unit used for convenience when dealing with electric and thermal analogies.	SI
ampere-turn	A-turn A.t	magnetomotive force	I	1 ampere-turn = 2864.77 A	Obsolete unit of magnetomotive force. The ampere-turn is equal to the magnetomotive-force produced when a current of one ampere flows through one turn of a magnetizing coil. 1 ampere-turn = $(4\pi/10)$ Gb (E)	
amphora (Greek, Attic)	–	capacity, volume	L^3	1 amphora (Greek, Attic) = $17.28 \times 10^{-3}\ m^3$	Obsolete Greek unit of volume employed in ancient times. It was used for capacity measurements of liquids. 1 amphora (Attic) = 64 cotyles (E)	Attic
amphora (large, Persian)	–	capacity, volume	L^3	1 amphora (large, Persian) = $97.8 \times 10^{-3} m^3$ (of water)	Obsolete unit of capacity of the Assyrio-Chaldean-Persian system used in ancient times. Measured by weight. 1 amphora (large, Persian) = 3 amphora (E)	Persian
amphora (Persian)	–	capacity, volume	L^3	1 amphora (Persian) = $32.6 \times 10^{-3} m^3$ (of water)	Obsolete unit of capacity of the Assyrio-Chaldean-Persian system used in ancient times. Measured by weight.	Persian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
amphora (Roman)	–	capacity, volume	L^3	1 amphora (Roman) $= 26.36544 \times 10^{-3}$ m^3	Obsolete Roman unit of volume employed in ancient times. It was used for capacity measurements of liquids. 1 amphora (Roman) = 48 sextarius (E)	Roman
angle droit	D	plane angle	α	1 D = 1.57079632680 rad	Obsolete technical unit of plane angle used in the French industry until 1961. 1 D = 90° (E) 1 D = 100 grades (E) 1 D = π/2 radian (E)	French
ångström	Å	length, distance	L	1 Å = 10^{-10} m (E)	Obsolete unit of wavelength employed in atomic and molecular physics for electromagnetic radiation measurements ranging from the UV to IR regions. The unit is named after the Swedish scientist A.J. Ångström (1814–1874). The unit is based on the wavelength of the emission spectra's red line of an atom of cadmium. The agreed numerical value is equal exactly to $\lambda = 6438.4696$ Å in dry air which contains at maximum a volume fraction of carbon dioxide of 30×10^{-6}, and measured under standard atmospheric pressure and at T = 15°C. The unit has the same order of magnitude as the radius of the atom.	INT
ångström star (WK_{α_1})	Å*	length, distance	L	1 Å* = $1.0000148192 \times 10^{-10}$ m (E)	Obsolete unit of wavelength used in atomic physics and radiocrystallography. The definition of the unit is based on the wavelength of the spectral line K_{α_1} of an atom of tungsten which is precisely equal to 0.2090100 Å*.	

angula	–	length, distance	L	1 angula = $1.904166667 \times 10^{-2}$ m	Obsolete Indian unit of length used in ancient times. 1 angula = 1/24 hasta (E)	Indian
ankar (Swedish)	–	capacity, volume	L^3	1 ankar (Swedish) = $39.257428835 \times 10^{-3}$ m^3	Obsolete Swedish unit of capacity for liquid substances. 1 ankar = 3/2 kubikfot (E) (Swedish) = 15 kanna (E)	Swedish
anker (Danish, liq.)	–	capacity, volume	L^3	1 anker (Danish, liq.) = $38.6460819700 \times 10^{-3}$ m^3	Obsolete Danish traditional unit of capacity used for liquids before 1912. 1 anker (Danish, liq.) = 40 pott (Danish, liq.) (E) 1 anker (Danish, liq.) = 5/4 cubic fod (Danish, liq.) (E)	Danish
anker (Dutch)	–	capacity, volume	L^3	1 anker (Dutch) = 38.400×10^{-3} m^3	Obsolete Dutch unit of capacity used for liquid substances. 1 anker (Dutch) = 32 mingelen (E)	Dutch
anker (Icelandic)	–	capacity, volume	L^3	1 anker (Icelandic) = $38.646081970 \times 10^{-3}$ m^3	Obsolete Icelandic traditional unit of capacity used for dry substances before 1907. 1 anker (Icelandic) = 5/4 cubic fet (Icelandic) (E)	Icelandic
anker (Latvian)	–	capacity, volume	L^3	1 anker (Latvian) = 38.256×10^{-3} m^3	Obsolete Latvian traditional unit of capacity. 1 anker (Latvian) = 30 stoof (Latvian) (E)	Latvian
anker (Prussian)	–	capacity, volume	L^3	1 anker (Prussian) = $34.3520728623 \times 10^{-3}$ m^3	Obsolete German unit of capacity used for liquid substances. 1 anker (Prussian) = 30 quart (E)	German
anker (Russian)	–	capacity, volume	L^3	1 anker (Russian) = 36.898230×10^{-3} m^3	Obsolete Russian unit of capacity for liquid substances used before 1917. 1 anker (Russian) = 3 vedro (E)	Russian
anker (UK, wine)	–	volume, capacity	L^3	1 anker (UK, wine) = 45.46092×10^{-3} m^3	Obsolete British unit of capacity for wine. 1 anker (UK, wine) = 10 wine gallons (E)	UK

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
anker (US, wine)	–	volume, capacity	L^3	1 anker (US, wine) $= 37.85411784 \times 10^{-3}$ m^3(E)	Obsolete American unit of volume used to measure the capacity of wine. 1 anker (US, wine) = 10 gallons (US, wine) (E)	US
annual fuel utilization efficiency	AFUE	furnace energy efficiency	nil	(see note)	American dimensionless unit of domestic furnace energy efficiency introduced by the US Department of Energy (DOE). It represents the percentage of the fuel energy actually delivered as heat energy, averaged over the course of a typical heating season. The actual calculation is quite complex, taking into account furnace properties. Older furnaces have ratings of 60% AFUE or even lower; the newest high-efficiency furnaces are rated in the 90%–95% AFUE range. The US Department of Energy requires new furnaces to operate at 78% AFUE or better.	US
anukabiet (Thai)	–	length, distance	L	1 anukabiet (Thai) $= 2.6041666667 \times 10^{-3}$ m	Obsolete Thai traditional unit of length used before 1923. 1 anukabiet (Thai) = 1/768 wah (Thai) (E)	Thai
apatan (Philippine)	–	capacity, volume	L^3	1 apatan (Philippine) $= 0.999 \times 10^{-6}$ m^3	Obsolete Philippine traditional unit of capacity used before 1906. 1 apatan (Philippine) = 1/4 chupa (Philippine) (E)	Philippine
API degree	API	specific gravity index of petroleum	nil	$^\circ\text{API} = 141.5/d^{60^\circ\text{F}}_{60^\circ\text{F}} - 131.5$	Hydrometer unit adopted in 1952 by the *American Petroleum Institute* (API). It serves to measure the density of raw petroleum and to avoid confusion in business transactions. It has a scale from 0°API (sp. gr. of 1.076) to 100°API (sp. gr. of 0.6112). Specific gravity is widely used in countries outside the US, and with the	US

					adoption of SI units API favours density at 15°C instead of degrees API.	
apostilb	asb	luminous luminance	JL^{-2}	1 asb = 0.318309886184 cd.m^{-2}	Obsolete German unit of luminous luminance. 1 asb = $[1/\pi]$ cd/m^2 (E) 1 asb = 10^{-4} lambert (E)	German
apt (Egyptian)	–	capacity, volume	L^3	1 apt (Egyptian) = 8.5×10^{-3}m^3 (of water)	Obsolete Egyptian unit of capacity used in ancient times. Measured by weight. 1 apt (Egyptian) = 1/4 khar (E)	Egyptian
aranzada (Spanish)	–	surface, area	L^2	1 aranzada (Spanish) = 4471.91788176 m^2	Obsolete Spanish unit of area. 1 aranzada (Spanish) = 6400 sq. vara (E)	Spanish
archine (Yugoslavian)	–	length, distance	L	1 archine (Yugoslavian) = 0.7110 m	Obsolete traditional Yugoslavian unit of length used before 1883. 1 archine (Yugoslavian) = 9/4 stopa (Yugoslavian) (E)	Yugoslavian
arcmin (minute of arc)	–	length, distance	L	1 arcmin = $2.90888208665 \times 10^{-4}$m ($R$ = 1 m)	Unit of curvilinear abscissa. It is equal to the angle expressed in minutes multiplied by the circle radius. 1 arcmin (m) = $(\pi/10\,800)R(m)\theta(')$	
arcsecond (second of arc)	arcsec	length, distance	L	1 arcsec = $4.84813681108 \times 10^{-6}$ m (for R = 1 m)	Obsolete unit of curvilinear abscissa used by astronomers. The arcsecond is equal to the plane angle expressed in second times the circle radius in metres. 1 arcsec = 1/60 arcmin (E) S(m) = $(\pi/648\,000)R$ (m) θ(") (E)	
ardabb (Saudi Arabian)	–	capacity, volume	L^3	1 ardabb (Saudi Arabian) = 1.58080 m^3	Obsolete Saudi Arabian traditional unit of capacity used for liquids before 1962. 1 ardabb (Saudi Arabian) = 1664 nusfiah (Saudi Arabian) (E)	Saudi Arabian
ardeb (Abyssinian, long)	–	capacity, volume	L^3	1 ardeb (Abyssinian, long) = 10.56×10^{-3} m^3	Obsolete Abyssinian traditional unit of capacity used before 1927. 1 ardeb (Abyssinian, long) = 24 madega (Abyssinian) (E)	Abyssinian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
ardeb (Egyptian)	–	capacity, volume	L^3	1 ardeb (Egyptian) = 198×10^{-3} m^3	Obsolete Egyptian traditional unit of capacity used before 1891. 1 ardeb (Egyptian) = 96 keddah (Egyptian) (E)	Egyptian
ardeb (Abyssinian, short)	–	capacity, volume	L^3	1 ardeb (Abyssinian, short) = 4.40×10^{-3} m^3	Obsolete Abyssinian traditional unit of capacity used before 1927. 1 ardeb (Abyssinian, short) = 10 madega (Abyssinian) (E)	Abyssinian
ardebb (Saudi Arabian)	–	capacity, volume	L^3	1 ardebb (Saudi Arabian) = 1.58080 m^3	Obsolete Saudi Arabian traditional unit of capacity used for liquids before 1962. 1 ardebb (Saudi Arabian) = 1664 nusfiah (Saudi Arabian) (E)	Saudi Arabian
are	a	surface, area	L^2	1 are = 10^2 m^2 (E)	French metric unit of area used in surveyor's measurements. It was introduced after the French Revolution. The unit is still used in agriculture.	French
arienzo (Spanish)	–	mass	M	1 arienzo (Spanish) = $1.99693142361 \times 10^{-4}$ kg	Obsolete Spanish unit of mass. 1 arienzo (Spanish) = 1/2304 libra (E)	Spanish
arpent (Belgian)	–	surface area	L^2	1 arpent (Belgian) = 4221.100900 m^2	Obsolete traditional Belgian unit of surface area used in land measurements before 1820. 1 arpent (Belgian) = 100 square perches (Belgian) (E) 1 arpent (Belgian) = 40000 square pieds (Belgian) (E)	Belgian
arpent (commun)	–	length, distance	L	1 arpent (commun) = 447.21359550 m (E)	Obsolete French unit of length used before the French revo lution of 1789. 1 arpent (commun) = 100 perches (E) 1 arpent (commun) = 2000 pieds (E)	French

arpent (de Paris)	a	surface, area	L^2	1 arpent (de Paris) = 3418.86895120 m^2	Obsolete French unit of area used in surveyor's measurements before the French Revolution (1789). 1 arpent (de Paris) = 32 400 sq. pieds (de Paris)	French
arpent (Eaux et Forêts)	a	surface, area	L^2	1 arpent (Eaux et Forêts) = 5107.19929747 m^2	Obsolete French unit of area used in surveyor's measurements before the French Revolution (1789). 1 arpent (Eaux et Forêts) = 48 400 sq. pieds (de Paris)	French
arpent (ordinaire, metric)	a	surface, area	L^2	1 arpent (metric) = 4225 m^2	Obsolete French metric unit of area used in surveyor's measurements. 1 arpent (metric) = 65 × 65 m^2 1 arpent (metric) = 195 pieds (metric) (E)	French
arpent (Québec)	–	length, distance	L	1 arpent (Québec) = 58.471095006 m	Obsolete French unit of length sometimes still used in Québec (Canada). 1 arpent (metric) = 195 pieds (metric) 1 arpent = 180 pieds (de Paris) (E) 1 arpent ≅ 191.834301201 ft	CAN, French
arpent (Québec)	a	surface, area	L^2	1 arpent (Québec) = 3418.894093 m^2	Obsolete French metric unit of area used in surveyor's measurements. Still used in Québec (Canada). 1 arpent = 32400 square pieds (de Paris) (E) 1 arpent = 36 800.3991173 ft^2	CAN, French
arratel (Portuguese)	–	mass	M	1 arratel (Portuguese) = 0.459 kg	Obsolete Portuguese unit of mass. 1 arratel (Portuguese) = 1 libra (E)	Portuguese
arroba (Argentinian)	–	mass	M	1 arroba (Argentinian) = 11.485 kg	Obsolete Argentinian traditional unit of mass used before 1887. 1 arroba (Argentinian) = 25 libra (Argentinian) (E)	Argentinian
arroba (Balearic)	–	mass	M	1 arroba (Balearic) = 10.408 kg	Obsolete Balearic traditional unit of mass. 1 arroba (Balearic) = 26 rottolo (Balearic) (E)	Balearic

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
arroba (Brazilian)	–	mass	M	1 arroba (Brazilian) = 14.6896 kg	Obsolete Brazilian traditional unit of mass used before 1874. 1 arroba (Brazilian) = 32 libra (Brazilian) (E)	Brazilian
arroba (Chilean)	–	mass	M	1 arroba (Chilean) = 11.502325 kg	Obsolete Chilean traditional unit of mass used before 1865 1 arroba (Chilean) = 25 libbra (Chilean) (E)	Chilean
arroba (Chilean)	–	capacity, volume	L^3	1 arroba (Chilean) $= 32.332 \times 10^{-3}$ m^3	Obsolete Chilean traditional unit of capacity used before 1865. 1 arroba (Chilean) = 4 almude (Chilean) (E)	Chilean
arroba (Colombian)	–	mass	M	1 arroba (Colombian) = 12.5 kg	Obsolete Colombian traditional unit of mass used before 1854. 1 arroba (Venezuelan) = 25 libbra (Venezuelan) (E)	Colombian
arroba (Mexican)	–	mass	M	1 arroba (Mexican) = 11.50615850 kg	Obsolete Mexican traditional unit of mass used before 1896. 1 arroba (Mexican) = 25 libbra (Mexican) (E)	Mexican
arroba (oil) (Spanish)	–	capacity, volume	L^3	1 arroba (oil) = 12.563×10^{-3} m^3	Obsolete Spanish unit of capacity used for liquid substances.	Spanish
arroba (Peruvian)	–	mass	M	1 arroba (Peruvian) = 11.50225 kg	Obsolete Peruvian traditional unit of mass used before 1869. 1 arroba (Peruvian) = 25 libbra (Peruvian) (E)	Peruvian
arroba (Portuguese)	–	mass	M	1 arroba (Portuguese) = 14.688 kg	Obsolete Portuguese unit of mass. 1 arroba (Portuguese) = 32 libra (E)	Portuguese
arroba (Spanish)	–	mass	M	1 arroba (Spanish) = 11.502325 kg	Obsolete Spanish unit of mass. 1 arroba (Spanish) = 25 libra (E)	Spanish

arroba (Venezuelan)	–	mass	M	1 arroba (Venezuelan) = 12.5 kg	Obsolete Venezuelan traditional unit of mass used before 1914. 1 arroba (Venezuelan) = 25 libbra (Venezuelan) (E)	Venezuelan
arroba (water) (Spanish)	–	capacity, volume	L^3	1 arroba (water) $= 15.643162 \times 10^{-3}$ m^3	Obsolete Spanish unit of capacity used for liquid substances. It was equal to 34 libra of river water.	Spanish
arroba (wine) (Spanish)	–	capacity, volume	L^3	1 arroba (wine) $= 16.133 \times 10^{-3} m^3$	Obsolete Spanish unit of capacity used for liquid substances.	Spanish
arrobe (Paraguayan)	–	mass	M	1 arrobe (Paraguayan) = 11.475 kg	Obsolete Paraguayan traditional unit of mass used before 1899. 1 arrobe (Paraguayan) = 25 libbra (Paraguayan) (E)	Paraguayan
arshin (Russian)	–	length, distance	L	1 arshin (Russian) = 0.7112 m (E)	Obsolete Russian unit of length used before 1917. It was equal to the distance at 17°C between the axes of two lines drawn on the Pt-Ir prototype marked "H-1894". 1 arshin (Russian) = 7/3 foute (E)	Russian
arshine (Estonian)	–	length, distance	L	1 arshine (Estonian) = 0.7112 m	Obsolete traditional Estonian unit of length used before 1900. 1 arshine (Estonian) = 7/3 foute (Estonian) (E)	Estonian
artaba (Persian)	–	capacity, volume	L^3	1 artaba (Persian) $= 66 \times 10^{-3}$ m^3	Obsolete Persian traditional unit of capacity used before 1933. 1 artaba (Persian) = 200 sextario (Persian) (E)	Persian
artaba (large, Persian)	–	capacity, volume	L^3	1 artaba (large, Persian) $= 65.2 \times 10^{-3}$ m^3 (of water)	Obsolete unit of capacity of the Assyrio-Chaldean-Persian system used in ancient times. Measured by weight. 1 artaba (large, Persian) = 2 amphora (E)	Persian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
artaba (short, Persian)	–	capacity, volume	L^3	1 artaba (short, Persian) $= 48.9 \times 10^{-3}$ m^3 (of water)	Obsolete unit of capacity of the Assyrio-Chaldean-Persian system used in ancient times. Measured by weight. 1 artaba (short, Persian) = 3/2 amphora (E)	Persian
artabe (Arabic) (amphora)	–	capacity, volume	L^3	1 artabe (Arabic) $= 65.28 \times 10^{-3} m^3$ (of water)	Obsolete Arabic unit of capacity used in ancient times. Measured by weight. 1 artabe (Arabic) = 2 cafiz (E)	Arabic
artabe (Egyptian)	–	capacity, volume	L^3	1 artabe (Egyptian) $= 51 \times 10^{-3}$ m^3 (of water)	Obsolete Egyptian unit of capacity used in ancient times. Measured by weight. 1 artabe (Egyptian) = 3/2 khar (E)	Egyptian
artal (Moroccan)	–	mass	M	1 artal (Moroccan) = 0.5075 kg	Obsolete traditional Moroccan unit of mass used before 1923. 1 artal (Moroccan) = 1/100 kantar (Moroccan) (E)	Moroccan
ASI	ASI	area specific impedance	$ML^4T^{-3}I^{-2}$	1 ASI $= 10^{-2}$ $\Omega.m^2$ (E)	Unit of area specific impedance used in the battery industry to measure battery performance. 1 ASI = 1 $\Omega.cm^2$ (E)	US, UK
ass (Swedish)	–	mass	M	1 ass (Swedish) $= 48.04246188 \times 10^{-3}$ kg	Obsolete Swedish unit of mass used before 1889. 1 ass (Swedish) = 1/8848 skålpund (Swedish) (E)	Swedish
assbaa (Arabic) [Arabian finger]	–	length, distance	L	1 assbaa (Arabic) $= 2 \times 10^{-2}$ m	Obsolete Arabic unit of length used in ancient times. 1 assbaa (Arabic) = 1/16 foot (Arabic) (E)	Arabic

astronomical unit	AU, UA	length, distance	L	1 AU = 1.49597870 × 10^{11} m	Unit of length employed in astronomy for describing planetary distance. One AU corresponds approximately to the mean distance between the Earth and the Sun. It was adopted by the International Astronomical Union in 1964.	
atmosphere cubic foot per hour	atm-$ft^3.h^{-1}$	pumping power throughput	ML^2T^{-3}	1 atm-$ft^3.h^{-1}$ = 0.797001244703 W	British and American unit used in physics and vacuum technology to express the pumping power throughput of a vacuum pump. It corresponds to the product of the pressure (P) times the volume flow rate (dV/dt) of the gas; assuming an ideal gas this can be written as follows: $P(dV/dt) = (dn/dt)RT$. Hence, at a given constant temperature, this physical quantity is directly proportional to the molar flow rate (dn/dt) of molecules pumped. 1 atm-$ft^3.h^{-1}$ = 0.797001244703 Pa.$m^{-3}.s^{-1}$ 1 atm-$ft^3.h^{-1}$ = 797.001244703 mW	UK, US
atmosphere cubic foot per min	atm-$ft^3.min^{-1}$	pumping power throughput	ML^2T^{-3}	1 atm-$ft^3.min^{-1}$ = 47.8200746822 W	British and American unit used in physics and vacuum technology to express the pumping power throughput of a vacuum pump. It corresponds to the product of the pressure (P) times the volume flow rate (dV/dt) of the gas; assuming an ideal gas this can be written as follows: $P(dV/dt) = (dn/dt)RT$. Hence, at a given constant temperature, this physical quantity is directly proportional to the molar flow rate (dn/dt) of molecules pumped. 1 atm-$ft^3.min^{-1}$ = 47.8200746822 Pa.$m^{-3}.s^{-1}$	UK, US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
atmosphere cubic metre per hour	atm-$m^3.h^{-1}$, acmh	pumping power throughput	ML^2T^{-3}	1 atm-$m^3.h^{-1}$ = 28.1458333 W (E)	International unit used in physics and vacuum technology to express the pumping power throughput of a vacuum pump. It corresponds to the product of the pressure (P) times the volume flow rate (dV/dt) of the gas; assuming an ideal gas this can be written as follows: $P(dV/d[t) = (dn/dt)RT$. Hence, at a given constant temperature, this physical quantity is directly proportional to the molar flow rate (dn/dt) of molecules pumped. 1 atm-$m^3.h^{-1}$ = (101 325/3600)Pa.$m^{-3}.s^{-1}$ (E) 1 atm-$m^3.h^{-1}$ = 28.1458333 W (E) 1 atm-$m^3.h^{-1}$ = (1/3600) atm-$m^3.s^{-1}$ (E)	INT
atmosphere cubic metre per minute	atm-$m^3.min^{-1}$, acmm	pumping power throughput	ML^2T^{-3}	1 atm-$m^3.min^{-1}$ = 1688.750 W (E)	International unit used in physics and vacuum technology to express the pumping power throughput of a vacuum pump. It corresponds to the product of the pressure (P) times the volume flow rate (dV/dt) of the gas; assuming an ideal gas this can be written as follows: $P(dV/dt) = (dn/dt)RT$. Hence, at a given constant temperature, this physical quantity is directly proportional to the molar flow rate (dn/dt) of molecules pumped. 1 atm-$m^3.min^{-1}$ = (101 325/60)Pa.$m^{-3}.s^{-1}$ (E) 1 atm-$m^3.min^{-1}$ = 1.688750 kW (E) 1 atm-$m^3.min^{-1}$ = (1/60) atm-$m^3.s^{-1}$ (E)	INT

atmosphere cubic metre per second	atm-m^3.s^{-1}, acms	pumping power throughput	ML^2T^{-3}	1 atm-m^3.s^{-1} = 101 325W (E)	International unit used in physics and vacuum technology to express the pumping power throughput of a vacuum pump. It corresponds to the product of the pressure (P) times the volume flow rate (dV/dt) of the gas; assuming an ideal gas this can be written as follows: $P(dV/dt) = (dn/dt)RT$. Hence, at a given constant temperature, this physical quantity is directly proportional to the molar flow rate (dn/dt) of molecules pumped. 1 atm-m^3.s^{-1} = 101 325 Pa.m^{-3}.s^{-1} (E) 1 atm-m^3.s^{-1} = 101.325 kW (E)	INT
atmosphere litre per hour	atm-dm^3.h^{-1}, atm-lph	pumping power throughput	ML^2T^{-3}	1 atm-dm^3.h^{-1} = 28.1458333 × 10^{-3} W (E)	International unit used in physics and vacuum technology to express the pumping power throughput of a vacuum pump. It corresponds to the product of the pressure (P) times the volume flow rate (dV/dt) of the gas; assuming an ideal gas this can be written as follows: $P(dV/dt) = (dn/dt)RT$. Hence, at a given constant temperature, this physical quantity is directly proportional to the molar flow rate (dn/dt) of molecules pumped. 1 atm-dm^3.h^{-1} = (101.325/3600) Pa.m^{-3}.s^{-1} (E) 1 atm-dm^3.h^{-1} = 28.1458333 mW (E) 1 atm-dm^3.h^{-1} = (1/3600) atm-dm^3.s^{-1} (E)	INT

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
atmosphere litre per minute	atm-dm^3.min^{-1}, atm-lpm	pumping power throughput	ML^2T^{-3}	1 atm-dm^3.min^{-1} = 1.688750 W (E)	International unit used in physics and vacuum technology to express the pumping power throughput of a vacuum pump. It corresponds to the product of the pressure (P) times the volume flow rate (dV/dt) of the gas; assuming an ideal gas this can be written as follows: $P(dV/dt) = (dn/dt)RT$. Hence, at a given constant temperature, this physical quantity is directly proportional to the molar flow rate (dn/dt) of molecules pumped. 1 atm-dm^3.min^{-1} = (101.325/60) Pa.m^{-3}.s^{-1} (E) 1 atm-dm^3.min^{-1} = 1.688750 W (E) 1 atm-dm^3.min^{-1} = (1/60) atm-dm^3.s^{-1} (E)	INT
atmosphere litre per second	atm-dm^3.s^{-1}, atm-lps	pumping power throughput	ML^2T^{-3}	1 atm-dm^3.s^{-1} = 101.325 W (E)	International unit used in physics and vacuum technology to express the pumping power throughput of a vacuum pump. It corresponds to the product of the pressure (P) times the volume flow rate (dV/dt) of the gas; assuming an ideal gas this can be written as follows: $P(dV/dt) = (dn/dt)RT$. Hence, at a given constant temperature, this physical quantity is directly proportional to the molar flow rate (dn/dt) of molecules pumped. 1 atm-dm^3.s^{-1} = 101.325Pa.m^{-3}.s^{-1} (E) 1 atm-m^3.s^{-1} = 101.325 W (E)	INT

atmosphere (standard atmosphere)	atm, A_n	pressure, stress	$ML^{-1}T^{-2}$	1 atm = 101 325 Pa (E)	Obsolete pressure and stress unit which should be discontinued. Unit of pressure equal to the air pressure measured at mean sea level.	INT
atmosphere (technical)	at	pressure, stress	$ML^{-1}T^{-2}$	1 at = 9.80665×10^4 Pa (E)	Obsolete MKpS pressure and stress derived unit. Obsolete. 1 at = 1 kgf.cm^{-2} (E) 1 atm = 1.033 227 45280 at	MKpS
atomic unit of mass [^{12}C = 12.0000]	u, uma, Da (^{12}C), AMU	mass	M	1 u (^{12}C) = $1.66053872801 \times 10^{-27}$ kg	The atomic unit of mass u (^{12}C) is equal to the fraction 1/12 of the mass of the carbon 12 atom. 1 u (^{12}C) = 1.00031793717 u (^{16}O)	
atomic unit of mass [^{16}O = 16.0000]	u, uma, Da (^{16}O) AMU	mass	M	1 u(^{16}O) = $1.66001094883 \times 10^{-27}$ kg	The atomic unit of mass u (^{16}O) is equal to the fraction 1/16 of the mass of the oxygen 16 atom. 1 u (^{16}O) = 0.999682163881 u (^{12}C)	
atomic unit of mass [^{1}H = 1.0000]	u, uma, Da (^{1}H) AMU	mass	M	1 u (^{1}H) = $1.67353249686 \times 10^{-27}$ kg	The atomic unit of mass u (^{1}H) is equal to the fraction 1/1 of the mass of the hydrogen (^{1}H) atom. 1 u (^{1}H) = 1.0078250321 u (^{12}C)	
atour (Egyptian)	–	length, distance	L	1 atour (Egyptian) = 5.235×10^3m	Obsolete Egyptian unit of length used in ancient times. 1 atour = 10 000 Royal cubits (E)	Egyptian
atour (Royal Egyptian)	–	length, distance	L	1 atour (Royal Egyptian) = 1.047×10^4 m	Obsolete Egyptian unit of length used in ancient times. 1 atour = 20 000 Royal cubits (E)	Egyptian
attogram	ag	mass	M	1 ag = 10^{-21} kg (E)	Submultiple of the SI base unit. 1 ag = 10^{-18} g (E)	SI
attometre	am	length, distance	L	1 am = 10^{-18} m (E)	Submultiple of the SI base unit.	SI

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
aune (de Paris)	aune	length, distance	L	1 aune (de Paris) = 0.649678833400 m	Obsolete French unit of length employed in the textile industry for clothes measurements. Its was used in France during the Ancien Régime before the French Revolution (1789). 1 aune (de Paris) = 1/3 toise (de Pérou) (E) 1 aune (de Paris) = 2 pieds (de Paris) (E)	French
aune (Haitian)	–	length, distance	L	1 aune (Haitian) = 0.1188 m	Obsolete Haitian traditional unit of length used before 1920. 1 aune (Haitian) = 99/1624 toise (Haitian) (E)	Haitian
aune (Swiss)	–	length, distance	L	1 aune (Swiss) = 0.60 m (E)	Obsolete traditional Swiss unit of length used before 1877. 1 aune (Swiss) = 2 pieds (Swiss) (E)	Swiss
aurure (Egyptian)	–	surface, area	L^2	1 aurure (Egyptian) = 2740.5225 m^2	Obsolete Egyptian unit of area used in ancient times. 1 aurure (Egyptian) = 100 pekeis (E)	Egyptian
Avogadro (Number)	N_A, L	number of entities per amount of substance	N^{-1}	1 $N_A = 6.02214199(47) \times 10^{23}$ mol^{-1}	Fundamental physical constant. The unit is named after A. Avogadro (1776–1856).	
azumbre (Spanish)	–	capacity, volume	L^3	1 azumbre (Spanish) = $1.95539525 \times 10^{-3}$ m^3(water)	Obsolete Spanish unit of capacity used for liquid substances. 1 azumbre (Spanish) = 1/8 arroba (water) (E)	Spanish
B unit (pastille dose)	–	exposure	ITM^{-1}	1 pastille dose = 1.290×10^{-1} $C.kg^{-1}$ (E)	Obsolete unit of exposure of ionizing radiations. It was equal to the radiation dose required to change the variation colour of a basic barium platinocyanide pastille from apple green (tint A) to reddish brown (tint B). 1 B unit = 500 röntgens (E)	

bag (UK)	–	capacity, volume	L^3	1 bag (UK) = 109.1062080 × 10^{-3} m^3	Obsolete British unit of capacity. 1 bag (UK) = 1 sack (UK) (E) 1 bag (UK) = 3 bushels (UK) (E) 1 bag (UK) = 6 buckets (UK) (E) 1 bag (UK) = 12 pecks (UK) (E) 1 bag (UK) = 24 gallons (UK) (E)	UK
bag (UK, cement)	–	mass	M	1 bag (UK, cement) = 42.63768278 kg (E)	Obsolete British unit of mass employed in civil engineering. 1 bag (UK, cement) = 94 lb (av.) of Portland cement (E)	UK
baha (Indian)	–	capacity, volume	L^3	1 baha (Indian) = 2.640 m^3 (of water)	Obsolete Indian unit of capacity used in ancient times. Measured by weight. 1 baha (Indian) = 200 drona (E)	Indian
bahar (Indonesian, long)	–	mass	M	1 bahar (Indonesian, long) = 277.92586125 kg	Obsolete Indonesian traditional unit of mass used before 1923. 1 bahar (Indonesian, long) = 9/2 picul (Indonesian) (E)	Indonesian
bahar (Indonesian, short)	–	mass	M	1 bahar (Indonesian, short) = 185.2839075 kg	Obsolete Indonesian traditional unit of mass used before 1923. 1 bahar (Indonesian, short) = 3 picul (Indonesian) (E)	Indonesian
bahar (Mozambican)	–	mass	M	1 bahar (Mozambian) = 109 kg	Obsolete unit of mass used in Mozambique.	Mozambican
bahar (Saudi Arabian)	–	mass	M	1 bahar (Saudi Arabian) = 202.50 kg	Obsolete Saudi Arabian traditional unit of mass used before 1962. 1 bahar (Saudi Arabian) = 3 kantar (Saudi Arabian) (E)	Saudi Arabian
baht (Thai)	–	mass	M	1 baht (Thai) = 15 × 10^{-3} kg	Obsolete Thai traditional unit of mass used before 1923. 1 baht (Thai) = 16 grani (Thai) (E)	Thai
baker's dozen	–	dimensionless counting unit	nil	1 baker's dozen = 13 entities (E)	Obsolete British and American dimensionless unit for counting.	UK, US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
bale (Brazilian, cotton)	–	mass	M	1 bale (Brazilian, cotton) = 113.3980925 kg	Brazilian commercial unit of mass used to measure ship ments of cotton. 1 bale (Brazilian, cotton) = 250 lb (E)	Brazilian
bale (Indian, cotton)	–	mass	M	1 bale (Indian, cotton) = 181.4369480 kg	Obsolete Indian commercial unit of mass used to measure shipments of cotton. 1 bale (Indian, cotton) = 400 lb (E)	Indian
bale (paper, modern)	bl	number of paper sheet	nil	1 bale (paper) = 5000 sheets of paper	Unit used in the paper industry. 1 bale (paper) = 5 bundles (E) 1 bale (paper) = 10 reams (E) 1 bale (paper) = 200 quires (E)	INT
bale (paper, old)	bl	number of paper sheet	nil	1 bale (paper, old) = 4800 sheets of paper	Obsolete unit extensively used in the British and American paper industry. 1 bale (paper, old) = 5 reams (old) (E) 1 bale (paper, old) = 10 reams (old) (E) 1 bale (paper, old) = 200 quires (old) (E)	UK, US
bale (Peru, cotton)	–	mass	M	1 bale (Peru, cotton) = 113.3980925 kg	Obsolete unit of mass used to measure shipments of cotton in Peru. 1 bale (Peru, cotton) = 250 lb (E)	Peru
bale (UK, cotton)	bl	mass	M	1 bale (UK, cotton) = 340.1942775 kg (E)	British commercial unit of mass used to measure shipments of cotton. It was named because cotton was baled or tied into large bundles. 1 bale (UK, cotton) = 750 lb (E)	UK
bale (US, cotton)	bl	mass	M	1 bale (US, cotton) = 226.7961850 kg (E)	American commercial unit of mass used to measure shipments of cotton. It was named because cotton was baled or tied into large bundles. First standardized in the *Cotton Futures Act*. 1 bale (US, cotton) = 500 lb (E)	US

balita (Philippine)	–	surface area	L^2	1 balita (Philippine) = 2795 m^2	Obsolete Philippine traditional unit of surface area used in land measurements before 1906. 1 balita (Philippine) = 10 loan (Philippine) (E)	Philippine
balle (Belgian)	–	mass	M	1 balle (Belgian) = 97.900 kg	Obsolete traditional Belgian unit of mass used before 1820. 1 balle (Belgian) = 200 livres (Belgian) (E)	Belgian
Balling degree	°Ba	specific gravity unit to express amount of sugar in syrups, juice	nil	$°\text{Balling} = 200 - 200/d_{60°F}^{60°F}$	Obsolete European hydrometer unit adopted in 1859 typical of the brewing industry indicating the percentage by weight (% wt) of dissolved solids.	European
balmer	–	wavenumber	L^{-1}	1 balmer = 10^2 m^{-1} (E)	Obsolete wavenumber unit proposed in 1951 for wavenumber measurements in spectroscopy; it has not been adopted. The unit is named after J.J. Balmer (1825–1898). 1 balmer = 1 kayser 1 balmer = 1 cm^{-1}	cgs
balthazar (belshazzar)	–	capacity, volume	L^3	1 balthazar = 12.122912×10^{-3} m^3	Obsolete British unit employed for expressing the capacity of wine containers. Still employed in oenology, especially in France. 1 balthazar = 8/3 gallons (UK) (E) 1 balthazar = 16 bouteilles (E)	UK, French
bamboo (Burmese)	–	length, distance	L	1 bamboo (Burmese) = 3.9116 m	Obsolete Burmese traditional unit of length used before 1920. 1 bamboo (Burmese) = 7 sandong (Burmese) (E)	Burmese
ban (Thai)	–	capacity, volume	L^3	1 ban (Thai) = 1.6 m^3	Obsolete Thai traditional unit of capacity used before 1923. 1 ban (Thai) = 1600 tanan (Thai) (E)	Thai

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
bank cubic metre	BCM	capacity, volume	L^3	1 bank cubic metre = 1 m^3 (E)	Canadian, Australian, and American unit of capacity commonly used in coal mining to measure the approximate contents of a cubic metre of rock in place, before it is drilled and blasted.	CAN, US, Australian
bar	bar	pressure, stress	$ML^{-1}T^{-2}$	1 bar = 10^5 Pa (E)	Pressure and stress unit employed in fluid mechanics. Its use is temporarily maintained with the SI. 1 atm = 1.01325 bar (E)	
bara (Chilean)	–	length, distance	L	1 bara (Chilean) = 0.836 m	Obsolete Chilean traditional unit of length used before 1865. 1 bara (Chilean) = 3 pie (Chilean) (E)	Chilean
bara (Indian)	–	mass	M	1 bara (Indian) = 94 kg	Obsolete Indian unit of mass used in ancient times. 1 bara (Indian) = 2 000 pala (E)	Indian
bara (Thai)	–	mass	M	1 bara (Thai) = 480 kg	Obsolete Thai traditional unit of mass used before 1923. 1 bara (Thai) = 512000 grani (Thai) (E)	Thai
barad	barad	pressure, stress	$ML^{-1}T^{-2}$	1 barad = 10^{-1} Pa (E)	Pressure and stress unit proposed and named after the British Association in 1888. Now replaced by the barye. 1 barad = 1 $dyne.cm^{-2}$ (E) 1 atm = 1 013 250 barad (E)	
barcella (Balearic, liq.)	–	capacity, volume	L^3	1 barcella (Balearic, liq.) = 11.995 $\times 10^{-3}$ m^3	Obsolete Balearic traditional unit of capacity used for liquids. 1 barcella (Balearic, liq.) = 6 almude (Balearic, liq.) (E)	Balearic

barge (US, oil)	–	capacity, volume	L^3	1 barge (US, oil) = 3974.68237320 m^3 (E)	Obsolete American unit of volume used in the oil and energy industry. The barges used on American rivers customarily carry about 25000 barrels of 42 US gallons of crude oil. 1 barge (US, oil) = 25000 barrels (US, oil) (E) 1 barge (US, oil) = 1.05×10^6gal (US, liq.) (E)	US
barid (Arabic) [veredus]	–	length, distance	L	1 barid (Arabic) = 2.304×10^4 m	Obsolete Arabic unit of length used in ancient times. 1 barid (Arabic) = 72 000 feet (Arabic) (E)	Arabic
baril (Argentinian)	–	capacity, volume	L^3	1 baril (Argentinian) = 76×10^{-3} m^3	Obsolete Argentinian traditional unit of capacity used for liquids before 1887. 1 baril (Argentinian) = 32 frasco (Argentinian) (E)	Argentinian
baril (Greek, liquid)	–	capacity, volume	L^3	1 baril (Greek, liquid) = 74.236×10^{-3} m^3	Obsolete traditional Greek unit of capacity used for liquids before 1922.	Greek
baril (Haitian)	–	capacity, volume	L^3	1 baril (Haitian) = $92.5149302784 \times 10^{-3}$ m^3	Obsolete Haitian traditional unit of capacity used before 1920. 1 baril (Haitian) = 1/80 toise cube (Haitian) (E)	Haitian
baril (Maltese)	–	capacity, volume	L^3	1 baril (Maltese) = 43.162 m^3	Obsolete Maltese traditional unit of capacity used for liquids before 1921.	Maltese
baril (Paraguayan)	–	capacity, volume	L^3	1 baril (Paraguayan) = 96×10^{-3} m^3	Obsolete Paraguayan traditional unit of capacity used before 1899. 1 baril (Paraguayan) = 128 cuarta (Paraguayan) (E)	Paraguayan
barile (Libyan)	–	capacity, volume	L^3	1 barile (Libyan) = 62.4975×10^{-3} m^3	Obsolete Libyan traditional unit of capacity used for liquids before 1927. 1 barile (Libyan) = 5 gorraf (Libyan) (E)	Libyan
barile di olio (Italian)	–	capacity, volume	L^3	1 barile di olio (Italian) = 33.43×10^{-3} m^3	Obsolete Italian unit of capacity.	Italian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
barile di vino (Italian)	–	capacity, volume	L^3	1 barile di vino (Italian) = 45.6×10^{-3} m^3	Obsolete Italian unit of capacity.	Italian
bark degree	°Bk	specific gravity of liquids, hydrometer index, hydrometer degree	nil	°Bk = $1000 \times [d_{60°F}^{60°F} - 1]$	A barkometer is used for testing tanning liquor. It has a scale ranging 0°–80°Bk; the number to the right of the decimal point of the sp. gr. is the °Bk, thus 1.025 sp. gr. is 25°Bk.	
barkometer degree	°Bk	specific gravity of liquids, hydrometer index, hydrometer degree	nil	°Bk = $1000(D - 1)$	Obsolete dimensionless unit used in determining the densities of tanning liquors. It corresponds to one thousand times the difference between specific gravity (D) of the tanning liquor minus one. For instance, a tanning liquor exhibiting 15°Bk has a specific gravity versus water of 1.015.	UK, US
barleycorn (UK)	–	length, distance	L	1 barleycorn (UK) = 8.466667×10^{-3} m	Obsolete British unit of length. 1 barleycorn (UK) = 4 lines (UK) (E) 1 barleycorn (UK) = 1/3 inch (E) 1 barleycorn (UK) = 1/36 foot (E)	UK
barn	b	surface, area	L^2	1 barn = 10^{-28} m^2 (E)	Obsolete unit of area employed to express cross section of nuclides. It was introduced by H.G. Holloway and C.P. Baker in Chicago in 1942, to measure the probability of some phenomena interesting nuclear physics (fission, capture, diffusion, absorption, etc, of nuclides). 1 barn = 10^{-24} cm^2 (E) 1 barn = 100 fm^2 (E)	
baromil	–	length, distance	L	1 baromil = $7.50061682704 \times 10^{-4}$ m	Obsolete American unit used for graduating mercury barometers. It was introduced by the American Meteorological Society. It corresponds to	US

					the increasing height of mercury column, which is equal to an increasing atmospheric pressure of 1 mbar if measured at 0°C for a barometer at the sea level and at a latitude of N45°. 1 baromil ≈ 0.75 mm = $760 \times 10^{-3}/1013.25$	
barony (US)	–	length, distance	L	1 barony (US) $= 16.187425689 \times 10^{6}$ m^2 (E)	Obsolete American unit of length used in surveyors measurements. 1 barony (US) = 4000 acres (E)	US
barral (Provence, wine)	–	volume, capacity	L^3	1 barral (Provence, wine) $= 36.788\ \ 10^{-3}$ m^3	Obsolete French unit of volume used to measure the capacity of wine in Southern France. 1 barral (Provence) = 36.788 dm^3 1 barral (Provence) = 40 pots (E) 1 barral (Provence) = 80 pintes (E) 1 barral (Provence) = 160 chopines (E)	French
barrel (Irish)	bbl.	capacity, volume	L^3	1 barrel (Irish) $= 112.323491482 \times 10^{-3}$ m^3	Obsolete traditional Irish unit of capacity for liquids used before the adoption of the Weights and Measures Act of 1824. 1 barrel (Irish) = (63/2) gallons (Irish) (E)	Irish
barrel (Scottish, liq.)	bbl.	capacity, volume	L^3	1 barrel (Scottish, liq.) $= 108.447229814 \times 10^{-3}$ m^3	Obsolete traditional Scottish unit of volume used before the Weights and Measures Act of 1824 to measure the capacity of liquids. 1 barrel (Scottish, liq.) = 8 gallons (Scottish, liq.) (E)	Scottish
barrel (UK, alcohol)	bbl (alcohol)	capacity, volume	L^3	1 barrel (UK, alcohol) $= 227.304600 \times 10^{-3}$ m^3	Obsolete British unit of capacity. 1 barrel (UK, alcohol) = 50 gallons (UK) (E)	US
barrel (UK, beer)	bbl (UK, beer)	capacity, volume	L^3	1 barrel (UK, beer) $= 166.361473728 \times 10^{-3}$ m^3	Obsolete British unit of capacity used in the brewery industry between 1803 and 1824. 1 barrel (UK, beer) = 36 gallons (UK, beer) (E)	UK

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
barrel (UK, butter)	–	mass	M	1 barrel (UK, butter) = 101.60469088 kg (E)	Obsolete British unit of mass used for weighing butter and cheese. 1 barrel (UK, butter) = 224 lb (E) 1 barrel (UK, butter) = 4 firkins (E) 1 barrel (UK, butter) = 28 cloves (E)	UK
barrel (UK, cement)	–	mass	M	1 barrel (UK, cement) = 170.550731120 kg (E)	Obsolete British unit for mass measurements in civil engineering. 1 barrel (UK, cement) = 376 lb (av.) of Portland cement (E) 1 barrel (UK, cement) = 4 bags (cement) (E)	UK
barrel (UK, salt)	–	mass	M	1 barrel (UK, salt) = 127.00586360 kg (E)	Obsolete British unit for mass employed for measurements in the chemical process industry. 1 barrel (UK, salt) = 280 lb (av.) of sodium chloride (E)	UK
barrel (UK, wine)	bbl (UK, wine)	capacity, volume	L^3	1 barrel (UK, wine) = $143.2018980 \times 10^{-3}$ m^3	Obsolete British unit of capacity used for alcohols and spirits. 1 barrel (UK, wine) = 31.5 gal (UK) (E)	UK
barrel (UK) per long ton	bbl (UK).(lg t)$^{-1}$	specific volume	L^3M^{-1}	1 barrel (UK).(lg t)$^{-1}$ = $1.40940242778 \times 10^{-4}$ $m^3.kg^{-1}$	Obsolete British unit of specific volume. 1 barrel (UK).(lg t)$^{-1}$ = 31.5 gal (UK).(2240 lb)$^{-1}$ (E)	UK
barrel (US, alcohol)	bbl (alcohol)	capacity, volume	L^3	1 barrel (US, alcohol) = $189.2705892 \times 10^{-3}$ m^3	Obsolete American unit of capacity. 1 barrel (US, alcohol) = 50 gallons (US, liq.) (E)	US
barrel (US, cranberry)	bbl (US, cranb.)	capacity, volume	L^3	1 barrel (US, cranberry) = $95.4710348640 \times 10^{-3}$ m^3	American unit of capacity used for cranberries. 1 barrel (US, cranberry) = 5826 in^3 (E)	US

barrel (US, dry)	bbl (US, dry)	capacity, volume	L^3	1 barrel (US, dry) = $115.628198985 \times 10^{-3}$ m^3	Obsolete American unit of capacity employed for dry foodstuffs (flour, grain). 1 barrel (US, dry) = 26.25 gal (US, dry) (E)	US
barrel (US, liq.)	bbl (US, liq.)	capacity, volume	L^3	1 barrel (US, liq.) = $119.240471196 \times 10^{-3}$ m^3	Obsolete American unit of capacity employed for liquid foodstuffs. 1 barrel (US, liq.) = 31.5 gal (US, liq.) (E)	US
barrel (US, liq.) per foot	bbl (US, liq.).ft^{-1}	surface, area	L^2	1 barrel (US, liq.).ft^{-1} = $3.912088950 \times 10^{-1}$ m^2	American unit of area used in chemical engineering. 1 barrel (US, liq.).ft^{-1} = 31.5 gal (US, liq.).ft^{-1} (E) 1 barrel (US, liq.).ft^{-1} = 2.625 gal (US, liq.).in^{-1} (E)	US
barrel (US, liq.) per inch	bbl (US, liq.).in^{-1}	surface, area	L^2	1 barrel (US, liq.).in^{-1} = 4.694506740 m^2	American unit of area used in chemical engineering. 1 barrel (US, liq.).in^{-1} = 31.5 gal (US, liq.).in^{-1} (E) 1 barrel (US, liq.).in^{-1} = 12 barrels (US, liq.).ft^{-1} (E)	US
barrel (US, liq.) per short ton	bbl (US, liq.).(sh. t)$^{-1}$	specific volume	L^3M^{-1}	1 barrel (US, liq.).(sh. t)$^{-1}$ = $1.31440120119 \times 10^{-4}$ $m^3.kg^{-1}$	Obsolete American unit of specific volume. 1 barrel (US, liq.).(sh. t)$^{-1}$ = 31.5 gal (US, liq.).(2000 lb)$^{-1}$ (E)	US
barrel (US, oil) (US, oil)	bbl (US, oil)	capacity, volume	L^3	1 barrel (US, oil) = $158.987294928 \times 10^{-3}$ m^3	American unit of capacity usually employed in the petroleum industry and trading in fuels. 1 bbl (US, oil) = 42 gallons (US, liq.) (E) 1 bbl (US, oil) = 34.9723003688 imperial gallons 1 bbl (US, oil) ≈ 159 litres	US
barrel (US, oil) per day-psi	bbl/(d-psi)	volume flow rate per pressure drop permeability	$M^{-1}L^4T$	1 barrel (US, oil) per day-psi = $2.66888397965 \times 10^{-10}$ $m^3.Pa^{-1}.s^{-1}$	British and American unit of permeability used in reservoir engineering.	UK, US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
barrel (US, oil) per foot	bbl (US, oil). ft^{-1}	surface, area	L^2	1 barrel (US, oil).ft^{-1} = 5.216118600 × 10^{-1} m^2	American unit of area used in chemical engineering. 1 barrel (US, oil).ft^{-1} = 42 gal (US, liq.).ft^{-1}. (E) 1 barrel (US, oil).ft^{-1} = 3.5 gal (US, liq.).in^{-1} (E)	US
barrel (US, oil) per inch	bbl (US, oil). in^{-1}	surface, area	L^2	1 barrel (US, oil).in^{-1} = 6.259342320 m^2	American unit of area used in chemical engineering. 1 barrel (US, oil).in^{-1} = 42 gal (US, liq.).in^{-1} (E) 1 barrel (US, oil).in^{-1} = 12 barrel (US, oil).ft^{-1} (E)	US
barrel (US, oil)-mile (statute)	bbl (US, oil)-mi (stat.)	quadratic moment of a plane area	L^4	1 barrel (US, oil)-mile (stat.) = 2.55865249169 × 10^2 m^4	Obsolete American unit.	US
barrel bulk (US, UK)	–	capacity, volume	L^3	1 barrel bulk (US, UK) = 141.58423296 10^{-3} m^3	Obsolete American and British commercial unit of capacity. 1 barrel bulk (US, UK) = 1/20 register ton (E) 1 barrel bulk (US, UK) = 1/8 freight ton (US) (E) 1 barrel bulk (US, UK) = 5 cubic feet (E)	UK, US
barrel oil equivalent	bboe	energy, work, heat	ML^2T^{-2}	1 bboe = 6.12 × 10^9 J	Usual American large unit of energy employed in oil industry and economics to express energy balances, assuming that 1 bbl of crude oil weighs 137 kg with a heating value of 44.67 MJ. kg^{-1} 1 bboe = 6.12 GJ	US
barrel oil per calendar day	BOPCD, bopcd	volume flow rate	L^3T^{-1}	1 bopcd = 0.158987294928 × (no. of operating days/365) m^3 per day	North American unit of volume flow rate used in the oil industry. The barrel oil per calendar day is the average daily crude oil feed rate to a petroleum refinery on an	US, CAN

					annual basis (see barrel oil per stream day). 1 bopcd = 1 bopsd × (no. of operating days/365)	
barrel oil per stream day	BOPSD, bopsd	volume flow rate	L^3T^{-1}	1 bopsd = $158.987294928\times10^{-3}$ m^3 per day	North American unit of volume flow rate used in the oil industry. The barrel oil per stream day is the average daily crude oil feed rate to a petroleum refinery on those days when the refinery is in full operation (see also barrel oil per calendar day). 1 bopsd = 1 barrel (US, oil)/day (E)	US, CAN
barrers	barrers	permeability coefficient (volume flow rate)	$M^{-1}L^3T$	1 barrers = $7.50061682704 \times 10^{-18}$ $m^2.s^{-1}.Pa^{-1}$	Obsolete American unit employed in gas separation by membrane processes. It was used, assuming Darcy's law, when the flow rate of the gas through the membrane was expressed in cubic centimetre per second. The membrane thickness and its surface area were expressed in centimetre and square centimetres respectively. Finally, the pressure drop across the membrane was expressed in cmHg (0°C). The unit is named after the New Zealand chemist R.M. Barrer (1910–1996), leader in the diffusion of gases. 1 barrers = 10^{-10} cm^3(STP).cm.$(cm^2.s.cmHg)^{-1}$ (E)	US
barril (Spanish)	–	mass	M	1 barril (Spanish) = 23.004650 kg	Obsolete Spanish unit of mass. 1 barril (Spanish) = 50 libra (E)	Spanish
barrile (Cuban)	–	capacity, volume	L^3	1 barrile (Cuban) = $22.7116666667 \times10^{-3}$ m^3	Obsolete Cuban traditional unit of capacity used before 1882. 1 barrile (Cuban) = 1/6 bocoy (Cuban) (E)	Cuban
baryd (Saudi Arabian)	–	length, distance	L	1 baryd (Saudi Arabian) = 19.320×10^3 m	Obsolete Saudi Arabian traditional unit of length used before 1962. 1 baryd (Saudi Arabian) = 4 farsakh (Saudi Arabian) (E)	Saudi Arabian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
barye (barrie, dynes per square centimetre, microbar)	–	pressure, stress	$ML^{-1}T^{-2}$	1 barye = 10^{-1} Pa (E)	Obsolete cgs derived unit of pressure and stress with a special name. 1 barye = 1 $dyn.cm^{-2}$ (E) 1 atm = 1 013 250 barye (E)	cgs
base box (basis box)	–	surface mass density	ML^{-2}	1 base box = $2.24193105752 \times 10^{-2}$ $kg.m^{-2}$	Obsolete American and British unit of surface mass density used in metallurgy. It serves to describe the amount of tin coating obtained by dip coating. It corresponds to the mass of coating, area of 31 360 square inches which corresponds to 112 sheets 14 inches high long by 10 inches wide.	UK, US
basis point	–	dimensionless fluctuations of interest rates	nil	1 basis point = 10^{-4} (E)	Anglo-Saxon unit used in finance to measure small dimensionless fluctuations of interest rates and the rates return of investments. 1 basis point = 0.01% (E)	UK, US
Bates degree	°Bates	specific gravity of liquids, hydrometer index, hydrometer degree	nil	°Bates = $1000 \times \{[d(60°F) - 1]/2.78\}$	American Hydrometer scale introduced in 1918. The Bates saccharometer was used to determine the specific gravity of malt worts. °Balling = 260 °Bates/ (360 + °Bates)	US
bath (Hebrew, new)	–	capacity, volume	L^3	1 bath (Hebrew, new) = 21.420×10^{-3} m^3 (of water)	Obsolete Hebrew unit of capacity used in ancient times. Measured by weight.	Hebrew
bath (Hebrew, obsolete)	–	capacity, volume	L^3	1 bath (Hebrew, obsolete) = 29.376×10^{-3} m^3 (of water)	Obsolete Hebrew unit of capacity used in ancient times. Measured by weight.	Hebrew
batman (Turkish)	–	mass	M	1 batman (Turkish) = 7.698 kg	Obsolete Turkish traditional unit of mass used before 1933. 1 batman (Turkish) = 6 oka (Turkish) (E)	Turkish

batman (Turkmenian)	–	mass	M	1 batman (Turkmenian) = 128 kg	Obsolete Turkmenian traditional unit of mass used before 1920. 1 batman (Turkmenian) = 256 mimtscha (Turkmenian) (E)	Turkmenian
batman shirez (Persian)	–	mass	M	1 batman shirez (Persian) = 5.888 kg	Obsolete Persian traditional unit of mass used before 1933. 1 batman shirez (Persian) = 640 dirhem (Persian) (E)	Persian
batman tauris (Persian)	–	mass	M	1 batman tauris (Persian) = 2.944 kg	Obsolete Persian traditional unit of mass used before 1933. 1 batman tauris (Persian) = 320 dirhem (Persian) (E)	Persian
baud	bd	rate of data transmission, quantity of information sent per time unit, telegraph signalling speed	T^{-1}	1 baud = 1 bit.s^{-1} (E)	Unit of rate of data transmission employed in computer science and telecommunications. It corresponds to one impulse per second. In computer science, it is equal to one bit per second. It was introduced in 1927 in Berlin. The unit is named after J.M.E. Baudot (1845–1903).	
Baumé degree (American)	°Bé (US)	specific gravity of liquids, hydrometer index, hydrometer degree	nil	• liquids lighter than water $°Bé\ (US) = 140/d_{60°F}^{60°F} - 130$ • liquids heavier than water $°Bé\ (US) = 145 - 145/d_{60°F}^{60°F}$		US
Baumé degree (Gerlach)	°Bé (Gerlach)	specific gravity of liquids, hydrometer index, hydrometer degree	nil	• liquids lighter than water $°Bé\ (Gerlach) = 146.3/d_{15°C}^{15°C} - 146.3$ • liquids heavier than water $°Bé\ (Gerlach) = 146.3 - 146.3/d_{15°C}^{15°C}$		
Baumé degree (Holland)	°Bé (Holl.)	specific gravity of liquids, hydrometer index, hydrometer degree	nil	• liquids lighter than water $°Bé\ (Holl.) = 144/d_{60°F}^{60°F} - 144$ • liquids heavier than water $°Bé\ (Holl.) = 144 - 144/d_{60°F}^{60°F}$		Dutch

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
Baumé degree (NIST)	°Bé (NIST)	specific gravity of liquids, hydrometer index, hydrometer degree	nil	• liquids lighter than water $°Bé\,(NIST) = 145/d^{60°F}_{60°F} - 145$ • liquids heavier than water $°Bé\,(NIST) = 145 - 145/d^{60°F}_{60°F}$		US
Baumé degree (old)	°Bé (old)	specific gravity of liquids, hydrometer index, hydrometer degree	nil	• liquids lighter than water $°Bé\,(old) = 146.78/d^{17.5°C}_{17.5°C} - 146.78$ • liquids heavier than water $°Bé\,(old) = 146.78 - 146.78/d^{17.5°C}_{17.5°C}$		
Baumé degree (rational)	°Bé (Rat.)	specific gravity of liquids, hydrometer index, hydrometer degree	nil	• liquids lighter than water $°Bé\,(Rat) = 144.30/d^{15°C}_{15°C} - 144.30$ • liquids heavier than water $°Bé\,(Rat) = 144.30 - 144.30/d^{15°C}_{15°C}$	The rational Baumé index was an old specific gravity index. It is now obsolete. The rational Baumé scale was used for liquids heavier and lighter than water. For liquids heavier than water the zero index corresponded to the graduation when the hydrometer was immersed in pure water at 15°C and the 10°Bé index was equal to the graduation when the hydrometer was immersed in a aqueous sodium chloride solution containing 10% wt of pure salt. This range was divided into ten equal parts and the graduation was continued to the 67°Bé index. For liquids lighter than water, the zero graduation was equal to the depth of the hydrometer in an aqueous sodium chloride solution containing 10% wt of pure salt measured at 12.5°C and the 10°Bé index was measured in pure water.	INT
bazar (Indian)	–	mass	M	1 bazar (Indian) = 37.3216 kg	Obsolete Indian traditional unit of mass used before 1920. 1 bazar (Indian) = 40 seer (Indian) (E)	Indian

bboe (barrel oil equivalent)	bboe	energy, work, heat	ML^2T^{-2}	1 bboe = 6.12×10^9 J	American large unit of energy employed in oil industry and economics to express energy balances, assuming that 1 bbl of crude oil weighs 137 kg and that the heating value of oil is 44.67 $MJ.kg^{-1}$ 1 bboe = 6.12 GJ	US
Beaufort wind index	–	wind speed dimension less index	nil	Beaufort force = 0.385870453232 $V_{(m/s)^{2/3}}$ (see note)	International dimensionless index used in marine navigation for estimating wind velocity based on the empirical Beaufort scale. It was first devised by the British admiral Sir Francis Beaufort (1774–1857) for estimating wind speed by observing the effects of the wind. Using the scale, sailors can judge the wind velocity by observing the wind's effects on the waves. There is a corresponding scale for observers on land. For example, a moderate gale (i.e., 32–38 miles per hour) is described as force 7 on the Beaufort scale. The equivalence between the Beaufort scale numbers and the wind velocity, denoted V, expressed in miles per hour is given by the following empirical equation: Beaufort force $= 0.66 \times V^{2/3}_{(mi/h)}$	INT
becher (Austrian, dry)	–	capacity, volume	L^3	1 becher (Austrian, dry) = $4.80382813 \times 10^{-4}$ m^3	Obsolete Austrian unit of capacity used for dry substances. 1 becher (Austrian, dry) = 1/128 metzel (E)	Austrian
bècherée (Lyonnais)	–	surface area	L^2	1 bècherée (Lyonnais) = 1367 m^2	Obsolete local French unit of surface area used for land measurements in south-eastern France before the revolution of 1789.	French

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
Beck degree	% Beck, °Beck	specific gravity unit to express amount of sugar in syrups, juice	nil	$^{\circ}\text{Beck} = 170/d_{12.5^{\circ}\text{C}}^{12.5^{\circ}\text{C}}) - 170$	Hydrometer unit introduced in 1830. The Beck hydrometer has 0°Beck corresponding to sp. gr. 1000 and 30°Beck to sp. gr. 0.850; equal divisions on the scale are continued as far as required in both directions.	UK, US
becquerel	Bq	radioactivity	T^{-1}	**SI derived unit** 1 Bq = 1 s^{-1} (E)	The becquerel is the SI derived unit, with a special name, for radioactivity. It describes a radioactivity of an amount of radionuclide decaying at the rate, on average, of one spontaneous nuclear transitions per second. This excepted the nature of the emitted particles (15th CGPM, May 1975). The unit is named after the French scientist A.H. Becquerel (1852–1908). 1 Bq = 2.702702 × 10^{-11} Ci	SI
becquerel per cubic metre	$Bq.m^{-3}$	radioactivity concentration	$L^{-3}T^{-1}$	**SI derived unit** 1 $Bq.m^{-3}$ = 1 $s^{-1}.m^{-3}$ (E)	The $Bq.m^{-3}$ is the SI derived unit. The becquerel per cubic metre is the ratio of one becquerel of radioactivity of the contained radionucleide to a volume of one cubic metre of the material.	SI
becquerel per kilogram	$Bq.kg^{-1}$	specific radioactivity	$M^{-1}T^{-1}$	**SI derived unit** 1 $Bq.kg^{-1}$ = 1 $s^{-1}.kg^{-1}$ (E)	According to the IAEA a material is considered as radioactive when its specific radioactivity is greater than 74 k Bq. kg (i.e., 2nCi. g^{-1})	SI
bekah (Hebrew) [sacred system]	–	mass	M	1 bekah (Hebrew) = 7.083333 × 10^{-3} kg	Obsolete Hebrew unit of mass used in ancient times. Sacred system. 1 bekah (Hebrew) = 1/120 mina (E)	Hebrew
bel	B	logarithm (Briggsian) of a ratio of two sound powers	nil	1 B = 10 dB (E) (see note)	The bel expresses the ratio of two sound pressure (P, P_0) or intensity levels (I, I_0) as a Briggs logarithm difference according to	

					the equation S (B) = $\log_{10}$ (I/I_0), where I_0 is the threshold sound intensity level (SIL) of hearing defined as 10^{-12} W.m^{-2}, or for sound pressure level (SPL), S(B) = 2 $\log_{10}$ (P/P_0) where P_0 is the threshold sound pressure level detected by the human ear defined as 2×10^{-4} barye (2×10^{-5} Pa) @ 1000 Hz. The unit is named after A.G. Bell (1847–1922). 1 B = 10 dB (E) 1 $B = 1/2\ \ln_{10} N_P(E) \approx 1.151293 N_P$	
bell	–	time, period, duration	T	1 bell = 1800 s (E)	Obsolete British and American unit of time used in marine navigation and in the Navy. 1 bell = 1/8 watch (E) 1 bell = 0.5 h (E) 1 bell = 30 min (E)	UK, US
bema (Greek, Attic) [Greek pace]	–	length, distance	L	1 bema (Greek, Attic) = 7.714×10^{-1} m	Obsolete Greek base unit of length employed in ancient times. 1 bema (Attic) = 5/2 pous (E)	Attic
benda (Guinean)	–	mass	M	1 benda (Guinean) = 64.2 $\times 10^{-3}$ kg	Obsolete Guinean traditional unit of mass used before 1906. 1 benda (Guinean) = 2 offa (Guinean) (E)	Guinean
benz	Bz, m.s^{-1}	velocity, speed	LT^{-1}	1 Bz = 1 m.s^{-1} (E)	Name proposed and refuted for the SI derived unit of velocity. The unit was named after the German Karl Benz (1844–1929). Anecdotal.	
berkovets (Russian)	–	mass	M	1 berkovets = 163.80687168 kg	Obsolete Russian unit of mass used before 1917 for general purposes. 1 berkovets = 400 funts (E)	Russian
berri (Abyssinian)	–	length, distance	L	1 berri (Abyssinian) = 0.8232 m	Obsolete Abyssinian traditional unit of length used before 1927. 1 berri (Abyssinian) = 6/5 pic (Abyssinian) (E)	Abyssinian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
bes (Roman)	–	mass	M	1 bes (Roman) = 218×10^{-3} kg	Obsolete Roman unit of mass used in ancient times. 1 bes (Roman) = 8 unciae (Roman) (E)	Roman
BeV (billion eV)	BeV	energy, work, heat	ML^2T^{-2}	1 BeV = $1.602176462 \times 10^{-10}$ J	Obsolete American unit of energy employed in nuclear physics. The name of the unit derived from the English acronym: **B**illion **e**lectron **V**olt 1 BeV = 1 GeV (E)	US
bicron (micromicron)	μμ	length, distance	L	1 μμ = 10^{-12} m (E)	Obsolete unit of length used in atomic spectroscopy. The unit is named after the acronym of dou**b**le mi**cron**. 1 μμ = 1 pm (E)	
biennium	–	time, period, duration	T	1 biennium = 6.3072×10^7 s (E)	1 biennium = 2 years (E)	INT
biggah (Indian, Bombay)	–	surface area	L^2	1 biggah (Indian, Bombay) = 752.514624 m^2	Obsolete Indian traditional unit of surface used in land measurements before 1920. 1 biggah (Indian, Bombay) = 1600 square guz (Indian, Bombay) (E)	Indian
biggah (Indian, Calcutta)	–	surface area	L^2	1 biggah (Indian, Calcutta) = 1339.56 m^2	Obsolete Indian traditional unit of surface used in land measurements before 1920. 1 biggah (Indian, Calcutta) = 1600 square guz (Indian, Calcutta)	Indian
bigha (Bangladesh)	–	surface area	L^2	1 bigha (Bangladesh) = 1337.80377600 m^2	Obsolete traditional unit of land surface area formerly used in British colonies (e.g., Bangladesh and India). Originally, the value for the bigha varied with location and hence it was standardized under British colonial rule in Bangladesh at 1600 square yards. 1 bigha (Bangladesh) = 1600 square yards (E) 1 bigha (Bangladesh) = 20 khattas (Bangladesh) (E)	Bangladesh

					1 bigha (Bangladesh) = 400 dhurs (Bangladesh) (E)	
bigha (India)	–	surface area	L^2	1 bigha (India) = 2529.285264 m^2	Obsolete traditional unit of land surface area formerly used in British colonies (e.g., Bangladesh and India). Originally, the value for the bigha varied with location and hence it was standardized under British colonial rule in central India at 3025 square yards or 5/8 acre. The bigha was divided into 20 katthas, and each kattha contained 20 dhurs. 1 bigha (India) = 3025 square yards (E) 1 bigha (India) = 5/8 acre (E) 1 bigha (India) = 20 khattas (India) (E) 1 bigha (India) = 400 dhurs (India) (E)	India
billet (wood)	–	length, distance	L	1 billet (wood) = 1.016 m (E)	Obsolete British and American unit of length for measuring stick of firewood. 1 billet (wood) = 40 in (E) 1 billet (wood) = 10/3 feet (E)	UK, US
billion cubic microns per square inch	bcm, bcmsi	length, distance	L	1 bcm = 1.55000310001 $\times 10^{-6}$ m	Obsolete American unit of volume surface density used in printing when using the flexographic process. Actually, a roller is engraved with numerous tiny cells used to transfer ink to the printing plate. It measures the total volume of these cells per unit surface area of the roller. 1 bcm = 1 $mm^3.in^{-2}$ (E) 1 bcm = 1 $\mu l.in^{-2}$ (E) 1 bcm = 1.55000310001 μm	US
binh (Annamese)	–	mass	M	1 binh (Annamese) = 30.2 kg	Obsolete Annameseian traditional unit of mass used before 1914. 1 binh (Annamese) = 8000 dong (Annamese) (E)	Annamese

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
biot	–	optical rotatory power		(see note)	Obsolete unit used in spectroscopy. It serves to express rotatory power of matter which has circular dichroism. $R = \frac{3 \times 10^3 hc}{8\pi^3 N \log_{10} e} \int \frac{\Delta\varepsilon d\lambda}{\lambda}$ The unit is named after J.B. Biot (1774–1862). 1 biot = 10^{-40} cgs	
biot (deca-ampere)	Bi	electric current intensity	I	1 Bi = 10 A (E)	Obsolete cgs unit of electric current in the emu subsystem. The biot is that constant current which, if maintained in two straight parallel conductors of infinite length, of negligible circular cross-section, and placed one centimetre apart in vacuo, would produce between these conductors a force equal to 2 dynes per centimetre of length (1961). The unit is named after J.B. Biot (1774–1862). 1 Bi = 1 abampere (E)	cgs
bismerpund (Danish)	–	mass	M	1 bismerpund (Danish) = 6 kg (E)	Obsolete Danish traditional unit of mass used before 1912. 1 bismerpund (Danish) = 12 pund (Danish) (E)	Danish
bisquare foot	ft^4	quadratic moment of a plane area	L^4	1 $ft^4 = 8.63097484124 \times 10^{-3}$ m^4	American and British unit of quadratic moment.	UK, US
bisquare inch	in^4	quadratic moment of a plane area	L^4	1 $in^4 = 4.162314256 \times 10^{-7}$ m (E)	American and British unit of quadratic moment.	UK, US
bisquare metre	m^4	quadratic moment of a plane area	L^4	**SI derived unit**		SI

bit	bit	quantity of information	nil	1 bit = 0 or 1	A bit is the information described by a symbol with two values. The name is a contraction of **bi**nary digi**t**.	
blanc (jeweller's)	–	mass	M	1 blanc (jeweller's) = 217.013888889 $\times 10^{-12}$ kg	Obsolete British and American unit of mass for weighing precious stones (i.e., diamond, emerald, ruby, and sapphire) and other gemstones. 1 blanc (jeweller's) = 1/9216 points (jeweller's) (E) 1 blanc (jeweller's) = 1/230400 grain (jeweller's) (E) 1 blanc (jeweller's) = 1/921600 carat (E) 1 blanc (jeweller's) = 217.013888889 ng	UK, US
blink	–	time, period, duration	T	1 blink = 0.86400 s (E)	Anecdotal unit 1 blink = 10^{-5} days (E)	
block (Eastern US)	–	length, distance	L	1 block (Eastern US) = 80.46720 m (E)	American informal unit of distance. A block is the average distance in US cities between street intersections in the rectangular street grids. 1 block (Eastern US) = 1/20 statute miles (E) 1 block (Eastern US) = 264 feet (E)	US
block (Midwestern US)	–	length, distance	L	1 block (Midwestern US) = 100.584 m (E)	American informal unit of distance. A block is the average distance in US cities between street intersections in the rectangular street grids. 1 block (Midwestern US) = 1/16 statute miles (E) 1 block (Midwestern US) = 330 feet (E)	US
block (UK)	–	mass	M	1 block (UK) = 2.26796185 kg	Obsolete British unit of mass. 1 block (UK) = 5 lb (E)	UK

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
block (Western US)	–	length, distance	L	1 block (Western US) = 160.9344 m (E)	American informal unit of distance. A block is the average distance in US cities between street intersections in the rectangular street grids. 1 block (Western US) = 1/10 statute miles (E) 1 block (Western US) = 528 feet (E)	US
blondel	–	luminous luminance	JL^{-2}	1 blondel = 0.3183098862 $cd.m^{-2}$	Obsolete French unit of luminous luminance adopted in 1942. The unit is named after A.E. Blondel (1863–1938). 1 blondel = $1/\pi$ $cd.m^{-2}$ (E) 1 blondel = 10^{-4} lambert (E)	French
blood unit	–	capacity, volume	L^3	1 blood unit = 450 $\times 10^{-9}$ m^3 (E)	International unit of capacity used in medicine for blood components. The human body usually contains about 12 blood units of whole blood (i.e., 5.4 dm^3). 1 blood unit = 450 ml (E)	INT
board foot measure	fbm, B.M.	capacity, volume	L^3	1 board foot = $2.359737216 \times 10^{-3}$ m^3	Obsolete British and American unit of capacity which is equal to the product of one foot of length per one foot width per one inch thickness. 1 board foot = 1/12 ft^3 (E) 1 board foot = 144 in^3 (E)	UK, US
board of trade unit	BTU	energy, work, heat	ML^2T^{-2}	1 board of trade unit = 3.6×10^6 J (E)	Obsolete British and American unit of energy used in electrical engineering. It was equal to the energy dissipated by one kilowatt in an hour. 1 board of trade unit = 1 kWh (E) 1 board of trade unit = 3.6 MJ (E)	UK, US
bocoy (Cuban)	–	capacity, volume	L^3	1 bocoy (Cuban) = 136.27 $\times 10^{-3}$ m^3	Obsolete Cuban traditional unit of capacity used before 1882. 1 bocoy (Cuban) = 6 barrile (Cuban) (E)	Cuban

bohr (a.u. of length, 1st Bohr radius)	a_0, b	length, distance	L	1 bohr = 5.29177249083 × 10^{-11} m	Fundamental physical constant. Base unit of a.u. system. The unit is named after N. Bohr (1885–1962). 1 bohr = $4\pi\varepsilon_0\hbar^2/m_0e^2$	a.u.
boisseau (metric)	–	volume, capacity	L^3	1 boisseau (metric) = 12.5 dm^3 (E)	Obsolete French unit of volume used for measuring dry substance (e.g., wheat flour) introduced in 1812. 1 boisseau (metric) = 4 picotins (E)	French
boisseau (de Paris, dry)	–	capacity, volume	L^3	1 boisseau (de Paris) = 12.64 × 10^{-3} m^3	Obsolete French unit of volume employed before the French Revolution. It was used for capacity measurements of dry substances, such as wheat, salt, coal and charcoal. Named after the Latin *bastia* and Gallic *basta* meaning 'hold in hand'. 1 boisseau (de Paris) = 1/144 muid (de Paris, dry) (E)	French
boisselée (Nantes)	–	surface area	L^2	1 boisselée (Nantes) = 356.13333 m^2	Obsolete local French unit of surface area. It corresponds to the surface that a farmer can sow using one boisseau of seeds. 1 boisselée (Nantes) = 60 square gaules (Nantes) (E) 1 boisselée (Nantes) = 2/15 journal (Nantes) (E)	French
boisselée (Versailles)	–	surface area	L^2	1 boisselée (Versailles) = 625 m^2 (E)	Obsolete local French unit of surface area used for land measurements after 1789. 1 boisselée (Versailles) = 6.25 ares (E) 1 boisselée (Versailles) = 12.5 perches (E) 1 boisselée (Versailles) = 1/2 minotée (Versailles) (E)	French
bokard (Saudi Arabian)	–	mass	M	1 bokard (Saudi Arabian) = 202.50 kg	Obsolete Saudi Arabian traditional unit of mass used before 1962. 1 bokard (Saudi Arabian) = 3 kantar (Saudi Arabian) (E)	Saudi Arabian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
bole	$g.cm.s^{-1}$	linear momentum, momentum	MLT^{-1}	1 bole = 10^{-5} $kg.m.s^{-1}$ (E)	Name suggested for the cgs linear momentum unit. Anecdotal. 1 bole = 1 $g.cm.s^{-1}$ (E)	cgs
boll (Scotland, corn) [bow]	–	volume, capacity	L^3	1 boll (Scotland, dry) = 145.474944 $\times 10^{-3}$ m^3	Obsolete Scottish unit of dry capacity for corn 'from Warrack, A' *Chambers' Scots Dictionary* (1911)'. 1 boll (Scotland) = 4 firlots (Scotland) (E) 1 boll (Scotland) = 16 pecks (UK, dry) (E)	UK
boll (Scottish, dry)	–	capacity, volume	L^3	1 boll (Scottish, dry) = 144.031018260 $\times 10^{-3}$ m^3 (wheat, peas, beans, rice, salt) 1 boll (Scottish, dry) = 210.116245573 $\times 10^{-3}$ m^3 (oats, barley, malt)	Obsolete traditional Scottish unit of volume used before the Weights and Measures Act of 1824 to measure the capacity of dry substances (wheat, peas, beans, salt, rice, barley, malt). 1 boll (Scottish, dry) = 256 lippies (Scottish, dry) (E)	Scottish
bolt (UK, cotton)	–	surface, area	L^2	1 bolt (UK, cotton) = 97.54819200 m^2 (E)	Obsolete British unit of surface area used to measured finished clothes. 1 bolt (UK, cotton) = 100 yards per 42 inches (E) 1 bolt (UK, cotton) = 1050 square feet (E)	UK
bolt (UK, wool)	–	surface, area	L^2	1 bolt (UK, wool) = 139.35456 m^2 (E)	Obsolete British unit of surface area used to measured finished clothes. 1 bolt (UK, wool) = 100 yards per 60 inches (E) 1 bolt (UK, wool) = 1500 square feet (E)	UK
bolt (US, UK cloth)	–	length, distance	L	1 bolt (US, UK) = 36.576 m (E)	Obsolete American and British unit of length. 1 bolt (US) = 120 feet (E)	US, UK
bone-dry ton	bdt	capacity, volume	L^3	1 bdt = $185.8060800/[D(lb/ft^3)]$ m^3 (E)	American unit of volume used in forestry to measure bulk wood products such as wood chips. One bone-dry ton is defined as the volume of wood chips that weigh	US

					2000 pounds (i.e., short ton) if all the moisture content were removed. 1 bdt = $2000/[D(\mathrm{lb/ft^3})]\mathrm{ft^3}$ (E)	
bone-dry unit	bdu	capacity, volume	L^3	1 bdu = $222.96729000/[D(\mathrm{lb/ft^3})]$ m^3 (E)	American unit of volume used in forestry to measure bulk wood products such as wood chips. One bone-dry unit is defined as the volume of wood chips that weigh 2400 pounds if all the moisture content were removed. 1 bdu = $2400/[D(\mathrm{lb/ft^3})]\mathrm{ft^3}$ (E)	US
bota (Portuguese)	–	capacity, volume	L^3	1 bota (Portuguese) = 429×10^{-3} m^3	Obsolete Portuguese unit of capacity for measuring liquids. 1 bota (Portuguese) = 26 almude (E) 1 bota (Portuguese) = 1 pipa (E)	Portuguese
bota (Spanish)	–	capacity, volume	L^3	1 bota (Spanish) = $469.2948600 \times 10^{-3}$ m^3 (water)	Obsolete Spanish unit of capacity used for liquid substances. 1 bota (Spanish) = 30 arroba (water) (E)	Spanish
botchka (Russian)	–	capacity, volume	L^3	1 botchka (Russian) = $491.976400 \times 10^{-3}$ m^3	Obsolete Russian unit of capacity for liquid substances, used before 1917. 1 botchka (Russian) = 40 vedro (E)	Russian
botella (Costa-Rican)	–	capacity, volume	L^3	1 botella (Costa-Rican) = 0.63×10^{-3} m^3 to 0.67×10^{-3} m^3	Obsolete Costa-Rican traditional unit of capacity used before 1912. 1 botella (Costa-Rican) = 32/25 cuartillo (Costa-Rican) (E)	Costa-Rican
botella (Guatemalan)	–	capacity, volume	L^3	1 botella (Guatemalan) = 0.63×10^{-3} m^3 to 0.67×10^{-3} m^3	Obsolete Guatemalan traditional unit of capacity used before 1912. 1 botella (Guatemalan) = 32/25 cuartillo (Guatemalan) (E)	Guatemalan
botella (Honduran)	–	capacity, volume	L^3	1 botella (Honduran) = 0.63×10^{-3} m^3 to 0.67×10^{-3} m^3	Obsolete Honduran traditional unit of capacity used before 1912. 1 botella (Honduran) = 32/25 cuartillo (Honduran) (E)	Honduran

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
botella (Nicaraguan)	–	capacity, volume	L^3	1 botella (Nicaraguan) = 0.63 $\times 10^{-3}$ m^3 to 0.67 $\times 10^{-3}$ m^3	Obsolete Nicaraguan traditional unit of capacity used before 1912. 1 botella (Nicaraguan) = 32/25 cuartillo (Nicaraguan) (E)	Nicaraguan
botella (Salvadoran)	–	capacity, volume	L^3	1 botella (Salvadoran) = 0.63 $\times 10^{-3}$ m^3 to 0.67 $\times 10^{-3}$ m^3	Obsolete Salvadoran traditional unit of capacity used before 1912. 1 botella (Salvadoran) = 32/25 cuartillo (Salvadoran) (E)	Salvadoran
bottle (US, new)	–	capacity, volume	L^3	1 bottle (US, new) = 750 $\times$ 10^{-6} m^3 (E)	American unit of capacity since 1979 for measuring liquids such as wine and alcoholic beverages. 1 bottle (US, liq.) = 750 ml (E)	US
bottle (US, old)	–	capacity, volume	L^3	1 bottle (US, old) = 757.0823568 $\times 10^{-6}$ m^3 (E)	Obsolete American unit of capacity for measuring liquids such as wine and alcoholic beverages used before 1979. 1 bottle (US, liq.) = 1/5 gallon (US, liq.) (E) 1 bottle (US, liq.) = 1 fifth (US, liq.) (E)	US
bottle (vodka) (Russian)	–	capacity, volume	L^3	1 bottle (vodka) (Russian) = 6.149705 $\times$ 10^{-4} m^3	Obsolete Russian unit of capacity for liquid substances, used before 1917. 1 bottle (vodka) (Russian) = 5 tcharka (E)	Russian
bottle (wine) (Russian)	–	capacity, volume	L^3	1 bottle (wine) (Russian) = 7.68713125 $\times$ 10^{-4} m^3	Obsolete Russian unit of capacity for liquid substances, used before 1917. 1 bottle (wine) (Russian) = 25/4 tcharka (E)	Russian
bourgeois	–	length, distance	L	1 bourgeois = 3.175 $\times 10^{-3}$ m (E)	Obsolete French traditional typographical unit of length used in printing. 1 bourgeois = 9 points (E)	French
bougie décimale	bd	luminous intensity	J	1 bougie décimale = 1.019 cd (E)	Obsolete unit of luminous intensity. It was equal to 1/20 of the Violle intensity. It was used during the period 1889–1919.	

bougie internationale	bi	luminous intensity	J	1 bougie internationale = 1 cd (E)	Precursor of the SI candela.	INT
bougie nouvelle	bn	luminous intensity	J	1 bougie nouvelle = 1 cd (E)	Obsolete unit of luminous intensity. It was equal to 1/60 of the intensity of one square centimetre of a blackbody radiator at the temperature of solidification of platinum (2046 K) [1948]. It was a precursor of the SI candela.	INT
bouteille champenoise (reputed quart)	–	capacity, volume	L^3	1 bouteille champenoise $= 0.757682 \times 10^{-3}$ m^3	Obsolete British unit employed for expressed the capacity of wine containers. Still employed in oenology, especially in France. 1 bout. champ. = 1/6 gallon (UK) (E)	UK, French
bovate (UK)	–	surface area	L^2	1 bovate (UK) $= 60.70284634 \times 10^3$ m^2 (E)	Obsolete British unit of land surface area equal to 1/8 hide. It was named after the Latin, *bovis*, ox, indicating that the bovate was an area that could be farmed with the help of one ox. 1 bovate (UK) = 1/8 hide (UK) (E) 1 bovate (UK) = 15 acres (E) 1 bovate (UK) = 72 600 square yards (E)	UK
box (UK)	–	mass	M	1 box (UK) = 40.82331330 kg	Obsolete British unit of mass. 1 box (UK) = 90 lb (E)	UK
bozze (Libyan)	–	capacity, volume	L^3	1 bozze (Libyan) $= 2.6040625 \times 10^{-3}$ m^3	Obsolete Libyan traditional unit of capacity used for liquids before 1927. 1 bozze (Libyan) = 1/24 barrile (Libyan) (E)	Libyan
braca (Brazilian)	–	length, distance	L	1 braca (Brazilian) = 2.2222222222 m	Obsolete Brazilian traditional unit of length used before 1874. 1 braca (Brazilian) = 20/3 pe (Brazilian) (E) 1 braca (Brazilian) = 20/9 m (E)	Brazilian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
brasse (French fathom)	–	length, distance	L	1 brasse = 1.6241970835 m (E)	Obsolete French unit of length used in navigation. It expressed the depth of sea water. 1 brasse = 5 pieds (E) = 5/6 toises (E)	French
braza (Argentinian)	–	length, distance	L	1 braza (Argentinian) = 1.732 m	Obsolete Argentinian traditional unit of length used before 1887. 1 braza (Argentinian) = 2 vara (Argentinian) (E)	Argentinian
breakfast cup	–	capacity, volume	L^3	1 breakfast cup (UK) = 284.130750 $\times 10^{-6}$ m^3 (E)	Obsolete British unit of capacity used in food recipes. 1 breakfast cup (UK) = 1/2 pint (UK) (E) 1 breakfast cup (UK) = 1 tumblerful (UK) (E)	UK
brevier	–	length, distance	L	1 brevier = 2.822222222 $\times 10^{-3}$ m	Obsolete French traditional typographical unit of length used in printing. 1 brevier = 8 points (E)	French
brewster	B	photoelastic work, stress optical coefficient	$M^{-1}LT^2$	1 brewster = 10^{-12} $m^2.N^{-1}$ (E)	CGS unit of stress optical coefficients. Usually variation of birefringence in most solid materials when they are strained by putting them under stress ranges between 1 and 10 brewsters.The unit is named after Sir David Brewster (1781–1868). 1 brewster = 10^{-13} $cm^2.dyn^{-1}$ (E)	
brick (UK)	–	mass	M	1 brick (UK) = 3.175146590 kg	Obsolete British unit of mass. 1 brick (UK) = 7 lb (E)	UK
brig	brig	logarithm in base ten of the ratio of two quantities	nil	1 brig = $\log_{10}(Q_1/Q_2)$	Logarithm in base ten of the ratio of two quantities. It was named after H. Briggs (1561–1630). 1 brig = $l/\ln_{10}$ Neper 1 brig ≅ 0.4342944810904 Np	

brill	–	brilliance	nil	(see note)	Obsolete unit of brightness used to express the brilliance of a source of light on a logarithmic scale which corresponds to subjective perception of an observer. An increase of one brill means doubling the luminance. For instance a luminance of one lambert is defined to have a brilliance of one brill. brill $(x) = 2^{(x-100)}$ lamberts $x = \log_2[\text{bril/lambert}] + 100$	INT
brill	–	brilliance	JL^{-2}	(see note)	Obsolete unit of brilliance for expressing the subjective brightness of a source of light. Brilliance (/brill) = [ln[luminance(/lambert)]/ln2] + 100	
brilliant	–	length, distance	L	1 brilliant = 1.2347222222 $\times 10^{-3}$ m	Obsolete French traditional typographical unit of length used in printing. 1 brilliant = 3.5 points (E)	French
British thermal unit (39°F; 4°C)	Btu (39°F)	energy, work, heat	ML^2T^{-2}	1 Btu (39°F) = 1059.67 J	Obsolete British unit of energy.	UK
British thermal unit (60°F; 15.56°C)	Btu (60°F)	energy, work, heat	ML^2T^{-2}	1 Btu (60°F) = 1054.678 J	Obsolete British unit of energy. The Btu (60°F) is equal to the heat needed to raise the temperature of one pound of air-free water by 1°F (from 59.5 to 60.5°F) at the constant pressure of one standard atmosphere (101 325 Pa).	UK
British thermal unit (Gas Inspection Act Regulations – 60.5°F)	Btu (Gas Insp. Act)	energy, work, heat	ML^2T^{-2}	1 Btu (Gas Insp. Act) = 1054.615 J	Obsolete British unit of energy.	UK
British thermal unit (ISO/TC 12)	Btu (ISO)	energy, work, heat	ML^2T^{-2}	1 Btu (ISO) = 1055.06 J (E)	Obsolete British unit of energy.	UK

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
British thermal unit (IT, International Steam Table)	Btu (IT)	energy, work, heat	ML^2T^{-2}	1 Btu (IT) = 1055.05585262 J (E)	Obsolete British unit of energy. The 5th International Conference on the properties of steam (London, July 1956) defined the Btu (IT) as the unit of energy whose magnitude is such that one Btu (IT) per pound equals 2326 joules per kilogram.	UK
British thermal unit (IT) per (pound-Fahrenheit degree)	Btu (IT).(lb-°F)$^{-1}$	specific heat capacity	$L^2T^{-2}\Theta^{-1}$	1 Btu (IT).(lb-°F)$^{-1}$ = 4 186.800 585 J.kg^{-1}.K^{-1}	Obsolete British unit of specific heat capacity. 1 Btu (IT).(lb-°F)$^{-1}$ = 1 cal (IT).g^{-1}.°C^{-1} (E)	UK
British thermal unit (IT) per barrel (US, oil)	Btu (IT)bbl (US oil)$^{-1}$	energy density	$ML^{-1}T^{-2}$	1 Btu (IT)bbl (US, oil)$^{-1}$ = 6.63610166521 × 10^3 J.m^{-3}	Obsolete American energy density unit.	US
British thermal unit (IT) per cubic foot	Btu (IT).ft^{-3}	energy density	$ML^{-1}T^{-2}$	1 Btu (IT).ft^{-3} = 37.258945807 × 10^3 J.m^{-3}	Obsolete British and American energy density unit.	UK, US
British thermal unit (IT) per Fahrenheit degree	Btu (IT).°F^{-1}	entropy	$ML^2T^{-2}\Theta^{-1}$	1 Btu (IT).°F^{-1} = 1.89910053472 × 10^3 J.K^{-1}	Obsolete British and American entropy unit.	UK, US
British thermal unit (IT) per foot per hour per Fahrenheit degree	Btu (IT).h^{-1}.ft^{-1}.°F^{-1}	thermal conductivity	$MLT^{-3}\Theta^{-1}$	1 Btu (IT).h^{-1}.ft^{-1}.°F^{-1} = 1.73073466637 W.m^{-1}.K^{-1}	Obsolete British and American unit of thermal conductivity used in chemical engineering and heat transfer technology.	UK, US
British thermal unit (IT) per gallon (UK)	Btu (IT).gal (UK)$^{-1}$	energy density	$ML^{-1}T^{-2}$	1 Btu (IT).gal (UK)$^{-1}$ = 2.32079740714 × 10^5 J.m^{-3}	Obsolete British energy density unit.	UK
British thermal unit (IT) per gallon (US)	Btu (IT).gal (US)	energy density	$ML^{-1}T^{-2}$	1 Btu (IT).gal (US)$^{-1}$ = 2.78716269939 × 10^5 J.m^{-3}	Obsolete American energy density unit.	US
British thermal unit (IT) per hour	Btu (IT).h^{-1}	power	ML^2T^{-3}	1 Btu (IT).h^{-1} = 0.293071070172 W	Obsolete British and American power unit.	UK, US

British thermal unit (IT) per hour per square foot	Btu (IT).$h^{-1}.ft^{-2}$	energy flux, heat flux	MT^{-3}	1 Btu (IT).$h^{-1}.ft^{-2}$ = 3.15459074506 W.m^{-2}	Obsolete British and American unit.	UK, US
British thermal unit (IT) per minute	Btu (IT).min^{-1}	power	ML^2T^{-3}	1 Btu (IT).min^{-1} = 17.5842642103 W	Obsolete British and American unit.	UK, US
British thermal unit (IT) per pound	Btu (IT).lb^{-1}	specific heat	L^2T^{-2}	1 Btu (IT).lb^{-1} = 2326 J.kg^{-1} (E)	Obsolete British unit.	UK
British thermal unit (IT) per second	Btu (IT).s^{-1}	power	ML^2T^{-3}	1 Btu (IT).s^{-1} = 1055.05585262 W	Obsolete British and American unit.	UK, US
British thermal unit (IT) per square foot per hour per Fahrenheit degree	Btu (IT).$h^{-1}.ft^{-2}.°F^{-1}$	coefficient of heat transfer	$MT^{-3}\Theta^{-1}$	1 Btu (IT).$h^{-1}.ft^{-2}.°F^{-1}$ = 5.67826334111 W.$m^{-2}.K^{-1}$	Obsolete British and American unit.	UK, US
British thermal unit (IT)-inch per square foot per hour per Fahrenheit degree	Btu (IT).$in.h^{-1}.ft^{-2}.°F^{-1}$	thermal conductivity	$MLT^{-3}\Theta^{-1}$	1 Btu (IT).$in.h^{-1}.ft^{-2}.°F^{-1}$ = $1.44227888864 \times 10^{-1}$ W.$m^{-1}.K^{-1}$	Obsolete British and American unit of thermal conductivity used in chemical engineering and heat transfer technology.	UK, US
British thermal unit (IT)-inch per square foot per second per Fahrenheit degree	Btu (IT).$in.s^{-1}.ft^{-2}.°F^{-1}$	thermal conductivity	$MLT^{-3}\Theta^{-1}$	1 Btu (IT).$in.s^{-1}.ft^{-2}.°F^{-1}$ = 519.22039991 W.$m^{-1}.K^{-1}$	Obsolete British and American unit of thermal conductivity used in chemical engineering and heat transfer technology.	UK, US
British thermal unit (mean)	Btu (mean), B	energy, work, heat	ML^2T^{-2}	1 Btu (mean) = 1055.87 J	Obsolete British unit of energy. The Btu (mean) is equal to 1/180 of the heat needed to raise the temperature of one pound of air-free water from 32°F (0°C) to 212°F (100°C) at the constant pressure of one standard atmosphere (101 325 Pa).	UK, FPS
British thermal unit (thermochemical)	Btu (therm.)	energy, work, heat	ML^2T^{-2}	1 Btu (therm.) = 1054.35026449 J	Obsolete British unit of energy.	UK
British thermal unit (therm.) per hour	Btu (therm.).h^{-1}	power	ML^2T^{-3}	1 Btu (therm.).h^{-1} = 0.2928750073469 W	Obsolete British and American unit.	UK, US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
British thermal unit (therm.) per foot per hour per Fahrenheit degree	Btu (therm.). $ft^{-1}.h^{-1}.°F^{-1}$	thermal conductivity	$MLT^{-3}\Theta^{-1}$	1 Btu (therm.).$ft^{-1}.h^{-1}.°F^{-1}$ = 1.729 57720553 $W.m^{-1}.K^{-1}$	Obsolete British and American unit of thermal conductivity used in chemical engineering and heat transfer technology.	UK, US
British thermal unit (therm.) per hour per square foot	Btu (therm.). $h^{-1}.\ ft^{-2}$	energy flux, heat flux	MT^{-3}	1 Btu (therm.).$h^{-1}.ft^{-2}$ = 3.15248105411 $W.m^{-2}$	Obsolete British and American unit.	UK, US
British thermal unit (therm.) per minute	Btu (therm.) $.min^{-1}$	power	ML^2T^{-3}	1 Btu (therm.).min^{-1} = 17.5725044082 W	Obsolete British and American unit.	UK, US
British thermal unit (therm.) per pound	Btu (therm.). lb^{-1}	specific heat	L^2T^{-2}	1 Btu (therm.).lb^{-1} = 2324.4444444 $J.kg^{-1}$	Obsolete British unit.	UK
British thermal unit (therm.) per (pound-fahrenheit degree)	Btu (therm.). $(lb\text{-}°F)^{-1}$	specific heat capacity	$L^2T^{-2}\Theta^{-1}$	1 Btu (therm.).$(lb\text{-}°F)^{-1}$ = 4184 $J.kg^{-1}.K^{-1}$ (E)	Obsolete British unit. 1 Btu (therm.).$(lb\text{-}°F)^{-1}$ = 1 cal (therm.).$g^{-1}.°C^{-1}$ (E)	UK
British thermal unit (therm.) per second	Btu (therm.). s^{-1}	power	ML^2T^{-3}	1 Btu (therm.).s^{-1} = 1054.35026449 W	Obsolete British and American unit.	UK, US
British thermal unit (therm.) per square foot per hour per Fahrenheit degree	Btu (therm.). $h^{-1}.\ ft^{-2}.°F^{-1}$	coefficient of heat transfer	$MT^{-3}\Theta^{-1}$	1 Btu (therm.).$h^{-1}.ft^{-2}.°F^{-1}$ = 5.67446446589740 $W.m^{-2}.K^{-1}$	Obsolete British and American unit.	UK, US
British thermal unit (therm.)-inch per square foot per hour per Fahrenheit degree	Btu (therm.). in. $h^{-1}.ft^{-2}.°F^{-1}$	thermal conductivity	$MLT^{-3}\Theta^{-1}$	1 Btu (therm.).$in.h^{-1}.\ ft^{-2}.°F^{-1}$ = $1.44131433794 \times 10^{-1}$ $W.m^{-1}.K^{-1}$	Obsolete British and American unit of thermal conductivity used in chemical engineering and heat transfer technology.	UK, US

British thermal unit (therm.)-inch per square foot per second per Fahrenheit degree	Btu (therm.). in. s^{-1}. ft^{-2}. $°F^{-1}$	thermal conductivity	$MLT^{-3}\Theta^{-1}$	1 Btu (therm.).in.s^{-1}.ft^{-2}.$°F^{-1}$ = 518.873161658 W.m^{-1}.K^{-1}	Obsolete British and American unit of thermal conductivity used in chemical engineering and heat transfer technology.	UK, US
British thermal unit (UK gas industry)	Btu (UK Gas industry)	energy, work, heat	ML^2T^{-2}	1 Btu (UK Gas industry) = 1054.76 J	Obsolete British unit of energy.	UK
Brix degree (°Fischer)	% Brix, °Brix	specific gravity unit to express amount of sugar in syrups, juice	nil	$°\text{Brix} = 400 - 400/d_{60°F}^{60°F}$	Saccharometer scale introduced in 1892,common in the sugar industry, representing the percentage of sugar by weight in 60°F water solution. For instance, 14°Brix corresponds to an aqueous solution which contains 10 g.l^{-1} of sugar and has the specific gravity 1.0386.	
bu (Japanese)	–	length, distance	L	1 bu (Japanese) = $3.030303030 \times 10^{-3}$ m	Obsolete Japanese unit of length. 1 bu = 1/100 shaku (E)	Japanese
Bubnoff unit	B, Bu	velocity, speed, distance rate	LT^{-1}	1 B = $31.688087814 \times 10^{-15}$m.$s^{-1}$	Obsolete unit of standard geological distance rate used in tectonophysics and plate tectonics. Proposed in 1969 by Fischer. 1 B = 1m.Ma^{-1}(E 1 B = 1μm.yr^{-1}(E)	INT
bucket (UK)	bk (UK)	capacity, volume	L^3	1 bucket (UK) = $18.18436800 \times 10^{-3}$ m^3	Obsolete British unit used for capacity measurements for all merchandise (solids, liquids, foodstuffs, etc). 1 bucket (UK) = 4 gallons (UK) (E) 1 bucket (UK) = 2 pecks (UK) (E)	UK
buhar (Saudi Arabian)	–	mass	M	1 buhar (Saudi Arabian) = 67.50 kg	Obsolete Saudi Arabian traditional unit of mass used before 1962. 1 buhar (Saudi Arabian) = 50 maund (Saudi Arabian) (E)	Saudi Arabian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
bundle (cotton)	bdl	length, distance	L	1 bundle (cotton) = 15 361.192 m (E)	Obsolete unit of length used to measure length of cotton yarns. 1 bundle (cotton) = 16800 yards (E) 1 bundle (cotton) = 20 hanks (E)	UK
bundle (paper)	bdl	number of sheets of paper	nil	1 bundle (paper) = 1000 sheets of paper (E)	British and American unit used in the printing and paper industry. 1 bundle (paper) = 1/5 bale (paper) (E) 1 bundle (paper) = 2 reams (paper) (E) 1 bundle (paper) = 40 quires (paper) (E)	UK, US
bundle (paper, old)	bdl	number of sheets of paper	nil	1 bundle (paper, old) = 960 sheets of paper (E)	British and American unit used in the printing and paper industry. 1 bundle (paper) = 1/5 bale (paper, old) (E) 1 bundle (paper, old) = 2 reams (paper, old) (E) 1 bundle (paper, old) = 40 quires (paper, old) (E)	UK, US
bundle (wool)	bdl	length, distance	L	1 bundle (wool) = 10 241.280 m (E)	Obsolete unit of length used to measure length of cotton yarns. 1 bundle (cotton) = 11 200 yards (E) 1 bundle (cotton) = 20 hanks (E) 1 bundle (cotton) = 140 skeins (E)	UK
busa (Saudi Arabian)	–	length, distance	L	1 busa (Saudi Arabian) $= 2.54 \times 10^{-2}$ m	Obsolete Saudi Arabian traditional unit of length used before 1962. 1 busa (Saudi Arabian) = 1 inch (E)	Saudi Arabian
bushel (UK)	bu (UK)	capacity, volume	L^3	1 bushel (UK) $= 36.3687360 \times 10^{-3}$ m^3	Obsolete British unit used for capacity measurements for all merchandise (solids, liquids, foodstuffs, etc). It contains 80 pounds distilled water at 62°F. 1 bushel (UK) = 4 pecks (UK) (E) 1 bushel (UK) = 8 gallons (UK) (E) 1 bushel (UK) = 32 quarts (UK) (E) 1 bushel (UK) = 64 pints (UK) (E)	UK

					1 bushel (UK) = 256 gills (UK) (E) 1 bushel (UK) = 1.03205719753 bushels (US, dry)	
bushel (US, dry) (Winchester bushel)	bu (US, dry)	capacity, volume	L^3	1 bushel (US, dry) $= 35.2390701669 \times 10^{-3}$ m^3 (E)	Obsolete American unit of capacity used to measure the volume of powdered or divided solid materials (flour, sand, cement, ores, etc). It contains 77.601 pounds distilled water at 62°F. Base unit in the dry system. 1 bushel (US, dry) = 4 pecks (US, dry) (E) 1 bushel (US, dry) = 32 quarts (US, dry) (E) 1 bushel (US, dry) = 64 pints (US, dry) (E) 1 bushel (US, dry) = 0.968938545648 bushels (UK) = 2150.42 in^3 (E)	US
butt (UK)	bt (UK)	capacity, volume	L^3	1 butt (UK) = $490.977936 \times 10^{-3}$ m^3	Obsolete British unit used for capacity measurements for all merchandise (solids, liquids, foodstuffs, etc). 1 butt (UK) = 108 gallons (UK) (E) 1 butt (UK) = 54 pecks (UK) (E) 1 butt (UK) = 27 buckets (UK) (E)	UK
butt (UK, beer)	bt. (UK)	capacity, volume	L^3	1 butt (UK, beer) $= 499.084421184 \times 10^{-3}$ m^3	Obsolete British unit of capacity used for beer and ale between 1803 and 1824. 1 butt (UK, beer) = 108 gallons (UK, beer) (E)	UK
button (UK) (UK line)	line (UK)	length, distance	L	1 line (UK) = 2.1166667×10^{-3} m	Obsolete British unit of length. 1 line (UK) = 1/4 barleycorn (UK) (E) 1 line (UK) = 1/12 inch (E) 1 line (UK) = 1/144 foot (E) 1 line (UK) = 1/432 yard (E) 1 line (UK) ≈ 2.117 mm	UK

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
button (US) (US line)	line (US)	length, distance	L	1 line (US) = 6.35×10^{-4} m (E)	Obsolete American unit of length. It was used in botany to describe flower measurements. 1 line (US) = 1/40 inch (E) 1 line (US) = 1/480 foot (E) 1 line (US) = 1/1440 yard (E) 1 line (US) = 0.635 mm (E)	US
byee (Burmese)	–	capacity, volume	L^3	1 byee (Burmese) = 0.505×10^{-3} m^3	Obsolete Burmese traditional unit of capacity used before 1920. 1 byee (Burmese) = 4 zalay (Burmese) (E)	Burmese
byte (octet)	o, B	quantity of information	nil	1 byte = 8 bits (E)	Unit employed in computer science. It is equal to a sequence of adjacent binary digits operated upon as a unit in a computer and usually shorter than a word. Multiple of 8 bits. 1 KB = 1024 B ($K = 2^{10}$) 1 MB = 1 048 576 B ($M = 2^{20}$)	
cab (Hebrew)	–	capacity, volume	L^3	1 cab (Hebrew) = 1.190×10^{-3} m^3 (of water)	Obsolete Hebrew unit of capacity used in ancient times. Measured by weight. 1 cab (Hebrew) = 1/18 ephah (new)	Hebrew
caba (Somalian)	–	capacity, volume	L^3	1 caba (Somalian) = 453×10^{-6} m^3	Obsolete Somalian traditional unit of capacity used before 1950. 1 caba (Somalian) = 1/360 gisla (Somalian) (E)	Somalian
cabaho (Eritrean)	–	capacity, volume	L^3	1 cabaho (Eritrean) = 6.36×10^{-3} m^3	Obsolete Eritrean traditional unit of capacity used before 1927. 1 cabaho (Eritrean) = 4 messe (Eritrean) (E)	Eritrean
caballiera (Costa-Rican)	–	surface area	L^2	1 caballiera (Costa-Rican) = 45.08316736×10^4 m^2	Obsolete Costa-Rican traditional unit of surface area used in land measurements before 1912.	Costa-Rican

					1 caballiera (Costa-Rican) = 640 000 square vara (Costa-Rican)	
caballiera (Cuban)	–	surface area	L^2	1 caballiera (Cuban) = 13.4202×10^4 m^2	Obsolete Cuban traditional unit of surface area used in land measurements before 1882. 1 caballiera (Cuban) = 12 fanega (Cuban) (E)	Cuban
caballiera (Guatemalan)	–	surface area	L^2	1 caballiera (Guatemalan) = 44.71864384×10^4 m^2	Obsolete Guatemalan traditional unit of surface area used in land measurements before 1912. 1 caballiera (Guatemalan) = 640 000 square vara (Guatema lan)	Guatemalan
caballiera (Honduran)	–	surface area	L^2	1 caballiera (Honduran) = 42.28120576×10^4 m^2	Obsolete Guatemalan traditional unit of surface area used in land measurements before 1912. 1 caballiera (Honduran) = 640 000 square vara (Honduran)	Honduran
caballiera (Mexican)	–	surface area	L^2	1 caballiera (Mexican) = $42.7953111552 \times 10^4$ m^2	Obsolete Mexican traditional unit of surface area used in land measurements before 1896. 1 caballiera (Mexican) = 12 fanega (Mexican) (E)	Mexican
caban (Philippine)	–	mass	M	1 caban (Philippine) = 58.2 kg	Obsolete Philippine traditional unit of mass used before 1906. 1 caban (Philippine) = 97 catty (Philippine) (E)	Philippine
cabda (Arabic) [Arabic palm]	–	length, distance	L	1 cabda (Arabic) = 8×10^{-2} m	Obsolete Arabic unit of length used in ancient times. 1 cabda (Arabic) = 1/4 feet (Arabic) (E)	Arabic
cable length (int.)	–	length, distance	L	1 cable length (int.) = 185.200 m	Obsolete international unit of length used in navigation. It was equal to one tenth of the international mile. 1 cable length (UK) = 1/10 mile (int.) (E)	INT

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
cable length (UK)	–	length, distance	L	1 cable length (UK) = 185.3184 m (E)	Obsolete British unit of length used in navigation. It was equal to one tenth of a mile (UK, naut.). 1 cable length (UK) = 7296 inches (E) 1 cable length (UK) = 608 feet (E) 1 cable length (UK) = 1/10 mile (UK, naut.) (E)	UK
cable length (US)	–	length, distance	L	1 cable length (US) = 219.456 m (E)	Obsolete American unit of length used in navigation. It was equal to 9/76 of a mile (US, naut.). 1 cable length (US) = 8640 inches (E) 1 cable length (US) = 720 feet (E) 1 cable length (US) = 240 yards (E) 1 cable length (US) = 120 fathoms (E) 1 cable length (US) = 9/76 mile (US, naut.) (E)	US
cados (Persian)	–	capacity, volume	L^3	1 cados (Persian) = 1.018750×10^{-3} m^3 (of water)	Obsolete unit of capacity of the Assyrio-Chaldean-Persian system used in ancient times. Measured by weight. 1 cados (Persian) = 1/32 amphora (E)	Persian
caffiso (Algerian)	–	capacity, volume	L^3	1 caffiso (Algerian) = 16.666×10^{-3} m^3	Obsolete traditional Algerian unit of capacity used before 1843. 1 caffiso (Algerian) = 761/40 khoul (Algerian) (E)	Algerian
caffiso (Maltese)	–	capacity, volume	L^3	1 caffiso (Maltese) = 20.457 m^3	Obsolete Maltese traditional unit of capacity used for liq uids before 1921.	Maltese
cafisso (Tunisian)	–	capacity, volume	L^3	1 cafisso (Tunisian) = 496×10^{-3} m^3	Obsolete Tunisian traditional unit of capacity used before 1895. 1 cafisso (Tunisian) = 129 saah (Tunisian) (E)	Tunisian
cafiz (Arabic) (talent)	–	capacity, volume	L^3	1 cafiz (Arabic) = 32.64×10^{-3} m^3 (of water)	Obsolete Arabic unit of capacity used in ancient times. Measured by weight.	Arabic

cafiz (Arabic)	–	surface, area	L^2	1 cafiz (Arabic) = 147.456 m^2	Obsolete Arabic unit of area used in ancient times. 1 cafiz (Arabic) = 1/40 feddan (E)	Arabic
cahiz (Spanish, dry)	–	capacity, volume	L^3	1 cahiz (Spanish, dry) = 666.012 × 10^{-3} m^3	Obsolete Spanish unit of capacity used for dry substances. 1 cahiz (Spanish, dry) = 12 fanega (E)	Spanish
caja (Costa-Rican)	–	mass	M	1 caja (Costa-Rican) = 16 kg	Obsolete Costa-Rican traditional unit of mass used before 1912. 1 caja (Costa-Rican) = 4/23 fanega (Costa-Rican) (E)	Costa-Rican
caja (Guatemalan)	–	mass	M	1 caja (Guatemalan) = 16 kg	Obsolete Guatemalan traditional unit of mass used before 1912. 1 caja (Guatemalan) = 4/23 fanega (Guatemalan) (E)	Guatemalan
caja (Honduran)	–	mass	M	1 caja (Honduran) = 16 kg	Obsolete Honduran traditional unit of mass used before 1912. 1 caja (Honduran) = 4/23 fanega (Honduran) (E)	Honduran
caja (Nicaraguan)	–	mass	M	1 caja (Nicaraguan) = 16 kg	Obsolete Nicaraguan traditional unit of mass used before 1912. 1 caja (Nicaraguan) = 4/23 fanega (Nicaraguan) (E)	Nicaraguan
caja (Salvadoran)	–	mass	M	1 caja (Salvadoran) = 16 kg	Obsolete Salvadoran traditional unit of mass used before 1912. 1 caja (Salvadoran) = 4/23 fanega (Salvadoran) (E)	Salvadoran
cajuella (Costa-Rican)	–	capacity, volume	L^3	1 cajuella (Costa-Rican) = 15.75 ×10^{-3} m^3 to 16.75 ×10^{-3} m^3	Obsolete Costa-Rican traditional unit of capacity used before 1912. 1 cajuella (Costa-Rican) = 32 cuartillo (Costa-Rican) (E)	Costa-Rican
cajuella (Guatemalan)	–	capacity, volume	L^3	1 cajuella (Guatemalan) = 15.75 ×10^{-3} m^3 to 16.75 ×10^{-3} m^3	Obsolete Guatemalan traditional unit of capacity used before 1912. 1 cajuella (Guatemalan) = 32 cuartillo (Guatemalan) (E)	Guatemalan

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
cajuella (Honduran)	–	capacity, volume	L^3	1 cajuella (Honduran) = 15.75 $\times 10^{-3}$ m^3 to 16.75 $\times 10^{-3}$ m^3	Obsolete Honduran traditional unit of capacity used before 1912. 1 cajuella (Honduran) = 32 cuartillo (Honduran) (E)	Honduran
cajuella (Nicaraguan)	–	capacity, volume	L^3	1 cajuella (Nicaraguan) = 15.75 $\times 10^{-3}$ m^3 to 16.75 $\times 10^{-3}$ m^3	Obsolete Nicaraguan traditional unit of capacity used before 1912. 1 cajuella (Nicaraguan) = 32 cuartillo (Nicaraguan) (E)	Nicaraguan
cajuella (Salvadoran)	–	capacity, volume	L^3	1 cajuella (Salvadoran) = 15.75 $\times 10^{-3}$ m^3 to 16.75$\times 10^{-3}$ m^3	Obsolete Salvadoran traditional unit of capacity used before 1912. 1 cajuella (Salvadoran) = 32 cuartillo (Salvadoran) (E)	Salvadoran
cal (Polish, Cracow)	–	length, distance	L	1 cal (Polish, Cracow) = 1.963666667 $\times 10^{-2}$ m	Obsolete traditional Polish unit of length used before 1919. 1 cal (Polish, Cracow) = 1/12 stopa (Polish, Cracow) (E)	Polish
cal (Polish, new)	–	length, distance	L	1 cal (Polish, new) = 2.400 $\times 10^{-2}$ m	Obsolete traditional Polish unit of length used before 1919. 1 cal (Polish, new) = 1/12 stopa (Polish, new) (E)	Polish
cal (Polish, Warsaw)	–	length, distance	L	1 cal (Polish, Warsaw) = 2.4816666667 $\times 10^{-2}$ m	Obsolete traditional Polish unit of length used before 1919. 1 cal (Polish, Warsaw) = 1/12 stopa (Polish, Warsaw) (E)	Polish
calemin (Spanish)	–	surface, area	L^2	1 calemin (Spanish) = 536.630 145811 m^2	Obsolete Spanish unit of area. 1 calemin (Spanish) = 768 sq. vara (E)	Spanish
calemin (Spanish, dry)	–	capacity, volume	L^3	1 calemin (Spanish, dry) = 4.6250833 $\times$ 10^{-3} m^3	Obsolete Spanish unit of capacity used for dry substances. 1 calemin (Spanish, dry) = 1/12 fanega (E)	Spanish

calibre (centiinch)	calibre, cin	length, distance	L	1 calibre = 2.54×10^{-4} m (E)	Obsolete American and British unit of length used in for calibre measurements of weapons. 1 calibre = 10 mils (E) 1 calibre = 10 thous (E) 1 calibre = 10^{-2} inch (E)	UK, US
calisse (Algerian)	–	capacity, volume	L^3	1 calisse (Algerian) = 16.666×10^{-3} m^3	Obsolete traditional Algerian unit of capacity used before 1843. 1 calisse (Algerian) = 761/40 khoul (Algerian) (E)	Algerian
calorie (15°C)	cal_{15}	energy, work, heat	ML^2T^{-2}	1 cal_{15} = 4.1855 J	The calorie (15°C) is an old heat unit. It was equal to the heat needed to raise the temperature of one gram of air-free water from 14.5°C to 15.5°C at the constant pressure of one standard atmosphere (101 325 Pa). The use of the calorie should have ceased from 31st December, 1977. Adopted by the CIPM in 1950.	
calorie (4°C)	cal_4	energy, work, heat	ML^2T^{-2}	1 cal_4 = 4.2045 J	Obsolete unit.	
calorie (kilogram - calorie)	Cal, kcal	energy, work, heat	ML^2T^{-2}	1 Cal = 4184 J (E)	Obsolete unit of thermal energy employed usually in dietetics. It should be discontinued to avoid confusion between 'small and large' calorie. Now abolished. 1 Cal = 1kcal (E)	
calorie (IT) (International Steam Table)	cal (IT)	energy, work, heat	ML^2T^{-2}	1 cal (IT) = 4.18674 J	Obsolete unit of energy. It was used in steam data tables of Keenan and Keyes. 1 cal (IT) = (1/860) W (int.).h (E) It was just defined at the 5th International Conference on the Properties of Steam (London, July 1956).	INT
calorie (IT) per centimetre per second per degree Celsius	cal (IT). cm^{-1}. $°C^{-1}$	thermal conductivity	$MLT^{-3}\Theta^{-1}$	1 cal (IT).cm^{-1}.$°C^{-1}$ = 418.674 W.m^{-1}.K^{-1} (E)	Obsolete unit of thermal conductivity employed in heat transfer measurements.	

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
calorie (IT) per gram	cal (IT). g^{-1}	specific heat	L^2T^{-2}	1 cal (IT).g^{-1} = 4186.74 J.kg^{-1} (E)	Obsolete unit.	INT
calorie (IT) per hour	cal (IT). h^{-1}	power	ML^2T^{-3}	1 cal (IT).h^{-1} = 1.162983333 × 10^{-3} W	Obsolete unit.	
calorie (IT) per minute	cal (IT). min^{-1}	power	ML^2T^{-3}	1 cal (IT).min^{-1} = 6.9779000 × 10^{-2} W	Obsolete unit.	
calorie (IT) per second	cal (IT). s^{-1}	power	ML^2T^{-3}	1 cal (IT).s^{-1} = 4.18674 W	Obsolete unit.	
calorie (mean)	cal_{mean}	energy, work, heat	ML^2T^{-2}	1 cal_{mean} = 4.19002 J	Obsolete unit of energy. The calorie (mean) is equal to 1/100 of the heat needed to raise the temperature of one gram of air-free water from 0°C to 100°C at the constant pressure of one standard atmosphere (101 325 Pa). The use of the calorie should have ceased from 31st December, 1977. Adopted by the CIPM in 1950.	
calorie (thermochemical)	cal (therm.)	energy, work, heat	ML^2T^{-2}	1 cal (therm.) = 4.1840 J (E)	Obsolete unit of energy. It was defined by the National Bureau of Standards (NBS) in 1953.	US
calorie (therm.) per centimetre per second and per degree Celsius	cal (therm.). $cm^{-1}.°C^{-1}$	thermal conductivity	$MLT^{-3}\Theta^{-1}$	1 cal (therm.).$cm^{-1}.°C^{-1}$ = 418.4 W.$m^{-1}.K^{-1}$ (E)	Obsolete unit of thermal conductivity employed in heat transfer measurements.	
calorie (therm.) per gram	cal (therm.). g^{-1}	specific heat	$LT^{-3}\Theta^{-1}$	1 cal (therm.).g^{-1} = 4184 J.kg^{-1} (E)	Obsolete unit.	
calorie (therm.) per hour	cal (therm.). h^{-1}	power	ML^2T^{-3}	1 cal (therm.).h^{-1} = 1.1622222 × 10^{-3} W	Obsolete unit.	

calorie (therm.) per minute	cal (therm.).min^{-1}	power	ML^2T^{-3}	1 cal (therm.).min^{-1} = 6.973333333 × 10^{-2} W	Obsolete unit.	
calorie (therm.) per second	cal (therm.).s^{-1}	power	ML^2T^{-3}	1 cal (therm.).s^{-1} = 4.1840 W	Obsolete unit.	
can (Annamese)	–	mass	M	1 can (Annamese) = 0.604 kg	Obsolete Annameseian traditional unit of mass used before 1914. 1 can (Annamese) = 160 dong (Annamese) (E)	Annamese
canada (Brazilian)	–	capacity, volume	L^3	1 canada (Brazilian) = 2.662 ×10^{-3} m^3	Obsolete Brazilian traditional unit of capacity used before 1874. 1 canada (Brazilian) = 1/2 alquiera (Brazilian) (E)	Brazilian
canada (Brazilian, Bahia)	–	capacity, volume	L^3	1 canada (Brazilian, Bahia) = 1.762 ×10^{-3} m^3	Obsolete Brazilian traditional unit of capacity used before 1874. 1 canada (Brazilian, Bahia) = 1/2 alquiera (Brazilian, Bahia) (E)	Brazilian
canada (Brazilian, common)	–	capacity, volume	L^3	1 canada (Brazilian, common) = 1.813 ×10^{-3} m^3	Obsolete Brazilian traditional unit of capacity used before 1874. 1 canada (Brazilian, common) = 1/2 alquiera (Brazilian, common) (E)	Brazilian
canada (Brazilian, salt)	–	capacity, volume	L^3	1 canada (Brazilian, salt) = 2.038 ×10^{-3} m^3	Obsolete Brazilian traditional unit of capacity used before 1874. 1 canada (Brazilian, salt) = 1/2 alquiera (Brazilian, salt) (E)	Brazilian
canada (Portuguese)	–	capacity, volume	L^3	1 canada (Portuguese) = 1.375 × 10^{-3} m^3	Obsolete Portuguese unit of capacity used for liquid substances. 1 canada (Portuguese) = 1/12 almude (E)	Portuguese

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
candela	cd	luminous intensity	J	**SI base unit**	The candela is the luminous intensity, in a given direction, of a source that emits monochromatic radiation of frequency 540×10^{12} Hz and that has a radiant intensity in that direction of 1/683 watt per steradian. [16th CGPM (1979), Resolution 3].	
candela per square metre	$cd.m^{-2}$	luminous luminance	$J.L^{-2}$	**SI derived unit**		SI
candle (int.)	c	luminous intensity	J	1 candle (int.) = 1.019 367 992 cd	Obsolete British unit of luminous intensity introduced in 1860 by the *Metropolitain Gas Act*. One candle (int.) was specified as a spermaceti candle weighing six to the pound and burning at the rate of 120 grain (av.) an hour. The US unit is a specified fraction of the average horizontal candlepower of a group of 45 carbon-filament lamps preserved at the Bureau of Standards (US). 1 candle (int) = 60/58.86 cd (E)	UK, INT
candle (new unit)	–	luminous intensity	J	1 candle (new unit) = 1 cd (E)	Obsolete unit of luminous intensity. It was equal to 1/60 of the intensity of one square centimetre of a blackbody radiator at the temperature of solidification of platinum (2046 K) [1948]. It was a precursor of the SI candela.	INT
candle (pentane)	–	luminous intensity	J	1 candle (pentane) = 1.019 367 992 cd	Obsolete British unit of luminous intensity. 1 candle (pentane) = 1 candle (int.)	UK
candlepower (spherical)	–	luminous flux	JΩ	1 candlepower (spherical) = 12.566370 lm	Obsolete American and British unit of luminous flux intensity. The candlepower (spherical) of a lamp is the average	UK, US

					candlepower of a lamp in all directions in space. It is equal to the total luminous flux of the lamp in lumens divided per 4π.	
candy (Burmese)	–	mass	M	1 candy (Burmese) = 244.8 kg	Obsolete Burmese traditional unit of mass used before 1920. 1 candy (Burmese) = 450 catty (Burmese) (E)	Burmese
candy (Ceylon and Madras)	–	mass	M	1 candy (Ceylon and Madras) = 226.796 kg	Obsolete Ceylonese and Madrasian traditional unit of mass used before 1920. 1 candy (Ceylon and Madras) = 800 seer (Ceylon) (E)	Ceylon
candy (Indian)	–	mass	M	1 candy (Indian) = 746.432 kg	Obsolete Indian traditional unit of mass used before 1920. 1 candy (Indian) = 800 seer (Indian) (E)	Indian
candy (Indian)	–	capacity, volume	L^3	1 candy (Indian) = 0.8808 m^3	Obsolete Indian traditional unit of capacity used before 1920. 1 candy (Indian) = 640 raik (Indian) (E)	Indian
canna (Balearic)	–	length, distance	L	1 canna (Balearic) = 1.564 m	Obsolete Balearic traditional unit of length. 1 canna (Balearic) = 8 palmos (Balearic) (E)	Balearic
canna (Italian)	–	length, distance	L	1 canna (Italian) = 2.055080 m	Obsolete national Italian unit of length. 1 canna (Italian) = 4 piedi liprando (E)	Italian
canna (Maltese)	–	length, distance	L	1 canna (Maltese) = 2.088 m	Obsolete Maltese traditional unit of length used before 1921. 1 canna (Maltese) = 8 palmo (Maltese) (E)	Maltese
canna (Moroccan)	–	length, distance	L	1 canna (Moroccan) = 0.533750 m	Obsolete traditional Moroccan unit of length used before 1923. 1 canna (Moroccan) = 7 tonni (Moroccan) (E)	Moroccan
canne (Egyptian)	–	length, distance	L	1 canne (Egyptian) = 4.071666667 m	Obsolete Egyptian unit of length used in ancient times. 1 canne = 70/9 Royal cubit (E)	Egyptian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
canne (Provence)	–	length, distance	L	1 canne (Provence) = 1.9685 m	Obsolete French unit of length used in surveyor measurements and agriculture in Southern France. 1 canne (Provence) = 8 pans (E)	French
canne carrée (Provence)	–	surface, area	L^2	1 canne carrée (Provence) = 3.87499225000 m^2	Obsolete French unit of length used in surveyor measurements and agriculture in Southern France. 1 canne carrée (Provence) = 64 pans carrés (E)	French
canne cube (Provence)	–	volume, capacity	L^3	1 canne cube (Provence) = 7.62792224412 m^3	Obsolete French unit of volume used in Southern France. 1 canne cube (Provence) = 512 pans cubes (E)	French
cannon shot (US)	–	length, distance	L	1 cannon shot (US) = 5559.552 m (E)	Obsolete American unit used in the last century to define the US territorial waters. 1 cannon shot (US) = 3 nautical miles (US) (E) 1 cannon shot (US) = 1 nautical league (US) (E)	US
canon	–	length, distance	L	1 canon = 16.93333333333 $\times 10^{-3}$ m	Obsolete French traditional typographical unit of length used in printing. 1 canon = 48 points (E)	French
cantar (Algerian, kebyr)	–	mass	M	1 cantar (Algerian, kebyr) = 81.912 kg	Obsolete traditional Algerian unit of mass used before 1843. 1 cantar (Algerian, kebyr) = 2400 ukkia (Algerian) (E)	Algerian
cantar (Algerian, khaldary)	–	mass	M	1 cantar (Algerian, khaldary) = 61.434 kg	Obsolete traditional Algerian unit of mass used before 1843. 1 cantar (Algerian, khaldary) = 1800 ukkia (Algerian) (E)	Algerian

cantar (Algerian, thary)	–	mass	M	1 cantar (Algerian, thary) = 54.608 kg	Obsolete traditional Algerian unit of mass used before 1843. 1 cantar (Algerian, thary) = 1600 ukkia (Algerian) (E)	Algerian
cantar (Libyan)	–	mass	M	1 cantar (Libyan) = 51.28 kg	Obsolete Libyan traditional unit of mass used before 1927. 1 cantar (Libyan) = 100 rottolo (Libyan) (E)	Libyan
cantar (Romanian)	–	mass	M	1 cantar (Romanian) = 56 kg	Obsolete traditional Romanian unit of mass used before 1884. 1 cantar (Romanian) = 44 oke (Romanian) (E)	Ruma nian
cantar (Syrian)	–	mass	M	1 cantar (Syrian) = 178.5 kg	Obsolete Syrian traditional unit of mass used before 1931. 1 cantar (Syrian) = 100 rottolo (Syrian) (E)	Syrian
cantara (Spanish)	–	capacity, volume	L^3	1 cantara (Spanish) $= 15.643162 \times 10^{-3}$ m^3 (water)	Obsolete Spanish unit of capacity used for liquid substances. 1 cantara (Spanish) = 1 arroba (water) (E)	Spanish
cantaro (Balearic)	–	mass	M	1 cantaro (Balearic) = 42.432 kg	Obsolete Balearic traditional unit of mass. 1 cantaro (Balearic) = 104 rottolo (Balearic) (E)	Balearic
cantaro (Italian)	–	mass	M	1 cantaro (Italian) = 46.05 kg	Obsolete Italian unit of mass. 1 cantaro (Italian) = 150 libbra (E)	Italian
cantaro (Maltese)	–	mass	M	1 cantaro (Maltese) = 79.379 kg	Obsolete Maltese traditional unit of mass used before 1921. 1 cantaro (Maltese) = 175 libra (Maltese) (E)	Maltese
cantaro (Tunisian, attari)	–	mass	M	1 cantaro (Tunisian, attari) = 50.392 kg	Obsolete Tunisian traditional unit of mass used before 1895. 1 cantaro (Tunisian, attari) = 1600 uckir (Tunisian) (E)	Tunisian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
cantaro (Tunisian, khaddari)	–	mass	M	1 cantaro (Tunisian, khaddari) = 62.990 kg	Obsolete Tunisian traditional unit of mass used before 1895. 1 cantaro (Tunisian, khaddari) = 2000 uckir (Tunisian) (E)	Tunisian
cantaro (Tunisian, sucki)	–	mass	M	1 cantaro (Tunisian, sucki) = 56.691 kg	Obsolete Tunisian traditional unit of mass used before 1895. 1 cantaro (Tunisian, sucki) = 1800 uckir (Tunisian) (E)	Tunisian
cantaro barbaresco (Balearic)	–	mass	M	1 cantaro barbaresco (Balearic) = 40.80 kg	Obsolete Balearic traditional unit of mass. 1 cantaro barbaresco (Balearic) = 100 rottolo (Balearic) (E)	Balearic
caphite (Arabic) (kiladja)	–	capacity, volume	L^3	1 caphite (Arabic) = 1.36×10^{-3} m^3 (of water)	Obsolete Arabic unit of capacity used in ancient times. Measured by weight. 1 caphite (Arabic) = 1/24 cafiz (E)	Arabic
capicha (Persian)	–	capacity, volume	L^3	1 capicha (Persian) = 2.64×10^{-3} m^3	Obsolete Persian traditional unit of capacity used before 1933. 1 capicha (Persian) = 8 sextario (Persian) (E)	Persian
carat	ct, Kt	fraction, relative values, yields, efficiencies, abundance	nil	1 carat = $41.666666667 \times 10^{-3}$	It corresponds to the mass fraction of gold in precious alloys used in jewellery (caratage). It is commonly used in precious metal business transactions. 1 carat = 41.67‰ (E) 24 carats = 1000‰ (E) 24 carats = 100% (E)	INT
carat (metric)	ct.	mass	M	1 carat (metric) = 2×10^{-4} kg (E)	Metric unit of mass introduced since 1932 and employed in jewellery for the weighing of precious metals, precious stones and gems (e.g. diamond, ruby, sapphire). The name of the unit is derived from the Sanskrit word *quirrat* meaning the small	INT

					and very uniform seeds of the carob tree which in antiquity were used to weigh precious metals and stones. 1 carat (metric) = 200 mg (E)	
carat (obsolete) (1877)	ct (obsolete)	mass	M	1 carat (obsolete) = 2.053×10^{-4} kg (E)	Obsolete unit of mass employed in jewellery for the weighing of precious metals, precious stones and gems (e.g. diamond, ruby, sapphire). It has now been replaced by the metric carat. The name of the unit is derived from the Sanskrit word *quirrat* meaning the small and very uniform seeds of the carob tree which in antiquity were used to weigh precious metals and stones. 1 carat (obsolete) = 205.3 mg (E)	INT
carat (Persian)	–	mass	M	1 carat (Persian) = $191.6666667 \times 10^{-6}$ kg	Obsolete Persian traditional unit of mass used before 1933. 1 carat (Persian) = 1/48 dirhem (Persian) (E)	Persian
carat (UK, old)	ct.	mass	M	1 carat (UK, old) = $204.958952330 \times 10^{-6}$ kg	Obsolete British unit of mass used before 1877 for weighing precious stones and gemstones (i.e., diamond, emerald, ruby, and sapphire). It was originally defined to 4 grains but this value was later revised to 3.163 grains. 1 carat (UK, old) = 3.163 grains (E)	UK
carcel	–	luminous intensity	J	1 carcel = 10 cd (E)	Obsolete French luminous intensity unit.	French
Carcel unit	–	luminous intensity	J	1 Carcel unit = 9.796126403 cd	Obsolete luminous intensity unit. The Carcel unit is the horizontal intensity of the Carcel lamp, burning 42 grams of colza oil per hour. It was used in the UK during the period 1880–1884. 1 Carcel unit = 9.61 candle (int.) (E)	UK

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
carga (Colombian)	–	mass	M	1 carga (Colombian) = 125 kg	Obsolete Colombian traditional unit of mass used before 1854. 1 carga (Venezuelan) = 250 libbra (Venezuelan) (E)	Colombian
carga (Costa-Rican)	–	mass	M	1 carga (Costa-Rican) = 161 kg	Obsolete Costa-Rican traditional unit of mass used before 1912. 1 carga (Costa-Rican) = 7/4 fanega (Costa-Rican) (E)	Costa-Rican
carga (Guatemalan)	–	mass	M	1 carga (Guatemalan) = 161 kg	Obsolete Guatemalan traditional unit of mass used before 1912. 1 carga (Guatemalan) = 7/4 fanega (Guatemalan) (E)	Guatemalan
carga (Honduran)	–	mass	M	1 carga (Honduran) = 161 kg	Obsolete Honduran traditional unit of mass used before 1912. 1 carga (Honduran) = 7/4 fanega (Honduran) (E)	Honduran
carga (Mexican, dry)	–	capacity, volume	L^3	1 carga (Mexican, dry) = 181.6128 $\times 10^{-3}$ m^3	Obsolete Mexican traditional unit of capacity used for dry substances before 1896. 1 carga (Mexican, dry) = 96 cuartillo (Mexican, dry) (E)	Mexican
carga (Nicaraguan)	–	mass	M	1 carga (Nicaraguan) = 161 kg	Obsolete Nicaraguan traditional unit of mass used before 1912. 1 carga (Nicaraguan) = 7/4 fanega (Nicaraguan) (E)	Nicaraguan
carga (Salvadoran)	–	mass	M	1 carga (Salvadoran) = 161 kg	Obsolete Salvadoran traditional unit of mass used before 1912. 1 carga (Salvadoran) = 7/4 fanega (Salvadoran) (E)	Salvadoran

carga (Venezuelan)	–	mass	M	1 carga (Venezuelan) = 125 kg	Obsolete Venezuelan traditional unit of mass used before 1914. 1 carga (Venezuelan) = 250 libbra (Venezuelan) (E)	Venezuelan
cargo (Balearic)	–	mass	M	1 cargo (Balearic) = 127.296 kg	Obsolete Balearic traditional unit of mass. 1 cargo (Balearic) = 312 rottolo (Balearic) (E)	Balearic
carnot	–	entropy	$ML^2T^{-2}\Theta^{-1}$	1 carnot = 1 $J.K^{-1}$ (E)	Obsolete unit of entropy.	
carreau (Haitian)	–	surface area	L^2	1 carreau (Haitian) = 1292.3 m^2	Obsolete Haitian traditional unit of surface area used in land measurements before 1920.	Haitian
carterée (Agen)	–	surface area	L^2	1 carterée (Agen) = 7290 m^2	Obsolete local French unit of surface area used for land measurements French unit of surface area used for land measurements in south-western France before the revolu tion of 1789. 1 carterée (Agen) = 6 cartonnets (Agen) (E) 1 carterée (Agen) = 18 lattes (Agen) (E) 1 carterée (Agen) 432 exots (Agen) (E)	French
Cartier degree	°Cartier	specific gravity of liquids, hydrometer index, hydrometer degree	nil	$°\text{Cartier} = 126.1 - (136.8/d)$ $d = d(12.5°\text{C})$	Obsolete hydrometer unit introduced in 1800. The Cartier hydrometer floats in water at the 10° scale division and at 30° corresponding to 32°Bé.	
carton (Montpellier)	–	surface area	L^2	1 carton (Montpellier) = 720 m^2	Obsolete local French unit of surface area. It corresponds to the surface that a farmer can sow using one half sétier of seeds. 1 carton (Montpellier) = 1/2 sétérée (E) 1 carton (Montpellier) = 75/2 dextres (E)	French
cartonnée (Haute-Loire)	–	surface area	L^2	1 cartonnée (Haute-Loire) = 833.333333333333 m^2	Obsolete local French unit of surface area used for land measurements after 1789. 1 cartonnée (Haute-Loire) = 1/12 hectare (E)	French

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
cartonnet (Agen)	–	surface area	L^2	1 cartonnet (Agen) = 1215 m^2	Obsolete local French unit of surface area used for land measurements in south-western France before the revolution of 1789. 1 cartonnet (Agen) = 1/6 carterée (Agen) (E) 1 cartonnet (Agen) = 3 lattes (Agen) (E) 1 cartonnet (Agen) = 72 exots (Agen) (E)	French
cash (Mauritius)	–	volume, capacity	L^3	1 cash (Mauritius) = 227.11 $\times 10^{-3}$ m^3	Obsolete unit of volume used for measuring capacity of liquids in Mauritius and Seychelles Islands. 1 cash (Mauritius) = 30 velts (Mauritius) (E)	Mauritius
cass (Cypriot)	–	capacity, volume	L^3	1 cass (Cypriot) = 4.7300635 $\times 10^{-3}$ m^3	Obsolete Cypriot traditional unit of capacity used before 1972. 1 cass (Cypriot) = 3.7 oke (Cypriot) (E)	Cypriot
cassaba (Saudi Arabian)	–	length, distance	L	1 cassaba (Saudi Arabian) = 3.840 m	Obsolete Saudi Arabian traditional unit of length used before 1962. 1 cassaba (Saudi Arabian) = 32/4025 farsakh (Saudi Ara bian) (E)	Saudi Arabian
castellano (Chilean)	–	mass	M	1 castellano (Chilean) = 4.60093 $\times 10^{-3}$ kg	Obsolete Chilean traditional unit of mass used before 1865. 1 castellano (Chilean) = 1/100 libbra (Chilean) (E)	Chilean
catty (Burmese)	–	mass	M	1 catty (Burmese) = 0.544 kg	Obsolete Burmese traditional unit of mass used before 1920. 1 catty (Burmese) = 1/3 viss (Burmese) (E)	Burmese
catty (Chinese)	–	mass	M	1 catty (Chinese) = 0.604789826667 kg	Old Chinese unit of mass used in the far East. 1 catty (Chinese) = 4/3 pound (E) 1 catty (Chinese) = 16 teals (Chinese) (E)	Chinese

					1 catty (Chinese) = 1/100 picul (Chinese) (E)	
catty (Indonesian)	–	mass	M	1 catty (Indonesian) = 0.617613025 kg	Obsolete Indonesian traditional unit of mass used before 1923. 1 catty (Indonesian) = 1/100 picul (Indonesian) (E)	Indonesian
catty (Philippine)	–	mass	M	1 catty (Philippine) = 0.600 kg	Obsolete Philippine traditional unit of mass used before 1906. 1 catty (Philippine) = 1/100 pecul (Philippine) (E)	Philippine
caudalie	–	subjective duration of wine taste in mouth	nil	(see note)	Subjective unit used in oenology to assess the taste of wine	oenology
cawney (India)	–	surface area	L^2	1 cawney (India) = 5395.808563 m^2	Obsolete traditional unit of land surface area formerly used in British colonies (e.g., India). Originally, the value for the cawney varied with location and hence it was standardized under British colonial rule in central India at 4/3 acres. It was named after the English translation of the original Tamil word for the unit. 1 cawney (India) = 4/3 acre (E) 1 cawney (India) = 58 080 square feet (E)	India
cawnie (Indian)	–	surface area	L^2	1 cawnie (Indian) = 540 m^2	Obsolete Indian traditional unit of surface used in land measurements before 1920.	Indian
Cé	–	time, period, duration	T	1 Cé = 864 s (E)	Obsolete decimal unit of time suggested in 1900 by the *Congrès International de Chronométrie*. 1 Cé = 1/100 day (E)	
celo	$ft.s^{-2}$	acceleration	LT^{-2}	1 Celo = 0.3048 $m.s^{-2}$ (E)	Name suggested for the unit of acceleration in the FPS system. Anecdotal.	FPS

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
Celsius degree	°C	temperature	Θ	T (K) = T(°C) + 273.15	Usual centigrade temperature scale introduced in 1742 employed in most countries. The unit is named after the Swedish scientist A. Celsius (1701–1744) the two reference points are 0°C (melting ice) and 100°C (boiling water).	INT
Celsius-heat unit (centigrade-heat unit)	Chu, chu, CHU	energy, work, heat	ML^2T^{-2}	1 chu = 1899.18 J	The chu is an obsolete British and American heat unit. It was equal to the heat needed to raise by 1°C the temperature of one pound of air-free water at the constant pressure of one standard atmosphere (101 325 Pa).	UK, US
cent	–	logarithmic musical interval	nil	$I = 1200 \log_2(f_1/f_2)$ (see note)	The cent is the interval between two musical sounds having as a basic frequency ratio the 1200th root of two. The number of cents between frequencies f_1 and f_2 is: $I = 1200 \log_2(f_1/f_2) \approx 3986.313714 \log_{10}(f_1/f_2)$ 1 cent = 1/1200 octave (E) 1 cent = 301/1200 savart (E)	
cental (kintal, centner, hundredweight)	cH, cwt	mass	M	1 cental = 45.359237 kg (E)	Obsolete British and American unit of mass used in business transactions especially in agriculture. It serves to measure the weight of foods and grain. 1 cental = 1 cwt (E) 1 cental = 100 lb av. (E) 1 cental = 1 sh. cwt (US) (E)	UK, US
centigrade-heat unit (Celsius-heat unit) (15°C)	Chu, chu (15°C)	energy, work, heat	ML^2T^{-2}	1 chu (15°C) = 1899.10 J (E)	The chu (15°C) is an Obsolete British and American heat unit. It was equal to the heat needed to raise the temperature of one pound of air-free water from 14.5°C to 15.5°C at the constant pressure of one	UK, US

					standard atmosphere (101 325 Pa). 1 Chu ≈ 455 cal 1 Chu = 1.8 Btu (E)	
centigram	cg	mass	M	1 cg = 10^{-5} kg (E)	Submultiple of the SI base unit. 1 cg = 10^{-2} g (E)	SI
centiHg	–	pressure, stress	$ML^{-1}T^{-2}$	1 centiHg (0°C) = 1333.22368421 Pa	Obsolete unit of pressure. Abbreviation of **centi**metre of mercury (**Hg**). It was defined as the pressure exerted by a column of mercury 1 cm high, measured at 0°C (32°F). 1 centiHg = 1 cmHg (0°C) (E) 76 centiHg (0°C) = 101 325 (E) 76 centiHg (0°C) = 1 atm (E). 1 centiHg (0°C) = 101 325/76 Pa (E)	
centilitre	cl, cL	capacity, volume	L^3	1 cl = 10^{-5} m^3 (E)	Submultiple of the litre.	
centimetre	cm	length, distance	L	1 cm = 10^{-2} m (E)	Submultiple of the SI base unit, cgs base unit	cgs, SI
centimetre (electromagnetic)	'cm'	electric inductance	$ML^2T^{-2}I^{-2}$	1 'cm' = 10^{-9} H (E)	Obsolete unit of electric inductance employed in electrical engineering and electronics. One 'cm' is equal to an e.m.f. of one emu cgs of induced voltage in a circuit by a variation of current of one emu cgs unit per second. 1 'cm' = 1 abhenry (E)	UK, US, cgs
centimetre (electrostatic)	'cm'	electric capacitance	$M^{-1}L^{-2}T^4I^2$	1 'cm' = 1.11188031733 $\times 10^{-12}$ F (E)	Obsolete unit of electric capacitance employed in electrical engineering and electronics. One 'cm' describes an electric capacitance which is equal to one esu cgs of electric potential during the increase of one esu cgs of charge. 1 'cm' = 1 stat farad (E) 1 'cm' = 1/(3000c) F (E)	UK, US, cgs

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
centimetre of mercury (0°C)	cmHg (0°C)	pressure, stress	$ML^{-1}T^{-2}$	1 cmHg (0°C) = 1333.22368421 Pa	Obsolete unit of pressure employed in physics to measure small pressures. It was defined as the pressure exerted by a column of mercury 1 cm high, measured at 0°C (32°F). 76 cmHg (0°C) = 101 325 (E) 76 cmHg (0°C) = 1 atm (E). 1 cmHg (0°C) = 101 325/76 Pa (E)	UK, US
centimetre of mercury (32°F)	cmHg (32°F)	pressure, stress	$ML^{-1}T^{-2}$	1 cmHg (32°F) = 1333.22368421 Pa	Obsolete unit of pressure employed in physics to measure small pressures. It was defined as the pressure exerted by a column of mercury 1 cm high, measured at 0°C (32°F). 76 cmHg (0°C) = 101 325 (E) 76 cmHg (0°C) = 1 atm (E). 1 cmHg (32°F) = 101 325/76 Pa (E)	UK, US
centimetre of water (15.56°C)	cmH_2O (15.56°C)	pressure, stress	$ML^{-1}T^{-2}$	1 cmH_2O (15.56°C) = 97.9705909630 Pa	Obsolete unit of pressure employed in physics to measure small pressures. It is equal to the pressure exerted by a column of water 1 cm high measured at 15.56°C (60°F). 1 atm = 1034.23893848 cmH_2O (60°F)	
centimetre of water (39.2°F)	cmH_2O (39.2°F)	pressure, stress	$ML^{-1}T^{-2}$	1 cmH_2O (39.2°F) = 98.063754138 Pa	Obsolete unit of pressure employed in physics to measure small pressures. It is equal to the pressure exerted by a column of water 1 cm high measured at 4°C (39.2°F). 1 atm = 1033.25638398 cmH_2O (4°C)	UK, US
centimetre of water (4°C)	cmH_2O (4°C)	pressure, stress	$ML^{-1}T^{-2}$	1 cmH_2O (4°C) = 98.063754138 Pa	Obsolete unit of pressure employed in physics to measure small pressures. It is equal to the pressure exerted by a column of water 1 cm high measured at 4°C (39.2°F). 1 atm = 1033.25638398 cmH_2O (4°C)	

centimetre of water (60°F)	cmH_2O (60°F)	pressure, stress	$ML^{-1}T^{-2}$	1 cmH_2O (60°F) = 97.9705909630 Pa	Obsolete unit of pressure employed in physics to measure small pressures. It is equal to the pressure exerted by a column of water 1 cm high measured at 15.56°C (60°F). 1 atm = 1034.3893848 cmH_2O (60°F)	UK, US
centimetre per second	$cm.s^{-1}$	velocity, speed	LT^{-1}	1 $cm.s^{-1} = 10^{-2}$ $m.s^{-1}$	Obsolete cgs unit of velocity.	cgs
centioctave	–	logarithmic musical interval	nil	(see note)	The centioctave is the interval between two musical sounds having as a basic frequency ratio the 1st root of two. The number of cents between frequencies f_1 and f_2 is: $I = 100 \times \log_2(f_1/f_2)$ 1 centioctave = 0.301 savart (E) 1 centioctave = 12 cent (E)	
centipoise	cP, cPo	dynamic viscosity, absolute viscosity	$ML^{-1}T^{-1}$	1 $cP = 10^{-3}$ Pa.s (E)	Unit of dynamic viscosity or absolute viscosity in the cgs system. In the UK the written symbol is cPo. 1 cP = 1 mPa.s (E)	cgs
centistokes	cSt	kinematic viscosity	L^2T^{-1}	1 $cSt = 10^{-6}$ $m^2.s^{-1}$ (E)	Submultiple of the old cgs unit of kinematic viscosity. 1 $cSt = 1$ $mm^2.s^{-1}$ (E)	cgs
centnar (Polish)	–	mass	M	1 centnar (Polish) = 40.5504 kg	Obsolete traditional Polish unit of mass used before 1919. 1 centnar (Polish) = 100 funt (Polish) (E)	Polish
centner (Latvian)	–	mass	M	1 centner (Latvian) = 50.28 kg	Obsolete Latvian traditional unit of mass. 1 centner (Latvian) = 120 pfund (Latvian) (E)	Latvian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
centner (kintal, cental, hundredweight)	cH, cwt	mass	M	1 centner = 45.359 237 kg (E)	Obsolete British unit of mass used in business transactions, especially in agriculture. It serves to measure food grain. 1 cental = 1 cwt (E) 1 cental = 100 lb (av.) (E) 1 cental = 1 sh. cwt (US) (E)	UK, US
centner (Danish)	–	mass	M	1 centner (Danish) = 50 kg (E)	Obsolete Danish traditional unit of mass used before 1912. 1 centner (Danish) = 100 pund (Danish) (E)	Danish
centner (Estonian)	–	mass	M	1 centner (Estonian) = 55.20 kg	Obsolete traditional Estonian unit of mass used before 1900. 1 centner (Estonian) = 120 pfund (Estonian) (E)	Estonian
centrad	–	plane angle	α	1 centrad = 10^{-2} rad (E)	Obsolete unit of plane angle used in optics and spectroscopy for measuring the angular deviation of a beam of visible light by a narrow prism. 1 centrad = centirad (E) 1 centrad = $1.74532925199 \times 10^{-8}$ °	
centum podium (Roman)	–	mass	M	1 centum podium = 32.7 kg	Obsolete Roman unit of mass used in ancient times. 1 centum podium = 100 libra (Roman) (E)	Roman
centurium (Roman)	–	surface, area	L^2	1 centurium (Roman) = 5.053503744×10^5 m^2	Obsolete Roman unit of area employed in ancient times. Plural centuria. 1 centurium (Roman) = 5 760 000 quadratus pes (legal 1st) (E)	Roman
century	–	time, period, duration	T	1 century = 3.1536×10^9 s (E)	1 century = 100 years (E)	
cequi (Turkish)	–	mass	M	1 cequi (Turkish) = 0.32075 kg	Obsolete Turkish traditional unit of mass used before 1933. 1 cequi (Turkish) = 1/4 oka (Turkish) (E)	Turkish

chad	chad	neutron fluence rate	$L^{-2}T^{-1}$	1 chad = 10^4 $n.m^{-2}s^{-1}$ (E) 1 chad = 10^{16} $n.m^{-2}.s^{-1}$ (E) (see note)	Obsolete unit of neutron fluence rate used in nuclear physics. The unit is named after Sir J. Chadwick (1891–1974). 1 chad = 1 $n.cm^{-2}s^{-1}$ (E) Sometimes: 1 Chad = 10^{12} $n.cm^{-2}s^{-1}$ (E)	
chahar (Indian)	–	surface area	L^2	1 chahar (Indian) = 2.962×10^{-2} m^2	Obsolete Indian traditional unit of surface used in land measurements before 1920.	Indian
chai meu (Thai)	–	capacity, volume	L^3	1 chai meu (Thai) = 31.25×10^{-6} m^3	Obsolete Thai traditional unit of capacity used before 1923. 1 chai meu (Thai) = 1/32 tanan (Thai) (E)	Thai
chain (engineer's)	ch	length, distance	L	1 chain (engineer's) = 30.48 m (E)	Obsolete American surveyor's unit of length. 1 chain (engineer's) = 1/6.6 furlong (US) (E) 1 chain (engineer's) = 6 rods (E) 1 chain (engineer's) = 100 feet (E) 1 chain (engineer's) = 100 links (US) (E)	US
chain (Gunter's)	ch	length, distance	L	1 chain (Gunter's) = 20.1168 m (E)	Obsolete British surveyor's unit of length. Invented by the English mathematician Edmund Gunter in the early 17th century. 1 chain (Gunter's) = 1/10 furlong (UK) (E) 1 chain (Gunter's) = 4 rods (E) 1 chain (Gunter's) = 66 feet (E) 1 chain (Gunter's) = 100 links (UK) (E)	UK
chain (Irish)	–	length, distance	L	1 chain (Irish) = 25.6032 m (E)	Obsolete unit of length used in surveyors' measurements in Ireland. 1 chain (Irish) = 84 feet (E) 1 chain (Irish) = 4 perches (E) 1 chain (Irish) = 1/10 furlongs (E)	Ireland
chain (Scottish)	ch.	length, distance	L	1 chain (Scottish) = 22.6770102596 m	Obsolete traditional Scottish unit of length used before the Imperial Weights and Measures Act of 1824. 1 chain (Scottish) = 74 feet (E)	Scottish

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
chain (UK, nautical)	ch. (UK, naut.)	length, distance	L	1 chain (UK, naut.) = 4.572 m (E)	Obsolete British unit of length used in navigation. 1 chain (UK, naut.) = 15 feet (E) 1 chain (UK, naut.) = 5 yards (E)	UK
chain (Ramsden's)	ch	length, distance	L	1 chain (Ramsden's) = 30.48 m (E)	Obsolete American surveyor's unit of length. 1 chain (Ramsden's) = 1/6.6 furlong (US) (E) 1 chain (Ramsden's) = 6 rods (E) 1 chain (Ramsden's) = 100 feet (E) 1 chain (Ramsden's) = 100 links (US) (E)	US
chain (surveyor's)	ch	length, distance	L	1 chain (surveyor's) = 20.1168 m (E)	Obsolete British surveyor's unit of length. 1 chain (surveyor's) = 1/10 furlong (UK) (E) 1 chain (surveyor's) = 4 rods (E) 1 chain (surveyor's) = 66 feet (E) 1 chain (surveyor's) = 100 links (E)	UK
chalder (Scottish, dry)	–	capacity, volume	L^3	1 chalder (Scottish, dry) = 2.30449629216 m^3 (wheat, peas, beans, rice, salt) 1 chalder (Scottish, dry) = 3.36185992917 m^3 (oats, barley, malt)	Obsolete traditional Scottish unit of volume used before the Weights and Measures Act of 1824 to measure the capacity of dry substances (wheat, peas, beans, salt, rice, barley, malt). 1 chalder (Scottish, dry) = 1024 lippies (Scottish, dry) (E)	Scottish
chalder (UK, coal)	chd	mass	M	1 chalder (UK, coal) = 2692.524300 kg (E)	Obsolete British unit of mass for coal. 1 chalder (UK, coal) = 1/8 keel (UK, coal) (E) 1 chalder (UK, coal) = 53 hundredweight (UK, long) (E)	UK
chaldron (UK)	chal (UK)	capacity, volume	L^3	1 chaldron (UK) = 1.309274496 m^3	Obsolete British unit used for capacity measurements for all merchandise (solids, liquids, foodstuffs, etc).	UK

					1 chaldron (UK) = 12 sacks (UK) (E) 1 chaldron (UK) = 36 bushels (UK) (E) 1 chaldron (UK) = 72 buckets (UK) (E) 1 chaldron (UK) = 144 pecks (UK) (E) 1 chaldron (UK) = 288 gallons (UK) (E)	
chalque (Greek, Attic)	–	mass	M	1 chalque (Greek, Attic) $= 9 \times 10^{-5}$ kg	Obsolete Greek unit of mass used in ancient times. 1 chalque (Greek, Attic) = 1/48 drachma (Greek, Attic) = 1/288 000 talent (E)	Attic
changawn (Thai)	–	capacity, volume	L^3	1 changawn (Thai) $= 0.5 \times 10^{-3}$ m^3	Obsolete Thai traditional unit of capacity used before 1923. 1 changawn (Thai) = 1/2 tanan (Thai) (E)	Thai
chao (Chinese)	–	capacity, volume	L^3	1 chao (Chinese) $= 10.3544 \times 10^{-6}$ m^3	Obsolete Chinese unit of capacity used in ancient times. 1 chao (Chinese) = 1/100 tcheng (E)	Chinese
character	–	quantity of information	nil	1 character = 8 bits (E)	Unit of information used in computer science and telecommunications.	INT
charak (Persian)	–	length, distance	L	1 charak (Persian) = 0.2286 m	Obsolete Persian traditional unit of length used before 1933. 1 charak (Persian) = 4 gireh (Persian) (E)	Persian
charge (Belgian)	–	mass	M	1 charge (Belgian) = 195.800 kg	Obsolete traditional Belgian unit of mass used before 1820. 1 charge (Belgian) = 400 livres (Belgian) (E)	Belgian
chariot (Belgian)	–	mass	M	1 chariot (Belgian) = 80.76750 kg	Obsolete traditional Belgian unit of mass used before 1820. 1 chariot (Belgian) = 165 livres (Belgian) (E)	Belgian
chattack (Indian)	–	capacity, volume	L^3	1 chattack (Indian) $= 68.8125 \times 10^{-6}$ m^3	Obsolete Indian traditional unit of capacity used before 1920. 1 chattack (Indian) = 1/20 raik (Indian) (E)	Indian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
chattack (Indian, Bombay)	–	surface area	L^2	1 chattack (Indian, Bombay) = 2.3516082 m^2	Obsolete Indian traditional unit of surface used in land measurements before 1920. 1 chattack (Indian, Bombay) = 5 square guz (Indian, Bombay) (E)	Indian
chattack (Indian, Calcutta)	–	surface area	L^2	1 chattack (Indian, Calcutta) = 4.186125 m^2	Obsolete Indian traditional unit of surface used in land measurements before 1920. 1 chattack (Indian, Calcutta) = 5 square guz (Indian, Calcutta)	Indian
chebel (Persian)	–	length, distance	L	1 chebel (Persian) = 25.600 m	Obsolete unit of length in the Assyrio-Chaldean-Persian system used in ancient times. 1 chebel = 80 zereths (E)	Persian
chei (Chinese)	–	capacity, volume	L^3	1 chei (Chinese) = 103.544 × 10^{-3} m^3	Obsolete Chinese unit of capacity used in ancient times. 1 chei (Chinese) = 100 cheng (E)	Chinese
chela (Somalian)	–	capacity, volume	L^3	1 chela (Somalian) = 1.359 ×10^{-3} m^3	Obsolete Somalian traditional unit of capacity used before 1950. 1 chela (Somalian) = 3 caba (Somalian) (E)	Somalian
cheng (Chinese)	–	capacity, volume	L^3	1 cheng (Chinese) = 1.03544 × 10^{-3} m^3	Obsolete Chinese unit of capacity used in ancient times. (Base unit)	Chinese
chenica (Persian)	–	capacity, volume	L^3	1 chenica (Persian) = 1.32 ×10^{-3} m^3	Obsolete Persian traditional unit of capacity used before 1933. 1 chenica (Persian) = 4 sextario (Persian) (E)	Persian
chenix (Greek, Attic) [χοινιξ]	–	capacity, volume	L^3	1 chenix (Greek, Attic) = 1.08 × 10^{-3} m^3	Obsolete Greek unit of volume employed in ancient times. It was used for capacity measurements of dry substances.	Attic
cheval-vapeur (horsepower)	cv, HP	power	ML^2T^{-3}	1 cv = 735.498750 W (France) 1 HP = 745.69987162 W (UK)	Obsolete unit of power introduced by James Watt in 1784 to allow to describe the power of steam machinery. It was equal to the work effort of a horse needed to raise	UK, INT

					vertically 528 cubic feet of water to one foot high in one minute. In 1850, the following conversion factors were adopted: 1 cv = 75 kgf.m.s^{-1} (E) (France) 1 HP = 550 lbf.ft.s^{-1} (E) (UK)	
chi (Chinese)	–	length, distance	L	1 chi (Chinese) = 0.32 m	Obsolete Chinese unit of length used in ancient times. Base unit of the Chinese system of length.	Chinese
chimanta (Philippine)	–	mass	M	1 chimanta (Philippine) = 6 kg	Obsolete Philippine traditional unit of mass used before 1906. 1 chimanta (Philippine) = 10 catty (Philippine) (E)	Philippine
chin (Cambodian)	–	mass	M	1 chin (Cambodian) = 3.75 $\times 10^{-3}$ kg	Obsolete Cambodian traditional unit of mass used before 1914. 1 chin (Cambodian) = 15/4 muoi (Cambodian) (E)	Cambodian
ching (Chinese)	–	surface, area	L^2	1 ching (Chinese) = 61 440 m^2	Obsolete Chinese unit of area used in ancient times. 1 ching (Chinese) = 100 meou (E)	Chinese
chinik (Turkish)	–	capacity, volume	L^3	1 chinik (Turkish) = 25 $\times 10^{-3}$ m^3 (E)	Obsolete Turkish traditional unit of capacity used before 1933. 1 chinik (Turkish) = 1/40 m^3 (E)	Turkish
chittak (Indian)	–	mass	M	1 chittak (Indian) = 58.315 $\times 10^{-3}$ kg	Obsolete Indian traditional unit of mass used before 1920. 1 chittak (Indian) = 1/16 seer (Indian) (E)	Indian
chkalik (Russian)	–	capacity, volume	L^3	1 chkalik (Russian) = 6.149705 $\times$ 10^{-5} m^3	Obsolete Russian unit of capacity for liquid substances used before 1917. 1 chkalik (Russian) = 1/2 tcharka (E)	Russian
chlorometric degree	°Chl	normal volume of free chlorine gas available per unit volume of bleach solution	nil	1 °Chl = 1 Nm^3 of Cl_2 per m^3 bleach (E) (see note)	Technical unit used in the European chemical industry for expressing the volume of free chlorine gas (i.e., Cl_2) measured at normal conditions of *(continued overleaf)*	INT

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
chlorometric degree *(continued)*					temperature and pressure (0°C and 1 atm) available from an aqueous solution of sodium hypochlorite and sodium hydroxide (bleach). 1 °Chl = 1 Nm^3 of Cl_2 per m^3 bleach (E) 1 °Chl = 44.61590602 moles of Cl_2 per m^3 bleach 1 °Chl = 1.581767716 g of Cl_2 per dm^3 bleach	
chô (Japanese)	–	surface, area	L^2	1 chô = 9917.355372 m^2	Obsolete Japanese unit of area. 1 chô = 3000 tsubo (E)	Japanese
chô (Japanese)	–	length, distance	L	1 chô (Japanese) = 109.091 m (E)	Obsolete Japanese unit of length. 1 chô = 360 shaku (E)	Japanese
chong (Cambodian)	–	mass	M	1 chong (Cambodian) = 30 kg	Obsolete Cambodian traditional unit of mass used before 1914. 1 chong (Cambodian) = 30000 muoi (Cambodian) (E)	Cambodian
chopine (de Paris)	–	capacity, volume	L^3	1 chopine (de Paris) = $0.476073129238 \times 10^{-3}$ m^3	Obsolete French unit of capacity employed before the French Revolution. It serves to express the capacity of liquids and grains. It varies according to the location and merchandise. 1 chopine (de Paris) = 1/2 pinte (de Paris) 1 chopine (de Paris) = 24 pouces cubes (E)	French
chopine (Provence, wine)				1 chopine (Provence, wine) = 0.229925 10^{-3} m^3	Obsolete French unit of volume used to measure the capacity of wine in Southern France. 1 chopine (Provence) = 229.925 cm^3 1 chopine (Provence) = 1/2 pinte (E) 1 chopine (Provence) = 1/4 pot (E) 1 chopine (Provence) = 1/160 barral (E)	French

chopine (Scottish, liq.)	–	capacity, volume	L^3	1 chopine (Scottish, liq.) $= 0.847243982925 \times 10^{-3}$ m^3	Obsolete traditional Scottish unit of volume used before the Weights and Measures Act of 1824 to measure the capacity of liquids. 1 chopine (Scottish, liq.) = 1/16 gallon (Scottish, liq.) (E)	Scottish
chopine (UK)	–	capacity, volume	L^3	1 chopine (UK) $= 0.568261500 \times 10^{-3}$ m^3	Obsolete British unit of capacity. 1 chopine (UK) = 1/8 gallons (UK) (E) 1 chopine (UK) = 4 gills (UK) (E)	UK
chopine (US, dry)	–	capacity, volume	L^3	1 chopine (US, dry) $= 0.550610471358 \times 10^{-3}$ m^3	Obsolete American unit of capacity. 1 chopine (US, dry) = 1/8 gallons (US, dry) (E)	US
chopine (US, liq.)	–	capacity, volume	L^3	1 chopine (US, liq.) $= 0.473176473 \times 10^{-3}$ m^3	Obsolete American unit of capacity. 1 chopine (US, liq.) = 1/8 gallons (US, liq.) (E) 1 chopine (US, liq.) = 4 gills (US, liq.) (E)	US
choryos (Egyptian) [Egyptian palm]	–	length, distance	L	1 choryos (Egyptian) $= 8.725 \times 10^{-2}$ m	Obsolete Egyptian unit of length used in ancient times. 1 choryos = 1/6 Royal cubit (E)	Egyptian
chronon (tempon)	–	time, period, duration	T	1 chronon $= 10^{-23}$ s (E)	Obsolete unit of time employed in atomic physics. It corresponds (approximately) to the time needed by light to cover a distance equal to the electron radius. 1 $(r_e/c) = 9.39963701488 \times 10^{-24}$	
chupa (Philippine)	–	capacity, volume	L^3	1 chupa (Philippine) $= 3.996 \times 10^{-6}$ m^3	Obsolete Philippine traditional unit of capacity used before 1906. 1 chupa (Philippine) = 4 apatan (Philippine) (E)	Philippine
cicéro	–	length, distance	L	1 cicéro $= 4.51165856528 \times 10^{-3}$ m	Obsolete French unit employed in typography. 1 cicéro = 12 points Didot (E) 1 cicero = 1/6 pouce (de Paris)	French

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
circular inch	cin, cir. in	surface, area	L^2	1 circular inch $= 5.06707479098 \times 10^{-4}$ m^2	Obsolete British and American unit of area. It was used for the measurement of small circular areas, such as the cross section of a wire. It was equal to the area of a disc with a diameter of one inch. 1 circular inch $= 10^6$ circular mils (E)	UK, US
circular mil	cmil, cir. mil	surface, area	L^2	1 circular mil $= 5.06707479098 \times 10^{-10}$ m^2	Obsolete British and American unit of area. It was used for the measurement of small circular areas, such as the cross section of a wire. It was equal to the area of a disc with a diameter of one mil. 1 circular mil $= \pi/4 \times 10^{-6}$ in^2 (E)	UK, US
circular mile (int. naut.)	cmi, cir. mi (int. naut.)	surface, area	L^2	1 circular mile (int. naut.) $= 2.693840302233 \times 10^6$ m^2	Obsolete international unit of area. It was used for the measurement of circular areas. It was equal to the area of a disc with a diameter of one mile (int. naut.).	INT
circular mile (int.)	cmi, cir. mi (int.)	surface, area	L^2	1 circular mile (int.) $= 2.03417190508 \times 10^6$ m^2	Obsolete international unit of area. It was used for the measurement of circular areas. It was equal to the area of a disc with a diameter of one mile (int.).	INT
circular mile (statute)	cmi, cir. mi (stat.)	surface, area	L^2	1 circular mile (stat.) $= 2.03417190508 \times 10^6$ m^2	Obsolete British and American unit of area. It was used for the measurement of circular areas. It was equal to the area of a disc with a diameter of one mile (statute).	UK, US
circular mile (US, naut.)	cmi, cir. mi (US, naut.)	surface, area	L^2	1 circular mile (US, naut.) $= 2.69728579516 \times 10^6$ m^2	Obsolete British and American unit of area. It was used for the measurement of circular areas. It was equal to the area of a disc with a diameter of one mile (US, naut.).	UK, US

circular mile (US, survey)	cmi, cir. mi (US, survey)	surface, area	L^2	1 circular mile (US, survey) $= 2.034418004178 \times 10^6$ m^2	Obsolete American unit of area. It was used for the measurement of circular areas. It was equal to the area of a disc with a diameter of one mile (US, survey).	US
circular millimetre	cmm, cir. mm	surface, area	L^2	1 circular millimetre $= 7.85398163398 \times 10^{-7}$ m^2	Obsolete British and American unit of area. It was used for the measurement of small circular areas, such as the cross section of a wire. It was equal to the area of a disc with a diameter of one millimetre. 1 circular mm $= \pi/4 \times 10^{-6}$ m^2(E)	UK
circumference	–	plane angle	α	1 circumference $= 2\pi$ rad (E)	1 circumference = 360 degrees (E) 1 circumference = 400 gons (E)	INT
clarke	–	mass fraction, relative abundance	nil	1 clarke $= 10^{-6}$ m/m (E)	Obsolete index used in geology and geochemistry. It described the average mass fraction of an element in the Earth's crust. In metallogeny, the Clarke index serves to express the ratio of the abundance of an element in an ore versus its average abundance in the Earth's crust. 1 Clarke = 1 ppm wt (E)	
Clarke degree	–	percentage of alcohol in wines and spirits	nil	1 Clarke° $= 10^{-2}$ v/v (E)	Unit introduced in 1730 1 Clarke° = 1% vol ethanol (E)	
Clarke degree	°THB, °e, °Clarke	hardness of water, concentration of calcium and magnesium in water	nil	1 °Clarke = 14.2537612525 mg of $CaCO_3$per1000cm^3 of water	British unit employed to express hardness of water. 1 °Clarke = 1 grain of $CaCO_3$ per UK gallon of water (E) 1 °Clarke = 14.2537612525 ppm wt. $CaCO_3$	UK
clausius (rank)	Cl	entropy	$ML^2T^{-2}\Theta^{-1}$	1 clausius = 4.184 $J.K^{-1}$ (E)	Obsolete unit of entropy. The unit is named after R.J.L. clausius (1822-1888). 1 clausius = 1 $cal_{th}.K^{-1}$ 1 clausius = 4.184 carnot (E)	

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
clima (Roman)	–	surface, area	L^2	1 clima (Roman) = 315.843984 m^2	Obsolete Roman unit of area employed in ancient times. 1 clima (Roman) = 3 600 quadratus pes (legal, 1st) (E)	Roman
clo	clo	heat insulation coefficient (thermal resistance multiplied by area)	$M^{-1}T^3\Theta$	1 clo = 0.154820212639 $W^{-1}.m^2.K$	Obsolete unit of heat insulation coefficient employed in the British textile industry. One clo corresponds to the heat insulation coefficient of clothing which conserves a temperature difference of 0.1°F between its surfaces when the heat flux is equal to 1 $kcal_{15}.h^{-1}.m^{-2}$ in an environment at 21°C with air movement of 0.1 $m.s^{-1}$ 1 clo = 0.180 $(kcal_{15}.h^{-1})^{-1}$ $m^2.°C$ (E) 1 clo = 0.648 $(cal_{15}.s^{-1})^{-1}.m^2.°C$ (E) 1 clo = 0.879109939 $(Btu_{IT}.h^{-1})^{-1}.ft^2.°F$	UK
clove (UK) (customary stone)	–	mass	M	1 clove (UK) = 3.628738960 kg (E)	Obsolete British unit of mass. 1 clove (UK) = 8 lb (av.) (E)	UK
clove (UK, butter)	–	mass	M	1 clove (UK, butter) = 3.62873896 kg (E)	Obsolete British unit of mass used for weighing butter and cheese. 1 clove (UK, butter) = 8 lb (E)	UK
clumsily	–	dimensionless fluctuations of interest rates	nil	1 clumsily = 1.5625 $\times 10^{-2}$ (E)	Obsolete British and American unit used in finance to measure small dimensionless fluctuations of interest rates and the rates return of investments. 1 clumsily = (1/64)% (E)	UK, US
clusec	clusec	pumping power	ML^2T^{-3}	1 clusec = 1.33322368421 $\times 10^{-6}$ W	Obsolete unit of pumping power employed in vacuum technology. 1 clusec = 10 $\mu mHg.cm^3.s^{-1}$ (E) 1 clusec = 1.33322368421 $\times 10^{-6}$ $Pa.m^3.s^{-1}$	

ço (Chinese)	–	capacity, volume	L^3	1 ço (Chinese) = 1.03544×10^{-6} m^3	Obsolete Chinese unit of capacity used in ancient times. 1 ço (Chinese) = 1/1000 tcheng (E)	Chinese
coal skip	–	mass	M	1 coal skip = 45.359237 kg (E)	Obsolete British unit employed in coal mining industry. 1 coal skip = 100 lb (av.) (E) 1 coal skip = 1 cwt (E)	UK
cochlearia (Roman, liquid)	–	capacity, volume	L^3	1 cochlearia (Roman, liquid) = $11.4433333 \times 10^{-6}$ m^3	Obsolete Roman unit of capacity used for measuring liquids. 1 cochlearia (Roman, liquid) = 1/48 sextarius (E)	Roman
codos (Spanish) (cubit)	–	length, distance	L	1 codos (Spanish) = 4.179525×10^{-1} m	Obsolete Spanish unit of length. 1 codos (Spanish) = 1/2 vara (E)	Spanish
coefficient of performance	COP	dimensionless energy efficiency	nil	(see note)	American dimensionless unit of energy efficiency for HVAC systems (e.g., heat pumps, air conditioners, refrigerators, and freezers). It corresponds to the ratio of the useful energy output of the system divided by the electric energy input when the unit is operating in a steady-state test condi tion. Typical values are in the range 2–4. Actually, the ratio is over unity, because the system takes advantage of the heat released or absorbed by the refrigerant when it condenses or evaporates. A heat pump which delivers two units of cooling for each unit of electricity also rejects three units of heat; thus it has a COP of 2.0 for cooling or 3.0 for heat. For air conditioners, the COP is considered to equal the energy efficiency ratio (EER) divided by 3.412.	US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
coffee measure (US)	–	capacity, volume	L^3	1 coffee measure (US) $= 29.573529562 \times 10^{-6}$ m^3	Obsolete American unit of volume for measuring coffee beans for grinding. 1 coffee measure (US) = 2 tablespoons (US) (E) 1 coffee measure (US) = 1 fluid ounce (US) (E)	US
coffee spoon (US)	–	capacity, volume	L^3	1 coffee spoon (US) $= 2.46446079688 \times 10^{-6}$ m^3	Obsolete American unit of capacity used in food recipes. 1 coffee spoon (US) = 1/12 fluid ounce (US) (E) 1 coffee measure (US) = 1/6 tablespoons (US) (E)	US
coffilas (Saudi Arabian)	–	mass	M	1 coffilas (Saudi Arabian) $= 3.375 \times 10^{-3}$ kg	Obsolete Saudi Arabian traditional unit of mass used before 1962. 1 coffilas (Saudi Arabian) = 1/10 vakias (Saudi Arabian) (E)	Saudi Arabian
cohi (Thai)	–	capacity, volume	L^3	1 cohi (Thai) = 32 m^3	Obsolete Thai traditional unit of capacity used before 1923. 1 cohi (Thai) = 32000 tanan (Thai) (E)	Thai
cola (Syrian)	–	mass	M	1 cola (Syrian) = 62.475 kg	Obsolete Syrian traditional unit of mass used before 1931. 1 cola (Syrian) = 35 rottolo (Syrian) (E)	Syrian
colluthun (Persian)	–	capacity, volume	L^3	1 colluthun (Persian) $= 8.25 \times 10^{-3}$ m^3	Obsolete Persian traditional unit of capacity used before 1933. 1 colluthun (Persian) = 25 sextario (Persian) (E)	Persian
Colombian	–	length, distance	L	1 Colombian $= 5.6444444444 \times 10^{-3}$ m	Obsolete British and American traditional typographical unit of length used in printing. 1 Colombian = 16 points (E)	UK, US

column inch	–	surface area	L^2	1 column inch $= 6.45160 \times 10^{-4}$ m^2 (E)	Obsolete British and American unit of surface area used in journalism to measure the area of columns in newspapers. It is equal to a column 1 inch wide and 1 inch deep. 1 column inch = 1 square inch (E)	UK, US
condylos (Greek, Attic)	–	length, distance	L	1 condylos (Greek, Attic) $= 3.857 \times 10^{-2}$ m	Obsolete Greek unit of length employed in ancient times. 1 condylos (Attic) = 1/8 pous (E)	Attic
congius (Roman gallon)	–	capacity, volume	L^3	1 congius (Roman gallon) $= 3.29568 \times 10^{-3}$ m^3	Obsolete Roman unit of volume employed in ancient times. It was used for capacity measurements of liquids. 1 congius (Roman gallon) = 6 sextarius (E)	Roman
coomb (UK)	–	capacity, volume	L^3	1 coomb (UK) $= 145.474944 \times 10^{-3}$ m^3	Obsolete British unit of volume. 1 coomb (UK) = 4 bushels (UK) (E) 1 coomb (UK) = 32 gallons (UK) (E)	UK
copas (Spanish)	–	capacity, volume	L^3	1 copas (Spanish) $= 0.12221203125 \times 10^{-3}$ m^3 (water)	Obsolete Spanish unit of capacity used for liquid substances. 1 copas (Spanish) = 1/128 arroba (water) (E)	Spanish
cor (Hebrew)	–	capacity, volume	L^3	1 cor (Hebrew) $= 214.20 \times 10^{-3}$ m^3 (of water)	Obsolete Hebrew unit of capacity used in ancient times. Measured by weight. 1 cor (Hebrew) = 10 ephah (new)	Hebrew
cord (UK, wood)	cd (UK)	capacity, volume	L^3	1 cord (UK, wood) $= 3.624556364$ m^3	Obsolete British unit of capacity which was employed for stacked logs of wood. It was equal to a pile of wood cut 4 feet long, piled 4 feet high and 8 feet wide. 1 cord (UK) = 8 cord-ft (E) 1 cord (UK) = 128 ft^3 (E) 1 cord (UK) = 1536 board foot measure (E)	UK

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
cord (US)	cd	capacity, volume	L^3	1 cord (US) = 3.624556364 m^3 (E)	American unit of volume used to measure stacked fire wood. The cord is legally defined as the volume of a stack of firewood 4 feet wide, 8 feet long, and 4 feet high. 1 cord (US) = 4 ft × 4 ft × 8 ft (E) 1 cord (US) = 128 cubic feet (E)	US
cord-foot	cord-ft	capacity, volume	L^3	1 cord-foot = 453.069545472 × 10^{-3} m^3	Obsolete British unit of capacity. 1 cord-foot = 1/8 cord (E) 1 cord-foot = 16 ft^3 (E)	UK
corde (Haitian)	–	capacity, volume	L^3	1 corde (Haitian) = 3.5525733227 m^3	Obsolete Haitian traditional unit of capacity used before 1920. 1 corde (Haitian) = 12/25 toise cube (Haitian) (E)	Haitian
cordele (Cuban)	–	surface area	L^2	1 cordele (Cuban) = 414.2037037 m^2	Obsolete Cuban traditional unit of surface area used in land measurements before 1882. 1 cordele (Cuban) = 1/27 fanega (Cuban) (E)	Cuban
corta (Balearic)	–	mass	M	1 corta (Balearic) = 3.672 kg	Obsolete Balearic traditional unit of mass. 1 corta (Balearic) = 9 rottolo (Balearic) (E)	Balearic
corterade (Montpellier)	–	surface area	L^2	1 corterade (Montpellier) = 2877 m^2	Obsolete local French unit of surface area used for land measurements in south-western France before the revolution of 1789.	French
coss (Indian, Bombay)	–	length, distance	L	1 coss (Indian, Bombay) = 1371.6 m	Obsolete Indian traditional unit of length used before 1920. 1 coss (Indian, Bombay) = 2000 guz (Indian, Bombay) (E)	Indian

coss (Indian, Calcutta)	–	length, distance	L	1 coss (Indian, Calcutta) = 1830 m	Obsolete Indian traditional unit of length used before 1920. 1 coss (Indian, Calcutta) = 2000 guz (Indian, Calcutta) (E)	Indian
cosse (Provence)	–	surface, area	L^2	1 cosse (Provence) = 39 m^2 (E)	Obsolete French unit of land surface area used in surveyor measurements and agriculture in Southern France. 1 cosse (Provence) = 0.39 ares (E)	French
cottah (Indian, Bombay)	–	surface area	L^2	1 cottah (Indian, Bombay) = 37.62573120 m^2	Obsolete Indian traditional unit of surface used in land measurements before 1920. 1 cottah (Indian, Bombay) = 80 square guz (Indian, Bombay) (E)	Indian
cottah (Indian, Calcutta)	–	surface area	L^2	1 cottah (Indian, Calcutta) = 66.978 m^2	Obsolete Indian traditional unit of surface used in land measurements before 1920. 1 cottah (Indian, Calcutta) = 80 square guz (Indian, Calcutta)	Indian
cotton (hand)	–	specific length	$M^{-1}L$	1 cotton = 1693.36181735 $m.kg^{-1}$	Obsolete American and British unit employed in the textile industry. 1 cotton = 840 $yd.lb^{-1}$ (E)	UK, US
cotyle (Greek, Attic) [χοτυλη]	–	capacity, volume	L^3	1 cotyle (Greek, Attic) = 0.27×10^{-3} m^3	Obsolete Greek unit of volume employed in ancient times. It was used for capacity measurements of both liquid and dry substances. 1 cotyle (Greek, Attic) = 1/4 chenix (E)	Attic
coudée (de Paris) (French cubit)	–	length, distance	L	1 coudée (de Paris) = 0.487259125051 m (E)	Obsolete French unit of length employed before the French Revolution (1789). It was equal to the distance between the elbow and the tip of the middle finger. 1 coudée (de Paris) = 18 pouces (de Paris)	French
coulomb	C	quantity of electricity, electric charge	IT	**SI derived unit** 1 C = 1 A.s (E)	The coulomb is the electric charge transported in one second by a current of one ampere. The unit is named after the French scientist C.A. Coulomb (1736–1806).	SI

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
coulomb (int.)	C (int.)	quantity of electricity, electric charge	IT	1 coulomb (int.) = 0.99985 C	Obsolete American unit.	IEUS
coulomb metre per joule	$C.m.J^{-1}$	1st electrical hyper-susceptibility	$M^{-1}L^{-1}T^{3}I$	**SI derived unit** 1 $C.m.J^{-1} = 1\ kg^{-1}.m^{-1}.s^{3}.A$ (E)	The relationship between electrical susceptibilities and polarization ($C.m^{-2}$) is given by the equation: $\vec{P} = \chi_m \varepsilon_0 \vec{E} + (1/2)\ \chi^{(2)} \varepsilon_0 E^2 + (1/6)\ \chi^{(3)} \varepsilon_0 E^3 + \cdots$	SI
coulomb per cubic metre	$C.m^{-3}$	electric charge density	$IT.L^{-3}$	**SI derived unit**		SI
coulomb per kilogram	$C.kg^{-1}$	exposure, specific electrical charge	ITM^{-1}	**SI derived unit.**	1 $C.kg^{-1} = 3.875968992 \times 10^{3}$ roentgen	
coulomb per square metre	$C.m^{-2}$	surface density of charge, electric flux density, electric displacement	ITL^{-2}	**SI derived unit.**	The coulomb per square metre is the unit of electric displacement in a capacitor where electrodes are two parallel planes, of infinite area, separated by a vacuum and which has an electric surface charge density of one coulomb per square metre.	SI
coulomb (thermal)	$J.K^{-1}$	entropy	$ML^{2}T^{-2}\Theta^{-1}$	1 coulomb (thermal) = 1 $J.K^{-1}$ (E)	SI unit used for convenience when dealing with electrical and thermal analogies.	SI
count	ct	dimensionless number of entities	nil	*n* count = *n* entities (E)	British and American commercial unit used in the food industry to measure the quantity of fruits. e.g., box apple 12 ct. = 12 apples in the box	UK, US
count	ct	number of threads per unit length	L^{-1}	1 count = 39.37007874 m^{-1}	Obsolete British and American unit used to measure the number of threads per inch. 1 count = 1 threads per inch (E)	UK, US
covada (Portuguese)	–	length, distance	L	1 covada (Portuguese) = 6.570×10^{-1} m	Obsolete Portuguese unit of length. 1 covada (Portuguese) = 2 pe (E)	Portuguese
covid (Ceylon)	–	length, distance	L	1 covid (Ceylon) = 0.464 m	Obsolete Ceylonese traditional unit of length used before 1920.	Ceylon

covid (Indian, Bombay)	–	length, distance	L	1 covid (Indian, Bombay) = 0.3429 m	Obsolete Indian traditional unit of length used before 1920. 1 covid (Indian, Bombay) = 1/2 guz (Indian, Bombay) (E)	Indian
covid (Indian, Calcutta)	–	length, distance	L	1 covid (Indian, Calcutta) = 0.4575 m	Obsolete Indian traditional unit of length used before 1920. 1 covid (Indian, Calcutta) = 1/2 guz (Indian, Calcutta) (E)	Indian
covid (Madras)	–	length, distance	L	1 covid (Madras) = 0.472 m	Obsolete Madrasian traditional unit of length used before 1920.	Madras
covid (Saudi Arabian)	–	length, distance	L	1 covid (Saudi Arabian) = 0.482 m	Obsolete Saudi Arabian traditional unit of length used before 1962. 1 covid (Saudi Arabian) = 482/635 farsakh (Saudi Arabian) (E)	Saudi Arabian
cran (mease)	cran	capacity, volume	L^3	1 cran = $170.478450 \times 10^{-3}$ m^3	Obsolete unit of capacity employed in the fishing industry (1796). It describes the amount of herrings and it is equal to the number of herrings which can be packed into a standard box of volume of 37.5 gal (UK) (named from the Gaelic, 1796). 1 cran ≈ 750 herrings	UK
crinal	crinal	force, weight	MLT^{-2}	1 crinal = 10^{-1} N (E)	Obsolete unit of force. 1 crinal = 1 $kg.dm.s^{-2}$ (E)	
crith	crith	mass	M	1 crith = $8.99384520569 \times 10^{-5}$ kg (1 atm, 273.15 K), 1 crith = $8.87623509074 \times 10^{-5}$ kg (1 bar, 273.15 K)	Obsolete unit of weight employed to measure mass of gas. It was equal to the mass of one litre of hydrogen in the standard state. Old standard (P = 101 325 Pa, T = 273.15 K New standard $P = 10^5$ Pa, T = 273.15 K	

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
crocodile	-	electric potential, electric potential difference, electromotive force	$ML^2T^{-3}I^{-1}$	1 crocodile = 10^6 V (E)	Obsolete British unit of electric potential employed in nuclear physics. 1 crocodile = 1 MV (E)	UK
cron	cron	time, period, duration	T	1 cron = 3.15576×10^{13} s	Unit of time employed in geology. It was suggested by J.S. Huxley in 1957. 1 cron = 1 My (E) = 1 Ma (E) 1 cron = 10^6 years (E)	
crosa	-	length, distance	L	1 crosa = 3656 m	Obsolete Indian unit of length used in ancient times. 1 crosa = 8000 hasta (E)	Indian
cuadra (Argentinian)	–	length, distance	L	1 cuadra (Argentinian) = 129.90 m	Obsolete Argentinian traditional unit of length used before 1887. 1 cuadra (Argentinian) = 150 vara (Argentinian) (E)	Argentinian
cuadra (Chilean)	–	length, distance	L	1 cuadra (Chilean) = 125.4 m	Obsolete Chilean traditional unit of length used before 1865. 1 cuadra (Chilean) = 150 bara (Chilean) (E)	Chilean
cuadra (Colombian)	–	length, distance	L	1 cuadra (Colombian) = 80 m	Obsolete Colombian traditional unit of length used before 1854. 1 cuadra (Colombian) = 100 vara (Colombian) (E)	Colombian
cuadra (Paraguayan)	–	length, distance	L	1 cuadra (Paraguayan) = 86.6 m	Obsolete Paraguayan traditional unit of length used before 1899. 1 cuadra (Paraguayan) = 100 vara (Paraguayan) (E)	Paraguayan
cuarta (Argentinian)	–	capacity, volume	L^3	1 cuarta (Argentinian) = 593.75×10^{-6} m^3	Obsolete Argentinian traditional unit of capacity used for liquids before 1887. 1 cuarta (Argentinian) = 1/4 frasco (Argentinian) (E)	Argentinian

cuarta (Colombian)	–	length, distance	L	1 cuarta (Colombian) = 0.200 m	Obsolete Colombian traditional unit of length used before 1854. 1 cuarta (Colombian) = 1/4 vara (Colombian) (E)	Colombian
cuarta (Costa-Rican)	–	length, distance	L	1 cuarta (Costa-Rican) = 0.209825 m	Obsolete Costa-Rican traditional unit of length used before 1912. 1 cuarta (Costa-Rican) = 1/4 vara (Costa-Rican) (E)	Costa-Rican
cuarta (Guatemalan)	–	length, distance	L	1 cuarta (Guatemalan) = 0.208975 m	Obsolete Guatemalan traditional unit of length used before 1912. 1 cuarta (Guatemalan) = 1/4 vara (Guatemalan) (E)	Guatemalan
cuarta (Honduran)	–	length, distance	L	1 cuarta (Honduran) = 0.2032 m	Obsolete Honduran traditional unit of length used before 1912. 1 cuarta (Honduran) = 1/4 vara (Honduran) (E)	Honduran
cuarta (Paraguayan)	–	capacity, volume	L^3	1 cuarta (Paraguayan) $= 0.750 \times 10^{-3}$ m^3	Obsolete Paraguayan traditional unit of capacity used before 1899. 1 cuarta (Paraguayan) = 1/4 frasco (Paraguayan) (E)	Paraguayan
cuarta (Venezuelan)	–	length, distance	L	1 cuarta (Venezuelan) = 0.200 m	Obsolete Venezuelan traditional unit of length used before 1857. 1 cuarta (Venezuelan) = 1/4 vara (Venezuelan) (E)	Venezuelan
cuartilla (Argentinian)	–	capacity, volume	L^3	1 cuartilla (Argentinian) $= 34.299425 \times 10^{-3}$ m^3	Obsolete Argentinian traditional unit of capacity used for dry substances before 1887. 1 cuartilla (Argentinian) = 1/4 fanega (Argentinian) (E)	Argentinian
cuartilla (Spanish)	-	capacity, volume	L^3	1 cuartilla (Spanish) $= 3.91079050 \times 10^{-3}$ m^3 (water)	Obsolete Spanish unit of capacity used for liquid substances. 1 cuartilla (Spanish) = 1/4 arroba (water) (E)	Spanish

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
cuartilla (Spanish)	-	surface, area	L^2	1 cuartilla (Spanish) = 17.4684292255 m^2	Obsolete Spanish unit of area. 1 cuartilla (Spanish) = 25 sq. vara (E)	Spanish
cuartilla (Spanish, dry)	-	capacity, volume	L^3	1 cuartilla (Spanish, dry) = 13.875250 $\times 10^{-3}$ m^3	Obsolete Spanish unit of capacity used for dry substances. 1 cuartilla (Spanish, dry) = 1/4 fanega (E)	Spanish
cuartillo (Chilean)	–	capacity, volume	L^3	1 cuartillo (Chilean) = 1.010375 $\times 10^{-3}$ m^3	Obsolete Chilean traditional unit of capacity used before 1865. 1 cuartillo (Chilean) = 1/8 almude (Chilean) (E)	Chilean
cuartillo (Costa-Rican)	–	capacity, volume	L^3	1 cuartillo (Costa-Rican) = 0.4921875 $\times 10^{-3}$ m^3 to 0.5234375 $\times 10^{-3}$ m^3	Obsolete Costa-Rican traditional unit of capacity used before 1912. 1 cuartillo (Costa-Rican) = 1/32 cajuella (Costa-Rican) (E)	Costa-Rican
cuartillo (Guatemalan)	–	capacity, volume	L^3	1 cuartillo (Guatemalan) = 0.4921875 $\times 10^{-3}$ m^3 to 0.5234375 $\times 10^{-3}$ m^3	Obsolete Guatemalan traditional unit of capacity used before 1912. 1 cuartillo (Guatemalan) = 1/32 cajuella (Guatemalan) (E)	Guatemalan
cuartillo (Honduran)	–	capacity, volume	L^3	1 cuartillo (Honduran) = 0.4921875 $\times 10^{-3}$ m^3 to 0.5234375 $\times 10^{-3}$ m^3	Obsolete Honduran traditional unit of capacity used before 1912. 1 cuartillo (Honduran) = 1/32 cajuella (Honduran) (E)	Honduran
cuartillo (Mexican, dry)	–	capacity, volume	L^3	1 cuartillo (Mexican, dry) = 1.8918 $\times 10^{-3}$ m^3	Obsolete Mexican traditional unit of capacity used for dry substances before 1896. 1 cuartillo (Mexican, dry) = 1/96 carga (Mexican, dry) (E)	Mexican
cuartillo (Mexican, oil)	–	capacity, volume	L^3	1 cuartillo (Mexican, oil) = 0.506162 $\times 10^{-3}$ m^3	Obsolete Mexican traditional unit of capacity used for liquids before 1896. 1 cuartillo (Mexican, oil) = 1/18 jarra (Mexican, oil) (E)	Mexican

cuartillo (Mexican, wine)	–	capacity, volume	L^3	1 cuartillo (Mexican, wine) $= 0.456264 \times 10^{-3}$ m^3	Obsolete Mexican traditional unit of capacity used for liquids before 1896. 1 cuartillo (Mexican, wine) = 1/18 jarra (Mexican, wine) (E)	Mexican
cuartillo (Nicaraguan)	–	capacity, volume	L^3	1 cuartillo (Nicaraguan) $= 0.4921875 \times 10^{-3}$ m^3 to 0.5234375×10^{-3} m^3	Obsolete Nicaraguan traditional unit of capacity used before 1912. 1 cuartillo (Nicaraguan) = 1/32 cajuella (Nicaraguan) (E)	Nicaraguan
cuartillo (Salvadoran)	–	capacity, volume	L^3	1 cuartillo (Salvadoran) $= 0.4921875 \times 10^{-3}$ m^3 to 0.5234375×10^{-3} m^3	Obsolete Salvadoran traditional unit of capacity used before 1912. 1 cuartillo (Salvadoran) = 1/32 cajuella (Salvadoran) (E)	Salvadoran
cuartillo (Spanish)	-	capacity, volume	L^3	1 cuartillo (Spanish) $= 0.4888488125 \times 10^{-3}$ m^3 (water)	Obsolete Spanish unit of capacity used for liquid substances. 1 cuartillo (Spanish) = 1/32 arroba (water) (E)	Spanish
cuartillo (Spanish, dry)	-	capacity, volume	L^3	1 cuartillo (Spanish, dry) $= 1.156270834 \times 10^{-3}$ m^3	Obsolete Spanish unit of capacity used for dry substances. 1 cuartillo (Spanish, dry) = 1/48 fanega (E)	Spanish
cubem (cubic int. stat. mile)	cubem, cu. mi (int. stat.)	capacity, volume	L^3	1 cubem $= 4.168218182544 \times 10^9$ m^3	Obsolete American and British unit of volume. 1 cubem = 1 cubic mile (int. stat) (E)	UK, US
cubi (Eritrean)	–	length, distance	L	1 cubi (Eritrean) = 0.32 m	Obsolete Eritrean traditional unit of length used before 1927. 1 cubi (Eritrean) = 16/23 derah (Eritrean) (E)	Eritrean
cubic attometre	am^3	capacity, volume	L^3	1 $am^3 = 10^{-54}$ m^3 (E)	Submultiple of the SI derived unit.	SI
cubic centimetre	cm^3	capacity, volume	L^3	1 $cm^3 = 10^{-6}$ m^3(E)	Submultiple of the SI derived unit.	SI

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
cubic centimetre (Mohr cubic centimetre)	cc	capacity, volume	L^3	1 cc = 1.00238 × 10^{-6} m^3(E)	Obsolete unit of capacity which was employed in pharmacy. It is equal to the volume occupied by one gram of pure water measured at 17.5°C. The unit is named after C.F. Mohr (1806–1879).	
cubic Coulomb cubic metre per square joule	$C^3.m^3.J^{-2}$	1st hyper-polarizability	$M^{-2}L^{-1}T^7I^3$	**SI derived unit** 1 $C^3.m^3.J^{-2}$ = 1 $kg^{-2}.m^{-1}.s^7$ .A^3 (E)	The relationship between electric dipolar moment (C.m) and hyperpolarizabilities is given by the equation: $p = \tilde{\alpha}E + (1/2)\tilde{\alpha}^{(2)}E^2 + (1/6)\tilde{\alpha}^{(3)}E^3 + \cdots$ with $\tilde{\alpha} = \alpha\varepsilon_0$	SI
cubic decametre	dam^3	capacity, volume	L^3	1 dam^3 = 10^3 m^3 (E)	Multiple of the SI derived unit.	SI
cubic decimetre	dm^3	capacity, volume	L^3	1 dm^3 = 10^{-3} m^3 (E)	Submultiple of the SI derived unit.	SI
cubic exametre	Em^3	capacity, volume	L^3	1 Em^3= 10^{54} m^3 (E)	Multiple of the SI derived unit.	SI
cubic femtometre	fm^3	capacity, volume	L^3	1 fm^3 = 10^{-45} m^3 (E)	Submultiple of the SI derived unit.	SI
cubic fod (Danish, liq.)	–	capacity, volume	L^3	1 cubic fod (Danish, liq.) = 30.9168655760 ×10^{-3} m	Obsolete Danish traditional unit of capacity used for liquids before 1912. 1 cubic fod (Danish, liq.) = 32 pott (Danish, liq.) (E)	Danish
cubic foot	ft^3, cu. ft	capacity, volume	L^3	1 ft^3 = 2.8316846592 × 10^{-2} m^3 (E)	British and American legal unit of capacity. 1 ft^3 = 1728 in^3 (E)	UK, US, FPS
cubic foot per minute	cfm, $ft^3.min^{-1}$	volume flow rate	L^3T^{-1}	1 $ft^3.min^{-1}$ = 4.719474432 × 10^{-4} $m^3.s^{-1}$	1 $ft^3.min^{-1}$ = 0.4719474432 $l.s^{-1}$	UK, US
cubic foot per pound	$ft^3.lb^{-1}$	specific volume	L^3M^{-1}	1 $ft^3.lb^{-1}$ = 6.24279605761 × 10^{-2} $m^3.kg^{-1}$	British and American unit of specific volume.	UK, US, FPS
cubic foot per second	cfs, $ft^3.s^{-1}$	volume flow rate	L^3T^{-1}	1 $ft^3.s^{-1}$ = 28.316846590 × 10^{-3} $m^3.s^{-1}$	1 $ft^3.s^{-1}$ = 28.316846659 $l.s^{-1}$	UK, US, FPS
cubic foot per UK ton	$ft^3.ton^{-1}$	specific volume	L^3M^{-1}	ft^3.(UK) ton^{-1} = 2.78696252571 × 10^{-5} $m^3.kg^{-1}$	Obsolete British unit of specific volume.	UK

cubic gigametre	Gm^3	capacity, volume	L^3	1 $Gm^3 = 10^{27}$ m^3 (E)	Multiple of the SI base unit.	SI
cubic hectometre	hm^3	capacity, volume	L^3	1 $hm^3 = 10^6$ m^3 (E)	Multiple of the SI derived unit.	SI
cubic inch	in^3, cu.in	capacity, volume	L^3	1 $in^3 = 1.6387064 \times 10^{-5}$ m^3 (E)	British and American legal unit of capacity.	UK, US
cubic inch per pound	$in^3.lb^{-1}$	specific volume	L^3M^{-1}	1 $in^3.lb^{-1}$ $= 3.612729200 \times 10^{-5}$ $m^3.kg^{-1}$	British and American unit of specific volume.	UK, US
cubic kilometre	km^3	capacity, volume	L^3	1 $km^3 = 10^9$ m^3 (E)	Multiple of the SI derived unit.	SI
cubic megametre	Mm^3	capacity, volume	L^3	1 $Mm^3 = 10^{18}$ m^3 (E)	Multiple of the SI derived unit.	SI
cubic metre	m^3	capacity, volume	L^3	**SI derived unit**	The cubic metre is the unit of capacity which is equal to the volume of a metre cube.	SI
cubic metre per coulomb	$m^3.C^{-1}$	Hall coefficient	$L^3I^{-1}T^{-1}$	**SI derived unit**		SI
cubic metre per hour	$m^3.h^{-1}$	volume flow rate	L^3T^{-1}	1 $m^3.h^{-1} = 2.7777777 \times 10^{-4}$ $m^3.s^{-1}$	1 $m^3.h^{-1} = [1/3600]$ $m^3.s^{-1}$ (E)	
cubic metre per kilogram	$m^3.kg^{-1}$	specific volume	L^3M^{-1}	**SI derived unit**		SI
cubic metre per mole	$m^3.mol^{-1}$	molar refraction, second virial coefficient	L^3N^{-1}	**SI derived unit**		SI
cubic metre per second	$m^3.s^{-1}$	volume flow rate	L^3T^{-1}	**SI derived unit**	The cubic metre per second is the SI derived unit of flow rate. It is equal to one cubic metre of a homogenous fluid which flows uniformly in one second.	SI
cubic micrometre	μm^3	capacity, volume	L^3	1 $\mu m^3 = 10^{-18}$ m^3 (E)	Submultiple of the SI derived unit.	SI
cubic millimetre	mm^3	capacity, volume	L^3	1 $mm^3 = 10^{-9}$ m^3 (E)	Submultiple of the SI derived unit.	SI
cubic nanometre	nm^3	capacity, volume	L^3	1 $nm^3 = 10^{-27}$ m^3 (E)	Submultiple of the SI derived unit.	SI
cubic petametre	Pm^3	capacity, volume	L^3	1 $Pm^3 = 10^{45}$ m^3 (E)	Multiple of the SI derived unit.	SI
cubic picometre	pm^3	capacity, volume	L^3	1 $pm^3 = 10^{-36}$ m^3 (E)	Submultiple of the SI derived unit.	SI
cubic terametre	Tm^3	capacity, volume	L^3	1 $Tm^3 = 10^{36}$ m^3 (E)	Multiple of the SI derived unit.	SI

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
cubic yard	yd^3, cu.yd	capacity, volume	L^3	1 $yd^3 = 764.554857984 \times 10^{-3}$ m^3(E)	British and American official unit of capacity. 1 $yd^3 = 27$ ft^3 (E) 1 $yd^3 = 46\,656$ in^3 (E)	UK, US
cubic yoctometre	ym^3	capacity, volume	L^3	1 $ym^3 = 10^{-72}$ m^3 (E)	Submultiple of the SI derived unit.	SI
cubic yottametre	Ym^3	capacity, volume	L^3	1 $Ym^3 = 10^{72}$ m^3 (E)	Multiple of the SI derived unit.	SI
cubic zeptometre	zm^3	capacity, volume	L^3	1 $zm^3 = 10^{-63}$ m^3 (E)	Submultiple of the SI derived unit.	SI
cubic zettametre	Zm^3	capacity, volume	L^3	1 $Zm^3 = 10^{63}$ m^3 (E)	Multiple of the SI derived unit.	SI
cubic zira (Turkish)	–	capacity, volume	L^3	1 cubic zira (Turkish) = 1 m^3 (E)	Obsolete Turkish traditional unit of capacity used before 1933. 1 cubic zira (Turkish) = 1 m^3 (E)	Turkish
cubit (Arabic, new)	–	length, distance	L	1 cubit (Arabic, new) = 4.80×10^{-1} m	Obsolete Arabic unit of length used in ancient times. 1 cubit (Arabic, new) = 3/2 feet (Arabic) (E)	Arabic
cubit (Greek, Attic)	–	length, distance	L	1 cubit (Greek, Attic) = 0.617120 m	Obsolete Greek unit of length employed in ancient times. 1 cubit (Attic) = 2 pous (E)	Attic
cubit (Hachemic, Arabic)	–	length, distance	L	1 cubit (Hachemic, Arabic) = 0.640 m	Obsolete Arabic unit of length used in ancient times. 1 cubit (Hachemic, Arabic) = 2 feet (Arabic) (E)	Arabic
cubit (Hebrew)	–	length, distance	L	1 cubit (Hebrew) = 0.555 m	Obsolete Hebrew unit of length used in ancient times. Base unit in the system of length.	Hebrew
cubit (Hebrew, sacred system)	–	length, distance	L	1 cubit (Hebrew, sacred system) = 0.640 m	Obsolete Hebrew unit of length used in ancient times 1 cubit (sacred, Hebrew) = 2 zereth (E)	Hebrew

cubit (new, Arabic)	–	length, distance	L	1 cubit (new, Arabic) = 0.480	Obsolete Arabic unit of length used in ancient times. 1 cubit (new, Arabic) = 3/2 feet (Arabic) (E)	Arabic
cubit (Moroccan)	–	length, distance	L	1 cubit (Moroccan) = 0.533750 m	Obsolete traditional Moroccan unit of length used before 1923. 1 cubit (Moroccan) = 7 tonni (Moroccan) (E)	Moroccan
cubit (Persian, long)	–	length, distance	L	1 cubit (Persian, long) = 0.640 m	Obsolete unit of length in the Assyrio-Chaldean-Persian system used in ancient times. 1 long cubit (Persian) = 2 zereth (E)	Persian
cubit (UK)	cu	length, distance	L	1 cubit (UK) = 0.4572 m (E)	Obsolete British unit of length. It was equal to the distance between the elbow and the tip of the middle finger. 1 cubit (UK) = 3/2 foot (E) 1 cubit (UK) = 9/2 hands (UK) (E) 1 cubit (UK) = 6 palms (UK) (E) 1 cubit (UK) = 18 inches (UK) (E) 1 cubit (UK) = 216 lines (UK) (E)	UK
cubito (Somalian)	–	length, distance	L	1 cubito (Somalian) = 0.560 m	Obsolete Somalian traditional unit of length used before 1950. 1 cubito (Somalian) = 1/7 top (Somalian) (E)	Somalian
cubitus (Roman) [Roman cubit]	–	length, distance	L	1 cubitus (Roman) = 0.4416 m	Obsolete Roman unit of length employed in ancient times. 1 cubitus (Roman) = 3/2 pes (E) 1 cubitus = 1 palmipes + 2 palmus (E)	Roman
cudava (Indian)	–	capacity, volume	L^3	1 cudava (Indian) $= 0.4125 \times 10^{-3}$ m^3 (of water)	Obsolete Indian unit of capacity used in ancient times. Measured by weight. 1 cudava (Indian) = 1/32 drona (E)	Indian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
cuddy (Saudi Arabian)	–	capacity, volume	L^3	1 cuddy (Saudi Arabian) $= 3.80 \times 10^{-3}$ m^3	Obsolete Saudi Arabian traditional unit of capacity used for liquids before 1962. 1 cuddy (Saudi Arabian) = 4 nusfiah (Saudi Arabian) (E)	Saudi Arabian
cuerda (Paraguayan)	–	length, distance	L	1 cuerda (Paraguayan) = 24.05555555556 m	Obsolete Paraguayan traditional unit of length used before 1899. 1 cuerda (Paraguayan) = 250/9 vara (Paraguayan) (E)	Paraguayan
cuerda (Puerto-Rican)	–	surface area	L^2	1 cuerda (Puerto-Rican) = 3930.395628 m^2	Obsolete Puerto-Rican unit of surface area extensively used by surveyors for measuring land. 1 cuerda (Puerto-Rican) = 4500 square vara (E)	Puerto-Rican
cuerta (Argentinian)	–	capacity, volume	L^3	1 cuerta (Argentinian) $= 114 \times 10^{-3}$ m^3	Obsolete Argentinian traditional unit of capacity used for liquids before 1887. 1 cuerta (Argentinian) = 48 frasco (Argentinian) (E)	Argentinian
culleus (Roman hogshead) [dolium]	–	capacity, volume	L^3	1 culleus (Roman hogshead) $= 527.30880 \times 10^{-3}$ m^3	Obsolete Roman unit of volume employed in ancient times. It was used for capacity measurements of liquids. 1 culleus (Roman hogshead) = 960 sextarius (E)	Roman
cumbha (Indian)	–	capacity, volume	L^3	1 cumbha (Indian) $= 264 \times 10^{-3}$ m^3(of water)	Obsolete Indian unit of capacity used in ancient times. Measured by weight. 1 cumbha (Indian) = 20 drona (E)	Indian
cumec (musec)	cumec	volume flow rate	L^3T^{-1}	1 cumec=1 $m^3.s^{-1}$ (E)	Obsolete American and British unit of volume flow rate used in chemical engineering and fluid dynamics. 1 cumec = 1 musec (E)	US, UK
cun (Chinese) [tsouen]	–	length, distance	L	1 cun (Chinese) $= 3.2 \times 10^{-2}$ m	Obsolete Chinese unit of length used in ancient times.	Chinese

					1 cun = 1/10 tchi (E) 1 cun = 3.2 cm (E)	
cup (metric)	–	length, distance	L	1 cup (metric) = 0.2 m (E)	Obsolete American metric unit of length.	US
cup (US, length)	–	length, distance	L	1 cup (US) = 0.2365882 m	Obsolete American unit of length.	US
cup (US, liq.)	cup (US, liq.)	capacity, volume	L^3	1 cup (US, liq.) $= 2.365882365 \times 10^{-4}$ m^3	Obsolete American unit of capacity. 1 cup (US, liq.) = 1/16 gal (US, liq.) 1 cup (US, liq.) = 8 fl. oz (US) (E) 1 cup (US, liq.) ≈ 236.59 cm^3	US
curie	Ci	radioactivity	T^{-1}	1 Ci = 3.7×10^{10} Bq (E)	Obsolete unit of radioactivity. One Curie is equal exactly to the radioactivity of a source which has the same radioactivity as one gram of the radium isotope $^{226}_{88}Ra$ in secular equilibrium with its radon derivative, $^{222}_{86}Rn$. The unit is named after the two famous French scientists Pierre and Marie Curie. The Ci is still in use.	INT
curie per litre	Ci/l	radioactivity concentration	$L^{-3}T^{-1}$	1 Ci/l = 3.7×10^{13} $Bq.m^{-3}$ (E)	Obsolete unit.	
cusec	–	volume flow rate	L^3T^{-1}	1 cusec $= 2.83168465920 \times 10^{-2}$ $m^3.s^{-1}$	Obsolete British unit of flow rate. It was used in vacuum pump technology. The name of the unit derived from the acronym of **cu**bic foot per **sec**ond. 1 cusec = 1 $ft^3.s^{-1}$ (E)	UK
cut (UK, asbestos)	–	specific length	LM^{-1}	1 cut (UK, asbestos) $= 201.59062542$ $m.kg^{-1}$ (E)	Obsolete British unit to measure specific length of glass wool and asbestos yarn. 1 cut (UK, asbestos) = 100 yd/lb (E) 1 cut (UK, asbestos) = 1/10 typp (E)	UK
cut (UK, cotton)	–	length, distance	L	1 cut (UK, cotton) = 65.8368 m (E)	Obsolete British unit to measure length of cotton yarn. 1 cut (UK, cotton) = 1/210 spindles (E) 1 cut (UK, cotton) = 7/12 skeins (E) 1 cut (UK, cotton) = 1/12 hank (E) 1 cut (UK, cotton) = 72 yards (E)	UK

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
cut (UK, linen)	–	length, distance	L	1 cut (UK, linen) = 274.320 m (E)	Obsolete British unit of length used for measuring the length of wet-spun linen yarn. 1 cut (UK, linen) = 300 yards (E) 1 cut (UK, linen) = 1/2 heer (UK, linen) (E)	UK
cut (UK, wool)	–	length, distance	L	1 cut (UK, wool) = 42.672 m (E)	Obsolete British unit to measure length of wool yarn. 1 cut (UK, wool) = 46 2/3 yards (E) 1 cut (UK, wool) = 1/18 hanks (E) 1 cut (UK, wool) = 1/324 spindles (E)	UK
cwierc (Polish)	–	capacity, volume	L^3	1 cwierc (Polish) = 32×10^{-3} m^3 (E)	Obsolete traditional Polish unit of capacity used before 1919. 1 cwierc (Polish) = 32 kwarta (Polish) (E)	Polish
cyanthos (Greek, Attic)	–	capacity, volume	L^3	1 cyanthos (Greek, Attic) = 4.5×10^{-5} m^3	Obsolete Greek unit of volume employed in ancient times. It was used for capacity measurements of dry substances. 1 cyanthos (Greek, Attic) = 1/24 chenix (E)	Attic
cyathus (Roman)	–	capacity, volume	L^3	1 cyathus (Roman) = 4.577333×10^{-5} m^3	Obsolete Roman unit of volume employed in ancient times. It was used for capacity measurements of liquids. 1 cyathus (Roman gallon) = 1/12 sextarius (E)	Roman
cycle per second (cycle)	cps, $c.s^{-1}$, cy, c	frequency	T^{-1}	1 $cycle.s^{-1} = 1$ s^{-1} (E)	Old frequency unit employed in broadcasting. Precursor of the hertz. 1 $cycle.s^{-1} = 1$ Hz (E)	UK, INT
D unit	–	exposure	ITM^{-1}	1 D unit = 258×10^{-4} $C.kg^{-1}$ (E)	Obsolete unit of exposure to X-rays. It was introduced in 1925. 1 D unit = 100 röntgens (E) (sometimes 102 roentgens)	

dain (Burmese)	–	length, distance	L	1 dain (Burmese) = 3911.6 m	Obsolete Burmese traditional unit of length used before 1920. 1 dain (Burmese) = 7000 sandong (Burmese) (E)	Burmese
daktylos (Greek, Attic) [Greek finger]	–	length, distance	L	1 daktylos (Greek, Attic) $= 1.928500 \times 10^{-2}$ m	Obsolete Greek unit of length employed in ancient times. 1 daktylos (Attic) = 1/16 pous (E)	Attic
dalton (atomic unit of mass)	u, uma, Da	mass	M	1 Da = $1.660540210 \times 10^{-27}$ kg	The atomic unit of mass u(^{12}C) is equal to the fraction 1/12 of the mass of the carbon 12 atom. The unit is named after J. Dalton (1766–1844).	
dan (Chinese) (shih)	–	mass	M	1 dan (Chinese) = 71.61792 kg	Obsolete Chinese unit of mass. 1 dan (Chinese) = 120 jin (E)	Chinese
danar (Persian)	–	mass	M	1 danar (Persian) = 0.184 kg	Obsolete Persian traditional unit of mass used before 1933. 1 danar (Persian) = 20 dirhem (Persian) (E)	Persian
danda (Indian, Bombay)	–	length, distance	L	1 danda (Indian, Bombay) = 1.3716 m	Obsolete Indian traditional unit of length used before 1920. 1 danda (Indian, Bombay) = 2 guz (Indian, Bombay) (E)	Indian
danda (Indian, Calcutta)	–	length, distance	L	1 danda (Indian, Calcutta) = 1.83 m	Obsolete Indian traditional unit of length used before 1920. 1 danda (Indian, Calcutta) = 2 guz (Indian, Calcutta) (E)	Indian
daneq (Arabic)	–	surface, area	L^2	1 daneq (Arabic) = 983.040 m^2	Obsolete Arabic unit of area used in ancient times. 1 daneq (Arabic) = 1/6 feddan (E)	Arabic

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
daniell	–	electric potential, electric potential difference, electromotive force	$ML^2T^{-3}I^{-1}$	1 daniell = 1.042 V (E)	Obsolete international unit of electromotive force used prior to the discovery of the Weston electrochemical cell. It was defined as the e.m.f of a Daniell primary electrochemical cell [(-)Zn(Hg)/ soln. 5–10wt% $ZnSO_4$ and 20 wt% H_2SO_4// satd. soln. $CuSO_4$/Cu(+)]. The experimental error was circa 4 mV. 1 daniell = 1.042 V(E) (by definition)	INT
danoranja (Yugoslavian)	–	surface area	L^2	1 danoranja (Yugoslavian) = 3591.820320 m^2	Obsolete traditional Yugoslavian unit of surface area used in land measurements before 1883. 1 danoranja (Yugoslavian) = 35 970 square stopa (E)	Yugoslavian
danskmil (Danish mile)	–	length, distance	L	1 danskmil (Danish mile) = 7.5325×10^3 m	Obsolete Danish unit of length.	Danish
daraf	–	electric elastance	$ML^2T^{-4}I^{-2}$	1 daraf = 1 F^{-1} (E)	Obsolete American unit of elastance employed to express the reciprocal electric capacitance. The name is derived by writing farad backwards.	US
darce	–	hydrodynamic permeability, permeability coefficient	L^2	1 darce = 10^{-12} m^2 (E)	Obsolete permeability unit employed in the oil industry, hydrology and civil engineering according to Darcy's equation, $Q_v = (KA/\eta)\Delta P/x$, one darce corresponds to a fluid having a dynamic viscosity (η) of one centipoise flowing at a volume flow rate ($\dot{v}$) of one cubic centimetre per second across a porous medium with a cross-sectional area (A) of one square centimetre and with one centimetre thickness (x) under a pressure differential of 1 bar (ΔP). 1 darce = 1 μm^2 (E)	

darcy	–	hydrodynamic permeability	L^2	1 darcy = $9.86923266716 \times 10^{-13}$ m^2	Obsolete unit of permeability. It was employed in the oil industry, hydrology and civil engineering to measure the permeability of porous matter according to Darcy's equation, $Q_v = (KA/\eta)\Delta P/x$, one darcy corresponds to the volume of liquid, having a dynamic viscosity of one centipoise, which flows through an area of one square centimetre of a porous medium in one second when it undergoes a pressure gradient of one atm per cm of length. The unit is named after H. Darcy (1803–1858). 1 darcy = 0.986923260716 μm^2	
daribah (Egyptian)	–	capacity, volume	L^3	1 daribah (Egyptian) = 1.584 m^3	Obsolete Egyptian traditional unit of capacity used before 1891. 1 daribah (Egyptian) = 768 keddah (Egyptian) (E)	Egyptian
dartung (Persian)	–	mass	M	1 dartung (Persian) = $1.022222222 \times 10^{-3}$ kg	Obsolete Persian traditional unit of mass used before 1933. 1 dartung (Persian) = 1/9 dirhem (Persian) (E)	Persian
darwin	–	evolutionary rate of change	T^{-1}	(see note)	Unit of evolutionary rate of change. The unit is named after C. Darwin (1809–1882). It was proposed for evolutionary rate of change measurements of a biological species (animal or botanical). One darwin corresponds to an evolution (disappearance, increase) which changes with a factor $e \approx 2.78$ in one million years.	
dash (US)	dash	capacity, volume	L^3	1 dash (US) = $2.95735295625 \times 10^{-6}$ m^3 (US)	Obsolete American unit of capacity used in food recipes. 1 dash (US) = 0.1 fl oz (US) (E)	US
day (anomalistic)	d (anom.)	time, period, duration	T	1 day (anomalistic) = 86 402.28063 s		

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
day (Bessel)	d (Bessel)	time, period, duration	T	1 day (Bessel) = 86 400.75452 s		
day (calendar)	d	time, period, duration	T	1 day (calendar) = 86 400 s (E)		
day (Gaussian)	d (Gauss.)	time, period, duration	T	1 day (Gaussian) = 86 402.10483 s		
day (sidereal)	d (sider.)	time, period, duration	T	1 day (sidereal) = 86 164 s		
day (solar mean)	d (solar mean)	time, period, duration	T	1 day (solar mean) = 86 400 s (E)		
day (tropical)	d (tropical)	time, period, duration	T	1 day (tropical) = 86 398.16556 s		
dBZ	dBZ	radar reflectivity	nil	(see note)	Unit of radar reflectivity used in meteorology. It is equal to the amount of energy returned to a weather radar site as a function of the amount transmitted. The scale is logarithmic, designed after the model of the decibel. For instance, a difference of 10 dBZ indicates a 10-fold increase in energy returned.	Meteorology
deben (Egyptian)	–	mass	M	1 deben = 13.65×10^{-3} kg	Obsolete Egyptian unit of mass used in ancient times.	Egyptian
debye	D	electric dipole moment	ITL	1 D = $3.335640952 \times 10^{-30}$ C.m (E)	Obsolete unit of electric dipole moment employed in molecular physics and in physical chemistry. The unit is named after P.J.W. Debye (1884–1966). 1 D = 10^{-18} esu (cgs) 1 D = 10^{-18} Fr.cm (E)	

decade	–	time, period, duration	T	1 decade = 3.155760 $\times 10^6$ s (E)	British and American unit of time equal to 10 years. 1 decade = 10 years (E) 1 decade = 120 months (E) 1 decade = 520 weeks (E) 1 decade = 3652.5 days (E) 1 decade = 87 660 hours (E)	UK, US
decagram	dag	mass	M	1 dag = 10^{-2} kg (E)	Submultiple of the SI base unit. 1 dag = 10 g (E)	SI
decametre	dam	length, distance	L	1 dam = 10 m (E)	Multiple of the SI base unit.	SI
decastère	dast	capacity, volume	L^3	1 dast = 10 m^3 (E)	Multiple of MTS unit.	MTS
decay time	t	relative time	nil	(see note)	Dimensionless unit of relative time used in nuclear physics. It is equal to the time required for an exponentially decaying process to decrease to 1/e ≈36.78794412% of its original value. The fraction of activity remaining at time T = $n \times$t measured in decay time units, is simply e^{-n}. The decay time equals ln2 (≈ 0.693147181) the half life. t = $1/\lambda$ and $T_{1/2}$ = ln2 × t	INT
decempeda (Roman) [Roman perch]	–	length, distance	L	1 decempeda (Roman) = 2.944 m	Obsolete Roman unit of length employed in ancient times. 1 decempeda (Roman) = 10 pes (E)	Roman
decempeda quadrata (Roman)	–	surface, area	L^2	1 decempeda quadrata (Roman) = 8.66713600 m^2	Obsolete Roman unit of area employed in ancient times. 1 decempeda quadrata (Roman) = 100 quadratus pes (E)	Roman
decibel	dB	logarithm (Briggsian) of a ratio of two sound powers	nil	1 dB = 0.1 B (E) (see note)	The decibel submultiple of the bel expresses the ratio of two sound pressures (P_1, P_0) or intensity levels (I_1, I_0) as a Briggs logarithm difference according to *(continued overleaf)*	

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
decibel *(continued)*					the equation S (dB) = 10 $\log_{10}$ (I/I_0), where I_o is the threshold sound intensity level (SIL) of hearing defined as 10^{-12} W.m^{-2}. For sound pressure levels (SPL), S (dB) = 20 $\log_{10}$ (P/P_0) where P_0 is the threshold sound pressure level detected by the human ear defined as 2×10^{-4} barye @ 1000 Hz (2×10^{-5} Pa). The unit is named after A.G. Bell (1847–1922). 1 dB = $1/20 \ln(10) N_p(E) \approx 0.1151293 Np$	
decigram	dg	mass	M	1 dg = 10^{-4} kg (E)	Submultiple of the SI base unit 1 dg = 10^{-1} g (E)	SI
decimetre	dm	length, distance	L	1 dm = 10^{-1} m (E)	Submultiple of the SI base unit.	SI
decistère	dst	capacity, volume	L^3	1 dst = 10^{-1} m^3 (E)	Submultiple of MTS unit	MTS
decitonne (quintal)	dt, q	mass	M	1 dt = 100 kg (E)	Obsolete French metric unit of mass still used in a few countries. Submultiple of the MTS base unit.	MTS, French
degree	°	plane angle	α	1° = $1.74532925199 \times 10^{-3}$ rad	1° = π/180 rad (E) 1° = 400/360 grade (E)	INT
degree hydrotimètrique français	°THF, °f	hardness of water, concentration of calcium and magnesium in water	nil	1 °THF = 10 mg of $CaCO_3$ per 1000 cm^3 of water	French unit employed to express hardness of water.	French
degree per second	°.s^{-1}	angular velocity, angular frequency, circular frequency	αT^{-1}	1 °.s^{-1} = $1.74532925199 \times 10^{-2}$ rad.s^{-1}	1°.s^{-1} = (π/180) rad.s^{-1}	
dekan	–	plane angle	α	1 dekan = 0.174532925199 rad	Obsolete unit of plane angle equal to 1/36 of a circle (i.e., 2π radians). The ancient Egyptians divided the circle of the Zodiac into 36 divisions, which the Greeks called dekans. The unit is still used occasionally	

					in astrology, where one dekan equals 1/3 sign. 1 dekan = 1/3 sign (E) 1 dekan = 10° (E)	
delta	δ (/ppm)	chemical shift	nil	$\delta(/\text{ppm}) = 10^6[(\nu - \nu_0)/\nu_0]$	Unit of chemical shift used in NMR spectroscopy. ν_0 is the resonance frequency of a reference molecule such as tetramethylsilane (TMS) for proton–NMR and ^{13}C–NMR resonance spectra. $\tau = 10 - \delta$ (E)	INT
delta (decadic)	A_{10}, A, DO	decadic absorbance	mil	$A_{10} = \log_{10}[I_0(\lambda)/I(\lambda)]$	Unit of decadic absorbance used in spectroscopy. It is equal to the logarithm in base ten of the ratio of spectral intensity of an incident light beam to the spectral intensity of the output light beam. $A_{10} = A_e/\ln 10$ (E)	INT
delta (napierian)	A_e, B	decadic absorbance	nil	$A_e = \ln[I_0(\lambda)/I(\lambda)]$	Unit of napierian absorbance used in spectroscopy. It is equal to the napierian logarithm of the ratio of spectral intensity of an incident light beam to the spectral intensity of the output light beam $A_e = A_{10} \times \ln 10$ (E)	INT
demal	D	normality	NL^{-3}	1 demal = 10^3 eq.m^{-3} (E)	Obsolete unit of normality employed in chemistry. 1 demal = 1 eq.l^{-1} (E)	
demiard	–	capacity, volume	L^3	1 demiard = $2.841307500 \times 10^{-4}$ m^3	Obsolete UK unit of capacity 1 demiard = 10 fl.oz (UK) (E) 1 demiard = 1/2 pint (UK) (E)	UK
denarius (Roman)	–	mass	M	1 denarius (Roman) = $3.89285714286 \times 10^{-3}$ kg	Obsolete Roman unit of mass used ancient times. 1 denarius (Roman) = 1/7 uncia (E)	Roman
denaro (Italian)	–	mass	M	1 denaro (Italian) = 1.0659722×10^{-3} kg	Obsolete Italian unit of mass. 1 denaro (Italian) = 1/288 libbra (E)	Italian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
denier	den, denier	linear mass density	ML^{-1}	1 denier $= 1.111111111 \times 10^{-7}$ kg.m^{-1}	Obsolete French unit of linear mass density employed in the textile industry. It served to express the thickness of thread, yarn and textile fibres. The denier is equal to the weight expressed in grams, of a thread of 9000 m length. 1 denier = 1/9 tex (E)	French
denier (de Paris) [French scruple]	–	mass	M	1 denier (de Paris) $= 1.27475481771 \times 10^{-3}$ kg	Obsolete French unit of mass employed before the French Revolution (1789). 1 denier (de Paris) = 1/384 livre (de Paris) (E)	French
denier (Roman)	–	mass	M	1 denier (Roman) $= 3.406250 \times 10^{-3}$ kg	Obsolete Roman unit of mass used in ancient times. 1 denier (Roman) = 1/8 uncia (E)	Roman
denke (Turkish)	–	mass	M	1 denke (Turkish) $= 801.875 \times 10^{-6}$ kg	Obsolete Turkish traditional unit of mass used before 1933. 1 denke (Turkish) = 1/1600 oka (Turkish) (E)	Turkish
denum (Libyan)	–	surface area	L^2	1 denum (Libyan) = 739.84 m^2	Obsolete Libyan traditional unit of surface area used in land measurements before 1927. 1 denum (Libyan) = 1600 square pic (Libyan) (E)	Libyan
depa (Indonesian)	–	length, distance	L	1 depa (Indonesian) = 1.70 m	Obsolete Indonesian traditional unit of length used before 1923. 1 depa (Indonesian) = 4 hasta (Indonesian) (E)	Indonesian
derah (Egyptian) [cubit]	–	length, distance	L	1 derah (Egyptian) = 0.449580 m	Obsolete Egyptian unit of length used in ancient times.	Egyptian
derah (Egyptian) [Royal cubit]	–	length, distance	L	1 derah (Royal, Egyptian) = 0.5235 m	Obsolete Egyptian unit of length used in ancient times.	Egyptian

derah (Eritrean)	–	length, distance	L	1 derah (Eritrean) = 0.460 m	Obsolete Eritrean traditional unit of length used before 1927. 1 derah (Eritrean) = 23/16 cubi (Eritrean) (E)	Eritrean
derime (Abyssinian)	–	mass	M	1 derime (Abyssinian) = 2.59166666667 $\times 10^{-3}$ kg	Obsolete Abyssinian traditional unit of mass used before 1927. 1 derime (Abyssinian) = 1/120 rottolo (Abyssinian) (E)	Abyssinian
dessatine	–	surface, area	L^2	1 dessatine = 10.92539750 m^2	Obsolete Russian unit of area 1 dessatine = 2400 square saashens (E)	Russian
dessert spoon (US)	dsp	capacity, volume	L^3	1 dessert spoon (US) = 9.8578431875 $\times 10^{-6}$ m^3 (E)	American unit of capacity used in food recipes. 1 dessert spoon (US) = 2 teaspoons (US) (E) 1 dessert spoon (US) = 1/3 fluid ounce (US) (E)	US
dessert spoonful (US)	dspf	capacity volume	L^3	1 dessert spoonful (US) = 9.8578431875 $\times 10^{-6}$ m^3 (E)	American unit of capacity used in food recipes. 1 dessert spoonful (US) = 2 teaspoons (US) (E) 1 dessert spoonful (US) = 1/3 fluid ounce (US) (E)	US
deunx (Roman)	–	mass	M	1 deunx (Roman) = 299.75 $\times$ 10^{-3} kg	Obsolete Roman unit of mass used in ancient times. 1 deunx (Roman) = 11 unciae (Roman) (E)	Roman
dextans (Roman)	–	mass	M	1 dextans (Roman) = 272.50 $\times$ 10^{-3} kg	Obsolete Roman unit of mass used in ancient times. 1 dextans (Roman) = 10 unciae (Roman) (E)	Roman
dextre (Montpellier)	–	surface area	L^2	1 dextre (Montpellier) = 19.20 m^2	Obsolete local French unit of surface area used for land measurements after 1789. It corresponds to the surface that a farmer can sow using 1/75 sétier of seeds. 1 carton (Montpellier) = 1/75 sétérée (E) 1 carton (Montpellier) = 2/75 carton (E)	French

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
dha (Burmese)	–	length, distance	L	1 dha (Burmese) = 3.9116 m	Obsolete Burmese traditional unit of length used before 1920. 1 dha (Burmese) = 7 sandong (Burmese) (E)	Burmese
dhanush [orgyla] [Indian fathom]	–	length, distance	L	1 dhanush = 1.828 m	Obsolete Indian unit of length used in ancient times. 1 dhanush = 4 hasta (E)	Indian
dharana (Indian)	–	mass	M	1 dharana (Indian) = 4.70×10^{-3} kg	Obsolete Indian unit of mass used in ancient times. 1 dharana (Indian) = 1/10 pala (E)	Indian
dhurra (Indian)	–	mass	M	1 dhurra (Indian) = 4.6652 kg	Obsolete Indian traditional unit of mass used before 1920. 1 dhurra (Indian) = 5 seer (Indian) (E)	Indian
diameter	dia, X	optical lens magnification	nil	1 diameter = 1 magnification (see note)	Obsolete British and American unit of lens magnification used in optical instruments, equivalent to power. The word power tends to be used as an adjective in turns such as '100-power eyepiece' or '10-power binoculars', while the word diameters often appears in declarative statements of magnification, such as 'the eyepiece lens magnifies 100 diameters'.	UK, US
diamond (printing)	–	length, distance	L	1 diamond (printing) = $1.411111111 \times 10^{-3}$ m	Obsolete British and American traditional typographical unit of length used in printing. 1 diamond (printing) = 4 points (E)	UK, US
diamond (US)	–	length, distance	L	1 diamond (US) = 0.48768 m	Obsolete American unit of length used in marking on US tape measures that is useful to carpenters who wish to place five studs in an 8 feet distance. 1 diamond (US) = 8/5 feet (E)	US

diaulos (Greek, Attic)	–	length, distance	L	1 diaulos (Greek, Attic) = 370.2720 m	Old Greek unit of length used in ancient times. 1 diaulos (Greek, Attic) = 2 stadia (E) 1 diaulos (Greek, Attic) = 1200 pous (E)	Attic
dichas (Egyptian)	–	length, distance	L	1 dichas (Egyptian) = 1.745×10^{-1} m	Obsolete Egyptian unit of length used in ancient times. 1 dichas = 1/3 Royal cubit (E) 1 dichas = 1/2 Royal foot (E)	Egyptian
dichas (Greek, Attic)	–	length, distance	L	1 dichas (Greek, Attic) = 1.542800×10^{-1} m	Obsolete Greek unit of length employed in ancient times. 1 dichas (Attic) = 1/2 pous (E)	Attic
dicker (UK)	–	dimensionless number of entities	T	1 dicker (UK) = 10 entities (E)	Obsolete dimensionless British unit of quantity equal to 10. It is named after the English translation of the Latin, *decem*, ten. After being used for centuries, especially by traders in furs and skins, the dicker has nearly disappeared from the English language.	UK
diedo (Spanish)	–	length, distance	L	1 diedo (Spanish) = $1.741468750 \times 10^{-2}$ m	Obsolete Spanish unit of length. 1 diedo (Spanish) = 1/48 vara (E)	Spanish
digit (Egyptian)	–	length, distance	L	1 digit (Egyptian) = 1.090625×10^{-2} m	Obsolete Egyptian unit of length used in ancient times. 1 digit = 1/48 Royal cubit (E)	Egyptian
digit (UK)	–	length, distance	L	1 digit (UK) = 19.05×10^{-3} m (E)	Obsolete British unit of length. It is equal to the width of a finger. The word is named after the Latin, *digitus*, finger or toe. 1 digit (UK) = 3/4 in (E)	UK
digitus (Roman) [Roman finger]	–	length, distance	L	1 digitus (Roman) = 1.84×10^{-2} m	Obsolete Roman unit of length employed in ancient times. 1 digitus (Roman) = 1/16 pes (E)	Roman
dihrem (Arabic)	–	mass	M	1 dihrem (Arabic) = 2.833333×10^{-3} kg	Obsolete Arabic unit of mass used in ancient times. System of the Prophet. 1 dihrem (Arabic) = 1/120 rotl (E)	Arabic

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
dimension	dim, D	number of space independent directions	nil	(see note)	Mathematical dimensionless unit measuring the number of independent directions in space. 1D =1 dim = linear, line 2D = 2 dim = planar, area 3D = 3 dim = space, volume	INT
dimerla (Romanian, dry)	–	capacity, volume	L^3	1 dimerla (Romanian, dry) = 24.6 $\times 10^{-3}$ m^3	Obsolete traditional Romanian unit of capacity used for dry substances before 1884. 1 dimerla (Romanian, dry) = 16 oke (Romanian) (E)	Romanian
dimigrade	dmgr	plane angle	a	1 dimigrade = 1.57079632680 $\times 10^{-6}$ rad	Obsolete name for a submultiple of grade used in the French artillery. The name comes from contraction of **d**ec i**milli**grade. 1 dimigrade = 1/10 000 gon (E) 1 dimigrade = 1/10 000 grade (E)	French
dinero (Spanish)	–	mass	M	1 dinero (Spanish) = 1.19815885417 $\times$ 10^{-3} kg	Obsolete Spanish unit of mass. 1 dinero (Spanish) = 1/384 libra (E)	Spanish
diobol (Greek, Attic)	–	mass	M	1 diobol (Greek, Attic) = 1.44 $\times$ 10^{-3} kg	Obsolete Greek unit of mass used in ancient times. 1 obol (Greek, Attic) = 1/3 drachma (Greek, Attic)	Attic
dioptre	δ	refractive power	L^{-1}	**SI derived unit** 1 dioptre = 1 m^{-1} (E)	The dioptre describes the refractive power of an optical system which has a focal length of 1 metre in a medium having a refractive index of one.	SI
diraa (Egyptian)	–	length, distance	L	1 diraa (Egyptian) = 0.58 m	Obsolete Egyptian traditional unit of length used before 1891. 1 diraa (Egyptian) = 1 pic (Egyptian) (E)	Egyptian

dirham (Turkish)	–	mass	M	1 dirham (Turkish) $= 3.2075 \times 10^{-3}$ kg	Obsolete Turkish traditional unit of mass used before 1933. 1 dirham (Turkish) = 1/400 oka (Turkish) (E)	Turkish
dirhem (Egyptian)	–	mass	M	1 dirhem (Egyptian) $= 28.08 \times 10^{-3}$ kg	Obsolete Egyptian traditional unit of mass used before 1891. 1 dirhem (Egyptian) = 9/400 oke (Egyptian) (E)	Egyptian
dirhem (Persian)	–	mass	M	1 dirhem (Persian) $= 9.2 \times 10^{-3}$ kg	Obsolete Persian traditional unit of mass used before 1933. 1 dirhem (Persian) = 1/50 rottel (Persian) (E)	Persian
djarib (Arabic)	–	surface, area	L^2	1 djarib (Arabic) = 1474.56 m^2	Obsolete Arabic unit of area used in ancient times. 1 djarib (Arabic) = 1/4 feddan (E)	Arabic
djeril (Turkish)	–	surface area	L^2	1 djeril (Turkish) = 10 000 m^2	Obsolete Turkish traditional unit of surface area used before 1933 for land measurements. 1 djeril (Turkish) = 1 hectare (E)	Turkish
dobson (Dobson unit)	DU	concentration of ozone in the air expressed as partial pressure	$ML^{-1}T^{-2}$	1 DU = $5.87051395054 \times 10^{-5}$ $mol.m^{-3}$ 1 DU = 1.31581699687 ppm vol. O_3 1 DU = $1.33322368421 \times 10^{-3}$ Pa of O_3	Unit employed in meteorology which is equal to the amount of ozone contained in atmospheric air. One dobson is equal to the height of the column expressed in µmHg (0°C) which corresponds to the amount of ozone contained in air. The unit is named after G.M.B. Dobson (1889–1970). 1 DU = 10^{-3} mmHg	
dodrans (Roman)	–	mass	M	1 dodrans (Roman) $= 245.25 \times 10^{-3}$ kg	Obsolete Roman unit of mass used in ancient times. 1 dodrans (Roman) = 9 unciae (Roman) (E)	Roman

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
doli [Russian grain]	–	mass	M	1 doli = $4.443545784 \times 10^{-5}$ kg	Obsolete Russian unit of mass used before 1917 for general uses. 1 doli = 1/9216 funt (E)	Russian
doli (Russian) [apothecary]	–	mass	M	1 doli (Russian) = $4.443494030 \times 10^{-5}$ kg	Obsolete Russian unit of mass used before 1917 in pharmacy.	Russian
dolichos (Greek, Attic)	–	length, distance	L	1 dolichos (Greek, Attic) = 2221.632 m	Old Greek unit of length used in ancient times. 1 dolichos (Greek, Attic) = 6 diaulos (E) 1 dolichos (Greek, Attic) = 12 stadia (E) 1 dolichos (Greek, Attic) = 7200 pous (E)	Attic
dolium (Roman hogshead) [culleus]	–	capacity, volume	L^3	1 dolium (Roman hogshead) = 527.3088×10^{-3} m^3	Obsolete Roman unit of volume employed in ancient times. It was used for capacity measurements of liquids. 1 culleus (Roman hogshead) = 960 sextarius (E)	Roman
dollar	dollar	reactivity of nuclear power reactor	nil	1 dollar = 10^{-5} (E)	Obsolete American unit of nuclear reactivity employed in nuclear engineering.	US
dong (Annamese)	–	mass	M	1 dong (Annamese) = 3.775×10^{-3} kg	Obsolete Annamese traditional unit of mass used before 1914. 1 dong (Annamese) = 1/18 000 kwan (Annamese) (E)	Annamese
donkey	–	power	ML^2T^{-3}	1 donkey = 248.566623860 W (E)	Obsolete British unit of power. 1 donkey ≈ 1/3 HP (550 $lbf.ft.s^{-1}$)	UK
donum (Cypriot)	–	surface area	L^2	1 donum (Cypriot) = 1337.80377776 m^2	Obsolete Cypriot traditional unit of surface area used in land measurements used before 1972. 1 donum (Cypriot) = 36 000 square pic (Cypriot) (E)	Cypriot

donum (Turkish)	–	surface area	L^2	1 donum (Turkish) = 913 m^2	Despite being obsolete the donum 'or dunum' is the unit of surface area used before 1933 for land measurements and originally imposed by the Turkish on the Ottoman Empire including the Middle East and the Balkans. It was defined as the amount a pair of oxen can plough in one day. Its value varies with location, and it was later standardized as 1210 square yards, or a quarter of an acre. Sometimes, in Mesopotamia and Arabia, it corresponds to 3600 square yards, and hence was the equivalent of the journal. 1 donum (Turkish) = 1600 square pics (Turkish) (E)	Turkish
donum (Turkish, metric)	–	surface area	L^2	1 donum (Turkish, metric) = 1000 m^2	Modernized traditional Turkish metric unit of surface area used for land measurements. The Turkish Government stated in 1939 that a donum was equal to a decare (i.e., 1000 square metres). 1 donum (Turkish, metric) = 1 decare (E)	Ottoman
donum (Yugoslavian)	–	surface area	L^2	1 donum (Yugoslavian) = 698.9920 m^2	Obsolete traditional Yugoslavian unit of surface area used in land measurements before 1883. 1 donum (Yugoslavian) = 7000 square stopa (E)	Yugoslavian
doon (Thai)	–	mass	M	1 doon (Thai) = 24 kg	Obsolete Thai traditional unit of mass used before 1923. 1 doon (Thai) = 25 600 grani (Thai) (E)	Thai
doppelzentner (Prussian)	–	mass	M	1 doppelzentner = 102.896420 kg (E)	Obsolete German unit of mass. 1 doppelzentner = 220 pfund (E)	German
dots (points) per inch	dpi, ppi	graphic resolution	L^{-1}	1 dpi = 39.3700787402 point.m^{-1}	Unit employed in computer science to describe graphic resolution.	INT

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
double pace (US, military)	–	length, distance	L	1 double pace (US, military) = 0.9144 m (E)	Old American unit of length used in the United States Army as official military double pace. 1 double pace (US, military) = 36 inches (E)	US
double remen (Egyptian)	–	length, distance	L	1 double remen (Egyptian) = 0.74034079902 m	Obsolete Egyptian unit of length used in ancient times. It was equal to the length of the diagonal of a square having its sides equal to one royal cubit (0.5235 m).	Egyptian
douzième	1/12	length, distance	L	1 douzième (Swiss) = 188×10^{-6} m (E)	Obsolete Swiss traditional unit of length used in watchmaking before 1877. It is named after the French, *douzième*, meaning twelfth. 1 douzième = 1/12 ligne (Swiss) (E)	Swiss
dozen	doz, dz	dimensionless unit of quantity	nil	1 dozen = 12 entities (E)	British and American dimensionless unit of quantity, equal to 12. From the French, *douzaine*, meaning dozen, itself a translation of Latin, *duodecem*, meaning twelve. 1 dozen = 1.2 dicker (E)	UK, US
draa (Libyan)	–	length, distance	L	1 draa (Libyan) = 0.4533333333 m	Obsolete Libyan traditional unit of length used before 1927. 1 draa (Libyan) = 2/3 pic (Libyan) (E)	Libyan
drachm (Persian)	–	mass	M	1 drachm (Persian) = 3.26×10^{-3} kg	Obsolete Persian unit of mass used in ancient times. 1 drachm (Persian) = 1/100 mine (E) 1 drachm (Persian) = 1/10 000 talent (E)	Persian
drachm (Turkish)	–	mass	M	1 drachm (Turkish) = 3.2075×10^{-3} kg	Obsolete Turkish traditional unit of mass used before 1933. 1 drachm (Turkish) = 1/400 oka (Turkish) (E)	Turkish

drachm (UK, fluid)	fl dr (UK)	capacity, volume	L^3	1 fl dr (UK) $= 3.551634375 \times 10^{-6}$ m^3	British unit used for capacity measurements for all merchandise (solids, liquids, foodstuffs, etc). 1 fl dr (UK) = 1/40 gill (UK) (E) 1 fl dr (UK) = 1/8 fl oz (UK) (E) 1 fl dr (UK) = 60 minims (UK) (E) 1 fl dr (UK) = 0.960760363080 fl dr (US, liq.)	UK
drachm (US, liq.)	fl dr (US)	capacity, volume	L^3	1 fluid drachm (US) $= 3.69669119531 \times 10^{-6}$ m^3	American unit used for capacity measurements of liquids. 1 fl dr (US) = 1/32 gills (US, liq.) (E) 1 fl dr (US) = 1/8 fl oz(US) (E) 1 fl dr (US) = 1.0408427288 fl dr (UK)	US
drachma (Greek, Attic)	–	mass	M	1 drachma (Greek, Attic) $= 4.32 \times 10^{-3}$ kg	Obsolete Greek unit of mass used in ancient times. 1 drachma (Greek, Attic) = 1/6000 Greek talent (E)	Attic
drachma (Polish)	–	mass	M	1 drachma (Polish) $= 3.1680 \times 10^{-3}$ kg	Obsolete traditional Polish unit of mass used before 1919. 1 drachma (Polish) = 1/128 funt (Polish) (E)	Polish
drachme (Austrian, apothecary)	–	mass	M	1 drachme (Austrian, apothecary) $= 4.37510416667 \times 10^{-3}$ kg	Obsolete Austrian unit of mass used in pharmacy. 1 drachme (Austrian, apothecary) = 1/96 pfund (Austrian, apothecary) (E)	Austrian
drachme (Cypriot)	–	mass	M	1 drachme (Cypriot) $= 3.175146590 \times 10^{-3}$ kg	Obsolete Cypriot traditional unit of mass used before 1972. 1 drachme (Cypriot) = 1/176 rottolo (Cypriot) (E)	Cypriot
drachme (Dutch)	–	mass	M	1 drachme (Dutch) $= 3.845060313250 \times 10^{-3}$ kg	Obsolete Dutch unit of mass. 1 drachme (Dutch) = 1/128 pond ordinary (Dutch) (E)	Dutch

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
drachme (Russian) (apothecary)	–	mass	M	1 drachme (Russian) = $3.73253498520 \times 10^{-3}$ kg	Obsolete Russian unit of mass used before 1917 in pharmacy. 1 drachme (Russian) = 84 doli (E)	Russian
drachme (Swiss, apothecary)	–	mass	M	1 drachme (Swiss, apothecary) = 3.906250×10^{-3} kg (E)	Obsolete traditional Swiss unit of mass used before 1877 in pharmacy. 1 loth (Swiss, apothecary) = 1/128 livre (Swiss) (E) 1 loth (Swiss, apothecary) = 1/96 livre (Swiss, apothecary) (E)	Swiss
drachme (Syrian)	–	mass	M	1 drachme (Syrian) = 4.4625×10^{-3} kg	Obsolete Syrian traditional unit of mass used before 1931. 1 drachme (Syrian) = 1/400 rottolo (Syrian) (E)	Syrian
dram or drachm (apothecary)	dr (ap.), dr (apoth.),	mass	M	1 dr (apoth.) = $3.887934580 \times 10^{-3}$ kg	Obsolete British and American unit of weight employed in pharmacy. It was used as a weight unit for drugs and medicine preparations (lotions, potions, ointments, plant extracts, etc). 1 dr (apoth.) = 1/96 lb (apoth.) (E) 1 dr (apoth.) = 1/8 oz (apoth.) (E) 1 dr (apoth.) = 3 scruples (apoth.) (E) 1 dr (apoth.) = 60 grains (apoth.) (E) 1 dr (apoth.) = 3.387934580 g	UK, US
dram or drachm (avoirdupois)	dr (avdp), dr (av.)	mass	M	1 dr (av.) = $1.77184519531 \times 10^{-3}$ kg (E)	Legal British and American unit of weight used since the WMA of 1963. 1 dr (av.) = 1/256 lb (av.) (E) 1 dr (av.) = 1/16 oz (av.) (E) 1 dr (av.) = 1.77184519531 g	UK, US
dram or drachm (troy)	dr (troy)	mass	M	1 dr (troy) = $3.887934580 \times 10^{-3}$ kg	Obsolete British unit of mass employed for the weighing of precious metals, precious stones and gems (diamond, ruby, sapphire) in the United Kingdom. Now	UK, US

					obsolete in the UK but remains in common use in the USA. 1 dr (troy) = 1/96 lb (troy) (E) 1 dr (troy) = 1/8 oz (troy) (E) 1 dr (troy) = 3 scruples (troy) (E) 1 dr (troy) = 60 grains (troy) (E) 1 dr (troy) = 3.387934580 g	
dram (Libyan)	–	mass	M	1 dram (Libyan) = 3.205×10^{-3} kg	Obsolete Libyan traditional unit of mass used before 1927. 1 dram (Libyan) = 1/160 rottolo (Libyan) (E)	Libyan
dramm (Yugoslavian)	–	mass	M	1 dramm (Yugoslavian) = 3.200×10^{-3} kg	Obsolete traditional Yugoslavian unit of mass used before 1883. 1 dramm (Yugoslavian) = 1/400 oka (Yugoslavian) (E)	Yugoslavian
dramme (Greek)	–	mass	M	1 dramme (Greek) = 3.2×10^{-3} kg	Obsolete traditional Greek unit of mass used before 1922. 1 dramme (Greek) = 4/625 pounds (Greek) (E)	Greek
dreiling (Austrian)	–	capacity, volume	L^3	1 dreiling (Austrian) = 1698.120 m^3	Obsolete Austrian unit of capacity used for liquid substances. 1 dreiling (Austrian) = 1200 mass (E)	Austrian
dreissiger (German, dry)	–	capacity, volume	L^3	1 dreissiger (German, dry) = 1.1581125×10^{-3} m^3	Obsolete German unit of capacity for measuring dry substances. 1 dreissiger (German, dry) = 1/32 metzen (E)	German
drex	drex	linear mass density	ML^{-1}	1 drex = 10^{-7} $kg.m^{-1}$ (E)	Obsolete American unit of linear mass density employed in the textile industry. 1 drex = 1 g.(10 000 m)$^{-1}$ (E) The name comes from **denier-tex**	US, CAN
drink (US, alcohol)	–	capacity, volume	L^3	1 drink (US, alcohol) = $14.7867647812 \times 10^{-6}$ m^3 (E)	Obsolete American unit of capacity for measuring the absolute alcohol content of *(continued overleaf)*	US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
drink (US, alcohol) *(continued)*					beverages. It was used by physicians to describe the medical effects of alcohol on the human body. 1 drink (US, alcohol) = 1/2 fl oz (US) (E)	
droit (jeweller's)	–	mass	M	1 droit (jeweller's) = $0.10416666667 \times 10^{-6}$ kg (E)	Obsolete British and American unit of mass for weighing precious stones (i.e., diamond, emerald, ruby, and sapphire) and other gemstones. 1 droit (jeweller's) = 5/96 points (jeweller's) (E) 1 droit (jeweller's) = 1/480 grain (jeweller's) (E) 1 droit (jeweller's) = 1/9600 carat (E) 1 droit (jeweller's) = 104.166667 µg	
drona (Indian)	–	capacity, volume	L^3	1 drona (Indian) = 13.2×10^{-3} m^3 (of water)	Obsolete Indian unit of capacity used in ancient times. Measured by weight.	Indian
drop (Scotland)	–	mass	M	1 drop (Scotland) = $1.94396730 \times 10^{-3}$ kg (E)	Obsolete Scottish unit of mass. 1 drop (Scotland) = 1/16 troy ounce (UK) (E) 1 drop (Scotland) = 1/192 troy pound (UK) (E)	UK
drop (Scottish)	dp	mass	M	1 drop (Scottish) = $1.92776757250 \times 10^{-3}$ kg	Obsolete traditional Scottish unit of mass used before the Weights and Measures Act of 1824. 1 drop (Scottish) = 1/320 pound (Scottish) (E)	Scottish
drop (UK)	drop (UK), min (UK),	capacity, volume	L^3	1 drop (UK) = $59.19390625 \times 10^{-9}$ m^3	British unit used for capacity measurements of all merchandise (solids, liquids, foodstuffs, etc). 1 drop (UK) = 1/76 800 gal (UK) (E) 1 drop (UK) = 1 minim (UK) (E)	UK

drop (US, apothecary)	drp, gtt	capacity, volume	L^3	1 drop (US, apothecary) = 61.6115199219 $\times 10^{-9}$ m^3 (E)	Obsolete American apothecary unit of volume equal to the minim and used in pharmacy. The derived drop is from the Latin, *gutta*, meaning drop. 1 drop (US, apothecary) = 1 minim (US, liq.) (E) 1 drop (US, apothecary) = 1/480 fl oz (US, liq.) (E 1 drop (US, apothecary) = 1/61440 gallon (US, liq.) (E)	US
drop (US, metric)	–	capacity, volume	L^3	1 drop (US, metric) = 50 $\times 10^{-9}$ m^3 (E)	Old American unit of volume standardized and used in pharmacy. 1 drop (US, metric) = 1/20 ml (E)	US
dry barrel (US)	bbl (US, dry)	capacity, volume	L^3	1 dry barrel (US) = 115.628198985 $\times$ 10^{-3} m^3	Obsolete American unit of capacity used to measure the volume of powdered or divided solid materials (flour, sand, cement, ores, etc). 1 dry barrel (US) = 26.25 gal (US, dry) (E)	US
dry bushel (US) (Winchester bushel)	bu. (US, dry)	capacity, volume	L^3	1 dry bushel (US) = 35.2390701669 $\times$ 10^{-3} m^3	Obsolete American unit of capacity used to measure the volume of powdered or divided solid materials (flour, sand, cement, ores, etc). It was defined by William III in 1702 and legally adopted in the US in 1836. It holds 77.601 pounds distilled water at 62°F. It was exactly defined as 2150.42 in^3. 1 bushel (US, dry) = 4 pecks (US, dry) (E) 1 bushel (US, dry) = 8 gallons (US, dry) (E) 1 bushel (US, dry) = 32 quarts (US, dry) (E) 1 bushel (US, dry) = 64 pints (US, dry) (E) 1 bushel (US, dry) = 0.968938545649 bushel (UK) 1 bushel (US, dry) = 2150.42 in^3 (E)	US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
dry peck (US)	pk (US, dry)	capacity, volume	L^3	1 dry peck (US) $= 8.80976754172 \times 10^{-3}$ m^3	Obsolete American unit of capacity used to measure the volume of powdered or divided solid materials (flour, sand, cement, ores, etc). 1 peck (US, dry) = 16 pints (US, dry) (E) 1 peck (US, dry) = 8 quarts (US, dry) (E) 1 peck (US, dry) = 537.605 in^3 (E) 1 peck (US, dry) = 0.968938545649 peck (UK)	US
dry pint (US)	pt (US, dry)	capacity, volume	L^3	1 dry pint (US) $= 0.550610471358 \times 10^{-3}$ m^3	Obsolete American unit of capacity used to measure the volume of powdered or divided solid materials (flour, sand, cement, ores, etc). 1 dry pint (US) = 1/8 gallons (US, dry) (E) =1/2 quart (US, dry)	US
dry quart (US)	qt (US, dry)	capacity, volume	L^3	1 dry quart (US) $= 1.10122094272 \times 10^{-3}$ m^3	Obsolete American unit of capacity used to measure the volume of powdered or divided solid materials (flour, sand, cement, ores, etc). 1 quart (US, dry) = 2 pints (US, dry) (E) 1 dry quart (US) = 1/4 gallons (US, dry) (E)	US
duella (Roman)	–	mass	M	1 duella (Roman) $= 90.833333 \times 10^{-3}$ kg	Obsolete Roman unit of mass used in ancient times. 1 duella (Roman) = 1/3 uncia (E)	Roman
duime (Dutch, inch)	–	length, distance	L	1 duime (Dutch) $= 23.5882833 \times 10^{-3}$ m	Obsolete unit of length used in Amsterdam (Netherlands). 1 duime = 1/12 voeten	Dutch
duïme (Russian inch)	–	length, distance	L	1 duïme (Russian) $= 2.54 \times 10^{-2}$ m	Obsolete Russian unit of length used before 1917. 1 duïme (Russian) = 1/12 foute (E)	Russian

dung (Persian)	–	mass	M	1 dung (Persian) $= 0.766666667 \times 10^{-3}$ kg	Obsolete Persian traditional unit of mass used before 1933. 1 dung (Persian) = 1/12 dirhem (Persian) (E)	Persian
dunum (Cypriot)	–	surface area	L^2	1 dunum (Cypriot) $= 1337.80377776$ m^2	Obsolete Cypriot traditional unit of surface area used in land measurements used before 1972. 1 dunum (Cypriot) = 36000 square pic (Cypriot) (E)	Cypriot
dunum (Turkish)	–	surface area	L^2	1 dunum (Turkish) = 913 m^2	Despite being obsolete the dunum or 'donum' is the unit of surface area used before 1933 for land measurements and originally imposed by the Turkish on the Ottoman Empire including the Middle East and the Balkans. It was defined as the amount a pair of oxen can plough in one day. Its value varies with location, and it was later standardized as 1210 square yards, or a quarter of an acre. Sometimes, in Meso potamia and Arabia, it corresponds to 3600 square yards, and hence was the equivalent of the journal. 1 dunum (Turkish) = 1600 square pics (Turkish) (E)	Turkish
dunum (Turkish, metric)	–	surface area	L^2	1 dunum (Turkish, metric) = 1000 m^2	Modernized traditional Turkish metric unit of surface area used for land measurements. The Turkish Government stated in 1939 that a dunum was equal to a decare (i.e., one thousand square metres). 1 dunum (Turkish, metric) = 1 decare (E)	Ottoman
dunun (Yugoslavian)	–	surface area	L^2	1 dunun (Yugoslavian) $= 698.9920$ m^2	Obsolete traditional Yugoslavian unit of surface area used in land measurements before 1883. 1 dunun (Yugoslavian) = 7000 square stopa (E)	Yugoslavian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
Dutch cask (UK, butter)	–	mass	M	1 Dutch cask (UK, butter) = 50.8023454400 kg (E)	Obsolete British unit of mass used for weighing butter and cheese. 1 Dutch cask (UK, butter) = 112 lb (E) 1 Dutch cask (UK, butter) = 2 firkins (E) 1 Dutch cask (UK, butter) = 14 cloves (E)	UK
duty (foot-pound-force)	ft-lbf	energy, work, heat	ML^2T^{-2}	1 ft-lbf = 1.35581794833 J	Obsolete British unit of energy. It was the work needed to displace vertically without friction a weight of one pound-force by one foot length.	UK, FPS
dycas degree	–	percentage of alcohol in wines and spirits	nil		Obsolete unit introduced in 1790.	
dyne	dyn	force, weight	MLT^{-2}	1 dyn = 10^{-5} N (E)	Obsolete cgs unit of force.	cgs
dyne per centimetre	dyn. cm^{-1}	surface tension, interfacial tension	MT^{-2}	1 dyn.cm^{-1} = 10^{-3} N.m^{-1} (E)	Obsolete cgs unit of interfacial and surface tension. 1 dyn. cm^{-1} = 1 m.N.m^{-1} (E)	cgs
dyne per square centimetre (barye, microbar, barrie)	dyn. cm^{-2}	pressure, stress	$ML^{-1}T^{-2}$	1 dyn.cm^{-2} = 10^{-1} Pa (E)	Obsolete cgs derived unit of pressure and stress. 1 dyn.cm^{-2} = 1 barye (E) 1 atm = 1 013 250 dyn.cm^{-2} (E)	cgs
dyne-centimetre	dyn.cm	moment of a force, torque	ML^2T^{-2}	1 dyn.cm = 10^{-7} N.m (E)	Obsolete cgs unit of torque.	cgs
E unit	–	rate of radiation exposure, intensity of X-rays	IM^{-1}	1 E unit = $2.57976871770 \times 10^{-4}$ C.kg^{-1}.s^{-1}	Obsolete unit of rate of exposure for X-ray radiation employed in radiochemistry. It was introduced by W. Daune in 1914. 1 E unit = 1 R.s^{-1} (E)	
EBC degree	°EBC	dimensionless coloration index	nil	(see note)	European dimensionless coloration index used to measure the coloration of beers. The unit is named after the acronym of **E**uropean **B**rewing **C**onvention. EBC degrees are related to the Lovibond	European

					degrees used in the US by the following empirical equation: $^{\circ}EBC = (^{\circ}L \times 2.65) - 1.2$	
effective dose at x per cent	ED	percentage of a population	nil	(see note)	Unit of measure used in pharmacology to express the percentage of a population which receives the desired benefit from a dose of the drug being studied (often given as a subscript). For instance, the ED50 dose is the amount of the drug which benefits 50% of the tested population.	INT
eimer (Austrian)	–	capacity, volume	L^3	1 eimer (Austrian) $= 56.604 \times 10^{-3}$ m^3	Obsolete Austrian unit of capacity used for liquid substances. 1 eimer (Austrian) = 40 mass (E)	Austrian
eimer (Hungarian)	–	capacity, volume	L^3	1 eimer (Hungarian) $= 54.30 \times 10^{-3}$ m^3	Obsolete traditional Hungarian unit of capacity used before 1876.	Hungarian
eimer (Prussian)	–	capacity, volume	L^3	1 eimer (Prussian) $= 68.7041457246 \times 10^{-3}$ m^3	Obsolete German unit of capacity used for liquid substances. 1 eimer (Prussian) = 60 quart (E) 1 eimer (Prussian) = 3840 cubic zoll (E) = 320 cubic fuss (E)	German
eimer (Swedish)	–	capacity, volume	L^3	1 eimer (Swedish) $= 78.514860 \times 10^{-3}$ m^3	Obsolete Swedish unit of capacity for liquid substances. 1 eimer (Swedish) = 30 kanna(E) 1 eimer (Swedish) = 3 kubikfot (E)	Swedish
Einheiten unit (absolute)	–	turbidity index	nil	1 Einheiten unit (absolute) = 1.0 (E)	Obsolete German unit of turbidity.	German
einstein	–	molar energy of electromagnetic radiation	$ML^2T^{-2}N^{-1}$	1 einstein $= 3.99031269082 \times 10^{-10}$ ν(Hz) J.mol^{-1}	Obsolete unit of molar energy of an electromagnetic radiation used in photochemistry. It was equal to the energy of one mole of photons having a frequency ν expressed in hertz. The unit is named after A. Einstein (1879–1955).	

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
electron classical radius	r_e	length, distance	L	$r_e = 2.817940285(31) \times 10^{-15}$ m	Fundamental physical constant. $r_e = \alpha^2 a_0$	
electron rest mass (a.u. of mass)	m_0, m_e	mass	M	1 $m_0 = 9.10938188(72) \times 10^{-31}$ kg	Fundamental physical constant. Base unit of the a.u. system.	a.u.
electronvolt	eV	energy, work, heat	ML^2T^{-2}	1 eV = $1.602176462(63) \times 10^{-19}$ J (E)	Unit of energy employed in nuclear and atomic physics. It is equal to the work done to an electron in moving it through a potential difference of one volt. The name is derived from the English acronym: equivalent Volt.	
eleventh-gram	–	mass	M	1 eleventh-gram = 10^{-14} kg (E)	Obsolete unit of mass in the practical systems of electrical unit. 1 eleventh-gram = 10^{-11} g (E)	US
ell (Flemish)	–	length, distance	L	1 ell (Flemish) = 0.6858 m (E)	Obsolete Flemish cloth unit of length. 1 ell (Flemish) = 27 inches (E)	Flemish
ell (Scottish)	–	length, distance	L	1 ell (Scottish) = 0.944875427487 m	Obsolete traditional Scottish unit of length used before the Imperial Weights and Measures Act of 1824. 1 ell (Scottish) = 37/12 feet (E)	Scottish
ell (Scottish)	–	length, distance	L	1 ell (Scottish) = 0.9398 m (E)	Obsolete Scottish cloth unit of length. 1 ell (Scottish) = 37 inches (E)	UK
ell (UK, US)	–	length, distance	L	1 ell (UK, US) = 1.143 m (E)	Obsolete American and British unit of length. 1 ell = 45 inches (E)	UK, US
elle (Dutch)	–	length, distance	L	1 elle (Dutch) = 0.707648500 m	Obsolete unit of length used in Amsterdam (Netherlands). 1 elle (Dutch) = 2.5 voetens (E)	Dutch
elle (Estonian)	–	length, distance	L	1 elle (Estonian) = 0.22860 m	1 elle (Estonian) = 3/4 foute (Estonian) (E)	Estonian

elle (Latvian)	–	length, distance	L	1 elle (Latvian) = 0.5370 m	Obsolete Latvian traditional unit of length. 1 elle (Latvian) = 4 quartier (Latvian) (E)	Latvian
elle (Prussian)	–	length, distance	L	1 elle (Prussian) $= 6.66946125 \times 10^{-1}$ m	Obsolete German unit of length. 1 elle = 17/8 fuss (E)	German
elle (Swiss)	–	length, distance	L	1 elle (Swiss) = 0.60 m (E)	Obsolete traditional Swiss unit of length before 1877. 1 elle (Swiss) = 2 fuss (Swiss) (E)	Swiss
em (US, printers)	em	length, distance	L	(see note)	American unit of length used in the printing industry. One em is the height of the point size being used. 1 em (printers) = 2 en (printers) (E)	US
eman	–	radioactivity concentration	$T^{-1}L^{-3}$	1 eman = 3700 $Bq.m^{-3}$	Obsolete unit of radioactivity concentration. It was defined in 1930 by The International Radium Standards Committee. It was employed in radiotherapy. The eman is a unit used in balneology to express the radioactivity concentration of hot springs containing the radon isotope $^{222}_{86}Rn$ (**eman**ation). 1 eman = 10^{-10} $Ci.dm^{-3}$ (E) 3.64 eman = 1 Mache unit (E)	
emerald	–	length, distance	L	1 emerald = $2.293055556 \times 10^{-3}$ m	Obsolete British typographical unit of length used in printing. 1 emerald = 6.5 points (E)	UK
éminée (Provence)	–	surface, area	L^2	1 éminée (Provence) = 775 m^2 (E)	Obsolete French unit of land surface area used in surveyors' measurements and agriculture in Southern France. 1 éminée (Provence) = 7.75 ares (E)	French
emmet (Eritrean)	–	length, distance	L	1 emmet (Eritrean) = 0.460 m	Obsolete Eritrean traditional unit of length used before 1927. 1 emmet (Eritrean) = 23/16 cubi (Eritrean) (E)	Eritrean
emu of charge (abcoulomb)	aC	quantity of electricity, electric charge	IT	1 abcoulomb = 10 C (E)	Obsolete cgs emu of electric charge.	cgs

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
emu of conductance (abmho)	aS, $(a)^{-1}$	electrical conductance	$M^{-1}L^{-2}T^{3}I^{2}$	1 abmho = 10^{9} S (E)	Obsolete cgs emu of electric conductance.	cgs
emu of current (abampere)	aA, Bi	electric current intensity	I	1 abampere = 10 A (E)	Obsolete cgs emu of electric current. 1 abampere = 1 biot (E)	cgs
emu of electric capacitance (abfarad)	aF	electric capacitance	$M^{-1}L^{-2}T^{4}I^{2}$	1 abfarad = 10^{9} F (E)	Obsolete cgs emu of electric capacitance.	cgs
emu of electric potential (abvolt)	aV	electric potential, electric potential difference, electromotive force	$ML^{2}T^{-3}I^{-1}$	1 abvolt = 10^{-8} V (E)	Obsolete cgs emu of electric potential.	cgs
emu of inductance (abhenry)	aH	electric inductance	$ML^{2}T^{-2}I^{-2}$	1 abhenry = 10^{-9} H (E)	Obsolete cgs emu of electric inductance.	cgs
emu of power (abwatt)	aW	power	$ML^{2}T^{-3}$	1 abwatt = 10^{-7} W (E)	Obsolete cgs emu of power.	cgs
emu of resistance (abohm)	aΩ	electric resistance	$ML^{2}T^{-3}I^{-2}$	1 abohm = 10^{-9} (E)	Obsolete cgs emu of electric resistance.	cgs
en (US, printers)	en	length, distance	L	(see note)	American unit of length used in the printing industry. One en is the half-height of the point size being used. 1 en (Printers) = 1/2 em (Printers) (E)	US
encablure (French cable length)	–	length, distance	L	1 encablure = 194.903650 m (E)	Obsolete French unit of length employed in navigation to describe short distances. 1 encablure = 120 brasses (E). 1 encablure = 1/10 mille (E) = 100 toises (E)	French
endere (Romanian)	–	length, distance	L	1 endere (Romanian) = 0.662 m	Obsolete Traditional Romanian unit of length used before 1884. 1 endere (Romanian) = (662/701) halibiu (Romanian) (E)	Romanian

energy efficiency rating	EER	dimensionless efficiency of an air conditioner	nil	1 EER = 0.293071070172	Dimensionless American unit used in HVAC to measure of the efficiency of an air conditioner. The EER is computed as the cooling capacity of the unit expressed in Btu(IT) per hour divided by the electric power consumed expressed in watts at a temperature of 95°F (i.e., 35°C) and under specified test conditions. Typical values of US domestic air conditioners are in the range 8000 to 12000.	US
energy factor (clothes dryers)	EF	mass of clothes per unit electric energy input	$L^{-2}T^{-2}$	1 EF (clothes dryers) = $1.25997880556 \times 10^{-7}$ kg.J^{-1} (E)	American unit defined in the US Department of Energy (DOE) and used to measure the energy efficiency of clothes dryers. It is equal to the mass of clothes dried expressed in pounds divided by the electric power consumed in kWh. 1 EF (clothes dryers) = 1 lb/kWh (E)	US
energy factor (clothes washers)	EF	volume of appliance per unit electric energy input	$M^{-1}LT^2$	1 EF (clothes washers) = $7.86579072001 \times 10^{-9}$ $m^3.J^{-1}$ (E)	American unit defined in the US Department of Energy (DOE) and used to measure the energy efficiency of clothes washers. It is equal to the volume of the washer expressed in cubic feet divided by the electric power input in kWh per washing cycle. 1 EF (clothes washers) = 1 ft^3/kWh (E)	US
energy factor (dish washers)	EF	number of cycles per electric energy input	$M^{-1}L^{-2}T^2$	1 EF (dishwashers) = $2.77777778 \times 10^{-7}$ cycles.J^{-1} (E)	American unit defined in the US Department of Energy (DOE) and used to measure the energy efficiency of dish washers. It represents the number of cycles per electric power input expressed in kWh. 1 EF (dishwashers) = 1 cycles/kWh (E)	US
engel (Dutch)	–	mass	M	1 engel (Dutch) = $1.538024125 \times 10^{-3}$ kg	Obsolete Dutch unit of mass. 1 engel (Dutch) = 1/320 pond ordinary (Dutch) (E)	Dutch

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
engjateigur (Icelandic)	–	surface area	L^2	1 engjateigur (Icelandic) = 5673.95806746 m^2	Obsolete Icelandic traditional unit of surface area used in land measurements before 1907. 1 engjateigur (Icelandic) = 1600 ferfaomur (Icelandic) (E)	Icelandic
engler (degree, second)	–	index of kinematic viscosity	nil	(see note)	Obsolete German empirical index of kinematic viscosity used in Europe. The engler degree corresponds to the efflux time expressed in seconds of 200 cm^3 of liquid through an orifice of 2.58 mm compared with the flow time of 200 cm^3 of pure water measured at 20°C in an engler viscosity meter, the latter is taken equal to 55 s. The relation is given by the Ubbelohde equation: ν ($m^2.s^{-1}$) $= 1.47 \times 10^{-7}$ t (s) $- 3.74 \times 10^{-4}$ /t (s)	UK
english	–	length, distance	L	1 english = $4.938888888889 \times 10^{-3}$ m	Obsolete British and American traditional typographical unit of length used in printing. 1 english =14 points (E)	UK, US
entelam (Eritrean)	–	capacity, volume	L^3	1 entelam (Eritrean) = 203.520×10^{-3} m^3	Obsolete Eritrean traditional unit of capacity used before 1927. 1 entelam (Eritrean) = 128 messe (Eritrean) (E)	Eritrean
entropy unit (unit of entropy)	ue, eu	molar entropy	$ML^2T^{-2}\Theta^{-1}N^{-1}$	1 ue = 4.184 $JK^{-1}mol^{-1}$	Obsolete unit of entropy. 1 ue = 4.184 $JK^{-1}mol^{-1}$	
enzyme unit (International Union of Biochemistry Unit)	U	enzyme catalytic activity	M^{-1}	1 enzyme unit = 10^6 kg^{-1} (E) (see note)	Unit of enzyme catalytic activity defined as the amount of enzyme which will catalyse the transformation of one micromole of substrate per minute under defined conditions of pH, temperature and substrate concentration.	INT

eon	eon	time, period, duration	T	1 eon = 3.15360×10^{15} s	Obsolete unit of time employed in Earth science. 1 eon = 1 Gy (E) 1 eon = 10^9 years (E)	
eotvös	Eo, E	acceleration gradient	T^{-2}	1 eotvös = 10^{-9} s^{-2} (E)	Obsolete unit of acceleration gradient employed in geophysics (gravimetry) and mine prospecting. The unit is named after the Hungarian physicist R. Eotvös (1848–1919). 1 eotvös = 10^{-9} $galcm^{-1}$ (E)	
ephah (Hebrew, new)	–	capacity, volume	L^3	1 ephah (Hebrew, new) = 21.420×10^{-3} m^3 (of water)	Obsolete Hebrew unit of capacity used in ancient times. Measured by weight.	Hebrew
ephah (Hebrew, old)	–	capacity, volume	L^3	1 ephah (Hebrew, old) = 29.376×10^{-3} m^3 (of water)	Obsolete Hebrew unit of capacity used in ancient times. Measured by weight.	Hebrew
erg	erg	energy, work, heat	ML^2T^{-2}	1 erg = 10^{-7} J (E)	Obsolete cgs unit of energy.	cgs
erg per second	$erg.s^{-1}$	power	ML^2T^{-3}	1 $erg.s^{-1}$ = 10^{-7} W (E)	Obsolete cgs unit of power.	cgs
erg per square centimetre	$erg.cm^{-2}$	surface tension, interfacial tension	MT^{-2}	1 $erg.cm^{-2}$ = 10^{-3} $J.m^{-2}$ (E)	Obsolete cgs unit of interfacial and surface tension.	cgs
erlang (traffic unit)	–	telephone traffic unit	nil	(see note)	Obsolete unit employed in telegraphy. One erlang was equal to the product $C \times T$ where C is the number of calls per hour and T is the mean duration of call. The unit is named after A.K. Erlang (1878–1929).	
es (Danish)	–	mass	M	1 es (Danish) = $54.6328671329 \times 10^{-6}$ kg	Obsolete Danish traditional unit of mass used before 1912. 1 es (Danish) = 1/9152 pund (Danish) (E)	Danish
escrupolo (Portuguese)	–	mass	M	1 escrupolo (Portuguese) = $1.195312500 \times 10^{-3}$ kg	Obsolete Portuguese unit of mass. 1 escrupolo (Portuguese) = 1/384 libra (E)	Portuguese
escrupulo (Spanish)	–	mass	M	1 escrupulo (Spanish) = $7.188953125 \times 10^{-3}$ kg	Obsolete Spanish unit of mass. 1 escrupulo (Spanish) = 1/64 libra (E)	Spanish

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
estadal (Spanish)	–	length, distance	L	1 estadal (Spanish) = 3.343620 m	Obsolete Spanish unit of length. 1 estadal (Spanish) = 4 vara (E)	Spanish
estadio (Portuguese)	–	length, distance	L	1 estadio (Portuguese) = 258.42 m	Obsolete Portuguese unit of length. 1 estadio (Portuguese) = 2360/3 pe (E)	Portuguese
estado (Spanish)	–	length, distance	L	1 estado (Spanish) = 1.671810 m	Obsolete Spanish unit of length. 1 estado (Spanish) = 2 vara (E)	Spanish
esu of charge (statcoulomb, franklin)	statC	quantity of electricity, electric charge	IT	1 statcoulomb $= 3.33564095198 \times 10^{-10}$ C	Obsolete cgs esu of electric charge. 1 statcoulomb = 1 Fr (E) 1 statcoulomb = (1/10c) A (E)	cgs
esu of conductance (statmho)	statmho	electrical conductance	$M^{-1}L^{-2}T^{3}I^{2}$	1 statmho = $1.11265005605 \times 10^{-12}$ S	Obsolete cgs esu of electric conductance. 1 statmho = $(10^{5}/c^{2})$ S (E)	cgs
esu of current (statampere)	statA	electric current intensity	I	1 statampere $= 3.33564095198 \times 10^{-10}$ A	Obsolete cgs esu of electric current. 1 statampere = (1/10c) A (E)	cgs
esu of electric capacitance (statfarad)	statF	electric capacitance	$M^{-1}L^{-2}T^{4}I^{2}$	1 statfarad = $1.11265005605 \times 10^{-12}$ F	Obsolete cgs esu of electric capacitance. 1 statfarad = $(10^{5}/c^{2})$ F (E)	cgs
esu of electric potential (statvolt)	statV	electric potential, electric potential difference, electromotive force	$ML^{2}T^{-3}I^{-1}$	1 statvolt = $2.99792458001 \times 10^{2}$ V	Obsolete cgs esu of electric potential. 1 statvolt = $(c/10^{6})$ v (E)	cgs
esu of inductance (stathenry)	statH	electric inductance	$ML^{2}T^{-2}I^{-2}$	1 stathenry = $8.987551788737 \times 10^{11}$ H	Obsolete cgs esu of electric inductance. 1 stathenry = $(10^{-5}c^{2})$ H (E)	cgs
esu of resistance (statohm)	statohm	electric resistance	$ML^{2}T^{-3}I^{-2}$	1 statohm = $8.987551788737 \times 10^{11}$	Obsolete cgs esu of resistance. 1 statohm = $(10^{-5}c^{2})$ Ω (E)	cgse-unit
e-unit	X-ray	exposure	ITM^{-1}	1 e-unit = 1.54786123062 to $2.06381497416 \times 10^{-3}$ C.kg^{-1}	Obsolete unit of X-ray exposure used in radiology. 1 e-unit = 6 to 8 roentgens	
exagram	Eg	mass	M	1 Eg = 10^{15} kg (E)	Multiple of the SI base unit 1 Eg = 10^{18} g (E)	SI
exametre	Em	length, distance	L	1 Em = 10^{18} m (E)	Multiple of the SI base unit	SI

excelsior	–	length, distance	L	1 excelsior = 1.05833333 $\times 10^{-3}$ m	Obsolete British and American traditional typographical unit of length used in printing. 1 excelsior = 3 points (E)	UK, US
exot (Agen)	–	surface area	L^2	1 exot (Agen) = 16.875 m^2	Obsolete local French unit of surface area used for land measurements in south-western France before the revolution of 1789. 1 exot (Agen) = 1/432 carterée (Agen) (E) 1 exot (Agen) = 1/72 cartonnet (Agen) (E) 1 exot (Agen) = 1/24 latte (Agen) (E)	French
f ratio	*f*/*n*		nil	(see note)	Unit to express the light-gathering power of the lenses in optical equipment (e.g., cameras and telescopes). The *f* ratio of *f*/*n* is the focal length of the lens divided by the aperture. For instance, *f*/4 indicates that the focal length is 4 times the aperture. In cameras the *f* ratio is proportional to the square root of the exposure time, hence, the *f* ratio is often said to express the speed of a lens.	
faah (Moroccan)	–	capacity, volume	L^3	1 faah (Moroccan) = 56 $\times 10^{-3}$ m^3	Obsolete traditional Moroccan unit of capacity used before 1923. 1 faah (Moroccan) = 4 mud (Moroccan) (E)	Moroccan
faden (Estonian)	–	length, distance	L	1 faden (Estonian) = 2.13360 m	Obsolete traditional Estonian unit of length used before 1900. 1 faden (Estonian) = 7 foute (Estonian) (E)	Estonian
faden (Latvian)	–	capacity, volume	L^3	1 faden (Latvian) = 4.077 m^3	Obsolete Latvian traditional unit of capacity.	Latvian
faggot (US, wood)	fgt	capacity, volume	L^3	1 faggot (US, wood) = 27.040596647 $\times 10^{-3}$ m^3	Obsolete American unit used to express the volume of stacked firewood. The faggot is equal to 3 feet in length and 2 feet in circumference. 1 faggot (US, wood) = $3/\pi$ cubic feet (E)	US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
Fahrenheit degree	°F	temperature	Θ	$T(\mathrm{K}) = 5/9[T(^\circ\mathrm{F}) + 459.67]$	Usual temperature scale in English-speaking countries. The scale is no longer in scientific use. It was invented in 1714 by the German scientist G.D. Fahrenheit (1686–1736), who set the zero at the lowest temperature he could obtain in the laboratory (by mixing ice and common salt) and took his own body temperature as 96°F. He chose 96 instead of 100 for the endscale to allow scale division multiples of 12 and 16. 32°F = 0°C (melting ice) 212°F = 100°C (boiling water) $T(^\circ\mathrm{C}) = 5/9[T(^\circ\mathrm{F}) - 32]$ $T(^\circ\mathrm{F}) = 9/5T(^\circ\mathrm{C}) + 32$	UK, US
fall (Scottish)	–	length, distance	L	1 fall (Scottish) = 5.66925256492 m	Obsolete traditional Scottish unit of length used before the Imperial Weights and Measures Act of 1824. 1 fall (Scottish) = 37/2 feet (E)	Scottish
fall (UK)	–	length, distance	L	1 fall (UK) = 6.858 m (E)	Obsolete British unit of length. It was used by surveyors in land surface area measurement such as the rod. These measurements were often made with a rope 6 ells long, and the distance falling under the rope was called a fall. 1 fall (UK) = 6 ells (UK) (E) 1 fall (UK) = 7.5 yards (E) 1 fall (UK) = 22.5 feet (UK) (E)	UK
fall (UK, area)	–	surface, area	L^2	1 fall (UK, area) = 47. 032164 m^2 (E)	Obsolete British unit of surface area equal to one square fall. It was used by surveyors in land measurements. 1 fall (UK, area) = 506.25 square feet (E) 1 fall (UK, area) = 56.25 square yards (E)	UK

					1 fall (UK, area) = 1 square fall (E)	
fally (Indian)	–	mass	M	1 fally (Indian) = 4.6652 kg	Obsolete Indian traditional unit of mass used before 1920. 1 fally (Indian) = 5 seer (Indian) (E)	Indian
famn (Swedish) (fanen)	–	length, distance	L	1 famn (Swedish) = 1.78140 m	Obsolete Swedish unit of length. 1 famn = 6 fot (E)	Swedish
fan (Annamese)	–	mass	M	1 fan (Annamese) = 3.775×10^{-4} kg	Obsolete Annameseian traditional unit of mass used before 1914. 1 fan (Annamese) = 1/10 dong (Annamese) (E)	Annamese
fanam (Ceylon and Madras)	–	mass	M	1 fanam (Ceylon and Madras) = $98.4357638889 \times 10^{-6}$ kg	Obsolete Ceylonese and Madrasian traditional unit of mass used before 1920. 1 fanam (Ceylon and Madras) = 1/2880 seer (Ceylon) (E)	Ceylonese
fanega (Argentinian)	–	capacity, volume	L^3	1 fanega (Argentinian) = 137.1977×10^{-3} m^3	Obsolete Argentinian traditional unit of capacity used for dry substances before 1887. 1 fanega (Argentinian) = 4 cuartilla (Argentinian) (E)	Argentinian
fanega (Chilean)	–	capacity, volume	L^3	1 fanega (Chilean) = 96.996×10^{-3} m^3	Obsolete Chilean traditional unit of capacity used before 1865. 1 fanega (Chilean) = 12 almude (Chilean) (E)	Chilean
fanega (Costa-Rican)	–	mass	M	1 fanega (Costa-Rican) = 92 kg	Obsolete Costa-Rican traditional unit of mass used before 1912. 1 fanega (Costa-Rican) = 4/7 carga (Costa-Rican) (E)	Costa-Rican
fanega (Cuban)	–	surface area	L^2	1 fanega (Cuban) = 11 183.50 m^2	Obsolete Cuban traditional unit of surface area used in land measurements before 1882. 1 fanega (Cuban) = 27 cordele (Cuban) (E)	Cuban

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
fanega (Guatemalan)	–	mass	M	1 fanega (Guatemalan) = 92 kg	Obsolete Guatemalan traditional unit of mass used before 1912. 1 fanega (Guatemalan) = 4/7 carga (Guatemalan) (E)	Guatemalan
fanega (Honduran)	–	mass	M	1 fanega (Honduran) = 92 kg	Obsolete Honduran traditional unit of mass used before 1912. 1 fanega (Honduran) = 4/7 carga (Honduran) (E)	Honduran
fanega (Mexican)	–	surface area	L^2	1 fanega (Mexican) = 35662.759296 m^2	Obsolete Mexican traditional unit of surface area used in land measurements before 1896. 1 fanega (Mexican) = 50 784 square vara (Mexican) (E)	Mexican
fanega (Mexican, dry)	–	capacity, volume	L^3	1 fanega (Mexican, dry) = 90.8064 $\times 10^{-3}$ m^3	Obsolete Mexican traditional unit of capacity used for dry substances before 1896. 1 fanega (Mexican, dry) = 48 cuartillo (Mexican, dry) (E)	Mexican
fanega (Nicaraguan)	–	mass	M	1 fanega (Nicaraguan) = 92 kg	Obsolete Nicaraguan traditional unit of mass used before 1912. 1 fanega (Nicaraguan) = 4/7 carga (Nicaraguan) (E)	Nicaraguan
fanega (Paraguayan)	–	capacity, volume	L^3	1 fanega (Paraguayan) = 288 $\times 10^{-3}$ m^3	Obsolete Paraguayan traditional unit of capacity used before 1899. 1 fanega (Paraguayan) = 384 cuarta (Paraguayan) (E)	Paraguayan
fanega (Peruvian)	–	mass	M	1 fanega (Peruvian) = 64.4126 kg	Obsolete Peruvian traditional unit of mass used before 1869. 1 fanega (Peruvian) = 140 libbra (Peruvian) (E)	Peruvian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
fanega (Salvadoran)	–	mass	M	1 fanega (Salvadoran) = 92 kg	Obsolete Salvadoran traditional unit of mass used before 1912. 1 fanega (Salvadoran) = 4/7 carga (Salvadoran) (E)	Salvadoran
fanega (Spanish, dry)	–	capacity, volume	L^3	1 fanega (Spanish, dry) = 55.501×10^{-3} m^3	Obsolete Spanish unit of capacity used for dry substances.	Spanish
fanegada (Peruvian)	–	surface area	L^2	1 fanegada (Peruvian) = 3144.88152180 m^2	Obsolete Peruvian traditional unit of surface area used in land measurements before 1869. 1 fanegada (Peruvian) = 4500 square vara (Peruvian) (E)	Peruvian
fanegada (Spanish)	–	surface, area	L^2	1 fanegada (Spanish) = 6 439.56174973 m^2	Obsolete Spanish unit of area. 1 fanegada (Spanish) = 9 216 sq. vara (E)	Spanish
fang (Chinese)	–	capacity, volume	L^3	1 fang (Chinese) = 3.276800 m^3	Obsolete Chinese unit of capacity used in ancient times. 1 fang (Chinese) = 100 cubic tchi (E)	Chinese
fanga (Portuguese, dry)	–	capacity, volume	L^3	1 fanga (Portuguese, dry) = 54×10^{-3} m^3	Obsolete Portuguese unit of capacity used for dry substances.	Portuguese
faomur (Icelandic)	–	length, distance	L	1 faomur (Icelandic) = 1.883142 m	Obsolete Icelandic traditional unit of length used before 1907. 1 faomur (Icelandic) = 6 fet (Icelandic) (E)	Icelandic
farad	F	electric capacitance	$M^{-1}L^{-2}T^4I^2$	**SI derived unit** 1 F = 1C.V^{-1} = 1 $kg^{-1}m^{-2}s^4$ A^2 (E)	The farad is the capacitance of an electric capacitor between the two plates of which there appears a difference of electric potential of one volt when it is charged by a quantity of electricity equal to one coulomb. The unit is named after the British scientist Sir M. Faraday (1791–1867).	SI

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
farad (int.)	F	electric capacitance	$M^{-1}L^{-2}T^{4}I^{2}$	1 F (int.) = 0.99951 F	Obsolete international unit of capacitance.	IEUS
farad (thermal)	$J.K^{-2}$	thermal capacity	$ML^{2}T^{-2}Q^{-2}$	1 farad (thermal) = 1 $J.K^{-2}$ (E)	SI unit used for convenience when dealing with electrical and thermal analogies.	SI
faraday (based on ^{12}C)	F	molar electric charge	ITN^{-1}	1 F = 96 485.309 $C.mol^{-1}$	Electric charge carried by one mole of electrons. 1 F = $N_a \times \lvert e \rvert$ 1 F ≈ 26.8014747222 Ah	
faraday (chemical)	F	molar electric charge	ITN^{-1}	1 F = 96 495.7 $C.mol^{-1}$	Electric charge carried by one mole of electrons. 1 F = $N_a \times \lvert e \rvert$ 1 F ≈ 26.80436111 Ah	
faraday (physical)	F	molar electric charge	ITN^{-1}	1 F = 96 512.9 $C.mol^{-1}$	Electric charge carried by one mole of electrons. 1 F = $N_a \times \lvert e \rvert$ 1 F ≈ 26.8116388889 Ah	
farasula (Ethiopian, coffee)	–	mass	M	1 farasula (Ethiopian, coffee) = 16.848 kg	Obsolete Ethiopian traditional unit of mass used before 1963. 1 farasula (Ethiopian, coffee) = 4320 kasm(Ethiopian) (E)	Ethiopian
farasula (Ethiopian, ivory)	–	mass	M	1 farasula (Ethiopian, ivory) = 13.4784 kg	Obsolete Ethiopian traditional unit of mass used before 1963. 1 farasula (Ethiopian, ivory) = 3456 kasm(Ethiopian) (E)	Ethiopian
farasula (Ethiopian, rubber)	–	mass	M	1 farasula (Ethiopian, rubber) = 17.9712 kg	Obsolete Ethiopian traditional unit of mass used before 1963. 1 farasula (Ethiopian, rubber) = 4608 kasm(Ethiopian) (E)	Ethiopian

farcella (Saudi Arabian)	–	mass	M	1 farcella (Saudi Arabian) = 13.50 kg	Obsolete Saudi Arabian traditional unit of mass used before 1962. 1 farcella (Saudi Arabian) = 1/5 kantar (Saudi Arabian) (E)	Saudi Arabian
farsakh (Egyptian)	–	length, distance	L	1 farsakh (Egyptian) = 1740 m	Obsolete Egyptian traditional unit of length used before 1891. 1 farsakh (Egyptian) = 3000 diraa (Egyptian) (E)	Egyptian
farsakh (Persian)	–	length, distance	L	1 farsakh (Persian) = 5486.40 m	Obsolete Persian traditional unit of length used before 1933. 1 farsakh (Persian) = 96 000 gireh (Persian) (E)	Persian
farsakh (Saudi Arabian)	–	length, distance	L	1 farsakh (Saudi Arabian) $= 4.830 \times 10^3$ m	Obsolete Saudi Arabian traditional unit of length used before 1962. 1 farsakh (Saudi Arabian) = 1/8 baryd (Saudi Arabian) (E)	Saudi Arabian
farsang (Abyssinian)	–	length, distance	L	1 farsang (Abyssinian) = 5070.226 m	Obsolete Abyssinian traditional unit of length used before 1927. 1 farsang (Abyssinian) = 7391 pic (Abyssinian) (E)	Abyssinian
farzil (Saudi Arabian)	–	mass	M	1 farzil (Saudi Arabian) = 13.50 kg	Obsolete Saudi Arabian traditional unit of mass used before 1962. 1 farzil (Saudi Arabian) = 1/5 kantar (Saudi Arabian) (E)	Saudi Arabian
fass (Austrian)	–	capacity, volume	L^3	1 fass (Austrian) = 566.040×10^{-3} m^3	Obsolete Austrian unit of capacity used for liquid substances. 1 fass (Austrian) = 400 mass (E)	Austrian
fathom	fath	length, distance	L	1 fathom = 1.8288 m (E)	Obsolete British and American unit of length employed in marine applications. It describes the depth of water. 1 fathom = 72 inches (E) 1 fathom = 6 feet (E) 1 fathom = 2 yards (E)	UK, US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
fatt (US, dry)	fatt	capacity, volume	L^3	1 fatt (US, dry) = 317.151648 $\times 10^{-3}$ m^3 (E)	Obsolete American unit of volume for measuring the capacity of powdered and divided solids (e.g., grain, flour). It is named after an old English grain unit. 1 fatt (US, dry) = 72 gallons (US, dry) (E) 1 fatt (US, dry) = 9 bushels (US, dry) (E) 1 fatt (US, dry) = 1/4 chalder (US, dry) (E)	US
FAU	FTU	dimensionless turbidity index	nil	(see note)	The formazin attenuation unit (FAU) is the recommended ISO dimensionless unit used for measuring the turbidity of water. Note that the turbidity is an optical quantity measuring the scattering and absorption of light by suspended solids in solution. It is measured by means of a nephelometer (from Greek, *nephelos*, meaning cloudy) that measures directly the fraction of light transmitted through a sample of solution as compared to the fraction scattered at an angle of 90° to one side through a standard preparation of formazin; the ratio determines the turbidity expressed in FAU. The procedure is specified by standard ISO 7027. For instance, drinking water should not have a turbidity above 1 FAU, although values up to 5 FAU are usually considered safe. Sometimes the unit is also called the NTU (nephelometric turbidity unit) or formazin nephelometric unit (FNU). 1 FAU = 1 FTU (E) = 1 FNU (E)	INT

faust (Hungarian)	–	length, distance	L	1 faust (Hungarian) = 0.10536 m	Obsolete traditional Hungarian unit of length used before 1876. 1 faust (Hungarian) = 1 marok (Hungarian) (E)	Hungarian
favn (Danish)	–	length, distance	L	1 favn (Danish) = 1.8831420 m	Obsolete Danish traditional unit of length used before 1912. 1 favn (Danish) = 6 fod (Danish) (E)	Danish
feddan (Arabic)	–	surface, area	L^2	1 feddan (Arabic) = 5898.24 m^2	Obsolete Arabic unit of area used in ancient times. 1 feddan (Arabic) = 14 400 sq. cubits Hachemic (E)	Arabic
feddan masri (Egyptian)	–	surface area	L^2	1 feddan masri (Egyptian) = 4200.08 m^2	Obsolete Egyptian traditional unit of surface area used in land measurements before 1891. 1 feddan masri (Egyptian) = 576 sahme (Egyptian) (E)	Egyptian
femtogram	fg	mass	M	1 fg = 10^{-18} kg (E)	Submultiple of the SI base unit. 1 fg = 10^{-15} g (E)	SI
femtometre	fm	length, distance	L	1 fm = 10^{-15} m (E)	Submultiple of the SI base unit.	SI
fen (Chinese) [gros]	–	length, distance	L	1 fen (Chinese) = 38.4 m	Obsolete Chinese unit of length used in ancient times. 1 fen = 120 tchi (E)	Chinese
fen (Chinese)	–	length, distance	L	1 fen (Chinese) = 3.2×10^{-3} m	Obsolete Chinese unit of length used in ancient times. 1 fen = 1/100 tchi (E)	Chinese
fen (Chinese)	–	surface, area	L^2	1 fen (Chinese) = 61.440 m^2	Obsolete Chinese unit of area used in ancient times. 1 fen (Chinese) = 1/10 meou (E) = 600 sq. tchi (E)	Chinese

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
feralin (Icelandic)	–	surface area	L^2	1 feralin (Icelandic) = 0.886555948041 m^2	Obsolete Icelandic traditional unit of surface area used in land measurements before 1907. 1 feralin (Icelandic) = 1/9 ferfaomur (Icelandic) (E)	Icelandic
ferfaomur (Icelandic)	–	surface area	L^2	1 ferfaomur (Icelandic) = 3.54622379216 m^2	Obsolete Icelandic traditional unit of surface area used in land measurements before 1907. 1 ferfaomur (Icelandic) = 36 ferfet (Icelandic) (E)	Icelandic
ferfet (Icelandic)	–	surface area	L^2	1 ferfet (Icelandic) = 9.85062164490 $\times 10^{-2}$ m^2	Obsolete Icelandic traditional unit of surface area used in land measurements before 1907. 1 ferfet (Icelandic) = 1/36 ferfaomur (Icelandic) (E)	Icelandic
ferk (Arabic)	–	capacity, volume	L^3	1 ferk (Arabic) = 8.16 $\times$ 10^{-3} m^3 (of water)	Obsolete Arabic unit of capacity used in ancient times. Measured by weight. 1 ferk (Arabic) = 1/4 cafiz (E)	Arabic
fermi	F, f	length, distance	L	1 F = 10^{-15} m (E)	Obsolete unit of length used in nuclear physics to describe nuclide dimensions. The unit is named after the Italo-American scientist E. Fermi (1901–1954). It has the same order of magnitude as nuclides' radii. 1 F = 1 fm (E)	
fermila (Icelandic)	–	surface area	L^2	1 fermila (Icelandic) = 5.67395806746 $\times 10^6$ m^2	Obsolete Icelandic traditional unit of surface area used in land measurements before 1907. 1 fermila (Icelandic) = 1.6 $\times 10^6$ ferfaomur (Icelandic) (E)	Icelandic

ferpumlungur (Icelandic)	–	surface area	L^2	1 ferpumlungur (Icelandic) = $6.84070947562 \times 10^{-6}$ m^2	Obsolete Icelandic traditional unit of surface area used in land measurements before 1907. 1 ferpumlungur (Icelandic) = 1/5184 ferfaomur (Icelandic) (E)	Icelandic
ferrado (Portuguese)	–	surface, area	L^2	1 ferrado (Portuguese) = 725.410125 m^2	Obsolete Portuguese unit of area. 1 ferrado (Portuguese) = 605 square vara (E)	Portuguese
fet (Icelandic)	–	length, distance	L	1 fet (Icelandic) = 0.313857 m	Obsolete Icelandic traditional unit of length used before 1907. 1 fet (Icelandic) = 12 pumlungur (Icelandic) (E)	Icelandic
feuillette (de Paris)	–	capacity, volume	L^3	1 feuillette (de Paris) = $137.109061220 \times 10^{-3}$ m^3	Obsolete French unit of capacity employed before the French Revolution. It served to express the capacity of liquids and grains. It varies according to the location and merchandise. 1 feuillette (de Paris) = 144 pintes (de Paris) 1 feuillette (de Paris) = 6192 pouces cube (F)	French
fierding (Icelandic)	–	mass	M	1 fierding (Icelandic) = 20 kg (E)	Obsolete Icelandic traditional unit of mass used before 1907. 1 fierding (Icelandic) = 40 pund (Icelandic) (E)	Icelandic
fifth (music)	1/5	musical intervals	nil	(see note)	British and American unit used in music to describe the frequency ratio between notes. Two notes differ by one fifth if the higher note has frequency exactly 3/2 times the frequency of the lower one.	UK, US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
fifth (US, wine)	–	capacity, volume	L^3	1 fifth (US, wine) $= 757.0823568 \times 10^{-6}$ m^3 (E)	Obsolete American unit of capacity used before 1979 for measuring the capacity of spirits and alcoholic beverages especially wine. 1 fifth (US, wine) = 1/5 gallon (US, liq.) (E) 1 fifth (US, wine) = 1 bottle (US, old) (E)	US
fine (gold)	–	fraction, relative values, yields, efficiencies, abundances	nil	1 fine (gold) = 0.001 (E)	Obsolete dimensionless unit of mass fraction used for measuring the purity of gold in jewellery. For instance, gold with a purity of 18 carats has a fineness of 750 ‰ wt. 1 fine = 1 ‰ wt (E) 1 fine = 3/125 carat (E)	
fine (jewellery)	‰	fineness, mass fraction of precious metals and alloys	nil	1 fine (jewellery) $= 10^{-3}$ (E)	British and American dimensionless unit of mass fraction used to express the purity of precious metals and alloys (i.e., silver, gold, and PGMs). It is equal to 1/1000. For instance, if a gold alloy is 950 fine, the bar contains at most 95% wt of gold and 5% wt of other metals and impurities.	UK, US
finger (Arabic)	–	length, distance	L	1 finger (Arabic) $= 2.00 \times 10^{-2}$ m	Obsolete Arabic unit of length used in ancient times called assbaa. 1 finger (Arabic) = 1/16 foot (E)	Arabic
finger (Egyptian)	–	length, distance	L	1 finger (Egyptian) $= 2.181250 \times 10^{-2}$ m	Obsolete Egyptian unit of length used in ancient times called thebs. 1 finger (Egyptian) = 1/16 zereth (E)	Egyptian
finger (Greek)	–	length, distance	L	1 finger (Greek) $= 1.92850 \times 10^{-2}$ m	Obsolete Greek unit of length used in ancient times called daktylos. 1 finger (Greek) = 1/16 pous (E)	Attic
finger (Greek, Attic)	–	length, distance	L	1 finger (Greek, Attic) $= 1.9285 \times 10^{-2}$ m	Obsolete Greek unit of length employed in ancient times. 1 finger (Attic) = 1/16 pous (E)	Attic

finger (Hebrew)	–	length, distance	L	1 finger (Hebrew) = 2.3125×10^{-2} m	Obsolete Hebrew unit of length used in ancient times. 1 finger = 1/24 cubit (E)	Hebrew
finger (Indian)	–	length, distance	L	1 finger (Indian) = $1.90416667 \times 10^{-2}$ m	Obsolete Indian unit of length used in ancient times called angula. 1 finger (Indian) = 1/24 hasta (E)	Indian
finger (Persian)	–	length, distance	L	1 finger (Persian) = 2×10^{-2} m	Obsolete unit of length in the Assyrio-Chaldean-Persian system used in ancient times. 1 finger = 1/16 zereth (E)	Persian
finger (Roman)	–	length, distance	L	1 finger (Roman) = 1.8400×10^{-2} m	Obsolete Roman unit of length used in ancient times called digitus. 1 finger (Roman) = 1/16 pes (E)	Roman
finger (Spanish)	–	length, distance	L	1 finger (Spanish) = 2.00×10^{-2} m	Obsolete Spanish unit of length used in ancient times called diedo. 1 finger (Arabic) = 1/16 foot (E)	Spanish
finger (UK, US)	–	length, distance	L	1 finger (UK, US) = 1.9050×10^{-2} m (E)	Obsolete American and British unit of length equal to the width of a finger. 1 finger (UK, US) = 1/16 foot (E) 1 finger (UK, US) = 3/4 inches (E)	UK, US
finger length (UK, US)	–	length, distance	L	1 finger length (UK, US) = 11.430×10^{-2} m (E)	Obsolete American and British unit of length equal to the length of the middle finger, from the tip to the joint where the finger is attached to the hand. 1 finger length (UK, US) = 3/8 foot (E) 1 finger length (UK, US) = 4.5 inches (E)	UK, US
Finsen unit	FU	irradiance, radiant flux received, energy flux	MT^{-3}	1 FU = 10^{-5} $W.m^{-2}$ (E)	Obsolete unit of irradiance employed for ultraviolet radiation measurements. UV radiation of $\lambda = 296.7$ nm has an irradiance of one Finsen unit when the energy density is equal to 10 $\mu W.m^{-2}$. The unit is named after N.R. Finsen (1860–1904).	

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
firkin (UK)	fir (UK)	capacity, volume	L^3	1 firkin (UK) = 40.914828 × 10^{-3} m^3	British unit used for capacity measurements for all merchandise (solids, liquids, foodstuffs, etc). 1 firkin (UK) = 9 gallons (UK) (E)	UK
firkin (UK, beer)	–	capacity, volume	L^3	1 firkin (UK, beer) = 41.5903684320 ×10^{-3} m^3	Obsolete British unit of capacity used for beer and ale between 1803 and 1824. 1 firkin (UK, beer) = 9 gallons (UK, beer) (E)	UK
firkin (UK, butter)	–	mass	M	1 firkin (UK, butter) = 25.40117272 kg (E)	Obsolete British unit of mass used for weighing butter and cheese. 1 firkin (UK, butter) = 56 lb (E) 1 firkin (UK, butter) = 7 cloves (E)	UK
firkin (US, liq.)	fir (US, liq.)	capacity, volume	L^3	1 firkin (US) = 34.0687060560 × 10^{-3} m^3	Obsolete American unit used for capacity measurements of liquids. 1 firkin (US) = 9 gallons (US, liq.) (E)	US
firlot (Scotland, corn)	–	volume, capacity	L^3	1 firlot (Scotland, dry) = 36.3687360 ×10^{-3} m^3	Obsolete Scottish unit of dry capacity for corn 'from Warrack, A., *Chambers' Scots Dictionary* (1911)'. 1 firlot (Scotland) = 1/4 boll (Scotland) (E) 1 firlot (Scotland) = 4 pecks (UK, dry) (E)	UK
firlot (Scottish, dry)	–	capacity, volume	L^3	1 firlot (Scottish, dry) = 36.0077545650 ×10^{-3} m^3 (wheat, peas, beans, rice, salt) 1 firlot (Scottish, dry) = 52.5290613933 ×10^{-3} m^3 (oats, barley, malt)	Obsolete traditional Scottish unit of volume used before the Weights and Measures Act of 1824 to measure the capacity of dry substances (wheat, peas, beans, salt, rice, barley, malt). 1 firlot (Scottish, dry) = 64 lippies (Scottish, dry) (E)	Scottish

first Bohr radius (Bohr, a.u. of length)	a_0, b, a.u.	length, distance	L	$a_0 = 5.291772083(19) \times 10^{-11}$ m	Physical fundamental constant. Base unit of a.u. system. The unit is named after N. Bohr (1885-1962). $a_0 = \frac{4\pi\varepsilon_0\hbar^2}{m_0 e^2}$	a.u.
Fischer degree	–	specific gravity of liquids, hydrometer index, hydrometer degree	nil	$^\circ\text{Fischer} = 400 - (400/d)$ $d = d\ (12^\circ\text{Ré}) = d\ (15^\circ\text{C})$ where d is density		
fisk (Icelandic)	–	mass	M	1 fisk (Icelandic) = 4 kg (E)	Obsolete Icelandic traditional unit of mass used before 1907. 1 fisk (Icelandic) = 8 pund (Icelandic) (E)	Icelandic
fit	fit	failure rate	T-1	1 fit = 277.77777779 $\times 10^{-15}$ failures.s^{-1} (E)	British and american unit of failure rate used in reliability, i.e., the number of defects per working time and per number of elements at the beginning. 1 fit = 1 failure per 10^9 hours (E)	US, UK
fjârdingsland (Swedish)	–	surface area	L^2	1 fjârdingsland (Swedish) = 0.2468189080 $\times 10^4$ m^2	Obsolete traditional Swedish unit of surface area used after decree 1665. 1 fjârdingsland (Swedish) = 28000 kvardratfot (E)	Swedish
fjerdingar (Danish)	–	surface area	L^2	1 fjerdingar (Danish) = 886.555948041 m^2	Obsolete Danish traditional unit of surface area used in land measurements before 1912. 1 fjerdingar (Danish) = (125/2) square ruthe (Danish) (E)	Danish
fjerdingkar (Danish, dry)	–	capacity, volume	L^3	1 fjerdingkar (Danish, dry) = 34.7814737730 $\times 10^{-3}$ m^3	Obsolete Danish traditional unit of capacity used for dry substances before 1912. 1 fjerdingkar (Danish, dry) = 36 pott (Danish, dry) (E)	Danish
fjerdingar (Swedish, dry)	–	capacity, volume	L^3	1 fjerdingar (Swedish, dry) = 18.3201334463 $\times 10^{-3}$ m^3	Obsolete Swedish unit of capacity for dry substances. 1 fjerdingar (Swedish, dry) = 7 kanna (E)	Swedish

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
flag (US)	flag	surface area	L^2	1 flag (US) = 0.464515200 m^2 (E)	American unit of surface area used in wood construction and referring to the sidewalk. 1 flag (US) = 5 ft^2 (E)	US
flagon (UK)	–	capacity, volume	L^3	1 flagon (UK) = 3.785411784 $\times 10^{-3}$ m^3 (E)	Obsolete British unit of volume for measuring the capacity of alcoholic beverages and spirits, generally taken equal to the wine gallon. A flagon was a large, narrow-necked pitcher or bottle.	UK
flask of mercury (UK)	Hg-flask	capacity, volume	L^3	1 flask of mercury (UK) = 34.473020120 kg	Obsolete British unit of mass used for weighing liquid mercury. Sometimes still in use for international mercury transactions. 1 flask of mercury = 76 lb (av.) (E)	UK, US, INT
flask of mercury (US)	Hg-flask	capacity, volume	L^3	1 flask of mercury (US) = 34.01942775 kg	Obsolete American unit of mass used for weighing liquid mercury. Only the British unit remains still in use for international mercury transations (see above). 1 flask of mercury = 75 lb (av.) (E)	UK, US, INT
flock (UK)	–	dimensionless unit of quantity	nil	1 flock (UK) = 40 entities (E)	Obsolete British unit of quantity. 1 flock (UK) = 2 scores (UK) (E)	UK
FLOPS	FLOPS	number of computations made per unit of time	T^{-1}	1 FLOPS = 1 operation.s^{-1} (E)	Unit used in computer science. The unit is named after the English acronym: **Fl**oating point **Op**erations per **S**econd.	
fluid dram (UK)	fl dr (UK)	capacity, volume	L^3	1 fluid dram (UK) = 3.551634375 $\times$ 10^{-6} m^3	British unit used for capacity measurements for all merchandise (solids, liquids, foodstuffs, etc). 1 fl dr (UK) = 1/1280 gal (UK) (E) 1 fl dr (UK) = 1/40 gill (UK) (E) 1 fl dr (UK) = 1/8 fl oz (UK) (E) 1 fl dr (UK) = 60 minims (UK) (E) 1 (UK) fl dr = 0.960760363080 fl dr (US)	UK

fluid dram (US)	fl dr (US)	capacity, volume	L^3	1 fluid drachm (US) = $3.69669119531 \times 10^{-6}$ m^3	American unit used for capacity measurements of liquids. 1 fl dr (US) = 1/1024 gal (US, liq.) (E) 1 fl dr (US) = 1/32 gill (US, liq.) (E) 1 fl dr (US) = 1/8 fl oz (US) (E) 1 fl dr (US) = 1.04084227288 fl dr (UK)	US
fluid ounce (UK)	fl oz (UK)	capacity, volume	L^3	1 fluid ounce (UK) = $28.41307500 \times 10^{-6}$ m^3	British unit used for capacity measurements for all merchandise (solids, liquids, foodstuffs, etc). 1 fl oz (UK) = 1/160 gal (UK) (E) 1 fl oz (UK) = 1/40 quart (UK) (E) 1 fl oz (UK) = 1/20 pint (UK) (E) 1 fl oz (UK) = 1/5 gill (UK) (E) 1 fl oz (UK) = 8 fl dr (UK) (E) 1 fl oz (UK) = 480 minims (UK) (E) 1 fl oz (UK) = 0.960760363078 fl oz (US)	UK
fluid ounce (US)	fl oz (US)	capacity, volume	L^3	1 fluid ounce (US) = $29.5735295625 \times 10^{-6}$ m^3	American unit used for capacity measurements of liquids. 1 fl oz (US) = 1/128 gal (US, liq.) (E) 1 fl oz (US) = 1/32 quart (US, liq.) (E) 1 fl oz (US) = 1/16 pint (US, liq.) (E) 1 fl oz (US) = 1/5 gill (US, liq.) (E) 1 fl oz (US) = 8 fl dr (US) (E) 1 fl oz (US) = 480 minims (US, liq.) (E) 1 fl oz (US) = 1.04084227288 fl oz (UK)	US
flux unit	fu	flux density of electromagnetic radiation	MT^{-4}	1 fu = 10^{-26} $W.m.^{-2}.Hz^{-1}$ (E)	Obsolete unit used in radioastronomy to measure the energy of incident radiation on the receiving body across a specific frequency bandwidth. 1 flux unit = 1 jansky (E)	@
fod (Danish)	–	length, distance	L	1 fod (Danish) = 0.313857 m	Obsolete Danish traditional unit of length used before 1912.	Danish
fod (Norwegian)	–	length, distance	L	1 fod (Norwegian) = 0.3137 m	Obsolete Norwegian traditional unit of length used before 1882.	Norwegian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
foot	ft (′)	length, distance	L	1 ft = 0.3048 m (E)	Base unit of FPS system. Legal unit in the UK system (since the WMA, 1963) and US system (since the USMB, 1959). 1 foot = 144 lines (UK) (E) 1 foot = 480 lines (US) (E) 1 foot = 12 inches (E) 1 foot = 1/3 yards (E)	UK, US, FPS
foot (Arabic)	–	length, distance	L	1 foot (Arabic) = 0.320 m	Obsolete Arabic unit of length used in ancient times.	Arabic
foot (Attic)	–	length, distance	L	1 foot (Attic) = 0.30856 m	Obsolete Greek unit of length used in ancient times called pous.	Attic
foot (Cape, South African)	–	length, distance	L	1 foot (Cape, South African) = 0.314858 m	Obsolete South African unit of length used until 1950.	South Africa
foot (Chinese)	–	length, distance	L	1 foot (Chinese) = 0.320 m	Obsolete Chinese unit of length used in ancient times called tchi.	Chinese
foot (Cypriot)	–	length, distance	L	1 foot (Cypriot) = 0.3048 m	Obsolete Cypriot traditional unit of length used before 1972. 1 foot (Cypriot) = 1/2 pic (Cypriot) (E)	Cypriot
foot (Dutch)	–	length, distance	L	1 foot (Dutch) = 0.2830594 m	Obsolete Dutch unit of length used in ancient times called voeten.	Dutch
foot (Egyptian)	–	length, distance	L	1 foot (Egyptian) = 0.349 m	Obsolete Egyptian unit of length used in ancient times called royal zereth.	Egyptian
foot (French)	–	length, distance	L	1 foot (French) = 0.3248394167 m	Obsolete French unit of length used in ancient times called pied de Paris.	French
foot (Hebrew)	–	length, distance	L	1 foot (Hebrew) = 0.320 m	Obsolete Chinese unit of length used in ancient times called zereth.	Hebrew
foot (Italian)	–	length, distance	L	1 foot (Italian) = 0.51377 m	Obsolete Italian unit of length used in ancient times called piede liprando.	Italian

foot (Japanese)	–	length, distance	L	1 foot (Japanese) = 0.303030303 m	Obsolete Chinese unit of length used in ancient times called shaku. 1 foot (Japanese) = 10/33 m (E)	Chinese
foot (old)	ft (′)	length, distance	L	1 ft (old) = 0.3047997 m	Obsolete British unit of length. It was used in the UK before the WMA of 1963. 1 ft (old) = 12 inches (old)	UK
foot (Persian)	–	length, distance	L	1 foot (Persian) = 0.320 m	Obsolete Persian unit of length used in ancient times called zereth.	Persian
foot (Portuguese)	–	length, distance	L	1 foot (Portuguese) = 0.3285 m	Obsolete Portuguese unit of length used in ancient times called pe.	Portuguese
foot (Prussian)	–	length, distance	L	1 fuss (Prussian) = 0.313857 m	Obsolete German unit of length.	German
foot (Roman)	–	length, distance	L	1 foot (Roman) = 0.2944 m	Obsolete Roman unit of length used in ancient times called pes.	Roman
foot (Russian)	–	length, distance	L	1 foot (Russian) = 0.3048 m	Obsolete Russian unit of length used in ancient times called foute.	Russian
foot (Scottish)	ft	length, distance	L	1 foot (Scottish) = 0.306446084592 m	Obsolete traditional Scottish unit of length used before the Imperial Weights and Measures Act of 1824.	Scottish
foot (Scottish)	–	length, distance	L	1 foot (Scottish) = 0.30645 m	Obsolete Scottish unit of length used in Scotland, slightly longer than the corresponding English units.	Scottish
foot (Spanish)	–	length, distance	L	1 foot (Spanish) = 0.278635 m	Obsolete Spanish unit of length used in ancient times called pie.	Spanish
foot (Swedish)	–	length, distance	L	1 foot (Swedish) = 0.29690 m	Obsolete Swedish unit of length used in ancient times called fot.	Swedish
foot (US Survey)	ft (US Survey)	length, distance	L	1 ft (US Survey) = 0.304800609601 m (E)	Obsolete American unit of length used in the USA for geodetic measurements. Discontinued since the USMB, 1959. 1 ft (US Survey) = (1200/3937) m (E)	US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
foot board measure (board foot measure)	fbm, B.M.	capacity, volume	L^3	1 fbm = $2.359737216 \times 10^{-3}$ m^3	Measure of capacity which is equal to the product of 1 foot of length per 1 foot width per 1 inch thickness. 1 bfm = 1/12 ft^3 (E) 1 bfm = 144 in^3 (E)	UK, US
foot of head (US)	ft hd	pressure, stress	$ML^{-1}T^{-2}$	1 foot of head (US) = 2988.98322613 Pa	American unit of pressure used in plumbing and hydraulics to express water pressure. It is equal to the depth of the water (at 4°C) upstream from the point at which the pressure is measured. 1 foot of head (US) $29.4989708969 \times 10^{-3}$ atm 1 foot of head (US) = $433.515365231 \times 10^{-3}$ psia	US
foot of water (39.2°F) [conventional]	ft H_2O (39.2°F)	pressure, stress	$ML^{-1}T^{-2}$	1 ft H_2O (39.2°F) = $2.98898322613 \times 10^3$ Pa	British and American unit of pressure employed in physics to measure small pressures. It is equal to the pressure exerted by a column of water one foot high measured at 4°C (39.2°F). 1 atm ≈ 33.89948766 ft H_2O (4°C)	UK, US
foot of water (15.56°C)	ft H_2O (15.5°C)	pressure, stress	$ML^{-1}T^{-2}$	1 ft H_2O (15.56°C) = $2.98614361255 \times 10^3$ Pa	British and American unit of pressure employed in physics to measure small pressures. It is equal to the pressure exerted by a column of water one foot high measured at 15.56°C (60°F). 1 atm ≈ 33.9317237035 ft H_2O (60°F).	UK, US
foot of water (4°C) [conventional]	ft H_2O (4°C)	pressure, stress	$ML^{-1}T^{-2}$	1 ft H_2O (4°C) = $2.98898322613 \times 10^3$ Pa	British and American unit of pressure employed in physics to measure small pressures. It is equal to the pressure exerted by a column of water one foot high measured at 4°C (39.2°F). 1 atm ≈ 33.89948766 ft H_2O (4°C).	UK, US

foot of water (60°F)	ft H_2O (60°F)	pressure, stress	$ML^{-1}T^{-2}$	1 ft H_2O (60°F) = $2.98614361255 \times 10^3$ Pa	British and American unit of pressure employed in physics to measure small pressures. It is equal to the pressure exerted by a column of water one foot high measured at 15.56°C (60°F). 1 atm ≈ 33.9317237035 ft H_2O (60°F).	UK, US
foot per hour	$ft.h^{-1}$, fph	velocity, speed	LT^{-1}	1 fph = 8.466667×10^{-5} $m.s^{-1}$	British and American unit of speed. 1 fph = 3.048×10^{-4} $km.h^{-1}$ (E)	UK, US
foot per minute	$ft.min^{-1}$, fpm	velocity, speed	LT^{-1}	1 fpm = 5.08×10^{-3} $m.s^{-1}$ (E)	British and American unit of speed. 1 fpm = 1.82880×10^{-2} $km.h^{-1}$ (E)	UK, US
foot per second	$ft.s^{-1}$, fps	velocity, speed	LT^{-1}	1 fps = 3.048×10^{-1} $m.s^{-1}$ (E)	British and American unit of speed. 1 fps = 1.097280 $km.h^{-1}$ (E)	UK, US, FPS
foot per square second	$ft.s^{-2}$	acceleration	LT^{-2}	1 $ft.s^{-2}$ = 0.3048 $m.s^{-2}$ (E)	Unit of acceleration in the FPS system.	FPS
football field (US)	–	length, distance	L	1 football field (US) = 109.728 m (E)	American unit of length. It is equal to the distance between the goal lines on an American football including the two end zones. 1 football field (US) = 120 yards (E)	US
foot-candle	ft.C, ft.cd, fc	illuminance	$JL^{-2}\Omega$	1 ft.C = 10.7639104167 lx	Obsolete British unit of illuminance. The foot-candle is equal to one lumen incident per square foot. 1 ft.C = 1.076391 milli-phot 1 ft.C = 1 $lm.ft^{-2}$ (E)	UK
foot-lambert	ft.L	luminous luminance	JL^{-2}	1ft.L = 3.42625909963 $cd.m^{-2}$	Obsolete American unit of luminous luminance. 1 ft.L = $[1/\pi]$ $cd.ft^{-2}$ (E) 1 ft.L = $[1/144\pi]$ $cd.in^{-2}$ (E) 1ft.L = 1.07639104167 milli-Lambert (E)	US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
foot-pound-force (duty)	ft-lbf	energy, work, heat	ML^2T^{-2}	1 ft-lbf = 1.355817948 J	Obsolete British unit of energy. It was the work needed to displace horizontally without friction a weight of one pound-force on one foot length.	UK, FPS
foot-pound-force per hour	ft-lbf.h^{-1}	power	ML^2T^{-3}	1 ft-lbf.h^{-1} = $3.76616096758 \times 10^{-4}$ W	British and American unit of power.	UK, US, FPS
foot-pound-force per minute	ft-lbf.min^{-1}	power	ML^2T^{-3}	1 ft-lbf.min^{-1} = $2.25969658055 \times 10^{-2}$ W	British and American unit of power.	UK, US, FPS
foot-pound-force per second	ft-lbf.s^{-1}	power	ML^2T^{-3}	1 ft-lbf.s^{-1} = 1.35581794833 W	British and American unit of power.	UK, US, FPS
foot-poundal	ft-pdl	energy, work, heat	ML^2T^{-2}	1 ft-pdl = $4.21401100938 \times 10^{-2}$ J	Obsolete British unit of energy. It was the work needed to displace vertically without friction a weight of one poundal a distance of one foot. 1 ft.pdl = 1 lb.ft^2.s^{-2} (E)	UK, FPS
foot-poundal per second	ft-pdl.s^{-1}	power	ML^2T^{-3}	1 ft-pdl.s^{-1} = $4.21401100938 \times 10^{-2}$ W	Obsolete British unit of power. 1 ft.pdl.s^{-1} = 1 lb.ft^2.s^{-3} (E)	UK, FPS
formazin attenuation unit	FTU	dimensionless turbidity index	nil	(see note)	The formazin attenuation unit (FAU) is the recommended ISO dimensionless unit used for measuring the turbidity of water. Note that the turbidity is an optical quantity measuring the scattering and absorption of light by suspended solids in solution. It is measured by means of a nephelometer (from Greek, *nephelos*, meaning cloudy) that measures directly the fraction of light transmitted through a sample of solution as compared to the fraction scattered at an angle of 90° to one side through a standard preparation of formazin; the ratio determines the turbidity expressed in FAU. The procedure	INT

					is specified by standard ISO 7027. For instance, drinking water should not have a turbidity above 1 FAU, although values up to 5 FAU are usually considered safe. Sometimes the unit is also called the NTU (nephelometric turbidity unit) or formazin nephelometric unit (FNU). 1 FAU = 1 FTU (E) = 1 FNU (E)	
formazin turbidity unit	FTU	dimensionless turbidity index	nil	(see note)	The formazin turbidity unit (FTU) is the recommended ISO dimensionless unit used for measuring the turbidity of water. Note that the turbidity is an optical quantity measuring the scattering and absorption of light by suspended solids in solution. It is measured by means of a nephelometer (from Greek, *nephelos*, meaning cloudy) that measures directly the fraction of light transmitted through a sample of solution as compared to the fraction scattered at an angle of 90° to one side through a standard preparation of formazin; the ratio determines the turbidity expressed in FTU. The procedure is specified by standard ISO 7027. For instance, drinking water should not have a turbidity above 1 FTU, although values up to 5 FTU are usually considered safe. Sometimes the unit is also called the NTU (nephelometric turbidity unit) or formazin nephelometric unit (FNU). 1 NTU = 1 FTU (E) = 1 FNU (E)	INT
formazine ASBL turbidity unit	–	turbidity index	nil	1 formazine ASBL turbidity unit $= 6.500 \times 10^{-5}$	Obsolete British and American unit of turbidity.	UK, US
formazine EBL turbidity unit	–	turbidity index	nil	1 formazine EBL turbidity unit $= 4.450 \times 10^{-3}$	Obsolete British and American unit of turbidity.	UK, US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
fortin (Turkish)	–	capacity, volume	L^3	1 fortin (Turkish) = 400 $\times 10^{-3}$ m^3 (E)	Obsolete Turkish traditional unit of capacity used before 1933. 1 fortin (Turkish) = 2/5 m^3 (E)	Turkish
fortnight (UK)	–	time, period, duration	T	1 fortnight (UK) = 1.2096 $\times 10^6$ s (E)	Obsolete British unit of time equal to two weeks or fourteen days. The unit was named after the contraction of 'fourteen nights' and it has been used since at least the 1100s in Great Britain. 1 fortnight = 14 days (E) 1 fortnight = 2 sennights (E)	UK
forty foot equivalent unit	FEU, FEQ	capacity, volume	L^3	1 FEU = 72.4911272755 m^3 (E)	Unit of capacity employed in marine applications. 1 FEU = 40 × 8 × 8 ft^3 (E)	UK, US
fot (Swedish) [Swedish foot]	–	length, distance	L	1 fot (Swedish) = 0.296900 m	Obsolete Swedish unit of length.	Swedish
fother (UK)	–	mass	M	1 fother (UK) = 990. 6457361 kg (E)	Obsolete British unit of mass used in the nineteenth century primarily for lead. 1 fother (UK) = 19.5 cwt (E) 1 fother (UK) = 2184 lb (av.) (E).	UK
fothers (UK, lead)	–	mass	M	1 fothers (UK, lead) = 952.5439770 kg	Obsolete British unit of mass used in the trading of pure lead bullion and its alloys. 1 fothers (UK, lead) = 168 stones (UK, lead) (E) 1 fothers (UK, lead) = 2100 lb (av.) (E)	UK
fotmal (UK, lead)	–	mass	M	1 fotmal (UK, lead) = 31.75146590 kg	Obsolete British unit of mass used in the trading of pure lead bullion and its alloys. 1 fotmal (UK, lead) = 70 lb (av.) (E) 1 fotmal (UK, lead) = 5.6 stones (UK, lead) (E)	UK

fourier	$W.cm^{-1}.{}^{\circ}C^{-1}$	thermal conductivity	$MLT^{-3}\Theta^{-1}$	1 $W.cm^{-1}.K^{-1} = 100\ W.m^{-1}.K^{-1}$	Obsolete cgs unit of thermal conductivity. The name was proposed but not adopted. The unit is named after J. Fourier (1768–1830).	cgs
fourth	1/4	musical intervals	nil	(see note)	British and American dimensionless unit used in music to describe the frequency ratio between notes. Two notes differ by one fourth if the higher note has frequency exactly 4/3 times the frequency of the lower one.	UK, US
foute (Estonian)	–	length, distance	L	1 foute (Estonian) = 0.3048 m	1 foute (Estonian) = 4/3 elle (Estonian) (E)	Estonian
foute (Russian foot)	–	length, distance	L	1 foute (Russian) = 0.3048 m (E)	Obsolete Russian unit of length used before 1917.	Russian
frail (UK)	–	mass	M	1 frail (UK) = 22.67961850 kg	Obsolete British unit of mass. 1 frail (UK) = 50 lb (E)	UK
francoeur degree	–	percentage of alcohol in wines and spirits	nil		Obsolete unit introduced in 1842.	
franklin	Fr	quantity of electricity, electric charge	IT	1 Fr = $3.33564095198 \times 10^{-10}$ C	Obsolete cgs unit of electric charge in the esu subsystem. The franklin is that charge which exerts on an equal charge at a distance of one centimetre in vacuo a force of one dyne (1941). The unit is named after the American scientist B. Franklin (1706–1790). 1 franklin = (1/10 × c) C (E)	cgs
frasco (Argentinian)	–	capacity, volume	L^3	1 frasco (Argentinian) = $2.375 \times 10^{-3}\ m^3$	Obsolete Argentinian traditional unit of capacity used for liquids before 1887. 1 frasco (Argentinian) = 1/192 pipa (Argentinian) (E)	Argentinian
frasco (Paraguayan)	–	capacity, volume	L^3	1 frasco (Paraguayan) = $3 \times 10^{-3}\ m^3$	Obsolete Paraguayan traditional unit of capacity used before 1899. 1 frasco (Paraguayan) = 4 cuarta (Paraguayan) (E)	Paraguayan

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
frasla (Somalian)	–	mass	M	1 frasla (Somalian) = 16.128 kg	Obsolete Somalian traditional unit of mass used before 1950. 1 frasla (Somalian) = 576 okia (Somalian) (E)	Somalian
fraunhofer	–	wavelength resolution for spectral lines	nil	1 fraunhofer = $10^6 \times (\delta\lambda/\lambda)$	Obsolete unit of used to express the wavelength resolution for spectral lines in atomic and molecular spectroscopy. The unit is named after J. von Fraunhofer (1787–1826).	
freight ton (UK, US)	–	capacity, volume	L^3	1 freight ton (UK, US) = 1.132673864 m^3	Obsolete American and British commercial unit of capacity used in transportation. 1 freight ton (UK, US) = 0.5 register ton (E) 1 freight ton (UK, US) = 8 barrel bulk (E) 1 freight ton (UK, US) = 40 cubic feet (E)	UK, US
french	–	length, distance	L	1 french = 0.333333 $\times 10^{-3}$ m (E)	Modern non-SI unit of length used in photonics for measuring the outside diameters of small tubes, and fibre optic bundles. 1 french = 1/3 mm (E)	INT
fresnel	f	frequency	T^{-1}	1 fresnel = 10^{12} Hz (E)	Obsolete unit of frequency employed in spectroscopy. The unit is named after A.J. Fresnel (1788–1827). 1 fresnel = 1 T Hz (E)	
frigorie	fg	energy, work, heat	ML^2T^{-2}	1 fg = −4185.5 J (E)	Obsolete heat unit employed in refrigeration and cryogenics. 1 fg = −1 $kcal_{15}$ (E)	
FTU	FTU	dimensionless turbidity index	nil	(see note)	The formazin turbidity unit (FTU) is the recommended ISO dimensionless unit used for measuring the turbidity of water. Note that the turbidity is an optical quantity measuring the scattering and	INT

					absorption of light by suspended solids in solution. It is measured by means of a nephelometer (from Greek, *nephelos*, meaning cloudy) that measures directly the fraction of light transmitted through a sample of solution as compared to the fraction scattered at an angle of 90° to one side through a standard preparation of formazin; the ratio determines the turbidity expressed in FTU. The procedure is specified by standard ISO 7027. For instance, drinking water should not have a turbidity above 1 FTU, although values up to 5 FTU are usually considered safe. Sometimes the unit is also called the NTU (nephelometric turbidity unit) or formazin nephelometric unit (FNU). 1 NTU = 1 FTU (E) = 1 FNU (E)	
fuang (Thai)	–	mass	M	1 fuang (Thai) = 1.875×10^{-3} kg	Obsolete Thai traditional unit of mass used before 1923. 1 fuang (Thai) = 2 grani (Thai) (E)	Thai
fuder (Austrian)	–	capacity, volume	L^3	1 fuder (Austrian) = 1.8100480 m^3	Obsolete Austrian unit of capacity used for liquid substances. 1 fuder (Austrian) = 1280 mass (E)	Austrian
fuder (Danish, liq.)	–	capacity, volume	L^3	1 fuder (Danish, liq.) = $927.505967280 \times 10^{-3}$ m^3	Obsolete Danish traditional unit of capacity used for liquids before 1912. 1 fuder (Danish, liq.) = 960 pott (Danish, liq.) (E) 1 fuder (Danish, liq.) = 30 cubic fod (Danish, liq.) (E)	Danish
fuder (Prussian)	–	capacity, volume	L^3	1 fuder (Prussian) = $824.449748695 \times 10^{-3}$ m^3	Obsolete German unit of capacity used for liquid substances. 1 fuder (Prussian) = 720 quart (E)	German

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
fuder (Swedish)	–	capacity, volume	L^3	1 fuder (Swedish) $= 942.178291524 \times 10^{-3}$ m^3	Obsolete Swedish unit of capacity for liquid substances. 1 fuder (Swedish) = 360 kanna (E)	Swedish
funal (sthène)	sth	force, weight	MLT^{-2}	1 sth = 10^3 N (E)	Obsolete MTS unit of force.	MTS
funt (Polish)	–	mass	M	1 funt (Polish) = 0.405504 kg	Obsolete traditional Polish unit of mass used before 1919.	Polish
funt [Russian pound]	–	mass	M	1 funt = 0.4095171792 kg	Obsolete Russian unit of mass used before 1917 for general use. It was equal to the mass of the Pt-Ir prototype marked "H1894" 1 kg = 2.4419 funts (E)	Russian
furlong (Irish)	–	length, distance	L	1 furlong (Irish) = 256.032 m (E)	Obsolete unit of length used in surveyors measurements in Ireland. 1 furlong (Irish) = 840 feet (E) 1 furlong (Irish) = 40 perches (E) 1 furlong (Irish) = 10 chains (Irish) (E)	Ireland
furlong (Scottish)	fu.	length, distance	L	1 furlong (Scottish) = 226.770102596 m	Obsolete traditional Scottish unit of length used before the Imperial Weights and Measures Act of 1824. 1 furlong (Scottish) = 740 feet (E)	Scottish
furlong (UK)	fur	length, distance	L	1 furlong (UK) $= 2.01168 \times 10^2$ m (E)	Obsolete British surveyors' unit of length. The name comes from the contraction of **fur**row **long**. 1 furlong (UK) = 1 000 links (UK) (E) 1 furlong (UK) = 660 feet (E) 1 furlong (UK) = 220 yards (E) 1 furlong (UK) = 40 rods (E) 1 furlong (UK) = 10 chains (UK) (E) 1 furlong (UK) = 1/8 mile (UK) (E)	UK

furlong (US)	fur	length, distance	L	1 furlong (US) $= 2.01168 \times 10^2$ m (E)	Obsolete American surveyors'unit of length. The name comes from the contraction of **fur**row **long**. 1 furlong (UK) = 1/8 mile (UK) (E) 1 furlong (US) = 1000 links (US) (E) 1 furlong (UK) = 660 feet (E) 1 furlong (UK) = 220 yards (E) 1 furlong (US) = 6.6 chains (US) (E)	US
fuss (Austrian) [Austrian foot]	–	length, distance	L	1 fuss (Austrian) = 0.316080 m	Obsolete Austrian unit of length.	Austrian
fuss (German) [Prussian foot]	–	length, distance	L	1 fuss (Prussian) = 0.313857 m	Obsolete German unit of length.	German
fuss (Swiss)	–	length, distance	L	1 fuss (Swiss) = 0.300 m (E)	Obsolete traditional Swiss unit of length before 1877.	Swiss
futtermassel (Austrian, dry)	–	capacity, volume	L^3	1 futtermassel (Austrian, dry) $= 1.921531250 \times 10^{-3}$ m^3	Obsolete Austrian unit of capacity used for dry substances. 1 futtermassel (Austrian, dry) = 1/32 metzel (E)	Austrian
gaillarde	–	length, distance	L	1 gaillarde = $3.00777237686 \times 10^{-3}$ m	Obsolete French unit of length employed in typography. It was a multiple of the point (Didot). 1 gaillarde = 8 points Didot (E)	French
gal (Galileo)	Gal, gal	acceleration	LT^{-2}	1 gal = 10^{-2} $m.s^{-2}$ (E)	Obsolete unit of acceleration in the cgs system. The unit is named after the famous Italian scientist G. Galileo (1564–1642). The gal is employed extensively in geophysics and geodesy to express acceleration due to gravity. 1 gal = 1 $cm.s^{-2}$ (E)	cgs
gallon (Canadian, liq.)	gal (Canadian)	capacity, volume	L^3	1 gallon (Canadian) $= 4.546092 \times 10^{-3}$ m^3 (E)	Obsolete Canadian unit of capacity. It was equal to the imperial gallon. 1 gallon (Canadian) = 1 gallon (UK) (E)	CAN

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
gallon (Irish)	gal.	capacity, volume	L^3	1 gallon (Irish) $= 3.56582512640 \times 10^{-3}$ m^3	Obsolete traditional Irish unit of capacity for liquids used before the adoption of the Weights and Measures Act of 1824. 1 gallon (Irish) = 217.6 cubic inches (E)	Irish
gallon (Scottish, liq.)	gal.	capacity, volume	L^3	1 gallon (Scottish, liq.) $= 13.5559037268 \times 10^{-3}$ m^3	Obsolete traditional Scottish unit of volume used before the Weights and Measures Act of 1824 to measure the capacity of liquids. 1 gallon (Scottish, liq.) = 827.232 in^3	Scottish
gallon (UK, beer)	gal	capacity, volume	L^3	1 gallon (UK, beer) $= 4.62115204800 \times 10^{-3}$ m^3	Obsolete British unit of capacity used for beer and ale between 1803 and 1824. 1 gallon (UK, beer) = 282 in^3 (E)	UK
gallon (UK) (imperial gallon)	gal (UK), imp. gal	capacity, volume	L^3	1 gallon (UK) $= 4.546092 \times 10^{-3}$ m^3	British unit used for capacity measurements for all merchandise (solids, liquids, foodstuffs, etc). Before 1976, the imperial gallon was equal to the volume at 62.02°F (16.7°C) under an atmostpheric pressure of 30 inHg (32°F) occupied by 58 031.8886 grains of water. Since the *Weights and Measures Act* of 1976, the imperial gallon is equal to the volume at 62°F under an atmosphere pressure of 30 in Hg (32°F) of 10 lb of distilled water with density $\rho = 0.998859$ $g.cm^{-3}$ measured in air of density 1.217 $g.dm^{-3}$ weighed against brass. 1 gallon (UK) = 4 quarts (UK) (E) 1 gallon (UK) = 8 pints (UK) (E) 1 gallon (UK) = 32 gills (UK) (E) 1 gallon (UK) = 160 fl oz (UK) (E)	UK

					1 gallon (UK) = 1.20095045385 gallon (US, liq.) 1 gallon (UK) = 1.03205719753 gallons (US, dry)	
gallon (UK) per foot	gal (UK).ft^{-1}	surface, area	L^2	1 gal (UK).ft^{-1} = 1.4915000×10^{-2} m^2 (E)	Obsolete British unit of area used for geometric shape measurements.	UK
gallon (UK) per hour	gph (UK)	volume flow rate	L^3T^{-1}	1 gal (UK).h^{-1} = $1.262803333 \times 10^{-6}$ $m^3.s^{-1}$	Obsolete British unit of volume flow rate employed in chemical engineering.	UK
gallon (UK) per mile (statute)	gal (UK).mi^{-1}(stat.)	surface, area	L^2	1 gal (UK).mi^{-1} (stat.) = $2.824810606 \times 10^{-6}$ m^2	Obsolete British unit of area used for geometric shape measurements.	UK
gallon (UK) per minute	gpm (UK)	volume flow rate	L^3T^{-1}	1 gal (UK).min^{-1} = $7.576820000 \times 10^{-5}$ $m^3.s^{-1}$	Obsolete British unit of volume flow rate employed in chemical engineering.	UK
gallon (UK) per pound	gal .lb^{-1}	specific volume	L^3M^{-1}	1 (UK) gal.lb^{-1} = $1.00224172642 \times 10^{-2}$ $m^3.kg^{-1}$	Obsolete British unit of specific volume.	UK
gallon (UK) per second	gps (UK)	volume flow rate	L^3T^{-1}	1 gal (UK).s^{-1} = 4.546092×10^{-3} $m^3.s^{-1}$ (E)	Obsolete British unit of volume flow rate employed in chemical engineering.	UK
gallon (US, dry)	gal (US, dry)	capacity, volume	L^3	1 gallon (US, dry) = $4.40488377086 \times 10^{-3}$ m^3 (E)	American unit of capacity used for dry powdered and divided solids (flour, sand, ores, etc) capacity measurements. 1 gal (US, dry) = 268.8025 cubic inches (E) (Def.) 1 gallon (US, dry) = 4 quarts (US, dry) (E) 1 gallon (US, dry) = 8 pints (US, dry) (E) 1 gallon (US, dry) = 0.968938545648 gallon (UK) 1 gallon (US, dry) = 1.16364718615 gallons (US, liq.)	US
gallon (US, liq.)	gal (US, liq.)	capacity, volume	L^3	1 gallon (US, liq.) = $3.785411784 \times 10^{-3}$ m^3	American unit used for capacity measurements of liquids. The US gallon is equal to the volume of 8.32828 lb of water at 60°F. It is employed to express only the capacity of liquids. *(continued overleaf)*	US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
gallon (US, liq.) *(continued)*					1 gallon (US) = 231 in^3 (E) (Def.) 1 gallon (US) = 4 quarts (US, liq.) (E) 1 gallon (US) = 8 pints (US, liq.) (E) 1 gallon (US) = 32 gills (US, liq.) (E) 1 gallon (US) = 128 fl oz (US) (E) 1 gallon (US) = 1024 fl dr (US, liq.) (E) 1 gallon (US) = 0.8326738183 gallon (UK)	
gallon (US) per day per capita	gpdpc	water consumption in modern countries	L^3T^{-1}	1 gpdpc = $43.81263636 \times 10^{-9}$ $m^3.s^{-1}$ per capita	American unit of tap water consumption in urban areas. 1 gpdpc = 3.785411784 $dm^3.\ day^{-1}$ per capita (E)	US
gallon (US, liq.) per foot	gal (US, liq.).ft^{-1}	surface, area	L^2	1 gal (US, liq.).ft^{-1} = $1.241933000 \times 10^{-2}$ m^2 (E)	Obsolete American unit of area used for geometric shape measurements.	US
gallon (US, liq.) per hour	gph (US)	volume flow rate	L^3T^{-1}	1 gal (US, liq.).h^{-1} = $1.051503273 \times 10^{-6}$ $m^3.s^{-1}$	Obsolete American unit of volume flow rate employed in chemical engineering.	US
gallon (US, liq.) per hour-horsepower	gal (US).h^{-1}.HP^{-1}	specific fuel consumption-energy ratio	$M^{-1}LT^2$	1 gal (US, liq.).h^{-1}-HP^{-1} = $1.410089117 \times 10^{-9}$ $m^3.J^{-1}$	American unit to expressed the specific fuel consumption (SFC) of motor oil engines. In this unit we assume: 1 HP = 550 lbf-ft.s^{-1}	US
gallon (US, liq.) per mile	gal (US).mi^{-1}	surface, area	L^2	1 gal (US, liq.).mi^{-1} = $2.352145833 \times 10^{-6}$ m^2	Obsolete American unit of area used for geometric shape measurements.	US
gallon (US, liq.) per minute	gpm (US)	volume flow rate	L^3T^{-1}	1 gal (US, liq.).min^{-1} = $6.309019640 \times 10^{-5}$ $m^3.s^{-1}$	Obsolete American unit of volume flow rate employed in chemical engineering.	US
gallon (US, liq.) per second	gps (US)	volume flow rate	L^3T^{-1}	1 gal (US, liq.).s^{-1} = $3.785411784 \times 10^{-3}$ $m^3.s^{-1}$	Obsolete American unit of volume flow rate employed in chemical engineering.	US
gallon (US, wine)	gal (US, wine)	volume, capacity	L^3	1 gallon (US, wine) = $3.785411784 \times 10^{-3}$ m^3 (E)	Obsolete American unit of volume used to measure the capacity of wine. 1 gal (US, wine) = 231 in^3 (E) 1 gal (US, wine) = 1 gal (US, liq.) (E)	US

gallon per flush (US, liq.)	gpf, GPF	volume, capacity	L^3	1 gallon per flush $= 3.785411784 \times 10^{-3}$ m^3	Common American customary unit of volume used in sanitary equipment and devices.	US
galvat	–	electric current intensity	I	1 galvat = 1 A (E)	Obsolete unit of electric current intensity named after the Italian scientist Luigi Galvani. Anecdotal.	
gamma	γ	magnetic induction field, magnetic flux density	$MI^{-1}T^{-2}$	1 $\gamma = 10^{-9}$ T (E)	Obsolete unit of magnetic induction employed in geophysics and magnetohydrodynamics. 1 $\gamma = 10^{-5}$ G,Γ (E) 1 $\gamma = 10^{-5}$ emu cgs (E)	
gamma	γ	mass	M	1 $\gamma = 10^{-9}$ kg (E)	Obsolete unit of mass employed in analytical chemistry. 1 $\gamma = 10^{-6}$ g (E) 1 $\gamma = 1$ μg (E)	
gan (Persian)	–	surface, area	L^2	1 gan (Persian) = 1474.56 m^2	Obsolete Persian unit of area used in ancient times. 1 gan (Persian) = 100 gar (Persian) (E)	Persian
gammell (Guinean)	–	mass	M	1 gammell (Guinean) = 195.399120 kg	Obsolete Guinean traditional unit of mass used before 1906. 1 gammell (Guinean) = 15 218/5 benda (Guinean) (E)	Guinean
gammil	gammil	mass of solute per unit volume of solution	ML^{-3}	1 gammil = 10^{-3}kg.m^{-3} (E)	Obsolete unit of concentration of solutes in aqueous solutions used in analytical chemistry and named after the French acronym **gra**m**m**e pour **mil**les **l**itres. When used for dilute aqueous solutions, one gammil is roughly equal to one ppm wt. 1 gammil = 1 g/m^3 (E) 1 gammil = 1 mg/l (E)	
ganta (Philippine)	–	capacity, volume	L^3	1 ganta (Philippine) $= 3.996 \times 10^{-3}$ m^3	Obsolete Philippine traditional unit of capacity used before 1906. 1 ganta (Philippine) = 1000 chupa (Philippine) (E)	Philippine

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
gar (Persian)	–	surface, area	L^2	1 gar (Persian) = 14.7456 m^2	Obsolete Persian unit of area used in ancient times. 1 gar (Persian) = 144 sq. ft (E) 1 gar (Persian) = 1 sq. qasab (E)	Persian
garava (Syrian)	–	capacity, volume	L^3	1 garava (Syrian) = 1.44 m^3	Obsolete Syrian traditional unit of capacity used before 1931. 1 garava (Syrian) = 450 rotl (Syrian) (E)	Syrian
garce (Indian)	–	capacity, volume	L^3	1 garce (Indian) = 8.808 m^3	Obsolete Indian traditional unit of capacity used before 1920. 1 garce (Indian) = 6400 raik (Indian) (E)	Indian
gariba (Arabic) (den)	–	capacity, volume	L^3	1 gariba (Arabic) = 261.120×10^{-3} m^3 (of water)	Obsolete Arabic unit of capacity used in ancient times. Measured by weight. 1 gariba (Arabic) = 8 cafiz (E)	Arabic
gariba (Persian)	–	capacity, volume	L^3	1 gariba (Persian) = 260.8×10^{-3} m^3 (of water)	Obsolete unit of capacity of the Assyrio-Chaldean-Persian system used in ancient times. Measured by weight. 1 gariba (Persian) = 8 amphora (E)	Persian
garnetz (Russian, dry)	–	capacity, volume	L^3	1 garnetz (Russian, dry) = 3.279842×10^{-3} m^3	Obsolete Russian unit of capacity for dry substances used before 1917. 1 garnetz = 4/15 vedro (Russian, dry)	Russian
garniec (Polish)	–	capacity, volume	L^3	1 garniec (Polish) = 4×10^{-3} m^3 (E)	Obsolete traditional Polish unit of capacity used before 1919. 1 garniec (Polish) = 4 kwarta (Polish) (E)	Polish
gasab (Egyptian)	–	length, distance	L	1 gasab (Egyptian) = 2.320 m	Obsolete Egyptian traditional unit of length used before 1891. 1 gasab (Egyptian) = 4 diraa (Egyptian) (E)	Egyptian
gat (Ethiopian)	–	length, distance	L	1 gat (Ethiopian) = 8×10^{-2} m	Obsolete Ethiopian traditional unit of length used before 1963. 1 gat (Ethiopian) = 16/5 tat (Ethiopian) (E)	Ethiopian

gauge (UK)	ga		nil	n gauge (UK) $= 866.297614011 \times 10^6/\rho$ $(\mathrm{kg.m^{-3}}).d^3$ (mm) (see note)	Obsolete dimensionless British unit used for measuring the inside diameter of a shotgun barrel. The gauge of a shotgun corresponds to the exact number of balls made of a lead alloy (with density ρ) required to make a pound avoirdupois, each of a diameter d, just fitting inside the barrel. For instance, if a lead ball weighing 1/16 pound just fitted in the barrel of a shotgun, then it was a 16-gauge shotgun.	UK
gauge (UK, US)	ga	number of loops per length	L^{-1}	1 gauge (UK, US) = 26.2467191601 m^{-1}	Obsolete American and British unit used in the textile industry for expressing the fineness of a knitted fabric, equal to the number of loops per 1.5 inches. 1 gauge (UK, US) = 8 loops per foot (E) 1 gauge (UK, US) = 24 loops per yard (E) 1 gauge (UK, US) = 42 240 loops per mile (E)	UK, US
gauss	G, Gs, Γ	magnetic induction field, magnetic flux density	$MI^{-1}T^{-2}$	1 G = 10^{-4} T (E)	Obsolete cgs unit of magnetic induction.	cgs
gavyuti (Indian)	–	length, distance	L	1 gavyuti (Indian) = 7312 m	Obsolete Indian unit of length used in ancient times. 1 gavyuti (Indian) = 16 000 hasta (E)	Indian
Gay-Lussac (Gay-Lussac degree)	°GL	percentage of alcohol in wines and spirits	nil	1 °GL = 1% (v/v) ethanol in water	Obsolete French unit used in oenology and introduced in 1824. It serves to express percentage of ethanol in wines and spirits.	French
Gay-Lussac degree	–	specific gravity of liquids, hydrometer index, hydrometer degree	nil	°Gay-Lussac = 100 − (100/d)	Obsolete unit of specific gravity.	
gee	g, G	acceleration of gravity	LT^{-2}	1 $g_n = 9.80665 \mathrm{m.s^{-2}}$ (E)	Common unit of the acceleration of gravity extensively used in aeronautics.	INT

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
geepound (slug)	slug	mass	M	1 slug = 14.5939029372 kg	Obsolete unit of mass. It was equal to the mass which under an acceleration of 1 ft.s^{-2} gives a force of 1 lbf. The name geepound sometimes used for the unit is derived from English: **g pound**.	UK, FPS
geira (Portuguese)	–	surface, area	L^2	1 geira (Portuguese) = 5803.281 m^2	Obsolete Portuguese unit of area. 1 geira (Portuguese) = 4840 square vara (E)	Portuguese
gemmho	–	electrical conductance	$M^{-1}L^{-2}T^3I^2$	1 gemmho = 10^{-6} S (E)	The name derived from the reverse writing of the two words meg-ohm.	
generation	gen	time, duration, period	T	1 generation = 7.8894 $\times 10^8$ to 1.0414 $\times 10^9$ s	Unit of time used in anthropology, genealogy, and demography. A generation is defined as the average length of time between the birth of a parent (mother or father) and the birth of the child. Approximate range of estimates for the length of a generation, from about 25 to 33 years. Genealogists tend to use the higher figures, while anthropologists the lower ones.	INT
gerah (Eqyptian) [Egyptian obol]	–	mass	M	1 gerah (Eqyptian) = 6.825 × 10 kg	Obsolete Egyptian unit of mass used in ancient times. 1 gerah (Egyptian) = =1/20 debens	Egyptian
gerah (Hebrew) [Hebrew obol] [sacred system]	–	mass	M	1 gerah (Hebrew) = 7.083333 × 10^{-4} kg	Obsolete Hebrew unit of mass used in ancient times. Sacred system. 1 gerah (Hebrew) = 1/1200 mina (E)	Hebrew
gerbe (Moroccan)	–	mass	M	1 gerbe (Moroccan) = 3.045 kg	Obsolete traditional Moroccan unit of mass used before 1923. 1 gerbe (Moroccan) = 6 rotal (Moroccan) (E)	Moroccan

gez (Persian)	–	length, distance	L	1 gez (Persian) = 0.9144 m	Obsolete Persian traditional unit of length used before 1933. 1 gez (Persian) = 16 gireh (Persian) (E)	Persian
ghalva (Arabic)	–	length, distance	L	1 ghalva (Arabic) = 230.400 m	Obsolete Arabic unit of length used in ancient times. 1 ghalva (Arabic) = 720 feet (Arabic) (E)	Arabic
ghalva (Persian) [stadion]	–	length, distance	L	1 ghalva (Persian) = 230.400 m	Obsolete unit of length in the Assyrio-Chaldean-Persian system used in ancient times. 1 ghalva = 720 zereths (E)	Persian
ghebeta (Eritrean)	–	capacity, volume	L^3	1 ghebeta (Eritrean) = 25.44 $\times 10^{-3}$ m^3	Obsolete Eritrean traditional unit of capacity used before 1927. 1 ghebeta (Eritrean) = 16 messe (Eritrean) (E)	Eritrean
giarra (Libyan)	–	capacity, volume	L^3	1 giarra (Libyan) = 44.0123239437 $\times 10^{-3}$ m^3	Obsolete Libyan traditional unit of capacity used for liquids before 1927. 1 giarra (Libyan) = 250/71 gorraf (Libyan) (E)	Libyan
gibbs	–	surface molar concentration	$N.L^{-2}$	1 gibbs = 10^{-6} $mol.m^{-2}$	Unit of adsorbed concentration of a molecule onto a surface. The unit is named after J.W. Gibbs (1839–1903). 1 gibbs = 10^{-10} $mol.cm^{-2}$ (E)	
gigabyte (gigaoctet)	Go, GB	quantity of information	nil	1 GB = 1 073 741 824 bytes (E)	1 GB = 2^{30}	
gigagram	Gg	mass	M	1 Gg = 10^6 kg (E)	Multiple of the SI base unit. 1 Gg = 10^9 g (E)	SI
gigametre	Gm	length, distance	L	1 Gm = 10^9 m (E)	Multiple of the SI base unit	SI
gigapascal	GPa	pressure, stress	$ML^{-1}T^{-2}$	1 GPa = 10^9 Pa (E)	Multiple of the derived SI pressure and stress unit.	SI

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
gilbert	Gb	magnetomotive force	I	1 Gb = 0.795774715459 A	Obsolete cgs unit of magnetomotive force. The unit is named after W. Gilbert (1544–1603). 1 Gb = 1 Œ.cm (E) 1 Gb = [10/4π] A.tr (E) 1 Gb = [1/4π] abampere.tr (E)	cgs
gill (Scottish, liq.)	–	capacity, volume	L^3	1 gill (Scottish, liq.) = 105.905497866 $\times 10^{-6}$ m^3	Obsolete traditional Scottish unit of volume used before the Weights and Measures Act of 1824 to measure the capacity of liquids. 1 gill (Scottish, liq.) = 1/128 gallon (Scottish, liq.) (E)	Scottish
gill (UK)	gi (UK)	capacity, volume	L^3	1 gill (UK) = 1.420653750 $\times$ 10^{-4} m^3	British unit used for capacity measurements for all merchandise (solids, liquids, foodstuffs, etc). 1 gill (UK) = 1/32 gallon (UK) (E) 1 gill (UK) = 1/16 pottle (UK) (E) 1 gill (UK) = 1/8 quart (UK) (E) 1 gill (UK) = 1/4 pint (UK) (E) 1 gill (UK) = 5 fl oz (UK) (E) 1 gill (UK) = 40 fl dr (UK) (E) 1 gill (UK) = 1.20095045385 (US) gill	UK
gill (US, liq.)	gi (US, liq.)	capacity, volume	L^3	1 gill (US, liq.) = 1.18294118250 $\times$ 10^{-4} m^3	American unit used for capacity measurements of liquids. 1 gill (US, liq.) = 1/32 gallon (US, liq.) (E) 1 gill (US, liq.) = 1/8 lq quart (US, liq.) (E) 1 gill (US, liq.) = 1/4 lq pint (US, liq.) (E) 1 gill (US, liq.) = 4 fl oz (US, liq.) (E) 1 gill (US, liq.) = 32 fl dr (US, liq.) (E) 1 gill (US, liq.) = 1920 minims (US, liq.) (E) 1 (US) gill = 0.832673818303 gill (UK)	US

giornata (Italian)	–	surface, area	L^2	1 giornata (Italian) = 3 800 m^2	Obsolete Italian unit of area.	Italian
gireh (Persian)	–	length, distance	L	1 gireh (Persian) = 5.715 $\times 10^{-2}$ m	Obsolete Persian traditional unit of length used before 1933. 1 gireh (Persian) = 1/2 urub (Persian) (E)	Persian
gisla (Eritrean)	–	mass	M	1 gisla (Eritrean) = 163.072 kg	Obsolete Eritrean traditional unit of mass used before 1927. 1 gisla (Eritrean) = 364 rottolo (Eritrean) (E)	Eritrean
gisla (Somalian)	–	mass	M	1 gisla (Somalian) = 161.28 kg	Obsolete Somalian traditional unit of mass used before 1950. 1 gisla (Somalian) = 5760 okia (Somalian) (E)	Somalian
gisla (Somalian)	–	capacity, volume	L^3	1 gisla (Somalian) = 163.08 $\times 10^{-3}$ m^3	Obsolete Somalian traditional unit of capacity used before 1950. 1 gisla (Somalian) = 360 caba (Somalian) (E)	Somalian
glass	–	time, duration, period	T	1 glass = 1800 s (E)	Obsolete Anglo-saxon unit of time measured by an hourglass or sand glass. At sea, time was traditionally measured with half-hourglasses, making the glass a nautical unit of time equal to 1/2 hour. In this usage the glass is another name for the bell. 1 glass = 30 min (E) 1 glass = 0.5 h (E)	US, UK
glass (US, wine)	–	capacity, volume	L^3	1 glass (US, wine) = 118.294118250 $\times 10^{-6}$ m^3 (E)	Obsolete American unit of capacity used before 1979 for measuring the capacity of spirits and alcoholic beverages especially wine. 1 glass (US, wine) = 1/32 gallon (US, liq.) (E) 1 glass (US, wine) = 4 fluid ounces (US) (E)	US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
glug	–	mass	M	1 glug = 9.80665×10^{-1} kg (E)	Obsolete unit of mass. It was equal to the mass which under an acceleration of 1 $cm.s^{-2}$ gives a force of 1 gram-force. It was the cgs equivalent of slug. 1 glug = 1 $g_f.cm^{-1}.s^2$ (E)	cgs
go (Japanese)	–	capacity, volume	L^3	1 go (Japanese) = $0.180390683696 \times 10^{-3}$ m^3	Obsolete Japanese unit of capacity. 1 go = 1/10 shô (E)	Japanese
gô (Japanese)	–	surface, area	L^2	1 gô (Japanese)= 0.330578512397 m^2	Obsolete Japanese unit of area. 1 gô = 1/10 bu (E)	Japanese
goad (UK, clothes)	–	length, distance	L	1 goad (UK, clothes) = 1.3716 m (E)	Obsolete British unit of length used for measuring clothes. A goad was originally a spear; later it was a pointed rod used for prodding animals to get a move on. 1 goad (UK, clothes) = 54 inches (E) 1 goad (UK, clothes) = 4.5 feet (E) 1 goad (UK, clothes) = 1.5 yards (E)	UK
gomari (Cypriot)	–	capacity, volume	L^3	1 gomari (Cypriot) = 163.6544×10^{-3} m^3	Obsolete Cypriot traditional unit of capacity used before 1972. 1 gomari (Cypriot) = 128 oke (Cypriot) (E)	Cypriot
gomor (Hebrew)	–	capacity, volume	L^3	1 gomor (Hebrew) = 2.142×10^{-3} m^3 (of water)	Obsolete Hebrew unit of capacity used in ancient times. Measured by weight. 1 gomor (Hebrew) = 1/10 ephah (new)	Hebrew
gon (Annamese)	–	length, distance	L	1 gon (Annamese) = 141 m	Obsolete Annamese traditional unit of length used before 1914. 1 gon (Annamese) = 300 thuoc (Annamese) (E)	Annamese
gon (grade)	gr, ^{g}	plane angle	α	1 gon = $1.57079632680 \times 10^{-2}$rad	1 gon = $\pi/200$ rad (E) 1 gon = 100 centesimal minutes (E) 1 gon = 10^4 centesimal seconds (E)	INT French

gorraf (Libyan)	–	capacity, volume	L^3	1 gorraf (Libyan) $= 12.499500 \times 10^{-3}$ m^3	Obsolete Libyan traditional unit of capacity used for liquids before 1927. 1 gorraf (Libyan) = 39/4 oka (Libyan) of water (E) 1 gorraf (Libyan) = 1/5 barrile (Libyan) (E)	Libyan
gouy	–	electrokinetic potential	$ML^2T^{-3}I^{-1}$	(see note)	Unit of electrokinetic potential employed in electrokinetics. It was suggested in 1956. The unit is named after L.G. Gouy (1854–1926).	
grade (gon)	gr, ^{g}	plane angle	α	1 gr = $1.57079632680 \times 10^{-2}$ rad	Obsolete unit of plane angle introduced after the French revolution (1789). Sometimes in use in the artillery. 1 grade = $\pi/200$ rad (E) 1 grade = 100 centesimal minutes (E) 1 grade = 10^4 centesimal seconds (E)	INT French
gradus (Roman) [Roman pace]	–	length, distance	L	1 gradus (Roman) = 0.736 m	Obsolete Roman unit of length employed in ancient times. 1 gradus (Roman) = 5/2 pes (E) 1 gradus (Roman) = 2 pes + 2 palmus	Roman
grain (apothecary)	gr (apoth.), gr (ap.)	mass	M	1 gr (apoth.) $= 6.479891000 \times 10^{-5}$ kg	Obsolete British and American unit of weight employed in pharmacy. It was employed at one time as a weight unit for drugs and medicines (lotions, potions, ointments, plant extracts, etc). 5760 grains (apoth.) = 1 lb (apoth.) (E)	UK, US
grain (avoirdupois)	gr (avdp), gr (av.)	mass	M	1 gr (av.) $= 6.479891000 \times 10^{-5}$ kg (E)	Legal American and British unit of weight since the WMA of 1963. 7000 grains (av.) = 1 lb (WMA, 1963) (E)	UK, US
grain (de Paris)	gr.	mass	M	1 grain (de Paris) $= 5.311478407 \times 10^{-5}$ kg	Obsolete French unit of mass employed before the French Revolution (1789). 1 grain (de Paris) = 1/9216 livre (de Paris) (E)	French

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
grain (Egyptian)	–	mass	M	1 grain (Egyptian) = 0.910×10^{-3} kg	Obsolete Egyptian unit of mass used in ancient times. 1 grain (Egyptian) = 1/15 deben (E)	Egyptian
grain (jeweller's)	gr (jew.)	mass	M	1 gr (jeweller's) = 5×10^{-5} kg (E)	Obsolete British unit of mass employed in jewellery for the weighing of precious metals, precious stones and gems (diamond, ruby, sapphire). 1 gr (jeweller's) = 0.25 carat (metric) (E) 1 gr (jeweller's) = 50 mg (E)	UK
grain (Russian) (apothecary)	–	mass	M	1 grain (Russian) = $6.220891642 \times 10^{-5}$ kg	Obsolete Russian unit of mass used before 1917 in pharmacy. 1 grain (Russian) = 5/7 doli (E)	Russian
grain (Scottish)	gr.	mass	M	1 grain (Scottish) = $64.7989100 \times 10^{-6}$ kg	Obsolete traditional Scottish unit of mass used before the Weights and Measures Act of 1824. 1 grain (Scottish) = 1/9520 pound (Scottish) (E)	Scottish
grain (Swiss, apothecary)	–	mass	M	1 grain (Swiss, apothecary) = $65.10416667 \times 10^{-6}$ kg (E)	Obsolete traditional Swiss unit of mass used before 1877 in pharmacy. 1 grain (Swiss, apothecary) = 1/7680 livre (Swiss) (E) 1 grain (Swiss, apothecary) = 1/5760 livre (Swiss, apothecary) (E)	Swiss
grain (troy)	gr (troy)	mass	M	1 gr (troy) = $6.479891000 \times 10^{-5}$ kg	Obsolete British unit of mass employed for the weighing of precious metals, precious stones and gems (diamond, ruby, sapphire) in the United Kingdom. Now obsolete in the UK but this unit remains in common use in the USA. 5760 grains (troy) = 1 lb (troy) (E)	UK, US
gram	g	mass	M	1 g = 10^{-3} kg (E)	Submultiple of the SI base unit; cgs base unit of mass.	cgs

gram-rad	–	radiation absorbed dose, specific energy, kerma, index of absorbed dose	L^2T^{-2}	1 gram-rad = 0.01 Gy (E)	Obsolete unit. 1 gram-rad = 10^2 erg.g^{-1} (E)	
gramcentimetre per second	g.cm.s^{-1}	linear momentum, momentum	MLT^{-1}	1 g.cm.s^{-1} = 10^{-5} kg.m.s^{-1} (E)	Obsolete cgs linear momentum unit.	cgs
gran (Austrian, apothecary)	–	mass	M	1 gran (Austrian, apothecary) = $7.29184027778 \times 10^{-6}$ kg	Obsolete Austrian unit of mass used in pharmacy. 1 gran (Austrian, apothecary) = 1/5760 pfund (Austrian, apothecary) (E)	Austrian
gran (German)	–	mass	M	1 gran (German) = 60.899869790×10 kg	Obsolete German unit of mass. 1 gran (German) = 1/7680 pfund (German) (E)	German
gran (Polish)	–	mass	M	1 gran (Polish) = 44.00×10^{-6} kg	Obsolete traditional Polish unit of mass used before 1919. 1 gran (Polish) = 1/9216 funt (Polish) (E)	Polish
grani (Thai)	–	mass	M	1 grani (Thai) = 0.9375×10^{-3} kg	Obsolete Thai traditional unit of mass used before 1923. 1 grani (Thai) = 1/1280 tchang (Thai) (E)	Thai
grano (Italian)	–	mass	M	1 grano (Italian) = $4.44155092593 \times 10^{-5}$ kg	Obsolete Italian unit of mass. 1 grano (Italian) = 1/6912 libbra (E)	Italian
grano (Spanish)	–	mass	M	1 grano (Spanish) = $4.99232855903 \times 10^{-5}$ kg	Obsolete Spanish unit of mass. 1 grano (Spanish) = 1/9216 libra (E)	Spanish
granos (Argentinian)	–	mass	M	1 granos (Argentinian) = $49.8480902778 \times 10^{-6}$ kg	Obsolete Argentinian traditional unit of mass used before 1887. 1 granos (Argentinian) = 1/9216 libra (Argentinian) (E)	Argentinian
granos (Chilean)	–	mass	M	1 granos (Chilean) = $49.9232855903 \times 10^{-6}$ kg	Obsolete Chilean traditional unit of mass used before 1865. 1 granos (Chilean) = 1/9216 libbra (Chilean) (E)	Chilean
grao (Portuguese)	–	mass	M	1 grao (Portuguese) = $4.980468750 \times 10^{-5}$ kg	Obsolete Portuguese unit of mass. 1 grao (Portuguese) = 1/ 9216 libra (E)	Portuguese

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
gray	Gy	radiation absorbed dose, specific energy, kerma, index of absorbed dose	L^2T^{-2}	**SI derived unit** 1 Gy = 1 $J.kg^{-1}$ (E)	The gray is the absorbed dose when the energy per unit mass imparted to matter by ionizing radiation is one joule per kilogram (15th CGPM, 1976). The unit is named after the British scientist L.H. Gray (1905–1965).	SI
great gross	–	dimensionless unit of quantity	nil	1 great gross = 1728 entities (E)	Dimensionless British unit of quantity, equal to a dozen gross. 1 great gross = 14.4 great hundred (E) 1 great gross = 28.8 shocks (E) 1 great gross = 86.4 scores (E) 1 great gross = 144 dozens (E)	UK
great hundred	–	dimensionless unit of quantity	nil	1 great hundred = 120 entities (E)	Dimensionless British unit of quantity initially used by merchants in medieval England for specifying quantities. 1 great hundred = 10 dozens (E) 1 great hundred = 6 scores (E) 1 great hundred = 2 shocks (E)	UK
great primer	–	length, distance	L	1 great primer = 6.350×10^{-3} m (E)	British and American obsolete traditional typographical unit of length used in printing. 1 great primer = 18 points (E)	UK, US
Greenwich mean solar time	GMT	time, period, duration	T	(see note)	Obsolete time standard. The GMT is defined as the average passage of the Sun across the meridian zero every day of the year.	INT
grein (Dutch)	–	mass	M	1 grein (Dutch) = $6.408433854 \times 10^{-5}$ kg	Obsolete Dutch unit of mass. 1 grein (Dutch) = 1/7680 pond ordinary (Dutch) (E)	Dutch

gros (de Paris) [French drachm]	–	mass	M	1 gros (de Paris) $= 3.824264453 \times 10^{-3}$ kg	Obsolete French unit of mass employed before the French Revolution (1789). 1 gros (de Paris) = 1/128 livre (de Paris) (E)	French
gross	–	dimensionless unit of quantity	nil	1 gross = 144 entities (E)	Dimensionless British unit of quantity, equal to a twelve-dozen gross. 1 gross = 12 dozens (E)	UK
ground (Indian)	–	surface area	L^2	1 ground (Indian) = 20.3 m^2	Obsolete Indian traditional unit of surface used in land mea surements before 1920.	Indian
guerze (Persian)	–	length, distance	L	1 guerze (Persian) = 0.9144 m	Obsolete Persian traditional unit of length used before 1933. 1 guerze (Persian) = 16 gireh (Persian) (E)	Persian
gur (Persian)	–	surface, area	L^2	1 gur (Persian) = 14 745.6 m^2	Obsolete Persian unit of area used in ancient times. 1 gur (Persian) = 1000 gar (E) 1 gur (Persian) = 144 000 sq. zereth (E)	Persian
Gurley unit	–	permeability	LT^{-1}	1 Gurley unit = 1.52973412288 $\times 10^{-6}$ $m^3.m^{-2}.s^{-1}$.Pa (E)	The Gurley unit is an American unit used in the pulp and paper industry for measuring the air permeability of paper. The unit is named after the name of a standard test procedure. It was used assuming Darcy's law when the flow rate of the gas through the membrane is 100 cubic centimetres per second. The membrane surface area is expressed in square inches. Finally, the pressure drop across the paper is a standard pressure difference of one atmosphere. 1 Gurley unit = 100 cm^3 (STP).$in^{-2}.s^{-1}.atm^{-1}$ (E)	US
guz (Indian, Bombay)	–	length, distance	L	1 guz (Indian, Bombay) = 0.6858 m	Obsolete Indian traditional unit of length used before 1920. 1 guz (Indian, Bombay) = 2 covid (Indian, Bombay) (E)	Indian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
guz (Indian, Calcutta)	–	length, distance	L	1 guz (Indian, Calcutta) = 0.915 m	Obsolete Indian traditional unit of length used before 1920. 1 guz (Indian, Calcutta) = 2 covid (Indian, Calcutta) (E)	Indian
guz (Saudi Arabian)	–	length, distance	L	1 guz (Saudi Arabian) = 0.635 m	Obsolete Saudi Arabian traditional unit of length used before 1962. 1 guz (Saudi Arabian) = 635/3840 farsakh (Saudi Arabian) (E)	Saudi Arabian
G-value (old)	G-value	radiochemical yield	$M^{-1}L^{-2}T^{2}$	1 G-value (old) = $6.241506480 \times 10^{16}$ entities.J^{-1} 1 G-value (old) = $1.036427234 \times 10^{-7}$ mol.J^{-1}	Obsolete unit of radiochemical yield still used in radiation chemistry and radiochemistry. It is exactly defined as the number of entities (e.g., molecules, ions) produced or destroyed when the energy of ionizing radiation absorbed in the medium during radiolysis is equal to one hectoelectron volt (heV). 1 G-value = 1 heV^{-1} (E)	INT
G-value (SI)	G-value (SI)	radiochemical yield	$NM^{-1}L^{-2}T^{2}$	1 G-value (SI) = 6.0221367×10^{23} entities.J^{-1} 1 G-value (SI) = 1 mol.J^{-1} (E)	SI unit of radiochemical yield still used in radiation chemistry and radiochemistry. It is exactly defined as the amount of substance of product formed or reactant consumed when the energy of ionizing radiation absorbed in the medium during radiolysis is equal to one joule. 1 G-value (SI) = 1 mol.J^{-1} (E)	SI
habbah (Arabic)	–	surface, area	L^{2}	1 habbah (Arabic) = 81.920 m^{2}	Obsolete Arabic unit of area used in ancient times. 1 habbah (Arabic) = 1/72 feddan (E) 1 habbah (Arabic) = 200 sq. cubit (Hachemic) (E)	Arabic

halbe (Austrian)	–	capacity, volume	L^3	1 halbe (Austrian) = 7.0755×10^{-4} m^3	Obsolete Austrian unit of capacity used for liquid substances. 1 halbe (Austrian) = 1/2 mass (E)	Austrian
halbe (Hungarian)	–	capacity, volume	L^3	1 halbe (Hungarian) = $0.84843750 \times 10^{-6}$ m^3	Obsolete traditional Hungarian unit of capacity used before 1876. 1 halbe (Hungarian) = 1/64 eimer (Hungarian) (E)	Hungarian
half	1/2	dimensionless unit of quantity	nil	1 half = 0.5 entities (E)	Dimensionless British unit of proportion equal to 1/2. The English word, half, is often used as prefix before the name of a unit to create a combination which functions as a new unit equal to half the old one.	UK
half-step	–	music interval	nil	(see note)	British and American dimensionless unit used in music. Two notes differ in frequency by a half-step if the higher one has frequency equal to 21/12, i.e., about 1.0595 times, the frequency of the lower one. 1 half-step = 1/12 octave (E)	UK, US
halibiu (Romanian)	–	length, distance	L	1 halibiu (Romanian) = 0.701 m	Obsolete traditional Romanian unit of length used before 1884. 1 halibiu (Romanian) = (701/662) endere (Romanian) (E)	Romanian
hand (UK)	hd	length, distance	L	1 hand (UK) = 10.16×10^{-2} m (E)	Obsolete British and American unit of length. 1 hand (UK) = 48 lines (UK) (E) 1 hand (UK) = 4 inches (E) 1 hand (UK) = 1/3 foot (E) 1 hand (UK) = 1/9 yard (E)	UK, US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
hank (UK, cotton)	–	length, distance	L	1 hank (UK, cotton) = 7680.096 m (E)	Obsolete British unit length for yarn. 1 hank (UK, cotton) = 840 yards (E) 1 hank (UK, cotton) = 7 leas (UK, cotton) (E) 1 hank (UK, cotton) = 12 cuts (UK, cotton) (E) 1 hank (UK, cotton) = 1.5 hank (UK, wool) (E)	UK
hank (UK, wool)	–	length, distance	L	1 hank (UK, wool) = 512.064 m (E)	Obsolete British unit length for yarn used in the textile industry. 1 hank (UK, wool) = 560 yards (E) 1 hank (UK, wool) = 7 leas (UK, wool) (E) 1 hank (UK, wool) = 12 cuts (UK, wool) (E)	UK
hao (Annamese)	–	mass	M	1 hao (Annamese) = 3.775×10^{-6} kg	Obsolete Annamese traditional unit of mass used before 1914. 1 hao (Annamese) = 1/1000 dong (Annamese) (E)	Annamese
hao (Annamese)	–	capacity, volume	L^3	1 hao (Annamese) = 28.26×10^{-3} m^3	Obsolete Annamese traditional unit of capacity used before 1914. 1 hao (Annamese) = 1/2 toa (Annamese) (E)	Annamese
hao (Chinese)	–	length, distance	L	1 hao (Chinese) = 3.2×10^{-5} m	Obsolete Chinese unit of length used in ancient times. 1 hao = 1/10 000 tchi (E)	Chinese
hao (Chinese)	–	surface, area	L^2	1 hao (Chinese) = 0.6144 m^2	Obsolete Chinese unit of area used in ancient times. 1 hao (Chinese) = 1/1000 meou (E) 1 hao (Chinese) = 6 sq. tchi (E)	Chinese
hap (Cambodian)	–	mass	M	1 hap (Cambodian) = 60 kg	Obsolete Cambodian traditional unit of mass used before 1914. 1 hap (Cambodian) = 60 000 muoi (Cambodian) (E)	Cambodian

hap (Thai)	–	mass	M	1 hap (Thai) = 60 kg	Obsolete Thai traditional unit of mass used before 1923. 1 hap (Thai) = 64 000 grani (Thai) (E)	Thai
hara (Indian)	–	mass	M	1 hara (Indian) = 9.4 kg	Obsolete Indian unit of mass used in ancient times. 1 hara (Indian) = 200 pala (E)	Indian
hartley	–	quantity of information	nil	1 hartley = 3.321928095 bits	Unit of information used in computer science. Entropy of a uniformly distributed random variable over 10 symbols. 1 hartley = $\log_2 10$ bits (E)	
hartree (a.u. of energy)	E_h	energy, work, heat	$ML^{2T^{-2}}$	1 a.u. of energy = $4.35974381(34) \times 10^{-18}$ J	The unit is named after D.R. Hartree (1897–1958) 1 a.u. of energy = 1 hartree (E) 1 a.u. of energy = 2 rydbergs (E) 1 a.u. of energy = $\hbar^2/m_0 a_0^2 = e^2/4\pi\varepsilon_0 a_0$	a.u.
hasch (Turkmenian)	–	length, distance	L	1 hasch (Turkmenian) = 0.7112 m	Obsolete Turkmenian traditional unit of length used before 1920.	Turkmenian
hasta (Indian)	–	length, distance	L	1 hasta (Indian) = 0.457 m	Obsolete Indian unit of length used in ancient times. Base unit of the Indian system of length.	Indian
hasta (Indonesian)	–	length, distance	L	1 hasta (Indonesian) = 0.425 m	Obsolete Indonesian traditional unit of length used before 1923. 1 hasta (Indonesian) = 2 kilan (Indonesian) (E)	Indonesian
hatt (Turkish)	–	length, distance	L	1 hatt (Turkish) = $2.62290710417 \times 10^{-3}$ m	Obsolete Turkish traditional unit of length used before 1933. 1 hatt (Turkish) = 1/288 pic (Turkish) (E)	Turkish
hattrick	–	dimensionless unit of quantity	nil	1 hattrick = 3 entities (E)	Dimensionless British and American unit of quantity used in sports in counting goals, especially goals scored by the same player. It originated in cricket, but is more familiar to North Americans in ice hockey.	UK, US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
Hazen unit	HAZEN	coloration index	nil	(see note)	The Hazen unit is an American dimensionless unit used in analytical chemistry to measure color of clear light solutions. It was originally measured in platinum units (i.e., Pt units, Pt-Co units, PCU, Hazen units, or APHA units). One Hazen unit corresponds to the color of a 1 mg Pt/l standard solution of potassium hexachloroplatinate, K_2PtCl_6, and cobaltous chloride, $CoCl_2$. The scale is defined by the color of specified dilutions of a platinum cobalt stock solution, ranging from 5 for the lightest color to 500 for the darkest. The preparation of these platinum-cobalt color standards was originally described in 1892 by Dr A. Hazen in the *American Chemical Journal* which resulted in the use of the term 'Hazen Color Standards' or 'Hazen Units'. The same test method is described in Part 2120 of *Standard Methods for the Examination of Water and Waste Water* by the American Public Health Association (APHA). All the color scales are in fact equivalents although they tend to be associated with different applications and have each found favour in different parts of the world.	US
head (UK)	hd	length, distance	L	(see note)	Obsolete British unit of length, equal to the approximate length of a horse's head, used in expressing the results of a horse race.	UK
heat flux unit (HFU)	HFU	thermal flux	MT^{-3}	1 HFU = 41.855×10^{-3} $W.m^{-2}$ (E)	Obsolete unit of thermal flux used in Earth science, especially in geophysics. 1 HFU = 1 $\mu cal_{15}.cm^{-2}.s^{-1}$ (E)	

heat index	HI	Dimensionless index for measuring the combined effect of heat and humidity on the human body	nil	(see note)	Measure of the combined effect of heat and humidity on the human body. US meteorologists compute the index from the temperature denoted by T and expressed in °F and from the relative humidity H expressed as a fraction (i.e., $H = 0.65$ if the relative humidity is 65%). The formula used is $\mathrm{HI} = -42.379 + 2.04901523T + 1014.333127H - 22.475541TH - 0.00683783\ \mathrm{T}^2 - 548.1717H2 + 0.122874T^2H + 8.5282TH2 - 0.0199T^2H^2$ (source *ASHRAE Handbook*).	INT
hebdo	–	dimensionless unit of quantity	nil	1 hebdo = 10^7 entities (E)	Obsolete metric prefix denoting ten million (i.e., 10^7). Named from the Greek, *hebdomos*, seventh.	MKS
hecatomb (Roman)	–	dimensionless counting unit	nil	1 hecatomb (Roman) = 100 oxen (E) (see note)	Obsolete dimensionless unit of ritual and religious sacrifice used during antiquity; introduced by the Greeks and later used by Romans. It designated the sacrifice of 100 oxen. Named after the Greek, *hekaton*, hundred, and *bous*, oxen.	Roman
hectare	ha	surface, area	L^2	1 hectare = 10^4 m^2 (E)	French metric unit of area used in surveyor's measurements. It was introduced after the French Revolution. The unit is still used in agriculture. 1 hectare = 100 ares (E)	French
hecte (Egyptian)	–	capacity, volume	L^3	1 hecte (Egyptian) = 2.125×10^{-3} m^3 (of water)	Obsolete Egyptian unit of capacity used in ancient times. Measured by weight. 1 hecte (Egyptian) = 1/16 khar (E)	Egyptian
hectogram	hg	mass	M	1 hg = 10^{-1} kg (E)	Submultiple of the SI base unit. 1 hg = 10^2 g (E)	SI
hectolitre	hl, hL	capacity, volume	L^3	1 hl = 0.1 m^3 (E)	Multiple of the litre.	
hectometre	hm	length, distance	L	1 hm = 10^2 m (E)	Multiple of the SI base unit	SI

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
hectopascal	hPa	pressure, stress	$ML^{-1}T^{-2}$	1 hPa = 10^2 Pa (E)	Multiple of the derived SI pressure and stress unit. Unit of pressure commonly employed in meteorology. It was adopted January 1st, 1986 by the World Meteorological Organization. 1 hPa = 1 mbar (E) 1 atm = 1 013.25 hPa (E)	SI
heer (UK, linen)	–	length, distance	L	1 heer (UK, linen) = 548.640 m (E)	Obsolete British unit of length used for measuring the length of wet-spun linen yarn. 1 heer (UK, linen) = 600 yards (E) 1 heer (UK, linen) = 2 cuts (UK, linen) (E)	UK
hefner unit (hefnerkerze)	HK	luminous intensity	J	1 hefner unit = 0.903 cd	Obsolete German unit of luminous intensity. It was equal to the horizontal intensity of the hefner lamp burning amyl acetate, with a flame 4 cm high. If the flame is l (mm) high, the intensity is $l = 1 + 0.027(l - 40)$. The unit is named after Hefner-Altenack (1845–1904). It was used in Germany before World War II.	German
hefnerkerze (hefner unit)	HK	luminous intensity	J	1 hefner unit = 0.903 cd	Obsolete German unit of luminous intensity. It was equal to the horizontal intensity of the hefner lamp burning amyl acetate, with a flame 4 cm high. If the flame is l mm high, the intensity is $l = 1 + 0.027(l - 40)$. The unit is named after Hefner-Altenack (1845-1904). It was used in Germany before World War II.	German
hekatomb (Greek)	–	dimensionless counting unit	nil	1 hekatomb (Greek) = 100 oxen (E) (see note)	Obsolete dimensionless unit of ritual and religious sacrifice used during antiquity; introduced by the Greeks and later used by Romans. It designated the sacrifice of	Greek

					100 oxen. Named after the Greek, *hekaton*, hundred, and *bous*, oxen.	
hektos (Greek, Attic) [εχτευζ]	–	capacity, volume	L^3	1 hektos (Greek, Attic) $= 8.64 \times 10^{-3}$ m^3	Obsolete Greek unit of volume employed in ancient times. It was used for capacity measurements of dry substances. 1 hektos (Greek, Attic) = 8 chenix (E)	Attic
helm (Egyptian)	–	mass	M	1 helm (Egyptian) = 249.60 kg	Obsolete Egyptian traditional unit of mass used before 1891. 1 helm (Egyptian) = 200 oke (Egyptian) (E)	Egyptian
Helm unit	–	turbidity index	nil	1 Helm unit $= 1.100 \times 10$	Obsolete German unit of turbidity based on a suspension of *barite* ($BaSO_4$).	German
helmholtz	–	surface density of dipolar moment	ITL^{-1}	1 helmholtz $= 3.33564095198 \times 10^{-10}$ $C.m^{-1}$	Unit suggested by Guggenheim for surface charge density of dipole measurements in the double-layer. The unit is named after H.L.F. Helmholtz (1821–1894). Anecdotal. 1 helmholtz = 1 debye.$Å^{-2}$ (E)	
hemina (Roman)	–	capacity, volume	L^3	1 hemina (Roman) $= 0.274625 \times 10^{-3}$ m^3	Obsolete Roman unit of volume employed in ancient times. It was used for capacity measurements of dry substances. 1 hemina (Roman) = 1/2 sextarius (E)	Roman
henry	H	electric inductance	$ML^2T^{-2}I^{-2}$	**SI derived unit** 1 H = 1 Wb.A^{-1} = 1 kg.m^2.s^{-2}.A^{-2} (E)	The henry is the inductance of a closed circuit in which an electromotive force of one volt is produced when the electric current in the circuit varies uniformly at a rate of one ampere per second. The unit is named after the American scientist J. Henry (1797–1878).	SI
henry (int. mean)	H (int. mean)	electric inductance	$ML^2T^{-2}I^{-2}$	1 H (int. mean) = 1.00049 H	Obsolete American unit of electric inductance.	US
henry (int. US)	H (US)	electric inductance	$ML^2T^{-2}I^{-2}$	1 H (int. US) = 1.000495 H	Obsolete American unit of electric inductance.	US, IEUS
henry per metre	$H.m^{-1}$	magnetic permeability	$MLT^{-2}I^{-2}$	**SI derived unit** 1 $H.m^{-1}$ = 1 kg.m.s^{-2}.A^{-2} (E)		SI

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
henry (thermal)	$J.K^2.W^{-2}$	thermal inductance	$M^{-1}L^{-2}T^4\Theta^2$	1 henry (thermal) = 1 $J.K^2.W^{-2}$ (E)	SI unit used for convenience when dealing with electrical and thermal analogies.	SI
heredium (Roman)	–	surface, area	L^2	1 heredium (Roman) = 5053.503744 m^2	Obsolete Roman unit of area employed in ancient times. Plural heredia. 1 heredium (Roman) = 57 600 quadratus pes legal (E)	Roman
hertz	Hz	frequency	T^{-1}	**SI derived unit** 1 Hz = 1 s^{-1} (E)	The hertz is the frequency of a periodic phenomenon of which the period is one second. The unit is named after the German scientist H. Hertz (1857–1894).	SI
hide (UK)	–	surface area	L^2	1 hide (UK) = 2.428113853×10^3 to 7.284341560×10^3 m^2 (4.856227707×10^3 m^2)	Obsolete British unit of surface area. The hide was the area of land that could be cultivated by a single ploughman and thus the amount of land necessary to support a family. Depending on local conditions, this could be as little as 60 acres or as much as 180 acres. Nevertheless, a value of 120 acres is a commonly used estimate. 1 hide (UK) = 1/100 hundred (UK) (E) 1 hide (UK) = 8 bovates (UK) (E)	UK
hide (US)	–	length, distance	L	1 hide (US) = 40.46856422×10^4 m^2 (E)	Obsolete American unit of length used in surveyors' measurements. 1 hide (US) = 100 acres (E)	US
hin (Hebrew)	–	capacity, volume	L^3	1 hin (Hebrew) = 3.570×10^{-3} m^3 (of water)	Obsolete Hebrew unit of capacity used in ancient times. Measured by weight. 1 hin (Hebrew) = 1/6 bath (new) (E)	Hebrew
hiro (Japanese)	–	length, distance	L	1 hiro (Japanese) = 1.515151515 m	Obsolete Japanese unit of length. 1 hiro = 5 shaku (E) 1 hiro = 50/33 m (E)	Japanese

hoé (Chinese)	–	length, distance	L	1 hoé (Chinese) = 3.2×10^{-7} m	Obsolete Chinese unit of length used in ancient times. 1 hoé = 1/1 000 000 tchi (E)	Chinese
hogshead (Irish)	hd.	capacity, volume	L^3	1 hogshead (Irish) = 449.293965928 $\times 10^{-3}$ m^3	Obsolete traditional Irish unit of capacity for liquids used before the adoption of the Weights and Measures Act of 1824. 1 hogshead (Irish) = 126 gallons (Irish) (E)	Irish
hogshead (UK)	hdd	capacity, volume	L^3	1 hogshead (UK) = 286.403796 $\times$ 10 m^3	Obsolete British unit of volume. 1 hogshead (UK) = 63 gal (UK) (E)	UK
hogshead (UK, beer)	hdd	capacity, volume	L^3	1 hogshead (UK, beer) = 249.542210592 $\times 10^{-3}$ m^3	Obsolete British unit of capacity used for beer and ale between 1803 and 1824. 1 hogshead (UK) = 54 gal (UK, beer) (E)	UK
hogshead (US, liq.)	hhd, hgs	capacity, volume	L^3	1 hogshead (US, liq.) = 238.480942392 $\times$ 10^{-3} m^3	Obsolete American unit of capacity. 1 hogshead (US, liq.) = 63 gallons (US) (E) 1 hogshead (US, liq.) = 2 barrels (US, liq.) (E) 1 hogshead (US, liq.) = 0.4857263940 butt (UK) (E)	
hold (Hungarian)	–	surface area	L^2	1 hold (Hungarian) = 4316 m^2	Obsolete traditional Hungarian unit of surface area used in land measurements before 1876. 1 hold (Hungarian) = 1 joch (Hungarian) (E)	Hungarian
homestead (US)	–	surface area	L^2	1 homestead (US) = 6.474970276 $\times 10^3$ m^2	Obsolete American unit of surface area extensively used in the Western United States, and equal to 160 acres. Under the *Homestead Act*, passed by Congress in 1862, settlers in the western states were allowed to take title to a homestead of 160 acres of land by registering a claim, settling on the land, and cultivating it. 1 homestead (US) = 160 acres (E) 1 homestead (US) = 1/4 sections (E) 1 homestead (US) = 1/4 square mile (E)	US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
hommée (Nantes)	–	surface area	L^2	1 hommée (Nantes) = 445 m^2	Obsolete local French unit of surface area. It corresponds to the surface that a farmer can plough alone in one day. 1 hommée (Nantes) = 75 sq. gaules (Nantes) (E) 1 hommée (Nantes) = 1/6 journal (Nantes) (E)	French
horsepower (cheval-vapeur)	cv, HP	power	ML^2T^{-3}	1 CV = 735.498750 W (E) 1 HP = 745.699871581 W	Obsolete unit of power introduced by James Watt in 1782 to allow to describe the power of steam machinery. Historically it was equal to the work effort of a horse needed to raise vertically 528 cubic feet of water to one foot in one minute (formal definition published in 1809). In 1850, the following conversion factor was adopted: 1 HP = 75 $kgfm.s^{-1}$ (E) in France 1 HP = 550 $ft\text{-}lb_f.s^{-1}$ (E) in UK and US	
horsepower (boiler)	HP, hp	power	ML^2T^{-3}	1 HP (boiler) = 9816.664971 W (E)	Obsolete American unit of power. The boiler HP is the power needed to evaporate in 1 h 34.5 lb of water at 1 atm and 100 °C	US
horsepower (metric)	HP, hp	power	ML^2T^{-3}	1 HP (metric) = 735.498750 W (E)	Obsolete American unit of power. 1 HP = 75 $kgf.m.s^{-1}$ 1 HP (metric) = 542.5 $ft.lb_f s^{-1}$ (approx.)	US
horsepower (electric)	HP, hp	power	ML^2T^{-3}	1 HP (electric) = 746.000 W (E)	Obsolete American unit of power.	US
horsepower (water)	HP, hp	power	ML^2T^{-3}	1 HP (water) = 746.043 W	Obsolete American unit of power.	US
horsepower	HP, hp	power	ML^2T^{-3}	1 HP = 745.699871581 W	Obsolete American unit of power. 550ft.lbf.s^{-1} (E)	US
horsepower (British)	BHP, hp	power	ML^2T^{-3}	1 BHP = 745.699871581 W	Obsolete British unit of power. 1 BHP = 550ft.lbf.s^{-1} (E)	UK, US

hou (Chinese)	–	capacity, volume	L^3	1 hou (Chinese) = 51.772 × 10^{-3} m^3	Obsolete Chinese unit of capacity used in ancient times. 1 hou (Chinese) = 50 tcheng (E)	Chinese
hour	h	time, period, duration	T	1 hour = 3600 seconds (E)	1 hour = 60 minutes (E)	INT
hour (sidereal)	–	time, period, duration	T	1 hour (sidereal) = 3590.170 s		@
hour of angle	–	plane angle	α	1 hour of angle = 0.2617993878 rad (astronomy) 1 hour of angle = 0.1308996939 rad (aeronautics)	Unit of plane angle employed in aeronautical navigation. 1 hour of angle = (2π/24) rad (E) (astronomy) 1 hour of angle = 15° (astronomy) (E) 1 hour of angle = 30° (aeronautics) (E)	
house	–	plane angle	α	1 house = 523.59877598 ×10^{-3} rad (E)	Unit of plane angle used in astrology; each sign of the Zodiac is called a house, thus the house can be considered a unit of angle measure equal to 1/6 circle or 30°. 1 house = 30° (E) 1 house = 1 signs (E) 1 house = π/6 rad (E)	
hubble	–	length, distance	L	1 hubble = 9.45425495549 × 10^{24} m	Obsolete unit of distance used in astronomy. The unit is named after E.P. Hubble (1889–1953). 1 hubble = 10^9 light-years (E) 1 hubble = 9.45425495549 Ym	@
hulmit (Estonian)	–	capacity, volume	L^3	1 hulmit (Estonian) = 11.48 ×10^{-3} m^3	Obsolete traditional Estonian unit of capacity used before 1900. 1 hulmit (Estonian) = 1/12 tonne (Estonian) (E)	Estonian
hun (Cambodian)	–	mass	M	1 hun (Cambodian) = 375 × 10^{-6} kg	Obsolete Cambodian traditional unit of mass used before 1914. 1 hun (Cambodian) = 3/8 muoi (Cambodian) (E)	Cambodian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
hundred (UK)	–	surface area	L^2	1 hundred (UK) = 2.428113853 $\times 10^5$ to 7.284341560 $\times 10^5$ m^2 (4.856227707 $\times 10^5$ m^2)	Obsolete British unit of surface area. The hundred is approximately the area of a village with its associated fields, so the name 'hundred' came to mean a minor division of a shire or county. This use carried over to the American colonies, where, for example, many of the early settlements in Virginia were called hundreds. 1 hundred (UK) = 100 hides (UK) (E) 1 hundred (UK) = 6000 to 18 000 acres (UK) (E)	UK
hundredweight (gross or long)	cH, cwt, lg cwt	mass	M	1 cwt (UK) = 50.80234544 kg (E)	Obsolete British unit of mass. 1 cwt (UK) = 4 quarters (UK) (E) 1 cwt (UK) = 8 stones (UK) (E) 1 cwt (UK) = 112 lb (av.) (E)	UK, CAN
hundredweight (net or short)	sh. cwt	mass	M	1 sh. cwt (US) = 45.359237 kg (E)	Obsolete American unit of mass. 1 sh. cwt (US) = 100 lb (av.) (E)	US, CAN
hundredweight (UK, avoirdupois)	cwt (av.)	mass	M	1 cwt (UK) = 50.80234544 kg (E)	Obsolete British unit of mass. 1 cwt (UK) = 4 quarters (UK) (E) 1 cwt (UK) = 8 stones (UK) (E) 1 cwt (UK) = 112 lb (av.) (E)	UK, CAN
hyakume (Japanese)	–	mass	M	1 hyakume (Japanese) = 0.375 kg (E)	Obsolete Japanese unit of mass. 1 hyakume (Japanese) = 1/10 kwan (E)	Japanese
hydrotimeter degree (American)	°TH (US)	hardness of water, concentration of calcium and magnesium in water	nil	1 °TH (US) = 1 mg of $CaCO_3$ per 1000 cm^3 of water (E)	American unit employed to express hardness of water. It was introduced by the US Geological Survey. (USGS) 1°TH(US) = 1 ppm of $CaCO_3$	US
hydrotimeter degree (British) (Clarke degree)	°THB, °e	hardness of water, concentration of calcium and magnesium in water	nil	1 °THB = 14.2537613525 mg of $CaCO_3$ per 1000 cm^3 of water	British unit employed to express hardness of water. 1°THB = 1 grain of $CaCO_3$/UK gallon of water.	UK

hydrotimeter degree (French)	°THF, °f	hardness of water, concentration of calcium and magnesium in water	nil	1 °THF = 10 mg $CaCO_3$ per 1000 cm^3 of water	French unit employed to express the hardness of water.	French
hydrotimeter degree (German)	°THG, °d	hardness of water, concentration of calcium and magnesium in water	nil	1 °THG = 10 mg of CaO per 1000 cm^3 of water	German unit employed to express hardness of water.	German
hyl (metric slug, mug, par, TME)	Hyl, hyl	mass	M	1 Hyl = 9.80665 kg	Obsolete technical metric unit of mass employed by mechanical engineers (base unit of the metric gravitational system). It was equal to the mass which under an acceleration of 1 $m.s^{-2}$ gives a force of 1 kgf. The name TME derived from the German acronym Technische Mass Einheit.	German
immi (Swiss, liq.)	–	capacity, volume	L^3	1 immi (Swiss, liq.) = 1.5 $\times 10^{-3}$ m^3	Obsolete Swiss unit of volume for measuring the capacity of liquids. The immi has been brought into the metric sys tem and now equals exactly 1.5 litres.	Swiss
inch	in, "	length, distance	L	1 inch = 2.54 $\times$ 10^{-2} m (E)	Legal unit in the UK system (since the WMA, 1963) and US system (since the USMB, 1959). The name derives from the old English unce, or ynche, which in turn came from the Latin unit uncia, which was 1/12th of a Latin foot or pes. 1 inch = 2.54 cm (E) 1 inch = 12 lines (UK) (E)	UK, US
inch (old)	in	length, distance	L	1 in (old) = 2.539998 $\times$ 10^{-2} m (E)	Obsolete British unit of length before the WMA of 1963. The old English 'ynche' was defined by King David I of Scotland about 1150 as the breadth of a man's thumb at the base of the nail. During the reign of King Edward II, in the early 14th century, the inch was defined as 'three grains of barley, dry and sound placed end to end lengthwise'.	UK

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
inch (Prussian)	–	length, distance	L	1 zoll (Prussian) $= 2.6154475 \times 10^{-2}$ m	Obsolete German unit of length. 1 zoll = 1/12 fuss (E)	German
inch (Scottish)	in.	length, distance	L	1 inch (Scottish) $= 2.55371737158 \times 10^{-2}$ m	Obsolete traditional Scottish unit of length used before the Imperial Weights and Measures Act of 1824. 1 inch (Scottish) = 1/12 feet (E)	Scottish
inch (US, Survey)	in, "	length, distance	L	1 in (US, Survey) $= 2.54000508 \times 10^{-2}$ m (E)	Obsolete American unit of length used in the USA for geodetic measurements. Discontinued since the USMB, 1959. 1 inch (US Survey) = (1/39.37) m (E)	US
inch of mercury (0°C)	inHg (0°C)	pressure, stress	$ML^{-1}T^{-2}$	1 inHg (0°C) $= 3.38638815789 \times 10^3$ Pa	British and American unit of pressure employed in physics to measure small pressures. It is equal to the pressure exerted by a column of mercury one inch high, measured at 0°C (32°F). 1 atm = 29.9212598425 inHg (0°C)	UK, US
inch of mercury (15.56°C)	inHg (15.56°C)	pressure, stress	$ML^{-1}T^{-2}$	1 inHg (15.56°C) $= 3.37718231423 \times 10^3$ Pa	British and American unit of pressure employed in physics to measure small pressures. It is equal to the pressure exerted by a column of mercury one inch high, measured at 15.56°C (60°F). 1 atm = 30.00282204 inHg (15.5°C)	UK, US
inch of mercury (32°F)	inHg (32°F)	pressure, stress	$ML^{-1}T^{-2}$	1 inHg (32°F) $= 3.38638815789 \times 10^3$ Pa	British and American unit of pressure employed in physics to measure small pressures. It is equal to the pressure exerted by a column of mercury one inch high, measured at 0°C (32°F). 1 atm = 29.9212598425 inHg (0°C)	UK, US
inch of mercury (60°F)	inHg (60°F)	pressure, stress	$ML^{-1}T^{-2}$	1 inHg (60°F) $= 3.37718231423 \times 10^3$ Pa	British and American unit of pressure employed in physics to measure small pressures. It is equal to the pressure exerted by a column of mercury one inch	UK, US

					high, measured at 15.56°C (60°F). 1 atm = 30.00282204 inHg (60°F)	
inch of rainfall	–	depth of rainfall, mass per surface area	ML^{-2}	1 inch (rainfall) = 25.3992888 $kg.m^{-2}$ of water at 3.98°C	British and American unit of depth of rainfall used in meteorology. It corresponds to the depth to which the rainfall falling on a horizontal enclosed surface, from which there are no losses by evaporation or otherwise, would have accumulated. 1 inch (rainfall) = 25.4 $dm^3.m^{-2}$ (E)	UK, US
inch of water (4°C)	inH_2O (4°C)	pressure, stress	$ML^{-1}T^{-2}$	1 inH_2O (4°C) = $2.49081935511 \times 10^2$ Pa	British and American unit of pressure employed in physics to measure small pressures. It is equal to the pressure exerted by a column of water one inch high, measured at 4°C (39.2°F). 1 atm = 406.793851960 inH_2O (39.2°F)	UK, US
inch of water (15.56°C)	inH_2O (15.56°C)	pressure, stress	$ML^{-1}T^{-2}$	1 inH_2O (15.5°C) = $2.48845301046 \times 10^2$ Pa	British and American unit of pressure employed in physics to measure small pressures. It is equal to the pressure exerted by a column of water one inch high, measured at 15.56°C (60°F). 1 atm = 407.180684442 inH_2O (15.5°C)	UK, US
inch of water (39.2°F)	inH_2O (39.2°F)	pressure, stress	$ML^{-1}T^{-2}$	1 inH_2O (39.2°F) = $2.49081935511 \times 10^2$ Pa	British and American unit of pressure employed in physics to measure small pressures. It is equal to the pressure exerted by a column of water one inch high, measured at 4°C (39.2°F). 1 atm = 406.793851960 inH_2O (4°C)	UK, US
inch of water (60°F)	inH_2O (60°F)	pressure, stress	$ML^{-1}T^{-2}$	1 inH_2O (60°F) = $2.48845301046 \times 10^2$ Pa	British and American unit of pressure employed in physics to measure small pressures. It is equal to the pressure exerted by a column of water one inch high, measured at 15.56°C (60°F). 1 atm = 407.180684442 inH_2O (60°F)	UK, US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
inch per second	$in.s^{-1}$, ips	velocity, speed	LT^{-1}	1 ips = 2.54×10^{-2} $m.s^{-1}$ (E)	British and American unit of speed. 1 ips = 9.144×10^{-2} $km.h^{-1}$ (E)	UK, US
inferno	–	temperature	Θ	1 inferno = 10^{9} K (E)	Unit of temperature suggested in 1968. Anecdotal.	
inhour (inverse hour)	–	reactivity of nuclear power reactors	nil	1 inhour = 2.6×10^{-5} (E)	Obsolete American unit of reactivity of nuclear power reactor proposed in 1947 by E. Fermi and used mainly in US nuclear engineering. Its name is derived from **in**verse **hour**. 1 inhour = 2.6 ppc (E)	US
International Annealed Copper Standard	%IACS	Electrical conductivity of metals and alloys		1% IACS = $1.72413793103 \times 10^{-10}$ W.m (E)	Unit of electrical conductivity of metals and alloys commonly used in electrical engineering. It is based on the resistivity of the international copper annealed standard. The International Annealed Copper Standard is a material of which the electrical resistance of a wire of 1 metre long in length and weighing 1 gram is 0.15328 ohm at 20°C. 100% IACS = 58.00 $MS.m^{-1}$ (E) 100% IACS = 1.72413793103 μΩ.cm (E)	INT
international atomic time (temps atomique international)	TAI	time, period, duration	T	(see note)	The TAI corresponds to a time scale established by the Bureau International de l'Heure (BIH) given by atomic clocks in several locations through the world. The international abbreviation TAI is employed in all languages.	INT
international unit	UI, IU	enzymatic activity	NT^{-1}	1 IU = 1.666667×10^{-8} $mol.s^{-1}$	Unit employed in biochemistry to describe enzymatic activity. One UI is equal to the amount of enzyme which transforms one micromole of substrate per minute	EUR

					at 298 K (25°C). 1 IU = 1 μmol.min^{-1} (E)	
iodine number	–	dimensionless index for measuring the insaturation of fatty acids	nil	1 iodine number = 10^{-2} kg/kg (E) (see note)	Old dimensionless index for measuring the unsaturation of fatty acids, i.e., the number of unsaturated double bonds (>C=C<) present in fatty acids. It corresponds to the mass of free iodine (I_2) expressed in centigrams (cg) required to saturate one gram of fatty acid. 1 iodine number = 10^{-2} g/g (E)	INT
iron (UK, shoes)	–	length, distance	L	1 iron (UK, shoes) = 5.291667×10^{-4} m	Obsolete British unit of length employed to measure thickness of shoe leather in soles. 1 iron (UK, shoes) = 3 points (UK) (E) 1 iron (UK, shoes) = 1/4 line (UK) (E) 1 iron (UK, shoes) = 1/48 inch (UK) (E)	UK
itcze (Hungarian)	–	capacity, volume	L^3	1 itcze (Hungarian) = $0.84843750 \times 10^{-6}$ m^3	Obsolete traditional Hungarian unit of capacity used before 1876. 1 itcze (Hungarian) = 1/64 eimer (Hungarian) (E)	Hungarian
jabia (Libyan)	–	surface area	L^2	1 jabia (Libyan) = 832.32 m^2	Obsolete Libyan traditional unit of surface area used in land measurements before 1927. 1 jabia (Libyan) = 1800 square pic (Libyan) (E)	Libyan
Jackson unit	–	turbidity index	nil	1 Jackson unit = 4.450×10	Obsolete British and American unit of turbidity.	UK, US
jacobi	–	electric resistance	$ML^2T^{-3}I^{-2}$	1 jacobi = 0.64 Ω	Obsolete unit of electric resistance defined in 1848. It is the resistance of a copper wire of length 25 feet which has a mass equal to 345 grains.	
jaktan (Guinean)	–	length, distance	L	1 jaktan (Guinean) = 3.658 m	Obsolete Guinean traditional unit of length used before 1906. 1 jaktan (Guinean) = 18986/3000 pic (Guinean) (E)	Guinean

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
jansky	–	electromagnetic radiation flux density	MT^{-4}	1 jansky = 10^{-26} $W.m^{-2}.Hz^{-1}$ (E)	Unit of adopted by International Union of Astronomy in 1973 to measure the energy of incident radiation on the receiving body across a specific frequency bandwidth. The unit is named after K.G. Jansky (1905–1950). 1 jansky = 1 flux unit (E)	@
jaob (Indian, Bombay)	–	length, distance	L	1 jaob (Indian, Bombay) = 4.7625×10^{-3}	Obsolete Indian traditional unit of length used before 1920. 1 jaob (Indian, Bombay) = 1/144 guz (Indian, Bombay) (E)	Indian
jaob (Indian, Calcutta)	–	length, distance	L	1 jaob (Indian, Calcutta) = $6.3541666667 \times 10^{-3}$ m	Obsolete Indian traditional unit of length used before 1920. 1 jaob (Indian, Calcutta) = 1/144 guz (Indian, Calcutta) (E)	Indian
jar	–	electric capacitance	$M^{-1}L^{-2}T^4I^2$	1 jar = $1.11188031733 \times 10^{-9}$ F (E)	Obsolete unit of electric capacitance. One jar is equal approximately to the electric capacitance stored in the famous bottle capacitor of the Dutch city of Leyden. 1 jar = 1000 'cm' (E) 1 jar = (1/3c) F (E) 1 jar = 1000 statfarad (E)	
jarra (Mexican, oil)	–	capacity, volume	L^3	1 jarra (Mexican, oil) = 9.110916×10^{-3} m^3	Obsolete Mexican traditional unit of capacity used for liq uids before 1896. 1 jarra (Mexican, oil) = 18 cuartillo (Mexican, oil) (E)	Mexican
jarra (Mexican, wine)	–	capacity, volume	L^3	1 jarra (Mexican, wine) = 8.212752×10^{-3} m^3	Obsolete Mexican traditional unit of capacity used for liq uids before 1896. 1 jarra (Mexican, wine) =18 cuartillo (Mexican, wine) (E)	Mexican

jerk	j	rate of change of acceleration with time	LT^{-3}	1 jerk = 10^{-2} m.s^{-3} (E)	Obsolete unit of rate of change of acceleration with time. Anecdotal. 1 jerk = 1 cm.s^{-3} (E) 1 jerk = 1 gal.s^{-1} (E)	cgs
jéroboam (jeroboam)	–	capacity, volume	L^3	1 jéroboam = 3.030728 × 10^{-3} m^3	Obsolete British unit which expressed the capacity of wine containers. Still employed in oenology, especially in France. 1 jéroboam = 2/3 gallon (UK) (E) 1 jéroboam = 4 bouteilles (E)	UK, French
jiffy	–	time, duration, period	T	1 jiffy = 0.01 s (E)	The jiffy (plural jiffies) is an anecdotal unit defined as the duration of a clock tick for measuring wall-clock time. The value used to be 1/60 second or 1/50 second depending on the frequency of AC power, but then 1/100 second became more common. This term is used on Linux computer systems, and for the Intel based chips, it has the value of 0.01 second. Two other definitions are millisecond, and the time taken for light to travel one foot.	Anecdotal
jigger (UK, liq.)	–	capacity, volume	L^3	1 jigger (UK, liq.) = 28.4130750 ×10^{-6} m^3 (E)	Obsolete British unit of volume used for measuring the capacity of liquids used in cocktail recipes. 1 jigger (UK, liq.) = 1 fluid ounce (UK) (E) 1 jigger (UK, liq.) = 1/160 gallon (UK) (E)	UK
jigger (US, liq.)	–	capacity, volume	L^3	1 jigger (US, liq.) = 44.36029438 ×10^{-6} m^3	Obsolete American unit of volume used to express the capacity for liquids used in cocktail recipes. 1 jigger (US, liq.) = 1.5 fluid ounce (US) (E) 1 jigger (US, liq.) = 3/256 gallon (US, liq.) (E)	US
jin (tchin)	–	mass	M	1 jin = 596.816 × 10^{-3} kg	Obsolete Chinese unit of mass.	Chinese

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
jitro (Czechoslovakian)	–	surface area	L^2	1 jitro (Czechoslovakian) = 17 268 m^2	Obsolete Czechoslovakian unit of surface area used before 1876. 1 jitro (Czechoslovakian) = (1439/500) merice (E)	Czech
jô (Japanese)	–	length, distance	L	1 jô (Japanese) = 3.030303030 m	Obsolete Japanese unit of length. 1 jô = 10 shaku (E) 1 jô = 100/33 m (E)	Japanese
joch (Austrian)	–	surface, area	L^2	1 joch (Austrian) = 5754.61822464 m^2	Obsolete Austrian unit of area. 1 joch (Austrian) = 1600 sq. klafter (E) 1 joch (Austrian) = 57 600 sq.fuss (E)	Austrian
joch (German)	–	surface area	L^2	1 joch (German) = 5760.0813383 m^2 (E)	The joch (plural, joche), is an obsolete German unit of land surface area used in German speaking countries (e.g., Germany, Switzerland, and Austria). Joch is also the word for a yoke in German, so presumably this unit represents an area that could be ploughed in a day by a yoke of oxen (similar in that sense to the British acre). One joch is equal to the surface area of a square field of 40 klafters on a side. 1 joch (German) = 40 klafters square (German) (E)	German
joch (Hungarian)	–	surface area	L^2	1 joch (Hungarian) = 4316 m^2	Obsolete traditional Hungarian unit of surface area used in land measurements before 1876. 1 joch (Hungarian) = 1 hold (Hungarian) (E)	Hungarian
Jordan's elementary time	–	time, period, duration	T	1 Jordan's time = $9.39963701488 \times 10^{-24}$ s	1 Jordan's time = $\alpha^3 \tau_0 = r_e / c_0$	
joule	J	energy, work, heat	ML^2T^{-2}	**SI derived unit** 1 J = 1 kg. $m^2.s^{-2}$ (E)	The joule is the work done when the point of application of a force of one newton is displaced a distance of one metre in the	SI

					direction of the force. The unit is named after the British scientist J.P. Joule (1818–1889).	
joule (int.)	J (int.)	energy, work, heat	ML^2T^{-2}	1 J (int.) = 1.000165 J (E)	Obsolete international unit of energy.	INT
joule per cubic metre	$J.m^{-3}$	energy density	$ML^{-1}T^{-2}$	**SI derived unit** 1 $J.m^{-3}$ = 1 $kg.m^{-1}.s^{-2}$ (E)		SI
joule per cubic metre per hertz	$J.m^{-3}.Hz^{-1}$	spectral radiant energy density in terms of frequency	$ML^{-1}T^{-1}$	**SI derived unit** 1 $J.m^{-3}.Hz^{-1}$ = 1 $kg.m^{-1}.s^{-1}$ (E)		SI
joule per kelvin	$J.K^{-1}$	entropy	$ML^2T^{-2}\Theta^{-1}$	**SI derived unit** 1 $J.K^{-1}$ = 1 $kg.m^2.s^{-2}.K^{-1}$ (E)		SI
joule per mole	$J.mol^{-1}$	molar energy	$ML^2T^{-2}N^{-1}$	**SI derived unit** 1 $J.mol^{-1}$ = 1kg. m^2. s^{-2}. mol^{-1} (E)		SI
joule per mole per kelvin	$J.mol^{-1}K^{-1}$	molar entropy, molar heat capacity	$ML^2T^{-2}N^{-1}\Theta^{-1}$	**SI derived unit** 1 $J.mol^{-1}K^{-1}$ = 1 kg. m^2. s^{-2}. $mol^{-1}K^{-1}$ (E)		SI
joule per quadratic metre	$J.m^{-4}$	spectral radiant energy density in terms of wavelength	$ML^{-2}T^{-2}$	**SI derived unit** 1 $J.m^{-4}$ = 1 $kg.m^{-2}.s^{-2}$ (E)		SI
joule per square metre	$J.m^{-2}$	spectral radiant energy density in terms of wavenumber	MT^{-2}	**SI derived unit** 1 $J.m^{-2}$ = 1 $kg.s^{-2}$ (E)		SI
joule-second	J.s	action, angular momentum	ML^2T^{-1}	**SI derived unit** 1 J.s = 1 $kg.m^2.s^{-1}$		SI
journal (Bretagne)	–	surface area	L^2	1 journal (Bretagne) = 4863 m^2	Obsolete local French unit of surface area. 1 journal (Bretagne) = 80 cordes carrées (E)	French
journal (French) (journeau, journée)	–	surface, area	L^2	1 journal (French) = 4000 m^2	Obsolete French unit of area used in surveyor's measurements before the French revolution (1789). 1 journal (French) = 40 ares (E)	French

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
journal (Nantes)	–	surface area	L^2	1 journal (Nantes) = 2671 m^2	Obsolete local French unit of surface area. It corresponds to the surface that a farmer can plough alone in 6 days. 1 journal (Nantes) = 450 sq. gaules (Nantes) (E) 1 journal (Nantes) = 6 hommées (Nantes) (E)	French
jow (Indian, Bombay)	–	length, distance	L	1 jow (Indian, Bombay) = 4.7625×10^{-3} m	Obsolete Indian traditional unit of length used before 1920. 1 jow (Indian, Bombay) = 1/144 guz (Indian, Bombay) (E)	Indian
jow (Indian, Calcutta)	–	length, distance	L	1 jow (Indian, Calcutta) = $6.3541666667 \times 10^{-3}$ m	Obsolete Indian traditional unit of length used before 1920. 1 jow (Indian, Calcutta) = 1/144 guz (Indian, Calcutta) (E)	Indian
jug (Scottish, liq.)	pt.	capacity, volume	L^3	1 jug (Scottish, liq.) = $1.69448796585 \times 10^{-3}$ m^3	Obsolete traditional Scottish unit of volume used before the Weights and Measures Act of 1824 to measure the capacity of liquids. 1 jug (Scottish, liq.) = 1/8 gallon (Scottish, liq.) (E)	Scottish
jug (Scottish, liq.)	–	capacity, volume	L^3	1 jug (Scottish, liq.) = $1.69491813 \times 10^{-3}$ m^3	Obsolete Scottish unit of volume for measuring the capacity of alcoholic beverages.	Scottish
jugerum (Roman)	–	surface, area	L^2	1 jugerum (Roman) = 2526.751872 m^2	Obsolete Roman unit of area employed in ancient times. Plural jugera. 1 jugerum (Roman) = 28 800 quadratus pes (E)	Roman
jun (Chinese) (kwan)	–	mass	M	1 jun (Chinese) = 17.90448 kg	Obsolete Chinese unit of mass. 1 jun (Chinese) = 30 jin (E)	Chinese

jungfru (Swedish)	–	capacity, volume	L^3	1 jungfru (Swedish) $= 8.17863100281 \times 10^{-5}$ m^3	Obsolete Swedish unit of capacity for liquid substances. 1 jungfru (Swedish) = 1/32 kanna (E)	Swedish
junkfra (Swedish, dry)	–	capacity, volume	L^3	1 junkfra (Swedish, dry) $= 8.17863100281 \times 10^{-5}$ m^3	Obsolete Swedish unit of capacity for dry substances. 1 junkfra (Swedish, dry) = 1/32 kanna (E)	Swedish
kaban (Philippine)	–	capacity, volume	L^3	1 kaban (Philippine) $= 99.90 \times 10^{-3}$ m^3	Obsolete Philippine traditional unit of capacity used before 1906. 1 kaban (Philippine) = 25 000 chupa (Philippine) (E)	Philippine
kabiet (Thai)	–	length, distance	L	1 kabiet (Thai) $= 5.208333333333 \times 10^{-3}$ m	Obsolete Thai traditional unit of length used before 1923. 1 kabiet (Thai) = 1/384 wah (Thai) (E)	Thai
kadam (Egyptian)	–	length, distance	L	1 kadam (Egyptian) = 0.290 m	Obsolete Egyptian traditional unit of length used before 1891. 1 kadam (Egyptian) = 1/2 diraa (Egyptian) (E)	Egyptian
kam meu (Thai)	–	capacity, volume	L^3	1 kam meu (Thai) $= 125 \times 10^{-6}$ m^3	Obsolete Thai traditional unit of capacity used before 1923. 1 kam meu (Thai) = 1/8 tanan (Thai) (E)	Thai
kamian (Polish)	–	mass	M	1 kamian (Polish) = 10.13760 kg	Obsolete traditional Polish unit of mass used before 1919. 1 kamian (Polish) = 25 funt (Polish) (E)	Polish
kan (Indonesian)	–	capacity, volume	L^3	1 kan (Indonesian) $= 1.5751 \times 10^{-3}$ m^3	Obsolete Indonesian traditional unit of capacity used before 1923. 1 kan (Indonesian) = 100/4199 picul (Indonesian) (E)	Indonesian
kanahm (Thai)	–	capacity, volume	L^3	1 kanahm (Thai) $= 1 \times 10^{-3}$ m^3	Obsolete Thai traditional unit of capacity used before 1923. 1 kanahm (Thai) = 1/20 sat (Thai) (E)	Thai

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
kande (Danish, liq.)	–	capacity, volume	L^3	1 kande (Danish, liq.) $= 1.93230409850 \times 10^{-3}$ m^3	Obsolete Danish traditional unit of capacity used for liquids before 1912. 1 kande (Danish, liq.) = 2 pott (Danish, liq.) (E) 1 kande (Danish, liq.) = 1/16 cubic fod (Danish, liq.) (E)	Danish
kani (Indian)	–	surface area	L^2	1 kani (Indian) = 307.5 m^2	Obsolete Indian traditional unit of surface used in land measurements before 1920.	Indian
kanna (Swedish)	–	capacity, volume	L^3	1 kanna (Swedish) $= 2.61716192090 \times 10^{-3}$ m^3	Obsolete Swedish unit of capacity for liquid substances. 1 kanna = 1/10 kubikfot (E)	Swedish
kanna (Swedish, dry)	–	capacity, volume	L^3	1 kanna (Swedish, dry) $= 2.61716192090 \times 10^{-3}$ m^3	Obsolete Swedish unit of capacity for dry substances. 1 kanna = 1/10 kubikfot (E)	Swedish
kanne	–	capacity, volume	L^3	1 kanne = 10^{-3} m^3 (E)	Name proposed for the litre. Anecdotal interest. 1 kanne = 1 dm^3 (E)	
kanne (Latvian)	–	capacity, volume	L^3	1 kanne (Latvian) = 2.5504×10^{-3} m^3	Obsolete Latvian traditional unit of capacity. 1 kanne (Latvian) = 2 stoof (Latvian) (E)	Latvian
kannor (Finnish)	–	capacity, volume	L^3	1 kannor (Finnish) $= 2.59507936508 \times 10^{-3}$ m^3	Obsolete Finnish traditional unit of capacity used for liq uids before 1892. 1 kannor (Finnish) = 1/63 tunna (Finnish) (E)	Finnish
kantang (Cambodian)	–	capacity, volume	L^3	1 kantang (Cambodian) = 7.5 m^3	Obsolete Cambodian traditional unit of capacity used before 1914. 1 kantang (Cambodian) = 15/2 muoi (Cambodian) (E)	Cambodian

kantar (Cypriot)	–	mass	M	1 kantar (Cypriot) = 55.8825799840 kg	Obsolete Cypriot traditional unit of mass used before 1972. 1 kantar (Cypriot) = 100 rottolo (Cypriot) (E)	Cypriot
kantar (Egyptian)	–	mass	M	1 kantar (Egyptian) = 44.9280 kg	Obsolete Egyptian traditional unit of mass used before 1891. 1 kantar (Egyptian) = 36 oke (Egyptian) (E)	Egyptian
kantar (Guinean)	–	mass	M	1 kantar (Guinean) = 976.9956 kg	Obsolete Guinean traditional unit of mass used before 1906. 1 kantar (Guinean) = 15 218 benda (Guinean) (E)	Guinean
kantar (Moroccan)	–	mass	M	1 kantar (Moroccan) = 50.75 kg	Obsolete traditional Moroccan unit of mass used before 1923. 1 kantar (Moroccan) = 100 rotal (Moroccan) (E)	Moroccan
kantar (Saudi Arabian)	–	mass	M	1 kantar (Saudi Arabian) = 67.50 kg	Obsolete Saudi Arabian traditional unit of mass used before 1962. 1 kantar (Saudi Arabian) = 50 maund (Saudi Arabian) (E)	Saudi Arabian
kantar (Turkish)	–	mass	M	1 kantar (Turkish) = 56.452 kg	Obsolete Turkish traditional unit of mass used before 1933. 1 kantar (Turkish) = 44 oka (Turkish) (E)	Turkish
kapp (Latvian)	–	surface area	L^2	1 kapp (Latvian) = 148.64 m^2	Obsolete Latvian traditional unit of surface area used in land measurements. 1 kapp (Latvian) = 1/35 tonnstelle (Latvian) (E)	Latvian
kapp line	–	magnetic induction flux	$ML^2T^{-2}I^{-1}$	1 kapp line = 6×10^{-5} Wb (E)	Obsolete British and American unit of magnetic flux named after G. Kapp. 1 kapp line = 6000 Mx (E)	UK, US
kappar (Swedish, dry)	–	capacity, volume	L^3	1 kappar (Swedish, dry) = $4.58003336158 \times 10^{-3}$ m^3	Obsolete Swedish unit of capacity for dry substances. 1 kappar (Swedish, dry) = 7/4 kanna (E)	Swedish

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
kappland (Swedish)	–	surface area	L^2	1 kappland (Swedish) = 154.261817500 m^2	Obsolete traditional Swedish unit of surface area used after a decree of 1665. 1 kappland (Swedish) = 1750 kvardratfot (E)	Swedish
karch (Austrian)	–	mass	M	1 karch (Austrian) = 224.004 kg	Obsolete Austrian unit of mass for general uses. 1 karch (Austrian) = 400 pfund (E)	Austrian
kartos (Cypriot)	–	capacity, volume	L^3	1 kartos (Cypriot) = 5.1142×10^{-3} m^3	Obsolete Cypriot traditional unit of capacity used before 1972. 1 kartos (Cypriot) = 4 oke (Cypriot) (E)	Cypriot
karus hiri-ichi-da (Japanese)	–	mass	M	1 karus hiri-ichi-da (Japanese) = 67.5 kg (E)	Obsolete Japanese unit of mass. 1 karus hiri-ichi-da (Japanese) = 18 kwan (E)	Japanese
karvar (Persian)	–	mass	M	1 karvar (Persian) = 588.80 kg	Obsolete Persian traditional unit of mass used before 1933. 1 karvar (Persian) = 64 000 dirhem (Persian) (E)	Persian
kasm (Ethiopian)	–	mass	M	1 kasm (Ethiopian) = 3.9×10^{-3} kg	Obsolete Ethiopian traditional unit of mass used before 1963. 1 kasm (Ethiopian) = 1/2 mutagalla(Ethiopian) (E)	Ethiopian
kassabah (Egyptian)	–	length, distance	L	1 kassabah (Egyptian) = 3.480 m	Obsolete Egyptian traditional unit of length used before 1891. 1 kassabah (Egyptian) = 6 diraa (Egyptian) (E)	Egyptian
katal	kat	enzymatic activity	NT^{-1}	SI derived unit 1 kat = 1 $mol.s^{-1}$ (E)	SI derived unit with special name adopted at the 21st CGPM (1999). Employed in biochemistry to describe enzymatic activity. 1 katal is equal to the amount of enzyme	SI

					which transforms 1 mole of substrate per second at $T = 298$ K (25°C).	
kayser	Ky	wavenumber	L^{-1}	1 Ky = 10^2 m^{-1} (E)	Obsolete wavenumber unit adopted in 1952 and used in spectroscopy. The unit is named after J.H.G. Kayser (1853–1940). 1 Ky = 1 cm^{-1} (E)	
keddah (Egyptian)	–	capacity, volume	L^3	1 keddah (Egyptian) = 2.06250×10^{-3} m^3	Obsolete Egyptian traditional unit of capacity used before 1891. 1 keddah (Egyptian) = 1/2 maloua (Egyptian) (E)	Egyptian
kedet (Egyptian)	–	mass	M	1 kedet = 136.5×10^{-3} kg	Obsolete Egyptian unit of mass used in ancient times. 1 kedet = 10 debens (E)	Egyptian
keel (UK)	–	mass	M	1 keel (UK) = 21.43858978×10^3 kg (E)	Obsolete British unit of mass measuring the amount of coal carried by a Tyne and Wear lighter in northern England. After considerable local variations, it was standardized in 1695, as 21 long tons and 4 hundredweights (i.e., 21.2 long tons) and extensively used in the coal mining industry. The name came from the Dutch, *kiel*, for shipping barges. 1 keel (UK, coal) = 8 Newcastle chaldrons (E) 1 keel (UK, coal) = 21 lg tons 4 cwt (E)	UK
keel (UK, coal)	–	mass	M	1 keel (UK, coal) = $21.54019446667 \times 10^3$ kg	Obsolete British unit of mass (1750) used in the coal mining industry. It was equal to the mass of coal carried by a Tyne & Wear lighter. 1 keel (UK, coal) = 8 Newcastle chaldrons (E) 1 keel (UK, coal) = 21 lg tons 4 cwt (E)	UK
keg (US, liq.)	–	capacity, volume	L^3	1 keg (US, liq.) = $45.424941408 \times 10^{-3}$ m^3 (E)	Obsolete American unit of volume used for measuring the capacity of liquids. 1 keg (US, liq.) = 12 gallons (US, liq.) (E)	US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
keg (US, nail)	–	mass	M	1 keg (US, nail) = 45.359237 kg (E)	Obsolete American unit of mass used to weigh nails. 1 keg (US, nail) = 100 pounds (E)	US
keila (Egyptian)	–	capacity, volume	L^3	1 keila (Egyptian) = 16.50×10^{-3} m^3	Obsolete Egyptian traditional unit of capacity used before 1891. 1 keila (Egyptian) = 8 keddah (Egyptian) (E)	Egyptian
kele (Libyan)	–	capacity, volume	L^3	1 kele (Libyan) = 23.886×10^{-3} m^3	Obsolete Libyan traditional unit of capacity used for dry substances before 1927. 1 kele (Libyan) = 3 orba (Libyan) (E)	Libyan
kella (Saudi Arabian)	–	capacity, volume	L^3	1 kella (Saudi Arabian) = $35.41666667 \times 10^{-3}$ m^3	Obsolete Saudi Arabian traditional unit of capacity used for dry substances before 1962. 1 kella (Saudi Arabian) = 5/12 teman (Saudi Arabian) (E)	Saudi Arabian
kelvin	K	absolute thermodynamic temperature	Θ	**SI base unit**	The kelvin, unit of thermodynamic temperature, is the fraction 1/273.16 of the thermodynamic temperature of the triple point of water [13th CGPM (1967), *(continued overleaf)*	SI, MKSA
kelvin *(continued)*					Resolution 4]. The unit is named after the British scientist Sir W. Thompson, Lord Kelvin (1824–1907).	
kelvin	–	energy, work, heat	ML^2T^{-2}	1 kelvin = 3.6×10^6 J (E)	Obsolete British name for the kilowatt-hour. Anecdotal. 1 kelvin = 3.6 MJ (E) 1 kelvin = 1 kWh (E)	UK
kelvin per pascal	$K.Pa^{-1}$	Joule–Thomson coefficient	$M^{-1}LT^2\Theta$	**SI derived unit**		SI

kelvin per watt	$K.W^{-1}$	thermal resistance	$M^{-1}L^{-2}T^{3}\Theta$	**SI derived unit** 1 $K.W^{-1} = 1\ kg^{-1}.m^{-2}.s^{3}.K$ (E)		SI
ken (Japanese)	–	length, distance	L	1 ken (Japanese) = 1.818181 m	Obsolete Japanese unit of length. 1 ken = 6 shaku (E) 1 ken = (20/11) m (E)	Japanese
ken (Thai)	–	length, distance	L	1 ken (Thai) = 1 m	Obsolete Thai traditional unit of length used before 1923. 1 ken (Thai) = 1/2 wah (Thai) (E)	Thai
kend (Ethiopian)	–	length, distance	L	1 kend (Ethiopian) = 0.49 m	Obsolete Ethiopian traditional unit of length used before 1963. 1 kend (Ethiopian) = 98/5 tat (Ethiopian) (E)	Ethiopian
keramion (Egyptian)	–	capacity, volume	L^3	1 keramion (Egyptian) $= 34 \times 10^{-3}\ m^3$ (of water)	Obsolete Egyptian unit of capacity used in ancient times. Measured by weight. 1 keramion (Egyptian) = 1 khar (E)	Egyptian
kerma	–	radiation absorbed dose, specific energy, kerma, index of absorbed dose	L^2T^{-2}	1 kerma = 1 $J.kg^{-1}$ (E)	The kerma is a unit employed in radiology. It corresponds to the kinetic energy transferred by neutral particles to charged particles per unit of mass of matter. The name of the unit is derived from the acronym of **k**inetic **e**nergy **r**eleased in **ma**terial.	
keup (Thai)	–	length, distance	L	1 keup (Thai) = 0.250 m	Obsolete Thai traditional unit of length used before 1923. 1 keup (Thai) = 1/8 wah (Thai) (E)	Thai
khahoon (Indian)	–	capacity, volume	L^3	1 khahoon (Indian) = 1.7616 m^3	Obsolete Indian traditional unit of capacity used before 1920. 1 khahoon (Indian) = 1280 raik (Indian) (E)	Indian
khanoubah (Egyptian)	–	capacity, volume	L^3	1 khanoubah (Egyptian) $= 128.906250 \times 10^{-6}\ m^3$	Obsolete Egyptian traditional unit of capacity used before 1891. 1 khanoubah (Egyptian) = 1/16 keddah (Egyptian) (E)	Egyptian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
khar (Egyptian)	–	capacity, volume	L^3	1 khar (Egyptian) $= 34 \times 10^{-3}$ m^3 (of water)	Obsolete Egyptian unit of capacity used in ancient times. Measured by weight.	Egyptian
kharouba (Libyan)	–	mass	M	1 kharouba (Libyan) $= 200.3125 \times 10^{-3}$ kg	Obsolete Libyan traditional unit of mass used before 1927. 1 kharouba (Libyan) = 1/2560 rottolo (Libyan) (E)	Libyan
kharsha (Indian)	–	mass	M	1 kharsha (Indian) $= 14.10 \times 10^{-3}$ kg	Obsolete Indian unit of mass used in ancient times. 1 kharsha (Indian) = 3/10 pala (E)	Indian
khô (Chinese)	–	capacity, volume	L^3	1 khô (Chinese) $= 1.03544 \times 10^{-4}$ m^3	Obsolete Chinese unit of capacity used in ancient times. 1 khô (Chinese) = 1/10 cheng (E)	Chinese
khoonke (Indian)	–	capacity, volume	L^3	1 khoonke (Indian) $= 86.0156250 \times 10^{-6}$ m^3	Obsolete Indian traditional unit of capacity used before 1920. 1 khoonke (Indian) = 1/16 raik (Indian) (E)	Indian
khoul (Algerian)	–	capacity, volume	L^3	1 khoul (Algerian) $= 0.876005256240 \times 10^{-3}$ m^3	Obsolete traditional Algerian unit of capacity used before 1843. 1 khoul (Algerian) = 40/761 caffiso (Algerian) (E)	Algerian
khoul (Arabic) (woebe)	–	capacity, volume	L^3	1 khoul (Arabic) $= 16.32 \times 10^{-3}$ m^3 (of water)	Obsolete Arabic unit of capacity used in ancient times. Measured by weight. 1 khoul (Arabic) = 1/2 cafiz (E)	Arabic
khous (Greek gallon)	–	capacity, volume	L^3	1 khous (Greek gallon) $= 3.24 \times 10^{-3}$ m^3	Obsolete Greek unit of volume employed in ancient times. It was used for capacity measurements of liquids. 1 khous (Greek gallon) = 12 cotyles (E) (E)	Attic

kieselgur unit	–	turbidity index	nil	1 kieselgur unit = 4.450×10	Obsolete German unit of turbidity based on *colloidal silica* (SiO_2)	German
kikkar (Arabic)	–	mass	M	1 kikkar (Arabic) = 42.5 kg	Obsolete Arabic unit of mass used in ancient times. System of the Prophet. 1 kikkar (Arabic) = 125 rotl (E)	Arabic
kikkar (Egyptian) [Egyptian talent]	–	mass	M	1 kikkar (Egyptian) = 40.95 kg	Obsolete Egyptian unit of mass used in ancient times. 1 kikkar = 3000 debens (Egyptian) (E)	Egyptian
kilan (Indonesian)	–	length, distance	L	1 kilan (Indonesian) = 0.2125 m	Obsolete Indonesian traditional unit of length used before 1923. 1 kilan (Indonesian) = 1/8 depa (Indonesian) (E)	Indonesian
kilderkin (UK)	–	capacity, volume	L^3	1 kilderkin (UK) = $81.82965600 \times 10^{-3}$ m^3	Obsolete British unit used for capacity measurements for all merchandise (solids, liquids, foodstuffs, etc). 1 kilderkin (UK) = 18 gallons (UK) (E) 1 kilderkin (UK) = 2 firkins (UK) (E)	UK
kile (Cypriot)	–	capacity, volume	L^3	1 kile (Cypriot) = 36.368×10^{-3} m^3	Obsolete Cypriot traditional unit of capacity used before 1972. 1 kile (Cypriot) = 28 oke (Cypriot) (E)	Cypriot
kile (Turkish)	–	capacity, volume	L^3	1 kile (Turkish) = 100×10^{-3} m^3 (E)	Obsolete Turkish traditional unit of capacity used before 1933. 1 kile (Turkish) = 1/10 m^3 (E)	Turkish
kilo (Romanian, dry)	–	capacity, volume	L^3	1 kilo (Romanian, dry) = 393.600×10^{-3} m^3	Obsolete traditional Romanian unit of capacity used for dry substances before 1884. 1 kilo (Romanian, dry) = 256 oke (Romanian) (E)	Romanian
kilobyte (kilooctet)	KB, Ko	quantity of information	nil	1 KB = 1024 bytes (E)	Unit used in computer science. 1 KB = 2^{10} bits (E)	
kilocalorie (4°C)	$kcal_4$	energy, work, heat	ML^2T^{-2}	1 $kcal_4$ = 4204.5 J	Obsolete multiple of a unit of energy.	

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
kilocalorie (15°C)	$kcal_{15}$	energy, work, heat	ML^2T^{-2}	1 $kcal_{15}$ = 4185.5 J (E)	Obsolete multiple of the calorie (15°C). It was equal to the heat needed to raise the temperature of one kilogram of air-free water from 14.5°C to 15.5°C at the constant pressure of one standard atmosphere (101 325 Pa). The use of the calorie should have ceased from December 31st, 1977.	
kilocalorie (20°C)	$kcal_{20}$	energy, work, heat	ML^2T^{-2}	1 $kcal_{20}$ = 4181.90 J	Obsolete multiple of a unit of energy.	
kilocalorie (mean)	$kcal_{mean}$	energy, work, heat	ML^2T^{-2}	1 $kcal_{mean}$ = 4190.02 J	Obsolete multiple of a unit of energy. The kilocalorie (mean) is equal to 1/100 of the heat needed to raise the temperature of one kilogram of air-free water from 0°C to 100°C at the constant pressure of one standard atmosphere (101 325 Pa). The use of the calorie should have ceased from December 31st, 1977.	
kilocalorie (thermochemical)	$kcal_{th}$	energy, work, heat	ML^2T^{-2}	1 $kcal_{th}$ = 4184.0 J (E)	Multiple of the obsolete unit of energy which was defined by the National Bureau of Standards (NBS) in 1953.	US
kilocalorie IT (International Steam Table)	$kcal_{IT}$	energy, work, heat	ML^2T^{-2}	1 $kcal_{IT}$ = 4186.74 J (E)	Multiple of the obsolete unit of energy which was used in steam data tables of Keenan and Keyes. It was first defined at the 5th International Conference on the Properties of Steam (London, July 1956). 1 $kcal_{IT}$ = (100/86) W (int).h (E)	INT
kilogram	kg	mass	M	**SI base unit**	The kilogram is the unit of mass; it is equal to the mass of the international prototype of the kilogram [1st CGPM (1889), 3rd CGPM (1901)] The prototype of the standard is a cylinder of iridium-platinum alloy, 39 mm in diameter and 39 mm high.	SI, MKSA

				1 kg = 10^3 g (E)		
kilogram force-metre	kgfm	energy, work, heat	ML^2T^{-2}	1 kgfm = 9.80665 J (E)	Obsolete MKpS unit of energy. It was the work needed to displace horizontally without friction a weight of 1 kgf by 1 m.	MKpS
kilogram force-metre per second	kgfm. s^{-1}	power	ML^2T^{-3}	1 kgfm.s^{-1} = 9.806650 W (E)	Obsolete MKpS unit of power.	MKpS
kilogram per cubic decimetre	kg.dm^{-3}	density, mass density	ML^{-3}	1 kg.dm^{-3} = 10^3 kg.m^{-3} (E)		
kilogram per cubic metre	kg.m^{-3}	density, mass density	ML^{-3}	**SI derived unit**	The kilogram per cubic metre is the unit of mass density of a homogenous body which has a mass of one kilogram and occupies a volume of one cubic metre.	SI
kilogram per metre	kg.m^{-1}	linear mass density	ML^{-1}	**SI derived unit**	The kilogram per metre is the SI derived unit of linear mass density. It is equal to the mass of one kilogram of a homogenous body of uniform section which is one metre in length.	SI
kilogram per second	kg.s^{-1}	mass flow rate	MT^{-1}	**SI derived unit**	The kilogram per second is the SI derived unit of mass flow rate. It corresponds to a uniform flow stream of a homogenous fluid of one kilogram in one second.	SI
kilogram per square metre	kg.m^{-2}	surface mass density	ML^{-2}	**SI derived unit**	The kilogram per square metre is the unit of surface mass density of a homogenous body having a uniform thickness and which has a mass of one kilogram per square metre of area.	SI
kilogram-force (kilogram-weight)	kgf, kgp, kg'	force, weight	MLT^{-2}	1 kgf = 9.80665 N (E)	Obsolete MKpS unit of force.	MKpS
kilogram-force per square centimetre	kgf. cm^{-2}	pressure, stress	$ML^{-1}T^{-2}$	1 kgf.cm^{-2} = 9.80665 × 10^4 Pa (E)	Obsolete pressure and stress unit. Multiple of the MKpS unit. 1 kgf.cm^{-2} = 0.980665 bar (E) 1 kgf.cm^{-2} = 1 at (E) 1 atm = 1.03322745280 kgf.cm^{-2}	MKpS

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
kilogram-force per square decimetre	kgf.dm^{-2}	pressure, stress	$ML^{-1}T^{-2}$	1 kgf.dm^{-2} = 9.80665 × 10^2 Pa (E)	Obsolete pressure and stress unit. Multiple of the MKpS unit. 1 atm = 103.322745280 kgf.dm^{-2}	MKpS
kilogram-force per square metre	kgf.m^{-2}	pressure, stress	$ML^{-1}T^{-2}$	1 kgf.m^{-2} = 9.806 65 Pa (E)	Obsolete pressure and stress unit. 1 atm = 10 332.2745280 kgf.m^{-2}	MKpS
kilogram-force per square millimetre	kgf.mm^{-2}	pressure, stress	$ML^{-1}T^{-2}$	1 kgf.mm^{-2} = 9.80665 × 10^6 Pa (E)	Obsolete pressure and stress unit. Submultiple of the MKpS unit. 1 kgf.mm^{-2} = 0.980665 GPa (E) 1 atm = 1.03322745280 × 10^{-2} kgf.mm^{-2}	MKpS
kilogram-force-second per square metre	kgf.s.m^{-2}	dynamic viscosity, absolute viscosity	$ML^{-1}T^{-1}$	1 kgf.s.m^{-2} = 9.80665 Pa.s (E)	Obsolete MKpS unit of dynamic viscosity or absolute viscosity.	MKpS
kilogram-square metre	kg.m^2	moment of inertia	ML^2	**SI derived unit**		SI
kilometre	km	length, distance	L	1 km = 10^3 m (E)	Multiple of the SI base unit	SI
kilotonne equivalent TNT	kt (TNT)	energy, work, heat	ML^2T^{-2}	1 kt (TNT) = 4.184 × 10^{12} J (E)	Obsolete unit of energy commonly used in seismology and in military applications. It serves to express the ratio of an explosion or seismic intensity in terms of the energy released by the explosion of one kiloton of trinitrotoluene assuming that 1 g of high explosive releases 1000 cal (therm.). 1 kT (TNT) = 10^{12} cal_{th} (E)	INT
kilowatt-hour	kWh	energy, work, heat	ML^2T^{-2}	1 kWh = 3.6 × 10^6 J (E)	Unit of power, for business use. It was adopted in 1882 by the Board of Trade Orders. It was equal to the energy produced by an electric current of one thousand amperes flowing under a potential difference of one volt during one hour. Sometimes, the Board of Trade kelvin is used as synonym.	

					1 kWh = 3.6 MJ (E)	
kin (Japanese)	–	mass	M	1 kin (Japanese) = 6×10^{-1} kg (E)	Obsolete Japanese unit of mass. 1 kin (Japanese) = 4/25 kwan (E)	Japanese
kine	kine	velocity, speed	LT^{-1}	1 kine = 10^{-2} m.s^{-1} (E)	Suggested name for the cgs unit of velocity. Anecdotal. 1 kine = 1 cm.s^{-1} (E)	cgs
king (Chinese)	–	surface, area	L^2	1 king (Chinese) = 6144 m^2	Obsolete Chinese unit of area used in ancient times. 1 king (Chinese) = 10 meou (E)	Chinese
kintal (cental, centner, hundredweight)	cH, cwt	mass	M	1 kintal = 45.359237 kg (E)	Obsolete British and American unit of mass used in business transactions, especially in agriculture. It served to measure the weight of grains. 1 cental = 1 cwt (E) 1 cental = 100 lb (av.) (E) 1 cental = 1 sh. cwt (US) (E)	UK, US
kip (kilopound)	kip	mass	M	1 kip = 453.59237 kg (E)	American unit of mass used by mechanical and civil engineers to express the weight of a construction. The name of the unit derived from the English acronym **K**ilo **I**mperial **P**ound. 1 kip = 1000 lb (av.) (E) 1 kip = 16 000 oz (av.) (E)	US
kip per square inch (kilopound-force per square inch)	kip.in^{-2}, ksi, KSI	pressure, stress	$ML^{-1}T^{-2}$	1 ksi = 6.89475729317 $\times$ 10^6 Pa	Obsolete British and American pressure and stress unit. 1 ksi = 1000 psi (E) 1 atm = 1.46959487755 $\times$ 10^{-2} ksi	UK, US
kip-force (kilopound-force)	kipf	force, weight	MLT^{-2}	1 kipf = 4448.2216152605 N	British and American unit of force employed in civil engineering. The name of the unit is derived from the acronym **K**ilo **I**mperial **P**ound-force. 1 kipf = 1000 lbf (E) 1 kipf = 16 000 ozf (E)	UK, US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
kirat (Egyptian)	–	mass	M	1 kirat (Egyptian) = 1.7550×10^{-3} kg	Obsolete Egyptian traditional unit of mass used before 1891. 1 kirat (Egyptian) = 9/6400 oke (Egyptian) (E)	Egyptian
kirat (Egyptian)	–	capacity, volume	L^3	1 kirat (Egyptian) = $64.4531250 \times 10^{-6}$ m^3	Obsolete Egyptian traditional unit of capacity used before 1891. 1 kirat (Egyptian) = 1/32 keddah (Egyptian) (E)	Egyptian
kirat (Egyptian)	–	length, distance	L	1 kirat (Egyptian) = $2.41666666667 \times 10^{-2}$ m	Obsolete Egyptian traditional unit of length used before 1891. 1 kirat (Egyptian) = 1/24 diraa (Egyptian) (E)	Egyptian
kirat kamel (Egyptian)	–	surface area	L^2	1 kirat kamel (Egyptian) = 175.0033333 m^2	Obsolete Egyptian traditional unit of surface area used in land measurements before 1891. 1 kirat kamel (Egyptian) = 24 sahme (Egyptian) (E)	Egyptian
kish (Chinese)	–	surface, area	L^2	1 kish (Chinese) = 153.60 m^2	Obsolete Chinese unit of area used in ancient times. 1 kish (Chinese) = 1/4 meou (E) 1 kish (Chinese) = 1500 sq. tchi (E)	Chinese
kist (Arabic)	–	capacity, volume	L^3	1 kist (Arabic) = 1.36×10^{-3} m^3 (of water)	Obsolete Arabic unit of capacity used in ancient times. Measured by weight. 1 kist (Arabic) = 1/24 cafiz (E)	Arabic
kit (Indonesian)	–	capacity, volume	L^3	1 kit (Indonesian) = 14.96345×10^{-3} m^3	Obsolete Indonesian traditional unit of capacity used before 1923. 1 kit (Indonesian) = 19/2 kan (Indonesian) (E)	Indonesian
kiyak-kin (Japanese)	–	mass	M	1 kiyak-kin (Japanese) = 60 kg (E)	Obsolete Japanese unit of mass. 1 kiyak-kin (Japanese) = 16 kwan (E)	Japanese

klafter (Austrian) [Austrian fathom]	–	length, distance	L	1 klafter (Austrian) = 1.897379993 m	Obsolete Austrian unit of length. 1 klafter (Austrian) = 6 fuss (Austrian) (E)	Austrian
klafter (German) [German fathom]	–	length, distance	L	1 klafter (German) = 1.897379993 m	Obsolete German unit of length used in German-speaking countries. 1 klafter (German) = 6 fuss (German) (E)	German
klafter (Swiss) [Swiss fathom]	–	length, distance	L	1 klafter (Swiss) = 1.8 m (E)	Obsolete Swiss unit of length similar to the British fathom.	Swiss
klam (Thai)	–	mass	M	1 klam (Thai) = 234.375 $\times 10^{-6}$ kg	Obsolete Thai traditional unit of mass used before 1923. 1 klam (Thai) = 1/4 grani (Thai) (E)	Thai
klom (Thai)	–	mass	M	1 klom (Thai) = 117.1875 $\times 10^{-6}$ kg	Obsolete Thai traditional unit of mass used before 1923. 1 klom (Thai) = 1/8 grani (Thai) (E)	Thai
KMV degree	°KMW	specific gravity unit to express amount of sugar in must	nil	1°KMW = 0.01 (m/m) (E)	Obsolete Austrian unit of mass fraction used to measure the sugar content of must expressed as a percentage. One degree KMW is roughly equivalent to 1 wt% sugar or 5° Oeschle. It was named after the abbreviation for **K**losterneuburger **M**ost**w**aage meaning Klosterneuburg must scale. 1°KMW = 1 wt% (E)	Austrian
knot (noeud, naut. mile per hour)	kn, knot, nmph	velocity, speed	LT^{-1}	1 knot = 5.144444444 $\times 10^{-1}$ $m.s^{-1}$	International unit of velocity employed in navigation. The unit dates from the late sixteenth century, when the speed of a ship was found by dropping a float tied to a knotted line (knotted log) over the side of the vessel. The knots were originally seven fathoms apart. The number of knots passing in 30 seconds gave the speed of the ship in nautical miles per hour. 1 knot = 1 nautical mile per hour (E) 1 knot = 1852 $m.h^{-1}$ (E) 1 knot ≈ 6076.11548556 $ft.h^{-1}$ (E)	INT

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
koelak (Indonesian)	–	capacity, volume	L^3	1 koelak (Indonesian) $= 3.7408625 \times 10^{-3}$ m^3	Obsolete Indonesian traditional unit of capacity used before 1923. 1 koelak (Indonesian) = 19/8 kan (Indonesian) (E)	Indonesian
kojang (Indonesian)	–	capacity, volume	L^3	1 kojang (Indonesian) = 1.98415347 m^3	Obsolete Indonesian traditional unit of capacity used before 1923. 1 kojang (Indonesian) = 12597/10 kan (Indonesian) (E)	Indonesian
kojang (Indonesian, Batavia)	–	mass	M	1 kojang (Indonesian, Batavia) = 1667.555168 kg	Obsolete Indonesian traditional unit of mass used before 1923. 1 kojang (Indonesian, Batavia) = 27 picul (Indonesian) (E)	Indonesian
kojang (Indonesian, Semarang)	–	mass	M	1 kojang (Indonesian, Semarang) = 1729.316470 kg	Obsolete Indonesian traditional unit of mass used before 1923. 1 kojang (Indonesian, Semarang) = 28 picul (Indonesian) (E)	Indonesian
kojang (Indonesian, Soerabaya)	–	mass	M	1 kojang (Indonesian, Soerabaya) = 1852.839075 kg	Obsolete Indonesian traditional unit of mass used before 1923. 1 kojang (Indonesian, Soerabaya) = 30 picul (Indonesian) (E)	Indonesian
koku	–	capacity, volume	L^3	1 koku = $180.390683696 \times 10^{-3}$ m^3	Obsolete Japanese unit of capacity. 1 koku = 100 shô (E)	Japanese
kolläst (Swedish, dry)	–	capacity, volume	L^3	1 kolläst (Swedish, dry) = 1.97857441220 m^3	Obsolete Swedish unit of capacity for dry substances. 1 kolläst (Swedish, dry) = 756 kanna (E)	Swedish
kolleh (Algerian)	–	capacity, volume	L^3	1 kolleh (Algerian) $= 0.876005256240 \times 10^{-3}$ m^3	Obsolete traditional Algerian unit of capacity used before 1843. 1 kolleh (Algerian) = 40/761 caffiso (Algerian) (E)	Algerian

koltunna (Swedish, dry)	–	capacity, volume	L^3	1 koltunna (Swedish, dry) $= 164.881201017 \times 10^{-3}$ m^3	Obsolete Swedish unit of capacity for dry substances. 1 koltunna (Swedish, dry) = 63 kanna (E)	Swedish
komma-ichi-da (Japanese)	–	mass	M	1 komma-ichi-da (Japanese) = 150 kg (E)	Obsolete Japanese unit of mass. 1 komma-ichi-da (Japanese) = 40 kwan (E)	Japanese
kommerzlast (German)	–	mass	M	1 kommerzlast = 3000 kg (E)	German unit of mass meaning commercial load, now inter preted as a metric unit equal to exactly 3 metric tons (i.e., tonnes).	German
kona (Indian)	–	mass	M	1 kona (Indian) $= 7.050 \times 10^{-3}$ kg	Obsolete Indian unit of mass used in ancient times. 1 kona (Indian) = 3/20 pala (E)	Indian
kop (Dutch, dry)	–	capacity, volume	L^3	1 kop (Dutch, dry) $= 0.851875 \times 10^{-3}$ m^3	Obsolete Dutch unit of capacity used for dry substances. 1 kop (Dutch, dry) = 1/32 schepel (E)	Dutch
korec (Czechoslovakian)	–	surface area	L^2	1 korec (Czechoslovakian) = 2878 m^2	Obsolete Czechoslovakian unit of surface area used before 1876. 1 korec (Czechoslovakian) = (1439/1000) merice (E)	Czech
korec (Czechoslovakian, capacity)	–	capacity, volume	L^3	1 korec (Czechoslovakian) $= 93.545 \times 10^{-3}$ m^3	Obsolete Czechoslovakian unit of capacity used before 1876. 1 korec (Czechoslovakian) = (53/40) merice (E)	Czech
korn (Swedish)	–	mass	M	1 korn = $4.250797024 \times 10^{-4}$ kg	Obsolete Swedish unit of weight. 1 korn = 1/1000 skålpund (E)	Swedish
kornskeppa (Icelandic)	–	capacity, volume	L^3	1 kornskeppa (Icelandic) $= 17.3907368865 \times 10^{-3}$ m^3	Obsolete Icelandic traditional unit of capacity used for dry substances before 1907. 1 kornskeppa (Icelandic) = 9/16 cubic fet (Icelandic) (E)	Icelandic

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
korntonde (Danish, dry)	–	capacity, volume	L^3	1 korntonde (Danish, dry) = 139.125895092 $\times 10^{-3}$ m^3	Obsolete Danish traditional unit of capacity used for dry substances before 1912. 1 korntonde (Danish, dry) = 144 pott (Danish, dry) (E)	Danish
korntonde (Norwegian, dry)	–	capacity, volume	L^3	1 korntonde (Norwegian, dry) = 138.97 $\times 10^{-3}$ m^3	Obsolete Norwegian traditional unit of capacity used before 1882 for dry substances.	Norwegian
korntunna (Icelandic)	–	capacity, volume	L^3	1 korntunna (Icelandic) = 139.125895092 $\times 10^{-3}$ m^3	Obsolete Icelandic traditional unit of capacity used for dry substances before 1907. 1 korntunna (Icelandic) = 9/2 cubic fet (Icelandic) (E)	Icelandic
korzec (Polish)	–	capacity, volume	L^3	1 korzec (Polish) = 128 $\times 10^{-3}$ m^3 (E)	Obsolete traditional Polish unit of capacity used before 1919. 1 korzec (Polish) = 128 kwarta (Polish) (E)	Polish
kouza (Cypriot)	–	capacity, volume	L^3	1 kouza (Cypriot) = 10.2284 $\times$ 10^{-3} m^3	Obsolete Cypriot traditional unit of capacity used before 1972. 1 kouza (Cypriot) = 8 oke (Cypriot) (E)	Cypriot
koyan (Far East)	–	mass	M	1 koyan = 2419.2 kg	Obsolete Far Eastern unit of mass. 1 koyan = 4000 catty (E)	Far East
koyan (Thai)	–	capacity, volume	L^3	1 koyan (Thai) = 3.2 m^3	Obsolete Thai traditional unit of capacity used before 1923. 1 koyan (Thai) = 3200 tanan (Thai) (E)	Thai
krina (Bulgarian)	–	capacity, volume	L^3	1 krina (Bulgarian) = 20 $\times 10^{-3}$ m^3 (E)	Obsolete Bulgarian unit of volume. The krina is now standardized in the metric system as being equal to exactly 20 litres.	Bulgarian
krouchka (Russian)	–	capacity, volume	L^3	1 krouchka (Russian) = 1.229941 $\times$ 10^{-3} m^3	Obsolete Russian unit of capacity for liquid substances used before 1917. 1 krouchka (Russian) = 10 tcharka (E)	Russian

krushky (Russian, dry)	–	capacity, volume	L^3	1 krushky (Russian, dry) $= 1.31193680 \times 10^{-3}$ m^3	Obsolete Russian unit of capacity for dry substances used before 1917. 1 krushky (Russian, dry) = 2/5 garnetz (E)	Russian
kuba (Abyssinian)	–	capacity, volume	L^3	1 kuba (Abyssinian) $= 1.012 \times 10^{-3}$ m^3	Obsolete Abyssinian traditional unit of capacity used before 1927. 1 kuba (Abyssinian) = 23/10 madega (Abyssinian) (E)	Abyssinian
kula (Moroccan)	–	mass	M	1 kula (Moroccan) = 11.165 kg	Obsolete traditional Moroccan unit of mass used before 1923. 1 kula (Moroccan) = 22 rotal (Moroccan) (E)	Moroccan
kulimet (Estonian)	–	capacity, volume	L^3	1 kulimet (Estonian) $= 11.5016128 \times 10^{-3}$ m^3	Obsolete Estonian unit of capacity.	Estonian
kulmet (Latvian)	–	capacity, volume	L^3	1 kulmet (Latvian) $= 11.4768 \times 10^{-3}$ m^3	Obsolete Latvian traditional unit of capacity. 1 kulmet (Latvian) = 9 stoof (Latvian) (E)	Latvian
kulmet (Latvian)	–	capacity, volume	L^3	1 kulmet (Latvian) $= 10.9106208 \times 10^{-3}$ m^3	Obsolete Latvian unit of capacity.	Latvian
kung (Chinese)	–	surface, area	L^2	1 kung (Chinese) = 2.560 m^2	Obsolete Chinese unit of area used in ancient times. 1 kung (Chinese) = 1/240 meou (E) 1 kung (Chinese) = 25 sq. tchi (E) 1 kung (Chinese) = 1 sq. pou (E)	Chinese
kunitz	–	enzymatic activity of ribonuclease	NL^{-3}	(see note)	The unit was proposed in 1946 and employed in biochemistry. It is used to expressed the enzymatic activity of ribonuclease. One kunitz is the amount of ribonuclease required to cause a decrease of 100% per minute in the UV light (300 nm) absorbed at 25°C by a 0.05% solution of yeast nucleic acid in a 0.05 M solution of acetate buffer (pH 5). The unit is named after the American biochemist M. Kunitz.	

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
kunk (Indian)	–	capacity, volume	L^3	1 kunk (Indian) = 344.0625 $\times 10^{-6}$ m^3	Obsolete Indian traditional unit of capacity used before 1920. 1 kunk (Indian) = 1/4 raik (Indian) (E)	Indian
kvadrattum (Swedish)	–	surface area	L^2	1 kvadrattum (Swedish) = 612.150069 $\times$ 10^{-6} m^2	Obsolete traditional Swedish unit of surface area used after decree 1665. 1 kvadrattum (Swedish) = 1/144 kvardratfot (E)	Swedish
kvardratfot (Swedish)	–	surface area	L^2	1 kvardratfot (Swedish) = 0.0881496100 m^2	Obsolete traditional Swedish unit of surface area used after decree 1665.	Swedish
kvat (Yugoslavian)	–	length, distance	L	1 kvat (Yugoslavian) = 1.8960 m	Obsolete traditional Yugoslavian unit of length used before 1883. kvat (Yugoslavian) = 6 stopa (Yugoslavian) (E)	Yugoslavian
kwai (Burmese)	–	capacity, volume	L^3	1 kwai (Burmese) = 4.04 $\times 10^{-3}$ m^3	Obsolete Burmese traditional unit of capacity used before 1920. 1 kwai (Burmese) = 8 byee (Burmese) (E)	Burmese
kwan (Annamese)	–	mass	M	1 kwan (Annamese) = 67.95 kg	Obsolete Annameseian traditional unit of mass used before 1914. 1 kwan (Annamese) = 18 000 dong (Annamese) (E)	Annamese
kwan (Japanese)	–	mass	M	1 kwan (Japanese) = 3.75 kg (E)	Obsolete Japanese unit of mass used in business transactions for pearls. 1 kwan (Japanese) = 1000 mommes (E)	Japanese
kwan (Chinese) (jun)	–	mass	M	1 kwan (Chinese) = 17.90448 kg	Obsolete Chinese unit of mass. 1 kwan (Chinese) = 30 jin (E)	Chinese
kwarta (Polish)	–	capacity, volume	L^3	1 kwarta (Polish) = 10^{-3} m^3 (E)	Obsolete traditional Polish unit of capacity used before 1919. 1 kwarta (Polish) = 1 dm^3 (E)	Polish

kwarterka (Polish)	–	capacity, volume	L^3	1 kwarterka (Polish) $= 250 \times 10^{-6}$ m^3 (E)	Obsolete traditional Polish unit of capacity used before 1919. 1 kwarterka (Polish) = 1/4 kwarta (Polish) (E)	Polish
kwien (Thai)	–	capacity, volume	L^3	1 kwien (Thai) = 3.2 m^3	Obsolete Thai traditional unit of capacity used before 1923. 1 kwien (Thai) = 3200 tanan (Thai) (E)	Thai
kyne	$cm.s^{-1}$	velocity, speed	LT^{-1}	1 kyne = 10^{-2} $m.s^{-1}$ (E)	Name proposed in 1888 by the British Association for the cgs unit of velocity. Anecdotal.	
kyo (Chinese)	–	length, distance	L	1 kyo (Chinese) = 96 m	Obsolete Chinese unit of length used in ancient times. 1 kyo = 300 tchi (E)	Chinese
laang (Thai)	–	capacity, volume	L^3	1 laang (Thai) $= 0.5 \times 10^{-3}$ m^3	Obsolete Thai traditional unit of capacity used before 1923. 1 laang (Thai) = 1/2 tanan (Thai) (E)	Thai
labor (Mexican)	–	surface area	L^2	1 labor (Mexican) $= 64.1929667328 \times 10^4$ m^2	Obsolete Mexican traditional unit of surface area used in land measurements before 1896. 1 labor (Mexican) = 18 fanega (Mexican) (E)	Mexican
labor (Spanish)	–	surface area	L^2	1 labor (Spanish) $= 6.987371690 \times 10^5$ m^2	Obsolete Spanish unit of land surface area extensively used in Spanish-speaking countries. The labor is defined equal to the area of a square with 1000 varas on a side. 1 labor (Spanish) = 10^6 square varas (Spanish) (E)	Spanish
labor (Texas)	–	surface area	L^2	1 labor (Texas) $= 7.16860146664 \times 10^5$ m^2	Obsolete American unit of land surface area used in Texas. The Texan labor is defined equal to the area of a square with 1000 Texas varas on a side. 1 labor (Spanish) = 10^6 square Texas varas (E)	US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
lachsa (Philippine)	–	mass	M	1 lachsa (Philippine) = 288 kg	Obsolete Philippine traditional unit of mass used before 1906. 1 lachsa (Philippine) = 48 catty (Philippine) (E)	Philippine
lakh (Indian)	–	dimensionless unit of quantity	nil	1 lakh (Indian) = 10^5 entities (E)	Dimensionless Indian unit of quantity.	Indian
lamany (Burmese)	–	capacity, volume	L^3	1 lamany (Burmese) = 63.125×10^{-6} m^3	Obsolete Burmese traditional unit of capacity used before 1920. 1 lamany (Burmese) = 1/8 byee (Burmese) (E)	Burmese
lambda	λ	capacity, volume	L^3	1 lambda = 10^{-9} m^3 (E)	Obsolete unit of capacity employed in analytical chemistry. 1 lambda = 1 μl (E)	
lambert	L	luminous luminance	JL^{-2}	1 L = 3.183098861×10^3 $cd.m^{-2}$	Obsolete American unit of luminous luminance. It was equal to the luminance of a surface equal to the emission of one lumen per square centimetre. The unit is named after J.H. Lambert (1728–1777). 1 L = $[1/\pi] \times 10^4$ $cd.m^{-2}$ (E) 1 L = 10^4 asb. (E)	US
lan (Burmese)	–	length, distance	L	1 lan (Burmese) = 2.2352 m	Obsolete Burmese traditional unit of length used before 1920. 1 lan (Burmese) = 4 sandong (Burmese) (E)	Burmese
lan (Czechoslovakian)	–	surface area	L^2	1 lan (Czechoslovakian) = 172 680 m^2	Obsolete Czechoslovakian unit of surface area used before 1876. 1 lan (Czechoslovakian) = (4317/50) merice (E)	Czech
lana (Russian)	–	mass	M	1 lana = $3.412643160 \times 10^{-2}$ kg	Obsolete Russian unit of mass used before 1917 for general use. 1 loth = 1/12 funt (E)	Russian

lanatz (Yugoslavian)	–	surface area	L^2	1 lanatz (Yugoslavian) = 5751.70560 m^2	Obsolete traditional Yugoslavian unit of surface area used in land measurements before 1883. 1 lanatz (Yugoslavian) = 57 600 square stopa (E)	Yugoslavian
langley		radiant energy, energy per surface area	MT^{-2}	1 langley (radiant energy) = $4.1855 \times 10^3 J.m^{-2}$ (E)	Obsolete unit of radiant energy used in geophysics. I langley (radiant energy) = 1 $cal_{15}.cm^{-2}$ (E)	UK, US, INT
langley	–	surface power density	MT^{-3}	1 langley = 6.975833333×10^2 $W.m^{-2}$	Obsolete unit of surface power density. It was equal to half the solar radiation surface density on Earth. The unit is named after S.P. Langley (1834–1906). 1 langley = 1 $cal_{15^\circ}.cm^{-2}.min^{-1}$ (E) Solar constant = 2 langleys (E)	
Langrohr–Einheiten unit	–	turbidity index	nil	1 Langrohr–Einheiten unit = 9.560×10^{-1}	Obsolete German unit of turbidity.	
lap (athletics, metric)	–	length, distance	L	1 lap (athletics, metric) = 400 m (E)	Unit of length used in athletics. A lap is one the length of one trip around a running track. Today for international competitions most tracks have a standard length of exactly 400 metres. 1 lap (metric) = 1312.33595801 feet	INT
lap (athletics, UK)	–	length, distance	L	1 lap (athletics, UK) = 402.336 m (E)	British unit of length used in athletics. A lap is one the length of one trip around a running track. This may vary from track to track, but at the level of serious competition most tracks have a standard length. 1 lap (athletics, UK) = 1/4 mile (E) 1 lap (athletics, UK) = 1320 feet (E)	UK

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
last (Danish, dry)	–	capacity, volume	L^3	1 last (Danish, dry) = 3.06076969202 m^3	Obsolete Danish traditional unit of capacity used for dry substances before 1912. 1 last (Danish, dry) = 22 korntonde (Danish, dry) (E)	Danish
last (Dutch, dry)	–	capacity, volume	L^3	1 last (Dutch, dry) = 2.94408 m^3	Obsolete Dutch unit of capacity used for dry substances. 1 last (Dutch, dry) = 108 schepel (E)	Dutch
last (Herrings)	–	quantity of herrings	nil	1 last (Herrings) = 13 200 herrings (E)	Obsolete British unit used by fishermen to measure the number of herrings. 1 last (Herrings) = 3300 warps (E)	UK
last (UK)	–	capacity, volume	L^3	1 last (UK) = 2.909498880 m^3	Obsolete British unit used for capacity measurements for all merchandise (solids, liquids, foodstuffs, etc). 1 last (UK) = 640 gal (UK) (E) 1 last (UK) = 320 pecks (UK) (E) 1 last (UK) = 80 bushels (UK) (E) 1 last (UK) = 2 weys (UK) (E)	UK
lastre (Argentinian)	–	capacity, volume	L^3	1 lastre (Argentinian) = 2.0579655 m^3	Obsolete Argentinian traditional unit of capacity used for dry substances before 1887. 1 lastre (Argentinian) = 15 fanega (Argentinian) (E)	Argentinian
latro (Bohemian)	–	length, distance	L	1 latro (Bohemian) = 1.90920 m	Obsolete Czechoslovakian unit of length used in Bohemia before 1876. 1 latro (Bohemian) = 129/20 stopa (Bohemian) (E)	Czech
latro (Moravian)	–	length, distance	L	1 latro (Moravian) = 1.83180 m	Obsolete Czechoslovakian unit of length used in Moravia before 1876. 1 latro (Moravian) = 129/20 stopa (Bohemian) (E)	Czech

latro (Praha)	–	length, distance	L	1 latro (Praha) = 1.9124250 m	Obsolete Czechoslovakian unit of length used in Praha before 1876. 1 latro (Praha) = 129/20 stopa (Bohemian) (E)	Czech
latro (Silesian)	–	length, distance	L	1 latro (Silesian) = 1.8672750 m	Obsolete Czechoslovakian unit of length used in Silesia before 1876. 1 latro (Silesian) = 129/20 stopa (Bohemian) (E)	Czech
latte (Agen)	–	surface area	L^2	1 latte (Agen) = 405 m^2	Obsolete local French unit of surface area used for land measurements in south-western France before the revolution of 1789. 1 latte (Agen) = 1/18 carterée (Agen) (E) 1 latte (Agen) = 1/3 cartonnet (Agen) (E) 1 latte (Agen) = 24 exots (Agen) (E)	French
lea (linen)	–	specific length	$M^{-1}L$	1 lea (linen) = 604.772077626 $m.kg^{-1}$	Obsolete American and British unit employed in the textile industry. 1 lea (linen) = 300 $yd.lb^{-1}$ (E)	UK, US
lea (UK)	–	length, distance	L	1 lea (UK) = 109.728 m (E)	Obsolete UK unit of length used in surveyors' measurements. 1 lea (UK) = 360 feet (E) 1 lea (UK) = 18 ropes (E) 1 lea (UK) = 3/2 wraps (E)	UK
lea (UK, cotton)	–	length, distance	L	1 lea (UK, cotton) = 109.728 m (E)	Obsolete British unit of length for yarn. 1 lea (UK, cotton) = 120 yards (E)	UK
lea (UK, linen)	–	length, distance	L	1 lea (UK, linen) = 274.320 m (E)	Obsolete British unit of length for yarn. 1 lea (UK, linen) = 300 yards (E)	UK
lea (UK, wool)	–	length, distance	L	1 lea (UK, wool) = 73.152 m (E)	Obsolete British unit of length for yarn. 1 lea (UK, wool) = 80 yards (E)	UK
league (Canadian)	–	length, distance	L	1 league (Canadian) = 4828.032 m (E)	Obsolete Canadian unit of length. 1 league (CAN) = 3 miles (E) 1 league (CAN) = 15 840 ft (E)	CAN

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
league (international nautical)	leag. (int. naut.)	length, distance	L	1 league (int. naut.) = 5556 m (E)	Obsolete international unit of length employed in navigation. 1 league (int. naut.) = 3 miles (int. naut.) (E)	INT, UK, US
league (statute, land)	leag. (stat.), st. lg.	length, distance	L	1 league (statute) = 4828.032 m (E)	Obsolete British and American unit of length. 1 league (statute) = 3 miles (statute) (E) 1 league (statute) = 960 rods (E) 1 league (statute) = 5280 yards (E)	UK, US
league (UK, nautical)	leag. (UK, naut.)	length, distance	L	1 league (UK, naut.) = 5559.552 m (E)	Obsolete British unit of length used in navigation. 1 league (UK, naut.) = 3 miles (UK, naut.) (E) 1 league (UK, naut.) = 30 cable lengths (UK, naut.) (E) 1 league (UK, naut.) = 1216 chains (UK, naut.) (E) 1 league (UK, naut.) = 3040 fathoms (E) 1 league (UK, naut.) = 6080 yards (E)	UK
league (US, nautical)	leag. (US, naut.)	length, distance	L	1 league (US, naut.) = 5559.552 m (E)	Obsolete American unit of length employed in navigation. 1 league (US, naut.) = 3 miles (US, naut.) (E) 1 league (US, naut.) = 30 cable lengths (US, naut.) (E) 1 league (US, naut.) = 3040 fathoms (E) 1 league (US, naut.) = 6080 yards (E)	US
leap (Welsh)	–	length, distance	L	1 leap (Welsh) = 2.0574 m (E)	Obsolete Welsh unit of length. 1 leap (Welsh) = 6 feet 9 inches (E) 1 leap (Welsh) = 81 inches (E)	Welsh

legana (Persian)	–	capacity, volume	L^3	1 legana (Persian) = 39.6 $\times 10^{-3}$ m^3	Obsolete Persian traditional unit of capacity used before 1933. 1 legana (Persian) = 120 sextario (Persian) (E)	Persian
legoa (Brazilian)	–	length, distance	L	1 legoa (Brazilian) = 6666.666666666667 m	Obsolete Brazilian traditional unit of length used before 1874. 1 legoa (Brazilian) = 20 000 pe (Brazilian) (E) 1 legoa (Brazilian) = 20 000/3 m (E)	Brazilian
legoa (Portuguese)	–	length, distance	L	1 legoa (Portuguese) = 6202.08 m	Obsolete Portuguese unit of length. 1 legoa (Portuguese) = 24 estadio (E) 1 legoa (Portuguese) = 3 milha (E) 1 legoa (Portuguese) = 5664 vara (E)	Portuguese
legua (Argentinian)	–	length, distance	L	1 legua (Argentinian) = 5196.00 m	Obsolete Argentinian traditional unit of length used before 1887. 1 legua (Argentinian) = 6000 vara (Argentinian) (E)	Argentinian
legua (California)	–	surface area	L^2	1 legua (California) = 1.79639956590 $\times$ 10^7 m^2	Obsolete unit of land surface area used by surveyors in the Southwest US states. 1 legua (California) = 25 labors (Calif.) (E) 1 legua (California) = 4439 acres (E)	US
legua (Chilean)	–	length, distance	L	1 legua (Chilean) = 4514.40 m	Obsolete Chilean traditional unit of length used before 1865. 1 legua (Chilean) = 5400 bara (Chilean) (E)	Chilean
legua (Colombian)	–	length, distance	L	1 legua (Colombian) = 5000 m	Obsolete Colombian traditional unit of length used before 1854. 1 legua (Colombian) = 6250 vara (Colombian) (E)	Colombian
legua (Mexican)	–	length, distance	L	1 legua (Mexican) = 4190 m	Obsolete Mexican traditional unit of length used before 1896. 1 legua (Mexican) = 5000 vara (Mexican) (E)	Mexican

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
legua (Paraguayan)	–	length, distance	L	1 legua (Paraguayan) = 4330 m	Obsolete Paraguayan traditional unit of length used before 1899. 1 legua (Paraguayan) = 5000 vara (Paraguayan) (E)	Paraguayan
legua (Spanish)	–	length, distance	L	1 legua (Spanish) = 4179.525 m	Obsolete Spanish unit of length. 1 legua (Spanish) = 5000 vara (E) 1 legua (Spanish) = 3 milla (E)	Spanish
legua (Texas)	–	surface area	L^2	1 legua (Texas) = $1.79194802338 \times 10^7$ m^2	Obsolete unit of land surface area used by surveyors in the Southwest US states. 1 legua (Texas) = 25 labors (Texas) (E) 1 legua (Texas) = 4428 acres (E)	US
legua (Venezuelan)	–	length, distance	L	1 legua (Venezuelan) = 5024 m	Obsolete Venezuelan traditional unit of length used before 1857. 1 legua (Venezuelan) = 6280 vara (Venezuelan) (E)	Venezuelan
lehen (Bohemian)	–	length, distance	L	1 lehen (Bohemian) = 12.8016 m	Ancient Bohemian unit used in mining in Central Europe during middle-age. 1 lehen (Bohemian) = 7 fathoms (E) 1 lehen (Bohemian) = 42 feet (E) 1 lehen (Bohemian) = 504 inches (E)	Bohemian
lentor (Stokes)	lentor St	kinematic viscosity	L^2T^{-1}	1 lentor = 10^{-4} $m^2.s^{-1}$ (E)	Obsolete name of the cgs unit of kinematic viscosity used between 1920 and 1940. 1 lentor = 1 stokes (E) 1 lentor = 1 $cm^2.s^{-1}$ (E)	cgs
lenz	–	magnetic field strength	IL^{-1}	1 lenz = 1 $A.m^{-1}$ (E)	Obsolete unit.	
lenz (resistance)	–	electric resistance	$ML^2T^{-3}I^{-2}$	1 lenz = $1.25241098979 \times 10^{-3}\Omega$	Obsolete unit of electrical resistance defined in 1838. It is the resistance of a wire gauge no. 11 copper wire one foot in length. 1 $lenz^{-1}$ = 798.459936995 S	

leo	–	acceleration	LT^{-2}	1 leo = 10 $m.s^{-2}$ (E)	Obsolete metric unit of acceleration. Anecdotal. 1 leo = 1 $dam.s^{-2}$ (E) g_n = 0.980665 leo (E)	
letech (Egyptian)	–	capacity, volume	L^3	1 letech (Egyptian) = 143.4375 × 10^{-3} m^3 (of water)	Obsolete Egyptian unit of capacity used in ancient times. Measured by weight. 1 letech (Egyptian) = 135/32 khar (E)	Egyptian
lethal dose at *x* percent	LDx	percentage of a population killed by a dose of drug or chemical	nil	(see note)	Dimensionless unit used in pharmacology to express the amount of a dose of the substance (e.g., drug, pesticide, chemical) being studied which killed a certain percentage *x* of a given population. The percentage *x* is often given as a subscript. For instance, the amount of the substance which kills 50% of the test population is LD_{50}.	INT
li (Annamese)	–	mass	M	1 li (Annamese) = 37.75 × 10^{-6} kg	Obsolete Annameseian traditional unit of mass used before 1914. 1 li (Annamese) = 1/100 dong (Annamese) (E)	Annamese
li (Chinese)	–	length, distance	L	1 li (Chinese) = 576 m	Obsolete Chinese unit of length. 1 li = 1800 tchi (E)	Chinese
liang (Chinese)	–	mass	M	1 liang (Chinese) = 37.301 × 10^{-3} kg	Obsolete Chinese unit of mass. 1 liang (Chinese) = 1/16 jin (E)	Chinese
libbra (Chilean)	–	mass	M	1 libbra (Chilean) = 0.460093 kg	Obsolete Chilean traditional unit of mass used before 1865. 1 libbra (Chilean) = 1/25 arroba (Chilean) (E)	Chilean
libbra (Colombian)	–	mass	M	1 libbra (Colombian) = 0.500 kg	Obsolete Colombian traditional unit of mass used before 1854. 1 libbra (Venezuelan) = 16 onza (Venezuelan) (E)	Colombian
libbra (Italian)	–	mass	M	1 libbra (Italian) = 0.307 kg	Obsolete Italian unit of mass.	Italian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
libbra (Mexican)	–	mass	M	1 libbra (Mexican) = 0.46024634 kg	Obsolete Mexican traditional unit of mass used before 1896. 1 libbra (Mexican) = 16 onza (Mexican) (E)	Mexican
libbra (Paraguayan)	–	mass	M	1 libbra (Paraguayan) = 0.459 kg	Obsolete Paraguayan traditional unit of mass used before 1899. 1 libbra (Paraguayan) = 16 once (Paraguayan) (E)	Paraguayan
libbra (Paraguayan, old)	–	mass	M	1 libbra (Paraguayan, old) = 0.46008 kg	Obsolete Paraguayan traditional unit of mass used before 1899. 1 libbra (Paraguayan, old) = 16 once (Paraguayan, old) (E)	Paraguayan
libbra (Peruvian)	–	mass	M	1 libbra (Peruvian) = 0.46009 kg	Obsolete Peruvian traditional unit of mass used before 1869. 1 libbra (Peruvian) = 1/25 arroba (Peruvian) (E)	Peruvian
libbra (Venezuelan)	–	mass	M	1 libbra (Venezuelan) = 0.500 kg	Obsolete Venezuelan traditional unit of mass used before 1914. 1 libbra (Venezuelan) = 16 onza (Venezuelan) (E)	Venezuelan
libra (Argentinian)	–	mass	M	1 libra (Argentinian) = 0.4594 kg	Obsolete Argentinian traditional unit of mass used before 1887. 1 libra (Argentinian) = 16 onza (Argentinian) (E)	Argentinian
libra (Brazilian)	–	mass	M	1 libra (Brazilian) = 0.45905 kg	Obsolete Brazilian traditional unit of mass used before 1874. 1 libra (Brazilian) = 1/32 arroba (Brazilian) (E)	Brazilian
libra (Maltese)	–	mass	M	1 libra (Maltese) = 0.453594285714 kg	Obsolete Maltese traditional unit of mass used before 1921. 1 libra (Maltese) = 16 ounces (Maltese) (E)	Maltese

libra (Portuguese)	–	mass	M	1 libra (Portuguese) = 0.459 kg	Obsolete Portuguese unit of mass.	Portuguese
libra (Roman pound)	–	mass	M	1 libra (Roman pound) $= 327 \times 10^{-3}$ kg	Obsolete Roman unit of mass used in ancient times. 1 libra (Roman pound) = 12 unciae (Roman) (E)	Roman
libra (Spanish)	–	mass	M	1 libra (Spanish) = 0.460093 kg	Obsolete Spanish unit of mass.	Spanish
libra mayor (Balearic)	–	mass	M	1 libra mayor (Balearic) = 1.224 kg	Obsolete Balearic traditional unit of mass. 1 libra mayor (Balearic) = 3 rottolo (Balearic) (E)	Balearic
liespfund (Latvian)	–	mass	M	1 liespfund (Latvian) = 8.38 kg	Obsolete Latvian traditional unit of mass. 1 liespfund (Latvian) = 20 pfund (Latvian) (E)	Latvian
liespfund (Estonian)	–	mass	M	1 liespfund (Estonian) = 9.20 kg	Obsolete traditional Estonian unit of mass used before 1900. 1 liespfund (Estonian) = 20 pfund (Estonian) (E)	Estonian
liespund (Icelandic)	–	mass	M	1 liespund (Icelandic) = 32 kg (E)	Obsolete Icelandic traditional unit of mass used before 1907. 1 liespund (Icelandic) = 64 pund (Icelandic) (E)	Icelandic
liespund (Swedish)	–	mass	M	1 liespund (Swedish) = 8.501594048 kg	Obsolete Swedish unit of weight. 1 liespund (Swedish) = 20 skålpund (Swedish) (E)	Swedish
lieue (Artois, Maine, Poitou)	–	length, distance	L	1 lieue (Artois, Maine, Poitou) = 3964 m	Obsolete French unit of length used before the French Revolution in 1789.	French
lieue (Beauce, Gâtinais)	–	length, distance	L	1 lieue (Beauce, Gâtinais) = 3268 m	Obsolete French unit of length used before the French Revolution in 1789.	French
lieue (Bourbonnais)	–	length, distance	L	1 lieue (Bourbonnais) = 4826 m	Obsolete French unit of length used before the French Revolution in 1789.	French
lieue (Bourgogne)	–	length, distance	L	1 lieue (Bourgogne) = 5121 m	Obsolete French unit of length used before the French Revolution in 1789.	French

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
lieue (Bretagne, Anjou)	–	length, distance	L	1 lieue (Bretagne, Anjou) = 4581 m	Obsolete French unit of length used before the French Revolution in 1789.	French
lieue (de Paris)	–	length, distance	L	1 lieue (de Paris) = 4443.80322046 m	Obsolete French unit of length used before the French Revolution in 1789. 1 lieue (de Paris) = 2280 toises (de Pérou) (E)	French
lieue (de Poste)	–	length, distance	L	1 lieue (de Poste) = 3898.073 m	Obsolete French unit of length used before the French Revolution (1789). 1 lieue (de Poste) = 2000 toises (de Paris) (E)	French
lieue (French, marine)	–	length, distance	L	1 lieue (French, marine) = 5564.9 m	Obsolete French unit of length used before the French Revolution in 1789.	French
lieue (French, mean)	–	length, distance	L	1 lieue (French, mean) = 5008.4 m	Obsolete French unit of length used before the French Revolution in 1789.	French
lieue (French, vieille)	–	length, distance	L	1 lieue (French, vieille) = 4451.9 m	Obsolete French unit of length used before the French Revolution in 1789.	French
lieue (metric) (French metric league)	–	length, distance	L	1 lieue (metric) = 4000 m (E)	Obsolete French metric unit of length used in France from 1812 to 1840. 1 lieue (metric) = 2000 toises (metric) (E) 1 lieue (metric) = 12 000 pieds (metric) (E)	French
lieue marine (French nautical league)	–	length, distance	L	1 lieue marine = 5847.1095006 m	Obsolete French unit of length used in navigation before the French Revolution (1789). 1 lieue marine = 3000 toises (de Perou) (E) 1 lieue marine = 3 milles (E) 1 lieue marine = 30 encablures 1 lieue marine = 3600 brasses (E)	French

lieue (Provence, Gascogne)	–	length, distance	L	1 lieue (Provence, Gascogne) = 5849 m	Obsolete French unit of length used before the French Revolution in 1789.	French
lieue (Sologne et Touraine)	–	length, distance	L	1 lieue (Sologne et Touraine) = 3933 m	Obsolete French unit of length used before the French Revolution in 1789.	French
lieue (Swiss)	–	length, distance	L	1 lieue (Swiss) = 4800 m (E)	Obsolete traditional Swiss unit of length used before 1877. 1 lieue (Swiss) = 16 000 fuss (Swiss) (E)	Swiss
lieue de 20 au degré	–	length, distance	L	1 lieue de 20 au degré = 5556 m	Obsolete French unit of length used in the Navy before the French Revolution in 1789.	French
lieue de 25 au degré	–	length, distance	L	1 lieue de 25 au degré = 4445 m	Obsolete French unit of length used in land surveying before the French Revolution in 1789.	French
light-minute	lmin, c-min	length, distance	L	1 light-minute = $1.7987547480 \times 10^{10}$ m (E)	Obsolete unit of distance used in astronomy. 1 light-minute = 1 c-min (E) 1 light-minute = 60 light-seconds (E) 1 light-minute = $(10^{-5}/5.256)$ light-year (E) 1 light-minute = 17.987547480 Gm (E)	@
light-second	lsec, c-sec	length, distance	L	1 light-second = 2.99792458×10^{8} m (E)	Obsolete unit of distance used in astronomy. 1 light-second = 1 c-sec (E) 1 light-second = (1/60) light-minute (E) 1 light-second = $(10^{-7}/3.1536)$ light-year (E) 1 light-second = 0.299792458 Gm (E)	@
light-year (année-lumière)	ly (AL, al)	length, distance	L	1 ly = $9.46052973 \times 10^{15}$ m	Unit of distance employed in astronomy and astrophysics. The light-year corresponds to the distance travelled in one tropical year by electromagnetic radiation in vacuum.	@

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
ligne (de Paris) (French line)	ligne	length, distance	L	1 ligne (de Paris) $= 2.25582928264 \times 10^{-3}$ m	Obsolete French unit of length. It was employed before the French Revolution (1789). It is still used in botany to describe the dimensions of plants. 1 ligne (de Paris) = 1/864 toises (de Paris) (E) 1 ligne (de Paris) = 12 points (de Paris) (E) 1 ligne (de Paris) = 1/12 pouce (de Paris) (E)	French
ligne (metric) (French metric line)	–	length, distance	L	1 ligne (metric) $= 2.314814814814 \times 10^{-3}$ m	Obsolete French unit of length used in France from 1812 to 1840. 1 ligne (metric) = 1/12 pouce (metric) (E)	French
ligne (Swiss)	–	length, distance	L	1 ligne (Swiss) $= 2.0833333333 \times 10^{-3}$ m	Obsolete traditional Swiss unit of length used before 1877. 1 ligne (Swiss) = 1/144 pied (Swiss) (E)	Swiss
lin (Cambodian)	–	mass	M	1 lin (Cambodian) $= 37.5 \times 10^{-6}$ kg	Obsolete Cambodian traditional unit of mass used before 1914. 1 lin (Cambodian) = 3/80 muoi (Cambodian) (E)	Cambodian
lina (Icelandic)	–	length, distance	L	1 lina (Icelandic) $= 2.1795625 \times 10^{-3}$ m	Obsolete Icelandic traditional unit of length used before 1907. 1 lina (Icelandic) = 1/144 fet (Icelandic) (E)	Icelandic
line	–	magnetic induction flux	$ML^2T^{-2}I^{-1}$	1 line $= 10^{-8}$ Wb (E)	Obsolete British and American unit of magnetic flux. 1 line = 1 maxwell (E)	US
line (Prussian)	–	length, distance	L	1 linie (Prussian) $= 2.179562500 \times 10^{-3}$ m	Obsolete German unit of length. 1 linie = 1/144 fuss (E)	German
line (UK) (UK button)	line (UK)	length, distance	L	1 line (UK) $= 2.1166667 \times 10^{-3}$ m	Obsolete British unit of length. 1 line (UK) = 1/12 inch (E) 1 line (UK) = 1/144 foot (E) 1 line (UK) = 1/432 yard (E)	UK

					1 line (UK) ≈ 2.11667 mm	
line (US) (US button)	line (US)	length, distance	L	1 line (US) = 6.35×10^{-4} m (E)	Obsolete American unit of length. It was used in botany for plant measurements. 1 line (US) = 1/40 inch (E) 1 line (US) = 1/480 foot (E) 1 line (US) = 1/1440 yard (E) 1 line (US) = 0.635 mm (E)	US
linea (Argentinian)	–	length, distance	L	1 linea (Argentinian) = $2.0046296296296 \times 10^{-3}$ m	Obsolete Argentinian traditional unit of length used before 1887. 1 linea (Argentinian) = 1/144 pie (Argentinian) (E)	Argentinian
linea (Chilean)	–	length, distance	L	1 linea (Chilean) = $1.935185185185185 \times 10^{-3}$ m	Obsolete Chilean traditional unit of length used before 1865. 1 linea (Chilean) = 1/144 pie (Chilean) (E)	Chilean
linea (Mexican)	–	length, distance	L	1 linea (Mexican) = $1.9398148148 \times 10^{-3}$ m	Obsolete Mexican traditional unit of length used before 1896. 1 linea (Mexican) = 1/12 pulgada (Mexican) (E)	Mexican
linea (Paraguayan)	–	length, distance	L	1 linea (Paraguayan) = $2.00462962962963 \times 10^{-3}$ m	Obsolete Paraguayan traditional unit of length used before 1899. 1 linea (Paraguayan) = 1/576 vara (Paraguayan) (E)	Paraguayan
linea (Spanish)	–	length, distance	L	1 linea (Spanish) = $1.45122395833 \times 10^{-3}$ m	Obsolete Spanish unit of length. 1 linea (Spanish) = 1/576 vara (E)	Spanish
linen (lea)	–	specific length	$M^{-1}L$	1 linen = 604.772077626 $m.kg^{-1}$	Obsolete American and British unit employed in the textile industry. 1 linen = 300 $yd.lb^{-1}$ (E)	UK, US
linha (Portuguese)	–	length, distance	L	1 linha (Portuguese) = 2.281250×10^{-3} m	Obsolete Portuguese unit of length. 1 linha (Portuguese) = 1/144 pe (E)	Portuguese
linia (Yugoslavian)	–	length, distance	L	1 linia (Yugoslavian) = $2.17931034483 \times 10^{-3}$ m	Obsolete traditional Yugoslavian unit of length used before 1883. 1 linia (Yugoslavian) = 2/290 stopa (Yugoslavian) (E)	Yugoslavian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
linie (Austrian) [Austrian line]	–	length, distance	L	1 linie (Austrian) $= 2.195000 \times 10^{-3}$ m	Obsolete Austrian unit of length. 1 linie (Austrian) = 1/144 fuss (E)	Austrian
linie (Danish)	–	length, distance	L	1 linie (Danish) $= 2.17956250 \times 10^{-3}$ m	Obsolete Danish traditional unit of length used before 1912. 1 linie (Danish) = 1/144 fod (Danish) (E)	Danish
linie (German) [Prussian line]	–	length, distance	L	1 linie (Prussian) $= 2.179562500 \times 10^{-3}$ m	Obsolete German unit of length. 1 linie = 1/144 fuss (E)	German
linie (Swedish) [Swedish line]	–	length, distance	L	1 linie (Swedish) $= 2.061805556 \times 10^{-3}$ m	Obsolete Swedish unit of length. 1 linie = 1/144 fot (E)	Swedish
linie (Swiss)	–	length, distance	L	1 linie (Swiss) $= 2.0833333333 \times 10^{-3}$ m	Obsolete traditional Swiss unit of length used before 1877. 1 linie (Swiss) = 1/144 fuss (Swiss) (E)	Swiss
linja (Polish, Cracow)	–	length, distance	L	1 linja (Polish, Cracow) $= 1.6363888889 \times 10^{-3}$ m	Obsolete traditional Polish unit of length used before 1919. 1 linja (Polish, Cracow) = 1/144 stopa (Polish, Cracow) (E)	Polish
linja (Polish, new)	–	length, distance	L	1 linja (Polish, new) $= 2.00 \times 10^{-3}$ m	Obsolete traditional Polish unit of length used before 1919. 1 linja (Polish, new) = 1/144 stopa (Polish, new) (E)	Polish
linja (Polish, Warsaw)	–	length, distance	L	1 linja (Polish, Warsaw) $= 2.0680555556 \times 10^{-3}$ m	Obsolete traditional Polish unit of length used before 1919. 1 linja (Polish, Warsaw) = 1/144 stopa (Polish, Warsaw) (E)	Polish
link (engineer's)	–	length, distance	L	1 link (engineer's) = 0.3048 (E)	Obsolete American surveyor's unit of length. 1 link (engineer's) = 1/100 chain (engineer's) (E)	US

link (Gunter's)	–	length, distance	L	1 link (Gunter's) = 0.201168 m (E)	Obsolete British surveyor's unit of length. 1 link (Gunter's) = 1/100 chain (Gunter's) (E)	UK
link (Ramsden's)	–	length, distance	L	1 link (Ramsden's) = 0.3048 m (E)	Obsolete American surveyor's unit of length. 1 link (Ramsden's) = 1/100 chain (Ramsden's) (E)	US
link (surveyor's)	–	length, distance	L	1 link (surveyor's) = 0.201168 m (E)	Obsolete British surveyor's unit of length. 1 link (surveyor's) = 1/100 chain (surveyor's) (E)	UK
lippy (Scottish, dry)	–	capacity, volume	L^3	1 lippy (Scottish, dry) = $2.25048466031 \times 10^{-3}$ m^3 (wheat, peas, beans, rice, salt) 1 lippy (Scottish, dry) = $3.28306633708 \times 10^{-3}$ m^3 (oats, barley, malt)	Obsolete traditional Scottish unit of volume used before the Weights and Measures Act of 1824 to measure the capacity of dry substances (wheat, peas, beans, salt, rice, barley, malt). 1 lippy (Scottish, dry) = 137.333 cubic inches (E) (wheat, peas, beans, rice, salt) 1 lippy (Scottish, dry) = 200.345 cubic inches (E) (oats, barley, malt)	Scottish
lispund (Danish)	–	mass	M	1 lispund (Danish) = 8 kg (E)	Obsolete Danish traditional unit of mass used before 1912. 1 lispund (Danish) = 16 pund (Danish) (E)	Danish
litra (Yugoslavian)	–	mass	M	1 litra (Yugoslavian) = 0.320 kg	Obsolete traditional Yugoslavian unit of mass used before 1883. 1 litra (Yugoslavian) = 1/4 oka (Yugoslavian) (E)	Yugoslavian
litre (1964)	L, l	capacity, volume	L^3	1 l (1964) = 10^{-3} m^3 (E)	Unit approved by the 12th CGPM (1964). 1 l = 1 dm^3 (E) Named after Claude Emile Jean Baptiste Litre (1716–1778).	INT

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
litre (old)	L, l	capacity, volume	L^3	1 l (old) = $1.0000028001 \times 10^{-3}$ m^3	The old litre was equal to the volume occupied by one one kilogram of pure water measured at the temperature of maximum density (4°C). Named after Claude Emile Jean Baptiste Litre (1716–1778).	French
litre per flush	lpf, LPF	volume, capacity	L^3	1 litre per flush = 10^{-3} m^3 (E)	Metric North-American unit of volume used in sanitary equipment and devices.	US, Canada
litre per kilogram	$l.kg^{-1}$	specific volume	L^3M^{-1}	1 $l.kg^{-1}$ = 10^{-3} $m^3.kg^{-1}$		
litre per minute	$l.min^{-1}$	volume flow rate	L^3T^{-1}	1 $l.min^{-1}$ = 1.666667×10^{-5} $m^3.s^{-1}$	1 $l.min^{-1}$ = $(10^{-3}/60)$ $m^3.s^{-1}$ (E)	
litre per second	$l.s^{-1}$	volume flow rate	L^3T^{-1}	1 $l.s^{-1}$ = 10^{-3} $m^3.s^{-1}$ (E)		
litre-atmosphere	l.atm	energy, work, heat	ML^2T^{-2}	1 l.atm = 101.325 J (E)	Obsolete unit of energy usually used in chemistry.	
litron (de Paris, dry)	–	capacity, volume	L^3	1 litron (de Paris, dry) = 0.790×10^{-3} m^3	Obsolete French unit of volume employed before the French Revolution. It was used for capacity measurements of dry substances. 1 litron = 1/16 boisseau (E)	French
livre (Belgian)	–	mass	M	1 livre (Belgian) = 0.48950 kg	Obsolete traditional Belgian unit of mass used before 1820.	Belgian
livre (de Paris) [French pound]	–	mass	M	1 livre (de Paris) = $489.505850 \times 10^{-3}$ kg	Obsolete French unit of mass employed before the French Revolution (1789). 1 livre (de Paris) = 16 onces (de Paris). 1 livre (de Paris) = 9216 grains 1 livre (de Paris) = 384 deniers (E)	French
livre de Charlemagne	–	mass	M	1 livre de Charlemagne = 0.367128 kg	Obsolete French unit of mass employed before the French Revolution (1789). 1 livre de Charlemagne = 5760 grains (E) 1 livre de Charlemagne = 480 oboles (E)	French

					1 livre de Charlemagne = 240 deniers (E) 1 livre de Charlemagne = 20 sols (E)	
livre (Swiss)	–	mass	M	1 livre (Swiss) = 0.500 kg (E)	Obsolete traditional Swiss unit of mass. 1 livre (Swiss) = 16 onces (Swiss) (E)	Swiss
livre (Swiss, apothecary)	–	mass	M	1 livre (Swiss, apothecary) = 0.375 kg (E)	Obsolete traditional Swiss unit of mass used before 1877 in pharmacy. 1 livre (Swiss) = 12 onces (Swiss) (E) 1 livre (Swiss) = 4/3 livres (Swiss, apothecary) (E)	Swiss
load (UK)	–	mass	M	1 load (UK) = 114.305277240 kg	Obsolete British unit of mass. 1 load (UK) = 252 pounds (UK) (E)	UK
load (UK, straw)	–	mass	M	1 load (UK, straw) = 587.855670048 kg	Obsolete British unit of mass used by farmers. 1 load (UK, straw) = 1296 pounds (UK, straw) (E)	UK
load (UK, wool)	–	mass	M	1 load (UK, wool) = 1371.66332688 kg	Obsolete British unit of mass used in the weighing of wool. 1 load (UK, wool) = 3024 lb (av.) (E) 1 load (UK, wool) = 108/13 sacks (UK, wool) (E) 1 load (UK, wool) = 12 weys (UK, wool) (E) 1 load (UK, wool) = 216 stones (UK, wool)	UK
loan (Philippine)	–	surface area	L^2	1 loan (Philippine) = 279.5 m^2	Obsolete Philippine traditional unit of surface area used in land measurements before 1906. 1 loan (Philippine) = 1/10 balita (Philippine) (E)	Philippine
lockie (Polish, Cracow)	–	length, distance	L	1 lockie (Polish, Cracow) = 0.117820 m	Obsolete traditional Polish unit of length used before 1919. 1 lockie (Polish, Cracow) = 1/2 stopa (Polish, Cracow) (E)	Polish

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
lockie (Polish, new)	–	length, distance	L	1 lockie (Polish, new) = 0.1440 m	Obsolete traditional Polish unit of length used before 1919. 1 lockie (Polish, new) = 1/2 stopa (Polish, new) (E)	Polish
lockie (Polish, Warsaw)	–	length, distance	L	1 lockie (Polish, Warsaw) = 0.14890 m	Obsolete traditional Polish unit of length used before 1919. 1 lockie (Polish, Warsaw) = 1/2 stopa (Polish, Warsaw) (E)	Polish
lod (Swedish)	–	mass	M	1 lod (Swedish) = 13.2837407×10 kg	Obsolete Swedish unit of mass used before 1889. 1 lod (Swedish) = 1/32 skålpund (Swedish) (E)	Swedish
lof (Estonian, Livonian)	–	capacity, volume	L^3	1 lof (Estonian, Livonian) = 68.880×10^{-3} m^3	Obsolete traditional Estonian unit of capacity used before 1900. 1 lof (Estonian, Livonian) = 6 hulmit (Estonian) (E)	Estonian
lof (Estonian, Reval)	–	capacity, volume	L^3	1 lof (Estonian, Reval) = 34.440×10^{-3} m^3	Obsolete traditional Estonian unit of capacity used before 1900. 1 lof (Estonian, Reval) = 3 hulmit (Estonian) (E)	Estonian
lof (Russian, dry)	–	capacity, volume	L^3	1 lof (Russian, dry) = $64.7222154667 \times 10^{-3}$ m^3	Obsolete Russian unit of capacity for dry substances used before 1917. 1 lof (Russian, dry) = 296/15 garnetz (E)	Russian
lofstelle (Estonian, Livonian)	–	surface area	L^2	1 lofstelle (Estonian, Livonian) = 3710 m^2	Obsolete traditional Estonian unit of surface area used before 1900 in land measurements. 1 lofstelle (Estonian, Livonian) = 5/7 lofstelle (Estonian, Livonian) (E)	Estonian
lofstelle (Estonian, Reval)	–	surface area	L^2	1 lofstelle (Estonian, Reval) = 1855 m^2	Obsolete traditional Estonian unit of surface area used before 1900 in land measurements.	Estonian

log (Hebrew)	–	capacity, volume	L^3	1 log (Hebrew) $= 2.975 \times 10^{-4}$ m^3 (of water)	Obsolete Hebrew unit of capacity used in ancient times. Measured by weight. 1 log (Hebrew) = 1/72 ephah (new)	Hebrew
loket (Bohemian)	–	length, distance	L	1 loket (Bohemian) = 0.592 m	Obsolete Czechoslovakian unit of length used in Bohemia before 1876. 1 loket (Bohemian) = 2 stopa (Bohemian) (E)	Czech
loket (Moravian)	–	length, distance	L	1 loket (Moravian) = 0.568 m	Obsolete Czechoslovakian unit of length used in Moravia before 1876. 1 loket (Moravian) = 2 stopa (Bohemian) (E)	Czech
loket (Praha)	–	length, distance	L	1 loket (Praha) = 0.593 m	Obsolete Czechoslovakian unit of length used in Praha before 1876. 1 loket (Praha) = 2 stopa (Bohemian) (E)	Czech
loket (Silesian)	–	length, distance	L	1 loket (Silesian) = 0.579 m	Obsolete Czechoslovakian unit of length used in Silesia before 1876. 1 loket (Silesian) = 2 stopa (Bohemian) (E)	Czech
long hundred (herrings)	–	quantity of herrings	nil	1 long hundred (herrings) = 132 herrings (E)	Obsolete British unit used by fishermen to measure the number of herrings. 1 long hundred (herrings) = 33 warps (E)	UK
long primer	–	length, distance	L	1 long primer $= 3.5277777778 \times 10^{-3}$ m	British and American obsolete traditional typographical unit of length used in printing. 1 long primer = 10 points (E)	UK, US
long ton (UK)	lg ton (UK)	mass	M	1 long ton (UK) = 1016.046909 kg	Obsolete British unit of mass. 1 long ton (UK) = 2240 lb (E)	UK
loof (Latvian)	–	capacity, volume	L^3	1 loof (Latvian) $= 68.8608 \times 10^{-3}$ m^3	Obsolete Latvian traditional unit of capacity. 1 loof (Latvian) = 54 stoof (Latvian) (E)	Latvian
loofstelle (Latvian)	–	surface area	L^2	1 loofstelle (Latvian) = 3716 m^2	Obsolete Latvian traditional unit of surface area used in land measurements. 1 loofstelle (Latvian) = 25 kapp (Latvian) (E)	Latvian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
lorentz	–	wavelength resolution for spectral lines per unit of magnetic induction	$M^{-1}L^{-1}T^{2}I$	1 lorentz = 46.6864521065 $m^{-1}.T^{-1}$	Obsolete unit of spectral resolution employed in atomic spectroscopy (Zeeman effect). It was equal to the wavenumber per unit of magnetic field induction. The unit is named after the Dutch physicist H.A. Lorentz (1853–1928). It is equal to the ratio of the Bohr magneton divided by *hc*. 1 lorentz = $\mu_B/hc = e/4\pi m_0 c$	
lot (de Paris)	–	mass	M	1 lot (de Paris) = 15.297057810 × 10^{-3} kg	Obsolete French unit of mass employed under the Ancien Régime before the French Revolution (1789). 1 lot (de Paris) = 1/32 livre (de Paris) (E)	French
lot (US)	–	length, distance	L	1 lot (US) =32.37485138 ×10^{4} m^{2} (E)	Obsolete American unit of length used in surveyors' measurements. 1 lot (US) = 80 acres (E)	US
loth	–	mass	M	1 loth = 13.09375 ×10^{-3} kg	Obsolete Latvian traditional unit of mass. 1 loth = 1/32 pfund (Latvian) (E)	Latvian
loth (Austrian)	–	mass	M	1 loth (Austrian) = 1.750031250 × 10^{-2} kg	Obsolete Austrian unit of mass for general uses. 1 loth (Austrian) = 1/32 pfund (E)	Austrian
loth (Belgian)	–	mass	M	1 loth (Belgian) = 15.2968750 ×10^{-3} kg	Obsolete traditional Belgian unit of mass used before 1820. 1 loth (Belgian) = 1/32 livre (Belgian) (E)	Belgian
loth (Danish)	–	mass	M	1 loth (Danish) = 15.6250 ×10^{-3} kg (E)	Obsolete Danish traditional unit of mass used before 1912. 1 loth (Danish) = 1/32 pund (Danish) (E)	Danish
loth (Estonian)	–	mass	M	1 loth (Estonian) = 14.375 ×10^{-3} kg	Obsolete traditional Estonian unit of mass used before 1900. 1 loth (Estonian) = 1/32 pfund (Estonian) (E)	Estonian

loth (Prussian)	–	mass	M	1 loth (Prussian) = $1.461596875 \times 10^{-2}$ kg	Obsolete German unit of mass. 1 loth (Prussian) = 1/32 pfund (E)	German
loth (Russian) [Russian lot]	–	mass	M	1 loth (Russian) = $1.279741185 \times 10^{-2}$ kg	Obsolete Russian unit of mass used before 1917 for general use. 1 loth (Russian) = 1/32 funt (E)	Russian
loth (Swiss)	–	mass	M	1 loth (Swiss) = 15.625×10^{-3} kg (E)	Obsolete traditional Swiss unit of mass. 1 loth (Swiss) = 1/32 livre (Swiss) (E)	Swiss
Lovibond degree	°L	dimensionless coloration index	nil	(see note)	Obsolete American dimensionless unit of coloration used to measure the darkness of beer and honey. The scale is open-ended, but most readings fall between one (i.e., very light gold or yellow) and 25 (i.e., very dark brown).	US
lumberg (lumerg)	–	radiant intensity	$ML^2T^{-3}\Omega^{-1}$	1 lumberg = 10^{-7} W.sr^{-1} (E)	Obsolete cgs unit of radiant intensity. 1 lumberg = 1 erg.s^{-1}.sr^{-1} (E)	cgs
lumen	lm	luminous flux	J	**SI derived unit** 1 lm = 1 cd.sr (E)	The lumen is the luminous flux emitted in a solid angle of one steradian by a point source having a uniform intensity of one candela.	SI
lumerg (lumberg)	–	radiant intensity	$ML^2T^{-3}W^{-1}$	1 lumerg = 10^{-7} W.sr^{-1} (E)	Obsolete cgs unit of radiant intensity. 1 lumerg = 1 erg.s^{-1}.sr^{-1} (E)	cgs
luong (Annamese)	–	mass	M	1 luong (Annamese) = 37.75×10^{-3} kg	Obsolete Annamese traditional unit of mass used before 1914. 1 luong (Annamese) = 10 dong (Annamese) (E)	Annamese
lusec	–	volume flow rate	L^3T^{-1}	1 lusec = 10^{-3} m^3.s^{-1} (E)	Obsolete British unit of flow rate used in vacuum technology. It is equal to the flow rate of pumping under a pressure of 0.133322368 Pa (0.001 mmHg). The name of the unit derived from the acronym of litre per second. 1 lusec = 1 dm^3.s^{-1} (E)	UK

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
lustrum		time, period, duration	T	1 lustrum = 1.5778800 × 10^{8} s	Roman ceremony that took place every 5 years. 1 lustrum = 5 years (E)	Roman
lut (Polish)	–	mass	M	1 lut (Polish) = 12.6720 ×10^{-3} kg	Obsolete traditional Polish unit of mass used before 1919. 1 lut (Polish) = 1/32 funt (Polish) (E)	Polish
lux	lx	illuminance	$JL^{-2}\Omega$	**SI derived unit** 1 lx = 1 lm.m^{-2} = 1 cd.m^{-2}.sr (E)	The lux is the illuminance produced by a luminous flux of one lumen uniformly distributed over a surface of one square metre.	SI
luxon (troland)	–	luminous luminance	$J.L^{-2}$	1 luxon = 10^{4} cd.m^{-2} (E)	Obsolete unit of luminous luminance employed in ophthalmology. It was equal to the retinal luminous luminance received by eyes by one surface having a luminous luminance of one candela per square centimetre. The optical aperture of eyes is about one square millimetre.	
luxon (photon)	hν	energy of electromagnetic radiation	$ML^{-2}T^{-2}$	1 hν = 6.62606876(52) × 10^{-34} ν (Hz) J	Obsolete unit of quantum of luminous energy transported by an electromagnetic radiation of frequency ν (Hz).	
ly (Annamese)	–	length, distance	L	1 ly (Annamese) = 470 ×10^{-6} m	Obsolete Annamese traditional unit of length used before 1914. 1 ly (Annamese) = 1/100 thuoc (Annamese) (E)	Annamese
lyi (Chinese)	–	surface, area	L^{2}	1 lyi (Chinese) = 6.144 m^{2}	Obsolete Chinese unit of area used in ancient times. 1 lyi (Chinese) = 1/100 meou (E) 1 lyi (Chinese) = 60 sq. tchi (E)	Chinese

lyne (Dutch) [Dutch line]	–	length, distance	L	1 lyne (Dutch) = $1.9656902778 \times 10^{-3}$ m	Obsolete unit of length used in Amsterdam (Netherlands). 1 lyne (Dutch) = 1/144 voetens (E)	Dutch
ma (Chinese)	–	capacity, volume	L^3	1 ma (Chinese) = 3.276800 m^3	Obsolete Chinese unit of capacity used in ancient times. 1 ma (Chinese) = 100 cubic tchi (E)	Chinese
mace (Chinese)	–	mass	M	1 mace (Chinese) = 1.5625×10^{-3} kg (E)	Obsolete traditional Chinese unit for weighing precious metals, especially silver, in the colonial period. 1 mace (Chinese) = 0.1 tael (Chinese) (E) 1 mace (Chinese) = 0.1 liang (Chinese) (E)	Chinese
Mach	M, Ma, N_{Ma}	dimensionless number	nil	(see note)	Dimensionless number extensively used in fluid mechanics. It is equal to the ratio of fluid velocity versus sound velocity in the fluid. It is extensively used as a dimensionless unit in hydro- and aerodynamics for measuring relative velocity of a moving body. In aircraft it is used to express the speed of an aircraft relative to the speed of sound in air. As a general rule, the name of the unit is placed before the measurement. For instance, Mach 2.0 indicates that the speed of an aircraft is twice the speed of sound in dry air for given temperature and pressure conditions. However, the actual speed of sound varies, and depends on the density and temperature of the atmosphere. For instance, at 0°C and a pressure of 101 325 Pa the speed of sound is roughly 331.6 m.s-1. This dimensionless number is named after the Austrian physicist Ernst Mach (1838–1916).	INT

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
Mache unit	–	radioactivity	T^{-1}	1 Mache unit = 13.32 Bq	Obsolete unit of radioactivity employed in radiochemistry. It was defined in 1930 by The International Radium Standards Committee. One Mache unit is equal to the amount of radon $^{222}_{86}Rn$ (emanation) needed to produce a saturated current equal to 10^{-3} esu cgs. The unit is named after the Austrian scientist H. Mache (1876–1954). 1 Mache unit = 3.6×10^{-10} Ci	INT
MacMichael degree	°McM	dimensionless viscosity index	nil	(see note)	Obsolete British and American dimensionless index of kinematic viscosity used to measure the viscosity or thickness of chocolate. Typical values range from around 60 °McM (very thin chocolates) to around 190 °McM (very thick chocolates).	UK, US
madega (Abyssinian)	–	capacity, volume	L^3	1 madega (Abyssinian) = 0.44×10^{-3} m^3	Obsolete Abyssinian traditional unit of capacity used before 1927. 1 madega (Abyssinian) = 1/24 long ardeb (Abyssinian) (E)	Abyssinian
magneton (Bohr)	μ_B, β	atomic magnetic dipole moment	IL^2	1 μ_B=9.2740154 $\times 10^{-24}$ $J.T^{-1}$	Fundamental constant. 1 μ_B=eh/4π m_0	
magneton (nuclear)	μ_N, β_N	nuclear magnetic dipole moment	IL^2	1 μ_N = 5.0507866 $\times 10^{-27}$ $J.T^{-1}$	Fundamental constant. 1 μ_N = eh/4π m_P	
magnitude	mag	dimensionless apparent brightness of stars	nil	Magnitude = 2.5 $\log_{10}$ (B_1/B_2)	Astronomical dimensionless unit used to express the apparent brightness of stars, planets, and other objects in the sky. For centuries, the brightest stars were said to be of the 'first magnitude', with fainter ones of the 'second magnitude' and so on down to 'sixth magnitude' for the faintest stars visible to the unaided eye. When it	@

					became possible to measure stellar brightnesses precisely, it was discovered that stars of a given traditional magnitude were roughly 2.5 times brighter than stars of the next magnitude. Astronomers agreed to define the magnitude scale so that a differ ence of exactly 5.0 mag corresponds to a brightness ratio of exactly 100 times. The scale is very unusual because it is upside down: brighter stars have lower, not higher magnitudes, in keeping with the historical origin of the scale. The zero point (0.0 mag) is set arbitrarily so that the stars historically listed as 'first magnitude' have magnitude measurements of 1.5 mag or brighter.	
magnum	–	capacity, volume	L^3	1 magnum = $1.515364000 \times 10^{-3}$ m^3	Obsolete British unit which expressed the capacity of a wine container. Still employed in oenology, especially in France. 1 magnum = 1/3 gallons (UK) (E) 1 magnum = 2 bouteilles (E)	UK, French
makhod (Persian)	–	mass	M	1 makhod (Persian) = $191.6666667 \times 10^{-6}$ kg	Obsolete Persian traditional unit of mass used before 1933. 1 makhod (Persian) = 1/48 dirhem (Persian) (E)	Persian
makuk (Arabic)	–	capacity, volume	L^3	1 makuk (Arabic) = 4.08×10^{-3} m^3 (of water)	Obsolete Arabic unit of capacity used in ancient times. Measured by weight. 1 makuk (Arabic) = 1/8 cafiz (E)	Arabic
makuk (Persian)	–	capacity, volume	L^3	1 makuk (Persian) = 4.075×10^{-3} m^3 (of water)	Obsolete unit of capacity of the Assyrio-Chaldean-Persian system used in ancient times. Measured by weight. 1 makuk (Persian) = 1/8 amphora (E)	Persian
makuk (Syrian)	–	capacity, volume	L^3	1 makuk (Syrian) = 800×10^{-3} m^3	Obsolete Syrian traditional unit of capacity used before 1931. 1 makuk (Syrian) = 250 rotl (Syrian) (E)	Syrian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
mal (Norwegian)	–	surface area	L^2	1 mal (Norwegian) = 1000 m^2	Obsolete Norwegian traditional unit of surface area used before 1882 in land measurements.	Norwegian
maloua (Egyptian)	–	capacity, volume	L^3	1 maloua (Egyptian) = 4.1250×10^{-3} m^3	Obsolete Egyptian traditional unit of capacity used before 1891. 1 maloua (Egyptian) = 2 keddah (Egyptian) (E)	Egyptian
malter (Luxemburg)	–	volume, capacity	L^3	1 malter (Luxemburg) = 0.191 m^3	Obsolete unit of capacity used in Luxemburg for measuring liquids. 1 malter (Luxemburg) = 191 dm^3	Luxemburg
man (Arabic)	–	mass	M	1 man (Arabic) = 0.680 kg	Obsolete Arabic unit of mass used in ancient times. System of the Prophet. 1 man (Arabic) = 2 rotl (E)	Arabic
man (Egyptian)	–	capacity, volume	L^3	1 man (Egyptian) = 8.5×10^{-4} m^3 (of water)	Obsolete Egyptian unit of capacity used in ancient times. Measured by weight. 1 man (Egyptian) = 1/40 khar (E)	Egyptian
mancus (UK)	–	mass	M	1 mancus (UK) = $62.20695360 \times 10^{-3}$ kg	Obsolete British unit of mass. 1 mancus (UK) = 2 ounces (Troy) (E)	UK
mancus (US)	–	mass	M	1 mancus (US) = $56.69990462500 \times 10^{-3}$ kg (E)	Obsolete American unit of mass. 1 mancus (US) = 2 ounces (E)	US
manpower (US)	–	power	ML^2T^{-3}	1 manpower (US) = 74.5699871581 W (E)	Obsolete American unit of power introduced by American engineers. It is equal to 0.1 horse power. 1 manpower (US) = 55 $lbf.ft.s^{-1}$ W (E) 1 manpower (US) = 1/10 hp (US) (E)	US
mansion (Persian) [stathmos]	–	length, distance	L	1 mansion (Persian) = 2.56×10^4 m	Obsolete unit of length in the Assyrio-Chaldean-Persian system used in ancient times. 1 mansion = 80 000 zereths (E)	Persian

manzana (Central America)	–	surface area	L^2	1 manzana (Central America) = 6988.921041 m^2	Obsolete South American unit of land surface area extensively used in Central America (e.g., Costa Rica, Nicara gua, Panama). 1 manzana (Central America) = 10 000 square vara (E)	South American
manzana (Costa-Rican)	–	surface area	L^2	1 manzana (Costa-Rican) = 7044.2449 m^2	Obsolete Costa-Rican traditional unit of surface area used in land measurements before 1912. 1 manzana (Costa-Rican) = 10 000 square vara (Costa-Rican)	Costa-Rican
manzana (Guatemalan)	–	surface area	L^2	1 manzana (Guatemalan) = 6987.2881 m^2	Obsolete Guatemalan traditional unit of surface area used in land measurements before 1912. 1 manzana (Guatemalan) = 10 000 square vara (Guatemalan)	Guatemalan
manzana (Honduran)	–	surface area	L^2	1 manzana (Honduran) = 6606.4384 m^2	Obsolete Honduran traditional unit of surface area used in land measurements before 1912. 1 manzana (Honduran) = 10 000 square vara (Honduran)	Honduran
mao (Annamese)	–	length, distance	L	1 mao (Annamese) = 70.5 m	Obsolete Annamese traditional unit of length used before 1914. 1 mao (Annamese) = 150 thuoc (Annamese) (E)	Annamese
marathon (athletics, 1908)	–	length, distance	L	1 marathon (athletics, 1908) = 42194.988 m	Obsolete unit of distance used in athletics. The length of a marathon was exactly defined as 26 miles 385 yards which is simply the distance run in the marathon event at the 1908 Olympics in London. However, the marathons at the Olympic Games were of varying lengths until the Paris Olympics of 1924, when the *(continued overleaf)*	INT

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
marathon (athletics, 1908)					International Olympic Committee fixed the 1908 London distance as official. On the other hand, a story is often told that the marathon is the exact distance run by Pheidippides in 490 BC to bring to Athens the news of the Greek victory over the Persians at the Battle of Marathon.	
marc (Belgian)	–	mass	M	1 marc (Belgian) = 0.2447500 kg	Obsolete traditional Belgian unit of mass used before 1820. 1 marc (Belgian) = 1/2 livre (Belgian) (E)	Belgian
marc (de Paris)	–	mass	M	1 marc (de Paris) $= 244.752925 \times 10^{-3}$ kg	Obsolete French unit of mass employed under the Ancien Régime (1789). The name of the unit is derived from Francic *marca*. 1 marc (de Paris) = 8 onces (de Paris) (E) 1 marc (de Paris) = 1/2 livre (de Paris) (E)	French
marco (Brazilian)	–	mass	M	1 marco (Brazilian) = 0.229525 kg	Obsolete Brazilian traditional unit of mass used before 1874. 1 marco (Brazilian) = 1/2 libra (Brazilian) (E)	Brazilian
marco (Spanish)	–	mass	M	1 marco (Spanish) $= 230.046500 \times 10^{-3}$ kg	Obsolete Spanish unit of mass. 1 marco (Spanish) = 1/2 libra (E)	Spanish
marhala (Arabic)	–	length, distance	L	1 marhala (Arabic) $= 4.608 \times 10^{4}$ m	Obsolete Arabic unit of length used in ancient times. 1 marhala (Arabic) = 144 000 feet (Arabic) (E)	Arabic
marhala (Saudi Arabian)	–	length, distance	L	1 marhala (Saudi Arabian) $= 38.640 \times 10^{3}$ m	Obsolete Saudi Arabian traditional unit of length used before 1962. 1 marhala (Saudi Arabian) = 8 farsakh (Saudi Arabian) (E)	Saudi Arabian

marine ton (US)	–	volume, capacity	L^3	1 marine ton (US) = 1.13267386 m^3	Obsolete American unit of capacity used in the Navy. 1 marine ton (US) = 40 cubic feet (E) 1 marine ton (US) = 299.2207792 US gal	US
maris (Greek, Attic)	–	capacity, volume	L^3	1 maris (Greek, Attic) = 6.48×10^{-3} m^3	Obsolete Greek unit of volume employed in ancient times. It was used for capacity measurements of dry substances. 1 maris (Greek, Attic) = 24 cotyles (E)	Attic
mark (Austrian)	–	mass	M	1 mark (Austrian) = 0.280005 kg	Obsolete Austrian unit of mass for general use. 1 mark (Austrian) = 1/2 pfund (E)	Austrian
mark (Danish)	–	mass	M	1 mark (Danish) = 0.250 kg (E)	Obsolete Danish traditional unit of mass used before 1912. 1 mark (Danish) = 1/2 pund (Danish) (E)	Danish
mark (Dutch)	–	mass	M	1 mark (Dutch) = $2.460838600 \times 10^{-1}$ kg	Obsolete Dutch unit of mass. 1 mark (Dutch) = 1/2 pond (Dutch) (E)	Dutch
mark (German)	–	mass	M	1 mark (German) = 233.855500×10^{3} kg	Obsolete Geman unit of mass. 1 mark (German) = 1/2 pfund (German) (E)	German
mark (Icelandic)	–	mass	M	1 mark (Icelandic) = 1 kg (E)	Obsolete Icelandic traditional unit of mass used before 1907. 1 mark (Icelandic) = 2 pund (Icelandic) (E)	Icelandic
mark twain (US)	–	length, distance	L	1 mark twain = 3.6576 m (E)	Obsolete American unit of length used to measure the minimum safe clearance for steam wheelers. The writer of Samuel Clemens took the pen name Mark Twain from this unit. 1 mark twain = 2 fathoms (E) 1 mark twain = 4 yards (E) 1 mark twain = 12 feet (E)	US
marok (Hungarian)	–	length, distance	L	1 marok (Hungarian) = 0.10536 m	Obsolete traditional Hungarian unit of length used before 1876. 1 marok (Hungarian) = 1 faust (Hungarian) (E)	Hungarian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
marta (Libyan)	–	capacity, volume	L^3	1 marta (Libyan) = 15.384 $\times 10^{-3}$ m^3	Obsolete Libyan traditional unit of capacity used for dry substances before 1927. 1 marta (Libyan) = 2 orba (Libyan) (E) 1 marta (Libyan) = 12 oka (Libyan) of water (E)	Libyan
mas	mas, milliarc second	plane angle	A	1 milliarcsecond = 48.481368 $\times$ 10^{-10} rad (E)	Unit of plane angle commonly used in astronomy. Its name is the acronym of **milli**arcsecond. 1 mas = $\pi/648\,000\,000$ rad (E)	@
masha (Indian)	–	mass	M	1 masha (Indian) = 971.916666667 $\times$ 10^{-6} kg	Obsolete Indian traditional unit of mass used before 1920. 1 masha (Indian) = 1/960 seer (Indian) (E)	Indian
masha (Indian)	–	mass	M	1 masha (Indian) = 8.812500 $\times$ 10^{-4} kg	Obsolete Indian unit of mass used in ancient times. 1 masha (Indian) = 3/160 pala (E)	Indian
mass (Austrian)	–	capacity, volume	L^3	1 mass (Austrian) = 1.4151 $\times$ 10^{-3} m^3	Obsolete Austrian unit of capacity used for liquid substances.	Austrian
mass of sun	–	mass	M	mass of sun = 1.9891 $\times 10^{30}$ kg	Unit of mass used in astronomy to express the masses of stars.	@
mässel (German, dry)	–	capacity, volume	L^3	1 mässel (German, dry) = 4.632450 $\times$ 10^{-3} m^3	Obsolete German unit of capacity for measuring dry substances. 1 mässel (German, dry) = 1/8 metzen (E)	German
mast (UK)	–	mass	M	1 mast (UK) = 933.1043040 $\times 10^{-3}$ kg	Obsolete British unit of mass. 1 mast (UK) = 5/2 pound (troy) (E)	UK
mastic drop unit	–	turbidity index	nil	1 mastic drop unit = 5.6 $\times$ 10^{-5}	Obsolete French unit of turbidity based on a suspension of mastic.	French
mat (Burmese)	–	mass	M	1 mat (Burmese) = 4.08 $\times 10^{-3}$ kg	Obsolete Burmese traditional unit of mass used before 1920. 1 mat (Burmese) = 16 ruay (Burmese) (E)	Burmese

mathusalem (methuselah)	–	capacity, volume	L^3	1 mathusalem $= 6.819138000 \times 10^{-3}$ m^3	Obsolete British unit which expressed the capacity of wine container. Still employed in oenology, especially in France. 1 mathusalem = 3/2 gallons (UK) (E) 1 mathusalem = 9 bouteilles (E)	UK, French
mattaro (Libyan)	–	mass	M	1 mattaro (Libyan) = 21.5376 kg	Obsolete Libyan traditional unit of mass used before 1927. 1 mattaro (Libyan) = 42 rottolo (Libyan) (E)	Libyan
mau (Annamese)	–	surface area	L^2	1 mau (Annamese) = 4970.25 m^2	Obsolete Annamese traditional unit of surface area used in land measurements before 1914. 1 mau (Annamese) = 900 square ngu (Annamese) (E)	Annamese
maund (Ceylon and Madras)	–	mass	M	1 maund (Ceylon and Madras) = 11.3398 kg	Obsolete Ceylonese and Madrasian traditional unit of mass used before 1920. 1 maund (Ceylon and Madras) = 40 seer (Ceylon) (E)	Ceylon
maund (Indian)	–	mass	M	1 maund (Indian) = 37.324301757 kg	Obsolete Indian unit of mass used before 1920 throughout South Asia. The maund varied considerably with location, but during the period of British rule in India it was more or less standardized at about 82 pounds avoirdupois. 1 maund (Indian) = 82.286 lb avdp (E) 1 maund (Indian) = 40 seer (Indian) (E)	Indian
maund (Saudi Arabian)	–	mass	M	1 maund (Saudi Arabian) = 1.350 kg	Obsolete Saudi Arabian traditional unit of mass used before 1962. 1 maund (Saudi Arabian) = 135/46 ratl (Saudi Arabian) (E)	Saudi Arabian
maxwell	Mx	magnetic induction flux	$ML^2T^{-2}I^{-1}$	1 Mx = 10^{-8} Wb (E)	Obsolete cgs unit of magnetic flux. The unit is named after J.C. Maxwell (1831–1879).	cgs

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
mayer	–	specific heat capacity	$L^2T^{-2}\Theta^{-1}$	1 mayer = 10^3 $J.kg^{-1}.K^{-1}$ (E)	Obsolete unit of heat capacity used in heat transfer engineering. The unit is named after J.R. Mayer (1814–1878). 1 mayer = 1 $J.g^{-1}.°C^{-1}$ (E)	
mean solar time	–	time, period, duration	T	(see note)	Time scale related to solar time. It corresponds to the universal time scale deduced from mean solar time by corrections of its secular inequalities and periodicity and which has its reference at twelve o'clock.	@
mease (UK) (cran)	cran	capacity, volume	L^3	1 mease (UK) = 170.47845×10^{-3} m^3	Obsolete British unit of capacity employed in the fishing industry. It describes an amount of herring and it is equal to the number of herring which can be packed into a standard box with a volume of 37.5 gallons (UK). 1 mease ≈ 750 herrings	UK
mecate (Costa-Rican)	–	length, distance	L	1 mecate (Costa-Rican) = 20.1432 m	Obsolete Costa-Rican traditional unit of length used before 1912. 1 mecate (Costa-Rican) = 24 vara (Costa-Rican) (E)	Costa-Rican
mecate (Guatemalan)	–	length, distance	L	1 mecate (Guatemalan) = 20.0616 m	Obsolete Guatemalan traditional unit of length used before 1912. 1 mecate (Guatemalan) = 24 vara (Guatemalan) (E)	Guatemalan
mecate (Honduran)	–	length, distance	L	1 mecate (Honduran) = 19.5072 m	Obsolete Honduran traditional unit of length used before 1912. 1 mecate (Honduran) = 24 vara (Honduran) (E)	Honduran
mecdema (Saudi Arabian)	–	capacity, volume	L^3	1 mecdema (Saudi Arabian) = $8.145833333 \times 10^{-3}$ m^3	Obsolete Saudi Arabian traditional unit of capacity used for dry substances before 1962.	Saudi Arabian

					1 mecdema (Saudi Arabian) = 23/100 kella (Saudi Arabian) (E)	
mediatabla (Guinean)	–	mass	M	1 mediatabla (Guinean) $= 2.00625 \times 10^{-3}$ kg	Obsolete Guinean traditional unit of mass used before 1906. 1 mediatabla (Guinean) = 1/32 benda (Guinean) (E)	Guinean
medimno (Cypriot)	–	capacity, volume	L^3	1 medimno (Cypriot) $= 20.4568 \times 10^{-3}$ m^3	Obsolete Cypriot traditional unit of capacity used before 1972. 1 medimno (Cypriot) = 56 oke (Cypriot) (E)	Cypriot
medimnos (Greek, Attic)	–	capacity, volume	L^3	1 medimnos (Greek, Attic) $= 51.84 \times 10^{-3}$ m^3	Obsolete Greek unit of volume employed in ancient times. It was used for capacity measurements of dry substances. 1 medimnos (Greek, Attic) = 48 chenica (E)	Attic
medio (Spanish, dry)	–	capacity, volume	L^3	1 medio (Spanish, dry) $= 2.312541667 \times 10^{-3}$ m^3	Obsolete Spanish unit of capacity used for dry substances. 1 medio (Spanish, dry) = 1/24 fanega (E)	Spanish
megabyte (mégaoctet)	Mo, MB	quantity of information	nil	1 MB = 1 048 576 byte	Unit used in computer science. 1 MB = 2^{20}	
megagram	Mg	mass	M	1 Mg = 10^3 kg (E)	Multiple of the SI base unit. 1 Mg = 10^6 g (E)	SI
megametre	Mm	length, distance	L	1 Mm = 10^6 m (E)	Multiple of the SI base unit.	SI
megapascal	MPa	pressure, stress	$ML^{-1}T^{-2}$	1 MPa = 10^6 Pa (E)	Multiple of the SI derived unit. 1 atm = 0.101325 MPa (E)	SI
megatonne equivalent TNT	Mt (TNT)	energy, work, heat	ML^2T^{-2}	1 Mt (TNT) = 4.184×10^{15} J (E)	Obsolete unit of energy commonly used in seismology and in military applications. It serves to express the ratio of an explosion or seismic intensity with the energy release by the explosion of one megatonne of trinitrotoluene with a chemical energy content of 1000 cal_{th} per gram. 1 Mt = 10^{15} cal_{th} (E)	

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
mehah (Hebrew) [Talmudic system]	–	mass	M	1 mehah (Hebrew) = 5.903333×10^{-4} kg	Obsolete Hebrew unit of mass used in ancient times. Rabbinacal or Talmudic system. 1 mehah (Hebrew) = 1/600 mina (E)	Hebrew
meile (Austrian) [Austrian mile]	–	length, distance	L	1 meile (Austrian) = 7585.92 m	Obsolete Austrian unit of length. 1 meile = 24 000 fuss (E)	Austrian
meile (Austrian, Bohemia)	–	length, distance	L	1 meile (Austrian, Bohemia) = 6910.00 m	Obsolete traditional Austrian unit of length used in Bohemia.	Austrian
meile (Austrian, Malachia)	–	length, distance	L	1 meile (Austrian, Malachia) = 7848.50 m	Obsolete traditional Austrian unit of length used in Malachia.	Austrian
meile (German, Baden)	–	length, distance	L	1 meile (German, Baden) = 8889.00 m	Obsolete traditional German unit of length.	German
meile (German, Baltic)	–	length, distance	L	1 meile (German, Baltic) = 7467.50 m	Obsolete traditional German unit of length.	German
meile (German, Bayern)	–	length, distance	L	1 meile (German, Bayern) = 7420.438 m	Obsolete traditional German unit of length.	German
meile (German) [Prussian mile]	–	length, distance	L	1 meile (Prussian) = 7532.568 m	Obsolete German unit of length. 1 meile = 24 000 fuss (E)	German
meile (Hungarian)	–	length, distance	L	1 meile (Hungarian) = 8353.59930 m	Obsolete traditional Hungarian unit of length used before 1876. 1 meile (Hungarian) = 79286.25 faust (Hungarian) (E)	Hungarian
meile (Latvian)	–	length, distance	L	1 meile (Latvian) = 7467.600 m	Obsolete Latvian traditional unit of length. 1 meile (Latvian) = 7 verste (Latvian) (E)	Latvian
meio (Portuguese)	–	capacity, volume	L^3	1 meio (Portuguese) = 0.6875×10^{-3} m^3	Obsolete Portuguese unit of capacity used for liquid substances. 1 meio (Portuguese) = 1/24 almude (E)	Portuguese
meio (Portuguese)	–	mass	M	1 meio (Portuguese) = 0.2295 kg	Obsolete Portuguese unit of mass. 1 meio (Portuguese) = 1/2 libra (E)	Portuguese

meio (Portuguese, dry)	–	capacity, volume	L^3	1 meio (Portuguese, dry) $= 6.75 \times 10^{-3}$ m^3	Obsolete Portuguese unit of capacity used for dry substances. 1 meio (Portuguese, dry) = 1/8 fanga (E)	Portuguese
mel	mel	subjectively estimated pitch	nil	(see note)	The pitch of a 1000 Hz tone at 40 dB above threshold is taken to be 1000 mels. The pitch of any sound judged to be double that pitch is taken to be 2000 mels, etc. The name mel is derived from the first three letters of the word **mel**ody.	
meou (Chinese)	–	surface, area	L^2	1 meou (Chinese) = 614.4 m^2	Obsolete Chinese unit of area used in ancient times. 1 meou = 6000 sq. tchi (E)	Chinese
merice (Czechoslovakian)	–	surface area	L^2	1 merice (Czechoslovakian) = 2000 m^2	Obsolete Czechoslovakian unit of surface area used before 1876.	Czech
merice (Czechoslovakian, capacity)	–	capacity, volume	L^3	1 merice (Czechoslovakian) $= 70.6 \times 10^{-3}$ m^3	Obsolete Czechoslovakian unit of capacity used before 1876.	Czech
meridian	–	length, distance	L	1 meridian = 15.522222222 $\times 10^{-3}$ m	Obsolete British and American traditional typographical unit of length used in printing. 1 meridian = 44 points (E)	UK, US
mertföld (Hungarian) [Hungarian mile]	–	length, distance	L	1 mertföld (Hungarian) = 8353.59930 m	Obsolete traditional Hungarian unit of length used before 1876. 1 mertföld (Hungarian) = 79286.25 faust (Hungarian) (E)	Hungarian
mesh	mesh	aperture of sieves opening of testing sieves, mesh	nil	(see note)	The mesh is the unit which describes the number of apertures (i.e., opening) or a sieve per unit of linear inch measured at the centre of any wire to a point exactly one inch distant. It depends on the geometry of the open area (e.g., holes, squares), on wire diameter, etc. It exists in *(continued overleaf)*	UK, US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
mesh *(continued)*					several series (ISO, Tyler, AFNOR, ASTM, BS, DIN, IMM, etc). In general, in the same series the number of meshes follows a geometric progression with a defined ratio which depends on the scale. 10 mesh (US) = 2 mm (approx.) 100 mesh (US) = 150 µm (approx.) 400 mesh (US) = 38 µm (approx.) For US mesh $r = \sqrt[4]{2}$ For Tyler mesh $r = \sqrt[2]{2}$	
mesh	mesh	number of apertures per unit length	L^{-1}	1 mesh = 39.3700787402 m^{-1}	British and American unit of aperture per unit length used to measure the fineness of sieves, fishing nets, and covers. It is equal to the number of apertures per linear inch in the net or in the sieve. However, it strongly depends of the wire diameter, and aperture geometry (e.g., square, circle, etc.).	UK, US
messe (Eritrean)	–	capacity, volume	L^3	1 messe (Eritrean) = 1.59 $\times 10^{-3}$ m^3	Obsolete Eritrean traditional unit of capacity used before 1927. 1 messe (Eritrean) = 1/128 entelam (Eritrean) (E)	Eritrean
met	met	power per surface area metabolism activity	MT^{-3}	1 met = 58.12 $W.m^{-2}$ (E)	Biochemical unit for measuring metabolism activity of warm-blooded animals, i.e., power loss per unit of body surface area. Metabolism refers to the sum of all the processes going on in the body to sustain life. One met is the metabolism of a seated, resting person, having a mean body surface area of 1.8 m^2 equal to about 58.15 watts per square metre regardless of the person's size. For instance, measurements of human metabolism generally fall in the range 0.8–3.0 mets.	Biology

métairée (Loire)	–	surface area	L^2	1 métairée (Loire) = 1000 m^2 (E)	Obsolete local French unit of surface area used for land measurements after 1789. 1 métairée (Loire) = 1/10 hectares (E)	French
metalli (Algerian)	–	capacity, volume	L^3	1 metalli (Algerian) = 17.90×10^{-3} m^3	Obsolete traditional Algerian unit of capacity used before 1843.	Algerian
metecali (Syrian)	–	mass	M	1 metecali (Syrian) = 4.4625×10^{-3} kg	Obsolete Syrian traditional unit of mass used before 1931. 1 metecali (Syrian) = 1/400 rottolo (Syrian) (E)	Syrian
metical (Algerian)	–	mass	M	1 metical (Algerian) = $4.70758620688 \times 10^{-3}$ kg	Obsolete traditional Algerian unit of mass used before 1843. 1 metical (Algerian) = 4/29 ukkia (Algerian) (E)	Algerian
metre	m	length, distance	L	**SI base unit**	The metre is the length of the path travelled by light in vacuum during a time interval of 1/299792458 of a second (17th CGPM (1983), Resolution 1). The unit is named after the Greek word *metron* meaning measure.	SI, MKSA, MTS
metre of water (4°C)	mH_2O, mCE (4°C)	pressure, stress	$ML^{-1}T^{-2}$	1 mH_2O (4°C) = 9806.37541380 Pa	Unit of pressure employed in physics to measure small pressures. It is equal to the pressure exerted by a column of water one metre high, measured at 4°C (39.2°F). 1 atm = 10.33256383 mH_2O (4°C)	
metre of water (15.56°C)	mH_2O, mCE (15.56°C)	pressure, stress	$ML^{-1}T^{-2}$	1 mH_2O (15.56°C) = 9797.05909630 Pa	Unit of pressure employed in physics to measure small pressures. It is equal to the pressure exerted by a column of water one metre high, measured at 15.56°C (60°F). 1 atm = 10.34238938 mH_2O (60°F)	
metre of water (39.2°F)	mH_2O, mCE (39.2°F)	pressure, stress	$ML^{-1}T^{-2}$	1 mH_2O (39.2°F) = 9806.37541380 Pa	Unit of pressure employed in physics to measure small pressures. It is equal to the pressure exerted by a column of water one metre high, measured at 4°C (39.2°F). 1 atm = 10.33256383 mH_2O (39.2°F)	UK, US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
metre of water (60°F)	mH_2O, mCE (60°F)	pressure, stress	$ML^{-1}T^{-2}$	1 mH_2O (60°F) = 9797.05909630 Pa	Unit of pressure employed in physics to measure small pressures. It is equal to the pressure exerted by a column of water one metre high, measured at 15.56°C (60°F). 1 atm = 10.34238938 mH_2O (60°F)	UK, US
metre per second	$m.s^{-1}$	velocity, speed	LT^{-1}	**SI derived unit**	The metre per second is the SI derived unit of linear velocity. It is the speed of a body which moves according to a uniform displacement and which covers a distance of one metre in one second.	SI
metre per square second	$m.s^{-2}$	acceleration	LT^{-2}	**SI derived unit**	The metre per square second is the SI derived unit of acceleration of an object which undergoes a variation of speed of one metre per second in one second.	SI
metrete (Greek, Attic)	–	capacity, volume	L^3	1 metrete (Greek, Attic) = 38.8×10^{-3} m^3	Obsolete Greek unit of volume employed in ancient times. It was used for capacity measurements of liquids. 1 metrete (Greek, Attic) = 144 cotylos (E)	Attic
metrete of Heron (Egyptian)	–	capacity, volume	L^3	1 metrete of Heron (Egyptian) = 42.5×10^{-3} m^3 (of water)	Obsolete Egyptian unit of capacity used in ancient times. Measured by weight. 1 metrete of Heron (Egyptian) = 5/4 khar (E)	Egyptian
metric	–	specific length	$M^{-1}L$	1 metric = 10^{-3} $kg.m^{-1}$ (E)	Obsolete metric unit employed in the textile industry. 1 metric = 1 $kg.(1000\ m)^{-1}$ (E) 1 metric = 1 $g.m^{-1}$ (E) 1 metric = 100 tex (E)	
metric slug (hyl, mug, par, TME, techma)	mug	mass	M	1 mug = 9.80665 kg (E)	Obsolete technical metric unit of mass employed by mechanical engineers (base unit of the metric gravitational system). It was equal to the mass which under an acceleration of 1 $m.s^{-2}$ gives a force of	German

					1 kgf. The name TME is derived from the German acronym Technische Mass Einheit. The name mug is derived from the abbreviation of **m**etric sl**ug**.	
metze (Austrian)	–	surface, area	L^2	1 metze (Austrian) = 1918.20607488 m^2	Obsolete Austrian unit of area. 1 metze (Austrian) = 1/3 joch (E) 1 metze (Austrian) = 1600/3 square klafter (E) 1 metze (Austrian) = 19200 square fuss (E)	Austrian
metze (Prussian, dry)	–	capacity, volume	L^3	1 metze (Prussian, dry) = 3.435890×10^{-3} m^3	Obsolete German unit of capacity used for dry substances.	German
metzel (Austrian, dry)	–	capacity, volume	L^3	1 metzel (Austrian, dry) = 61.489×10^{-3} m^3	Obsolete Austrian unit of capacity used for dry substances.	Austrian
metzen (German, dry)	–	capacity, volume	L^3	1 metzen (German, dry) = 37.0596×10^{-3} m^3	Obsolete German unit of capacity for measuring dry substances. 1 metzen (German, dry) = 32 dreissiger (E)	German
metzen (Hungarian)	–	capacity, volume	L^3	1 metzen (Hungarian) = 62.445×10^{-3} m^3	Obsolete traditional Hungarian unit of capacity used before 1876. 1 metzen (Hungarian) = (23/20) eimer (Hungarian) (E)	Hungarian
mho	mho	electric conductance	$M^{-1}L^{-2}T^3I^2$	1 mho = 1 S (E)	Obsolete unit of conductance. The name derived from the reverse writing of the word ohm.	INT
mic	–	electric inductance	$ML^2T^{-2}I^{-2}$	1 mic = 10^{-6} H (E)	Obsolete unit of electric inductance employed by the Royal Navy at the beginning of the century. Abbreviation of microhenry. 1 mic = 1 μH (E)	UK
mickey	–	resolution of a com puter mouse	nil	1 mickey = 85 $\times 10^{-6}$ m to 127 $\times 10^{-6}$ m (see note)	Subjective dimensionless unit used in computer science and introduced to measure the smallest movement of a computer mouse. Anecdotal. One mickey *(continued overleaf)*	

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
mickey *(continued)*					is the length of the smallest detectable movement of the cursor on the screen and it depends on the equipment. Typical values are in the range 1/200 to 1/300 inch. Obviously, the name comes from the Disney cartoon character Mickey mouse.	
micri-erg	micri-erg	energy, heat, work	ML^2T^{-2}	1 micri-erg = 10^{-21} J (E)	Obsolete unit used in surface chemistry for measuring the surface energy of molecules. 1 micri-erg = 10^{-14} erg (E)	
microbar (barye, barie, dyn.cm^{-2})	μbarye	pressure, stress	$ML^{-1}T^{-2}$	1 μbar = 10^{-1} Pa (E)	Obsolete cgs derived unit of pressure and stress. 1 μbar = 1 dyn.cm^{-2} (E) 1 μbar = 1 barye (E) 1 atm = 1 013 250 μbar (E)	cgs
microgamma (picogram)	γγγ μγ	mass	M	1 γγγ = 10^{-15} kg (E)	Obsolete unit of mass employed in analytical chemistry. 1 γγγ = 10^{-12} g (E) 1 γγγ = 1 pg (E)	
microgram (gamma)	μg γ	mass	M	1 μg = 10^{-9} kg (E)	Submultiple of the SI base unit. 1 μg = 10^{-6} g (E)	SI
microinch	μin	length, distance	L	1 μin = 2.54×10^{-8} m (E)	American and British submultiple of the inch using in mechanical engineering for expressing surface roughness (R_a) and tolerances. 1 μinch = 10^{-6} in (E).	UK, US
microlitre	μl	capacity, volume	L^3	1 μl = 10^{-9} m^3 (E)	1 μl = 1 mm^3 (E)	
micrometre	μμ	length, distance	L	1 μm = 10^{-6} m (E)	Submultiple of the SI base unit.	SI
micromicron (bicron)	μμ	length, distance	L	1 μμ = 10^{-12} m (E)	Obsolete unit of wavelength unit used in atomic spectroscopy. 1 μμ = 1 pm (E)	

micron	μ	length, distance	L	1 μ = 10^{-6} m (E)	Obsolete unit of wavelength unit used in atomic spectroscopy. 1 μ = 1 μm (E)	
micron of mercury (millitorr)	μHg (0°C)	pressure, stress	$ML^{-1}T^{-2}$	1 μHg (0°C) = 0.1333223684 Pa	Obsolete unit of pressure employed in physics to measure small pressures. It is equal to the pressure exerted by a column of mercury one micrometre high, measured at 0°C (32°F). 1 μHg (0°C) = 10^{-3} mmHg (0°C) (E) 1 μHg (0°C) = 10^{-3} torr (E) 1 atm = 760 000 μHg (0°C) (E) 1 μHg (0°C) = (101325/760000) Pa (E)	
miglio (Italian)	–	length, distance	L	1 miglio (Italian) = 2226.336667 m	Obsolete Italian unit of length. 1 miglio (Italian) = 13 000/3 piedi liprando (E)	Italian
miglio (Italian, Lombardia)	–	length, distance	L	1 miglio (Italian, Lombardia) = 1784.808 m	Obsolete Italian unit of length used before 1861.	Italian
miglio (Italian, Napoli)	–	length, distance	L	1 miglio (Italian, Napoli) = 1855.110 m	Obsolete Italian unit of length used before 1861.	Italian
miglio (Italian, Piemonte)	–	length, distance	L	1 miglio (Italian, Piemonte) = 2466.0768 m	Obsolete Italian unit of length used before 1861.	Italian
miglio (Italian, Roma)	–	length, distance	L	1 miglio (Italian, Roma) = 1487.934 m	Obsolete Italian unit of length used before 1861.	Italian
miglio (Italian, Toscana)	–	length, distance	L	1 miglio (Italian, Toscana) = 1635.67 m	Obsolete Italian unit of length used before 1861.	Italian
miglio (Italian, Venezia)	-	length, distance	L	1 miglio (Italian, Venezia) = 1738.675 m	Obsolete Italian unit of length used before 1861.	Italian
mignonette (French)	–	length, distance	L	1 mignonette (French) = 2.44381505620 $\times 10^{-3}$ m	Obsolete French traditional typographical unit of length used in printing. 1 mignonette (French) = 6.5 points (de Paris) (E)	French

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
mignonne	–	length, distance	L	1 mignonne $= 2.63180082975 \times 10^{-3}$ m	Obsolete French unit of length employed in typography. It was a multiple of the point (Didot). 1 mignonne = 7 points (Didot) (E)	French
miil (Danish)	–	length, distance	L	1 miil (Danish) = 7532.568 m	Obsolete traditional Danish unit of length. 1 miil (Danish) = 24 000 fod (E)	Danish
mil	–	plane angle	α	1 mil = $1.02265385859 \times 10^{-3}$ rad	Obsolete British unit of plane angle used by Ordnance Survey on 1:50 000 series maps. It was defined as the 6144th part of the circle. 1 mil = 15/256° (E) 1 mil = $\pi/3072$ rad (E)	UK
mil (Egyptian)	–	length, distance	L	1 mil (Egyptian) = 580 m	Obsolete Egyptian traditional unit of length used before 1891. 1 mil (Egyptian) = 1000 diraa (Egyptian) (E)	Egyptian
mil (Swedish)	–	length, distance	L	1 mil (Swedish) = 5344.20 m	Obsolete Swedish unit of length. 1 mil = 18 000 fot (E)	Swedish
mil (thou)	mil thi	length, distance	L	1 mil = 2.54×10^{-5} m (E)	American and British submultiple of the inch. 1 mil = 1 thou (E) 1 mil = 10^{-1} calibre (E) 1 mil = 10^{-3} inch (E) 1 mil = 25.4 μm (E)	UK, US
mil per year	mpy	rate of corrosion	LT^{-1}	1 mpy = $8.05428716389 \times 10^{-10}$ m.s^{-1}	American and British unit used by corrosion engineers to express the rate of corrosion of metals and alloys. 1 mpy = 25.4 μm/year (E)	UK, US

mila alandi (Icelandic)	–	length, distance	L	1 mila alandi (Icelandic) = 7532.568 m	Obsolete Icelandic traditional unit of length used before 1907. 1 mila alandi (Icelandic) = 24 000 fet (Icelandic) (E)	Icelandic
milangle (NIST)	(NIST), milangle	plane angle	α	1 milangle (NIST) = $9.81747704247 \times 10^{-4}$ rad	Unit of plane angle employed in the artillery. It is equal to the 6400th part of the circle. 1 (NIST) = 0.05625° (E) 1 (NIST) = 0.0625 grade (E)	INT
mile (Bohemian)	–	length, distance	L	1 mile (Bohemian) = 6987.6720 m	Obsolete Czechoslovakian unit of length used in Bohemia before 1876. 1 mile (Bohemian) = 23 607 stopa (Bohemian) (E)	Czech
mile (Danish)	–	length, distance	L	1 mile (Danish) = 7532.568 m	Obsolete traditional Danish unit of length. 1 mile (Danish) = 24 000 fod (E)	Danish
mile (geographical)	mile (geogr.)	length, distance	L	1 mile (geographical) = 7421.29822268 m	Obsolete British and American unit of length. It was equal to the length which is subtended by an arc of 4 minutes at the Equator. The calculation is based on the value of the equatorial radius of Earth recommended by the IUGG of 6378.136 km 1 mile (Geographical) = 24348 ft (E)	UK, US
mile (international nautical)	mi (int. naut.)	length, distance	L	1 mile (int. naut.) = 1852 m (E)	Legal international unit of length temporarily maintained with the SI. It is still used in navigation (mercantile marine, aviation) . It is equal to the length of an arc of one minute measured at N45° latitude. The int. nautical mile has been taken equal to the nautical mile since 1970. 1 mile (int. naut.) ≅ 6076.115486 feet	INT
mile (international)	mi (int.)	length, distance	L	1 mile (int.) = 1609.344 m	Obsolete International unit of length used in navigation (mercantile marine, aviation) 1 mile (int.) = 1760 yards (E)	INT

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
mile (Irish)	–	length, distance	L	1 mile (Irish) = 2048.5608 m (E)	Obsolete unit of length used in surveyors measurements in Ireland. 1 mile (Irish) = 6721 feet (E) 1 mile (Irish) = 320 perches (Irish) (E) 1 mile (Irish) = 80 chains (Irish) (E) 1 mile (Irish) = 8 furlongs (Irish) (E)	Ireland
mile (Moravian)	–	length, distance	L	1 mile (Moravian) = 6704.3880 m	Obsolete Czechoslovakian unit of length used in Moravia before 1876. 1 mile (Moravian) = 23 607 stopa (Bohemian) (E)	Czech
mile (naut.) per hour (knot, noeud)	knot	velocity, speed	LT^{-1}	1 knot = $5.144444444 \times 10^{-1}$ $m.s^{-1}$	International unit of velocity employed in navigation. The unit dates from the late sixteenth century, when the speed of a ship was found by dropping a float tied to a knotted line (knotted log) over the side of the vessel. The knots were originally seven fathoms apart. The number of knots passing in 30 seconds gave the speed of the ship in nautical miles per hour. 1 knot = 1 nautical mile per hour (E) 1 knot = 1852 $m.h^{-1}$ (E) 1 knot = 6080 $ft.h^{-1}$ (E)	INT
mile (Praha)	–	length, distance	L	1 mile (Praha) = 6999.4755 m	Obsolete Czechoslovakian unit of length used in Praha before 1876. 1 mile (Praha) = 23 607 stopa (Bohemian) (E)	Czech
mile (Prussian) [meile]	–	length, distance	L	1 meile (Prussian) = 7532.568 m	Obsolete German unit of length. 1 meile = 24 000 fuss (E)	German
mile (Scottish)	–	length, distance	L	1 mile (Scottish) = 1813.8648 m (E)	Obsolete traditional Scottish unit of length used in surveyors' measurements before the Imperial Weights and Measures Act of 1824.	Scotland

					1 mile (Scottish) = 5951 feet (E) 1 mile (Scottish) = 320 perches (Scottish) (E) 1 mile (Scottish) = 80 chains (Scottish) (E) 1 mile (Scottish) = 8 furlongs (Scottish) (E)	
mile (Silesian)	–	length, distance	L	1 mile (Silesian) = 6834.2265 m	Obsolete Czechoslovakian unit of length used in Silesia before 1876. 1 mile (Silesian) = 23 607 stopa (Bohemian) (E)	Czech
mile (statute, land)	mi (stat.), st. mi	length, distance	L	1 mile (statute) = 1609.344 m (E)	Obsolete British unit of length employed for land distance measurements. Originally derived from the Roman 'mille passus' of 5000 pes (i.e., 4840 ft). During the reign of Queen Elizabeth I, the mile gained an additional 280 ft to 5280 ft in order to accommodate 8 furlongs, the most popular measure of length at that time. 1 statute mile = 1.609344 km 1 statute mile = 5280 feet (E) 1 statute mile = 1760 yards (E) 1 statute mile = 320 rods (E)	UK
mile (telegraph, nautical)	mi (teleg., naut.)	length, distance	L	1 mile (teleg., naut.) = 1855.3176 m	Obsolete British and American unit of length employed in navigation. It is equal to the length of a minute of arc measured at Equator. 1 mile (teleg. naut.) = 6087 feet (E)	INT, UK, US
mile (UK, London)	–	length, distance	L	1 mile (UK, London) = 1523.986 m	Obsolete British unit of length based on the definition of the Roman mile and originally defined as 5000 feet or 8 fur longs. Since the change of the statute in 1593 it was defined as 5280 feet. 1 mile (UK, London) = 5000 feet (E)	UK

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
mile (UK, nautical)	mi (UK, naut.)	length, distance	L	1 mile (UK, naut.) = 1853.184 m (E)	Obsolete British unit of length employed in navigation. It is equal to the length of a minute of arc measured at a latitude of N48°. The British Admiralty used the round figure of 6080 feet. 1 mile (UK, naut.) = 6080 feet (E) 1 mile (UK, naut.) = 10 cable lengths (UK, naut.)	UK
mile (UK, nautical, old)	–	length, distance	L	1 mile (UK, nautical, old) = 1854.98171040 m	Obsolete British unit of length used in navigation and origi nally defined as 6085.898 feet; it was later defined as 6080 feet. 1 mile (UK, nautical, old) = 6085.898 feet (E)	UK
mile (US, nautical)	mi (US, naut.)	length, distance	L	1 mile (US, naut.) = 1853.184 m (E)	Obsolete American unit of length employed in navigation. It is equal to the length of a minute of arc measured at a latitude of N48°. 1 mile (US naut.) = 6080 feet (E)	US
mile (US, survey)	mi (US, survey)	length, distance	L	1 mile (US, survey) = 1609.3472187 m	Obsolete American unit of length used in geodetic and surveyor's measurements. 1 mile (US, survey) = (6 336 000/3937) m (E)	US
mile per hour (stat.)	mph, $mi.h^{-1}$	velocity, speed	LT^{-1}	1 $mi.h^{-1} = 4.470400000 \times 10^{-1}$ $m.s^{-1}$	American and British unit of linear velocity employed to express the terrestrial speed of vehicles. 1 $mi.h^{-1} = 1.609344$ $km.h^{-1}$	UK, US
milha (Portuguese)	–	length, distance	L	1 milha (Portuguese) = 2067.36 m	Obsolete Portuguese unit of length. 1 milha (Portuguese) = 8 estadio (E)	Portuguese
miliaresium (Roman)	–	mass	M	1 miliaresium (Roman) $= 5.450 \times 10^{-3}$ kg	Old Roman unit of mass used in ancient times. 1 miliaresium (Roman) = 1/5 uncia (E)	Roman

milla (Mexican)	–	length, distance	L	1 milla (Mexican) = 1396.66666666667 m	Obsolete Mexican traditional unit of length used before 1896. 1 milla (Mexican) = 5000 pie (Mexican) (E)	Mexican
milla (Spanish)	–	length, distance	L	1 milla (Spanish) = 1393.175 m	Obsolete Spanish unit of length. 1 milla (Spanish) = 5000/3 vara (E)	Spanish
mille (Arabic)	–	length, distance	L	1 mille (Arabic) = 1.920×10^3 m	Obsolete Arabic unit of length used in ancient times. 1 mille (Arabic) = 6000 feet (Arabic) (E)	Arabic
mille (Egyptian) [Egyptian mile]	–	length, distance	L	1 mille (Egyptian) = 1.745×10^3 m	Obsolete Egyptian unit of length used in ancient times. 1 mile = 10 000/3 Royal cubit (E)	Egyptian
mille (Greek, Attic) [Greek mile]	–	length, distance	L	1 mille (Greek, Attic) = 1388.520 m	Obsolete Greek unit of length employed in ancient times. 1 mille (Attic) = 4500 pous (E)	Attic
mille (Persian) [Babylonian mile]	–	length, distance	L	1 mille (Persian) = 1728 m	Obsolete unit of length in the Assyrio-Chaldean-Persian system used in ancient times. 1 mille = 5400 zereths (E)	Persian
mille marin [French nautical mile]	–	length, distance	L	1 mille marin = 1949.03650020 m	Obsolete French unit of length used in navigation before the French Revolution (1789). 1 mille marin = 950 toises (de Pérou) (E) 1 mille marin = 10 encablures (E) 1 mille marin = 1200 brasses (E) 1 mille marin = 6000 pieds (E)	French
millenium	–	time, period, duration	T	1 millenium = 3.15576×10^{10} s	1 millenium = 1000 years (E)	INT
millerole (Tunisian)	–	capacity, volume	L^3	1 millerole (Tunisian) = 64×10^{-3} m^3	Obsolete Tunisian traditional unit of capacity used before 1895. 1 millerole (Tunisian) = 4/31 cafisso (Tunisian) (E)	Tunisian
millia (Roman) [Roman mile]	–	length, distance	L	1 millia (Roman) = 1472 m	Obsolete Roman unit of length employed in ancient times. 1 milia (Roman) = 5000 pes (E)	Roman

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
milliampere per square centimetre	$mA.cm^{-2}$	electric current density	IL^{-2}	1 $mA.cm^{-2} = 10$ $A.m^{-2}$ (E)	Unit of electric current density usually employed in electrochemistry in laboratory experiments.	
milliarcsecond (millisecond of arc)	mas, milli-arcsec	length, distance	L	1 milli-arcsec $= 4.84813681108 \times 10^{-9}$ m (for $R = 1$ m)	Obsolete unit of curvilinear abscissa used by astronomers. The milli-arcsecond is equal to the plane angle expressed in thousand of a second times the circle radius in metres. 1 milli-arcsec = 1/1000 arcsec (E) S (m) $= (\pi/648000000)R$ (m) Θ (mas) (E)	@
milliard	–	dimensionless unit of quantity	nil	1 milliard $= 10^9$ entities (E)	Dimensionless French unit of quantity equivalent to a billion. Named after the French *milliard*.	French
milliard (US)	–	capacity, volume	L^3	1 milliard (US) $= 10^9$ m^3 (E)	American unit of volume used in civil engineering to describe large volumes of water. One milliard equals exactly one cubic kilometre of water, which is one billion cubic metres. 1 milliard (US) = 1 km^3 (E)	US
millibar	mbar	pressure, stress	$ML^{-1}T^{-2}$	1 mbar $= 10^2$ Pa (E)	At one time it was a unit of pressure commonly employed in meteorology. It was replaced by the hPa on January 1st 1986 by the World Meteorological Organization. 1 mbar = 1 hPa (E) 1 atm = 1013.25 mbar (E)	
millidarcy	–	hydrodynamic permeability	L^2	1 millidarcy $= 9.869232667160 \times 10^{-16}$ m^2	Obsolete permeability unit employed in oil industry, hydrology and civil engineering. According to Darcy's law: $Q_v = (KA/\eta)(\Delta P/x)$ one millidarcy corresponds to a fluid having a dynamic viscosity (η) of one ΔP flowing at a volume	

					flow rate (Q_v) of 1 cm^3s^{-1} across a porous medium with a cross-sectional area (A) of one square centimetre and with one centimetre thickness (x) under a pressure differential of 1/100 atm. The unt is named after H. Darcy (1803–1858) 1 mD ≅ 986.923266716 nm^2	
millième (Artillery)	m_a	plane angle	α	1 m_a = 981.747704247 $\times 10^{-6}$ rad	Obsolete French unit of plane angle used in the artillery. It was defined as the 6400th part of the circle. 1 $m_a = 2\pi/6400$ radian (E) 1 $m_a = 0.05625^\circ$ (E)	French
millième (French)	‰ (FRA)	plane angle	α	1‰(FRA) = 9.999996667 × 10^{-4} rad	Unit of plane angle employed in the French artillery. One millième is equal to a plane angle under which it is possible to observe a difference of height of 1 m at 1000 m. 1‰(FRA) = 5.729576041 × 10^{-2} ° 1‰(FRA) = 6.366195602 × 10^{-2} grade	French
millième (NATO)	‰ (NATO)	plane angle	α	1‰(NATO) = 9.81747704247 × 10^{-4} rad	Unit of plane angle employed in the artillery. It is equal to the 6400th part of the circle. 1‰(NATO) = 5.625 × 10^{-2}° (E) 1‰(NATO) = 6.250 × 10^{-2} grade (E)	INT
millième (Rimailho)	m_r	plane angle	α	1 m_r = 1.04719755120 $\times 10^{-3}$ rad	Obsolete French unit of plane angle used in the artillery. It was defined as the 6000th part of the circle. 1 $m_r = 2\pi/6000$ radian (E) 1 $m_r = 0.060^\circ$ (E)	French
millième (US before 1945)	‰(US)	plane angle	α	1‰(US) = 1.57079632680 × 10^{-3} rad	Obsolete unit of plane angle employed in the American artillery before World War II. It is equal to the 4000th part of the circle. 1‰(US) = 0.09° 1‰(US) = 0.1 grade	US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
millième (USSR)	‰ (USSR)	plane angle	α	1‰(USSR) $= 9.97331001140 \times 10^{-4}$ rad	Obsolete unit of plane angle employed in the Soviet artillery. It is equal to the 6300th part of the circle. 1‰(USSR) = 0.0571428571429° 1‰(USSR) = 0.0634920634921 grade	Russian
millième vrai	m_v	plane angle	a	1 m_v $= 10^{-3}$ rad (E)	Obsolete name for a submultiple of grade used in the French artillery. 1 m_v = 1 milliradian (E)	French
millier (de Paris)	–	mass	M	1 millier (de Paris) = 489.5058500 kg	Obsolete French unit of mass used before the French revolution of 1789. 1 millier (de Paris) = 1000 livres (de Paris) 1 millier (de Paris) = 2000 marcs (de Paris) 1 millier (de Paris) = 16000 onces (de Paris)	French
milligamma (nanogram)	mγ	mass	M	1 mγ = 10^{-12} kg (E)	Obsolete unit of mass employed in analytical chemistry. 1 mγ = 10^{-9} g (E) 1 mγ = 1 ng (E)	
milligram	mg	mass	M	1 mg = 10^{-6} kg (E)	Submultiple of the SI base unit. 1 mg = 10^{-3} g (E)	SI
milligram per square decimetre per day	mg. dm^{-2}. d^{-1}	rate of corrosion	$ML^{-2}T^{-1}$	1 mg.dm^{-2}.d^{-1} $= 1.15740740741 \times 10^{-9}$ m.s^{-1} (for a material with a specific gravity 8)	Unit used by corrosion engineers to express the rate of corrosion of metals and alloys. 1 mg.dm^{-2}.d^{-1} corresponds to 4.565625×10^{-3} mm per year for a material with density of 8000 kg.m^{-3} (c.a 0.18 mpy)	
millik	millik	reactivity of nuclear power reactor	nil	1 millik = 10^{-5} (E)	Obsolete Canadian unit of nuclear reactivity employed in nuclear engineering.	CAN
millilitre	ml, mL	capacity, volume	L^3	1 ml = 10^{-6} m^3 (E)	1 ml = 1 cm^3 (E)	

millimetre	mm	length, distance	L	1 mm = 10^{-3} m (E)	Submultiple of the SI base unit.	SI
millimetre of mercury (0°C)	mmHg, torr, Torr (0°C)	pressure, stress	$ML^{-1}T^{-2}$	1 mmHg (0°C) = 133.322368421 Pa	Obsolete unit of pressure employed in physics to measure small pressures. It is equal to the pressure exerted by a column of mercury one millimetre high, measured at 0°C (32°F). 760 mmHg (0°C) = 1 atm (E) 1 mmHg = 1 torr (E) 1 mmHg (0°C) = (101 325/760) Pa (E)	
millimetre (meteorological)	mm	depth of rainfall per unit surface area	L^{-1}	1 mm (meteorological) = 10^{-3} m^3 water per m^2	International meteorological unit for rainfall measurement. It corresponds to the depth expressed in millimetres to which the rainfall falling on horizontal enclosed surface, from which there are no losses by evaporation or otherwise would have accumulated. It is equal to 1000 cubic millimetre of water (accumulated rainfall) per square metre of land. 1 mm (meteorological) = 1 dm^3/m^2s (E)	INT
milline	–	length, distance	L	1 milline = 2.11666667 $\times 10^{-3}$ m	Unit of length used in advertising. One milline equals the width of a line of a modern agate type (i.e., 5.5 points) times the width of a column times one million copies of the publication.	
millimetre of water (4°C)	mmH_2O, mmCE (4°C)	pressure, stress	$ML^{-1}T^{-2}$	1 mmH_2O (4°C) = 9.80637541438 Pa	Unit of pressure employed in physics to measure small pressures. It is equal to the pressure exerted by a column of water one millimetre high, measured at 4°C (39.2°F). 1 atm = 10 332.5638398 mmH_2O (4°C)	
millimetre of water (15.56°C)	mmH_2O, mmCE (15.56°C)	pressure, stress	$ML^{-1}T^{-2}$	1 mmH_2O (15.56°C) = 9.79705909630 Pa	Obsolete unit of pressure employed in physics to measure small pressures. It is equal to the pressure exerted by a column of water one millimetre high, measured at 15.56°C (60°F). 1 atm = 10 342.3893848 mmH_2O (60°F)	

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
millimetre of water (39.2°F)	mmH_2O, mmCE (39.2°F)	pressure, stress	$ML^{-1}T^{-2}$	1 mmH_2O (39.2°F) = 9.806375414380 Pa	Unit of pressure employed in physics to measure small pressures. It is equal to the pressure exerted by a column of water one millimetre high, measured at 4°C (39.2°F). 1 atm = 10 332.5638398 mmH_2O (4°C)	
millimetre of water (60°F)	mmH_2O, mmCE (60°F)	pressure, stress	$ML^{-1}T^{-2}$	1 mmH_2O (60°F) = 9.79705909630 Pa	Obsolete unit of pressure employed in physics to measure small pressures. It is equal to the pressure exerted by a column of water one millimetre high, measured at 15.56°C (60°F). 1 atm = 10 342.3893848 mmH_2O (60°F)	
millimicron (nanometre)	mμ, nm	length, distance	L	1 mμ = 10^{-9} m (E)	Obsolete unit of wavelength employed in spectroscopy. 1 mμ = 1 nm (E)	
MIM	MIM	number of instructions computed per unit of time	T^{-1}	1 MIM = 1.666667×10^4 instructions.s^{-1}	Unit used in computer science. The unit is named after the English acronym: Million Instructions per Minute. 1 MIM = (100000/6) ins.s^{-1} (E)	
mimtscha (Turkmenian)	–	mass	M	1 mimtscha (Turkmenian) = 0.500 kg	Obsolete Turkmenian traditional unit of mass used before 1920. 1 mimtscha (Turkmenian) = 1/256 batman (Turkmenian) (E)	Turkoman
mina (Greek)	–	mass	M	1 mina (Greek) = 1.500 kg	Obsolete traditional Greek unit of mass used before 1922. 1 mina (Greek) = 3 pounds (Greek) (E)	Greek
mina (Hebrew) [Sacred system]	–	mass	M	1 mina (Hebrew) = 0.850 kg	Obsolete Hebrew unit of mass used in ancient times. Sacred system.	Hebrew
mina (Hebrew) [Talmudic system]	–	mass	M	1 mina (Hebrew) = 0.3542 kg	Obsolete Hebrew unit of mass used in ancient times. Rabbinacal or Talmudic system.	Hebrew

mina (Roman)	–	mass	M	1 mina (Roman) = 0.545 kg	Obsolete Roman unit of mass used in ancient times. 1 mina (Roman) = 5/3 libra (Roman) (E)	Roman
mine (de Paris, dry)	–	capacity, volume	L^3	1 mine (de Paris, dry) = 175.840×10^{-3} m^3	Obsolete French unit of volume employed before the French Revolution. It was used for capacity measurements of dry substances. 1 mine = 6 boisseaux (E)	French
mine (Egyptian)	–	mass	M	1 mine (Egyptian) = 0.819 kg	Obsolete Egyptian unit of mass used in ancient times. 1 mine (Egyptian) = 60 debens (Egyptian) (E)	Egyptian
mine (Greek, Attic)	–	mass	M	1 mine (Greek, Attic) = 0.432 kg	Obsolete Greek unit of mass used in ancient times. 1 mine (Greek, Attic) = 1/60 Greek talents (E)	Attic
mine (Persian)	–	mass	M	1 mine (Persian) = 0.326 kg	Obsolete Persian unit of mass used in ancient times. 1 mine (Persian) = 100 drachms (Persian)	Persian
minée (Versailles)	–	surface area	L^2	1 minée (Versailles) = 2500 m^2 (E)	Obsolete local French unit of surface area used for land measurements after 1789. 1 minée (Versailles) = 25 ares (E) 1 minée (Versailles) = 2 minotées (Versailles) (E) 1 minée (Versailles) = 4 boisselées (E) 1 minée (Versailles) = 50 perches (E)	French
miner's inch	–	volume flow rate	L^3T^{-1}	1 miner's inch = $0.78657907200 \times 10^{-3}$ $m^3.s^{-1}$ (British Columbia) 1 miner's inch = $0.745180173474 \times 10^{-3}$ $m^3.s^{-1}$ (Colorado)	Obsolete American and Canadian unit of flow rate of water used by early miners. It was equal to the volume of water which flows through an aperture of one square inch section under a difference of height *(continued overleaf)*	CAN, US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
miner's inch *(continued)*				1 miner's inch $= 0.707921164800 \times 10^{-3}$ $m^3.s^{-1}$ (Northern California, Nevada, Arizona, Oregon, and Montana) 1 miner's inch $= 0.566336931840 \times 10^{-3}$ $m^3.s^{-1}$ (Southern CA, ID KS, NK, SD, ND, NM, and WA)	ranging from 4 to 6.5 inches. Since the value of the miner's inch varies by locality, most western states have established the value by statute. For instance an act of the California legislature, May 23, 1901 makes the standard miner's inch 1.5 cubic feet per minute through any aperture or orifice., (i.e., 11.25 US $gal.min^{-1}$) 1 miner's inch = (1/36) $ft^3.s^{-1}$ (BC) 1 miner's inch = (1/38) $ft^3.s^{-1}$ (CO) 1 miner's inch = (1/40) $ft^3.s^{-1}$ (NCA, NV, AZ, OR, MT) 1 miner's inch = (1/50) $ft^3.s^{-1}$ (SCA, ID, KS, NK, SD, ND, UT, NM, and WA)	
mingelen (Dutch)	–	capacity, volume	L^3	1 mingelen (Dutch) $= 1.200 \times 10^{-3}$ m^3	Obsolete Dutch unit of capacity used for liquid substances.	Dutch
minim (UK)	min (UK),	capacity, volume	L^3	1 minim (UK) $= 5.919390625 \times 10^{-8}$ m^3	British unit used for capacity measurements for all merchandise (solids, liquids, foodstuffs, etc). 1 minim (UK) = 1/76800 gal (UK) (E) 1 minim (UK) = 0.960760363079 minim (US)	UK
minim (Jewish)	–	time, duration, period	T	1 minim = 3.33333 s	1 minim = 1/1080 h	Jewish
minim (US)	min (US),	capacity, volume	L^3	1 minim (US) $= 6.161151992 \times 10^{-8}$ m^3	American unit used for capacity measurements of liquids. 1 minim (US) = 1/61440 gal (US) (E) 1 minim (US) = 1.04084227288 minim (UK)	US
minion	–	length, distance	L	1 minion $=2.469444444444 \times 10^{-3}$ m	Obsolete traditional typographical unit of length used in printing. 1 minion = 7 points (E)	

minot (de Paris, dry)	–	capacity, volume	L^3	1 minot (de Paris, dry) $= 37.920 \times 10^{-3}$ m^3	Obsolete French unit of volume employed before the French Revolution. It was used for capacity measurements of dry substances. 1 minot = 3 boisseaux (E)	French
minotée (Versailles)	–	surface area	L^2	1 minotée (Versailles) =1250 m^2 (E)	Obsolete local French unit of surface area used for land measurements after 1789. 1 minotée (Versailles) = 12.50 ares (E) 1 minotée (Versailles) = 25 perches (E) 1 minotée (Versailles) = 2 boisselées (Versailles) (E)	French
minute	min, mn	time, period, duration	T	1 minute = 60 seconds (E)	Sexagesimal multiple of the second.	INT
minute of angle	′	plane angle	α	$1' = 2.90888208665 \times 10^{-4}$ rad	Sexagesimal submultiple of the plane angle degree. $1' = \pi/10800$ rad (E)	INT
minute of angle (new)	c	plane angle	α	1 c = $1.57079632680 \times 10^{-4}$rad	Obsolete French unit of plane angle introduced after the French Revolution (1789). 1 c = 1/100 gon (grade) (E)	French
mips	MIPS	computing power	T^{-1}	1 mips = 10^6 s^{-1} (E)	Unit used in computer science to express the computing power of a computer. It is equal to one **m**illion **i**nstructions **p**er **s**econd. An instruction is a single program command to the computer's central processor. In a particular computer, there is a definite relationship between the rate at which instructions are processed, in mips, and the 'clock speed' of the processor, measured in megahertz (MHz). However, this relationship varies considerably between computer types, hence it is usually not meaningful to compare the mips rates of dissimilar machines.	Computer

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
mira (Czechoslovakian)	–	surface area	L^2	1 mira (Czechoslovakian) = 2878 m^2	Obsolete Czechoslovakian unit of surface area used before 1876. 1 mira (Czechoslovakian) = (1439/1000) merice (E)	Czech
mired	–	temperature of colour	Θ^{-1}	1 mired = 10^6 K^{-1} (E)	Unit of temperature of colour employed in photography. The name of the unit derived from the English acronym: **Mi**cro **R**eciprocal **D**egrees. TC (mired) = 1 000 000/T (K).	INT
mirze (Romanian, dry)	–	capacity, volume	L^3	1 mirze (Romanian, dry) = 196.8 $\times 10^{-3}$ m^3	Obsolete traditional Romanian unit of capacity used for dry substances before 1884. 1 mirze (Romanian, dry) = 128 oke (Romanian) (E)	Romanian
miskal (Egyptian)	–	mass	M	1 miskal (Egyptian) = 0.112320 kg	Obsolete Egyptian traditional unit of mass used before 1891. 1 miskal (Egyptian) = 9/100 oke (Egyptian) (E)	Egyptian
miskal (Persian)	–	mass	M	1 miskal (Persian) = 4.6 $\times 10^{-3}$ kg	Obsolete Persian traditional unit of mass used before 1933. 1 miskal (Persian) = 1/2 dirhem (Persian) (E)	Persian
miskal (Turkish)	–	mass	M	1 miskal (Turkish) = 4.81125 $\times 10^{-3}$ kg	Obsolete Turkish traditional unit of mass used before 1933. 1 miskal (Turkish) = 3/800 oka (Turkish) (E)	Turkish
misura (Balearic)	–	mass	M	1 misura (Balearic) = 14.688 kg	Obsolete Balearic traditional unit of mass. 1 misura (Balearic) = 36 rottolo (Balearic) (E)	Balearic

mitcal (Syrian)	–	mass	M	1 mitcal (Syrian) = 4.4625 $\times 10^{-3}$ kg	Obsolete Syrian traditional unit of mass used before 1931. 1 mitcal (Syrian) = 1/400 rottolo (Syrian) (E)	Syrian
mite (jeweller's)	–	mass	M	1 mite (jeweller's) = 2.5 $\times 10^{-6}$ kg (E)	Obsolete British and American unit of mass for weighing precious stones (i.e., diamond, emerald, ruby, and sapphire) and other gemstones. 1 mite (jeweller's) = 5/4 point (jeweller's) (E) 1 mite (jeweller's) = 1/20 grain (jeweller's) (E) 1 mite (jeweller's) = 1/80 carat (E) 1 mite (jeweller's) = 2.5 μg (E)	UK, US
mite (UK)	–	mass	M	1 mite (UK) = 3.23994550 $\times 10^{-6}$ kg	Obsolete British unit of mass. 1 mite (UK) = 1/20 grain (E)	UK
mkono (East Africa)	–	length, distance	L	1 mkono (East Africa) = 0.45720 m (E)	African unit of distance used in East Africa (e.g., Kenya, Tanzania), and standardized under the British rule. 1 mkono (East Africa) = 18 inches (E) 1 mkono (East Africa) = 1/2 yard (E)	East African
MKpS unit of mass	–	mass	M	1 MKps = 9.806 65 kg (E)	Obsolete MKpS unit of mass.	MKps
mô (Japanese)	–	length, distance	L	1 mô (Japanese) = 3.030303030 $\times$ 10^{-5} m	Obsolete Japanese unit of length. 1 mô = 1/10 000 shaku (E) 1 mô = (10/330 000) m (E)	Japanese
mocha (Abyssinian)	–	mass	M	1 mocha (Abyssinian) = 31.1000 $\times 10^{-3}$ kg	Obsolete Abyssinian traditional unit of mass used before 1927. 1 mocha (Abyssinian) = 12 derime (Abyssinian) (E)	Abyssinian
modius (Arabic)	–	capacity, volume	L^3	1 modius (Arabic) = 40.8 $\times$ 10^{-3} m^3 (of water)	Obsolete Arabic unit of capacity used in ancient times. Measured by weight. 1 modius (Arabic) = 5/4 cafiz (E)	Arabic

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
modius (Roman muid)	–	capacity, volume	L^3	1 modius (Roman muid) $= 8.788 \times 10^{-3}$ m^3	Obsolete Roman unit of volume employed in ancient times. It was used for capacity measurements of dry substances. 1 modius (Roman muid) = 16 sextarius (E)	Roman
moio (Brazilian)	–	capacity, volume	L^3	1 moio (Brazilian) $= 319.440 \times 10^{-3}$ m^3	Obsolete Brazilian traditional unit of capacity used before 1874. 1 moio (Brazilian) = 60 alquiera (Brazilian) (E)	Brazilian
moio (Brazilian, Bahia)	–	capacity, volume	L^3	1 moio (Brazilian, Bahia) $= 211.440 \times 10^{-3}$ m^3	Obsolete Brazilian traditional unit of capacity used before 1874. 1 moio (Brazilian, Bahia) = 60 alquiera (Brazilian, Bahia) (E)	Brazilian
moio (Brazilian, com mon)	–	capacity, volume	L^3	1 moio (Brazilian, common) $= 217.560 \times 10^{-3}$ m^3	Obsolete Brazilian traditional unit of capacity used before 1874. 1 moio (Brazilian, common) = 60 alquiera (Brazilian, com mon) (E)	Brazilian
moio (Brazilian, salt)	–	capacity, volume	L^3	1 moio (Brazilian, common) $= 244.56 \times 10^{-3}$ m^3	Obsolete Brazilian traditional unit of capacity used before 1874. 1 moio (Brazilian, salt) = 60 alquiera (Brazilian, salt) (E)	Brazilian
moio (Portuguese, dry)	–	capacity, volume	L^3	1 moio (Portuguese, dry) $= 810 \times 10^{-3}$ m^3	Obsolete Portuguese unit of capacity used for dry substances. 1 moio (Portuguese, dry) = 15 fanga (E)	Portuguese
moio (Spanish)	–	capacity, volume	L^3	1 moio (Spanish) $= 250.290520 \times 10^{-3}$ m^3 (water)	Obsolete Spanish unit of capacity used for liquid substances. 1 moio (Spanish) = 16 arroba (water) (E)	Spanish
molal	m	molality	NM^{-1}	1 molal = 1 $mol.kg^{-1}$ (E)	Obsolete notation used by chemists to describe the molality of reagents, i.e., the number of moles per unit mass of solvent, and it often appears to be a unit of measure. This unit is not approved by the	INT

					CGPM. Its use is declining, but still substantial, especially in general chemistry.	
molar	M	molarity	NL^{-3}	1 molar = 10^3 mol. m^{-3}(E)	Obsolete notation used by chemists to describe the molarity of chemical reagents expressed in moles per unit volume and it often appears to be a unit of measure. For instance, a solution described as 1.0 mM has a concentration of 1.0 $mmol.dm^{-3}$. Although the unit is not approved by the CGPM, and its use is declining, it still remains in use in chemistry textbooks.	INT
mole	mol	amount of substance	N	**SI base unit**	The mole is the amount of substance of a system which contains as many elementary entities as there are atoms in 0.012 kg of carbon 12. When the mole is used, the elementary entities must be specified and may be atoms, molecules, ions, electrons, other particles, or specified groups of such particles [14th CGPM (1971), Resolution 3]. In this definition, it is understood that the carbon 12 atoms are unbound, at rest and in their ground state.	SI
mole per cubic centimetre	$mol.cm^{-3}$ mM	molarity, molar concentration	$N.L^{-3}$	1 $mol.cm^{-3} = 10^6$ $mol.m^{-3}$ (E)		
mole per cubic decimetre	$mol.dm^{-3}$, M	molarity, molar concentration	$N.L^{-3}$	1 $mol.dm^{-3} = 10^3$ $mol.m^{-3}$ (E)		
mole per cubic metre	$mol.m^{-3}$	molarity, molar concentration	$N.L^{-3}$	**SI derived unit**		SI
mole per litre	$mol.l^{-1}$, M	molarity, molar concentration	$N.L^{-3}$	1 $mol.l^{-1} = 10^3$ $mol.m^{-3}$ (E)	Unit employed in chemistry.	

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
momme	Me	mass	M	1 momme = 3.75×10^{-3} kg (E)	Obsolete Japanese unit of mass used in the pearl trade. 1 momme = 3.75 g (E) 1 momme = 1/1000 kwan (E)	Japanese
mon	–	flatness of rolled steel plate	L	1 mon = 2.54×10^{-5} m (E)	Obsolete British unit employed in metallurgy for describing the flatness of rolled steel plates. A surface has a flatness of one mon if no part of it is more than one mil above or below a straight line drawn between any two points one metre apart on the surface.	UK
month (30 days)	–	time, period, duration	T	1 month (30 d) = 2.592×10^{6} s (E)	1 month = 30 days (E)	INT
month (lunar)	–	time, period, duration	T	1 month (lunar) = 2.4192×10^{6} s (E)	Unit of time employed in navigation for tidal computations. The lunar month is equal to the time interval between two successive full Moons. 1 month (lunar) = 28 days (E)	
month (solar mean)	–	time, period, duration	T	1 month (solar mean) = 2.628×10^{6} s (E)		
moo (Burmese)	–	mass	M	1 moo (Burmese) = 2.04×10^{-3} kg	Obsolete Burmese traditional unit of mass used before 1920. 1 moo (Burmese) = 8 ruay (Burmese) (E)	Burmese
moot (Indian, Bombay)	–	length, distance	L	1 moot (Indian, Bombay) = 5.715×10^{-3} m	Obsolete Indian traditional unit of length used before 1920. 1 moot (Indian, Bombay) = 1/12 guz (Indian, Bombay) (E)	Indian
moot (Indian, Calcutta)	–	length, distance	L	1 moot (Indian, Calcutta) = 7.625×10^{-2} m	Obsolete Indian traditional unit of length used before 1920. 1 moot (Indian, Calcutta) = 1/12 guz (Indian, Calcutta) (E)	Indian

morga (Polish, Cracow)	–	surface area	L^2	1 morga (Polish, Cracow) = 3748.0191480 m^2	Obsolete traditional Polish unit of surface area used in land measurements before 1919. 1 morga (Polish, Cracow) = 67 500 square stopa (Polish, Cracow) (E)	Polish
morga (Polish, new)	–	surface area	L^2	1 morga (Polish, new) = 5598.720 m^2	Obsolete traditional Polish unit of surface area used in land measurements before 1919. 1 morga (Polish, new) = 67 500 square stopa (Polish, new) (E)	Polish
morga (Polish, Warsaw)	–	surface area	L^2	1 morga (Polish, Warsaw) = 5986.226700 m^2	Obsolete traditional Polish unit of surface area used in land measurements before 1919. 1 morga (Polish, Warsaw) = 67 500 square stopa (Polish, Warsaw) (E)	Polish
morgan	morgan	length, distance	L	1 morgan = 3×10^{-4} m	Obsolete unit used in genetics. One morgan is the distance along the chromosome in a gene which gives a recombination frequency of 1%.	
morgen (Dutch)	–	surface, area	L^2	1 morgen (Dutch) = 8244.346 m^2	Obsolete Dutch unit of area.	Dutch
morgen (Prussian)	–	surface, area	L^2	1 morgen (Prussian) = 2553.28113037 m^2	Obsolete German unit of area. 1 morgen (Prussian) = 180 square Ruthe (E)	German
Moszkowski (Weißkopf unit)	–	probability of transition	nil	(see note)	Obsolete unit employed in nuclear physics to express the nuclear quantum state's transition probability.	
motyka (Yugoslavian)	–	surface area	L^2	1 motyka (Yugoslavian) = 798.8480 m^2	Obsolete traditional Yugoslavian unit of surface area used in land measurements before 1883. 1 motyka (Yugoslavian) = 8000 square stopa (E)	Yugoslavian
mounce	–	mass	M	1 mounce = 25×10^{-3} kg (E)	Obsolete British and American unit of mass. Named after the acronym of metric ounce. Anecdotal. 1 mounce = 25 g (E)	UK, US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
mud (Dutch, dry)	–	capacity, volume	L^3	1 mud (Dutch, dry) $= 109.040 \times 10^{-3}$ m^3	Obsolete Dutch unit of capacity used for dry substances. 1 mud (Dutch, dry) = 4 schepel (E)	Dutch
mud (Moroccan)	–	capacity, volume	L^3	1 mud (Moroccan) $= 14 \times 10^{-3}$ m^3	Obsolete traditional Moroccan unit of capacity used before 1923. 1 mud (Moroccan) = 1/4 saah (Moroccan) (E)	Moroccan
mudd (Arabic)	–	capacity, volume	L^3	1 mudd (Arabic) $= 0.68 \times 10^{-3}$ m^3 (of water)	Obsolete Arabic unit of capacity used in ancient times. Measured by weight. 1 mudd (Arabic) = 1/48 cafiz (E)	Arabic
mug (hyl, metric slug, par, TME)	mug	mass	M	1 mug = 9.80665 kg (E)	Obsolete technical metric unit of mass employed by mechanical engineers (base unit of the metric gravitational system). It was equal to the mass which under an acceleration of $1 m.s^{-2}$ gives a force of 1 kgf. The name TME derives from the German acronym Technische Mass Einheit. The name mug derives from the abbreviation of **m**etric sl**ug**.	German
muid (de Paris)	–	capacity, volume	L^3	1 muid (de Paris) $= 274.218122441 \times 10^{-3}$ m^3	Obsolete French unit of capacity employed before the French Revolution. It served to express the capacity of liquids. It varied according to the location and merchandise. 1 muid (de Paris) = 288 pintes (de Paris)	French
muid (de Paris, dry)	–	capacity, volume	L^3	1 muid (de Paris, dry) $= 268.240320 \times 10^{-3}$ m^3	Obsolete French unit of capacity employed before the French Revolution. It served to express the capacity of dry substances. It varies according to the location and merchandise. 1 muid (de Paris, dry) = 144 boisseaux (de Paris) (E)	French

muoi (Cambodian)	–	mass	M	1 muoi (Cambodian) = 1 $\times 10^{-3}$ kg	Obsolete Cambodian traditional unit of mass used before 1914. 1 muoi (Cambodian) = 1 gram (E)	Cambodian
muoi (Cambodian)	–	capacity, volume	L^3	1 muoi (Cambodian) = 1 m^3	Obsolete Cambodian traditional unit of capacity used before 1914. 1 muoi (Cambodian) = 1 cubic metre (E)	Cambodian
muoi (Cambodian)	–	length, distance	L	1 muoi (Cambodian) = 1 m	Obsolete Cambodian traditional unit of length used before 1914. 1 muoi (Cambodian) = 1 metre (E)	Cambodian
musec (cumec)	cumec	volume flow rate	L^3T^{-1}	1 cumec = 1 $m^3.s^{-1}$ (E)	Obsolete British and American unit of flow rate. It was used in vacuum pump technology. The name of the unit derived from the acronym of **cu**bic **me**tre per second.	UK, US
mussa (Cypriot)	–	mass	M	1 mussa (Cypriot) = 2.79412899920 kg	Obsolete Cypriot traditional unit of mass used before 1972. 1 mussa (Cypriot) = 5 rottolo (Cypriot) (E)	Cypriot
musti (Indian)	–	capacity, volume	L^3	1 musti (Indian) = 5.156250 $\times 10^{-5}$ m^3 (of water)	Obsolete Indian unit of capacity used in ancient times. Measured by weight. 1 musti (Indian) = 1/256 drona (E)	Indian
mutagalla (Ethiopian)	–	mass	M	1 mutagalla (Ethiopian) = 7.8 $\times 10^{-3}$ kg	Obsolete Ethiopian traditional unit of mass used before 1963. 1 mutagalla (Ethiopian) = 2 kasm (Ethiopian) (E)	Ethiopian
mutchkin (Scottish)	–	capacity, volume	L^3	1 mutchkin (Scottish) = 426.19612500 $\times 10^{-6}$ m^{-3} (E)	Obsolete Scottish unit of volume used for measuring the capacity alcoholic beverages. 1 mutchkin (Scottish) = 15 fluid ounces (UK) (E)	Scottish

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
mutchkin (Scottish, liq.)	–	capacity, volume	L^3	1 mutchkin (Scottish, liq.) $= 0.423621991462 \times 10^{-3}$ m^3	Obsolete traditional Scottish unit of volume used before the Weights and Measures Act of 1824 to measure the capacity of liquids. 1 mutchkin (Scottish, liq.) = 1/32 gallon (Scottish, liq.) (E)	Scottish
muth (Austrian, dry)	–	capacity, volume	L^3	1 muth (Austrian, dry) $= 1.844670$ m^3	Obsolete Austrian unit of capacity used for dry substances. 1 muth (Austrian, dry) = 30 metzel (E)	Austrian
muthmassel (Austrian, dry)	–	capacity, volume	L^3	1 muthmassel (Austrian, dry) $= 3.8430625 \times 10^{-3}$ m^3	Obsolete Austrian unit of capacity used for dry substances. 1 muthmassel (Austrian, dry) = 1/16 metzel (E)	Austrian
mutsje (Dutch)	–	capacity, volume	L^3	1 mutsje (Dutch) $= 0.150 \times 10^{-3}$ m^3	Obsolete Dutch unit of capacity used for liquid substances. 1 mutsje (Dutch) = 1/8 mingelen (E)	Dutch
myriagram	myg	mass	M	1 myriagram = 10 kg (E)	Obsolete metric designation for gramultiple. 1 myriagram = 10^4 g (E)	
myriametre	mym	length, distance	L	1 mym = 10^4 m (E)	Obsolete name for a multiple of the metre. 1 mym = 10 km (E)	
n unit	–	dose of neutrons	L^2T^{-2}	1 n unit = 40 Gy	Obsolete unit of neutron dose employed in nuclear physics. One n unit is equal to the dose of fast neutrons which produces the same amount of ionization in a ionizing chamber as one röntgen of X-rays. 1 n unit = 1 R (E)	
nabuchodonosor (nabuchadnezzar)	–	capacity, volume	L^3	1 nabuchodonosor $= 15.153640 \times 10^{-3}$ m^3	Obsolete British unit used to express the capacity of a wine container. Still employed in oenology, especially in France.	UK, French

					1 nabuchodonosor = 10/3 gallons (UK) (E) 1 nabuchodonosor = 20 bouteilles (E)	
nail (UK)	–	length, distance	L	1 nail (UK) = 5.715×10^{-2} m (E)	Obsolete British unit of length. 1 nail (UK) = 9/4 inches (UK) (E) 1 nail (UK) = 1/4 span (UK) (E) 1 nail (UK) = 1/4 quarter yard (UK) (E) 1 nail (UK) = 3/4 palm (UK) (E) 1 nail (UK) = 27 lines (UK) (E)	UK
nanogram	ng	mass	M	1 ng = 10^{-12} kg (E)	Submultiple of the SI base unit. 1 ng = 10^{-9} g (E)	SI
nanometre	nm	length, distance	L	1 nm = 10^{-9} m (E)	Submultiple of the SI base unit.	SI
nanon (nanometre)	–	length, distance	L	1 nanon = 10^{-9} m (E)	Obsolete unit of wavelength employed in spectroscopy. 1 nanon = 1 nm (E)	
nasch (Arabic)	–	mass	M	1 nasch (Arabic) = 56.666667×10^{-3} kg	Obsolete Arabic unit of mass used in ancient times. System of the Prophet. 1 nasch (Arabic) = 1/6 rotl (E)	Arabic
nat	ni	quantity of information	nil	1 nat = 0.693147180560 bits	Dimensionless unit of quantity of information used in information theory and defined as the Naperian logarithm of two bits. 1 nat = ln 2 bits (E)	Computer
nautical mile (international)	mi (int., naut.)	length, distance	L	1 mile (int., naut.) = 1 852 m (E)	Legal international unit of length temporarily maintained with the SI. It is still used in navigation (mercantile marine, aviation). It is equal to the length of an arc of one minute measured at a latitude of N45°. The int. nautical mile has been taken equal to the nautical mile since 1970. 1 mile (int., naut.) = 6076.115486 feet	INT

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
nautical mile (UK)	mi (UK, naut.)	length, distance	L	1 mile (UK, naut.) = 1853.184 m (E)	Obsolete British unit of length employed in navigation. It is equal to the length of a minute of arc measured at a latitude of N48°. The British Admiralty used the round figure of 6080 feet. 1 mile (UK, naut.) = 6080 feet (E)	UK
nautical mile (US)	mi (US, naut.)	length, distance	L	1 mile (US, naut.) = 1853.184 m (E)	Obsolete American unit of length employed in navigation. It is equal to the length of a minute of arc measured at a latitude of N48°. 1 mile (US, naut.) = 6080 feet (E)	US
neal (Cambodian)	–	mass	M	1 neal (Cambodian) = 0.600 kg	Obsolete Cambodian traditional unit of mass used before 1914. 1 neal (Cambodian) = 600 muoi (Cambodian) (E)	Cambodian
neper	Np	logarithm (Napierian) of a ratio of two sound powers	nil	1 Np = 8.68588963808 dB (see note)	The neper expresses the ratio of two sound powers as a natural logarithm difference according to the equation $S(N_P) = \ln I/I_0$. The unit is named after John Napier (1550–1617). $S(N_P) = (20/\ln 10)S(\mathrm{dB})$	
nephelometric turbidity unit	NTU	dimensionless turbidity index	nil	(see note)	The nephelometric turbidity unit (NTU) is the American standard dimensionless unit used for measuring the turbidity of water. Note that the turbidity is an optical quantity measuring the scattering and absorption of light by suspended solids in solution. It is measured by means of a nephelometer (from Greek, *nephelos*, meaning cloudy) that measures directly the fraction of light transmitted through a sample of solution as compared to the	US

					fraction scattered at an angle of 90° to one side through a standard preparation of formazin; the ratio determines the turbidity expressed in NTU. For instance, drinking water should not have a turbidity above 1 NTU, although values up to 5 NTU are usually considered safe. Outside the US, the unit is also called the FTU (formazin turbidity unit) or formazin nephelometric unit (FNU). 1 NTU = 1 FTU (E) = 1 FNU (E)	
nepit (nit)	nit	quantity of information	nil	1 nepit = $\ln(P/P_0)$ (see note)	Unit of information defined as the napierian logarithm of the ratio of two probabilities at the receiver before (P_0) and after (P) reception of a message. Acronym of **nep** and digit. Sometimes named nit.	INT
nest	–	dimensionless unit of quantity	nil	1 nest = 3 entities (E)	Dimensionless unit of quantity equal to 3. This unit was often, but not always, used for items which nest together, such as 3 bowls or 3 hampers.	UK
neter (Ethiopian)	–	mass	M	1 neter (Ethiopian) = 0.336 kg	Obsolete Ethiopian traditional unit of mass used before 1963. 1 neter (Ethiopian) = 1120/13 kasm(Ethiopian) (E)	Ethiopian
neu (Annamese)	–	mass	M	1 neu (Annamese) = 0.3775 kg	Obsolete Annamese traditional unit of mass used before 1914. 1 neu (Annamese) = 100 dong (Annamese) (E)	Annamese
nevat (Arabic)	–	mass	M	1 nevat (Arabic) = 14.166667×10^{-3} kg	Obsolete Arabic unit of mass used in ancient times. System of the Prophet. 1 nevat (Arabic) = 1/24 rotl (E)	Arabic

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
new style	NS			(see note)	Notation used after dates to indicate that the date is stated in the Gregorian calendar (the calendar now in general use) rather than in the Julian calendar. The notation is used primarily for Gregorian dates between 15 October 1582, when the Gregorian calendar was adopted in Catholic Europe, and 14 September 1752, when it was adopted in Great Britain.	
newton	N	force, weight	MLT^{-2}	**SI derived unit** 1 N = 1 kg.m.s^{-2} (E)	The newton is that force which, when applied to a body having a mass of one kilogram, gives it an acceleration of one metre per second squared (9th CGPM, 1948). The newton is approximately equal to the force applied by the Earth's gravity field on an apple. The unit is named after the British scientist Isaac Newton (1642–1727).	SI
newton per metre	N.m^{-1}	surface tension, interfacial tension	MT^{-2}	**SI derived unit** 1 N.m^{-1} = 1 J.m^{-2} = 1kg.s^{-2}		SI
newton per square metre	N.m^{-2}	pressure, stress	$ML^{-1}T^{-2}$	**SI derived unit** 1 N.m^{-2} = 1 Pa (E)	1 atm = 101 325 N.m^{-2} (E)	SI
newton second	N.s	linear momentum, momentum	MLT^{-1}	**SI derived unit** 1 N.s^{-1} = 1kg.m.s^{-1}		SI
newton-metre	N.m	moment of a force, torque	ML^2T^{-2}	**SI derived unit**		SI
ngan (Thai)	–	surface area	L^2	1 ngan (Thai) = 400 m^2	Obsolete Thai traditional unit of surface area used in land measurements before 1923. 1 ngan (Thai) = 100 square wah (Thai)	Thai

ngu (Annamese)	–	length, distance	L	1 ngu (Annamese) = 2.35 m	Obsolete Annameseian traditional unit of length used before 1914. 1 ngu (Annamese) = 5 thuoc (Annamese) (E)	Annamese
nibble (or nybble)	ni	quantity of information	nil	1 nibble = 4 bits (E)	Dimensionless unit of quantity of information used in information theory and defined as half a byte or four bits. It is used in computer science. A nibble can be represented as a single hexadecimal (base-16) digit, with the letters A–F used as digits representing the decimal numbers 10–15, respectively. It was suggested but not adopted in computer science as alternative multiple unit of one bit.	Computer
nile	nile	reactivity of nuclear power reactor	nil	1 nile = 10^{-5} (E)	Obsolete British unit of nuclear reactivity employed in nuclear engineering.	UK
niou (Thai)	–	capacity, volume	L^3	1 niou (Thai) = 10×10^{-6} m^3	Obsolete Thai traditional unit of capacity used before 1923. 1 niou (Thai) = 1/100 tanan (Thai) (E)	Thai
niou (Thai)	–	length, distance	L	1 niou (Thai) = $2.0833333333333 \times 10^{-3}$ m	Obsolete Thai traditional unit of length used before 1923. 1 niou (Thai) = 1/96 wah (Thai) (E)	Thai
niranga (Indian, Bombay)	–	length, distance	L	1 niranga (Indian, Bombay) = 6.858 m	Obsolete Indian traditional unit of length used before 1920. 1 niranga (Indian, Bombay) = 10 guz (Indian, Bombay) (E)	Indian
niranga (Indian, Calcutta)	–	length, distance	L	1 niranga (Indian, Calcutta) = 9.15 m	Obsolete Indian traditional unit of length used before 1920. 1 niranga (Indian, Calcutta) = 10 guz (Indian, Calcutta) (E)	Indiannisf keddah (Egyptian)
–		capacity, volume	L^3	1 nisf keddah (Egyptian) = 1.031250×10^{-3} m^3	Obsolete Egyptian traditional unit of capacity used before 1891. 1 nisf keddah (Egyptian) = 1/2 keddah (Egyptian) (E)	Egyptian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
nisoku-ichi-nin (Japanese)	–	mass	M	1 nisoku-ichi-nin (Japanese) = 26.250 kg (E)	Obsolete Japanese unit of mass. 1 nisoku-ichi-nin (Japanese) = 7 kwan (E)	Japanese
nit	nt	luminous luminance	JL^{-2}	1 nit = 1 $cd.m^{-2}$ (E)	Obsolete MKSA unit of luminous luminance. The unit was adopted by the *Comité International de L'Éclairage* (CIE) in 1948. 1 nit = 10^{-4} stilb (E)	MKSA
niyo (Japanese)	–	mass	M	1 niyo (Japanese) = 1.5×10^{-2} kg (E)	Obsolete Japanese unit of mass. 1 niyo (Japanese) = 1/250 kwan (E)	Japanese
nockat (Turkish)	–	length, distance	L	1 nockat (Turkish) = $218.575592014 \times 10^{-6}$ m	Obsolete Turkish traditional unit of length used before 1933. 1 nockat (Turkish) = 1/3456 pic (Turkish) (E)	Turkish
noeud (knot, naut. mile per hour)	n. mi. h^{-1}, knot, nmph	velocity, speed	LT^{-1}	1 noeud = $5.144444444 \times 10^{-1}$ $m.s^{-1}$	International unit of velocity employed in navigation. The unit dates from the late sixteenth century, when the speed of a ship was found by dropping a float tied to a knotted line (knotted log) over the side of the vessel. The knots were originally seven fathoms apart. The number of knots passing in 30 seconds gave the speed of the ship in nautical miles per hour. 1 knot = 1 nautical mile per hour (E) 1 knot = 1852 $m.h^{-1}$ (E) 1 knot = 6076.115486 $ft.h^{-1}$ (E)	INT
noggin (UK)	nogg (UK)	capacity, volume	L^3	1 noggin (UK) = $1.420653750 \times 10^{-4}$ m^3	Obsolete British unit of capacity. 1 noggin (UK) = 1/4 pint (UK) 1 noggin (UK) = 1 roquille (UK) (E) 1 noggin (UK) = 1/32 gal (UK) (E)	U.K

nonpareil	–	length, distance	L	1 nonpareil $= 2.11666666667 \times 10^{-3}$ m	Obsolete French traditional typographical unit of length used in printing. 1 nonpareil = 6 points (E)	French
nook (Scottish)	–	surface area	L^2	1 nook (Scottish) = $1.02849358863 \times 10^5$ m^2	Obsolete traditional Scottish unit of surface area used in land measurements before the Imperial Weights and Measures Act of 1824. 1 nook (Scottish) = 1 095 200 square feet (Scottish) (E)	Scottish
nook (Scottish)	–	surface area	L^2	1 nook (Scottish) $= 8.09371284482 \times 10^4$ m^2 (E)	Obsolete Scottish unit of land surface area used in Scotland and Northern England. 1 nook (Scottish) = 20 acres (E) 1 nook (Scottish) = 4/125 square mile (E)	Scottish
normal acceleration, (standard free-fall acceleration, normal gravity, standard gravity)	g_n	acceleration	LT^{-2}	1 $g_n = 9.80665$ $m.s^{-2}$ (E)	Physical fundamental constant adopted by the *Bureau International des Poids et Mesures* (BIPM) in 1892 and approved definitively by the 5th CGPM (1913). The acceleration due to gravity varies according to the location, but for convenience in computation, the value was standardized in 1913. The value has been adopted as a standard or accepted value by the CIPM. 1 $g_n = 32.1740485564$ $ft.s^{-2}$ in the FPS system.	INT
normal cubic metre	m^3 (NTP), Nm^3	capacity, volume	L^3	1 $Nm^3 = 1$ m^3 (NTP) (E)	Unit of volume used in the gas industry. It is the volume of a defined gas measured at standard temperature and pressure (273.15K, 101 325 Pa).	INT
nox	nox	illuminance	$JL^{-2}\Omega$	1 nox $= 3.18309886184 \times 10^{-3}$ lx (E)	Obsolete unit of illuminance introduced in Germany during World War II for small illumination measurements. Named after Latin nox, noctis meaning night. 1 nox $= 10^{-3}$ apostilb (E) 1 nox $= (1/1000\,\pi)$ lux (E)	German

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
noy	–	noisiness	nil	(see note)	American unit of perceived noise. One noy is defined as the perceived noisiness of the frequency band 910–1090 Hz of random noise at a sound pressure level of 40 dB above 2×10^{-4} barye. The unit derived from the first syllable of the word **noi**se.	US
NTU	NTU	dimensionless turbidity index	nil	(see note)	The nephelometric turbidity unit (NTU) is the American standard dimensionless unit used for measuring the turbidity of water. Note that the turbidity is an optical quantity measuring the scattering and absorption of light by suspended solids in solution. It is measured by means of a nephelometer (from Greek, *nephelos*, meaning cloudy) that measures directly the fraction of light transmitted through a sample of solution as compared to the fraction scattered at an angle of 90° to one side through a standard preparation of formazin; the ratio determines the turbidity expressed in NTU. For instance, drinking water should not have a turbidity above 1 NTU, although values up to 5 NTU are usually considered safe. Outside the US, the unit is also called the FTU (formazin turbidity unit) or formazin nephelometric unit (FNU). 1 NTU = 1 FTU (E) = 1 FNU (E)	US
nufsorba (Libyan)	–	capacity, volume	L^3	1 nufsorba (Libyan) = 3.846×10^{-3} m^3	Obsolete Libyan traditional unit of capacity used for dry substances before 1927. 1 nufsorba (Libyan) = 1/2 orba (Libyan) (E)	Libyan

nul (Turkish)	–	length, distance	L	1 nul (Turkish) = 1007.196328 m	Obsolete Turkish traditional unit of length used before 1933. 1 nul (Turkish) = 4000/3 pic (Turkish) (E)	Turkish
nus (Algerian)	–	length, distance	L	1 nus (Algerian) = 0.2335 m to 0.3115 m	Obsolete traditional Algerian unit of length used before 1843. 1 nus (Algerian) = 4 termin (Algerian) (E)	Algerian
nusfiah (Saudi Arabian)	–	capacity, volume	L^3	1 nusfiah (Saudi Arabian) $= 0.950 \times 10^{-3}$ m^3	Obsolete Saudi Arabian traditional unit of capacity used for liquids before 1962. 1 nusfiah (Saudi Arabian) = 1/8 zudda (Saudi Arabian) (E)	Saudi Arabian
nybble (or nibble)	ni	quantity of information	nil	1 nybble = 4 bits (E)	Dimensionless unit of quantity of information used in information theory and defined as half a byte or four bits. It is used in computer science. A nibble can be represented as a single hexadecimal (base-16) digit, with the letters A–F used as digits representing the decimal numbers 10–15, respectively. It was suggested but not adopted in computer science as alternative multiple unit of one bit.	Computer
nyläst (Swedish)	–	mass	M	1 nyläst (Swedish) = 5100.956429 kg	Obsolete Swedish unit of weight. 1 nyläst (Swedish) = 12 000 skålpund (E)	Swedish
o'clock (plane angle)	–	plane angle	α	1 o'clock = 0.523598775598 rad (E)	Obsolete British and American unit of plane angle for describing an angle in terms of the face of a standard (12- hour) clock. Each hour 'o'clock' spans an angle of 30°, so '4 o'clock' means an angle of 120° measured from dead ahead or some other agreed-upon point of reference. 1 o'clock = 30° (E) 1 o'clock = $\pi/6$ rad (E)	UK, US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
o'clock (time)	–	time, duration, period	T	(see note)	British contraction of the phrase "of the clock", used in England after a statement of time. This phrase is a relatively recent invention, actually, it has been traced to the early 1700s. Earlier, time was usually stated in hours and minutes, and this is still the case in most languages.	UK
obol (Greek, Attic)	–	mass	M	1 obol (Greek, Attic) = 0.72×10^{-3} kg	Obsolete Greek unit of mass used in ancient times. 1 obol (Greek, Attic) = 1/6 drachma (Greek, Attic)	Attic
ocean-ton (UK)	–	capacity, volume	L^3	1 ocean-ton (UK) = 1.132673863638 m^3	Obsolete British unit of capacity used in mercantile shipping. 1 ocean-ton (UK) = 40 cubic feet (E)	UK
ochava (Mexican)	–	mass	M	1 ochava (Mexican) = $3.59567453125 \times 10^{-3}$ kg	Obsolete Mexican traditional unit of mass used before 1896. 1 ochava (Mexican) = 1/128 libbra (Mexican) (E)	Mexican
ochava (Spanish)	–	mass	M	1 ochava (Spanish) = $3.59447656250 \times 10^{-3}$ kg	Obsolete Spanish unit of mass. 1 ochava (Spanish) = 1/128 libra (E)	Spanish
ochavillo (Spanish, dry)	–	capacity, volume	L^3	1 ochavillo (Spanish, dry) = $72.2669270833 \times 10^{-6}$ m^3	Obsolete Spanish unit of capacity used for dry substances. 1 ochavillo (Spanish, dry) = 1/768 fanega (E)	Spanish
ocque (Arabic)	–	mass	M	1 ocque (Arabic) = 1.360 kg	Obsolete Arabic unit of mass used in ancient times. System of the Prophet. 1 ocque (Arabic) = 4 rotl (E)	Arabic
octant	–	solid angle	Ω	1 octant = 1.57079632680 sr	Obsolete international unit of solid angle used in astronomy. 1 octant = π/2 sr (E)	@

octant	–	plane angle	α	1 octant = 0.785398163 rad (E)	Obsolete unit of plane angle which represent one-eighth of 2π radians. 1 octant = 45° (E) 1 octant = $\pi/4$ (E)	
octant	–	solid angle	Ω	1 octant = 1.570796327 sr (E)	Obsolete unit of solid angle measure. 1 octant = 1/8 sphere (E) 1 octant = $\pi/2$ steradian (E) 1 octant = 5156.6620156 (°)2	
octava (Argentinian)	–	capacity, volume	L^3	1 octava (Argentinian) = 296.875×10^{-6} m^3	Obsolete Argentinian traditional unit of capacity used for liquids before 1887. 1 octava (Argentinian) = 1/8 frasco (Argentinian) (E)	Argentinian
octave	–	logarithmic musical interval	nil	1 octave = $\log_2 f_1/f_2$ (E) (see note)	The octave is the interval between two musical sounds having as a basic frequency ratio the 1st root of two. The number of octaves between frequencies f_1 and f_2 is: $I = \log_2(f_1/f_2)$ 1 octave = 301 savart (E) 1 octave = 1200 cent (E)	
octet (byte)	o, B	quantity of information	nil	1 byte = 8 bits (E)	Unit employed in computer science. It is equal to a sequence of adjacent binary digits operated upon as a unit in a computer and usually shorter than a word. Multiple of 8 bits. 1 KB = 1024 B ($K = 2^{10}$) 1 MB = 1 048 576 B ($M = 2^{20}$)	
Oechsle degree	°Oe	specific gravity unit to express amount of sugar in must	nil	1°Oe = 0.022 $(x/\text{wt\%})^2$ + 4.54 $(x/\text{wt\%})$ (E) (see note)	Obsolete German unit of mass fraction used to measure the sugar content of must expressed as a percentage. It is also used in Switzerland. One degree Oechsle is roughly equivalent to 0.22 wt% sugar. This unit is related legally to the Austrian unit the °KMW by the following equation: 1°Oe = 0.022 (°KMW)^2 + 4.54 (°KMW)	German

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
oersted	Œ, œ	magnetic field strength	IL^{-1}	1 Œ = 79.5774715459 $A.m^{-1}$	Obsolete cgs of magnetic field strength in the emu subsystem. One oersted is the magnetic field strength that would exert a force of one dyne on a unit magnetic dipole in vacuo. The unit is named after H.C. Oersted (1777–1851). 1 Œ = (1000/4π) $A.m^{-1}$ (E) 1 Œ = 1/4π $abampere.cm^{-1}$ (E)	cgs
oeuvrée (French)	–	surface area	L^2	1 oeuvrée (French) = 670 m^2	Obsolete local French unit of surface area used for land measurements after 1789. It corresponds to the surface that a farmer can sow in one day.	French
offa (Guinean)	–	mass	M	1 offa (Guinean) = 32.10 $\times 10^{-3}$ kg	Obsolete Guinean traditional unit of mass used before 1906. 1 offa (Guinean) = 1/2 benda (Guinean) (E)	Guinean
ohm	Ω	electric resistance	$ML^2T^{-3}I^{-2}$	**SI derived unit** 1 Ω = 1 $kg.m^2.s^{-3}.A^{-2}$ (E)	The ohm is the electric resistance between two points of a conductor when a constant difference of potential of one volt, applied between these two points, produces in this conductor a current of one ampere, this conductor not being the source of electromotive force. The unit is named after the German scientist G.S. Ohm (1789–1854).	SI
ohm (acoustic, cgs)	–	acoustic impedance	$ML^{-4}T^{-1}$	1 cgs acoustic ohm = 10^{-5} $Pa.s.m^{-3}$ (E)	Obsolete cgs unit of acoustic impedance. An acoustic impedance (including acoustic resistance and reactance) has a magnitude of 1 cgs acoustic ohm when a sound pressure of 1 barye produces a volume velocity of 1 $cm^3.s^{-1}$. 1 cgs acoustic ohm = 1 $dyn.s.cm^{-5}$ (E)	cgs

ohm (acoustic, SI)	–	acoustic impedance	$ML^{-4}T^{-1}$	1 SI acoustic ohm = 1 Pa.s.m^{-3} (E)	SI unit of acoustic impedance. An acoustic impedance (including acoustic resistance and reactance) has a magnitude of 1 SI acoustic ohm when a sound pressure of 1 pascal produces a volume velocity of 1 $m^3.s^{-1}$. 1 SI acoustic ohm = 1 N.s.m^{-5} (E)	SI
ohm (Danish, liq.)	–	capacity, volume	L^3	1 ohm (Danish, liq.) = $154.584327880 \times 10^{-3}$ m^3	Obsolete Danish traditional unit of capacity used for liquids before 1912. 1 ohm (Danish, liq.) = 160 pott (Danish, liq.) (E) 1 ohm (Danish, liq.) = 5 cubic fod (Danish, liq.) (E)	Danish
ohm (int. mean)	–	electric resistance	$ML^2T^{-3}I^{-2}$	1 ohm (int. mean) = 1.00049 Ω	Obsolete IEUS unit of electric resistance defined in 1908. It is the resistance measured at 0°C of a mercury column of 106.300 cm length which has a mass equal to 14.4521 grams (IEC, 1908).	US, IEUS
ohm (int. US)	–	electric resistance	$ML^2T^{-3}I^{-2}$	1 ohm (int. US) = 1.000495 Ω	Obsolete IEUS unit of electric resistance.	US, IEUS
ohm (legal)	ohm legal	electric resistance	$ML^2T^{-3}I^{-2}$	1 legal ohm = 0.9972 Ω	Obsolete unit of electric resistance defined in 1883. It was the resistance measured at 0°C of a mercury column of 106 cm length which has a cross section of one square millimetre.	US
ohm (mechanical, cgs)	–	mechanical impedance	$ML^{-4}T^{-1}$	1 ohm (mechanical, cgs) = 10^{-5} kg.$m^{-4}.s^{-1}$ (E)	Obsolete cgs unit for mechanical impedance used in acoustical engineering. 1 ohm (mechanical, cgs) = 1 g.$cm^{-4}.s^{-1}$ (E)	cgs
ohm (mechanical, SI)	–	mechanical impedance	$ML^{-4}T^{-1}$	**SI derived unit** 1 ohm (mechanical, SI) = 1 kg.$m^{-4}.s^{-1}$ (E)		SI

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
ohm (Prussian)	–	capacity, volume	L^3	1 ohm (Prussian) = 137.408291449 × 10^{-3} m^3	Obsolete German unit of capacity used for liquid substances. 1 ohm (Prussian) = 120 quart (E)	German
ohm (Swedish)	–	capacity, volume	L^3	1 ohm (Swedish) = 157.029715254 × 10^{-3} m^3	Obsolete Swedish unit of capacity for liquid substances. 1 ohm (Swedish) = 60 kanna (E)	Swedish
ohm (thermal)	K2.W-1	thermal resistance	$M^{-1}L^{-2}T^3Q^{-2}$	1 ohm (thermal) = 1 $K^2.W^{-1}$ (E)	SI unit used for convenience when dealing with electric and thermal analogies.	SI
ohm circular mil per foot	Ω.cmi .ft^{-1}	electric resistivity	$MLT^{-3}I^{-2}$	1 Ω.cmi.ft^{-1} = 1.66242611253 × 10^{-9} Ω.m	Obsolete British and American unit of electric resistivity. 1 Ω.cmi.ft^{-1} = 16.6242611253 μΩ.cm	UK, US
ohm metre	Ω.m	electric resistivity	$ML^3T^{-3}I^{-2}$	**SI derived unit** **1** Ω.m= 1 kg.m.s^{-3}.A^{-2} (E)		SI
oka (Arabic)	–	mass	M	1 oka (Arabic) = 1.360 kg	Obsolete Arabic unit of mass used in ancient times. System of the Prophet. 1 oka (Arabic) = 4 rotl (E)	Arabic
oka (Greek)	–	mass	M	1 oka (Greek) = 1.250 kg	Obsolete traditional Greek unit of mass used before 1922. 1 oka (Greek) = 5/2 pounds (Greek) (E)	Greek
oka (Greek, liquid)	–	capacity, volume	L^3	1 oka (Greek, liquid) = 1.333to1.340 × 10^{-3} m^3	Obsolete traditional Greek unit of capacity used for liquids before 1922.	Greek
oka (Libyan)	–	mass	M	1 oka (Libyan) = 1.282 kg	Obsolete Libyan traditional unit of mass used before 1927. 1 oka (Libyan) = 5/2 rottolo (Libyan) (E)	Libyan
oka (Turkish)	–	mass	M	1 oka (Turkish) = 1.283 kg	Obsolete Turkish traditional unit of mass used before 1933. 1 oka (Turkish) = 25/11 rottel (Turkish) (E)	Turkish

oka (Turkish)	–	mass	M	1 oka (Turkish) = 1.270058636 kg (E)	Obsolete Turkish unit of mass extensively used in Turkey and the Eastern Mediterranean. Its value varied with location over the expanse of the area formerly part of the Turkish empire. The oka is also used sometimes as a unit of capacity for liquid representing the volume occupied by an oka of water or wine.	Turkish
oka (Yugoslavian)	–	mass	M	1 oka (Yugoslavian) = 1.280 kg	Obsolete traditional Yugoslavian unit of mass used before 1883.	Yugoslavian
oke (Cypriot)	–	mass	M	1 oke (Cypriot) = 1.270058636 kg	Obsolete Cypriot traditional unit of mass used before 1972. 1 oke (Cypriot) = 25/11 rottolo (Cypriot) (E)	Cypriot
oke (Cypriot)	–	capacity, volume	L^3	1 oke (Cypriot) = 1.27855×10^{-3} m^3	Obsolete Cypriot traditional unit of capacity used before 1972. 1 oke (Cypriot) = 1/28 kile (Cypriot) (E)	Cypriot
oke (Egyptian)	–	mass	M	1 oke (Egyptian) = 1.248 kg	Obsolete Egyptian traditional unit of mass used before 1891. 1 oke (Egyptian) = 1/36 kantar (Egyptian) (E)	Egyptian
oke (Romanian)	–	mass	M	1 oke (Romanian) = 1.2727272727 kg	Obsolete traditional Romanian unit of mass used before 1884. 1 oke (Romanian) = 1/44 cantar (Romanian) (E)	Romanian
oke (Romanian, dry)	–	capacity, volume	L^3	1 oke (Romanian, dry) = 1.53750×10^{-3} m^3	Obsolete traditional Romanian unit of capacity used for dry substances before 1884. 1 oke (Romanian, dry) = 1/16 dimerla (Romanian) (E)	Romanian
oke (Romanian, liquid)	–	capacity, volume	L^3	1 oke (Romanian, liquid) = 1.4150×10^{-3} m^3	Obsolete traditional Romanian unit of capacity used for liquids before 1884. 1 oke (Romanian, liquid) = 1/10 viacka (Romanian, liquid) (E)	Romanian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
oke thapal (Burmese)	–	length, distance	L	1 oke thapal (Burmese) = 78.232 m	Obsolete Burmese traditional unit of length used before 1920. 1 oke thapal (Burmese) = 140 sandong (Burmese) (E)	Burmese
okia (Eritrean)	–	mass	M	1 okia (Eritrean) = 28×10^{-3} kg	Obsolete Eritrean traditional unit of mass used before 1927. 1 okia (Eritrean) = 1/16 rottolo (Eritrean) (E)	Eritrean
okia (Somalian)	–	mass	M	1 okia (Somalian) = 28×10^{-3} kg	Obsolete Somalian traditional unit of mass used before 1950. 1 okia (Somalian) = 1/16 rottolo (Somalian) (E)	Somalian
okieh (Egyptian)	–	mass	M	1 okieh (Egyptian) = 0.336960 kg	Obsolete Egyptian traditional unit of mass used before 1891. 1 okieh (Egyptian) = 27/100 oke (Egyptian) (E)	Egyptian
oltunna (Icelandic)	–	capacity, volume	L^3	1 oltunna (Icelandic) = $131.396678698 \times 10^{-3}$ m^3	Obsolete Icelandic traditional unit of capacity used for dry substances before 1907. 1 oltunna (Icelandic) = 17/4 cubic fet (Icelandic) (E)	Icelandic
olympiad	–	time, duration, period	T	1 olympiad = 1.262304×10^8 s (E)	Obsolete unit of time used in athletics and equal to four years. In ancient Greece, the olympiad referred to the four- year interval between successive Olympic Games. This usage was revived when the modern Olympics began, in 1896. 1 olympiad = 4 years (E)	INT
onca (Portuguese)	–	mass	M	1 onca (Portuguese) = 2.868750×10^{-2} kg	Obsolete Portuguese unit of mass. 1 onca (Portuguese) = 1/16 libra (E)	Portuguese

once (Belgian)	–	mass	M	1 once (Belgian) $= 30.5937500 \times 10^{-3}$ kg	Obsolete traditional Belgian unit of mass used before 1820. 1 once (Belgian) = 1/16 livre (Belgian) (E)	Belgian
once (de Paris) [French ounce]	–	mass	M	1 once (de Paris) $= 30.5941156250 \times 10^{-3}$ kg	Obsolete French unit of mass employed before the French Revolution (1789). 1 once (de Paris) = 1/16 livre (de Paris) (E) 1 once (de Paris) = 8 gros (de Paris) (E)	French
once (Paraguayan)	–	mass	M	1 once (Paraguayan) $= 28.6875 \times 10^{-3}$ kg	Obsolete Paraguayan traditional unit of mass used before 1899. 1 once (Paraguayan) = 1/16 libbra (Paraguayan) (E)	Paraguayan
once (Russian)	–	mass	M	1 once $= 2.559482370 \times 10^{-2}$ kg	Obsolete Russian unit of mass used before 1917 for general use. 1 once = 1/16 funt (E)	Russian
once (Russian) (apothecary)	–	mass	M	1 once (Russian) $= 2.98602798816 \times 10^{-2}$ kg	Obsolete Russian unit of mass used before 1917 in pharmacy. 1 once (Russian) = 672 doli (E)	Russian
once (Swiss)	–	mass	M	1 once (Swiss) $= 31.250 \times 10^{-3}$ kg (E)	Obsolete traditional Swiss unit of mass. 1 once (Swiss) = 1/16 livre (Swiss) (E)	Swiss
once (Syrian)	–	mass	M	1 once (Syrian) $= 29.759 \times 10^{-3}$ kg	Obsolete Syrian traditional unit of mass used before 1931. 1 once (Syrian) = 1/60 rottolo (Syrian) (E)	Syrian
oncia (Italian)	–	length, distance	L	1 oncia (Italian) $= 4.281416067 \times 10^{-2}$ m	Obsolete Italian unit of length. 1 oncia (Italian) = 1/12 piedi liprando (E)	Italian
oncia (Italian)	–	mass	M	1 oncia (Italian) $= 2.558333 \times 10^{-2}$ kg	Obsolete Italian unit of mass. 1 oncia (Italian) = 1/12 libbra (E)	Italian
onza (Argentinian)	–	mass	M	1 onza (Argentinian) $= 28.7125 \times 10^{-3}$ kg	Obsolete Argentinian traditional unit of mass used before 1887. 1 onza (Argentinian) = 1/16 libra (Argentinian) (E)	Argentinian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
onza (Brazilian)	–	mass	M	1 onza (Brazilian) = 28.690625×10^{-3} kg	Obsolete Brazilian traditional unit of mass used before 1874. 1 onza (Brazilian) = 1/16 libra (Brazilian) (E)	Brazilian
onza (Chilean)	–	mass	M	1 onza (Chilean) = $28.7558125 \times 10^{-3}$ kg	Obsolete Chilean traditional unit of mass used before 1865. 1 onza (Chilean) = 1/16 libbra (Chilean) (E)	Chilean
onza (Colombian)	–	mass	M	1 onza (Colombian) = 31.25×10^{-3} kg	Obsolete Colombian traditional unit of mass used before 1854. 1 onza (Venezuelan) = 1/16 libbra (Venezuelan) (E)	Colombian
onza (Mexican)	–	mass	M	1 onza (Mexican) = $28.76539625 \times 10^{-3}$ kg	Obsolete Mexican traditional unit of mass used before 1896. 1 onza (Mexican) = 1/16 libbra (Mexican) (E)	Mexican
onza (Spanish)	–	mass	M	1 onza (Spanish) = $28.755812500 \times 10^{-3}$ kg	Obsolete Spanish unit of mass. 1 onza (Spanish) = 1/16 libra (E)	Spanish
onza (Venezuelan)	–	mass	M	1 onza (Venezuelan) = 31.25×10^{-3} kg	Obsolete Venezuelan traditional unit of mass used before 1914. 1 onza (Venezuelan) = 1/16 libbra (Venezuelan) (E)	Venezuelan
open window unit	owu	acoustical absorption area	L^2	1 open window unit = 0.9290304 m^2 (E)	Obsolete British unit of acoustical absorption area. 1 open window unit = 1 ft^2 (E) 1 open window unit = 1 sabine (UK) (E)	UK
orba (Libyan)	–	capacity, volume	L^3	1 orba (Libyan) = 7.692×10^{-3} m^3	Obsolete Libyan traditional unit of capacity used for dry substances before 1927. 1 orba (Libyan) = 1/2 marta (Libyan) (E)	Libyan

orguia (Greek, Attic) [Greek fathom]	–	length, distance	L	1 orguia (Greek, Attic) = 1.851360 m	Obsolete Greek unit of length employed in ancient times. 1 orguia (Attic) = 6 pous (E)	Attic
orgye (Arabic) [Arabic fathom]	–	length, distance	L	1 orgye (Arabic) = 1.920 m	Obsolete Arabic unit of length used in ancient times. 1 orgye (Arabic) = 6 feet (Arabic) (E)	Arabic
orgye (Egyptian) [Egyptian fathom]	–	length, distance	L	1 orgye (Egyptian) = 2.094 m	Obsolete Egyptian unit of length used in ancient times. 1 orgye = 4 Royal cubit (E)	Egyptian
ort (Danish)	–	mass	M	1 ort (Danish) $= 0.97656250 \times 10^{-3}$ kg (E)	Obsolete Danish traditional unit of mass used before 1912. 1 ort (Danish) = 1/512 pund (Danish) (E)	Danish
ort (Swedish)	–	mass	M	1 ort $= 4.2507970247 \times 10^{-3}$ kg	Obsolete Swedish unit of weight. 1 ort = 1/100 skålpund (E)	Swedish
ort (Swedish, dry)	–	capacity, volume	L^3	1 ort (Swedish, dry) $= 8.17863100281 \times 10^{-5}$ m^3	Obsolete Swedish unit of capacity for dry substances. 1 ort (Swedish, dry) = 1/32 kanna (E)	Swedish
osmini (Russian, dry)	–	capacity, volume	L^3	1 osmini (Russian, dry) $= 104.954944 \times 10^{-3}$ m^3	Obsolete Russian unit of capacity for dry substances used before 1917. 1 osmini (Russian, dry) = 32 garnetz (E)	Russian
ottavo (Italian)	–	mass	M	1 ottavo (Italian) $= 3.197916667 \times 10^{-3}$ kg	Obsolete Italian unit of mass. 1 ottavo (Italian) = 1/96 libbra (E)	Italian
ottingar (Finnish)	–	capacity, volume	L^3	1 ottingar (Finnish) $= 15.5704761905 \times 10^{-3}$ m^3	Obsolete Finnish traditional unit of capacity used for liquids before 1892. 1 ottingar (Finnish) = 6 kannor (Finnish) (E)	Finnish
ottingkar (Danish, dry)	–	capacity, volume	L^3	1 ottingkar (Danish, dry) $= 17.3907368865 \times 10^{-3}$ m^3	Obsolete Danish traditional unit of capacity used for dry substances before 1912. 1 ottingkar (Danish, dry) = 18 pott (Danish, dry) (E)	Danish

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
oukia (Arabic)	–	mass	M	1 oukia (Arabic) $= 1.133333 \times 10^{-1}$ kg	Obsolete Arabic unit of mass used in ancient times. System of the Prophet. 1 oukia (Arabic) = 1/3 rotl (E)	Arabic
ounce (apothecary)	oz (apoth.), oz (ap.)	mass	M	1 oz (apoth.) $= 3.110347680 \times 10^{-2}$ kg	Obsolete British and American unit of weight employed in pharmacy. It was used at one time as a unit of weight for drugs and other medical preparations (lotions, potions, ointments, plants extracts, etc). 1 oz (apoth.) = 1/12 lb (apoth.) (E) 1 oz (apoth.) = 8 drachms (apoth.) (E) 1 oz (apoth.) = 24 scruples (apoth.) (E) 1 oz (apoth.) = 480 grains (apoth.) (E)	UK, US
ounce (av.)-force per square inch	ozf.in^{-2}, osi, OSI	pressure, stress	$ML^{-1}T^{-2}$	1 ounce(av.)-force per square inch = 430.9223308 Pa	Obsolete British and American unit of pressure and stress. 1 atm = 235.135180408 osi 1 osi = 1/16 psi (E)	UK, US
ounce (avoirdupois)	oz avdp, oz (av.)	mass	M	1 oz (av.) $= 2.8349523125 \times 10^{-2}$ kg (E)	Legal American and British unit of weight since the WMA of 1963. 1 oz (av.) = 1/16 lb (av.) (E) 1 oz (av.) = 16 drams (av.) (E) 1 oz (av.) = 437.5 grains (av.) (E)	UK, US
ounce (Maltese)	–	mass	M	1 ounce (Maltese) $= 28.3496428571 \times 10^{-3}$ kg	Obsolete Maltese traditional unit of mass used before 1921. 1 ounce (Maltese) = 1/16 libra (Maltese) (E)	Maltese
ounce (metric)	mounce	mass	M	1 ounce (metric) $= 25 \times 10^{-3}$ kg (E)	Obsolete British and American unit of mass. 1 ounce (metric) = 25 g (E)	UK, US

ounce (Scottish)	oz	mass	M	1 ounce (Scottish) $= 30.8442811600 \times 10^{-3}$ kg	Obsolete traditional Scottish unit of mass used before the Weights and Measures Act of 1824. 1 ounce (Scottish) = 1/20 pound (Scottish) (E)	Scottish
ounce (troy)	oz (troy)	mass	M	1 oz (troy) $= 3.110347680 \times 10^{-2}$ kg	Obsolete British unit of mass employed for the weighing of precious metals, precious stones and gems (diamond, ruby, sapphire) in the United Kingdom. Now obsolete in the UK, but this unit remains in common use in the USA. 1 oz (troy) = 1/12 lb (troy) (E) 1 oz (troy) = 20 pennyweights (troy) (E) 1 oz (troy) = 480 grains (troy) (E)	UK, US
ounce (UK, liquid)	fl oz (UK)	capacity, volume	L^3	1 fluid ounce (UK) $= 28.41307500 \times 10^{-6}$ m^3	British unit used for capacity measurements for all merchandise (solids, liquids, foodstuffs, etc). 1 fl oz (UK) = 1/160 gallon (UK) 1 fl oz (UK) = 1/40 quart (UK) (E) 1 fl oz (UK) = 1/20 pint (UK) (E) 1 fl oz (UK) = 1/5 gill (UK) (E) 1 fl oz (UK) = 8 fl dr (UK) (E) 1 fl oz (UK) = 480 minims (UK) (E) 1 fl oz (UK) = 0.960760363079 fl oz (US)	UK
ounce (UK, mercantile)	oz	mass	M	1 ounce (UK, mercantile) $= 29.159509500 \times 10^{-3}$ kg	Obsolete British unit of mass of the English Mercantile weights used since the late 12th century. 1 ounce (UK, mercantile) = 450 grains (E) 1 ounce (UK, mercantile) = 1/15 lb (UK, mercantile) (E)	UK
ounce (UK, shoes)	–	length, distance	L	1 ounce (UK, shoes) $= 3.9687500 \times 10^{-6}$ m (E)	Obsolete British unit of length used to measure non-soles shoe leather thickness. 1 ounce (UK, shoes) = 1/64 inch (E) 1 ounce (UK, shoes) = 9/4 points (E)	UK

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
tpgoto 493 ounce (UK, Tower)	oz	mass	M	1 ounce (UK, Tower) $= 29.159509500 \times 10^{-3}$ kg	Old British unit of mass, base unit for English Tower weights and abolished in 1528. 1 ounce (UK, Tower) = 450 grains (E) 1 ounce (UK, Tower) = 1/12 pound (UK, Tower) (E)	UK
ounce (US, liquid)	fl oz (US)	capacity, volume	L^3	1 fluid ounce (US) $= 29.5735295625 \times 10^{-6}$ m^3	American unit used for capacity measurements of liquids. 1 fl oz (US) = 1/128 gall (US, liq.) (E) 1 fl oz (US) = 1/32 quart (US, liq.) (E) 1 fl oz (US) = 1/16 pint (US, liq.) (E) 1 fl oz (US) = 1/4 gill (US, liq.) (E) 1 fl oz (US) = 8 fl dr (US) (E) 1 fl oz (US) = 480 minims (US, liq.) (E) 1 fl oz (US) = 1.04084227288 fl oz (UK)	US
ounce-force (av.)	ozf av.	force, weight	MLT^{-2}	1 ozf = $2.780138510 \times 10^{-1}$ N	British and American unit of force. 1 ozf = 1/16 000 kip (E) 1 ozf = 1/16 lbf (E)	UK, U.S, CAN
ouncedal	odl	force, weight	MLT^{-2}	1 ouncedal = $8.640934654850 \times 10^{-3}$ N	Obsolete British and American submultiple unit of force in the FPS systems. It corresponds to the force which accelerates an ounce at 1 $ft.s^{-2}$. 1 ouncedal = 1 $oz.ft.s^{-2}$ (E) 1 ouncedal = 1/16 $lbft.s^{-2}$ (E)	UK, US
outava (Portuguese, dry)	–	capacity, volume	L^3	1 outava (Portuguese, dry) $= 1.6875 \times 10^{-3}$ m^3	Obsolete Portuguese unit of capacity used for dry substances. 1 outava (Portuguese, dry) = 1/32 fanga (E)	Portuguese
outava (Portuguese)	–	mass	M	1 outava (Portuguese) $= 3.585937500 \times 10^{-3}$ kg	Obsolete Portuguese unit of mass. 1 outava (Portuguese) = 1/128 libra (E)	Portuguese
outen (Egyptian)	–	capacity, volume	L^3	1 outen (Egyptian) $= 2.125 \times 10^{-4}$ m^3 (of water)	Obsolete Egyptian unit of capacity used in ancient times. Measured by weight. 1 outen (Egyptian) = 1/160 khar (E)	Egyptian

oxhoft (Danish, liq.)	–	capacity, volume	L^3	1 oxhoft (Danish, liq.) = 231.876491820 $\times 10^{-3}$ m^3	Obsolete Danish traditional unit of capacity used for liquids before 1912. 1 oxhoft (Danish, liq.) = 240 pott (Danish, liq.) (E) 1 oxhoft (Danish, liq.) = 15/2 cubic fod (Danish, liq.) (E)	Danish
oxhoft (Prussian)	–	capacity, volume	L^3	1 oxhoft (Prussian) = 206.112437174 $\times 10^{-3}$ m^3	Obsolete German unit of capacity used for liquid substances. 1 oxhoft (Prussian) = 180 quart (E)	German
oxhoft (Swedish)	–	capacity, volume	L^3	1 oxhoft (Swedish) = 235.544580 $\times 10^{-3}$ m^3	Obsolete Swedish unit of capacity for liquid substances. 1 oxhoft (Swedish) = 90 kanna (E)	Swedish
oxhooft (Dutch)	–	capacity, volume	L^3	1 oxhooft (Dutch) = 230.400 $\times 10^{-3}$ m^3	Obsolete Dutch unit of capacity used for liquid substances. 1 oxhooft (Dutch) = 192 mingelen (E)	Dutch
oxybaphon (Greek, Attic)	–	capacity, volume	L^3	1 oxybaphon (Greek, Attic) = 6.75 $\times 10^{-5}$ m^3	Obsolete Greek unit of volume employed in ancient times. It was used for capacity measurements of dry substances. 1 oxybaphon (Greek, Attic) = 1/16 chenica (E)	Attic
oxygen volume	vol. O_2	relative strength of aqueous hydrogen per oxide solutions	nil	x vol. O_2 = (3.0351334x) g/$dm^3H_2O_2$ x vol. O_2 = (89.2299456x) mol/$dm^3H_2O_2$	Obsolete unit of potential oxygen gas released by an aqueous solution of hydrogen peroxide (H_2O_2). It was equal to the total volume of oxygen released at standard temperature and pressure after overall decomposition of the a given volume of solution. A solution of hydrogen peroxide of 120 volumes means that the decomposition of 1 dm^3 of the reagent will give off 120 dm^3 of pure oxygen at 273.15 K and 101 325 Pa. 1 vol. O_2 = 329.474810 $\times 10^{-3}$ $m^3.kg^{-1}$ pure H_2O_2	INT

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
pace (Persian)	–	length, distance	L	1 pace (Persian) = 1.920 m	Obsolete unit of length in the Assyrio-Chaldean-Persian system used in ancient times. 1 pace = 6 zereths (E)	Persian
pace (UK)	–	length, distance	L	1 pace (UK) = 7.62×10^{-1} m (E)	Obsolete British unit of length. It was defined as the distance between points where alternate feet touch the ground. 1 pace (UK) = 2.5 feet (E) 1 pace (UK) = 30 inches (E)	UK
pace (UK, geometric)	–	length, distance	L	1 pace (UK, geometric) = 1.524 m (E)	Old British and American unit of length defined as the distance between points where the same foot hits the ground. 1 pace (UK, geometric) = 60 inches (E) 1 pace (UK, geometric) = 5 feet (E)	UK, US
pace (US, military)	–	length, distance	L	1 pace (US, military) = 0.762 m (E)	Old American unit of length used in the United States Army as the official military pace. It was defined as the distance between points where alternate feet touch the ground. 1 pace (US) = 2.5 feet (E) 1 pace (US, military) = 30 inches (E)	US
pack	pk	items per package	nil	1 pack = 1 item per package (E)	British and American commercial unit for specifying the number of items per package. For instance, in retail trade, packages containing 4 items are often described as ‘‘4 pack” or 4 pk. The symbol pk should be discontinued because it can be confused with symbol of the peck.	
packen (Russian)	–	mass	M	1 packen (Russian) = 491.420615095 kg (E)	Obsolete Russian unit of mass used before the revolution of 1917. 1 packen (Russian) = 1200 funts (E)	Russian

					1 packen (Russian) = 30 poods (E) 1 packen (Russian) = 3 berkovets (E)	
paegel (Danish, liq.)	–	capacity, volume	L^3	1 paegel (Danish, liq.) $= 0.241538012312 \times 10^{-3}$ m^3	Obsolete Danish traditional unit of capacity used for liquids before 1912. 1 paegel (Danish, liq.) = 1/128 cubic fod (Danish) (E)	Danish
pagoda (Ceylon and Madras)	–	mass	M	1 pagoda (Ceylon and Madras) $= 3.5436875 \times 10^{-3}$ kg	Obsolete Ceylonese and Madrasian traditional unit of mass used before 1920. 1 pagoda (Ceylon and Madras) = 1/80 seer (Ceylon) (E)	Ceylon
pai (Burmese)	–	mass	M	1 pai (Burmese) $= 1.02 \times 10^{-3}$ kg	Obsolete Burmese traditional unit of mass used before 1920. 1 pai (Burmese) = 4 ruay (Burmese) (E)	Burmese
pai (Thai)	–	mass	M	1 pai (Thai) $= 468.75 \times 10^{-6}$ kg	Obsolete Thai traditional unit of mass used before 1923. 1 pai (Thai) = 1/2 grani (Thai) (E)	Thai
pair (UK)	pr	dimensionless unit of quantity	nil	1 pair (UK) = 2 entities (E)	Dimensionless British unit of quantity equal to 2. The word is named after the Latin, *paria*, meaning two equals.	UK
pala (Indian)	–	capacity, volume	L^3	1 pala (Indian) $= 5.156250 \times 10^{-5}$ m^3 (of water)	Obsolete Indian unit of capacity used in ancient times. Measured by weight. 1 pala (Indian) = 1/256 drona (E)	Indian
pala (Indian)	–	mass	M	1 pala (Indian) $= 4.70 \times 10^{-3}$ kg	Obsolete Indian unit of mass used in ancient times.	Indian
palaz (Yugoslavian)	–	length, distance	L	1 palaz (Yugoslavian) $= 3.63218390805 \times 10^{-2}$ m	Obsolete traditional Yugoslavian unit of length used before 1883. 1 palaz (Yugoslavian) = 10/87 stopa (Yugoslavian) (E)	Yugoslavian
palestra (Greek, Attic) [Greek palm]	–	length, distance	L	1 palestra (Greek, Attic) $= 7.714 \times 10^{-2}$ m	Obsolete Greek unit of length employed in ancient times. 1 palestra (Attic) = 1/4 pous (E)	Attic

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
paletz (Russian)	–	length, distance	L	1 paletz (Russian) = 1.27×10^{-2} m	Obsolete Russian unit of length used before 1917. 1 duïme (Russian) = 1/24 foute (E)	Russian
palgat (Burmese)	–	length, distance	L	1 palgat (Burmese) = 0.1016 m	Obsolete Burmese traditional unit of length used before 1920. 1 palgat (Burmese) = 2/11 sandong (Burmese) (E)	Burmese
pally (Indian)	–	capacity, volume	L^3	1 pally (Indian) = 5.505×10^{-3} m^3	Obsolete Indian traditional unit of capacity used before 1920. 1 pally (Indian) = 4 raik (Indian) (E)	Indian
palm (Egyptian, short)	–	length, distance	L	1 palm (Egyptian, short) = $7.485714286 \times 10^{-2}$ m	Obsolete Egyptian unit of length used in ancient times.	Egyptian
palm (Hebrew)	–	length, distance	L	1 palm (Hebrew) = 9.25×10^{-2} m	Obsolete Hebrew unit of length used in ancient times. 1 palm = 1/6 long cubit (E)	Hebrew
palm (Persian)	–	length, distance	L	1 palm (Persian) = 8×10^{-2} m	Obsolete unit of length in the Assyrio-Chaldean-Persian system used in ancient times. 1 palm = 1/4 zereth (E)	Persian
palm (UK)	plm	length, distance	L	1 palm (UK) = 7.62×10^{-2} m (E)	Obsolete British unit of length. 1 palm (UK) = 3 inches (E) 1 palm (UK) = 1/10 paces (UK) (E) 1 palm (UK) = 36 lines (UK) (E)	UK
palma (Spanish)	–	length, distance	L	1 palma (Spanish) = $2.089762500 \times 10^{-1}$ m	Obsolete Spanish unit of length. 1 palma (Spanish) = 1/4 vara (E)	Spanish
palmipes (Roman)	–	length, distance	L	1 palmipes (Roman) = 0.368 m	Obsolete Roman unit of length employed in ancient times. 1 palmipes (Roman) = 5/4 pes (E) 1 palmipes = 1 pes + 1 palmus (E)	Roman

palmo (Brazilian)	–	length, distance	L	1 palmo (Brazilian) = 0.22222222222222 m	Obsolete Brazilian traditional unit of length used before 1874. 1 palmo (Brazilian) = 2/3 pe (Brazilian) (E) 1 palmo (Brazilian) = 2/9 m (E)	Brazilian
palmo (Libyan)	–	length, distance	L	1 palmo (Libyan) = $2.26666666666667 \times 10^{-2}$ m	Obsolete Libyan traditional unit of length used before 1927. 1 palmo (Libyan) = 1/3 pic (Libyan) (E)	Libyan
palmo (Maltese)	–	length, distance	L	1 palmo (Maltese) = 0.261 m	Obsolete Maltese traditional unit of length used before 1921. 1 palmo (Maltese) = 1/8 canna (Maltese) (E)	Maltese
palmo (Portuguese)	–	length, distance	L	1 palmo (Portuguese) = 2.190×10^{-1} m	Obsolete Portuguese unit of length. 1 palmo (Portuguese) = 2/3 pe (E)	Portuguese
palmos (Balearic)	–	length, distance	L	1 palmos (Balearic) = 0.1955 m	Obsolete Balearic traditional unit of length. 1 palmos (Balearic) = 1/8 canna (Balearic) (E)	Balearic
palmus (Roman) [Roman palm]	–	length, distance	L	1 palmus (Roman) = 7.36×10^{-2} m	Obsolete Roman unit of length employed in ancient times. 1 palmus (Roman) = 1/4 pes (E)	Roman
pan (Provence)	–	length, distance	L	1 pan (Provence) = 0.2460625 m	Obsolete French unit of length used in surveyors' measurements and agriculture in Southern France. 1 pan (Provence) = 1/8 canne (E)	French
pan carré (Provence)	–	surface, area	L^2	1 pan carré (Provence) = $6.0546753906 \times 10^{-2}$ m^2	Obsolete French unit of land surface area used in surveyors' measurements and agriculture in Southern France. 1 pan carré (Provence) = 1/64 canne carrée (E)	French
pan cube (Provence)	–	volume, capacity	L^3	1 pan cube (Provence) = $14.8982856330 \times 10^{-3}$ m^3	Obsolete French unit of volume used in Southern France. 1 pan cube (Provence) = 1/512 canne cube (E)	French

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
panal (Basse-Alpes)	–	surface area	L^2	1 panal (Basse-Alpes) = 625 m^2 (E)	Obsolete local French unit of surface area used for land measurements after 1789. 1 panal (Basse-Alpes) =1/16 hectares (E)	French
panilla (Spanish)	–	capacity, volume	L^3	1 panilla (Spanish) = $0.156431692 \times 10^{-3}$ m^3 (water)	Obsolete Spanish unit of capacity used for liquid substances. 1 panilla (Spanish) = 1/100 arroba (water) (E)	Spanish
par (hyl, mug, metric slug, TME, techma)	par	mass	M	1 par = 9.80665 kg (E)	Obsolete technical metric unit of mass employed by mechanical engineers (base unit of the metric gravitational system). It was equal to the mass which under an acceleration of $1 m.s^{-2}$ gives a force of 1 kgf. The name TME derives from the German acronym Technische Mass Einheit. The name of the unit *par* derives from the French word *paresseux* = sluggish.	German
paragon	–	length, distance	L	1 paragon = $7.0555555556 \times 10^{-3}$ m	Obsolete traditional typographical unit of length used in printing. 1 paragon = 20 points (E)	
parah (Indian)	–	mass	M	1 parah (Indian) = $31.1013333333 \times 10^{-3}$ kg	Obsolete Indian traditional unit of mass used before 1920. 1 parah (Indian) = 1/30 seer (Indian) (E)	Indian
parah (Indian)	–	capacity, volume	L^3	1 parah (Indian) = 0.1101 m^3	Obsolete Indian traditional unit of capacity used before 1920. 1 parah (Indian) = 80 raik (Indian) (E)	Indian
parasang (Arabic)	–	length, distance	L	1 parasang (Arabic) = 5.760×10^3 m	Obsolete Arabic unit of length used in ancient times. 1 parasang (Arabic) = 18 000 feet (Arabic) (E)	Arabic

parasang (Persian)	–	length, distance	L	1 parasang (Persian) = 6400 m	Obsolete unit of length in the Assyrio-Chaldean-Persian system used in ancient times. 1 parasang = 20 000 zereths (E)	Persian
parasang (Persian)	–	length, distance	L	1 parasang (Persian) = 5486.40 m	Obsolete Persian traditional unit of length used before 1933. 1 parasang (Persian) = 96 000 gireh (Persian) (E)	Persian
parasange (Egyptian)	–	length, distance	L	1 parasange (Egyptian) $= 6.980 \times 10^3$ m	Obsolete Egyptian unit of length used in ancient times. 1 parasange = 40 000/3 Royal cubit (E)	Egyptian
parmack (Turkish)	–	length, distance	L	1 parmack (Turkish) $= 3.147488525 \times 10^{-2}$ m	Obsolete Turkish traditional unit of length used before 1933. 1 parmack (Turkish) = 1/24 pic (Turkish) (E)	Turkish
parsec	pc	length, distance	L	1 parsec $= 3.0856775854 \times 10^{16}$ m	Astronomical unit of length employed to describe stellar distance. The parsec is the distance from which one AU would subtend an angle of 1 second of arc. The parsec is derived from the English acronym **par**allax **sec**ond. 1 pc $= 2.062648 \times 10^5$ AU 1 pc = 3.261633 l.y. 1 pc $= (6.48/\pi) \times 10^5$ AU (E)	@
part per billion	ppb	fraction, relative values, yields, efficiencies, abundance	nil	1 ppb $= 10^{-9}$ (E)		INT
part per hundred (percent)	pph, %, pct	fraction, relative values, yields, efficiencies, abundance	nil	1 pph = 1% $= 10^{-2}$ (E)		INT
part per hundred million	pphm	fraction, relative values, yields, efficiencies, abundance	nil	1 pphm $= 10^{-8}$ (E)		INT

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
part per hundred thousand	ppht	fraction, relative values, yields, efficiencies, abundance	nil	1 ppht = 10^{-5} (E)		INT
part per million	ppm	fraction, relative values, yields, efficiencies, abundance	nil	1 ppm = 10^{-6} (E)		INT
part per quadrillion	ppq	fraction, relative values, yields, efficiencies, abundance	nil	1 ppt = 10^{-15} (E)		INT
part per tera	ppt	fraction, relative values, yields, efficiencies, abundance	nil	1 ppt = 10^{-12} (E)		INT
part per thousand	ppt, ‰	fraction, relative values, yields, efficiencies, abundance	nil	1 ppt = 1‰ = 10^{-3} (E)		INT
particle flux unit	pfu	particle flux per unit of solid angle	$L^{-2}T^{-1}W^{-1}$	1 pfu = 1 $cm^{-2}.s^{-1}.sr^{-1}$ (E)	Obsolete unit used in aeronautics to measure the rate at which particles are received by a spacecraft as particles per solid angle per detector area per second.	@
parto (Maltese)	–	mass	M	1 parto (Maltese) = 1.77185267857 × 10^{-3} kg	Obsolete Maltese traditional unit of mass used before 1921. 1 parto (Maltese) = 1/256 libra (Maltese) (E)	Maltese
pas (de Paris) (French pace)	–	length, distance	L	1 pas (de Paris) = 0.624 m	Obsolete French unit of length used before the French Revolution (1789).	French
pas (géographique)	–	length, distance	L	1 pas (géographique) = 1.6241970835 m	Obsolete French unit of length used before the French revolution of 1789. 1 pas (géographique) = 5 pieds (E)	French

pascal	Pa	pressure, stress	$ML^{-1}T^{-2}$	**SI derived unit** 1 Pa = 1 $N.m^{-2}$ (E) = 1 $kg.m^{-1}s^{-2}$ (E)	The pascal is the uniform pressure which applied on a plane area of one square metre, exerts perpendicularly at this surface a total force of one newton (14th CGPM, 1971). The unit is named after the French scientist B. Pascal (1623–1662). 1 atm = 101 325 Pa (E)	SI
pascal second	Pa.s	dynamic viscosity, absolute viscosity	$ML^{-1}T^{-1}$	**SI derived unit** 1 Pa.s = 1 $kg.m^{-1}.s^{-1}$ (E)	The pascal second is the unit of dynamic viscosity or absolute viscosity. It describes the laminar flow of an homogeneous fluid which undergoes a shear stress normal to it of one pascal when it undergoes a velocity gradient of one reciprocal second.	SI
paso geometrico (Brazilian)	–	length, distance	L	1 paso geometrico (Brazilian) = 1.6666666667 m	Obsolete Brazilian traditional unit of length used before 1874. 1 paso geometrico (Brazilian) = 5 pe (Brazilian) (E) 1 paso geometrico (Brazilian) = 5/3 m (E)	Brazilian
passo (Spanish)	–	length, distance	L	1 passo (Spanish) = 1.393175 m	Obsolete Spanish unit of length. 1 passo (Spanish) = 5/3 vara (E)	Spanish
passus (Roman) [Roman double pace]	–	length, distance	L	1 passus (Roman) = 1.472 m	Obsolete Roman unit of length employed in ancient times. 1 passus (Roman) = 5 pes (E)	Roman
pastille dose (B unit)	–	exposure	ITM^{-1}	1 pastille dose = 1.290×10^{-1} $C.kg^{-1}$	Obsolete unit of exposure of ionizing radiations. It was equal to the radiation dose required to change the variation colour of a basic barium platinocyanide pastille from apple green (tint A) to reddish brown (tint B). 1 B unit = 500 röntgens (E)	
payok (Russian, dry)	–	capacity, volume	L^3	1 payok (Russian, dry) = 52.477472×10^{-3} m^3	Obsolete Russian unit of capacity for dry substances used before 1917. 1 payok (Russian, dry) = 16 garnetz (E)	Russian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
pe (Brazilian)	–	length, distance	L	1 pe (Brazilian) = 0.33333333333333 m	Obsolete Brazilian traditional unit of length used before 1874. 1 pe (Brazilian) = 3/10 vara (Brazilian) (E) 1 pe (Brazilian) = 1/3 m (E)	Brazilian
pe (Portuguese)	–	length, distance	L	1 pe (Portuguese) = 0.3285 m	Obsolete Portuguese unit of length.	Portuguese
pearl	–	length, distance	L	1 pearl = $1.763888888889 \times 10^{-3}$ m	Obsolete British and American traditional typographical unit of length used in printing. 1 pearl = 5 points (E)	UK, US
pechya (Greek, Attic)	–	length, distance	L	1 pechya (Greek, Attic) = 0.462840 m	Old Greek unit of length used in ancient times. 1 pechya (Greek, Attic) = 1.5 pous (E) 1 pechya (Greek, Attic) = 24 digits (E)	Attic
peck (Scottish, dry)	–	capacity, volume	L^3	1 peck (Scottish, dry) = $9.00193864125 \times 10^{-3}$ m^3 (wheat, peas, beans, rice, salt) 1 peck (Scottish, dry) = $13.1322653483 \times 10^{-3}$ m^3 (oats, barley, malt)	Obsolete traditional Scottish unit of volume used before the Weights and Measures Act of 1824 to measure the capacity of dry substances (wheat, peas, beans, salt, rice, barley, malt). 1 peck (Scottish, dry) = 4 lippies (Scottish, dry) (E)	Scottish
peck (UK)	pk (UK)	capacity, volume	L^3	1 peck (UK) = $9.092184000 \times 10^{-3}$ m^3	Obsolete British unit used for capacity measurements for all merchandise (solids, liquids, foodstuffs, etc). 1 peck (UK) = 2 gallons (UK) (E) 1 peck (UK) = 4 pottle (UK) (E) 1 peck (UK) = 8 quarts (UK) (E) 1 peck (UK) = 16 pints (UK) (E) 1 peck (UK) = 64 gills (UK) (E) 1 peck (UK) = 1.0320579753 peck (US)	UK

peck (US, dry)	pk (US, dry)	capacity, volume	L^3	1 peck (US, dry) = $8.80976754172 \times 10^{-3}$ m^3	Obsolete American unit of capacity used to measure the volume of powdered or divided solid materials (flour, sand, cement, ores, etc). 1 peck (US, dry) = 2 gallons (US, dry) (E) 1 peck (US, dry) = 16 pints (US, dry) (E) 1 peck (US, dry) = 8 quarts (US, dry) (E) 1 peck (US, dry) = 0.968938545648 peck (UK) 1 peck = 537.605 in^3 (E)	US
pecul (Philippine)	–	mass	M	1 pecul (Philippine) = 60 kg	Obsolete Philippine traditional unit of mass used before 1906. 1 pecul (Philippine) = 100 catty (Philippine) (E)	Philippine
pekeis (Egyptian)	–	surface, area	L^2	1 pekeis (Egyptian) = 27.405225 m^2	Obsolete Egyptian unit of area used in ancient times. 1 pekeis = 100 sq. royal cubits (derah) (E)	Egyptian
penge (Danish)	–	surface area	L^2	1 penge (Danish) = 81.5223860270 m^2	Obsolete Danish traditional unit of surface area used in land measurements before 1912. 1 penge (Danish) = (500/87) square ruthe (Danish) (E)	Danish
pennyweight (troy)	dwt (troy)	mass	M	1 dwt (troy) = $1.555173840 \times 10^{-3}$ kg	Obsolete British and American unit of mass. 1 dwt (troy) = 1/240 lb (troy) (E) 1 dwt (troy) = 24 grains (troy) (E)	UK, US
pennyweight (UK, mercantile)	dwt	mass	M	1 pennyweight (UK, mercantile) = $1.45797547500 \times 10^{-3}$ kg	Obsolete British unit of mass of the English Mercantile weights used since the late 12th century. 1 dwt (UK, mercantile) = 22.5 grains (E) 1 dwt (UK, mercantile) = 1/20 ounce (UK, mercantile) (E) 1 dwt (UK, mercantile) = 1/300 pound (UK, mercantile) (E)	UK

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
pennyweight (UK, Tower)	dwt	mass	M	1 pennyweight (UK, Tower) = 1.45797547500 $\times 10^{-3}$ kg	Obsolete British unit of mass of the English Mercantile weights used since the late 12th century. 1 dwt (UK, Tower) = 22.5 grains (E) 1 dwt (UK, Tower) = 1/20 ounce (UK, Tower) (E) 1 dwt (UK, Tower) = 1/240 pound (UK, Tower) (E)	UK
per annum	P.A., p.a.	frequency	T^{-1}	1 per annum = 3.16880878 $\times 10^{-9}$ Hz (E)	British and American unit of frequency equal to once a year and extensively used by physicians. 1 per annum = 1 per year (E)	UK, US
per diem	P.D., p.d.	frequency	T^{-1}	1 per diem = 1.15740740741 $\times 10^{-6}$ Hz (E)	British and American unit of frequency equal to once a year and extensively used by physicians. 1 per diem = 1 per day (E)	UK, US
per mill	‰	fraction, proportion	nil	1 per mill = 10^{-3} (E)	British and American unit of proportion, equal to one thousandth. Note that unlike percent, per mill is written as two words. Its symbol is like the percent symbol but with two zeroes in the denominator. The spelling per mill is common in the US, while per mil is more common in the UK	UK, US
percent	%	plane angle	α	1% = 9.999666687 $\times 10^{-3}$ rad	Unit of plane angle employed in civil engineering. One percent describes a plane angle which corresponds to a difference of height of one metre for 100 metres of length. 1% = 0.572938697683° 1% = 0.636598552982 gon	INT

perch (rod, pole)	rd	length, distance	L	1 perch = 5.0292 m (E)	Obsolete American and British unit of length used in surveyor's measurements. 1 perch = 1 pole (E) 1 perch = 1 rod (E) 1 perch = 5.5 yards (E) 1 perch = 16.5 feet (E) 1 perch = 198 inches (E)	UK, US
perch (Irish)	–	length, distance	L	1 perch (Irish) = 6.4008 m (E)	Obsolete unit of length used in surveyors' measurements in Ireland. 1 perch (Irish) = 21 feet (E)	Ireland
perche (Belgian)	–	length, distance	L	1 perche (Belgian) = 6.497 m	Obsolete traditional Belgian unit of length used before 1820. 1 perche (Belgian) = 30 pieds (E)	Belgian
perche (de Paris)	–	length, distance	L	1 perche (de Paris) = 5.8471095006 m	Obsolete French unit of length used before the French Revolution (1789). 1 perche (Paris) = 18 pieds (de Paris) (E) 1 perche (Paris) = 3 toises (de Pérou) (E)	French
perche (ordinaire)	–	length, distance	L	1 perche (ordinaire) = 6.496788334 m	Obsolete French unit of length used before the French Revolution (1789). 1 perche (ordinaire) = 20 pieds (de Paris) (E) 1 perche (ordinaire) = 20/6 toises (de Pérou) (E)	French
perche (de Paris)	–	surface, area	L^2	1 perche (de Paris) = 34.18868950120 m^2	Obsolete French unit of area used in surveyor's measurements before the French revolution in 1789. 1 perche (de Paris) = 1/100 arpent (de Paris) (E) 1 perche (de Paris) = 1 sq. perche (de Paris) (E)	French
perche (Eaux et Forêts)	–	length, distance	L	1 perche (Eaux et Forêts) = 7.14646716740 m	Obsolete French unit of length used before the French Revolution (1789). 1 perche (Eaux et Forêts) = 22 pieds (de Paris) (E)	French

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
perche (Eaux et Forêts)	–	surface, area	L^2	1 perche (Eaux et Forêts) = 51.0719929747 m^2	Obsolete French metric unit of area used in surveyor's measurements. 1 perche (Eaux et Forêts) = 1/100 arpent (Eaux et Forêts) (E) 1 perche (Eaux et Forêts) = 484 sq. pieds (E)	French
perche (masonry) [of stone]	–	capacity, volume	L^3	1 perche (masonry) = $700.841953152 \times 10^{-3}$ m^3	Obsolete American and British unit of employed in civil engineering. It was equal to a quantity 1.5 feet thick, 1 foot high and 16.5 feet long. 1 perche (masonry) = 24.75 ft^3	UK, US
perche (Québec)	–	length, distance	L	1 perche (Québec) = 5.8471095006 m	Obsolete French unit of length used before the French Revolution (1789). Still used in the Québec (Canada). 1 perche (Québec) = 18 pieds (de paris) (E)	CAN
perche (Royale)	–	length, distance	L	1 perche (Royale) = 7.14646716667 m	Obsolete French unit of length used before the French revolution of 1789. 1 perche (Royale) = $3\frac{2}{3}$ toises (de Pérou) (E) 1 perche (Royale) = 22 pieds (E)	French
perche (Swiss)	–	length, distance	L	1 perche (Swiss) = 4.80 m (E)	Obsolete traditional Swiss unit of length used before 1877. 1 perche (Swiss) = 16 fuss (Swiss) (E)	Swiss
perche (Versailles)	–	surface area	L^2	1 perche (Versailles) = 50 m^2	Obsolete local French unit of surface area used for land measurements after 1789. 1 perche (Versailles) = 1/50 minée (Versailles) (E)	French
perfect ream	–	quantity of paper sheet	nil	1 perfect ream = 516 sheets (E)	British dimensionless unit of quantity for paper. While an ordinary ream is 480 or 500 sheets, a perfect ream is 516 sheets. The additional amount is to allow for sheets which may be spoiled in shipment.	UK

peridot (jeweller's)	–	mass	M	1 peridot (jeweller's) = $5.20833333 \times 10^{-9}$ kg	Obsolete British and American unit of mass for weighing precious stones (i.e., diamond, emerald, ruby, and sapphire) and other gemstones. 1 peridot (jeweller's) = 1/384 point (jeweller's) (E) 1 peridot (jeweller's) = 1/9600 grain (jeweller's) (E) 1 peridot (jeweller's) = 1/192 000 carat (E) 1 peridot (jeweller's) = 5.208333 μg	UK, US
perm	–	permeability	L^2	1 perm = 10^{-4} m^2	1 perm = 1 cm^2 (E)	
perm (0°C)	perm (0°C)	permeability	$L^{-1}T$	1 perm (0°C) = $5.72135028221 \times 10^{-11}$ $kg.Pa^{-1}.m^{-2}.s^{-1}$	American unit employed in gas separation by the membrane process. The perm (0°C) is defined as one grain of water passing through a membrane having a cross-sectional area of one square foot in one hour under the action of vapour pressure differential of one inch of mercury measured at 0°C. 1 perm (0°C) = 1 grain (water).$h^{-1}.ft^{-2}$ in Hg^{-1} (E)	US
perm (23°C)	perm (23°C)	permeability	$L^{-1}T$	1 perm (23°C) = $5.74526429720 \times 10^{-11}$ $kg.Pa^{-1}.m^{-2}.s^{-1}$	American unit employed in gas separation by the membrane process. The perm (23°C) is defined as one grain of water passing through a membrane having a cross-sectional area of one square foot in one hour under the action of vapour pressure differential of one inch of mercury measured at 23°C. 1 perm (23°C) = 1 grain (water).$h^{-1}.ft^{-2}.inHg^{-1}$ (E)	US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
perm-inch (0°C)	perm-inch (0°C)	permeability coefficient (mass flow rate)	T	1 perm-inch (0°C) = $1.4532297168 \times 10^{-12}$ $kg.Pa^{-1}.m^{-1}.s^{-1}$	American unit employed in gas separation by membrane process. The perm-inch (0°C) is defined as one grain of water passing in one hour across a membrane of one square foot cross-sectional area and one inch thickness under the action of vapour pressure differential of one inch of mercury measured at 0°C. 1 perm-inch (0°C) = 1 grain (water).$h^{-1}.ft^{-2}.in.inHg^{-1}$ (E) 1 perm-inch (0°C) = 1/12 grain (water).$h^{-1}.ft^{-1}.inHg^{-1}$ (E)	UK, US
perm-inch (23°C)	perm-inch (23°C)	permeability coefficient (mass flow rate)	T	1 perm-inch (23°C) = $1.45929713149 \times 10^{-12}$ $kg.Pa^{-1}.m^{-1}.s^{-1}$	American unit employed in gas separation by membrane process. The perm-inch (23°C) is defined as one grain of water passing in one hour across a membrane of one square foot cross-sectional area and one inch thickness under the action of vapour pressure differential of one inch of mercury measured at 23°C. 1 perm-inch (23°C) = 1 grain (water).$h^{-1}.ft^{-2}.in.inHg^{-1}$ (E) 1 perm-inch (23°C) = 1/12 grain (water).$h^{-1}.ft^{-1}.inHg^{-1}$ (E)	UK, US
permicron	–	wavenumber	L^{-1}	1 permicron = 10^6 m^{-1} (E)	Obsolete wavenumber unit which has been proposed in spectroscopy. 1 permicron = 1 μm^{-1} (E)	
pes (Roman) [Roman foot]	–	length, distance	L	1 pes (Roman) = 0.2944 m	Obsolete Roman unit of length employed in ancient times. Base unit of length.	Roman
pes (Roman, 1st legal)	–	length, distance	L	1 pes (Roman, 1st legal) = 0.2962 m	Obsolete Roman unit of length used in ancient times	Roman

pes (Roman, 2nd legal)	–	length, distance	L	1 pes (Roman, 2nd legal) = 0.2967 m	Obsolete Roman unit of length used in ancient times.	Roman
pes (Roman, Drussian)	–	length, distance	L	1 pes (Roman, Drussian) = 0.3196 m	Obsolete Roman unit of length used in ancient times.	Roman
pesi (Syrian)	–	mass	M	1 pesi (Syrian) = 2.975 $\times 10^{-3}$ kg	Obsolete Syrian traditional unit of mass used before 1931. 1 pesi (Syrian) = 1/600 rottolo (Syrian) (E)	Syrian
petagram	Pg	mass	M	1 Pg = 10^{12} kg (E)	Multiple of the SI base unit. 1 Pg = 10^{15}g (E)	SI
petametre	Pm	length, distance	L	1 Pm = 10^{15} m (E)	Multiple of the SI base unit.	SI
petit romain	–	length, distance	L	1 petit romain = 3.38374392396 $\times 10^{-3}$ m	Obsolete French unit of length employed in typography. It was a multiple of the point Didot. 1 petit romain = 9 points Didot (E)	French
petit texte	–	length, distance	L	1 petit texte = 2.8197866030 $\times 10^{-3}$ m	Obsolete French unit of length employed in typography. It was a multiple of the point Didot. 1 petit texte = 7.5 points Didot (E)	French
pfennig (Austrian) (demat)	–	mass	M	1 pfennig (Austrian) = 1.09376953125 $\times 10^{-3}$ kg	Obsolete Austrian unit of mass for general use. 1 pfennig (Austrian) = 1/512 pfund (E)	Austrian
pfennig (German)	–	mass	M	1 pfennig (German) = 9.13498046875 $\times 10^{-4}$ kg	Obsolete German unit of mass. 1 pfennig (German) = 1/512 pfund (German) (E)	German
pfiff (Austrian)	–	capacity, volume	L^3	1 pfiff (Austrian) = 1.768875 $\times 10^{-4}$ m^3	Obsolete Austrian unit of capacity used for liquid substances. 1 pfiff (Austrian) = 1/8 mass (E)	Austrian
pflug (Danish)	–	surface area	L^2	1 pflug (Danish) = 90.7833290797 $\times 10^4$ m^2	Obsolete Danish traditional unit of surface area used in land measurements before 1912. 1 pflug (Danish) = 2000 square ruthe (Danish) (E)	Danish

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
pfund (Latvian)	–	mass	M	1 pfund (Latvian)= 0.419 kg	Obsolete Latvian traditional unit of mass. 1 pfund (Latvian)= 32 loth (Latvian) (E)	Latvian
pfund (Austrian)	–	mass	M	1 pfund (Austrian) = 0.560010 kg	Obsolete Austrian unit of mass for general use.	Austrian
pfund (Austrian, apothecary)	–	mass	M	1 pfund (Austrian, apothecary) = 420.0075×10^{-3} kg	Obsolete Austrian unit of mass used in pharmacy. 1 pfund (Austrian, apothecary) = 3/4 pfund (Austrian)	Austrian
pfund (Estonian)	–	mass	M	1 pfund (Estonian) = 0.460 kg	Obsolete traditional Estonian unit of mass used before 1900. 1 pfund (Estonian) = 32 loth (Estonian) (E)	Estonian
pfund (Prussian)	–	mass	M	1 pfund = 467.711×10^{-3} kg (E)	Obsolete German unit of mass.	German
pH	pH	index of acidity	nil	$pH = colog_{10} a_{H+}$ (where a_{H+} is the thermodynamic activity of solvated hydrogen cations)	Unit introduced by the Swedish scientist Sørensen at the beginning of the century (1909) to measure the acidity of aqueous solutions. Acid solutions: $0 < pH < 7$ Neutral solution: $pH = 7$ Alkaline solutions: $7 < pH < 14$	INT
phan (Annamese)	–	length, distance	L	1 phan (Annamese) = 4.7×10^{-3} m	Obsolete Annameseian traditional unit of length used before 1914. 1 phan (Annamese) = 1/100 thuoc (Annamese) (E)	Annamese
phi unit	ϕ unit	dimensionless index of particle size	nil	1 phi unit = $colog_2$ (d/mm) (E)	Phi unit (ϕ) or phi number is an old dimensionless unit used internationally in geology and applied mineralogy to express the particle size distribution (PSD) of fine-grained unconsolidated sediments. It was first introduced by Krumbein in 1941. It consisted of the cologarithm of base two of the diameter of the particle, d, expressed	INT

					in mm. Hence the resulting phi scale is simply the logaritmic transformation of the Udden (1898)–Wentworth (1922) fractions and varies inversely with the particle size, *d*.	
philosophia	–	length, distance	L	1 philosophia $= 4.13568701818 \times 10^{-3}$ m	Obsolete French unit of length employed in typography. It was a multiple of the point Didot. 1 philosophia = 11 points Didot (E)	French
phon	phon, P	loudness level	nil	(see note)	The phon is the unit of loudness level. The loundness level of a given sound is the sound pressure level in dB of a pure tone of frequency 1000 Hz (relative to 20 μPa) which is assessed by normal observers as being equally loud as the sound in question. The value at the audible threshold is zero phon, the threshold of hearing is about 140 phons.	US, UK
phot	ph	illuminance	$JL^{-2}\Omega$	1 ph $= 10^4$ lux (E)	Obsolete cgs illuminance unit.	cgs
photon (luxon)	$h\nu$	energy of electromagnetic radiation	ML^2T^{-2}	1 $h\nu = 6.626075540 \times 10^{-34}$ ν (Hz) (J)	Obsolete unit of quantum of luminous energy transported by an electromagnetic radiation of frequency ν (Hz).	
phyeam (Cambodian)	–	length, distance	L	1 phyeam (Cambodian) = 2 m	Obsolete Cambodian traditional unit of length used before 1914. 1 phyeam (Cambodian) = 2 muoi (Cambodian) (E)	Cambodian
pic (Abyssinian)	–	length, distance	L	1 pic (Abyssinian) = 0.686 m	Obsolete Abyssinian traditional unit of length used before 1927. 1 pic (Abyssinian) = 5/6 berri (Abyssinian) (E)	Abyssinian
pic (Algerian)	–	length, distance	L	1 pic (Algerian) = 0.467 m to 0.623 m	Obsolete traditional Algerian unit of length used before 1843. 1 pic (Algerian) = 8 termin (Algerian) (E)	Algerian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
pic (Cypriot)	–	length, distance	L	1 pic (Cypriot) = 0.6096 m	Obsolete Cypriot traditional unit of length used before 1972. 1 pic (Cypriot) = 2 feet (Cypriot) (E)	Cypriot
pic (Egyptian)	–	length, distance	L	1 pic (Egyptian) = 0.58 m	Obsolete Egyptian traditional unit of length used before 1891. 1 pic (Egyptian) = 1 diraa (Egyptian) (E)	Egyptian
pic (Endezian)	–	length, distance	L	1 pic (Endezian) = 0.673 m	Obsolete Tunisian traditional unit of length used before 1895.	Tunisian
pic (Guinean)	–	length, distance	L	1 pic (Guinean) = 0.578 m	Obsolete Guinean traditional unit of length used before 1906. 1 pic (Guinean) = 3000/18 986 jaktan(Guinean) (E)	Guinean
pic (Libyan)	–	length, distance	L	1 pic (Libyan) = 0.680 m	Obsolete Libyan traditional unit of length used before 1927. 1 pic (Libyan) = 3/2 draa (Libyan) (E)	Libyan
pic (Moroccan)	–	length, distance	L	1 pic (Moroccan) = 0.610 m	Obsolete traditional Moroccan unit of length used before 1923. 1 pic (Moroccan) = 8 tonni (Moroccan) (E)	Moroccan
pic (Syrian)	–	length, distance	L	1 pic (Syrian) = 0.582 m	Obsolete Syrian traditional unit of length used before 1931.	Syrian
pic (Tunisian)	–	length, distance	L	1 pic (Tunisian) = 0.488 m to 0.637 m	Obsolete Tunisian traditional unit of length used before 1895.	Tunisian
pic (Turkish)	–	length, distance	L	1 pic (Turkish) = 0.755397246 m	Obsolete Turkish traditional unit of length used before 1933. 1 pic (Turkish) = 8 urumb (Turkish) (E)	Turkish
pica	–	length, distance	L	1 pica = 4.217518×10^{-3} m	American unit of length employed in typography. The pica is still used today in the printing industry. 1 pica = 12 points US (E) 1 pica = 1/6 inch (approx.)	US

pica (ATA)	–	length, distance	L	1 pica (ATA) = 4.2175176 $\times 10^{-3}$ m	Typographical unit of length used in the printing industry. 1 pica (ATA) = 12 points (ATA) (E)	INT
pica (computer)	–	length, distance	L	1 pica (computer) = 4.233333333 $\times$ 10^{-3} m	Unit extensively used in word processors and software. 1 pica (computer) = 1/6 inches (E)	INT
pica (Postscript)	–	length, distance	L	1 pica (Postscript) = 4.233333333 $\times$ 10^{-3} m	Typographical unit of length used in the printing industry. 1 pica (Postscript) = 12 points (Postscript) (E)	INT
pica (small)	–	length, distance	L	1 pica (small) = 3.8805555556 $\times$ 10^{-3} m	Typographical unit of length used in the printing industry. 1 pica (small) = 11 points (E)	
pica (TeX)	–	length, distance	L	1 pica (TeX) = 4.217517642 $\times 10^{-3}$ m	Typographical unit of length used in the printing industry. 1 pica (TeX) = 12 points (TeX) (E)	INT
picogram	pg	mass	M	1 pg = 10^{-15} kg (E)	Submultiple of the SI base unit. 1 pg = 10^{-12} g (E)	SI
picometre	pm	length, distance	L	1 pm = 10^{-12} m (E)	Submultiple of the SI base unit.	SI
picul (Annamese)	–	mass	M	1 picul (Annamese) = 60.4 kg	Obsolete Annameseian traditional unit of mass used before 1914. 1 picul (Annamese) = 16 000 dong (Annamese) (E)	Annamese
picul (Cambodian)	–	mass	M	1 picul (Cambodian) = 60 kg	Obsolete Cambodian traditional unit of mass used before 1914. 1 picul (Cambodian) = 60 000 muoi (Cambodian) (E)	Cambodian
picul (Chinese)	–	mass	M	1 picul (Chinese) = 60.4789826667 kg	Old Chinese unit of mass used in the far East. 1 picul (Chinese) = 400/3 pounds (E) 1 picul (Chinese) = 1600 teals (Chinese) (E) 1 picul (Chinese) = 100 catties (Chinese) (E)	Chinese

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
picul (Indonesian)	–	mass	M	1 picul (Indonesian) = 61.7613025 kg	Obsolete Indonesian traditional unit of mass used before 1923. 1 picul (Indonesian) = 1/2 amat (Indonesian) (E)	Indonesian
picul (Indonesian)	–	capacity, volume	L^3	1 picul (Indonesian) = $66.1384490 \times 10^{-3}$ m^3	Obsolete Indonesian traditional unit of capacity used before 1923. 1 picul (Indonesian) = 4199/100 kan (Indonesian) (E)	Indonesian
pie (Argentinian)	–	length, distance	L	1 pie (Argentinian) = 0.2886666666667 m	Obsolete Argentinian traditional unit of length used before 1887. 1 pie (Argentinian) = 1/3 vara (Argentinian) (E)	Argentinian
pie (Chilean)	–	length, distance	L	1 pie (Chilean) = 0.2786666666667 m	Obsolete Chilean traditional unit of length used before 1865. 1 pie (Chilean) = 1/3 bara (Chilean) (E)	Chilean
pie (Colombian)	–	length, distance	L	1 pie (Colombian) = 0.266666666667 m	Obsolete Colombian traditional unit of length used before 1854. 1 pie (Colombian) = 1/3 vara (Colombian) (E)	Colombian
pie (Mexican)	–	length, distance	L	1 pie (Mexican) = 0.27933333333 m	Obsolete Mexican traditional unit of length used before 1896. 1 pie (Mexican) = 1/3 vara (Mexican) (E)	Mexican
pie (Peruvian)	–	length, distance	L	1 pie (Peruvian) = 0.27866 m	Obsolete Peruvian traditional unit of length used before 1869. 1 pie (Peruvian) = 1/3 vara (Peruvian) (E)	Peruvian
pie (Spanish)	–	length, distance	L	1 pie (Spanish) = 2.786350×10^{-1} m	Obsolete Spanish unit of length. 1 pie (Spanish) = 1/3 vara (E)	Spanish
pie (Venezuelan)	–	length, distance	L	1 pie (Venezuelan) = 0.266666666667 m	Obsolete Venezuelan traditional unit of length used before 1857. 1 pie (Venezuelan) = 1/3 vara (Venezuelan) (E)	Venezuelan

pièce	–	volume, capacity	L^3	1 pièce = 0.225 m^3 (E)	Obsolete French unit of volume used after 1812 to measure stacked wood. 1 pièce = 225 dm^3 (E)	French
piece (UK)	pc	dimensionless unit of quantity	nil	1 piece (UK) = 1 (E)	British dimensionless unit of quantity, equal to unity. This unit, like count (ct) is used to indicate that a measurement represents an exact count of items. 1 piece (UK) = 1 count (E)	UK
pied (Belgian)	–	length, distance	L	1 pied (Belgian) = 0.32485 m	Obsolete traditional Belgian unit of length used before 1820.	Belgian
pied (de Paris)	pied	length, distance	L	1 pied (de Paris) = 0.3248394167 m	Obsolete French unit of length used before the French Revolution (1789). 1 pied = 12 pouces (de Paris) (E) 1 pied = 1/6 toise (de Pérou) (E)	French
pied mesure planche (Québec)	pmp	capacity, volume	L^3	1 pmp (Québec) $= 2.359737216 \times 10^{-3}$ m^3	Old French unit of capacity which is equal to the product of one foot of length per one foot width per one inch thickness. It is still in use in the province of Québec (Canada). 1 pmp (Québec) = 1 board foot measure (UK) (E) 1 pmp = 1/12 ft^3 (E) 1 pmp = 144 in^3 (E)	CAN
pied (metric) (French metric foot)	–	length, distance	L	1 pied (metric) = 0.333333333 m (E)	Obsolete French unit of length used from 1812 to 1840. 1 pied (metric) = 12 pouces (metric) (E) 1 pied (metric) = 144 lignes (metric) (E) 1 pied (metric) = 1/3 m (E) 1 pied (metric) = 1/6 toise (metric) (E)	French
pied (Swiss)	–	length, distance	L	1 pied (Swiss) = 0.300 m (E)	Obsolete traditional Swiss unit of length used before 1877.	Swiss
piede liprando	–	length, distance	L	1 piede liprando = 0.51377 m	Obsolete Italian unit of length. Base unit of length.	Italian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
piede (Paraguayan)	–	length, distance	L	1 piede (Paraguayan) = 0.2886666666667 m	Obsolete Paraguayan traditional unit of length used before 1899. 1 piede (Paraguayan) = 1/3 vara (Paraguayan) (E)	Paraguayan
pièze (sthène.m^{-2})	pz	pressure, stress	$ML^{-1}T^{-2}$	1 pz = 10^3 Pa (E)	Obsolete MTS pressure and stress derived unit with a special name. 1pz = 1 sn.m^{-2} (E) 1 hpz = 1 bar (E) 1 atm = 1.01325 hpz (E)	MTS
pigon (Egyptian)	–	length, distance	L	1 pigon (Egyptian) = 4.362500×10^{-1} m	Obsolete Egyptian unit of length used in ancient times. 1 pigon = 5/6 Royal cubit (E)	Egyptian
pik	–	length, distance	L	1 pik = 0.7112 m	Obsolete unit of distance used in the Eastern Mediterranean and Middle East. The pik varied considerably with locations. It is equal to an arm, like the Italian braccio and the Russian arshin.	
piki (Greek, long)	–	length, distance	L	1 piki (Greek, long) = 0.669 m	Obsolete traditional Greek unit of length used before 1922.	Greek
piki (Greek, mansonry)	–	length, distance	L	1 piki (Greek, mansonry) = 0.750 m	Obsolete traditional Greek unit of length used before 1922.	Greek
piki (Greek, short)	–	length, distance	L	1 piki (Greek, short) = 0.648 m	Obsolete traditional Greek unit of length used before 1922.	Greek
pin (UK)	–	capacity, volume	L^3	1 pin (UK) = 20.457414×10^{-3} m^3 (UK) (E)	Obsolete British unit of volume, used for measuring the capacity of alcoholic beverage especially beer. A pin must not be confused with the pint. 1 pin (UK) = 1/8 barrel (UK) (E) 1 pin (UK) = 4.5 gallons (UK) (E) 1 pin (UK) = 1/2 firkin (UK) (E)	UK

pin (UK, beer)	–	capacity, volume	L^3	1 pin (UK, beer) $= 20.7951842160 \times 10^{-3}$ m^3	Obsolete British unit of capacity used for measuring alcoholic beverages between 1803 and 1824. 1 pin (UK, beer) = 9/2 gallons (UK, beer) (E)	UK
pin length (US)	–	length, distance	L	1 pin length (US) $= 1.5875 \times 10^{-3}$ m (E)	Obsolete American unit of length. 1 pin length (US) = 1/16 inch (E)	US
pinar (Persian)	–	mass	M	1 pinar (Persian) = 0.1472 kg	Obsolete Persian traditional unit of mass used before 1933. 1 pinar (Persian) = 16 dirhem (Persian) (E)	Persian
pince (Indian)	–	mass	M	1 pince (Indian) $= 31.1013333333 \times 10^{-3}$ kg	Obsolete Indian traditional unit of mass used before 1920. 1 pince (Indian) = 1/30 seer (Indian) (E)	Indian
pinch (US)	–	capacity, volume	L^3	1 pinch (US) $= 616.115199219 \times 10^{-9}$ m^3 (E)	Obsolete American unit of volume used for measuring capacity in food recipes. 1 pinch (US) = 1/8 teaspoon (US) (E) 1 pinch (US) = 1/48 fluid ounce (US) (E)	US
ping (Chinese)	–	capacity, volume	L^3	1 ping (Chinese) $= 517.720 \times 10^{-3}$ m^3	Obsolete Chinese unit of capacity used in ancient times. 1 ping (Chinese) = 500 tcheng (E)	Chinese
pint (Dutch)	–	capacity, volume	L^3	1 pint (Dutch) $= 0.600 \times 10^{-3}$ m^3	Obsolete Dutch unit of capacity used for liquid substances. 1 pint (Dutch) = 1/2 mingelen (E)	Dutch
pint (Irish)	pt.	capacity, volume	L^3	1 pint (Irish) $= 445.728140800 \times 10^{-6}$ m^3	Obsolete traditional Irish unit of capacity for liquids used before the adoption of the Weights and Measures Act of 1824. 1 pint (Irish) = 1/8 gallon (Irish) (E)	Irish
pint (Scottish, liq.)	pt.	capacity, volume	L^3	1 pint (Scottish, liq.) $= 1.69448796585 \times 10^{-3}$ m^3	Obsolete traditional Scottish unit of volume used before the Weights and Measures Act of 1824 to measure the capacity of liquids. 1 pint (Scottish, liq.) = 1/8 gallon (Scottish, liq.) (E)	Scottish

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
pint (UK)	pt (UK)	capacity, volume	L^3	1 pint (UK) $= 0.568261500 \times 10^{-3}$ m^3	Obsolete British unit used for capacity measurements for all merchandise (solids, liquids, foodstuffs, etc). 1 pint (UK) = 1/8 gallon (UK) (E) 1 pint (UK) = 1/4 pottle(UK) (E) 1 pint (UK) = 1/2 quart (UK) (E) 1 pint (UK) = 4 gills (UK) (E) 1 pint (UK) = 20 fl oz (UK) (E) 1 pint (UK) = 160 fl dr (UK) (E) 1 pint (UK) = 1.0320579753 pint (US, dry) 1 pint (UK) = 1.20095045385 pint (US, liq.)	UK
pint (US, dry)	pt (US, dry)	capacity, volume	L^3	1 pint (US, dry) $= 0.550610471358 \times 10^{-3}$ m^3	American unit of capacity used to measure the volume of powdered or divided solid materials (flour, sand, clinker, ore, etc). 1 pint (US, dry) = 1/8 gallon (US, dry) 1 pint (US, dry) = 1/2 quart (US, dry)	US
pint (US, liquid)	pt (US, liq.)	capacity, volume	L^3	1 pint (US, liq.) $= 0.4731764730 \times 10^{-3}$ m^3	American unit used for capacity measurements of liquids. 1 pint (US, liq.) = 1/8 gallon (US, liq.) (E) 1 pint (US, liq.) = 1/2 quart (US, liq.) (E) 1 pint (US, liq.) = 4 gills (US, liq.) (E) 1 pint (US, liq.) = 16 fl oz (US, liq.) (E) 1 pint (US, liq.) = 128 fl dr (US, liq.) (E) 1 pint (US, liq.) = 0.832673818304 pint (UK)	US
pinte (de Paris)	–	capacity, volume	L^3	1 pinte (de Paris) $= 0.952146258475 \times 10^{-3}$ m^3	Obsolete French unit of capacity defined as 48 pouces cubes in 1742 and employed before the French Revolution. It served to express the capacity of liquids and grains. It varied according to the location and merchandise. 1 pinte (de Paris) = 1/288 muid (de Paris) (E) 1 pinte (de Paris) = 48 pouces cubes (E)	French

pinte (Provence, wine)				1 pinte (Provence, wine) $= 0.45985 \times 10^{-3}$ m^3	Obsolete French unit of volume used to measure the capacity of wine in Southern France. 1 pinte (Provence) = 459.85 cm^3 1 pinte (Provence) = 1/80 barral (E) 1 pinte (Provence) = 1/2 pot (E) 1 pinte (Provence) = 2 chopines (E)	French
pipa (Argentinian)	–	capacity, volume	L^3	1 pipa (Argentinian) $= 456 \times 10^{-3}$ m^3	Obsolete Argentinian traditional unit of capacity used for liquids before 1887. 1 pipa (Argentinian) = 192 frasco (Argentinian) (E)	Argentinian
pipa (Brazilian)	–	capacity, volume	L^3	1 pipa (Brazilian) $= 479.160 \times 10^{-3}$ m^3	Obsolete Brazilian traditional unit of capacity used before 1874. 1 pipa (Brazilian) = 90 alquiera (Brazilian) (E)	Brazilian
pipa (Brazilian, Bahia)	–	capacity, volume	L^3	1 pipa (Brazilian, Bahia) $= 317.160 \times 10^{-3}$ m^3	Obsolete Brazilian traditional unit of capacity used before 1874. 1 pipa (Brazilian, Bahia) = 90 alquiera (Brazilian, Bahia) (E)	Brazilian
pipa (Brazilian, common)	–	capacity, volume	L^3	1 pipa (Brazilian, common) $= 326.340 \times 10^{-3}$ m^3	Obsolete Brazilian traditional unit of capacity used before 1874. 1 pipa (Brazilian, common) = 90 alquiera (Brazilian, common) (E)	Brazilian
pipa (Brazilian, salt)	–	capacity, volume	L^3	1 pipa (Brazilian, salt) $= 366.84 \times 10^{-3}$ m^3	Obsolete Brazilian traditional unit of capacity used before 1874. 1 pipa (Brazilian, salt) = 90 alquiera (Brazilian, salt) (E)	Brazilian
pipa (Portuguese)	–	capacity, volume	L^3	1 pipa (Portuguese) $= 429 \times 10^{-3}$ m^3	Obsolete Portuguese unit of capacity used for liquid substances. 1 pipa (Portuguese) = 26 almude (E)	Portuguese
pipa (Spanish)	–	capacity, volume	L^3	1 pipa (Spanish) $= 422.36537400 \times 10^{-3}$ m^3 (water)	Obsolete Spanish unit of capacity used for liquid substances. 1 pipa (Spanish) = 27 arroba (water) (E)	Spanish

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
pipe (Danish, liq.)	–	capacity, volume	L^3	1 pipe (Danish, liq.) = 463.752983640 $\times 10^{-3}$ m^3	Obsolete Danish traditional unit of capacity used for liquids before 1912. 1 pipe (Danish, liq.) = 480 pott (Danish, liq.) (E) 1 pipe (Danish, liq.) = 15 cubic fod (Danish, liq.) (E)	Danish
pipe (Irish)	–	capacity, volume	L^3	1 pipe (Irish) = 1.79717586371 m^3	Obsolete traditional Irish unit of capacity for liquids used before the adoption of the Weights and Measures Act of 1824. 1 pipe (Irish) = 504 gallons (Irish) (E)	Irish
pipe (Paraguayan)	–	capacity, volume	L^3	1 pipe (Paraguayan) = 576 $\times 10^{-3}$ m^3	Obsolete Paraguayan traditional unit of capacity used before 1899. 1 pipe (Paraguayan) = 768 cuarta (Paraguayan) (E)	Paraguayan
pipe (Russian)	–	capacity, volume	L^3	1 pipe (Russian) = 442.778760 $\times$ 10^{-3} m^3	Obsolete Russian unit of capacity for liquid substances used before 1917. 1 pipe (Russian) = 36 vedro (E)	Russian
pipe (Swedish)	–	capacity, volume	L^3	1 pipe (Swedish) = 471.089145762 $\times$ 10^{-3} m^3	Obsolete Swedish unit of capacity for liquid substances. 1 pipe (Swedish) = 180 kanna (E)	Swedish
pipe (US, wine)	–	volume, capacity	L^3	1 pipe (US, wine) = 476.961884784 $\times$ 10^{-3} m^3 (E)	Obsolete American unit of volume used to measure the capacity of wine. 1 pipe (US, wine) = 126 gallons (US, wine) (E) 1 pipe (US, wine) = 2 hogsheads (US, wine) (E)	US
piso (Guinean)	–	mass	M	1 piso (Guinean) = 8.0250 $\times 10^{-3}$ kg	Obsolete Guinean traditional unit of mass used before 1906. 1 piso (Guinean) = 1/8 benda (Guinean) (E)	Guinean

pixel	pel	logical unit of visual information	nil	(see note)	A pixel, which is the common acronym for **pi**cture **el**ement, is the smallest logical unit of visual information that can be used to build an image in two dimensions on a computer display, or by extension on any 2-D surface. This unit is logical rather than physical. Actually, the physical size of a pixel depends on the resolution of the display screen. If the display is set to its maximum resolution, the physical size of a pixel will equal the physical size of the dot pitch of the display. If, however, the resolution is lower than the maximum resolution, a pixel will appear larger than the physical size of the screen's dot. Hence, the definition of a pixel depends on the user's distance from the viewing surface (e.g., paper or screen).	Computer
planck	–	action, angular momentum	ML^2T^{-1}	1 planck = 1 J.s (E)	Unit of angular momentum proposed for the SI. The unit is named after the German physicist M. Planck (1858–1947). Anecdotal.	
Plato degree	°P	specific gravity unit to express amount of sugar in must	nil	1 °P = 0.01 (m/m) (E)	Obsolete German unit of mass fraction used to measure the sugar content of must expressed as a percentage. One degree Plato is roughly equivalent to 1 wt% sucrose. 1 °P = 1 wt% sucrose (E) 1 °P = 1°Balling (E)	German
plethron (Greek, Attic)	–	length, distance	L	1 plethron (Greek, Attic) = 30.856 m	Obsolete Greek unit of length employed in ancient times. 1 plethron (Attic) = 100 pous (E)	Attic

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
poignerée (Lyonnais)	–	surface area	L^2	1 poignerée (Lyonnais) = 1333.333333 m^2	Obsolete local French unit of surface area used for land measurements in south-eastern France before the revolution of 1789. It corresponds to the surface area that a farmer can sow with a hand of seeds. 1 poignerée (Lyonnais) =1/3 journal (Lyonnais) (E)	French
point (angle)	–	plane angle	α	1 point (angle) = 0.196349540849 rad	International unit of plane angle used in for reporting compass readings in aeronautics and marine navigation. 1 point (angle) = 1/32 circle (E) 1 point (angle) = $\pi/16$ rad (E)	INT
point (ATA)	–	length, distance	L	1 point (ATA) = 0.3514598×10^{-3} m	Typographical unit of length used in the printing industry.	INT
point (Australian)	pt	length, distance	L	1 point (Australian) = 25.4×10^{-5} m (E)	Old Australian unit of length equal to 1/100 inch. 1 point (Australian) = 1/100 inch (E)	Australian
point (Berthold)	–	length, distance	L	1 point (Berthold) = $375.939849624 \times 10^{-6}$ m	Old typographical unit of length used in the French printing industry. It was introduced by H. Berthold in 1878 in order to create a metric version of the point (Didot). 1 point (Berthold) = 1/2660 m (E)	French
point (computer)	pt	length, distance	L	1 point (computer) = $352.777777778 \times 10^{-6}$ m	Unit extensively used in word processors and software. 1 point (computer) = 1/72 inches (E)	INT
point (de Paris)	–	length, distance	L	1 point (de Paris) = $1.8798573553 \times 10^{-4}$ m	Obsolete French unit of length used before the French Revolution (1789). 1 point (de Paris) = 1/12 ligne (de Paris) (E) 1 point (de Paris) = 1/144 pouce (de Paris) (E)	French

					1 point (de Paris) = 1/10 368 toise (de Pérou) (E)	
point (Didot)	–	length, distance	L	1 point (Didot) = $3.75971547107 \times 10^{-4}$ m	French unit of length used in typography. The point Didot is still used in the French printing industry and it has been adopted in several countries. The unit is named after F.-A. Didot (1730–1804). 1 point Didot = 1/6 ligne (de Paris) (E) 1 point Didot = 1/72 pouce (de Paris) (E)	French
point (Fournier)	–	length, distance	L	1 point (Fournier) = $348.826666667 \times 10^{-6}$ m	Old French typographical unit of length used before the French Revolution of 1789. It was introduced by P. Fournier in 1737 and defined as the 1/12 of the cicero. 1 point (Fournier) = (0.1648/12) in (E)	French
point (jeweller's)	–	mass	M	1 point (jeweller's) = 2×10^{-6} kg (E)	Obsolete British and American unit of mass employed in jewellery for the weighing of precious metals, precious stones and gems (e.g. diamond, ruby, sapphire). 1 point (jeweller's) = 0.01 carat (metric) (E) 1 point (jeweller's) = 2 mg (E)	UK, US
point (meteorological)	in	depth of rainfall per unit surface area	L^{-1}	1 point (meteorological) = 25.4×10^{-3} m^3 water per m^2	Obsolete British meteorological unit for rainfall measurement. It corresponds to the depth expressed in inches to which the rainfall falling on a horizontal enclosed surface, from which there are no losses by evaporation or otherwise, would have accumulated. It is equal to 144 cubic inches of water (accumulated rainfall) per square foot of land (British Meteorological Office, 1967). 1 point (meteorological) = 1 inch of rainfall (E) 1 point (meteorological) = 144 $in^3.ft^{-2}$ (E)	UK

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
point (metric)	–	length, distance	L	1 point (metric) = 375 $\times 10^{-6}$ m	Metric typographical unit of length used in the printing industry and introduced in 1977 by Eurograf. 1 point (metric) = 3/8 mm (E)	French
point (Postscript)	–	length, distance	L	1 point (Postscript) = 352.777777778 $\times 10^{-6}$ m	Typographical unit of length used in the printing industry. 1 point (Postscript) = 1/72 inch (E)	INT
point (TeX)	–	length, distance	L	1 point (TeX) = 351.4598035 $\times 10^{-6}$ m	Typographical unit of length used in the printing industry.	INT
point (Truchet)	–	length, distance	L	1 point (Truchet) = 188 $\times 10^{-6}$ m	Obsolete French typographical unit of length used in the printing industry.	French
point (US printer's)	–	length, distance	L	1 point (US) = 3.51459803515 $\times 10^{-4}$ m	American unit of length used in typography. The point is still used today in the printing industry. It was invented by Nelson Hawks in 1879 and dominates USA publishing. It was standardized by the American Typefounders Association at the value of 0.013837 inches exactly. 1 point (US printer's)≈ 1/72.27 inch	US
point (US, silversmith)	pt	length, distance	L	1 point (US, silversmith) = 6.35 $\times 10^{-6}$ m (E)	Obsolete American unit of length used by US silversmiths to measure the thickness of silver coatings and plating. 1 point (US, silversmith) = 1/4000 inch (E) 1 point (US, silversmith) = 6.35 μm (E)	US
point (I.N.) (Imprimerie Nationale)	–	length, distance	L	1 point (I.N.) = 3.9877 $\times 10^{-4}$ m	French unit of length used in typography. The point (I.N.) is still used in the French printing industry. It was created by a group directed by Firmin Didot in 1881.	French
poise	P, Po	dynamic viscosity, absolute viscosity	$ML^{-1}T^{-1}$	1 P = 10^{-1} Pa.s (E)	Obsolete unit of dynamic viscosity or absolute viscosity in the cgs system. In the UK the written symbol was Po.	cgs

poiseuille	–	dynamic viscosity, absolute viscosity	$ML^{-1}T^{-1}$	**SI derived unit** 1 poiseuille = 1 Pa.s (E)	Unit proposed for the SI unit of dynamic viscosity. The unit is named after the French physician and physicist J.-L. Poiseuille (1799–1869).	SI
pole (rod, perch)	rd	length, distance	L	1 pole = 5.0292 m (E)	Obsolete American and British unit of length used in surveyor's measurements. 1 pole = 1 perch (E) 1 pole = 1 rod (E) 1 pole = 5.5 yards (E) 1 pole = 16.5 feet (E) 1 pole = 198 inches (E)	UK, US
pollam (Ceylon and Madras)	–	mass	M	1 pollam (Ceylon and Madras) = 35.436875×10^{-3} kg	Obsolete Ceylonese and Madrasian traditional unit of mass used before 1920. 1 pollam (Ceylon and Madras) = 1/8 seer (Ceylon) (E)	Ceylon
pollegada (Portuguese)	–	length, distance	L	1 pollegada (Portuguese) = 2.737500×10^{-2} m	Obsolete Portuguese unit of length. 1 pollegada (Portuguese) = 1/12 pe (E)	Portuguese
pollen count	–	pollen surface density	L^{-2}	1 pollen count = 10^4 pollen.m^{-2}	Obsolete unit introduced in 1930 by botanists for counting pollen under a microscope. It was equal to the number of grains of pollen per unit of area 1 pollen count = 1 pollen.cm^{-2} (E)	
polougarnetz (Russian, dry)	–	capacity, volume	L^3	1 polougarnetz (Russian, dry) = 1.639921×10^{-3} m^3	Obsolete Russian unit of capacity for dry substances used before 1917. 1 polougarnetz (Russian, dry) = 1/2 garnetz (E)	Russian
poncelet	–	power	ML^2T^{-3}	1 poncelet = 980.665 W (E)	Obsolete French unit of power. It was equal to the work done during one second by a force which accelerates a mass of 100 kg on a distance of one metre. The unit is named after J.V. Poncelet (1788–1867). 1 poncelet = 100 kgfm.s^{-1} (E) 1 poncelet = 4/3 cheval-vapeur (E)	French
pond (Amsterdam)	–	mass	M	1 pond (Amsterdam) = 0.49409032 kg	Obsolete Dutch unit of mass.	Dutch

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
pond (Dutch) [Dutch pound]	–	mass	M	1 pond (Dutch) = 0.49216772 kg	Obsolete Dutch unit of mass.	Dutch
pond (Dutch, apothecary)	–	mass	M	1 pond (Dutch, apothecary) = 0.369125790 kg	Obsolete Dutch unit of mass. 1 pond (Dutch, apothecary) = 3/4 pond (Dutch)	Dutch
pond (gram-force)	p	force, weight	MLT^{-2}	1 pond = 9.80665×10^{-3} N (E)	Obsolete submultiple of the MKpS system.	MKpS
pondiuscule (Hebrew) [Talmudic system]	–	mass	M	1 pondiuscule (Hebrew) = 2.951667×10^{-4} kg	Obsolete Hebrew unit of mass used in ancient times. Rabbinical or Talmudic system. 1 pondiuscule (Hebrew) = 1/1200 mina (E)	Hebrew
pony (US, spirit)	–	capacity, volume	L^3	1 pony (US, spirit) = $29.5735295625 \times 10^{-6}$ m^3 (E)	Obsolete American unit of capacity used before 1979 for measuring the capacity of spirits and alcoholic beverages, especially wine. 1 pony (US, spirit) = 1/128 gallon (US, liq.) (E) 1 pony (US, spirit) = 1 fluid ounce (US) (E)	US
pood (Russian)	–	mass	M	1 pood = 16.3806871680 kg	Obsolete Russian unit of mass used before 1917 for general use. 1 poods = 40 funts (E)	Russian
posson (de Paris)	–	capacity, volume	L^3	1 posson (de Paris) = $1.19018282309 \times 10^{-4}$ m^3	Obsolete French unit of capacity employed before the French Revolution. It served to express the capacity of liquids and grains. It varied according to the location and merchandise. 1 posson (de Paris) = 1/8 pinte (de Paris) (E)	French
post meridiem	PM, pm	time notation	nil	(see note)	Latin term meaning "after noon," used after a time to indicate that the time occurs after 12:00 noon. Thus 4:30 pm is the same as 16:30. The notations "AM" and "PM"	US, UK

					are used extensively in the United States, where time is usually not stated on a 24-hour basis.	
pot (Belgian, dry)	pot	capacity, volume	L^3	1 pot (Belgian, dry) = 1.5 $\times 10^{-3}$ m^3 (E)	Obsolete Belgian unit of volume for measuring the capacity dry liquids. 1 pot (Belgian, dry) = 1.5 dm^3 (E)	Belgian
pot (Belgian, liq.)	pot	capacity, volume	L^3	1 pot (Belgian, liq.) = 0.5 $\times 10^{-3}$ m^3 (E)	Obsolete Belgian unit of volume used for the capacity of liquids. 1 pot (Belgian, liq.) = 0.5 dm^3 (E)	Belgian
pot (Danish)	pot	capacity, volume	L^3	1 pot (Danish) = 0.967 $\times 10^{-3}$ m^3 (E)	Obsolete Danish unit of volume for measuring the capacity of liquids. 1 pot (Danish) = 0.967 dm^3 (E)	Danish
pot (Norwegian)	pot	capacity, volume	L^3	1 pot (Norwegian) = 0.965 $\times 10^{-3}$ m^3 (E)	Obsolete Norwegian unit of volume for measuring the capacity of liquids. 1 pot (Norwegian) = 0.965 dm^3 (E)	Norwegian
pot (Norwegian, liquid)	–	capacity, volume	L^3	1 pot (Norwegian, liquid) = 0.9651 $\times 10^{-3}$ m^3	Obsolete Norwegian traditional unit of capacity used before 1882 for liquids.	Norwegian
pot (Provence, wine)				1 pot (Provence, wine) = 0.9197 $\times$ 10^{-3} m^3	Obsolete French unit of volume used to measure the capac ity of wine in Southern France. 1 pot (Provence) = 919.7 cm^3 1 pot (Provence) = 1/40 barral (E) 1 pot (Provence) = 2 pintes (E) 1 pot (Provence) = 4 chopines (E)	French
pot (Swiss)	pot	capacity, volume	L^3	1 pot (Swiss) = 1.5 $\times 10^{-3}$ m^3 (E)	Obsolete Swiss unit of volume used for the capacity of liquids. 1 pot (Swiss) = 1.5 dm^3 (E)	Swiss
potiche de mercure (flask of mercury)	–	capacity, volume	L^3	1 potiche de mercure = 34.473020120 kg	Obsolete French unit of mass used for weighing liquid mercury. 1 potiche de mercure = 76 lb (av.)	French

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
pott (Danish, dry)	–	capacity, volume	L^3	1 pott (Danish, dry) = 0.966152049250 $\times 10^{-3}$ m^3	Obsolete Danish traditional unit of capacity used for dry substances before 1912. 1 pott (Danish, dry) = 1/32 cubic fod (Danish) (E)	Danish
pott (Danish, liq.)	–	capacity, volume	L^3	1 pott (Danish, liq.) = 0.966152049250 $\times$ 10^{-3} m^3	Obsolete Danish traditional unit of capacity used for liquids before 1912. 1 pott (Danish, liq.) = 1/32 cubic fod (Danish) (E)	Danish
pottar (Icelandic)	–	capacity, volume	L^3	1 pottar (Icelandic) = 0.966152049250 $\times$ 10^{-3} m^3	Obsolete Icelandic traditional unit of capacity used for dry substances before 1907. 1 pottar (Icelandic) = 1/32 cubic fet (Icelandic) (E)	Icelandic
pottle (Irish)	–	capacity, volume	L^3	1 pottle (Irish) = 1.78291256320 $\times$ 10^{-3} m^3	Obsolete traditional Irish unit of capacity for liquids used before the adoption of the Weights and Measures Act of 1824. 1 pottle (Irish) = 1/2 gallon (Irish) (E)	Irish
pottle (UK)	–	capacity, volume	L^3	1 pottle (UK) = 2.273046 $\times$ 10^{-3} m^3	Obsolete British unit used for capacity measurements for all merchandise (solids, liquids, foodstuffs, etc). 1 pottle (UK) = 1/2 gallon (UK) (E) 1 pottle (UK) = 2 quarts (UK) (E) 1 pottle (UK) = 4 pints (UK) (E) 1 pottle (UK) = 16 gills (UK) (E)	UK
pou (Chinese)	–	length, distance	L	1 pou (Chinese) = 5760 m	Obsolete Chinese unit of length used in ancient times. 1 pôu = 18 000 tchi (E)	Chinese
pôu (Chinese)	–	length, distance	L	1 pôu (Chinese) = 1.6 m	Obsolete Chinese unit of length used in ancient times. 1 pôu = 5 tchi (E)	Chinese

pouce (de Paris)	–	length, distance	L	1 pouce (de Paris) $= 2.70699513917 \times 10^{-2}$ m	Obsolete French unit of length used before the French Revolution (1789). 1 pouce (de Paris) = 12 lignes (de Paris) (E) 1 pouce (de Paris) = 144 points (de Paris) (E) 1 pouce (de Paris) = 1/72 toise (de Pérou) (E) 1 pouce (de Paris) = 1/12 pied (de Paris) (E)	French
pouce (metric) (French metric inch)	–	length, distance	L	1 pouce (metric) $= 2.77777778 \times 10^{-2}$ m	Obsolete French unit of length used in France from 1812 until 1840. 1 pouce (metric) = 1/36 m (E) 1 pouce (metric) = 1/12 pied (metric) (E) 1 pouce (metric) = 12 lignes (metric) (E)	French
pouce (Swiss)	–	length, distance	L	1 pouce (Swiss) $= 2.50 \times 10^{-2}$ m (E)	Obsolete traditional Swiss unit of length used before 1877. 1 pouce (Swiss) = 1/12 pied (Swiss) (E)	Swiss
pouce fontainier	–	volume flow rate	L^3T^{-1}	1 pouce fontainier $= 320.289206699 \times 10^{-6}$ m^3 s^{-1} (first definition) 1 pouce fontainier (standardized) $= 222.167491432 \times 10^{-6}$ m^3 s^{-1}	Obsolete French unit of volume flow rate of water. It was equal to the volume of water which flows through a circular aperture or orifice of one pouce (de Paris) section diameter under a difference of pressure of 7 lignes of water column at the aperture centerline, i.e. 807 cubic pieds per day. It was later standardized to exactly 560 cubic pieds (de Paris) per day.	French
poumar	–	linear mass density	ML^{-1}	1 poumar $= 4.96054647858 \times 10^{-7}$ $kg.m^{-1}$	Obsolete British unit of linear mass density employed in the textile industry. The name of the unit is derived from the English acronym: **pou**nd per **m**illion y**ar**d. 1 poumar = 10^6 $lb.yd^{-1}$ (E)	UK

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
pound (apothecary)	lb (ap.), lb (apoth.)	mass	M	1 lb (apoth.) = 373.241721600 × 10^{-3} kg (E)	Obsolete British and American unit of weight employed in pharmacy. It was employed at one time as a unit of weight for drugs and medicinal preparations (lotions, potions, ointments, plant extracts, etc). 1 lb (apoth.) = 5760 grains (apoth.) (E) 1 lb (apoth.) = 240 pennyweights (apoth.) (E) 1 lb (apoth.) = 12 ounces (apoth.) (E)	UK, US
pound (Austrian) (zollpfund)	–	mass	M	1 zollpfund = 560.00448 × 10^{-3} kg	Obsolete Austrian unit of weight. 1 kg = 1.7857 zollpund (E)	Austrian
pound (avoirdupois, pound-mass)	lb (avdp.), lb (av.)	mass	M	1 lb (av.) = 453.5924277 × 10^{-3} kg (E)	Obsolete British and American unit of mass. It was used as a base unit of mass for the imperial system before the WMA of 1963. 1 lb (av.) = 7000 grains (av.) (E) 1 lb (av.) = 256 drams (av.) (E) 1 lb (av.) = 16 ounces (av.) (E)	UK, US, FPS
pound (Greek)	–	mass	M	1 pound (Greek) = 0.500 kg	Obsolete traditional Greek unit of mass used before 1922. 1 pound (Greek) = 625/4 dramme (Greek) (E)	Greek
pound (imperial standard)	lb (IS)	mass	M	1 lb (IS) = 453.592338 × 10^{-3} kg	Obsolete British unit of mass. It was used as a base unit of mass for the imperial system before the WMA of 1963.	UK
pound (Prussian)	–	mass	M	1 pfund = 467.711 × 10^{-3} kg (E)	Obsolete German unit of mass.	German
pound (Russian, apothecary)	–	mass	M	1 pound (Russian, apothecary) = 0.358323358579 kg	Obsolete Russian unit of mass used before 1917 in pharmacy.	Russian

pound (Russian)	–	mass	M	1 funt = 409.517179246 × 10^{-3} kg	Obsolete Russian unit of weight employed before 1917 for general use. 1 kg = 2.4419 funts (E)	Russian
pound (Scottish)	lb	mass	M	1 pound (Scottish) = 0.616885623200 kg	Obsolete traditional Scottish unit of mass used before the Weights and Measures Act of 1824. 1 pound (Scottish) = 9520 grains (E)	Scottish
pound (Swedish) (skålpund)	–	mass	M	1 skålpund = 425.0797024444 × 10^{-3} kg	Obsolete Swedish unit of weight. 1 kg = 2.3525 skålpunds (E)	Swedish
pound (Swiss) (zollpfund)	–	mass	M	1 zollpfund = 500 × 10^{-3} kg (E)	Obsolete Swiss unit of weight. 1 kg = 2 zollpfunds (E)	Swiss
pound (troy)	lb (tr.), lb (troy)	mass	M	1 lb (troy) = 373.241721600 × 10^{-3} kg (E)	Obsolete British unit of mass employed for the weighing of precious metals, precious stones and gems (diamond, ruby, sapphire) in the United Kingdom. Now obsolete in the UK, this unit remains in common use in the USA. 1 lb (troy) = 5760 grains (troy) (E) 1 lb (troy) = 240 pennyweights (troy) (E) 1 lb (troy) = 12 ounces (troy) (E)	UK, US
pound (UK, new hay)	lb (UK, new hay)	mass	M	1 lb (UK, new hay) = 272.155402800 × 10^{-3} kg	Obsolete British unit of mass used by farmers. 1 lb (UK, new hay) = 3/5 lb (UK, straw) (E)	UK
pound (UK, old hay)	lb (UK, old hay)	mass	M	1 lb (UK, old hay) = 291.595074429 × 10^{-3} kg	Obsolete British unit of mass used by farmers. 1 lb (UK, old hay) = 9/14 lb (UK, straw) (E)	UK
pound (UK, straw)	lb (UK, straw)	mass	M	1 lb (UK, straw) = 453.592338 × 10^{-3} kg	Obsolete British unit of mass used by farmers. 1 lb (UK, straw) = 1 lb (av.) (E)	UK

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
pound (UK, mercantile)	lb	mass	M	1 pound (UK, mercantile) = 0.437392642500 kg	Obsolete British unit of mass, base unit of the English Mercantile weights used since the late 12th century. 1 pound (UK, mercantile) = 6750 grains (E) 1 pound (UK, mercantile) = 675/576 lb (troy) (E) 1 pound (UK, mercantile) = 27/28 lb (av.) (E) 1 pound (UK, mercantile) = 15 ounces (UK, mercantile) (E)	
pound (UK, merchant)	lb	mass	M	1 pound (UK, merchant) = 0.46655215199 kg	Obsolete British unit of mass. 1 pound (UK, merchant) = 7200 grains (E) 1 pound (UK, merchant) = 5/4 lb (troy) (E) 1 pound (UK, merchant) = 36/35 lb (av.) (E) 1 pound (UK, merchant) = 15 ounces (troy) (E)	UK
pound (UK, merchant, old)	–	mass	M	1 pound (UK, merchant, old) = $497.655629 \times 10^{-3}$ kg	Obsolete British unit of mass. 1 pound (UK, merchant, old) = 7680 grains (E)	UK
pound (UK, Tower)	lb	mass	M	1 pound (UK, Tower) = 0.34991411400 kg	Old British unit of mass, base unit for English Tower weights and abolished in 1528. 1 pound (UK, Tower) = 5400 grains (E) 1 pound (UK, Tower) = 135/144 lb (troy) (E) 1 pound (UK, Tower) = 27/35 lb (av.) (E) 1 pound (UK, Tower) = 12 ounces (UK, Tower) (E)	UK
pound (US)	lb (US)	mass	M	1 lb (US) = $453.5924277 \times 10^{-3}$ kg	Obsolete American unit of mass. 1 lb (US) = 5760 grains (av.)	US

pound (WMA, 1963) [USMB, 1959]	lb (1963)	mass	M	1 lb (WMA, 1963) = 453.59237 × 10^{-3} kg (E)	Legal unit of mass in the imperial British System and in the American. It was adopted in 1963 by the Weights and Measures Act (WMA) in England and in the US in 1959 by the US Metric Board (USMB, 1959). It has been linked to the international kilogram standard (Sèvres).	UK, US, FPS
pound per cubic foot	lb.ft^{-3}	density, mass density	ML^{-3}	1 lb.ft^{-3} = 16.0184633740 kg.m^{-3}	American and British unit of density.	UK, US, FPS
pound per linear inch	pli	linear mass density	ML^{-1}	1 pli = 17.8579673228 kg.m^{-1}	Obsolete American and British unit of linear mass density used for measuring heavy metallic rods (e.g., copper, steel).	US, UK
pound-centigrade-unit (centigrade-heat unit)	pcu	energy, work, heat	ML^2T^{-2}	1 pcu = 1899.1008 J	The pcu is an obsolete British and American heat unit. It was equal to the heat needed to raise the temperature of one pound of air-free water by 1°C at a constant pressure of one standard atmosphere (101 325 Pa). The named was derived from the acronym **p**ound **c**entigrade **u**nit. 1 pcu = 1.8 Btu (E)	UK, US
pound-force	lbf av., lbf	force, weight	MLT^{-2}	1 pound-force = 4.4482216152605 N (E)	British and American legal unit of force and weight. It is equal to the force which is produced by the standard acceleration (g = 9.80665 m.s^{-2} or circa 32.174 ft.s^{-2}) of a body weighing one pound (1963). 1 lbf = 1 lb × 32.1740485564 ft.s^{-2} (E) 1 lbf = 32.1740485564 poundal 1 lbf = 10^{-3} kip (E) 1 lbf = 16 ozf (E)	UK, US, FPS
pound-force per square foot	lbf.ft^{-2} (lbf/sq.ft, psf, PSF)	pressure, stress	$ML^{-1}T^{-2}$	1 lbf.ft^{-2} = 47.8802589803 Pa	FPS pressure and stress unit. 1 lbf.ft^{-2} = 1 psf (E) 1 lbf.ft^{-2} = 1/144 lbf.in^{-2} (E) 1 atm = 2116.216623 psf	UK, US, FPS

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
pound-force per square inch	$lbf.in^{-2}$ psi, PSI	pressure, stress	$ML^{-1}T^{-2}$	1 psi = $6.89475729317 \times 10^{3}$ Pa	FPS pressure and stress unit. 1 $lbf.in^{-2}$ = 1 psi (E) 1 atm = 14.69594877 psi 1 $lbf.in^{-2}$ = 144 $lbf.ft^{-2}$ (E)	UK, US, FPS
pound-mole	lbmol	amount of substance	N	1 lbmol = 0.45359237 mol (E)	Obsolete British and American unit used to express an amount of substance. It was defined after the pound (WMA, 1963)	UK, US
poundal	pdl	force, weight	MLT^{-2}	1 pdl = 0.138254954376 N (E)	Obsolete FPS unit of force and weight. It is equal to the force which is produced by an acceleration of 1 $ft.s^{-2}$ of a body weighing one pound (1963). 1 pdl = 1 lb × 1 $ft.s^{-2}$ (E) 1 lbf = 1 lb × 32.1740485564 $ft.s^{-2}$	FPS
poundal per square foot	$pdl.ft^{-2}$	pressure, stress	$ML^{-1}T^{-2}$	1 $pdl.ft^{-2}$ = 1.48816394357 Pa	Obsolete British and American unit of pressure and stress. 1 $pdl.ft^{-2}$ = 1 $lb.ft^{-1}.s^{-2}$ (E)	UK, US
pourcentmille	pcm	reactivity of nuclear power reactor	nil	1 pcm = 10^{-5} (E)	Obsolete French unit of nuclear reactivity employed in nuclear engineering.	French
poure (Latvian)	–	capacity, volume	L^3	1 poure (Latvian) = 68.8608×10^{-3} m^3	Obsolete Latvian traditional unit of capacity. 1 poure (Latvian) = 54 stoof (Latvian) (E)	Latvian
pourvette (Latvian)	–	surface area	L^2	1 pourvette (Latvian) = 3716 m^2	Obsolete Latvian traditional unit of surface area used in land measurements. 1 pourvette (Latvian) = 25 kapp (Latvian) (E)	Latvian
pous (Greek, Attic) [Greek foot]	–	length, distance	L	1 pous (Greek, Attic) = 0.30856 m	Obsolete Greek unit of length employed in ancient times.	Attic
powa (Ceylon and Madras)	–	mass	M	1 powa (Ceylon and Madras) = 70.87375×10^{-3} kg	Obsolete Ceylonese and Madrasian traditional unit of mass used before 1920. 1 powa (Ceylon and Madras) = 1/4 seer (Ceylon) (E)	Ceylon

powa (Indian)	–	mass	M	1 powa (Indian) = 0.23326 kg	Obsolete Indian traditional unit of mass used before 1920. 1 powa (Indian) = 1/4 seer (Indian) (E)	Indian
pragilbert	–	magnetomotive force	I	1 pragilbert = 11 459.08 A	1 pragilbert = 4π ampere-turns (E)	
pramroi (Cambodian)	–	mass	M	1 pramroi (Cambodian) = 1 kg	Obsolete Cambodian traditional unit of mass used before 1914. 1 pramroi (Cambodian) = 1 kilogram (E)	Cambodian
praoersted	–	magnetic field strength	IL^{-1}	1 praoersted = 11 459.08 $A.m^{-1}$	1 praoersted = 4π ampere-turns per metre (E)	
prastha (Indian)	–	capacity, volume	L^3	1 prastha (Indian) = 8.250×10^{-4} m^3 (of water)	Obsolete Indian unit of capacity used in ancient times. Measured by weight. 1 prastha (Indian) = 1/16 drona (E)	Indian
preece	–	electric resistance	$ML^2T^{-3}I^{-2}$	1 preece = 10^6 Ω (E)	Obsolete British unit of electric resistance employed in the last century for insulating material measurements. The unit is named after W. Preece (1834–1913). 1 preece = 1 MΩ (E)	UK
preece (resistivity)	preece	electrical resistivity	$ML^3T^{-3}I^{-2}$	1 preece (resistivity) = 10^{-7} Ω.m (E)	Obsolete British unit of electrical resistivity used for describing the resistivity of insulating materials. 1 preece (resistivity) = 1MΩ.quadrant (E) 1 preece (resistivity) = 10 μΩ.cm (E)	UK
pret (Polish, Cracow)	–	length, distance	L	1 pret (Polish, Cracow) = 3.53460 m	Obsolete traditional Polish unit of length used before 1919. 1 pret (Polish, Cracow) = 15 stopa (Polish, Cracow) (E)	Polish
pret (Polish, new)	–	length, distance	L	1 pret (Polish, new) = 4.320 m	Obsolete traditional Polish unit of length used before 1919. 1 pret (Polish, new) = 15 stopa (Polish, new) (E)	Polish

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
pret (Polish, Warsaw)	–	length, distance	L	1 pret (Polish, Warsaw) = 4.4670 m	Obsolete traditional Polish unit of length used before 1919. 1 pret (Polish, Warsaw) = 15 stopa (Polish, Warsaw) (E)	Polish
probmetze (Austrian, dry)	–	capacity, volume	L^3	1 probmetze (Austrian, dry) = $6.00478515625 \times 10^{-5}$ m^3	Obsolete Austrian unit of capacity used for dry substances. 1 probmetze (Austrian, dry) = 1/1024 metzel (E)	Austrian
prony	–	power	ML^2T^{-3}	1 prony = 98.0665 W (E)	1 prony = 10 $kgfm.s^{-1}$ (E) 1 prony = 1/10 poncelet (E) 1 prony = 4/30 cheval-vapeur (E)	
proof (UK)	–	percentage of alcohol in wines and spirits	nil	1 UK proof = 0.5727% (v/v) ethanol 1 UK proof = 0.4950% (m/m) ethanol	British unit used in oenology. It serves to express the percentage of ethanol in wines and spirits. 1 UK proof = 0.5727 °GL	UK
proof (US)	–	percentage of alcohol in wines and spirits	nil	1 US proof = 0.5% (v/v) ethanol 1 US proof = 0.4249% (m/m) ethanol	American unit used in oenology. It serves to express the percentage of ethanol in wines and spirits at 60°F. 1 US proof = 0.5 °GL (E)	US
prout	–	energy, work, heat	ML^2T^{-2}	1 prout = $2.9699890010 \times 10^{-14}$ J	Obsolete unit of energy employed in nuclear physics for measurements of binding energy of nuclides. One prout is equal to 1/12 of the binding energy of the deuteron. The unit is named after W. Prout (1786–1850). 1 prout ≈ 0.185381 MeV	
puff	puff	electric capacitance	$M^{-1}L^{-2}T^4I^2$	1 puff = 10^{-12} F (E)	Obsolete unit of electric capacitance employed in electronics. The name is derived from the pronunciation of the symbol "pF" very quickly. 1 puff = 1 pF (E)	

pulgada (Argentinian)	–	length, distance	L	1 pulgada (Argentinian) = 2.40555555556 $\times 10^{-2}$ m	Obsolete Argentinian traditional unit of length used before 1887. 1 pulgada (Argentinian) = 1/36 vara (Argentinian) (E)	Argentinian
pulgada (Chilean)	–	length, distance	L	1 pulgada (Chilean) = 2.3222222222222 $\times 10^{-2}$ m	Obsolete Chilean traditional unit of length used before 1865. 1 pulgada (Chilean) = 1/36 bara (Chilean) (E)	Chilean
pulgada (Colombian)	–	length, distance	L	1 pulgada (Colombian) = 2.2222222222 $\times 10^{-2}$ m	Obsolete Colombian traditional unit of length used before 1854. 1 pulgada (Colombian) = 1/36 vara (Colombian) (E)	Colombian
pulgada (Costa-Rican)	–	length, distance	L	1 pulgada (Costa-Rican) = 2.331388889 $\times 10^{-2}$ m	Obsolete Costa-Rican traditional unit of length used before 1912. 1 pulgada (Costa-Rican) = 1/36 vara (Costa-Rican) (E)	Costa-Rican
pulgada (Guatemalan)	–	length, distance	L	1 pulgada (Guatemalan) = 2.321944444 $\times 10^{-2}$ m	Obsolete Guatemalan traditional unit of length used before 1912. 1 pulgada (Guatemalan) = 1/36 vara (Guatemalan) (E)	Guatemalan
pulgada (Honduran)	–	length, distance	L	1 pulgada (Honduran) = 2.2577777778 $\times 10^{-2}$ m	Obsolete Honduran traditional unit of length used before 1912. 1 pulgada (Honduran) = 1/36 vara (Honduran) (E)	Honduran
pulgada (Mexican)	–	length, distance	L	1 pulgada (Mexican) = 2.327777777778 $\times 10^{-2}$ m	Obsolete Mexican traditional unit of length used before 1896. 1 pulgada (Mexican) = 1/36 vara (Mexican) (E)	Mexican
pulgada (Paraguayan)	–	length, distance	L	1 pulgada (Paraguayan) = 2.40555555556 $\times 10^{-2}$ m	Obsolete Paraguayan traditional unit of length used before 1899. 1 pulgada (Paraguayan) = 1/36 vara (Paraguayan) (E)	Paraguayan
pulgada (Spanish)	–	length, distance	L	1 pulgada (Spanish) = 2.321958333 $\times 10^{-2}$ m	Obsolete Spanish unit of length. 1 pulgada (Spanish) = 1/36 vara (E)	Spanish

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
pulgada (Venezuelan)	–	length, distance	L	1 pulgada (Venezuelan) $= 2.2222222222 \times 10^{-2}$ m	Obsolete Venezuelan traditional unit of length used before 1857. 1 pulgada (Venezuelan) = 1/36 vara (Venezuelan) (E)	Venezuelan
pulgado (Brazilian)	–	length, distance	L	1 pulgado (Brazilian) $= 2.77777777778 \times 10^{-2}$ m	Obsolete Brazilian traditional unit of length used before 1874. 1 pulgado (Brazilian) = 1/12 pe (Brazilian) (E) 1 pulgado (Brazilian) = 1/36 m (E)	Brazilian
pumlungur (Icelandic)	–	length, distance	L	1 pumlungur (Icelandic) $= 2.615475 \times 10^{-2}$ m	Obsolete Icelandic traditional unit of length used before 1907. 1 pumlungur (Icelandic) = 1/12 fet (Icelandic) (E)	Icelandic
puncheon (Irish)	–	capacity, volume	L^3	1 puncheon (Irish) $= 449.293965928 \times 10^{-3}$ m^3	Obsolete traditional Irish unit of capacity for liquids used before the adoption of the Weights and Measures Act of 1824. 1 puncheon (Irish) = 126 gallons (Irish) (E)	Irish
puncheon (UK)	–	capacity, volume	L^3	1 puncheon (UK) $= 318.226440 \times 10^{-3}$ m^3	Obsolete British unit used for capacity measurements for all merchandise (solids, liquids, foodstuffs, etc). 1 puncheon (UK) = 70 gallons (UK) (E)	UK
puncheon (UK, beer)	–	capacity, volume	L^3	1 puncheon (UK, beer) $= 332.722947456 \times 10^{-3}$ m^3	Obsolete British unit of capacity used for measuring alcoholic beverages used between 1803 and 1824. 1 pin (UK, beer) = 72 gallons (UK, beer) (E)	UK
puncheon (US, wine)	–	volume, capacity	L^3	1 puncheon (US, wine) $= 317.974589856 \times 10^{-3}$ m^3 (E)	Obsolete American unit of volume used to measure the capacity of wine. 1 puncheon (US, wine) = 84 gallons (US, wine) (E)	US

pund (Danish)	–	mass	M	1 pund (Danish) = 0.5 kg (E)	Obsolete Danish traditional unit of mass used before 1912. 1 pund (Danish) = 16 unze (Danish) (E)	Danish
pund (Icelandic)	–	mass	M	1 pund (Icelandic) = 0.500 kg (E)	Obsolete Icelandic traditional unit of mass used before 1907. 1 pund (Icelandic) = 1/2 mark (Icelandic) (E)	Icelandic
pundland (Swedish)	–	surface area	L^2	1 pundland (Swedish) = $1.97455126400 \times 10^4$ m^2	Obsolete traditional Swedish unit of surface area used after decree 1665. 1 pundland (Swedish) = 224 000 kvardratfot (E)	Swedish
punkt (German) [Prussian point]	–	length, distance	L	1 punkt (Prussian) = $1.816302083 \times 10^{-4}$ m	Obsolete German unit of length. 1 punkt = 1/1728 fuss (E)	German
punkt(Austrian) [Austrian point]	–	length, distance	L	1 punkt (Austrian) = $1.829166667 \times 10^{-4}$ m	Obsolete Austrian unit of length. 1 punkt (Austrian) = 1/1728 fuss (E)	Austrian
punto (Italian)	–	length, distance	L	1 punto (Italian) = $3.567847222 \times 10^{-3}$ m	Obsolete Italian unit of length. 1 punto (Italian) = 1/144 piedi liprando (E)	Italian
punto (Philippine)	–	mass	M	1 punto (Philippine) = 0.200 kg	Obsolete Philippine traditional unit of mass used before 1906. 1 punto (Philippine) = 1/3 catty (Philippine) (E)	Philippine
punto (Spanish)	–	length, distance	L	1 punto (Spanish) = $1.20935329861 \times 10^{-4}$ m	Obsolete Spanish unit of length. 1 punto (Spanish) = 1/6912 vara (E)	Spanish
pygon (Greek, Attic)	–	length, distance	L	1 pygon (Greek, Attic) = 0.385700 m	Old Greek unit of length used in ancient times. 1 pygon (Greek, Attic) = 1.25 pous (E) 1 pygon (Greek, Attic) = 20 digits (E)	Attic
pyron	–	irradiance, radiant flux received, energy flux	MT^{-3}	1 pyron = 6.975833333×10^2 $W.m^{-2}$	Obsolete unit of irradiance employed for pyrometry measurements. The name derived from Greek *pyros* = fire. 1 pyron = 1 langley (E) 1 pyron = 1 $cal_{15°}.cm^{-2}.min^{-1}$ (E)	

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
Q (Japanese)	–	length, distance	L	1 Q (Japanese) = 0.25 $\times 10^{-3}$ m (E)	Japanese unit of length used in phototypesetting. The unit is named after the first letter of quarter of a millimetre. 1 Q (Japanese) = 1/4 mm (E)	Japanese
Q unit	–	energy, work, heat	ML^2T^{-2}	1 Q unit = 1.05505585262 $\times 10^{21}$ J	Obsolete American unit of heat and energy employed in energy resource and reserve assessment. One Q unit is approximately equal to the energy released during the combustion of 180 billion petroleum barrels. 1 Q unit = 10^{18} Btu (IT) (E) 1 Q unit = 10^3 quad (E)	US
qamha (Arabic)	–	surface, area	L^2	1 qamha (Arabic) = 61.44 m^2	Obsolete Arabic unit of area used in ancient times. 1 qamha (Arabic) = 1/96 feddan (E)	Arabic
qasab (Arabic)	–	length, distance	L	1 qasab (Arabic) = 3.840 m	Obsolete Arabic unit of length used in ancient times. 1 qasab (Arabic) = 12 feet (Arabic) (E)	Arabic
qasab (Persian)	–	length, distance	L	1 qasab (Persian) = 3.840 m	Obsolete unit of length in the Assyrio-Chaldean-Persian system used in ancient times. 1 qasab = 12 zereths (E)	Persian
qasaba (Arabic)	–	surface, area	L^2	1 qasaba (Arabic) = 14.7456 m^2	Obsolete Arabic unit of surface area used in ancient times. 1 qasaba (Arabic) = 1/400 feddan (E)	Arabic
qirat (Arabic)	–	surface, area	L^2	1 qirat (Arabic) = 245.780 m^2	Obsolete Arabic unit of area used in ancient times. 1 qirat (Arabic) = 1/24 feddan (E)	Arabic

quad	q	quantity of information	nil	1 q = 32 bit (E)	British and American dimensionless unit of quantity of information defined as 4 bytes. It was suggested but not adopted in computer science as alternative multiple unit of 1 bit.	UK, US
quad [quadrillion (Btu)]	quad	energy, work, heat	ML^2T^{-2}	1 quad = $1.05505585262 \times 10^{18}$ J	Obsolete American unit of heat and energy employed in energy resource and reserve assessment. One quad is approximately equal to the energy realeased during the combustion of 180 million petroleum barrels. 1 quad = 10^{15} Btu (IT) (E)	US
quade (de Paris)	–	capacity, volume	L^3	1 quade (de Paris) = $1.90429251695 \times 10^{-3}$ m^3	Obsolete French unit of capacity employed before the French Revolution. It served to express the capacity of liquids and grains. It varied according to the location and merchandise. 1 quade (de Paris) = 2 pintes (de Paris)	
quadrans (Roman)	–	mass	M	1 quadrans (Roman) = 81.75×10^{-3} kg	Obsolete Roman unit of mass used in ancient times. 1 quadrans (Roman) = 3 unciae (Roman) (E)	Roman
quadrant	–	length, distance	L	1 quadrant = 10^7 m (E)	Obsolete unit of length which is equal to a quadrant of the Earth measured at the Equator. 1 quadrant = 10 000 km (E)	INT
quadrant	–	length, distance	L	1 quadrant = 10^{-11} m (E)	Obsolete unit of length in the practical systems of electrical unit. 1 quadrant = 10^{-9} cm (E)	US
quadrant	–	plane angle	α	1 quadrant = 1.570796327 rad (E)	1 quadrant = $\pi/2$ rad (E)	
quadrantal (Roman, dry)	–	capacity,volume	L^3	1 quadrantal (Roman, dry) = 26.365440×10^{-3} m^3	Obsolete Roman unit of capacity for measuring dry substances. 1 quadrantal (Roman, dry) = 3 modius (E)	Roman

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
quadratic coulomb quadratic metre per cubic joule	$C^4.m^4.J^{-3}$	2nd hyper-polarizability	$M^{-3}L^{-2}T^{10}I^4$	**SI derived unit** $1\ C^4.m^4.J^{-3} = 1\ kg^{-3}.m^{-2}.s^{10}.A^4$ (E)	The relationship between electric dipolar moment (Cm) and hyperpolarizability is given by the following equation: $P = \alpha^* E + \frac{1}{2}\alpha^{*(2)}E^2 + \frac{1}{6}\alpha^{*(3)}E^3 + \cdots$ with $\alpha^* = \alpha\varepsilon_0$	SI
quadratus pes (Roman, 1st legal)	–	surface, area	L^2	1 quadratus pes (1st legal) $= 8.773444 \times 10^{-2}\ m^2$	Obsolete Roman unit of area.	Roman
quadratus pes (Roman, 2nd legal)	–	surface, area	L^2	1 quadratus pes (2nd legal) $= 8.803089 \times 10^{-2}\ m^2$	Obsolete Roman unit of area.	Roman
quadratus pes (Roman, Drussian)	–	surface, area	L^2	1 quadratus pes (Drussian) $= 10.214416 \times 10^{-2}\ m^2$	Obsolete Roman unit of area.	Roman
quadrennium	–	time, duration, period	T	1 quadrenium $= 1.262304 \times 10^8$ s (E)	Unit of time equal to four years. 1 quadrenium = 4 years (E)	INT
quadrillion (Btu) [quad]	quad	energy, work, heat	ML^2T^{-2}	1 quad $= 1.05505585262 \times 10^{18}$ J	Obsolete American unit of heat and energy employed in energy resource and reserve assessment. One quad is approximately equal to the energy realeased during the combustion of 180 million petroleum barrels. 1 quad $= 10^{15}$ Btu (IT) (E)	US
quanthar (Arabic)	–	mass	M	1 quanthar (Arabic) = 34 kg	Obsolete Arabic unit of mass used in ancient times. System of the Prophet. 1 quanthar (Arabic) = 100 rotl (E)	Arabic
quantum	hn	energy, work, heat	ML^2T^{-2}	1 quantum $= 6.6260755 \times 10^{-34}\nu$ (Hz) J (E)	Obsolete unit of energy used in quantum physics. The amount of energy in a quantum depends on the frequency of the radiation carrying the energy; it is equal to the frequency expressed in hertz multiplied by Planck's constant.	INT

quart (Irish)	qt.	capacity, volume	L^3	1 quart (Irish) = $891.456281600 \times 10^{-6}$ m^3	Obsolete traditional Irish unit of capacity for liquids used before the adoption of the Weights and Measures Act of 1824. 1 quart (Irish) = 1/4 gallons (Irish) (E)	Irish
quart (de Paris, dry)	–	capacity, volume	L^3	1 quart (de Paris, dry) = 3.160×10^{-3} m^3	Obsolete French unit of capacity employed before the French Revolution. It served to express the capacity of dry substances. 1 quart (de Paris) = 1/4 boisseau (de Paris) (E)	French
quart (Prussian)	–	capacity, volume	L^3	1 quart (Prussian) = $1.14506909541 \times 10^{-3}$ m^3	Obsolete German unit of capacity used for liquid substances. 1 quart (Prussian) = 64 cubic zoll (E)	German
quart (Prussian, dry)	–	capacity, volume	L^3	1 quart (Prussian, dry) = $1.145296667 \times 10^{-3}$ m^3	Obsolete German unit of capacity used for dry substances. 1 quart (Prussian, dry) = 1/3 metzel (E)	German
quart (Scottish, liq.)	qt.	capacity, volume	L^3	1 quart (Scottish, liq.) = $3.38897593170 \times 10^{-3}$ m^3	Obsolete traditional Scottish unit of volume used before the Weights and Measures Act of 1824 to measure the capacity of liquids. 1 quart (Scottish, liq.) = 1/4 gallon (Scottish, liq.) (E)	Scottish
quart (UK)	qt (UK)	capacity, volume	L^3	1 quart (UK) = $1.136523000 \times 10^{-3}$ m^3	Obsolete British unit used for capacity measurements for all merchandise (solids, liquids, foodstuffs, etc). 1 quart (UK) = 1/4 gallon (UK) (E) 1 quart (UK) = 2 pints (UK) (E) 1 quart (UK) = 8 gills (UK) (E) 1 quart (UK) = 40 fl oz (UK) (E) 1 quart (UK) = 320 fl dr (UK) (E) 1 quart (UK) = 1.200950454 quart (US)	UK
quart (US, dry)	qt (US, dry)	capacity, volume	L^3	1 quart (US, dry) = $1.10122094272 \times 10^{-3}$ m^3	Obsolete American unit of capacity used to measure the volume of powdered or divided solid materials (flour, sand, cement, ores, etc). 1 quart (US, dry) = 2 pints (US, dry) (E)	US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
quart (US, liquid)	qt (US, liq.)	capacity, volume	L^3	1 quart (US, liq.) $= 0.9463529460 \times 10^{-3}$ m^3	American unit used for capacity measurements of liquids. 1 quart (US, liq.) = 1/4 gallon (US, liq.) (E) 1 quart (US, liq.) = 2 pints (US, liq.) (E) 1 quart (US, liq.) = 8 gills (US, liq.) (E) 1 quart (US, liq.) = 32 fl oz (US, liq.) (E) 1 quart (US, liq.) = 256 fl dr (US, liq.) (E) 1 quart (US, liq.) = 0.832673818303 quart (UK)	US
quartano (Balearic)	–	mass	M	1 quartano (Balearic) = 3.672 kg	Obsolete Balearic traditional unit of mass. 1 quartano (Balearic) = 9 rottolo (Balearic) (E)	Balearic
quarte (Balearic, dry)	–	capacity, volume	L^3	1 quarte (Balearic, dry) $= 4.17538461540 \times 10^{-3}$ m^3	Obsolete Balearic traditional unit of capacity used for dry substances. 1 quarte (Balearic, dry) = 4 almude (Balearic, dry) (E)	Balearic
quarteau (de Paris)	–	capacity, volume	L^3	1 quarteau (de Paris) $= 68.5545306102 \times 10^{-3}$ m^3	Obsolete French unit of capacity employed before the French Revolution. It served to express the capacity of liquids and grains. It varies according to the location and merchandise. 1 quarteau (de Paris) = 72 pintes (de Paris) (E)	French
quarter (Japan)	–	length, distance	L	1 quarter (Japan) $= 0.25 \times 10^{-3}$ m (E)	Japanese typographical unit of length used in the printing industry for font size.	Japanese
quarter (Swedish)	–	capacity, volume	L^3	1 quarter (Swedish) $= 4.36193653483 \times 10^{-4}$ m^3	Obsolete Swedish unit of capacity for liquid substances. 1 quarter (Swedish) = 1/6 kanna (E)	Swedish

quarter (Swedish, dry)	–	capacity, volume	L^3	1 quarter (Swedish, dry) $= 4.36193653483 \times 10^{-4}$ m^3	Obsolete Swedish unit of capacity for dry substances. 1 quarter (Swedish, dry) = 1/6 kanna (E)	Swedish
quarter (UK capacity)	–	capacity, volume	L^3	1 quarter (UK cap) $= 290.949888 \times 10^{-3}$ m^3	British unit used for capacity measurements of liquids. 1 quarter (UK, capacity) = 64 gallons (UK)	UK
quarter (UK, mass)	–	mass	M	1 quarter (UK, mass) = 12.700586360 kg (E)	Obsolete British unit of mass. 1 quarter = 28 lb (av.) (E) 1 quarter = 2 stones (av.) (E)	UK
quarter (US, long)	–	mass	M	1 quarter (US, long) = 254.0117272 kg (E)	Obsolete American unit of mass. 1 quarter (US, long) = 560 lb (av.) (E) 1 quarter (US, long) = 5 lg cwt (av.) (E)	US
quarter (US, short)	–	mass	M	1 quarter (US, short) = 226.796185 kg (E)	Obsolete American unit of mass. 1 quarter (US, short) = 500 lb (av.) 1 quarter (US, short) = 5 sh. cwt (US) (E)	US
quarter section	–	surface, area	L^2	1 quarter section $= 6.47497027584 \times 10^5$ m^2	Obsolete British and American unit of area. 1 quarter section = 160 acres (E) 1 quarter section = 77 440 square yards (E)	UK, US
quarter yard (UK)	–	length, distance	L	1 quarter yard (UK)=0.2286 m (E)	Obsolete British unit of length for clothing material. 1 quarter yard (UK) = 4 nails (UK)	UK
quartera (Balearic, liq.)	–	capacity, volume	L^3	1 quartera (Balearic, liq.) $= 71.97 \times 10^{-3}$ m^3	Obsolete Balearic traditional unit of capacity used for liq uids. 1 quartera (Balearic, liq.) = 36 almude (Balearic, liq.) (E)	Balearic
quarteron (de Paris)	–	mass	M	1 quarteron (de Paris) $= 122.3764625 \times 10^{-3}$ kg	Obsolete French unit of mass employed before the French Revolution (1789). 1 quarteron (de Paris) = 1/4 livre (de Paris) (E)	French
quartern (UK)	–	mass	M	1 quartern (UK) = 1.814369480 kg	Obsolete British unit of mass. 1 quartern (UK) = 4 lb (E)	UK

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
quartier (Latvian)	–	length, distance	L	1 quartier (Latvian) = 0.134250 m	Obsolete Latvian traditional unit of length. 1 quartier (Latvian) = 1/4 elle (Latvian) (E)	Latvian
quartillo (Portuguese)	–	capacity, volume	L^3	1 quartillo (Portuguese) = 0.34375×10^{-3} m^3	Obsolete Portuguese unit of capacity used for liquid substances. 1 quartillo (Portuguese) = 1/48 almude (E)	Portuguese
quartin (Balearic, dry)	–	capacity, volume	L^3	1 quartin (Balearic, dry) = 27.14×10^{-3} m^3	Obsolete Balearic traditional unit of capacity used for dry substances. 1 quartin (Balearic, dry) = 26 almude (Balearic, dry) (E)	Balearic
quarto (Portuguese, dry)	–	capacity, volume	L^3	1 quarto (Portuguese, dry) = 3.375×10^{-3} m^3	Obsolete Portuguese unit of capacity used for dry substances. 1 quarto (Portuguese, dry) = 1/16 fanga (E)	Portuguese
quartus (Roman, liquid)	–	capacity, volume	L^3	1 quartus (Roman, liquid) = 1.373125×10 m^3	Old Roman unit of capcity used in ancient times. 1 quartus (Roman, liquid) = 1/4 sextarius (E)	Roman
quatern (UK)	–	capacity, volume	L^3	1 quatern (UK) = $0.142065375 \times 10^{-3}$ m^3	Obsolete British unit of capacity. 1 quatern (UK) = 1/32 gallons (UK) (E) 1 quatern (UK) = 1 gill (UK) (E) 1 quatern (UK) = 1 roquille (UK) (E)	UK
quei (Chinese)	–	capacity, volume	L^3	1 quei (Chinese) = 1.03544×10^{-7} m^3	Obsolete Chinese unit of capacity used in ancient times. 1 quei (Chinese) = 1/10 000 tcheng (E)	Chinese
quent (Latvian)	–	mass	M	1 quent (Latvian) = 3.2734375×10^{-3} kg	Obsolete Latvian traditional unit of mass. 1 quent (Latvian) = 1/128 pfund (Latvian) (E)	Latvian
quent (Estonian)	–	mass	M	1 quent (Estonian) = 3.59375×10^{-3} kg	Obsolete traditional Estonian unit of mass used before 1900. 1 quent (Estonian) = 1/128 pfund (Estonian) (E)	Estonian

quentchen (Austrian)	–	mass	M	1 quentchen (Austrian) $= 4.375078125 \times 10^{-3}$ kg	Obsolete Austrian unit of mass for general uses. 1 quentchen (Austrian) = 1/128 pfund (E)	Austrian
quentchen (Prussian)	–	mass	M	1 quentchen (Prussian) $= 4.871989583 \times 10^{-3}$ kg	Obsolete German unit of mass. 1 quentchen (Prussian) = 1/96 pfund (E)	German
Quevenne degree	°Q	specific gravity index on lactometric scale	nil	$^{\circ}Q = 1000 \times (\text{S.G.} - 1)$	Obsolete French dimensionless hydrometer unit used for milk. Each degree is 1/1000th of the specific gravity (S.G.) unit above 1.000. For instance, 15°Q and 40°Q correspond to solutions having the specific gravities 1.015 and 1.040 respectively.	French
quicunx (Roman)	–	mass	M	1 quicunx (Roman) $= 136.25 \times 10^{-3}$ kg	Obsolete Roman unit of mass used in ancient times. 1 quicunx (Roman) = 5 unciae (Roman) (E)	Roman
quignon (Philippine)	–	surface area	L^2	1 quignon (Philippine) = 27 950 m^2	Obsolete Philippine traditional unit of surface area used in land measurements before 1906. 1 quignon (Philippine) = 100 loan (Philippine) (E)	Philippine
quint (German)	–	mass	M	1 quint (German) $= 3.65399218750 \times 10^{-3}$ kg	Obsolete German unit of mass. 1 quint (German) = 1/128 pfund (German) (E)	German
quintal (Ancien Régime)	q	mass	M	1 quintal (Ancien Régime) = 48.9505850 kg	Obsolete French unit of mass employed before the French Revolution (1789). 1 quintal (Ancien Régime) = 100 livres (de Paris) (E)	French
quintal (Argentinian)	–	mass	M	1 quintal (Argentinian) = 45.94 kg	Obsolete Argentinian traditional unit of mass used before 1887. 1 quintal (Argentinian) = 100 libra (Argentinian) (E)	Argentinian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
quintal (Belgian)	–	mass	M	1 quintal (Belgian) = 48.9500 kg	Obsolete traditional Belgian unit of mass used before 1820. 1 quintal (Belgian) = 100 livres (Belgian) (E)	Belgian
quintal (Brazilian)	–	mass	M	1 quintal (Brazilian) = 58.7584 kg	Obsolete Brazilian traditional unit of mass used before 1874. 1 quintal (Brazilian) = 128 libra (Brazilian) (E)	Brazilian
quintal (Colombian)	–	mass	M	1 quintal (Colombian) = 50 kg	Obsolete Colombian traditional unit of mass used before 1854. 1 quintal (Venezuelan) = 100 libbra (Venezuelan) (E)	Colombian
quintal (metric)	q	mass	M	1 q = 100 kg (E)	Obsolete French metric unit of mass still used in a few countries.	French
quintal (Mexican)	–	mass	M	1 quintal (Mexican) = 46.024634 kg	Obsolete Mexican traditional unit of mass used before 1896. 1 quintal (Mexican) = 100 libbra (Mexican) (E)	Mexican
quintal (Paraguayan)	–	mass	M	1 quintal (Paraguayan) = 45.9 kg	Obsolete Paraguayan traditional unit of mass used before 1899. 1 quintal (Paraguayan) = 100 libbra (Paraguayan) (E)	Paraguayan
quintal (Peruvian)	–	mass	M	1 quintal (Peruvian) = 46.009 kg	Obsolete Peruvian traditional unit of mass used before 1869. 1 quintal (Peruvian)= 100 libbra (Peruvian) (E)	Peruvian
quintal (Portuguese)	–	mass	M	1 quintal (Portuguese) = 58.752 kg	Obsolete Portuguese unit of mass. 1 quintal (Portuguese) = 128 libra (E)	Portuguese
quintal (Spanish)	–	mass	M	1 quintal (Spanish) = 46.0093 kg	Obsolete Spanish unit of mass. 1 quintal (Spanish) = 100 libra (E)	Spanish

quintal (US)	quint. (US)	mass	M	1 quintal (US) = 45.359237 kg (E)	Obsolete British and American unit of mass. 1 quintal (US) = 100 lb (av.) (E) 1 quintal (US) = 1 quintal (UK) (E)	UK, US
quintal (Venezuelan)	–	mass	M	1 quintal (Venezuelan) = 50 kg	Obsolete Venezuelan traditional unit of mass used before 1914. 1 quintal (Venezuelan) = 100 libbra (Venezuelan) (E)	Venezuelan
quintale (Chilean)	–	mass	M	1 quintale (Chilean) = 46.0093 kg	Obsolete Chilean traditional unit of mass used before 1865. 1 quintale (Chilean) = 100 libbra (Chilean) (E)	Chilean
quintalmacho (Spanish)	–	mass	M	1 quintalmacho (Spanish) = 69.01395 kg	Obsolete Spanish unit of mass. 1 quintalmacho (Spanish) = 150 libra (E)	Spanish
quintant	–	plane angle	α	1 quintant = 1.25663706144 rad	International unit of plane angle used in for reporting compass readings in aeronautics and marine navigation. 1 quintant = 1/5 circle (E) 1 quintant = $2\pi/5$ rad (E)	INT
quintin (Danish)	–	mass	M	1 quintin (Danish) = 3.906250×10^{-3} kg (E)	Obsolete Danish traditional unit of mass used before 1912. 1 quintin (Danish) = 1/128 pund (Danish) (E)	Danish
quintin (Swedish)	–	mass	M	1 quintin (Swedish) = $3.3209351750 \times 10^{-3}$ kg	Obsolete Swedish unit of mass used before 1889. 1 quintin (Swedish) = 1/128 skålpund (Swedish) (E)	Swedish
quinto (Guinean)	–	mass	M	1 quinto (Guinean) = 6.01875×10^{-3} kg	Obsolete Guinean traditional unit of mass used before 1906. 1 quinto (Guinean) = 3/32 benda (Guinean) (E)	Guinean

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
quinze-seize (de Paris)	15/16	length, distance	L	1 quinze-seize (de Paris) = 1.82722171875 m	Obsolete French unit of length employed in textiles and clothing measurements. It was used in France during the Ancien Régime before the French Revolution (1789). 1 quinze-seize = 15/16 toise (de Pérou) (E)	French
quo (Annamese)	–	surface area	L^2	1 quo (Annamese) = 9940.5 m^2	Obsolete Annameseian traditional unit of surface area used in land measurements before 1914. 1 quo (Annamese) = 1800 square ngu (Annamese) (E)	Annamese
R-value	R-value	heat insulation coefficient (thermal resistance multiplied by area)	$M^{-1}T^3\Theta$	1 R-value = 0.176110183682 $W^{-1}.m^2.K$	Obsolete unit of heat-insulation coefficient employed in the British and American building engineering. One R-value corresponds to the heat insulation coefficient of a wall which conserves a temperature difference of 1°F between its faces when the heat flux is equal to one $Btu_{IT}.h^{-1}.ft^{-2}$. 1 R-value = 1 $(Btu_{IT}/h)^{-1}.ft^2.°F$ (E) 1 R-value = 0.1761101838 RSI 1 R-value = 1 $(U\text{-factor})^{-1}$ (E)	UK, US
rabah (Hebrew) [Sacred system]	–	mass	M	1 rabah (Hebrew) = 3.541667×10^{-3} kg	Obsolete Hebrew unit of mass used in ancient times. Sacred system. 1 rabah (Hebrew) = 1/240 mina (E)	Hebrew
racion (Spanish, dry)	–	capacity, volume	L^3	1 racion (Spanish, dry) = $2.89067708333 \times 10^{-4}$ m^3	Obsolete Spanish unit of capacity used for dry substances. 1 racion (Spanish, dry) = 1/192 fanega (E)	Spanish
rad (radiation absorbed dose)	rd, rad	radiation absorbed dose, specific energy, kerma, index of absorbed dose	L^2T^{-2}	1 rad = 10^{-2} Gy (E)	Obsolete absorbed dose unit employed in ionizing radiation dosimetry. It was adopted in 1953 by the ICRU. The rad is the absorbed dose when the energy per	

					unit mass imparted to matter by ionizing radiation is one hundred ergs per gram. 1 rad = 10^{-2} J.kg^{-1} (E) 1 rad = 10^{2} erg.g^{-1} (E) 1 rad = $2.39005736 \times 10^{-6}$ cal.g^{-1} 1 rad = $6.24180762749 \times 10^{13}$ eV.g^{-1}	
radian	rad	plane angle	α	**SI Supplementary Unit**	The radian is an SI supplementary unit. One radian is a plane angle enclosed between two radii which intercept, on a circle, an arc of length equal to the radius.	SI
radian (hyperbolic)	rdh	hyperbolic plane angle	dimension less	(see note)	The hyperbolic radian is the theoretical dimensionless unit of hyperbolic plane angle defined in hyperbolic trigonometry. Its geometrical construction is based on the hyperbola of the circle. Consider the equilateral hyperbola defined analytically by the following equation: $x^2 - y^2 = R^2$ which has its arc lying within the left and right-half planes. If a ray is drawn from the origin O by analogy with the circular angle, the hyperbolic angle measures the area contained between the hyperbola and the abscissa. Then the hyperbolic angle expressed in hyperbolic radians is defined as the ratio of twice the surface area to the radius squared.	INT
radian per minute	rad.min^{-1}	angular velocity, angular frequency, circular frequency	αT^{-1}	1 rad.min^{-1} = 0.0166667 rad.s^{-1}		
radian per second	rad.s^{-1}	angular velocity, angular frequency, circular frequency	αT^{-1}	**SI derived unit**	The radian per second is the unit of angular velocity of an object which is in uniform revolution around an axis and which is defined as a plane angle of one radian in one second.	SI

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
radian per square second	$rad.s^{-2}$	angular acceleration	αT^{-2}	**SI derived unit**	The radian per square second is the SI derived unit of angular acceleration. It is the acceleration of an object which is in revolution around an axis and which undergoes a variation of angular velocity of one radian per second in one second.	SI
radian square metre per kilogram	$rad.m^2.kg^{-1}$	specific optical rotatory power	$M^{-1}L^2\alpha$	**SI derived unit**		SI
radian square metre per mole	$rad.m^2.mol^{-1}$	molar optical rotatory power	$N^{-1}L^2\alpha$	**SI derived unit**		SI
radiation	–	radioactivity	T^{-1}	1 radiation = 1 Bq (E)	Obsolete unit of radioactivity meaning the amount of substance who produces one nuclear transition per second. Older name for the becquerel.	
rai (Thai)	–	surface area	L^2	1 rai (Thai) = 1600 m^2	Obsolete Thai traditional unit of surface area used in land measurements before 1923. 1 rai (Thai) = 400 square wah (Thai)	Thai
raik (Indian)	–	mass	M	1 raik (Indian) = 1.1663 kg	Obsolete Indian traditional unit of mass used before 1920. 1 raik (Indian) = 5/4 seer (Indian) (E)	Indian
raik (Indian)	–	capacity, volume	L^3	1 raik (Indian) = 1.37625×10^{-3} m^3	Obsolete Indian traditional unit of capacity used before 1920. 1 raik (Indian) = 1/80 parah (Indian) (E)	Indian
raliza (Yugoslavian)	–	surface area	L^2	1 raliza (Yugoslavian) = 2496.400 m^2	Obsolete traditional Yugoslavian unit of surface area used in land measurements before 1883. 1 raliza (Yugoslavian) = 25 000 square stopa (E)	Yugoslavian

Rankine degree	°R	temperature	Θ	T(K) = 5/9T(°R)	Usual absolute temperature scale in the English-speaking countries. T(°R) = T(°F) + 459.67 1 °F = 1°R (E)	UK, US
ratl (Saudi Arabian)	–	mass	M	1 ratl (Saudi Arabian) = 0.450 kg	Obsolete Saudi Arabian traditional unit of mass used before 1962. 1 ratl (Saudi Arabian) = 1/3 maund (Saudi Arabian) (E)	Saudi Arabian
rayl (cgs)	rayl	specific acoustic impedance	$ML^{-2}T^{-1}$	1 rayl = 10 $kg.m^{-2}.s^{-1}$ (E)	Obsolete cgs unit of specific acoustic impedance. A specific acoustic impedance has a magnitude of 1 rayl when a sound pressure of 1 barye produces a linear velocity of 1 $cm.s^{-1}$. The unit is named after the British scientist, the third Lord Rayleigh (1842–1919).	cgs
rayl (MKSA)	rayl	specific acoustic impedance	$ML^{-2}T^{-1}$	1 rayl = 1 $kg.m^{-2}.s^{-1}$ (E)	Obsolete MKSA unit of specific acoustic impedance. A specific acoustic impedance has a magnitude of 1 rayl when a sound pressure of 1 Pa produces a linear velocity of 1 $m.s^{-1}$. The unit is named after Lord Rayleigh (1842–1919).	MKSA
rayleigh	R	photon fluence rate	$L^{-2}T^{-1}\Omega^{-1}$	1 rayleigh $= (1/4\pi) \times 10^{10}$ $m^{-2}.s^{-1}.sr^{-1}$	Obsolete unit used in photometry. The unit is named after the British scientist, the fourth Lord Rayleigh (1875–1947).	
real (Indonesian)	–	mass	M	1 real (Indonesian) $= 19.3004070312 \times 10^{-3}$ kg	Obsolete Indonesian traditional unit of mass used before 1923. 1 real (Indonesian) = 1/3200 picul (Indonesian) (E)	Indonesian
ream	ream	quantity of paper sheet	nil	1 ream = 500 sheets (E)	Unit used in the printing industry.	INT
ream (old)	ream	number of sheets of paper	nil	1 ream (old) = 480 sheets (E)	Obsolete British and American unit of quantity used in the printing industry for counting sheets of paper. The unit is *(continued overleaf)*	UK, US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
ream (old) *(continued)*					named after the Arabic, *rizmah*, meaning a bundle. Today, the modern standardized ream is equal to 500 sheets. 1 ream (old) = 20 quires (old) (E)	
Réaumur degree	°Ré	temperature	Θ	T (°Ré) = 0.8 T(°C)	Obsolete French temperature scale. 0°Ré = 0°C (melting ice) 80°Ré = 100°C (boilling water)	French
rebia (Algerian)	–	length, distance	L	1 rebia (Algerian) = 1.1675 $\times 10^{-1}$ m to 1.5575 $\times 10^{-1}$ m	Obsolete traditional Algerian unit of length used before 1843. 1 rebia (Algerian) = 2 termin (Algerian) (E)	Algerian
reciprocal joule per cubic metre	$J^{-1}.m^{-3}$	density of state	$M^{-1}L^{-5}T^{2}$	**SI derived unit**		SI
reciprocal metre	m^{-1}	wavenumber	L^{-1}	**SI derived unit**		SI
reciprocal ohm per centimetre	roc	electrical conductivity	$M^{-1}L^{-3}T^{3}I^{2}$	1 roc = 100 $S.m^{-1}$ (E)	Name suggested in 1964 for the practical cgs electrical conductivity unit. 1 roc = 1 $\Omega^{-1}.cm^{-1}$ (E)	
reciprocal ohm per metre	rom	electrical conductivity	$M^{-1}L^{-3}T^{3}I^{2}$	1 rom = 1 $S.m^{-1}$ (E)	Name suggested in 1964 for the practical MKS electrical conductivity unit. 1 rom = 1 $\Omega^{-1}.m^{-1}$ (E)	
reciprocal second	s^{-1}	frequency	T^{-1}	**SI derived unit** 1 s^{-1} = 1 Hz (E)		SI
reciprocal volt square metre second	$m^2.V^{-1}.s^{-1}$	electric mobility of ions and charged particles	$M^{-1}T^{2}I$	**SI derived unit** 1 $V^{-1}.m^2.s^{-1}$ = 1 $kg^{-1}.s^2.A$ (E)		SI
redshift	z	relative astronomical distance	nil	(see note)	Obsolete unit of relative distance used in astronomy, to express the recession of distant galaxies from the Earth. Just as sound from a receding train is lowered in pitch, light from distant galaxies is shifted toward longer wavelengths, that is, toward	@

					the red end of the spectrum. The redshift equals z if the wavelength of light is $z + 1$ times the normal wavelength; thus a redshift of 0.40 means that the wave length of the light is 40% longer than normal.	
Redwood Admiralty (second)	–	index of kinematic viscosity	nil	ν (m^2/s) = $1.47 \times 10^{-7} t$ (s) – $3.74 \times 10^{-4}/t$ (s) (see note)	Obsolete British empirical index of kinematic viscosity which corresponds to the flowing time expressed in seconds, of 50 cm^3 of liquid in a Redwood viscosimeter. ν (cm^2/s) = 0.00147 t (s) - 3.74/t (s)	UK
Redwood No. 1 (second)	–	index of kinematic viscosity	nil	(see note) ν ($m^2.s^{-1}$) = $2.47 \times 10^{-7} t$ (s) $- 0.50 \times 10^{-4}$ /t (s) for 34 s < t < 100 s ν ($m^2.s^{-1}$) = $2.70 \times 10^{-6} t$ (s) $- 20 \times 10^{-4}$ /t (s) for t > 100 s	Obsolete British empirical index of kinematic viscosity which corresponds to the flowing time expressed in seconds, of 50 cm^3 of liquid in a Redwood viscosimeter. ν ($cm^2 s^{-1}$) = $0.00247t$(s) $- 0.5/t$(s) for 34 s < t < 100 s ν ($cm^2 s^{-1}$) = $0.0027t$(s) $- 20/t$(s) for t > 100 s	UK
ref (Swedish)	–	length, distance	L	1 ref (Swedish) = 47.504 m	Obsolete Swedish unit of length. 1 ref (Swedish) = 160 fot (E)	Swedish
rège (French, blé)	–	surface area	L^2	1 rège (French, blé) = 66.6666666667 m^2	Obsolete local French unit of surface area used for land measurements before 1789. 1 rège (French, blé) = 1/60 journal (E)	French
rège (French, vigne)	–	surface area	L^2	1 rège (French, vigne) = 80 m^2	Obsolete local French unit of surface area used for land measurements before 1789. 1 rège (French, vigne) = 1/50 journal (E)	French
register ton (UK)	–	capacity, volume	L^3	1 register ton (UK) = 2.831684659 m^3	Obsolete British unit of capacity used in mercantile shipping. 1 register ton (UK) = 100 ft^3 (E)	UK

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
réhoboam (rehoboam)	–	capacity, volume	L^3	1 réhoboam = 4.546092×10^{-3} m^3	Obsolete British unit which expressed the capacity of a wine container. Still employed in oenology, especially in France. 1 réhoboam = 1 gallon (UK) (E) 1 réhoboam = 6 bouteilles (E)	UK, French
rem (rad equivalent mammals or man)	rem	dose equivalent, index of dose equivalent	L^2T^{-2}	1 rem = 10^{-2} Sv (E)	Obsolete unit of dose equivalent employed in radioprotection. One rem was equal to the quantity of ionizing radiation which produces a specific absorbed energy on living substance which produces the same biological effect as one rad of X-rays generated by an electric voltage of 200–250 kilovolts.	
rema (Egyptian)	–	surface, area	L^2	1 rema (Egyptian) = 1370.2612500 m^2	Obsolete Egyptian unit of area used in ancient times. 1 rema (Egyptian) = 50 pekeis (E)	Egyptian
rep (rad equivalent physical)	rep	dose equivalent, index of dose equivalent	L^2T^{-2}	1 rep = 10^{-2} sievert (E)	Obsolete unit of dose equivalent employed in radioprotection. The rep is equal to the quantity of radiation which releases, in one gram of body tissue, the same energy as one röntgen of X or gamma rays in the same air mass.	
reputed quart (bouteille champenoise)	–	capacity, volume	L^3	1 reputed quart = $0.757682000 \times 10^{-3}$ m^3	Obsolete British unit which expressed the capacity of a wine container. Still employed in oenology, especially in France. 1 reputed quart = 1/6 gallon (UK) (E)	UK, French
retti (Indian) (ratica)	–	mass	M	1 retti (Indian) = 1.468750×10^{-4} kg	Obsolete Indian unit of mass used in ancient times. 1 retti (Indian) = 1/320 pala (E)	Indian

revolution	rev	plane angle	α	1 revolution = 2π rd (E)	British and American unit of plane angle used in engineering. 1 revolution = 360° 1 revolution = 400 grades (E)	UK, US
revolutions per minute	rpm, rev. min^{-1}	angular velocity, angular frequency, circular frequency	αT^{-1}	1 rpm = 0.104719755120 $rad.s^{-1}$	1 rpm = $\pi/30$ $rad.s^{-1}$ (E)	UK, US
revolutions per second	rps, $rev.s^{-1}$	angular velocity, angular frequency, circular frequency	αT^{-1}	1 $rev.s^{-1}$ = 6.28318530718 $rad.s^{-1}$	Anglo-saxon unit of angular velocity. 1 rps = 2π $rad.s^{-1}$ (E)	UK, US
reynolds (reyns)	reyns (reyn)	dynamic viscosity, absolute viscosity	$ML^{-1}T^{-1}$	1 reyns = 1.48816394357 Pa.s	Unit of dynamic viscosity or absolute viscosity in the FPS system. The unit is named after O. Reynolds (1842–1912). 1 reyn = $lb.ft^{-1}.s^{-1}$ (E)	FPS
reyns	reyns (reyn)	dynamic viscosity, absolute viscosity	$ML^{-1}T^{-1}$	1 reyns = 1.48816394357 Pa.s	Unit of dynamic viscosity or absolute viscosity in the FPS system. The unit is named after O. Reynolds (1842-1912). 1 reyn = $lbft^{-1}.s^{-1}$ (E)	FPS
rhe	–	reciprocal of dynamic viscosity fluidity	$M^{-1}LT$	1 rhe = 10 $(Pa.s)^{-1}$ (E)	Obsolete cgs unit of fluidity. 1 rhe = 1 Po^{-1} (E)	cgs
ri (Japanese)	–	length, distance	L	1 ri (Japanese) = 3927.273 m	Obsolete Japanese unit of length. 1 ri = 12 960 shaku (E) 1 ri = (129 600/33) m (E)	Japanese
Richter degree	–	percentage of alcohol in wines and spirits	nil	1 °Richter = 10^{-2} v/v ethanol (E)	Obsolete British unit introduced for expressing alcohol percentage in spirits. 1 °Richter = 1%vol ethanol (E)	UK
richtstrahlwert	–	electron-optics brightness	$IL^{-2}\Omega^{-1}$	1 richtstrahlwert = 10^4 $A.m^{-2}.sr^{-1}$ (E)	Obsolete German unit of electron-optics brightness used in mass spectrometry and ionized particle beam studies. 1 richtstrahlwert = 1 $A.cm^{-2}.sr^{-1}$ (E)	German
ridge (Welsh)	–	length, distance	L	1 ridge (Welsh) = 6.1722 m (E)	Obsolete Welsh unit of length. 1 ridge (Welsh) = 3 leaps (E) 1 ridge (Welsh) = 20 feet 3 inches (E)	Welsh

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
riga last (UK, timber)	–	capacity, volume	L^3	1 riga last (UK, timber) = 2.26534772736 m^3 (E)	Obsolete British unit of volume used for measuring timber. The riga last is named after the Latvian capital, Riga, which was a major port for the shipment of timber from Russian forests. 1 riga last (UK, timber) = 80 cubic feet (E)	UK
right angle	⊥	plane angle	α	1 right angle = 1.57079632680 rad (E)	1 right angle = π/2 rad (E) 1 plane angle = 90 degrees (E) 1 plane angle = 100 gon (E)	
rin (Japanese)	–	length, distance	L	1 rin (Japanese) = $3.030303030 \times 10^{-4}$ m	Obsolete Japanese unit of length. 1 rin = 1/1000 shaku (E) 1 rin = 1/3300 m (E)	Japanese
ringing equivalent number	REN	electric conductance	$M^{-1}T^3L^{-2}I^2$	1 REN = 1/4000 Ω^{-1} (E)	Obsolete unit of conductance	UK, US
rob (Egyptian)	–	capacity, volume	L^3	1 rob (Egyptian) = 8.250×10^{-3} m^3	Obsolete Egyptian traditional unit of capacity used before 1891. 1 rob (Egyptian) = 4 keddah (Egyptian) (E)	Egyptian
robbah (Egyptian)	–	capacity, volume	L^3	1 robbah (Egyptian) = 515.6250×10^{-6} m^3	Obsolete Egyptian traditional unit of capacity used before 1891. 1 robbah (Egyptian) = 1/4 keddah (Egyptian) (E)	Egyptian
roc	roc	electrical conductivity	$M^{-1}L^{-3}T^3I^2$	1 roc = 10^2 $S.m^{-1}$ (E)	Suggested name for the cgs unit of electrical conductivity. Acronym of **r**eciprocal **o**hm **c**entimetre. 1 roc = 1 $\Omega^{-1}.cm^{-1}$ (E) 1 roc = 100 rom (E)	cgs
rod (perch, pole)	rd	length, distance	L	1 rod = 5.0292 m (E)	Obsolete American and British unit of length used in surveyor's measurements. The rod was determined by lining up 16 men after the Sunday service and measuring the combined length of all their	UK, US

					left feet. The word rod is the anglicization of the Dutch rood, which is traced to the German ruthe. 1 rod = 1 perch (E) 1 rod = 1 pole (E) 1 rod = 5.5 yards (E) 1 rod = 16.5 feet (E) 1 rod = 198 inches (E)	
rod (Scottish)	–	surface area	L^2	1 rod (Scottish) = 1285.61698579 m^2	Obsolete traditional Scottish unit of surface area used in land measurements before the Imperial Weights and Measures Act of 1824. 1 rod (Scottish) = 13 690 square feet (Scottish) (E)	Scottish
rod (UK)	–	capacity, volume	L^3	1 rod (UK) = 28.31684659 m^3	Obsolete British unit of capacity used in mercantil shipping. 1 rod (UK) = 10 register tons (UK) 1 rod (UK) = 1000 ft^3 (E)	UK
roeden (Dutch)	–	length, distance	L	1 roeden (Dutch) = 3.6797722 m	Obsolete unit of length used in Amsterdam (Netherlands) 1 roeden (Dutch) = 13 voetens (E)	Dutch
roeneng (Thai)	–	length, distance	L	1 roeneng (Thai) = 4000 m	Obsolete Thai traditional unit of length used before 1923. 1 roeneng (Thai) = 2000 wah (Thai) (E)	Thai
roentgen (röntgen)	R	exposure	ITM^{-1}	1 R = 2.58×10^{-4} $C.kg^{-1}$	Obsolete unit of exposure employed in ionizing radiation dosimetry. It was equal to the quantity of gamma or X-rays which produce an electric charge of one franklin of two signs per ionization in one cubic centimetre of dry air (ρ = 1.293 $g.cm^{-3}$) with standard T and P (0°C, 760 torr). The unit is named after the German Physicist W.C. Roentgen (1845–1923) who discovered the X-ray in 1895.	

roentgen-hour-metre	rhm, $R.m.h^{-1}$	strength of gamma rays sources	ILM^{-1}	1 rhm = 7.166667 × 10^{8} $C.kg^{-1}.m.s^{-1}$ (E)	Obsolete unit used in nuclear physics to measure the strength of gamma ray sources. A source of strength 1 rhm produces ionization at the rate 1 roentgen per hour at a distance of 1 metre from the source. The symbol is the acronym of **r**oentgen-**h**our-**metre**. 1 rhm = 1 $R.m.h^{-1}$ (E)	
roll (UK, US)	–	surface area	L^2	1 roll (UK, US) = 2.7870912 m^2 (E)	Obsolete British and American unit of length used to measure wallpaper. 1 roll (UK, US) = 30 square feet (E)	UK, US
rom	rom	electrical conductivity	$M^{-1}L^{-3}T^3I^2$	1 rom = 1 $S.m^{-1}$ (E)	Suggested name for the MKSA unit of electrical conductivity. Acronym of **r**eciprocal **o**hm **m**etre. 1 rom = 1 $\Omega^{-1}.m^{-1}$ (E) 1 rom = 0.01 roc (E)	MKSA
rood (UK)	–	surface, area	L^2	1 rood (UK) = 1.01171410560 × 10^{3} m^2	Obsolete British unit of area used in surveyor's measurements. Named after the Dutch rood and the German ruthe. 1 rood (UK) = 1/4 acre (E) 1 rood (UK) = 40 square rods (UK) (E) 1 rood (UK) = 10 890 sq. feet (E)	UK
rope (UK)	–	length, distance	L	1 rope (UK) = 6.096 m (E)	Obsolete British unit of length. 1 rope (UK) = 20 feet (E)	UK
roquille (de Paris)	–	capacity, volume	L^3	1 roquille (de Paris) = 2.97545705773 × 10^{-5} m^3	Obsolete French unit of capacity employed before the French Revolution. It served to express the capacity of liquids and grains. It varied according to location and merchandise. 1 roquille (de Paris) = 1/32 pinte (de Paris) (E)	French
roquille (US)	–	capacity, volume	L^3	1 roquille (US) = 1.18294118250 × 10^{-4} m^3	Obsolete American unit of capacity. 1 roquille (US) = 1/32 gallon (US) (E) 1 roquille (US) = 1 gill (US) (E) 1 roquille (US) = 1 noggin (US)	US

roquille (UK)	–	capacity, volume	L^3	1 roquille (UK) $= 1.420653750 \times 10^{-4}$ m^3	Obsolete British unit of capacity. 1 roquille (UK) = 1/32 gallon (UK) (E) 1 roquille (UK) = 1 gill (UK) (E) 1 roquille (UK) = 1 noggin (UK) (E)	UK
rotal (Moroccan)	–	mass	M	1 rotal (Moroccan) = 0.5075 kg	Obsolete traditional Moroccan unit of mass used before 1923. 1 rotal (Moroccan) = 1/100 kantar (Moroccan) (E)	Moroccan
rotl (Arabic)	–	mass	M	1 rotl (Arabic) = 0.340 kg	Obsolete Arabic unit of mass used in ancient times. System of the Prophet.	Arabic
rotl (Syrian)	–	capacity, volume	L^3	1 rotl (Syrian) $= 3.2 \times 10^{-3}$ m^3	Obsolete Syrian traditional unit of capacity used before 1931. 1 rotl (Syrian) = 1/250 makuk (Syrian) (E)	Syrian
rotoli (Egyptian)	–	mass	M	1 rotoli (Egyptian) = 0.449280 kg	Obsolete Egyptian traditional unit of mass used before 1891. 1 rotoli (Egyptian) = 9/25 oke (Egyptian) (E)	Egyptian
rottel (Persian)	–	mass	M	1 rottel (Persian) = 0.460 kg	Obsolete Persian traditional unit of mass used before 1933. 1 rottel (Persian) = 50 dirhem (Persian) (E)	Persian
rottel (Turkish)	–	mass	M	1 rottel (Turkish) = 0.56452 kg	Obsolete Turkish traditional unit of mass used before 1933. 1 rottel (Turkish) = 11/25 oka (Turkish) (E)	Turkish
rottolo (Abyssinian)	–	mass	M	1 rottolo (Abyssinian) = 0.311 kg	Obsolete Abyssinian traditional unit of mass used before 1927. 1 rottolo (Abyssinian) = 120 derime (Abyssinian) (E)	Abyssinian
rottolo (Algerian, kebyr)	–	mass	M	1 rottolo (Algerian, kebyr) = 0.81912 kg	Obsolete traditional Algerian unit of mass used before 1843. 1 rottolo (Algerian, kebyr) = 24 ukkia (Algerian) (E)	Algerian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
rottolo (Algerian, khaldary)	–	mass	M	1 rottolo (Algerian, khaldary) = 0.6143 kg	Obsolete traditional Algerian unit of mass used before 1843. 1 rottolo (Algerian, khaldary) = 18 ukkia (Algerian) (E)	Algerian
rottolo (Algerian, thary)	–	mass	M	1 rottolo (Algerian, thary) = 0.546 kg	Obsolete traditional Algerian unit of mass used before 1843. 1 rottolo (Algerian, thary) = 16 ukkia (Algerian) (E)	Algerian
rottolo (Balearic)	–	mass	M	1 rottolo (Balearic) = 0.408 kg	Obsolete Balearic traditional unit of mass. 1 rottolo (Balearic) = 1/26 arroba (Balearic) (E)	Balearic
rottolo (Cypriot)	–	mass	M	1 rottolo (Cypriot) = 0.55882580 kg	Obsolete Cypriot traditional unit of mass used before 1972. 1 rottolo (Cypriot) = 176 drachme (Cypriot) (E)	Cypriot
rottolo (Eritrean)	–	mass	M	1 rottolo (Eritrean) = 0.448 kg	Obsolete Eritrean traditional unit of mass used before 1927. 1 rottolo (Eritrean) = 16 okia (Eritrean) (E)	Eritrean
rottolo (Libyan)	–	mass	M	1 rottolo (Libyan) = 0.5128 kg	Obsolete Libyan traditional unit of mass used before 1927. 1 rottolo (Libyan) = 1/100 cantaro (Libyan) (E)	Libyan
rottolo (Maltese)	–	mass	M	1 rottolo (Maltese) = 0.79379 kg	Obsolete Maltese traditional unit of mass used before 1921. 1 rottolo (Maltese) = 7/4 libra (Maltese) (E)	Maltese
rottolo (Somalian)	–	mass	M	1 rottolo (Somalian) = 0.448 kg	Obsolete Somalian traditional unit of mass used before 1950. 1 rottolo (Somalian) = 16 okia (Somalian) (E)	Somalian

rottolo (Syrian)	–	mass	M	1 rottolo (Syrian) = 1.785 kg	Obsolete Syrian traditional unit of mass used before 1931. 1 rottolo (Syrian) = 1/100 cantar (Syrian) (E)	Syrian
rottolo (Tunisian, attari)	–	mass	M	1 rottolo (Tunisian, attari) = 0.50392 kg	Obsolete Tunisian traditional unit of mass used before 1895. 1 rottolo (Tunisian, attari) = 16 uckir (Tunisian) (E)	Tunisian
rottolo (Tunisian, khaddari)	–	mass	M	1 rottolo (Tunisian, khaddari) = 0.6299 kg	Obsolete Tunisian traditional unit of mass used before 1895. 1 rottolo (Tunisian, khaddari) = 20 uckir (Tunisian) (E)	Tunisian
rottolo (Tunisian, sucki)	–	mass	M	1 rottolo (Tunisian, sucki) = 0.56691 kg	Obsolete Tunisian traditional unit of mass used before 1895. 1 rottolo (Tunisian, sucki) = 18 uckir (Tunisian) (E)	Tunisian
round	–	plane angle	α	1 round = 6.283185307 rad (E)	Obsolete British unit of plane angle. 1 round = 2π rad (E) 1 round = 360° (E)	UK
rowland	–	length, distance	L	1 rowland $\approx 10^{-10}$ m	Obsolete unit of wavelength used in spectroscopy. The unit is named after H.A. Rowland (1848–1901). 1 rowland $\approx$ 0.1 nm	
RSI (metric R-value)	RSI	heat insulation coefficient (thermal resistance multiplied by area)	$M^{-1}T^3\Theta$	1 RSI = 1 $W^{-1}.m^2.K$ (E)	Unit of heat insulation coefficient employed in the British and American building engineering. One RSI corresponds to the heat insulation coefficient of a wall which conserves a temperature difference of 1°C between its faces when the heat flux is equal to one $W.m^{-2}$. 1 RSI = 1 $W^{-1}.m^2.^\circ C$ (E) 1 RSI = 5.678285660 R-value 1 RSI = 1 $(USI)^{-1}$ (E)	UK, US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
ruay (Burmese)	–	mass	M	1 ruay (Burmese) = 255 $\times 10^{-6}$ kg	Obsolete Burmese traditional unit of mass used before 1920. 1 ruay (Burmese) = 3/6400 catty (Burmese) (E)	Burmese
rubbo (Italian)	–	mass	M	1 rubbo (Italian) = 7.675 kg	Obsolete Italian unit of mass. 1 rubbo (Italian) = 25 libbra (E)	Italian
ruby (modern)	–	length, distance	L	1 ruby (modern) = 1.9402777 $\times 10^{-3}$ m	Obsolete British typographical unit of length used in printing. 1 ruby (modern) = 11/144 in (E) 1 ruby (modern) = 5.5 points (E)	UK
ruby (old)	–	length, distance	L	1 ruby (old) = 1.81428571429 $\times 10^{-3}$ m	Obsolete British typographical unit of length used in printing and originally defined as 14 lines per inch. 1 ruby (old) = 1/14 pouces (E) 1 ruby (old) = 36/7 points (E)	French
rundlet (Irish)	–	capacity, volume	L^3	1 rundlet (Irish) = 96.2772784131 $\times 10^{-3}$ m^3	Obsolete traditional Irish unit of capacity for liquids used before the adoption of the Weights and Measures Act of 1824. 1 rundlet (Irish) = 18 gallons (Irish) (E)	Irish
rune	r	quantity of information	nil	1 r = 16 bit (E)	Dimensionless unit of quantity of information defined as two bytes. It was suggested but not adopted in computer science as alternative multiple unit of 1 bit.	Computer
R-unit (German)	R-unit (G)	exposure rate	IM^{-1}	1 R-unit (German) = 3.762500000 $\times$ 10 $C.kg^{-1}$	Obsolete German unit of X-ray exposure rate. 1 R-unit (German) = 5250 $roentgens.h^{-1}$ (E) 1 R-unit (German) = 2.5 R-units (Solomon) (E)	German

R-unit (Solomon)	R-unit (S)	exposure rate	IM^{-1}	1 R-unit (Solomon) $= 1.50500 \times 10$ C.kg^{-1}	Obsolete unit of X-ray exposure rate. 1 R-unit (Solomon) $= 2100$ roentgens.h^{-1} (E)	German
ruthe (Danish)	–	length, distance	L	1 ruthe (Danish) = 3.7662840 m	Obsolete Danish traditional unit of length used before 1912. 1 ruthe (Danish) = 12 fod (Danish) (E)	Danish
ruthe (Prussian)	–	length, distance	L	1 ruthe (Prussian) = 3.766284000 m	Obsolete German unit of length. 1 ruthe = 12 fuss (E)	German
ruthe (Swiss)	–	length, distance	L	1 ruthe (Swiss) = 1.80 m (E)	Obsolete traditional Swiss unit of length used before 1877. 1 ruthe (Swiss) = 6 fuss (Swiss) (E)	Swiss
rutherford	–	radioactivity	T^{-1}	1 rutherford = 10^6 Bq	Obsolete unit of radioactivity used in nuclear physics. One rutherford is defined as the quantity of radioactive material which undergoes one million spontaneous nuclear transitions per second. The unit is named after Lord Rutherford (1871–1937). 37 rutherfords = 1 mCi (E).	
ruttee (Indian)	–	mass	M	1 ruttee (Indian) $= 121.48958333 \times 10^{-6}$ kg	Obsolete Indian traditional unit of mass used before 1920. 1 ruttee (Indian) = 1/7680 seer (Indian) (E)	Indian
rydberg	Ry	energy, work, heat	ML^2T^{-2}	1 Ry $= 2.17987190134 \times 10^{-18}$ J	Obsolete unit of energy used in atomic and quantum spectroscopy. 1 Ry $= m_0e^4/2\varepsilon_0^2h^2$ 1 Ry = 13.6056917140 eV	
sâa (Arabic)	–	capacity, volume	L^3	1 sâa (Arabic) $= 2.72 \times 10^{-3}$ m^3 (of water)	Obsolete Arabic unit of capacity used in ancient times. Measured by weight. 1 sâa (Arabic) = 1/12 cafiz (E)	Arabic
saah (Algerian)	–	capacity, volume	L^3	1 saah (Algerian) $= 2.52289513798 \times 10^{-3}$ m^3	Obsolete traditional Algerian unit of capacity used before 1843. 1 saah (Algerian) = 72/25 khoul (Algerian) (E)	Algerian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
saah (Tunisian)	–	capacity, volume	L^3	1 saah (Tunisian) $= 3.84496124031 \times 10^{-3}$ m^3	Obsolete Tunisian traditional unit of capacity used before 1895. 1 saah (Tunisian) = 1/129 cafisso (Tunisian) (E)	Tunisian
saashen (Russian)	–	length, distance	L	1 saashen (Russian) = 2.1336 m	Obsolete Russian unit of length used before 1917. 1 saashen (Russian) = 7 foute (E)	Russian
sabbitha (Persian)	–	capacity, volume	L^3	1 sabbitha (Persian) $= 3.63 \times 10^{-3}$ m^3	Obsolete Persian traditional unit of capacity used before 1933. 1 sabbitha (Persian) = 22 sextario (Persian) (E)	Persian
sabine (metric)	–	acoustical absorption area	L^2	1 sabine (metric) = 1 m^2 (E)	Obsolete metric unit of absorption of surface covering in room acoustics equal to that of 1 square metre of perfectly absorbing material. The unit is named after W.C. Sabine (1868–1919). 1 sabine (metric) = 1 m^2 (E)	MKSA
sabine (UK)	–	acoustical absorption area	L^2	1 sabine (UK) $= 9.290304 \times 10^{-2}$ m^2 (E)	Obsolete British and American unit of absorption of surface covering in room acoustics equal to that of 1 square foot of perfectly absorbing material. The unit is named after W.C. Sabine (1868–1919). 1 sabine (UK) = 1 ft^2 (E)	UK, US
sac (charcoal)	–	mass	M	1 sac (charcoal) = 50 kg (E)	Obsolete French unit of mass used before 1911 to measure the mass of coal bags.	French
sack (UK)	sk (UK)	capacity, volume	L^3	1 sack (UK) $= 109.106208 \times 10^{-3}$ m^3	Obsolete British unit used for capacity measurements for all merchandise (solids, liquids, foodstuffs, etc). 1 sack (UK) = 3 bushels (UK) (E) 1 sack (UK) = 12 pecks (UK) (E) 1 sack (UK) = 24 gallons (UK) (E) 1 sack (UK) = 96 quarts (UK) (E)	UK

					1 sack (UK) = 1 bag (UK) (E)	
sack (UK, wool)	–	mass	M	1 sack (UK, wool) = 165.107622680 kg (E)	Obsolete British unit of mass used in the weighing of wool. In 1389 a royal statute fixed the sack of wool at 26 stones. 1 sack (UK, wool) = 364 lb (av.) (E) 1 sack (UK, wool) = 13/9 weys (UK, wool) (E) 1 sack (UK, wool) = 26 stones (UK, wool) (E)	UK
saco (Colombian)	–	mass	M	1 saco (Colombian) = 62.5 kg	Obsolete Colombian traditional unit of mass used before 1854. 1 saco (Colombian) = 125 libbra (Colombian) (E)	Colombian
saco (Venezuelan)	–	mass	M	1 saco (Venezuelan) = 62.5 kg	Obsolete Venezuelan traditional unit of mass used before 1914. 1 saco (Venezuelan) = 125 libbra (Venezuelan) (E)	Venezuelan
saddirham (Persian)	–	mass	M	1 saddirham (Persian) = 1.472 kg	Obsolete Persian traditional unit of mass used before 1933. 1 saddirham (Persian) = 160 dirhem (Persian) (E)	Persian
sah (Bohemian)	–	length, distance	L	1 sah (Bohemian) = 1.7760 m	Obsolete Czechoslovakian unit of length used in Bohemia before 1876. 1 sah (Bohemian) = 6 stopa (Bohemian) (E)	Czech
sah (Moravian)	–	length, distance	L	1 sah (Moravian) = 1.7040 m	Obsolete Czechoslovakian unit of length used in Moravia before 1876. 1 sah (Moravian) = 6 stopa (Moravian) (E)	Czech
sah (Praha)	–	length, distance	L	1 sah (Praha) = 1.7790 m	Obsolete Czechoslovakian unit of length used in Praha before 1876. 1 sah (Praha) = 6 stopa (Praha) (E)	Czech
sah (Silesian)	–	length, distance	L	1 sah (Silesian) = 1.7370 m	Obsolete Czechoslovakian unit of length used in Silesia before 1876. 1 sah (Silesian) = 6 stopa (Silesian) (E)	Czech

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
sahme (Egyptian)	–	surface area	L^2	1 sahme (Egyptian) = 7.291805555556 m^2	Obsolete Egyptian traditional unit of surface area used in land measurements before 1891. 1 sahme (Egyptian) = 1/576 feddan masri (Egyptian) (E)	Egyptian
salinity of seawater	S (‰)			S (‰) = 0.03 + 1.805 Cl (‰) [1902] S (‰) = 1.80655 Cl (‰) [UNESCO, 1969] $S = 0.0080 - 0.1692K^{0.5} + 25.3853K + 14.0941K^{1.5} - 7.0261K^2 + 2.7081K^{2.5}$ (*Practical Salinity Scale*, 1978) (see note)	Salinity was defined, in 1902, as the total amount of solid material in grams contained in one kilogram of seawater when all halides had been replaced by the equivalent of chloride, when all the carbonates were converted to oxides, and when all organic matter was completely oxidized. The definition of 1902 was translated into an equation where the salinity (S) and chlorinity (Cl) are expressed in parts per thousand. The fact that the equation of 1902 gives a salinity of 0.03‰ for zero chlorinity was a cause for concern and a program, led by UNESCO, helped to determine a more precise relation between chlorinity and salinity. The definition of 1969 produced a revised equation. The definitions of 1902 and 1969 give identical results at a salinity of 35‰ and do not differ significantly for most marine and oceanographic applications. The definition of salinity was amended again in 1978, with the *Practical Salinity Scale*. This defines salinity in terms of a conductivity ratio where the practical salinity, symbol S, of a sample of sea water, is defined in terms of the ratio K of the electrical conductivity of a sea water sample at 15°C and at one standard	INT

					atmosphere, to that of a potassium chloride (KCl) solution, in which the mass fraction of KCl is 0.0324356, at the same temperature and pressure.	
salma (Maltese)	–	capacity, volume	L^3	1 salma (Maltese) = 290.944 m^3	Obsolete Maltese traditional unit of capacity used for liquids before 1921.	Maltese
salmanazar (salmarazd)	–	capacity, volume	L^3	1 salmanazar = 9.092184×10^{-3} m^3 (E)	Obsolete British unit used to express the capacity of a wine container. Still employed in oenology, especially in France. 1 salmanazar = 2 gallons (UK) (E) 1 salmanazar = 12 bouteilles (E)	UK, French
salmée (Provence)	–	surface, area	L^2	1 salmée (Provence) = 6200 m^2(E)	Obsolete French unit of land surface area used in surveyor measurements and agriculture in Southern France. 1 salmée (Provence) = 62 ares (E)	French
salomon	–	capacity, volume	L^3	1 salomon = $18.18436800 \times 10^{-3}$ m^3	Obsolete unit of volume used for measuring the capacity of wine containers still used in oenology both in UK and France. 1 salomon = 24 bouteilles champenoises (E) 1 salomon = 4 wine gallons (E)	UK, French
saltspoon (US)	ssp	capacity, volume	L^3	1 saltspoon (US) = $1.232239844 \times 10^{-6}$ m^3 (E)	American unit of volume used for measuring the capacity of merely used in food recipes. 1 saltspoon (US) = 1/4 teaspoon (US) (E) 1 saltspoon (US) = 1/24 fluid ounce (US) (E)	US
salung (Thai)	–	mass	M	1 salung (Thai) = 3.75×10^{-3} kg	Obsolete Thai traditional unit of mass used before 1923. 1 salung (Thai) = 4 grani (Thai) (E)	Thai

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
saltus (Roman)	–	surface, area	L^2	1 saltus (Roman) = 2.021401498×10^6 m^2	Obsolete Roman unit of area employed in ancient times. 1 saltus (Roman) = 23 040 000 quadratus pes (E)	Roman
sandong (Burmese)	–	length, distance	L	1 sandong (Burmese) = 0.5588 m	Obsolete Burmese traditional unit of length used before 1920. 1 sandong (Burmese) = 1/7 dha sandong (Burmese) (E)	Burmese
sao (Annamese)	–	surface area	L^2	1 sao (Annamese) = 497.025 m^2	Obsolete Annameseian traditional unit of surface area used in land measurements before 1914. 1 sao (Annamese) = 90 square ngu (Annamese) (E)	Annamese
sao (Annamese)	–	length, distance	L	1 sao (Annamese) = 7.05 m	Obsolete Annameseian traditional unit of length used before 1914. 1 sao (Annamese) = 15 thuoc (Annamese) (E)	Annamese
saponification number	–	dimensionless index for measuring the saponification capability of fatty acids	nil	1 saponification number = 10^{-3} kg $KOH.kg^{-1}$ fatty acid (E) (see note)	Old dimensionless index used in the food industry for measuring the saponification capability of fatty acids. It corresponds to the mass of potassium hydroxide (KOH) expressed in milligrams (mg) required to saponificate one gram of fatty acid. 1 saponification number = 1 mg $KOH.g^{-1}$ fatty acid (E)	INT
saros	–	time, duration, period	T	(see note)	Unit of time used in astronomy, mostly in predicting solar and lunar eclipses. The saros is equal to exactly 223 lunar months (i.e., 6585 days 7 hours 23 minutes). Hence, this is either 10 or 11 days more than 18 years, depending on the number of leap years during the period. Astronomers	@

					in ancient times discovered that the saros is very nearly equal to 19 eclipse years (6585.78 days). This means that one saros after an eclipse the Sun, Moon, and Earth return almost exactly to the same position and another, very similar eclipse occurs. However, because of the 7 hours 23 minutes included, the Earth has turned about one third of a revolution and the new eclipse occurs about 116° of longitude west of the preceding one. After 3 saros, the eclipse returns nearly to its original location. Thus eclipses at a particular location tend to repeat with a period of 3 saros or 54 years 1 month.	
sarpler (UK, wool)	–	mass	M	1 sarpler (UK, wool) = 907.1847400 kg (E)	Obsolete British unit of mass used for weighing wool. 1 sarpler (UK, wool) = 2 sacks (UK, wool) (E) 1 sarpler (UK, wool) = 700 lb (E)	UK
sat (Thai)	–	capacity, volume	L^3	1 sat (Thai) = 20×10^{-3} m^3	Obsolete Thai traditional unit of capacity used before 1923. 1 sat (Thai) = 20 tanan (Thai) (E)	Thai
sath (Hebrew) (Hebrew modius)	–	capacity, volume	L^3	1 sath (Hebrew) = 6.426×10^{-3} m^3 (of water)	Obsolete Hebrew unit of capacity used in ancient times. Measured by weight. 1 sath (Hebrew) = 3/10 ephah (new)	Hebrew
satlijk (Yugoslavian)	–	mass	M	1 satlijk (Yugoslavian) = 0.320 kg	Obsolete traditional Yugoslavian unit of mass used before 1883. 1 satlijk (Yugoslavian) = 1/4 oka (Yugoslavian) (E)	Yugoslavian
saum (Austrian)	–	mass	M	1 saum (Austrian) = 154.002750 kg	Obsolete Austrian unit of mass for general use. 1 saum (Austrian) = 275 pfund (E)	Austrian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
savart	–	logarithmic musical interval	nil	$I = 1/1000 \times \log_{10}(f_1/f_2)$ (see note)	The savart is the interval between two musical sounds having as a basic frequency ratio the 1000th root of two. The number of cents between frequencies f_1 and f_2 is: $I = 1/1000 \times \log_{10}(f_1/f_2)$. The unit is named after the French physicist F. Savart (1791–1841). 1 savart = 1/301 octave (E) 1 savart = 1200/301 cent (E)	
sawk (Thai)	–	length, distance	L	1 sawk (Thai) = 0.5 m	Obsolete Thai traditional unit of length used before 1923. 1 sawk (Thai) = 1/4 wah (Thai) (E)	Thai
Saybolt Furol second (SFS)	Saybolt, SFS	index of kinematic viscosity	nil	ν ($m^2.s^{-1}$) = $2.24 \times 10^{-7}[t$ (s) – $1.84 \times 10^{-4}/t$ (s) for 25 s < t < 40 s ν ($m^2.s^{-1}$) = $2.16 \times 10^{-7} t$ (s) – $0.60 \times 10^{-4}/t$ (s) for 40 s < t (see note)	Obsolete American empirical index of kinematic viscosity. The Saybolt Furol second (SFS) corresponds to the flowing time expressed in seconds of 60 cm^3 of liquid in a Saybolt Furol viscosimetre. Furol is the acronym of **fu**el **ro**ad **l**ubricant. ν ($cm^2.s^{-1}$) = 0.00224t (s)− $1.84/t$ (s) for 25 s < t < 40 s ν ($cm^2.s^{-1}$) = 0.00216t (s) $0.60/t$ (s) for 40 s < t	US
Saybolt universal second (SUS)	Saybolt, SUS	index of kinematic viscosity	nil	(see note) ν ($m^2.s^{-1}$) = $2.26 \times 10^{-7}\, t$ (s) $- 1.95 \times 10^{-4}/t$ (s) for 32 < t(s) < 100 s ν ($m^2.s^{-1}$) = $2.20 \times 10^{-7}\, t$ (s) $- 1.35 \times 10^{-4}/t$ (s) for 100 < t(s)	Obsolete British and American empirical index of kinematic viscosity. The Saybolt universal second (SUS) corresponds to the flowing or efflux time expressed in seconds of 60 cm^3 of liquid in a Saybolt Universal viscosimeter with an orifice of 0.176 cm diameter and 1.225 cm in length (ASTMD58).	UK, US

sazen (Polish, Cracow)	–	length, distance	L	1 sazen (Polish, Cracow) = 1.413840 m	Obsolete traditional Polish unit of length used before 1919. 1 sazen (Polish, Cracow) = 6 stopa (Polish, Cracow) (E)	Polish
sazen (Polish, new)	–	length, distance	L	1 sazen (Polish, new) = 1.7280 m	Obsolete traditional Polish unit of length used before 1919. 1 sazen (Polish, new) = 6 stopa (Polish, new) (E)	Polish
sazen (Polish, Warsaw)	–	length, distance	L	1 sazen (Polish, Warsaw) = 1.78680 m	Obsolete traditional Polish unit of length used before 1919. 1 sazen (Polish, Warsaw) = 6 stopa (Polish, Warsaw) (E)	Polish
scala (Cypriot)	–	surface area	L^2	1 scala (Cypriot) = 1337.80377776 m^2	Obsolete Cypriot traditional unit of surface area used in land measurements used before 1972. 1 scala (Cypriot) = 36 000 square pic (Cypriot) (E)	Cypriot
scheffel (Prussian, dry)	–	capacity, volume	L^3	1 scheffel (Prussian, dry) = $222.357600 \times 10^{-3}$ m^3	Obsolete German unit of capacity used for dry substances. 1 scheffel (Prussian, dry) = 6 metzen (E)	German
schepel (Dutch, dry)	–	capacity, volume	L^3	1 schepel (Dutch, dry) = 27.26×10^{-3} m^3	Obsolete Dutch unit of capacity used for dry substances.	Dutch
schiffpfund (Belgian)	–	mass	M	1 schiffpfund (Belgian) = 146.850 kg	Obsolete traditional Belgian unit of mass used before 1820. 1 schiffpfund (Belgian) = 300 livres (Belgian) (E)	Belgian
schiffspfund (Estonian)	–	mass	M	1 schiffspfund (Estonian) = 184 kg	Obsolete traditional Estonian unit of mass used before 1900. 1 schiffspfund (Estonian) = 400 pfund (Estonian) (E)	Estonian
schiffspfund (Prussian)	–	mass	M	1 schiffspfund (Prussian) = 154.34463 kg	Obsolete German unit of mass. 1 schiffspfund (Prussian) = 330 pfund (E)	German

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
schoeme (Persian)	–	length, distance	L	1 schoeme (Persian) = 6912 m	Obsolete unit of length in the Assyrio-Chaldean-Persian system used in ancient times. 1 schoeme = 21 600 zereths (E)	Persian
schooner (US)	–	capacity, volume	L^3	1 schooner (US) $= 399.242649094 \times 10^{-6}$ m^3 (E)	Obsolete American unit of volume used to measure the capacity of alcoholic liquids. A schooner is a large tumbler or drinking glass. 1 schooner (US) = 13.5 fluid ounces (US)	US
score (UK)	–	dimensionless unit of quantity	nil	1 score (UK) = 20 entities (E)	Obsolete British dimensionless unit of quantity equal to twenty. Named after a Old English word, itself derived from the Norse word, *skor*, meaning a notch cut in a stick as a tally mark.	UK
score (UK)	–	mass	M	1 score (UK) = 9.071847400 kg	Obsolete British unit of mass. 1 score (UK) = 20 lb (E)	UK
scripulum (Roman) [Roman scruple]	–	mass	M	1 scripulum (Roman) $= 1.135416667 \times 10^{-3}$ kg	Obsolete Roman unit of mass used in ancient times. 1 scripulum (Roman) = 1/24 uncia (Roman) (E)	Roman
scruple (Austrian, apothecary)	–	mass	M	1 scruple (Austrian, apothecary) $= 1.4583593750 \times 10^{-3}$ kg	Obsolete Austrian unit of mass used in pharmacy. 1 scruple (Austrian, apothecary) = 1/288 pfund (Austrian, apothecary) (E)	Austrian
scruple (Swiss, apothecary)	–	mass	M	1 scruple (Swiss, apothecary) $= 1.30208333 \times 10^{-3}$ kg (E)	Obsolete traditional Swiss unit of mass used before 1877 in pharmacy. 1 loth (Swiss, apothecary) = 1/384 livre (Swiss) (E) 1 loth (Swiss, apothecary) = 1/288 livre (Swiss, apothecary) (E)	Swiss

scruple (UK fluid)	–	capacity, volume	L^3	1 scruple (UK fl.) $= 1.183878125 \times 10^{-6}$ m^3	Obsolete British unit of capacity. 1 scruple (UK fl.) = 20 minims (UK) (E)	UK
scruple (UK, apoth.)	s, scr (ap.)	mass	M	1 scruple (UK) $= 1.295978200 \times 10^{-3}$ kg	Obsolete British unit of mass. Sometimes written scrupule. The unit is derived from the Latin *scripulum*. 1 scruple (UK) = 1/288 lb (apoth.) (E) 1 scruple (UK) = 20 grains (apoth.) (E)	UK
scruple (US, apoth.)	s, scr (ap.)	mass	M	1 scruple (US) $= 1.295978200 \times 10^{-3}$ kg	Obsolete American unit of mass. Sometimes written scrupule. The unit is derived from the Latin *scripulum*.	US
					1 scruple (US) = 1/288 lb (apoth.) (E) 1 scruple (US) = 20 grains (apoth.) (E)	
scrupule (Russian) (apothecary)	–	mass	M	1 scrupule (Russian) $= 1.24417832840 \times 10^{-3}$ kg	Obsolete Russian unit of mass used before 1917 in pharmacy. 1 scrupule (Russian) = 28 doli (E)	Russian
se (Japanese)	–	surface, area	L^2	1 se = 99.17355372 m^2	Obsolete Japanese unit of area. 1 se = 30 Tsubo (E)	Japanese
seam (UK)	–	capacity, volume	L^3	1 seam (UK) $= 290.949888 \times 10^{-3}$ m^3	Obsolete British unit of capacity. 1 seam (UK) = 64 gallons (UK) (E) 1 seam (UK) = 1/10 last (UK) (E) 1 seam (UK) = 8 bushels (UK) (E)	UK
second	s	time, period, duration	T	**SI base unit**	The second is the duration of 9 192 631 770 periods of the radiation corresponding to the transition between the two hyperfine levels ($F = 4$, $m_F = 0$ to $F = 3$, $m_F = 0$) of the ground state of the caesium 133 atom [13th CGPM (1967)].	SI, MTS, MKSA, cgs, MKpS, FPS
second (sidereal)	–	time, period, duration	T	1 second (sidereal) = 0.9972696 s		@
second of angle	″	plane angle	α	$1'' = 4.848136811 \times 10^{-6}$ rad	$1'' = \pi/(3600 \times 180)$ rad (E)	INT
second of angle (new)	cc	plane angle	α	1 cc = $1.570796327 \times 10^{-6}$ rad	1 cc = 1/10 000 gon (grade) (E)	French

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
section of land (square statute mile)	sq.mi, mi^2 (stat.)	surface, area	L^2	1 section = 2.589988110×10^6 m^2	Obsolete British and American unit of area. 1 section = 1 square mile (stat.) (E) 1 section = 640 acres (E) 1 section = 2560 roods (UK) (E) 1 section = 6400 sq. chains	UK, US
second longitude	–	plane angle	a	1 second longitude = $7.27220521664 \times 10^{-5}$ rad (E)	Unit of plane angle commonly used by astronomers. Actually, astronomers measure longitude, which they call right ascension, in time-related units by dividing the equator circle into 24 hours instead of 360 degrees. 1 second longitude = $(2\pi/86400)$ rad (E)	@
secton (Medoc)	–	surface area	L^2	1 secton (Montpellier) = 2837 m^2	Obsolete local French unit of surface area used for land measurements in south-western France before the revolution of 1789.	French
seer (Ceylon and Madras)	–	mass	M	1 seer (Ceylon and Madras) = 0.283495 kg	Obsolete Ceylonese and Madrasian traditional unit of mass used before 1920. 1 seer (Ceylon and Madras) = 1/5 vis (Ceylon) (E)	Ceylon
seer (Indian)	–	mass	M	1 seer (Indian) = 0.93304 kg	Obsolete Indian traditional unit of mass used before 1920. 1 seer (Indian) = 4/5 raik (Indian) (E)	Indian
seer (Indian)	–	capacity, volume	L^3	1 seer (Indian) = 1.7203125×10^{-3} m^3	Obsolete Indian traditional unit of capacity used before 1920. 1 seer (Indian) = 5/4 raik (Indian) (E)	Indian
seer (Indian)	–	mass	M	1 seer (Indian) = 0.933107543946 kg	Obsolete Indian unit of mass used in India and South Asia. It varied considerably with location, but the official size in British India was defined and standardized exactly as 2.05715 pounds avoirdupois. 1 seer (Indian) = 1/40 maund (Indian) (E)	Indian

seer (Indian, dry)	–	capacity, volume	L^3	1 seer (Indian, dry) $= 10^{-3}$ m^3	Obsolete unit of volume used in northern India to measure the capacity of dry products. It is equal to a little more than a litre.	Indian
sei (Chinese)	–	capacity, volume	L^3	1 sei (Chinese) $= 103.544 \times 10^{-3}$ m^3	Obsolete Chinese unit of capacity used in ancient times. 1 sei (Chinese) = 100 tcheng (E)	Chinese
seidel (Austrian)	–	capacity, volume	L^3	1 seidel (Austrian) $= 3.537750 \times 10^{-4}$ m^3	Obsolete Austrian unit of capacity used for liquid substances. 1 seidel (Austrian) = 1/4 mass (E)	Austrian
seir (Arabic) [Arabic stadion]	–	length, distance	L	1 seir (Arabic) = 192 m	Obsolete Arabic unit of length used in ancient times. 1 seir (Arabic) = 600 feet (Arabic) (E)	Arabic
seit (Burmese)	–	capacity, volume	L^3	1 seit (Burmese) $= 2.02 \times 10^{-3}$ m^3	Obsolete Burmese traditional unit of capacity used before 1920. 1 seit (Burmese) = 4 byee (Burmese) (E)	Burmese
semester	sem	time, duration, period	T	1 semester $= 1.5768 \times 10^7$ s	Common unit of time, named after the Latin, *semester*, meaning six months, and originally a semester was understood to equal 6 months or 1/2 year.	INT
semester-hour	sem-hr	academic credit	nil	(see note)	American unit of academic credit. One semester-hour is equal to one semester's study for a period of one hour per school day. In US secondary schools, this means 5 hours per week, and in US colleges and universities, usually 3 hours per week. However, "academic hours" slightly shorter than regular hours (often 50 or 55 minutes per class) are typically used in these calculations.	US
semis (Roman)	–	mass	M	1 semis (Roman) $= 163.50 \times 10^{-3}$ kg	Obsolete Roman unit of mass used in ancient times. 1 semis (Roman) = 6 unciae (Roman) (E)	Roman

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
semitone	–	frequency ratio of two notes	nil	(see note)	Dimensionless unit used in music to describe the frequency ratio between two notes. Two notes are said to differ by one semitone if the higher note has frequency exactly 16/15 = 1.0667 times the frequency of the lower one. However, sometimes, the semitone is used as a synonym for the half step in the standard chromatic scale, i.e., two notes differ by a semitone if the higher note has frequency exactly 21/12 = 1.0595 times the frequency of the lower one.	
semiuncia (Roman)	–	mass	M	1 semiuncia (Roman) = 13.625×10^{-3} kg	Obsolete Roman unit of mass used in ancient times. 1 semiuncia (Roman) = 1/2 uncia (Roman) (E)	Roman
semodius (Roman)	–	capacity, volume	L^3	1 semodius (Roman) = 4.394240×10^{-3} m^3	Obsolete Roman unit of volume employed in ancient times. It was used for capacity measurements of dry substances. 1 semodius (Roman) = 8 sextarius (E)	Roman
sen (Cambodian)	–	length, distance	L	1 sen (Cambodian) = 40 m	Obsolete Cambodian traditional unit of length used before 1914. 1 sen (Cambodian) = 40 muoi (Cambodian) (E)	Cambodian
sen (Thai)	–	length, distance	L	1 sen (Thai) = 40 m	Obsolete Thai traditional unit of length used before 1923. 1 sen (Thai) = 20 wah (Thai) (E)	Thai
sennight	–	time, period, duration	T	1 sennight = 6.048×10^5 s (E)	Obsolete British and American unit of time. 1 sennight = 7 days (E) 1 sennight = 1/2 fortnight (E)	UK, US

senus (Egyptian)	–	length, distance	L	1 senus (Egyptian) = 52.35 m	Obsolete Egyptian unit of length used in ancient times. 1 senus = 100 Royal cubit (E)	Egyptian
sep (Egyptian)	–	mass	M	1 sep = 1.365×10^{-3} kg	Obsolete Egyptian unit of mass used in ancient times. 1 sep = 1/10 deben (E)	Egyptian
septunx (Roman)	–	mass	M	1 septunx (Roman) = 190.75×10^{-3} kg	Obsolete Roman unit of mass used in ancient times. 1 septunx (Roman) = 7 unciae (Roman) (E)	Roman
seron (Guinean)	–	mass	M	1 seron (Guinean) = 12.0375×10^{-3} kg	Obsolete Guinean traditional unit of mass used before 1906. 1 seron (Guinean) = 3/16 benda (Guinean) (E)	Guinean
sescuncia	–	mass	M	1 sescuncia (Roman) = 40.875×10^{-3} kg	Obsolete Roman unit of mass. 1 sescuncia (Roman) = 1.5 uncia (E)	Roman
sesep (Cambodian)	–	capacity, volume	L^3	1 sesep (Cambodian) = 40 m^3	Obsolete Cambodian traditional unit of capacity used before 1914. 1 sesep (Cambodian) = 40 muoi (Cambodian) (E)	Cambodian
sesma (Spanish)	–	length, distance	L	1 sesma (Spanish) = $1.393175000 \times 10^{-1}$ m	Obsolete Spanish unit of length. 1 sesma (Spanish) = 1/6 vara (E)	Spanish
seste (Thai)	–	capacity, volume	L^3	1 seste (Thai) = 800×10^{-3} m^3	Obsolete Thai traditional unit of capacity used before 1923. 1 seste (Thai) = 800 tanan (Thai) (E)	Thai
sétérée (Montpellier)	–	surface area	L^2	1 sétérée (Montpellier) = 1440 m^2	Obsolete local French unit of surface area. It corresponds to the surface that a farmer can sod using one sétier of seeds. 1 sétérée (Montpellier) = 2 cartons (E) 1 sétérée (Montpellier) = 75 dextres (E)	French

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
sétier (de Paris, dry)	–	capacity, volume	L^3	1 sétier (de Paris, dry) $= 151.680 \times 10^{-3}$ m^3	Obsolete French unit of capacity employed before the French Revolution. It served to express the capacity of dry substances. It varied according to location and merchandise. The unit is named after Latin *sextarius*: sixth. 1 sétier (de Paris) = 12 boisseaux (de Paris) (E)	French
setta (Egyptian)	–	surface, area	L^2	1 setta (Egyptian) = 27405 m^2	Obsolete Egyptian unit of area used in ancient times. 1 setta (Egyptian) = 1000 pekeis (E)	Egyptian
seventh	–	frequency ratio of two notes	nil	(see note)	British and American dimensionless unit used in music to describe the frequency ratio between two notes. Two notes differ by one seventh if the higher note has frequency exactly 15/8 times the frequency of the lower one.	UK, US
sextans (Roman)	–	mass	M	1 sextans (Roman) $= 54.50 \times 10^{-3}$ kg	Obsolete Roman unit of mass used in ancient times. 1 sextans (Roman) = 2 unciae (Roman) (E)	Roman
sextant	–	plane angle	α	1 sextant = 1.04719755120 rad	International unit of plane angle used in for reporting compass readings in aeronautics and marine navigation. 1 sextant = 1/6 circle (E) 1 sextant = $\pi/3$ rad (E)	INT
sextario (Persian)	–	capacity, volume	L^3	1 sextario (Persian) $= 330 \times 10^{-6}$ m^3	Obsolete Persian traditional unit of capacity used before 1933. 1 sextario (Persian) = 1/4 chenica (Persian) (E)	Persian
sextarius (Roman, liq.)	–	capacity, volume	L^3	1 sextarius (Roman, liq.) $= 0.549280 \times 10^{-3}$ m^3	Obsolete Roman unit of volume employed in ancient times. It was used for capacity measurements of liquids.	Roman

sextarius (Roman, dry)	–	capacity, volume	L^3	1 sextarius (Roman, dry) $= 0.549280 \times 10^{-3}$ m^3	Obsolete Roman unit of volume employed in ancient times. It was used for capacity measurements of dry substances.	Roman
sexte (Greek, dry)	–	capacity, volume	L^3	1 sexte (Greek, dry) $= 0.54 \times 10^{-3}$ m^3	Obsolete Greek unit of capacity for measuring dry substances. 1 sexte (Greek, dry) = 2 cotylos (E)	Greek
sextingar (Finnish)	–	capacity, volume	L^3	1 sextingar (Finnish) $= 7.78523809524 \times 10^{-3}$ m^3	Obsolete Finnish traditional unit of capacity used for liquids before 1892. 1 sextingar (Finnish) = 3 kannor (Finnish) (E)	Finnish
shackles (UK)	–	length, distance	L	1 shackles (UK) = 27.432 m (E)	Obsolete British unit of length employed in navigation. 1 shackles (UK) = 15 fathoms (E) 1 shackles (UK) = 30 yards (E) 1 shackles (UK) = 90 feet (E)	UK
shaftment	–	length, distance	L	1 shaftment = 0.1525 m(E)	Obsolete British unit of distance equal to 2 palms or 6 inches. A shaftment is the distance from the tip of the out stretched thumb to the opposite side of the palm of the hand. The ending "-ment" is from the old English word mund, hand. 1 shaftment = 2 palms (E) 1 shaftment = 6 inches (E)	UK
shaftment (UK)	–	length, distance	L	1 shaftment (UK) = 0.150 m (E)	Obsolete British unit of length measured from tip of out stretched thumb to the opposite side of the palm of the hand. 1 shaftment (UK) = 6 inches (E)	UK
shake	–	time, period, duration	T	1 shake = 10^{-8} s (E)	1 shake = 1 ns (E)	US
shaku	–	capacity, volume	L^3	1 shaku = $1.803906837 \times 10^{-5}$ m^3	Obsolete Japanese unit of capacity. 1 shaku = 1/100 shô (E)	Japanese
shaku (Japanese)	–	length, distance	L	1 shaku (Japanese) = 0.3030303030 m	Obsolete Japanese unit of length. 1 shaku = 10/33 m (E)	Japanese

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
shari (Indian)	–	capacity, volume	L^3	1 shari (Indian) $= 211.2 \times 10^{-3}$ m^3 (of water)	Obsolete Indian unit of capacity used in ancient times. Measured by weight. 1 shari (Indian) = 16 drona (E)	Indian
shed	–	surface, area	L^2	1 shed $= 10^{-52}$ m^2 (E)	Obsolete British unit of area used in nuclear physics to express the cross section of a nuclide. 1 shed $= 10^{-24}$ barn (E)	UK
shekel (Hebrew) [Sacred system]	–	mass	M	1 shekel (Hebrew) $= 14.166667 \times 10^{-3}$ kg	Obsolete Hebrew unit of mass used in ancient times. Sacred system. 1 shekel (Hebrew) = 1/60 mina (E)	Hebrew
shekel (Hebrew) [Talmudic system]	–	mass	M	1 shekel (Hebrew) $= 1.416800 \times 10^{-2}$ kg	Obsolete Hebrew unit of mass used in ancient times. Rabbinical or Talmudic system. 1 shekel (Hebrew) = 1/25 mina (E)	Hebrew
sheng (or cheng)	–	volume, capacity	L^3	1 sheng (Chinese) $= 1.03544 \times 10^{-3}$ m^3 (E)	Obsolete Chinese unit of volume for measuring the capacity of liquids.	Chinese
shi (Japanese)	–	length, distance	L	1 shi (Japanese) $= 3.030303030 \times 10^{-6}$ m	Obsolete Japanese unit of length. 1 shi = 1/100 000 shaku (E)	Japanese
shiffspfund	–	mass	M	1 shiffspfund = 167.6 kg	Obsolete Latvian traditional unit of mass. 1 shiffspfund = 400 pfund (Latvian) (E)	Latvian
shih (dan)	–	mass	M	1 shih = 71.617920 kg	Obsolete Chinese unit of mass. 1 shih = 120 jin (E)	Chinese
shita (Annamese)	–	capacity, volume	L^3	1 shita (Annamese) $= 28.26 \times 10^{-3}$ m^3	Obsolete Annameseian traditional unit of capacity used before 1914. 1 shita (Annamese) = 1/2 toa (Annamese) (E)	Annamese
shô	–	capacity, volume	L^3	1 shô $= 1.803906837 \times 10^{-3}$ m^3	Obsolete Japanese unit of capacity. 1 shô = 2401/1331 dm^3	Japanese

shock (UK) or shook	–	dimensionless quantity	nil	1 shock (UK) = 60 entities (UK)	Obsolete British dimensionless unit of quantity equal to 60. It is named after the German, *schock*. It is more often used informally to mean a pile or heap, as in a shock of corn stalks. However, in cooperage (the making of barrels), a bundle of 60 barrel staves is traditionally called a shock. 1 shock (UK) = 5 dozen (E) 1 shock (UK) = 3 scores (E)	UK
shoeme (Egyptian)	–	length, distance	L	1 shoeme (Egyptian) = 6.282×10^3 m	Obsolete Egyptian unit of length used in ancient times. 1 shoeme = 12 000 Royal cubit (E)	Egyptian
short actus (Roman)	–	surface, area	L^2	1 short actus (Roman) = 35.093776 m^2	Obsolete Roman unit of area employed in ancient times. 1 short actus (Roman) = 400 quadratus pes (E)	Roman
short cumbha (Indian)	–	capacity, volume	L^3	1 short cumbha (Indian) = 26.4×10^{-3} m^3(of water)	Obsolete Indian unit of capacity used in the Ancien Times. Measured by weight. 1 short cumbha (Indian) = 2 drona (E)	Indian
short ton (US, ton)	sh. ton	mass	M	1 short ton (US) = 907.184740 kg (E)	American unit of mass. 1 short ton = 2000 lb (US) (E)	US
shot (US)	–	volume, capacity	L^3	1 shot (US) = $29.5735295625 \times 10^{-6}$ m^3 (E)	Obsolete American unit of volume used to measure the capacity of alcoholic beverages and spirits. 1 shot (US) = 1 fluid ounce (US)	US
shower unit	s	length, distance	L	1 shower unit = $\ln 2/\mu$ (m^{-1})	Obsolete unit of length employed in astrophysics for cosmic-ray measurements. It was equal to the thickness of a medium which halves the intensity of an incident beam of charged particles. It corresponds to the half-thickness $X_{1/2}$ of the considered medium for a given charged particle of energy E.	@

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
shtoff (Russian)	–	capacity, volume	L^3	1 shtoff (Russian) $= 1.537426250 \times 10^{-3}$ m^3	Obsolete Russian unit of capacity for liquid substances used before 1917. 1 shtoff (Russian) = 25/2 tcharka (E)	Russian
shu	–	mass	M	1 shu = $15.54208333 \times 10^{-6}$ kg	Obsolete Chinese unit of mass. 1 shu = 1/38 400 jin (E)	Chinese
sicca (Indian)	–	mass	M	1 sicca (Indian) = 11.663×10^{-3} kg	Obsolete Indian traditional unit of mass used before 1920. 1 sicca (Indian) = 1/80 seer (Indian) (E)	Indian
sicilium (Roman)	–	mass	M	1 sicilium (Roman) = 6.8125×10^{-3} kg	Obsolete Roman unit of mass used in ancient times. 1 sicilium (Roman) = 1/4 uncia (E)	Roman
Siegbahn unit (CuK_{α_1}) (X unit)	UX, X	length, distance	L	1 UX (CuK_{α_1}) $= 1.00020778970 \times 10^{-13}$ m	Obsolete unit of length used in atomic spectroscopy and X-ray diffractometry measurements. It was introduced by K.N.G. Siegbahn (1886–1977) in 1925. It was equal to the distance between lattice planes with the Miller index (200) of a calcite crystal (Island Spath) measured by X-ray diffraction using a CuK_{α_1} spectral line. This interlattice distance is equal to 3029.45 UX. 1 UX ($CuK_{\alpha 1,2}$) = $1.00020778970 \times 10^{-3}$ Å	INT
siemens (resistance)	–	electric resistance	$ML^2T^{-3}I^{-2}$	1 siemens = 0.940733772 Ω (E)	Obsolete German unit of electric resistance. It was defined in 1860. It was the resistance measured at 0°C of a mercury column of 100 cm length with a cross section of one square millimetre. 1 siemens (resistance) = 1/1.063 Ω (E)	German
siemens	S	electrical conductance	$M^{-1}L^{-2}T^3I^2$	**SI derived unit** 1 S = 1 $A.V^{-1}$ (E) 1 S = 1 $kg^{-1}.m^{-2}.s^3.A^2$	The siemens is the electrical conductance of a conductor in which a current of one ampere is produced by an electrical potential difference of one volt	SI

					(14th CGPM, 1972). The unit is named after the German scientist E.W. Siemens (1816–1892).	
siemens per metre	$S.m^{-1}$	electrical conductivity	$M^{-1}L^{-3}T^{3}I^{2}$	**SI derived unit** $1\ S.m^{-1} = 1A.V.m^{-1}$ (E)		
sievert	Sv	dose equivalent, index of dose equivalent	$L^{2}T^{-2}$	**SI derived unit** 1 Sv = 1J.kg^{-1} (E) 1 Sv = 1 m^{2}.s^{-2}	The sievert is the SI derived unit of dose equivalent when the absorbed dose of ionizing radiation multiplied by the dimensionless factors Q (quality factor) and N (product of any other multiplying factors) stipulated by the ICRP is one joule per kilogram(16th CGPM, 1980). The unit is named after the Swedish scientist R.M. Sievert (1896–1966). The relationship between the absorbed dose of radiation D and the dose equivalent H is given by $H = Q \times N \times D$. Q is also known as the relative biological efficiency (RBE) which varies with the nature of the radiation. N is a factor which takes into account the distribution of energy throughout the dose. 1 Sv = 100 rem (E) RBE = 1 X-ray, gamma ray RBE = 1 beta particle ($E < 1$ MeV) RBE = 1.08 beta particle ($E > 1$ MeV) RBE = 4–5 neutrons ($E < 1$ MeV) RBE = 10 neutrons ($E > 1$ MeV) RBE = 8.5 protons (1 MeV) RBE = 10 protons (0.1 MeV) RBE = 15 alpha particles (5 MeV) RBE = 20 alpha particles (1 MeV) (ICRP)	SI
sievert unit	–	dose equivalent, index of dose equivalent	ITM^{-1}	1 sievert unit $= 2.16184618543 \times 10^{-3} C.kg^{-1}$ (E)	Obsolete international unit of dose exposure originally defined as the dose of gamma rays delivered in one hour at a distance of one centimetre from a point	INT

(continued overleaf)

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
sievert unit *(continued)*					source containing one milligram of radium-226 in secular equilibrium with its daughter radon-222 and tightly enclosed in a platinum cap sule having thin walls of 0.5 mm thickness. The unit is named after the Swedish scientist R.M. Sievert (1896–1966). 1 sievert unit = 8.38 roentgens (E)	
sigma	σ	length, distance	L	1 $\sigma = 10^{-12}$m(E)	Obsolete submultiple of the metre. 1 σ = 1 pm	
sigma	s, sigma	time, period, duration	T	1 s = 10^{-6} s (E)	Obsolete unit used in physics for measuring small time intervals. 1 s = 1 μs (E)	
sign	–	plane angle	α	1 sign = 5.23598775598 × 10^{-1} rad	1 sign = $\pi/6$ rad (E) 1 sign = 30° (E)	
Sikes degree	–	percentage of alcohol in wines and spirits	nil	1° Sikes = 10^{-2} v/v ethanol (E)	Obsolete British unit introduced in 1794 for expressing percentage of alcohol in wines and spirits. 1° Sikes = 1% vol EtOH (E)	UK
sintzer (Ethiopian)	–	length, distance	L	1 sintzer (Ethiopian) = 0.160 m	Obsolete Ethiopian traditional unit of length used before 1963. 1 sintzer (Ethiopian) = 32/5 tat (Ethiopian) (E)	Ethiopian
sir (Persian)	–	mass	M	1 sir (Persian) = 18.4 ×10^{-3} kg	Obsolete Persian traditional unit of mass used before 1933. 1 sir (Persian) = 2 dirhem (Persian) (E)	Persian
sir (Turkmenian)	–	mass	M	1 sir (Turkmenian) = 16 kg	Obsolete Turkmenian traditional unit of mass used before 1920. 1 sir (Turkmenian) = 32 mimtscha (Turkmenian) (E)	Turkmenian

siriometre	–	length, distance	L	1 siriometre = $1.49597870 \times 10^{17}$ m	Obsolete unit of distance employed in astronomy. 1 siriometre = 10^6 AU (E) 1 siriometre = (π/3.24) siriusweit (E)	@
siriusweit	–	length, distance	L	1 siriusweit = $1.5428387847 \times 10^{17}$ m	Obsolete unit of distance employed in astronomy. 1 siriusweit = 5 parsecs (E) 1 siriusweit = (3.24/π) siriometre (E)	@
sitio (Mexican)	–	surface area	L^2	1 sitio (Mexican) = $17.5560631462 \times 10^6$ m^2	Obsolete Mexican traditional unit of surface area used in land measurements before 1896. 1 sitio (Mexican) = 12 307/25 fanega (Mexican) (E)	Mexican
sixth	–	frequency ratio of two notes	nil	(see note)	British and American dimensionless unit used in music to describe the frequency ratio between two notes. Two notes differ by one minor sixth if the higher note has frequency exactly 8/5 times the frequency of the lower one, or by a major sixth if the higher note has frequency exactly 5/3 times the frequency of the lower one.	UK, US
skålpund (Swedish) [Swedish pound]	–	mass	M	1 skålpund = 0.4250797024 kg	Obsolete Swedish unit of weight. 1 kg = 2.3525 skålpunds (E)	Swedish
skaalpund (Norwegian)	–	mass	M	1 skaalpund (Norwegian) = 0.4981 kg	Obsolete Norwegian traditional unit of mass used before 1882.	Norwegian
skæppe (Danish)	–	volume, capacity	L^3	1 skæppe (Danish) = 17.370×10^{-3} m^3 (E)	Obsolete Danish unit of volume used to measure the capacity of dry products. Use of the unit was spread by Norse traders. Note that the Dutch schepel and German scheffel are versions of this unit. 1 skjeppe (Danish) = 18 pots (Danish) (E)	Danish

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
skein	–	length, distance	L	1 skein (UK) = 109.728000 m (E)	Obsolete British unit of length. 1 skein (UK) = 60 fathoms (E) 1 skein (UK) = 120 yards (E) 1 skein (UK) = 360 feet (E)	UK
skein (UK)	–	surface, area	L^2	1 skein (UK) = 12 040.2339840 m^2 m^2	Obsolete British unit of area used in surveyor's measurements. (E) 1 skein (UK) = 1 square skein (UK) (E)	UK
skein (UK, cotton)	–	surface, area	L^2	1 skein (UK, cotton) = 2.7870912 m^2 (E)	Obsolete British unit of surface area used to measured finished clothes. It was defined by 80 turns of thread on a reel with a 54 inch circumference (varies for other kinds of thread). 1 skein (UK, cotton) = 80 inches per 54 inches (E) 1 skein (UK, cotton) = 4320 square inches (E) 1 skein (UK, cotton) = 30 square feet (E)	UK
skieppe (Danish, dry)	–	capacity, volume	L^3	1 skieppe (Danish, dry) = 17.3907368865 $\times 10^{-3}$ m^3	Obsolete Danish traditional unit of capacity used for dry substances before 1912. 1 skieppe (Danish, dry) = 18 pott (Danish, dry) (E)	Danish
skiepper (Danish)	–	surface area	L^2	1 skiepper (Danish) = 3546.22379218 m^2	Obsolete Danish traditional unit of surface area used in land measurements before 1912. 1 skiepper (Danish) = 250 square ruthe (Danish) (E)	Danish
skippund (Danish)	–	mass	M	1 skippund (Danish) = 160 kg (E)	Obsolete Danish traditional unit of mass used before 1912. 1 skippund (Danish) = 320 pund (Danish) (E)	Danish

skippund (Icelandic)	–	mass	M	1 skippund (Icelandic) = 160 kg (E)	Obsolete Icelandic traditional unit of mass used before 1907. 1 skippund (Icelandic) = 320 pund (Icelandic) (E)	Icelandic
skippund (Swedish)	–	mass	M	1 skippund = 170.031880978 kg	Obsolete Swedish unit of weight. 1 skippund = 400 skålpunds (E)	Swedish
skot	–	illuminance	$J\Omega L^{-2}$	1 skot = 10^{-3} lx (E)	Obsolete illuminance unit introduced in Germany during World War II for small illumination measurements.	German
skjeppe (Norwegian)	–	volume, capacity	L^3	1 skjeppe (Norwegian) = 17.3718×10^{-3} m^3 (E)	Obsolete Norwegian unit of volume used before 1882 to measure the capacity of dry products. Use of the unit was spread by Norse traders. Note that the Dutch schepel and German scheffel are versions of this same unit. 1 skjeppe (Norwegian) = 18 pots (Norwegian) (E)	Norwegian
skrupul (Polish)	–	mass	M	1 skrupul (Polish) = 1.0560×10^{-3} kg	Obsolete traditional Polish unit of mass used before 1919. 1 skrupul (Polish) = 1/384 funt (Polish) (E)	Polish
skyplast (Danish)	–	mass	M	1 skyplast (Danish) = 2600 kg (E)	Obsolete Danish traditional unit of mass used before 1912. 1 skyplast (Danish) = 5200 pund (Danish) (E)	Danish
slinch	–	mass	M	1 slinch = 175.126835246 kg	Obsolete American unit of mass used in the inch-pound- second (IPS) system. It was defined as the mass that produced a pound-force when submitted to an acceleration of 1 $in.s^{-2}$. It was used by American aerospace engineers at NASA. 1 slinch = 1 $lbf.(in.s^{-2})^{-1}$ (E) 1 slinch = 12 slugs (E)	US, IPS

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
slug (geepound)	–	mass	M	1 slug = 14.5939029372 kg	Obsolete unit of mass. It was equal to the mass which under an acceleration of 1ft.s^{-2} gives a force of 1 lbf. The name geepound sometimes used for the unit is derived from English: ***g pound***.	UK, US, FPS
slug-force	–	force, weight	MLT^{-2}	1 slug-force = 143.117298239 N	Obsolete unit of force derived from German slug.	
small pica	–	length, distance	L	1 small pica = 3.8805555556 $\times 10^{-3}$ m	Obsolete British and American traditional typographical unit of length used in printing. 1 small pica = 11 points (E)	UK, US
snit (US, liq.)	snit	capacity, volume	L^3	1 snit (US, liq.) = 88.7205886875 $\times$ 10^{-6} m^3	Obsolete American unit of capacity used for spirits, and other alcoholic beverages such as liquors. It is equal to two jiggers, i.e., 3 U.S. fluid ounces. The origin of this unit is unknown. 1 snit (US, liq.) = 2 jiggers (US, liq.) (E) 1 snit (US, liq.) = 3 fluid ounces (US, liq.) (E)	US
soally (Indian)	–	capacity, volume	L^3	1 soally (Indian) = 0.1101 m^3	Obsolete Indian traditional unit of capacity used before 1920. 1 soally (Indian) = 80 raik (Indian) (E)	Indian
soekoe (Indonesian)	–	mass	M	1 soekoe (Indonesian) = 4.82510175780 $\times 10^{-3}$ kg	Obsolete Indonesian traditional unit of mass used before 1923. 1 soekoe (Indonesian) = 1/12 800 picul (Indonesian) (E)	Indonesian
solar mass	M$\odot$	mass	M	1 M $\odot$ = 1.9891 $\times$ 10^{30} kg	Astronomical unit of mass.	@
solar neutrino unit	snu	particle flux rate of solar neutrinos at the Earth's surface	T^{-1}	1 snu = 10^{-36} neutrino capture per target atom per second (E)	The solar neutrino unit (snu) is a old unit used by astrophysicists to measure the particle flux rate at which neutrinos from the Sun are detected on Earth. One snu was	@

					defined as 10^{-36} neutrino capture per target atom per second.	
solar neutrino unit	snu	frequency of neutrino capture	T^{-1}	1 solar neutrino unit = 10^{-36} Hz	Obsolete unit used in astrophysics to measure the rate at which neutrinos from the Sun are detected on Earth. 1 solar neutrino unit = 10^{-36} neutrino capture per target atom per second.	@
solidus (Roman)	–	mass	M	1 solidus (Roman) = 4.541667×10^{-3} kg	Obsolete Roman unit of mass used in ancient times. 1 solidus (Roman) = 1/6 uncia (E)	Roman
solive (de Paris)	–	volume, capacity	L^3	1 solive (de Paris) = 0.102831795915 m^3	Obsolete French unit of volume used for measuring stacked wood before the French revolution of 1789. 1 solive (de Paris) = 3 pieds cubes (de Paris) (E)	French
solomon	–	capacity, volume	L^3	1 solomon = $18.18436800 \times 10^{-3}$ m^3	Obsolete unit of volume used for measuring the capacity of wine containers still used in oenology both in UK and France. 1 solomon = 24 bottles (E) 1 solomon = 4 wine gallons (E)	UK, French
solotnik (Russian) [Russian denier]	–	mass	M	1 solotnik = $4.2655803953 \times 10^{-3}$ kg	Obsolete Russian unit of mass from before 1917 for general use. 1 solotnik = 1/96 funt (E)	Russian
sompay (Thai)	–	mass	M	1 sompay (Thai) = 0.9375×10^{-3} kg	Obsolete Thai traditional unit of mass used before 1923. 1 sompay (Thai) = 1/1280 tchang (Thai) (E)	Thai
sone	–	subjective loudness	nil	(see note)	If S is the loudness in sones and P the loudness level in phons: $\log_{10} S = 0.0301 \times P - 1.204$	

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
sotka (Russian)	–	length, distance	L	1 sotka (Russian) = 2.1336×10^{-2} m	Obsolete Russian unit of length used before 1917. 1 sotka (Russian) = 7/100 foute (E)	Russian
Soxhlet degree	°Sx	specific gravity index on lactometric scale	nil	°Sx = 1000× (S.G.−1)	Soxhlet's lactometer, for determining the density of milk, has a scale from 25°Sx (sp. gr. 1.025) to 35°Sx (sp. gr. 1.035) divided into suitable scale divisions.	
span (Indian, Bombay)	–	length, distance	L	1 span (Indian, Bombay) = 0.17145 m	Obsolete Indian traditional unit of length used before 1920. 1 span (Indian, Bombay) = 1/4 guz (Indian, Bombay) (E)	Indian
span (Indian, Calcutta)	–	length, distance	L	1 span (Indian, Calcutta) = 0.22875 m	Obsolete Indian traditional unit of length used before 1920. 1 span (Indian, Calcutta) = 1/4 guz (Indian, Calcutta) (E)	Indian
span (UK)	sp	length, distance	L	1 span (UK) = 0.2286 m (E)	Obsolete British unit of length. 1 span (UK) = 9 inches (E) 1 span (UK) = 3/4 foot (E) 1 span (UK) = 9/4 hands (E) 1 span (UK) = 3 palms (E)	UK
spanna (Swedish, dry)	–	capacity, volume	L^3	1 spanna (Swedish, dry) = $73.2805337852 \times 10^{-3}$ m^3	Obsolete Swedish unit of capacity for dry substances. 1 spanna (Swedish, dry) = 28 kanna (E)	Swedish
spannland (Swedish)	–	surface area	L^2	1 spannland (Swedish) = 0.9872756320×10^4 m^2	Obsolete traditional Swedish unit of surface area used after decree 1665. 1 spannland (Swedish) = 112 000 kvardratfot (E)	Swedish
spat	S	length, distance	L	1 spat = 10^{12} m (E)	Obsolete unit of distance employed in astronomy. 1 spat = 1 Tm (E)	@

spat	sp	solid angle	Ω	1 sp = 12.5663706144 sr	The spat describes the solid angle which contains all the space around a point. 1 sp = 4π steradians (E)	
sphere	–	solid angle	Ω	1 sphere = 4πsr (E)	Unit of solid angle measure. 1 sphere = 41 252.96(°) (E)	UK, US
spherical right angle	–	solid angle	Ω	1 spherical right angle = 3.14159265359 sr	Obsolete international unit of solid angle used in astronomy. 1 spherical right angle = πsr (E)	@
spindle (UK, cotton)	–	length, distance	L	1 spindle (UK, cotton) = 13825.728 m (E)	Obsolete British unit of length used for cotton yarn. 1 spindle (UK, cotton) = 15 120 yards (E) 1 spindle (UK, cotton) = 18 hanks (E)	UK
spindle (UK, jute)	–	length, distance	L	1 spindle (UK, jute) = 13167.360 m (E)	Obsolete British unit of length used for jute yarn. 1 spindle (UK, jute) = 14 400 yards (E)	UK
spithame (Egyptian) [Egyptian span]	–	length, distance	L	1 spithame (Egyptian) = 2.61750×10^{-1} m	Obsolete Egyptian unit of length used in ancient times. 1 spithame = 1/2 Royal cubit (E)	Egyptian
spithame (Greek, Attic) [Greek span]	–	length, distance	L	1 spithame (Greek, Attic) = 2.3142×10^{-1} m	Obsolete Greek unit of length employed in ancient times. 1 spthame (Attic) = 3/4 pous (E)	Attic
split (US, wine)	–	capacity, volume	L^3	1 split (US, wine) = $189.270589200 \times 10^{-6}$ m^3 (E)	Obsolete American unit of capacity used before 1979 for measuring the capacity of spirits and alcoholic beverages especially wine. 1 split (US, wine) = 1/20 gallon (US, liq.) (E) 1 split (US, wine) = 1/4 bottle (US, old) (E)	US
square (UK, US)	sq.	surface area	L^2	1 square (UK, US) = 9.290304 m^2 (E)	Obsolete American and British unit of surface area used for measuring roofing material, finished lumber, and other building materials. 1 square (UK, US) = 100 square feet (E)	UK, US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
square (cubic metre) per square mole	$m^6.mol^{-2}$	third virial coefficient	L^6N^{-2}	**SI derived unit**		SI
square ångström	$Å^2$	surface, area	L^2	1 $Å^2 = 10^{-20}$ m^2 (E)	Obsolete unit of area used in atomic physics to express cross sections of atoms.	
square attometre	am^2	surface, area	L^2	1 $am^2 = 10^{-36}$ m^2 (E)	Submultiple of the SI derived unit	SI
square bohr	$a_0{}^2$	surface, area	L^2	1 $a_0{}^2 = 2.80028517784 \times 10^{-21}$ m^2	Obsolete unit of area used in atomic physics to express cross section of atoms. 1 $a_0^2 = [\pi\varepsilon_0 h^2/\pi^2 e^2]^2 = (\varepsilon_0^2 h^4/\pi^2 e^4)$ (E)	a.u.
square centimetre	cm^2	surface, area	L^2	1 $cm^2 = 10^{-4}$ m^2 (E)	Submultiple of the SI derived unit	SI, cgs
square chain (engineer's)	sq. ch. (engineer's)	surface, area	L^2	1 sq. chain (engineer's) = 929.030400 m^2 (E)	American unit of area employed in surveyor's measurements. 1 sq. chain (engineer's) = 36.7309458219 rd^2 1 sq. chain (engineer's) = 10 000 ft^2 (E)	US
square chain (Gunter's)	sq. ch. (Gunter's)	surface, area	L^2	1 sq. chain (Gunter's) = 404.6856422 m^2 (E)	British unit of area employed in surveyor's measurements. 1 sq. chain (Gunter's) = 16 rd^2 (E) 1 sq. chain (Gunter's) = 4356 ft^2 (E)	UK
square coulomb square metre per joule	$C^2.m^2.J^{-2}$	2nd electrical hypersusceptibility of a molecule	$M^{-2}L^{-2}T^6I^2$	**SI derived unit** 1 $C^2.m^2.J^{-2} = 1$ $kg^{-2}.m^{-2}.s^6.A^2$ (E)	The relationship between polarization ($C.m^{-2}$) and hypersusceptibilities is given by the equation: $P = \chi\varepsilon_0 E + 1/2\chi^{(2)}\varepsilon_0 E^2 + 1/6\chi^{(3)}\varepsilon_0 E^3 + \cdots$	SI
square cubit (Egyptian)	–	surface, area	L^2	1 square cubit (Egyptian) = 0.274052250 m^2	Obsolete Egyptian unit of area used in ancient times. 1 square cubit (Egyptian) = 1/100 pekeis (E)	Egyptian
square decametre	dam^2	surface, area	L^2	1 $dam^2 = 100$ m^2 (E)	Multiple of the SI derived unit.	SI
square decimetre	dm^2	surface, area	L^2	1 $dm^2 = 10^{-2}$ m^2 (E)	Submultiple of the SI derived unit.	SI

square degree (old)	$\square^\circ$, $(^\circ)^2$	solid angle	Ω	$1\ (^\circ)^2 = 3.04617419785 \times 10^{-4}$ sr	Obsolete unit of solid angle used in astronomy. $1\ (^\circ)^2 = (\pi/180)^2$ sr (E) $1\ (^\circ)^2 = 3600$ square minutes (E) $1\ (^\circ)^2 = (3600)^2$ square seconds (E)	@
square dekapode (Attic)	–	surface, area	L^2	1 square dekapode (Attic) $= 9.520927360\ m^2$	Obsolete Greek unit of area used in ancient times. 1 square dekapode (Attic) = 100 sq. pous (E)	Attic
square exametre	Em^2	surface, area	L^2	$1\ Em^2 = 10^{36}\ m^2$ (E)	Multiple of the SI derived unit.	SI
square fall (Scottish)	–	surface area	L^2	1 square fall (Scottish) $= 32.1404246448\ m^2$	Obsolete traditional Scottish unit of surface area used in land measurements before the Imperial Weights and Measures Act of 1824. 1 square fall (Scottish) = 1369/4 square feet (Scottish) (E)	Scottish
square femtometre	fm^2	surface, area	L^2	$1\ fm^2 = 10^{-30}\ m^2$ (E)	Submultiple of the SI derived unit.	SI
square fermi	F^2	surface, area	L^2	$1\ F^2 = 10^{-30}\ m^2$	Obsolete unit of area employed in nuclear physics to express the cross section of a nuclide.	
square foot	ft^2, sq.ft, $\square'$	surface, area	L^2	$1\ ft^2 = 9.290304000 \times 10^{-2}\ m^2$ (E)	Legal unit of area in the UK, US and FPS systems. $1\ ft^2 = 144\ in^2$ (E)	UK, US, FPS
square foot (Persian)	–	surface, area	L^2	1 square foot (Persian) $= 1.024 \times 10^{-1}\ m^2$	Obsolete Persian unit of area used in ancient times. 1 square foot (Persian) = 1/144 gar (E) $1\ ft^2$ (US survey) $= (1200/3937)^2$ m (E)	Persian
square foot (Scottish)	–	surface area	L^2	1 square foot (Scottish) $= 0.0939092027605\ m^2$	Obsolete traditional Scottish unit of surface area used in land measurements before the Imperial Weights and Measures Act of 1824.	Scottish
square foot (US, survey)	ft^2 (US, survey)	surface, area	L^2	$1\ ft^2$ (US, survey) $= 9.290341161 \times 10^{-2}\ m^2$ (E)	Obsolete American unit of area used in geodetic and surveyor's measurements.	US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
square foot per hour	$ft^2.h^{-1}$, sq.ft/h	kinematic viscosity	$L^2.T^{-1}$	1 $ft^2.h^{-1} = 2.58064 \times 10^{-5}$ $m^2.s^{-1}$	British and American unit of kinematic viscosity.	UK, US
square fot (Swedish)	–	surface, area	L^2	1 square fot (Swedish) = 8.814961×10^{-2} m^2	Obsolete Swedish unit of area.	Swedish
square gigametre	Gm^2	surface, area	L^2	1 $Gm^2 = 10^{18}$ m^2 (E)	Multiple of SI derived unit.	SI
square gon (old)	^{g}, $(g)^2$	solid angle	Ω	1 $(g)^2 = 2.46740110029 \times 10^{-4}$ sr	Obsolete unit of solid angle. 1 $(g)^2 = (\pi/200)^2$ rad (E)	French
square grade (old)	^{g}, $(g)^2$	solid angle	Ω	1 $(g)^2 = 2.46740110029 \times 10^{-4}$ sr	Obsolete unit of solid angle. 1 $(g)^2 = (\pi/200)^2$ rad (E)	French
square guz (Indian, Bombay)	–	surface area	L^2	1 square guz (Indian, Bombay) = 0.470321640 m^2	Obsolete Indian traditional unit of surface used in land measurements before 1920.	Indian
square guz (Indian, Calcutta)	–	surface area	L^2	1 square guz (Indian, Calcutta) = 0.837225 m^2	Obsolete Indian traditional unit of surface used in land measurements before 1920.	Indian
square hectometre	hm^2	surface, area	L^2	1 $hm^2 = 10^4$ m^2 (E)	Multiple of the SI derived unit. 1 hm^2 = 1 hectare (E)	SI
square inch	in^2, sq. in, □″	surface, area	L^2	1 $in^2 = 6.4516 \times 10^{-4}$ m^2 (E)	Legal submultiple unit of area in the UK, US and FPS systems. 1 $ft^2 = 144$ in^2 (E)	UK, US, FPS
square inch per hour	$in^2.h^{-1}$, sq. in/h	kinematic viscosity	$L^2.T^{-1}$	1 $in^2.h^{-1}$ = $1.792111111 \times 10^{-7}$ $m^2.s^{-1}$	British and American unit of kinematic viscosity.	UK, US
square kilometre	km^2	surface, area	L^2	1 $km^2 = 10^6$ m^2 (E)	Multiple of the SI derived unit.	SI
square kvat (Yugoslavian)	–	surface area	L^2	1 square kvat (Yugoslavian) = 3.5948160 m^2	Obsolete traditional Yugoslavian unit of surface area used in land measurements before 1883. 1 square kvat (Yugoslavian) = 36 square stopa (E)	Yugoslavian
square league (Canadian)	sq. leag (Canada)	surface, area	L^2	1 sq. leag (Canada) = $2.33098929930 \times 10^7$ m^2	Obsolete Canadian unit of area. 1 sq. leag (Canada) = 9 sq. miles (Canada)	CAN

square league (int., naut.)	sq. leag (int., naut.)	surface, area	L^2	1 sq. leag (int., naut.) = 3.086913600×10^7 m^2	Obsolete international unit of length employed in navigation. 1 sq. leag (int., naut.) = 9 sq. miles (int., naut.)	INT, UK, US
square league (statute, land)	sq. leag (statute, land)	surface, area	L^2	1 sq. leag (statute) = $2.33098929930 \times 10^7$ m^2	Obsolete British and American unit of length. 1 sq. leag (statute) = 9 sq. miles (statute)	UK, US
square league (US, naut.)	sq. leag (UK, naut.)	surface, area	L^2	1 sq. leag (US, naut.) = $3.09086184407 \times 10^7$ m^2	Obsolete American unit of length employed in navigation. 1 sq. leag (US, naut.) = 9 sq. miles (US, naut.)	US
square league (UK, naut.)	sq. leag (UK, naut.)	surface, area	L^2	1 sq. leag (UK, naut.) = $3.09086184407 \times 10^7$ m^2	Obsolete British unit of length used in navigation. 1 sq. leag (UK, naut.) = 9 sq. miles (UK, naut.)	UK
square megametre	Mm^2	surface, area	L^2	1 $Mm^2 = 10^{12}$ m^2 (E)	Multiple of the SI derived unit	SI
square meile (Hungarian)	–	surface area	L^2	1 square meile (Hungarian) = $69.7826212650 \times 10^6$ m^2	Obsolete traditional Hungarian unit of surface area used in land measurements before 1876. 1 square meile (Hungarian) = 16 168.355 joch (Hungarian) (E)	Hungarian
square mertföld (Hungarian)	–	surface area	L^2	1 square mertföld (Hungarian) = $69.7826212650 \times 10^6$ m^2	Obsolete traditional Hungarian unit of surface area used in land measurements before 1876. 1 square mertföld (Hungarian) = 16 168.355 joch (Hungarian) (E)	Hungarian
square metre	m^2	surface, area	L^2	**SI derived unit**	The square metre is the SI derived unit. It is equal to the area of a surface of the plane square with sides of one metre.	SI
square metre per hour	$m^2.h^{-1}$, sq. m/h	kinematic viscosity	$L^2.T^{-1}$	1 $m^2.h^{-1} = 2.777778 \times 10^{-4}$ $m^2.s^{-1}$	British and American unit of kinematic viscosity.	UK, US
square metre per mole	$m^2.mol^{-1}$	molar absorption coefficient	L^2N^{-1}	**SI derived unit**		SI

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
square metre per second	$m^2.s^{-1}$	kinematic viscosity, coefficient of diffusion, thermal diffusivity	L^2T^{-1}	**SI derived unit**	The square metre per second is the SI derived unit of kinematic viscosity of an homogenous fluid having a density of one kilogram per cubic metre and a dynamic viscosity of one pascal-second.	SI
square metre per steradian	$m^2.sr$	light gathering power, throughtput	$L^2\Omega$	**SI derived unit**		SI
square micrometre	μm^2	surface, area	L^2	$1\ \mu m^2 = 10^{-12}\ m^2$ (E)	Submultiple of the SI derived unit.	SI
square mile (geographical)	sq. mi. (Geogr.)	surface, area	L^2	1 sq. mi (geographical) $= 5.508001297 \times 10^7\ m^2$	Obsolete American and British unit of area employed in geodetic measurements.	UK, US
square mile (int. naut.)	sq. mi (int. naut.)	surface, area	L^2	1 sq. mi (int. naut.) $= 3.429904000 \times 10^6\ m^2$	International unit of area employed in navigation (mercantile marine, aviation).	INT
square mile (int.)	sq. mi (int.)	surface, area	L^2	1 sq. mi (int.) $= 2.58998811034 \times 10^6\ m^2$	Obsolete international unit of area employed in navigation (mercantile marine, aviation). 1 sq. mile (int.) = 640 acres (E)	INT, UK, US
square mile (statute, land)	sq. mi (stat.)	surface, area	L^2	1 sq. mi (statute) $= 2.58998811034 \times 10^6\ m^2$	Obsolete American and British unit of area employed in geodetic measurements. 1 sq. mile (stat.) = $(5280)^2\ ft^2$ (E)	UK, US
square mile (telegraph nautical)	sq. mi (teleg., naut.)	surface, area	L^2	1 sq. mi (teleg., naut.) $= 3.442203397 \times 10^6\ m^2$	Obsolete American and British unit of area employed in navigation (mercantile marine).	UK, US
square mile (UK, naut.)	sq. mi (UK, naut.)	surface, area	L^2	1 sq. mi (UK, naut.) $= 3.43429093786 \times 10^6\ m^2$	Obsolete British unit of area employed in navigation (mercantile marine). 1 sq. mile (UK, naut) = $(6080)^2\ ft^2$ (E)	UK
square mile (US, naut.)	sq. mi (US, naut.)	surface, area	L^2	1 sq. mi (US, naut.) $= 3.43429093786 \times 10^6\ m^2$	Obsolete American unit of area employed in navigation (mercantile marine). 1 sq. mile (US, naut) = $(6080)^2\ ft^2$ (E)	US

square mile (US, survey)	sq. mi (US, surv.)	surface, area	L^2	1 sq. mi (US, survey) $= 2.58999847031 \times 10^6$ m^2	Obsolete American unit of area employed in geodetic and surveyors' measurements.	US
square millimetre	mm^2	surface, area	L^2	1 $mm^2 = 10^{-6}$ m^2 (E)	Submultiple of the SI derived unit.	SI
square minute	(′)2	solid angle	Ω	1 square minute $= 8.46159499409 \times 10^{-10}$ sr	Obsolete international unit of solid angle used in astronomy. 1 square minute = $(\pi/10\,800)^2$ sr (E) 1 square minute = (1/3600) square degree (E)	@
square nanometre	nm^2	surface, area	L^2	1 $nm^2 = 10^{-18}$ m^2 (E)	Submultiple of the SI derived unit.	SI
square ngu (Annamese)	–	surface area	L^2	1 square ngu (Annamese) $= 5.5225$ m^2	Obsolete Annameseian traditional unit of surface area used in land measurements before 1914. 1 square ngu (Annamese) = 1/6 thuoc (Annamese) (E)	Annamese
square perch	rd^2	surface, area	L^2	1 $rd^2 = 25.29285264$ m^2 (E)	Obsolete British and American unit of area used in surveyor's measurements. 1 $rd^2 = 272.25$ ft^2 (E)	UK, US
square petametre	Pm^2	surface, area	L^2	1 $Pm^2 = 10^{30}$ m^2 (E)	Multiple of the SI derived unit.	SI
square pic (Libyan)	–	surface area	L^2	1 square pic (Libyan) $= 0.4624$ m^2	Obsolete Libyan traditional unit of surface area used in land measurements before 1927. 1 square pic (Libyan) = 1/1800 denum (Libyan) (E)	Libyan
square pic (Turkish)	–	surface area	L^2	1 square pic (Turkish) $= 0.570625$ m^2	Obsolete Turkish traditional unit of surface area used before 1933 for land measurements. 1 square pic (Turkish) = 1/1600 dunum (Turkish) (E)	Turkish
square picometre	pm^2	surface, area	L^2	1 $pm^2 = 10^{-24}$ m^2 (E)	Submultiple of the SI derived unit.	SI

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
square plethron (Attic)	–	surface, area	L^2	1 square plethron (Attic) = 952.0927360 m^2	Obsolete Greek unit of area used in ancient times. 1 square plethron (Attic) = 10 000 sq. pous (E)	Attic
square pole	rd^2	surface, area	L^2	1 rd^2 = 25.29285264 m^2 (E)	Obsolete British and American unit of area used in surveyor's measurements. 1 rd^2 = 272.25 ft^2 (E)	UK, US
square pous (Attic)	–	surface, area	L^2	1 square pous (Attic) = 9.520927360 × 10^{-2} m^2	Obsolete Greek unit of area used in ancient times.	Attic
square pret (Polish, Cracow)	–	surface area	L^2	1 square pret (Polish, Cracow) = 12.493397160 m^2	Obsolete traditional Polish unit of surface area used in land measurements before 1919. 1 square pret (Polish, Cracow) = 225 square stopa (Polish, Cracow) (E)	Polish
square pret (Polish, new)	–	surface area	L^2	1 square pret (Polish, new) = 18.66240 m^2	Obsolete traditional Polish unit of surface area used in land measurements before 1919. 1 square pret (Polish, new) = 225 square stopa (Polish, new) (E)	Polish
square pret (Polish, Warsaw)	–	surface area	L^2	1 square pret (Polish, Warsaw) = 19.9540890 m^2	Obsolete traditional Polish unit of surface area used in land measurements before 1919. 1 square pret (Polish, Warsaw) = 225 square stopa (Polish, Warsaw) (E)	Polish
square ref (Swedish)	–	surface, area	L^2	1 square ref (Swedish) = 881.4961 m^2	Obsolete Swedish unit of area.	Swedish
square rod	rd^2	surface, area	L^2	1 rd^2 = 25.29285264 m^2 (E)	Obsolete British and American unit of area used in surveyor's measurements. 1 rd^2 = 272.25 ft^2 (E)	UK, US
square ruthe (Danish)	–	surface area	L^2	1 square ruthe (Danish) = 14.1848951687 m^2	Obsolete Danish traditional unit of surface area used in land measurements before 1912.	Danish

square second	$(''')^2$	solid angle	Ω	1 square second $= 2.35044305390 \times 10^{-12}$ sr	Obsolete international unit of solid angle used in astronomy. 1 square second $= (\pi/648\,000)^2$ sr (E) 1 square second $= (1/3600)^2$ square degree (E)	@
square stopa (Polish, Cracow)	–	surface area	L^2	1 square stopa (Polish, Cracow) $= 0.0555262096$ m^2	Obsolete traditional Polish unit of surface area used in land measurements before 1919.	Polish
square stopa (Polish, new)	–	surface area	L^2	1 square stopa (Polish, new) $= 0.082944$ m^2	Obsolete traditional Polish unit of surface area used in land measurements before 1919.	Polish
square stopa (Polish, Warsaw)	–	surface area	L^2	1 square stopa (Polish, Warsaw) $= 0.088684840$ m^2	Obsolete traditional Polish unit of surface area used in land measurements before 1919.	Polish
square stopa (Yugoslavian)	–	surface area	L^2	1 square stopa (Yugoslavian) $= 0.0998560$ m^2	Obsolete traditional Yugoslavian unit of surface area used in land measurements before 1883.	Yugoslavian
square terametre	Tm^2	surface, area	L^2	1 Tm$^2 = 10^{24}$ m^2 (E)	Multiple of the SI derived unit.	SI
square vara (Costa-Rican)	–	surface area	L^2	1 square vara (Costa-Rican) $= 70.4424490 \times 10^{-2}$ m^2	Obsolete Costa-Rican traditional unit of surface area used in land measurements before 1912. 1 square vara (Costa-Rican) = 1/10 000 manzana (Costa-Rican)	Costa-Rican
square vara (Guatemalan)	–	surface area	L^2	1 square vara (Guatemalan) $= 69.872881 \times 10^{-2}$ m^2	Obsolete Guatemalan traditional unit of surface area used in land measurements before 1912. 1 square vara (Guatemalan) = 1/10 000 manzana (Guatemalan)	Guatemalan
square vara (Honduran)	–	surface area	L^2	1 square vara (Honduran) $= 66.064384 \times 10^{-2}$ m^2	Obsolete Honduran traditional unit of surface area used in land measurements before 1912. 1 square vara (Honduran) = 1/10 000 manzana (Honduran)	Honduran

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
square vara (Mexican)	–	surface area	L^2	1 square vara (Mexican) = 70.2244×10^{-2} m^2	Obsolete Mexican traditional unit of surface area used in land measurements before 1896. 1 square vara (Mexican) = 1/50 784 fanega (Mexican) (E)	Mexican
square vara (Peruvian)	–	surface area	L^2	1 square vara (Peruvian) = $69.88625604 \times 10^{-2}$ m	Obsolete Peruvian traditional unit of surface area used in land measurements before 1869. 1 square vara (Peruvian) = 9 square pie (Peruvian) (E)	Peruvian
square vara (Portuguese)	–	surface, area	L^2	1 square vara (Portuguese) = 1.199025 m^2	Obsolete Portuguese unit of area.	Portuguese
square vara (Spanish)	–	surface, area	L^2	1 square vara (Spanish) = 0.698737169025 m^2	Obsolete Spanish unit of area.	Spanish
square volt per square kelvin	$V^2.K^{-2}$	Lorenz coefficient	$M^2L^4T^{-6}I^{-2}\Theta^{-2}$	**SI derived unit**		SI
square wah (Thai)	–	surface area	L^2	1 square wah (Thai) = 4 m^2	Obsolete Thai traditional unit of surface area used in land measurements before 1923. 1 square wah (Thai) = 1/100 ngan (Thai)	Thai
square yard (old)	yd^2, sq. yd (old)	surface, area	L^2	1 yd^2 (old) = 0.836125897 m^2	Obsolete British unit of area.	UK
square yard (US)	yd^2, sq. yd (US)	surface, area	L^2	1 yd^2 (US) = 0.836307067 m^2	Obsolete American unit of area.	US
square yard (WMA, 1963)	yd^2, sq. yd	surface, area	L^2	1 yd^2= 0.83612736 m^2 (E)	Legal unit of area in the UK, US systems. 1 yd^2 = 9 ft^2 (E) 1 yd^2 = 144 in^2 (E)	UK, US
square yoctometre	ym^2	surface, area	L^2	1 $ym^2 = 10^{-48}$ m^2 (E)	Submultiple of the SI derived unit.	SI
square yottameter	Ym^2	surface, area	L^2	1 $Ym^2 = 10^{48}$ m^2 (E)	Multiple of the SI derived unit.	SI

square zeptometer	zm^2	surface, area	L^2	1 $zm^2 = 10^{-42}$ m^2 (E)	Submultiple of the SI derived unit.	SI
square zettameter	Zm^2	surface, area	L^2	1 $Zm^2 = 10^{42}$ m^2 (E)	Multiple of the SI derived unit.	SI
ssah (Algerian)	–	capacity, volume	L^3	1 ssah (Algerian) = $2.52289513798 \times 10^{-3}$ m^3	Obsolete traditional Algerian unit of capacity used before 1843. 1 ssah (Algerian) = 72/25 khoul (Algerian) (E)	Algerian
stack (UK, coal)	stk	capacity, volume	L^3	1 stack (UK, coal) = 3.05821943194 m^3 (E)	Obsolete British unit of volume used in Great Britain for coal and firewood. 1 stack (UK, coal) = 4 cubic yards (E) 1 stack (UK, coal) = 108 cubic feet (E) 1 stack (UK, coal) = 27/32 cord (UK, wood) (E)	UK
stade (Egyptian)	–	length, distance	L	1 stade (Egyptian) = 209.400 m	Obsolete Egyptian unit of length used in ancient times. 1 stade = 400 Royal cubit (E)	Egyptian
stadion (Greek, Attic)	–	length, distance	L	1 stadion (Greek, Attic) = 185.136 m	Obsolete Greek unit of length employed in ancient times. 1 stadion (Attic) = 600 pous (E)	Attic
stadium (Roman)	–	length, distance	L	1 stadium (Roman) = 199.750 m	Obsolete Roman unit of length used in ancient times in athletics. It was equal to 625 Roman feet (common pes) or also 1/8 Roman mile. The plural is *stadia*. 1 stadium (Roman) = 625 pes (Roman) (E) 1 stadium (Roman) = 1/8 mille passus (E)	Roman
standard (Northern Europe)	std	capacity, volume	L^3	1 standard (Northern Europe) = 4.67227968768 m^3 (E)	Obsolete unit of volume used to measure the volume of finished lumber in Northern Europe. 1 standard (Northern Europe) = 165 cubic feet (E) 1 standard (Northern Europe) = 1980 board-foot measure (E)	Northern Europe
standard (Petrograd)	–	capacity, volume	L^3	1 standard = 4.67227968768 m^3	1 standard = 165 cubic feet (E)	

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
standard (UK, timber)	–	volume, capacity	L^3	1 standard (UK, timber) = 4.67227968768 m^3 (E)	Obsolete British unit of volume used to measure stacked wood. 1 standard (UK, timber) = 1980 board-foot measure (E) 1 standard (UK, timber) = 165 cubic feet (E)	UK
standard (US, timber)	–	volume, capacity	L^3	1 standard (US, timber) = 4.67227968768 m^3 (E)	Obsolete American unit of volume used to measure stacked wood. The unit is named after the St Petersburg or Pittsburgh standard. Apparently the term is short for "standard hundred" which was meant to refer to 100 pieces of wood (i.e. deals). However, this particular standard is equal to 120 deals which are: 12 ft × 11 in × 1.5 in. 1 standard (US, timber) = 120 × (12 ft × 11 in. × 1.5 in.) (E) 1 standard (US, timber) = 165 cubic feet (E)	US
standard atmosphere	atm	pressure, stress	$ML^{-1}T^{-2}$	1 atm = 101 325 Pa (E)	Obsolete unit of pressure and stress which should be disontinued. Unit of pressure equal to the air pressure measured at mean sea level.	INT
standard cubic foot	ft^3 (STP)	capacity, volume	L^3	1 ft^3 (STP) = $2.83168465920 \times 10^{-2}$ m^3	Unit of volume used in the British and American gas industry. It is the volume of a defined gas measured at standard T and P (273.15K, 101 325 Pa).	UK, US
standard cubic foot	SCF, ft^3 (60°F, 1 atm)	capacity, volume	L^3	1 ft^3 (60°F, 1 atm) = $26.7911250676 \times 10^{-3}$ m^3	Obsolete American and British unit employed in the oil and gas industries to express the volume of an ideal gas in the specified T and P conditions (60°F, 1 atm). The numerical value is obtained by the classical equation $PV = nRT$ applied to an ideal gas.	UK, US

standard cubic metre	m^3 (STP)	capacity, volume	L^3	1 m^3 (STP) = 1 m^3 (E)	Unit of volume used in the British and American gas industry. It is the volume of a defined gas measured at standard *T* and *P* (273.15K, 101 325 Pa).	INT
standard cubic metre	SCM, m^3 (STP)	amount of substance	N	1 m^3 (STP) = 44.61590602 mol (273.15 K, 1 atm) 1 m^3 (STP) = 44.03247571 mol (273.15 K, 1 bar)	Obsolete metric unit employed in physical chemistry to express the amount of substance of an ideal gas in the standard *T* and *P* conditions. The numerical value is obtained by the classical equation $PV = nRT$ applied to an ideal gas.	
standard cubic metre	m^3 (STP)	capacity, volume	L^3	1 m^3 (STP) = 0.916149589 m^3 (NTP) (E)	Unit of volume used in the gas industry. It is the volume of a defined gas measured at standard temperature and pressure (298.15 K, 101 325 Pa).	INT
standard gauge	–	length, distance	L	1 standard gauge = 1.4351 m (E)	American unit of length used in North America to measure the standard width between railroad tracks. The standard railroad gauge is 4 feet and 8.5 inches between inside rails, measured 5/8 inch below top of rail. The gauge may be varied from 4 feet and 8.375 inches on some high-speed tangent track to 4 feet 9.125 inches on curves of small radius. 1 standard gauge = 4 feet + 8.5 inches (E) 1 standard gauge = 56.5 inches (E)	US
standard time	–	time, period, duration	T	(see note)	Time scale related to the law. It corresponds to the universal time adjusted by the fixed time period which depends on the country or regional location.	
stang (Swedish)	–	length, distance	L	1 stang (Swedish) = 4.7504 m	Obsolete Swedish unit of length. 1 stang (Swedish) = 16 fot (E)	Swedish
Stang (Welsh)	–	surface area	L^2	1 stang (Welsh) = 2709.0526464 m^2 (E)	Obsolete Welsh unit of land surface area. 1 stang (Welsh) = 3240 square yards (E)	Welsh

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
stapp	–	effect of acceleration on the human body	nil	(see note)	Obsolete American unit used to measure the effects of acceleration or deceleration on the human body. One stapp represents an acceleration of 9.80665 $m.s^{-2}$ for 1 second. The unit is named for the American physician John P. Stapp, a pioneer in research on the effects of acceleration on the human body in aircraft programmes during the 1940s and 1950s.	US
stat	–	radioactivity	T^{-1}	1 stat = 134.31 Bq	Obsolete unit of radioactivity rarely used in nuclear sciences. 1 stat = 3.63×10^{-9} Ci	
statampere (esu of current)	statA	electric current intensity	I	1 statampere = $3.33564095198 \times 10^{-10}$ A	Obsolete cgs unit of electric current in the esu subsystem. 1 statampere = (1/10c) A (E)	cgs
statcoulomb (esu of charge)	statC	quantity of electricity, electric charge	IT	1 statcoulomb = $3.33564095198 \times 10^{-10}$ C	Obsolete cgs unit of electric charge in the esu subsystem. 1 statcoulomb = (1/10c) C (E)	cgs
stater (Greek)	–	mass	M	1 stater (Greek) = 50 kg	Obsolete traditional Greek unit of mass used before 1922. 1 stater (Greek) = 100 pounds (Greek) (E)	Greek
statfarad (esu of capacitance)	statC	electric capacitance	$M^{-1}L^{-2}T^{4}I^{2}$	1 statfarad = $1.11188031733 \times 10^{-12}$ F	Obsolete unit of electric capacitance in the esu subsystem. 1 statfarad = $(10^{5}/c^{2})$ F (E)	cgs
stathenry (esu of inductance)	statH	electric inductance	$ML^{2}T^{-2}I^{-2}$	1 stathenry = $8.98755178737 \times 10^{11}$ H	Obsolete cgs unit of electric inductance in the esu subsystem. 1 stathenry = 10^{-5} c^{2}H (E)	cgs
statmho (esu of conductance)	statmho	electric conductance	$M^{-1}L^{-2}T^{3}I^{2}$	1 statmho = $1.112650056 \times 10^{-12}$ S	Obsolete cgs unit of electric conductance in the esu subsystem. 1 statmho = $10^{5}/c^{2}$S (E)	cgs

stathmos (Greek, Attic)	–	length, distance	L	1 stathmos (Greek, Attic) = 24 684.800 m	Old Greek unit of length used in ancient times. 1 stathmos (Greek, Attic) = 80 000 pous (E) 1 stathmos (Greek, Attic) = 800 plethra (E)	Attic
statohm (esu of resistance)	statohm	electric resistance	$ML^2T^{-3}I^{-2}$	1 statohm = $8.98755178737 \times 10^{11}$ Ω	Obsolete cgs unit of electric resistance in the esu subsystem. 1 statohm = 10^{-5} $c^2\Omega$ (E)	cgs
statvolt (esu of electric potential)	statV	electric potential, electric potential difference, electromotive force	$ML^2T^{-3}I^{-1}$	1 statvolt = 2.99792458×10^2 V (E)	Obsolete cgs unit of electric potential in the esu subsystem. 1 statvolt = $(c/10^6)$ V (E)	cgs
stedian	sd	solid angle	Ω	1 stedian = 1 sr (E)	Obsolete unit of solid angle. Old name of the modern steradian.	
steekan (Dutch)	–	capacity, volume	L^3	1 steekan (Dutch) = 19.200×10^{-3} m^3	Obsolete Dutch unit of capacity used for liquid substances. 1 steekan (Dutch) = 16 mingelen (E)	Dutch
stein (Austrian)	–	mass	M	1 stein (Austrian) = 11.200200 kg	Obsolete Austrian unit of mass for general use. 1 stein (Austrian) = 20 pfund (E)	Austrian
stein (Belgian)	–	mass	M	1 stein (Belgian) = 3.9160 kg	Obsolete traditional Belgian unit of mass used before 1820. 1 stein (Belgian) = 8 livres (Belgian) (E)	Belgian
stein (Prussian)	–	mass	M	1 stein (Prussian) = 10.289642 kg	Obsolete German unit of mass. 1 stein (Prussian) = 22 pfund (E)	German
stekar (Russian)	–	capacity, volume	L^3	1 stekar (Russian) = 18.449115×10^{-3} m^3	Obsolete Russian unit of capacity for liquid substances used before 1917. 1 stekar (Russian) = 3/2 vedro (E)	Russian
sten (Swedish)	–	mass	M	1 sten (Swedish) = 13.6025504768 kg	Obsolete Swedish unit of weight. 1 sten (Swedish) = 32 skålpund (E)	Swedish
step (tone)	–	frequency ratio of two notes	nil	(see note)	Dimensionless unit used in music to describe the frequency ratio in between two notes, also named tone. Two notes *(continued overleaf)*	Music

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
step (tone) *(continued)*					differ by a step if the higher note has frequency exactly 21/6 = 1.12246 times the frequency of the lower one.	
step (UK)	–	length, distance	L	1 step (UK) = 0.762 m (E)	Obsolete British unit of length. 1 step (UK) = 1/2 pace (E) 1 step (UK) = 30 inches (E)	UK
steradian	sr	solid angle	Ω	**SI supplementary unit**	The steradian is the solid angle which has its apex on the centre of a sphere, and cuts into this sphere surface an equivalent area of one square which has its side equal to the sphere radius. The space described by a solid angle could be the interior of a conical or pyramidal surface.	SI
stère	st	capacity, volume	L^3	1 st = 1 m^3 (E)	Obsolete French unit of measure employed in the wood industry. One stère is equal to one cubic metre of stacked log wood for use as fuel.	French
sthène (Funal)	sthène, sn	force, weight	MLT^{-2}	1 sth = 10^3 N (E)	Obsolete MTS unit of force.	MTS
sthène per square metre	sthène. m^{-2} $sn.m^{-2}$	pressure, stress	$ML^{-1}T^{-2}$	1 $sn.m^{-2}$ = 10^3 Pa (E)	Obsolete MTS pressure and stress unit. 1 $sn.m^{-2}$ = 1 pz (E) 1 hpz = 1 bar (E) 1 atm = 101.325 $sn.m^{-2}$ (E)	MTS
stick (printing)	–	length	L	1 stick (printing) = 5.08 $\times 10^{-2}$ m (E)	Obsolete British and American typographical unit used in the printing industry. 1 stick (printing) = 2 inches (E)	UK, US
stick (US, butter)	stk	mass	M	1 stick (US, butter) = 0.1133980925 kg (E)	American unit of mass used to measure the amount of butter. Actually, butter in the USA is sold in one pound packages that	US

					contain four individually wrapped pieces or sticks. 1 stick (US, butter) = 1/4 lb (E)	
stilb	sb	luminous luminance	JL^{-2}	1 stilb = 10^4 $cd.m^{-2}$(E)	Obsolete submultiple of the cgs unit of luminous luminance. The unit is named after Greek *stilbein*: shining. 1 stilb = 1 $cd.m^{-2}$ (E)	cgs
stokes (lentor)	St	kinematic viscosity	L^2T^{-1}	1 St = 10^{-4} $m^2.s^{-1}$ (E)	Obsolete cgs unit of kinematic viscosity. 1 St = 1 $cm^2.s^{-1}$ (E)	cgs
stone (Cypriot)	–	mass	M	1 stone (Cypriot) = 22.3530319936 kg	Obsolete Cypriot traditional unit of mass used before 1972. 1 stone (Cypriot) = 40 rottolo (Cypriot) (E)	Cypriot
stone (Scottish)	st.	mass	M	1 stone (Scottish) = 9.87016997120 kg	Obsolete traditional Scottish unit of mass used before the Weights and Measures Act of 1824. 1 stone (Scottish) = 16 pounds (Scottish) (E)	Scottish
stone (UK)	st (UK)	mass	M	1 stone (UK) = 6.350293180 kg (E)	Obsolete British unit of mass. Sometimes used in the turf industry. In 1389 a royal statute fixed the stone of wool at 14 pounds. 1 stone (UK) = 14 lb (av.) (E) 1 stone (UK) = 224 ounces (av.) (E)	UK
stone (UK, lead)	–	mass	M	1 stone (UK, lead) = 5.6699046250 kg	Obsolete British unit of mass used in the trading of pure lead bullion and its alloys. 1 stone (UK, lead) = 12.5 lb (av.) (E)	UK
stone (UK, wool)	st (UK, wool)	mass	M	1 stone (UK, wool) = 5.669904625 kg (E)	Obsolete British unit of mass employed in the weighing of wool before 1389. 1 stone (UK, wool) = 12.5 lb (av.) (E)	UK
stoof (Latvian)	–	capacity, volume	L^3	1 stoof (Latvian) = 1.2752 $\times 10^{-3}$ m^3	Obsolete Latvian traditional unit of capacity. 1 stoof (Latvian) = 1/2 kanne (Latvian) (E)	Latvian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
stoop (Dutch)	–	capacity, volume	L^3	1 stoop (Dutch) = 2.4×10^{-3} m^3	Obsolete Dutch unit of capacity used for liquid substances. 1 stoop (Dutch) = 2 mingelen (E)	Dutch
stop	–	relative photographic exposure	nil	(see note)	Dimensionless unit of relative exposure used in photography. In photography, the amount of light used to expose the film can be controlled either by varying the aperture, by varying the length of time the shutter is open to admit light, or by some combination of these two methods. Two exposures differ by one stop if one is made with twice the light of the other; similarly, they differ by *n* stops if one is made with $2n$ times the light of the other.	
stop (Swedish)	–	capacity, volume	L^3	1 stop (Swedish) = $1.30858096045 \times 10^{-3}$ m^3	Obsolete Swedish unit of capacity for liquid substances. 1 stop (Swedish) = 1/2 kanna (E)	Swedish
stop (Swedish, dry)	–	capacity, volume	L^3	1 stop (Swedish, dry) = $1.30858096045 \times 10^{-3}$ m^3	Obsolete Swedish unit of capacity for dry substances. 1 stop (Swedish, dry) = 1/2 kanna (E)	Swedish
stopa (Bohemian)	–	length, distance	L	1 stopa (Bohemian) = 0.296 m	Obsolete Czechoslovakian unit of length used in Bohemia before 1876.	Czech
stopa (Moravian)	–	length, distance	L	1 stopa (Moravian) = 0.284 m	Obsolete Czechoslovakian unit of length used in Moravia before 1876.	Czech
stopa (Polish, Cracow)	–	length, distance	L	1 stopa (Polish, Cracow) = 0.23564 m	Obsolete traditional Polish unit of length used before 1919. 1 stopa (Polish, Cracow) = 12 cal (Polish, Cracow) (E)	Polish

stopa (Polish, new)	–	length, distance	L	1 stopa (Polish, new) = 0.2880 m	Obsolete traditional Polish unit of length used before 1919. 1 stopa (Polish, new) = 12 cal (Polish, new) (E)	Polish
stopa (Polish, Warsaw)	–	length, distance	L	1 stopa (Polish, Warsaw) = 0.2978 m	Obsolete traditional Polish unit of length used before 1919. 1 stopa (Polish, Warsaw) = 12 cal (Polish, Warsaw) (E)	Polish
stopa (Praha)	–	length, distance	L	1 stopa (Praha) = 0.2965 m	Obsolete Czechoslovakian unit of length used in Praha before 1876.	Czech
stopa (Silesian)	–	length, distance	L	1 stopa (Silesian) = 0.2895 m	Obsolete Czechoslovakian unit of length used in Silesia before 1876.	Czech
stopa (Yugoslavian)	–	length, distance	L	1 stopa (Yugoslavian) = 0.316 m	Obsolete traditional Yugoslavian unit of length used before 1883.	Yugoslavian
Stoppani degree	–	specific gravity of liquids, hydrometer index, hydrometer degree	nil	$^{\circ}\text{Stoppani} = 166 - 166/d_{60^{\circ}\text{F}}^{60^{\circ}\text{F}}$		
stremma (Greek, land)	–	surface, area	L^2	1 stremma (Greek, land) = 1000 m^2	Old Greek unit of area used by surveyors for land measurements.	Greek
stremma (Greek, royal)	–	surface, area	L^2	1 stremma (Greek, royal) = 1270 m^2	Obsolete Greek unit of area used in ancient times by surveyors for land measurements.	Greek
strike (UK)	–	volume, capacity	L^3	1 strike (UK) = $70.79211648 \times 10^{-3}$ m^3 (E)	Obsolete British unit of volume, varying considerably with locations. 1 strike (UK) = 2.5 cubic feet (E)	UK
strike (UK)	–	capacity, volume	L^3	1 strike (UK) = 72.737472×10^{-3} m^3	Obsolete British unit of capacity. 1 strike (UK) = 16 gallons (E) 1 strike (UK) = 2 bushels (UK) (E)	UK
stringene (Romanian)	–	length, distance	L	1 stringene (Romanian) = 1.960 m	Obsolete traditional Romanian unit of length used before 1884. 1 stringene (Romanian) = (1960/701) halibiu (Romanian) (E)	Romanian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
strob	–	angular velocity	αT^{-1}	1 strob = 1 rad.s^{-1} (E)	Suggested unit of angular velocity which represents a rotation speed of one radian per second. It is named after the Greek, *strobos*, meaning rotating.	
strontium unit	strontium unit	specific radioactivity	$T^{-1}M^{-1}$	1 strontium unit = 3.7×10^4 Bq of ^{90}Sr per kg of Ca	Obsolete unit of specific radioactivity which expresses the microcuries of strontium-90 radionuclide absorbed in one kilogram of calcium. It was used to express the radiocontamination of food and plants in radioecology and environmental sciences. 1 strontium unit = 1 μCi of ^{90}Sr per kg of Ca	
strych (Czechoslovakian)	–	surface area	L^2	1 strych (Czechoslovakian) = 2878 m^2	Obsolete Czechoslovakian unit of surface area used before 1876. 1 strych (Czechoslovakian) = (1439/1000) merice (E)	Czech
strych (Czechoslovakian, capacity)	–	capacity, volume	L^3	1 strych (Czechoslovakian) = 93.545×10^{-3} m^3	Obsolete Czechoslovakian unit of capacity used before 1876. 1 strych (Czechoslovakian) = (53/40) merice (E)	Czech
stubche (Danish, liq.)	–	capacity, volume	L^3	1 stubche (Danish, liq.) = $3.8646081970 \times 10^{-3}$ m^3	Obsolete Danish traditional unit of capacity used for liquids before 1912. 1 stubche (Danish, liq.) = 4 pott (Danish, liq.) (E) 1 stubche (Danish, liq.) = 1/8 cubic fod (Danish, liq.) (E)	Danish
stunde (Swiss)	–	length, distance	L	1 stunde (Swiss) = 4800 m (E)	Obsolete Swiss unit of distance named after the German word for the hour. It was defined as the distance a person can walk in an hour.	Swiss

sturgeon	–	magnetic reluctance	$M^{-1}L^2T^2I^2$	1 sturgeon = 1 H^{-1} (E)	Suggested SI derived unit of magnetic reluctance which is used to measure the resistance of magnetic flow in a homogeneous medium of uniform cross-section. It is equal to the length divided by the product of the cross-sectional area and the magnetic permeability, i.e., $R = L/(A\mu_0\mu_R)$.	SI
sû (Chinese)	–	length, distance	L	1 sû (Chinese) = 3.2×10^{-6} m	Obsolete Chinese unit of length used in ancient times. 1 sû = 1/100 000 tchi (E)	Chinese
sû (Egyptian)	–	surface, area	L^2	1 sû (Egyptian) = 171.282656250 m^2	Obsolete Egyptian unit of area used in ancient times. 1 sû (Egyptian) = 25/4 pekeis (E)	Egyptian
sumner unit	–	enzymatic activity	MT^{-1}	1 sumner unit = 3.333333×10^{-9} kg(NH_3-N_2).s^{-1}	Obsolete unit of enzymatic activity. It expresses the amount of enzyme which releases one milligram of ammonia-nitrogen at 293.15 K in 5 minutes. The unit is named after J.B. Sumner (1877–1955) 1 sumner unit = 14.28 International Union of Biochemistry Association units	INT
sun (Japanese)	–	length, distance	L	1 sun (Japanese) = $3.030303030 \times 10^{-2}$ m	Obsolete Japanese unit of length. 1 sun = 1/10 shaku (E) 1 sun = 10/330 m (E)	Japanese
svedberg (time)	S	time of sedimentation of molecules	T	1 S = 10^{-13} s (E)		
svedberg (velocity)	Sv	velocity of sedimentation of molecules	LT^{-1}	1 Sv = 10^{-15} $m.s^{-1}$ (E)	Obsolete unit of sedimentation velocity employed in biochemistry and biophysics. The unit is named after T. Svedberg (1884–1971) the Swedish pioneer in the use of the ultracentrifuge in biochemistry.	
sverdup	–	volume flow rate	L^3T^{-1}	1 sverdup = 10^6 $m^3.s^{-1}$ (E)	Obsolete unit of flow rate employed in physical oceanography. The unit is named after H.U. Sverdup (1888–1957).	

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
ta (Annamese)	–	mass	M	1 ta (Annamese) = 60.4 kg	Obsolete Annameseian traditional unit of mass used before 1914. 1 ta (Annamese) = 16 000 dong (Annamese) (E)	Annamese
tabla (Somalian)	–	capacity, volume	L^3	1 tabla (Somalian) = 20.385×10^{-3} m^3	Obsolete Somalian traditional unit of capacity used before 1950. 1 tabla (Somalian) = 45 caba (Somalian) (E)	Somalian
tablespoon (Australian)	tbsp	capacity, volume	L^3	1 tablespoon (Australian) = 20×10^{-6} m^3 (E)	Australian unit of volume used in food recipes. 1 tablespoon (Australian) = 20 ml (E)	Australian
tablespoon (metric)	–	capacity, volume	L^3	1 tablespoon (metric) = 1.5×10^{-5} m^3	Obsolete American unit of capacity employed in pharmacy. 1 tablespoon (metric) = 15 cm^3 1 tablespoon (metric) = 3 teaspoons (metric)	U.K, US
tablespoon (US)	–	capacity, volume	L^3	1 tablespoon (US) = $1.47867647812 \times 10^{-5}$ m^3	Obsolete American unit of capacity employed in pharmacy. 1 tablespoon (US) = 1/2 fl oz (US) (E) 1 tablespoon (US) = 3 teaspoons (US) (E)	US
tael (Asian) (tahil)	–	mass	M	1 tael (Asian) = $37.7993641667 \times 10^{-3}$ kg	Obsolete Asian unit of mass used throughout Eastern Asia. During the colonial period, the tael was more or less standardized throughout the region at 4/3 ounce avoirdupois. 1 tael (Asian) = 1/16 old catty (E) 1 tael (Asian) = 1/12 pound (E)	Asian
tael (Cambodian)	–	mass	M	1 tael (Cambodian) = 37.5×10^{-3} kg	Obsolete Cambodian traditional unit of mass used before 1914. 1 tael (Cambodian) = 75/2 muoi (Cambodian) (E)	Cambodian

tael (Chinese)	–	mass	M	1 tael (Chinese) $= 37.7993641667 \times 10^{-3}$ kg	Obsolete Chinese unit of mass also called liang. 1 tael (Asian) = 1/16 old catty (E) 1 tael (Asian) = 1/12 pound (E)	Chinese
tael (Indonesian)	–	mass	M	1 tael (Indonesian) $= 38.6008140625 \times 10^{-3}$ kg	Obsolete Indonesian traditional unit of mass used before 1923. 1 tael (Indonesian) = 1/1600 picul (Indonesian) (E)	Indonesian
tael (Japanese)	–	mass	M	1 tael (Japanese) $= 37.51 \times 10^{-3}$ kg	Obsolete japanese unit of mass.	Japanese
tahil (Asian) (tael)	–	mass	M	1 tahil (Asian) $= 37.7993641667 \times 10^{-3}$ kg	Obsolete Asian unit of mass used throughout Eastern Asia. During the colonial period, the tael was more or less standardized throughout the region at 4/3 ounce avoirdupois. 1 tahil (Asian) =1/16 catty (E) 1 tahil (Asian) =1/12 pound (E)	Asian
tail (Hong Kong)	–	mass	M	1 tail (Hong Kong) $= 37.799466270 \times 10^{-3}$ kg	Obsolete unit used in the commerce of pearls.	Hong Kong
tail (Singapore)	–	mass	M	1 tail (Singapore) $= 37.79303777 \times 10^{-3}$ kg	Obsolete unit used in the commerce of pearls.	Singapore
tail (Taiwan)	–	mass	M	1 tail (Taiwan) $= 37.50093752 \times 10^{-3}$ kg	Obsolete unit used in the commerce of pearls.	Taiwan
taim (Burmese)	–	length, distance	L	1 taim (Burmese) = 0.4572 m	Obsolete Burmese traditional unit of length used before 1920. 1 taim (Burmese) = 9/11 sandong (Burmese) (E)	Burmese
takar (Indonesian)	–	capacity, volume	L^3	1 takar (Indonesian) $= 25.437865 \times 10^{-3}$ m^3	Obsolete Indonesian traditional unit of capacity used before 1923. 1 takar (Indonesian) = 323/20 kan (Indonesian) (E)	Indonesian
talaton (Greek)	–	mass	M	1 talaton (Greek) = 150 kg	Obsolete traditional Greek unit of mass used before 1922. 1 talaton (Greek) = 300 pounds (Greek) (E)	Greek

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
talbot	talbot	luminous energy	$M^{-1}L^{-2}T^{3}J$	1 talbot = 1 cd.sr.kg^{-1}m^{-2}s^{3} (E)	Obsolete MKSA unit of luminous energy. It was named after W.H. Fox Talbot (1800–1877). 1 talbot = 1 lm.W^{-1} (E)	MKSA
talent (Greek, Attic)	–	mass	M	1 talent (Greek, Attic) = 25.920 kg	Obsolete Greek unit of mass used in ancient times.	Attic
talent (Hebrew) [Talmudic system]	–	mass	M	1 talent (Hebrew) = 21.252 kg	Obsolete Hebrew unit of mass used in ancient times. Rabbinacal or Talmudic system. 1 talent of Moses = 60 mina (E)	Hebrew
talent (Persian)	–	mass	M	1 talent (Persian) = 32.6 kg	Obsolete Persian unit of mass. 1 talent (Persian) = 100 mines	Persian
talent of Moses (Hebrew) [Sacred system]	–	mass	M	1 talent of Moses = 42.5 kg	Obsolete Hebrew unit of mass used in ancient times. Sacred system. 1 talent of Moses = 50 mina (E)	Hebrew
tali (Indonesian)	–	mass	M	1 tali (Indonesian) = 2.41255087891 × 10^{-3} kg	Obsolete Indonesian traditional unit of mass used before 1923. 1 tali (Indonesian) = 1/25 600 picul (Indonesian) (E)	Indonesian
tam (Annamese)	–	length, distance	L	1 tam (Annamese) = 2.35 m	Obsolete Annameseian traditional unit of length used before 1914. 1 tam (Annamese) = 5 thuoc (Annamese) (E)	Annamese
tamlaum (Thai)	–	capacity, volume	L^{3}	1 tamlaum (Thai) = 400 ×10^{-3} m^{3}	Obsolete Thai traditional unit of capacity used before 1923. 1 tamlaum (Thai) = 400 tanan (Thai) (E)	Thai
tamlung (Thai)	–	mass	M	1 tamlung (Thai) = 60 ×10^{-3} kg	Obsolete Thai traditional unit of mass used before 1923. 1 tamlung (Thai) = 64 grani (Thai) (E)	Thai

tan (Chinese)	–	mass	M	1 tan (Chinese) = 59.6816 kg	Obsolete Chinese unit of mass used in ancient times. 1 tan (Chinese) = 100 jin (Chinese) (E)	Chinese
tan (Japanese)	–	surface, area	L^2	1 tan (Japanese) = 991.735537191 m^2	Obsolete Japanese unit of area. 1 tan (Japanese) = 300 tsubo (E)	Japanese
tanan (Thai)	–	capacity, volume	L^3	1 tanan (Thai) = 1×10^{-3} m^3	Obsolete Thai traditional unit of capacity used before 1923. 1 tanan (Thai) = 1/20 sat (Thai) (E)	Thai
tang (Thai)	–	capacity, volume	L^3	1 tang (Thai) = 40×10^{-3} m^3	Obsolete Thai traditional unit of capacity used before 1923. 1 tang (Thai) = 40 tanan (Thai) (E)	Thai
tanica (Eritrean)	–	capacity, volume	L^3	1 tanica (Eritrean) = 19.08×10^{-3} m^3	Obsolete Eritrean traditional unit of capacity used before 1927. 1 tanica (Eritrean) = 12 messe (Eritrean) (E)	Eritrean
tank (Indian)	–	mass	M	1 tank (Indian) = $12.958888889 \times 10^{-3}$ kg	Obsolete Indian traditional unit of mass used before 1920. 1 tank (Indian) = 1/72 seer (Indian) (E)	Indian
tank-sala (Indian)	–	mass	M	1 tank-sala (Indian) = 2.643750×10^{-3} kg	Obsolete Indian unit of mass used in ancient times. 1 tank-sala (Indian) = 9/160 pala (E)	Indian
tao (Cambodian)	–	capacity, volume	L^3	1 tao (Cambodian) = 15 m^3	Obsolete Cambodian traditional unit of capacity used before 1914. 1 tao (Cambodian) = 15 muoi (Cambodian) (E)	Cambodian
tarie (Algerian)	–	capacity, volume	L^3	1 tarie (Algerian) = $1.05120630749 \times 10^{-3}$ m^3	Obsolete traditional Algerian unit of capacity used before 1843. 1 tarie (Algerian) = 6/5 khoul (Algerian) (E)	Algerian
tarri (Algerian)	–	capacity, volume	L^3	1 tarri (Algerian) = $1.05120630749 \times 10^{-3}$ m^3	Obsolete traditional Algerian unit of capacity used before 1843. 1 tarri (Algerian) = 6/5 khoul (Algerian) (E)	Algerian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
tassoo (Indian, Bombay)	–	length, distance	L	1 tassoo (Indian, Bombay) $= 2.8575 \times 10^{-3}$ m	Obsolete Indian traditional unit of length used before 1920. 1 tassoo (Indian, Bombay) = 1/24 guz (Indian, Bombay) (E)	Indian
tassoo (Indian, Calcutta)	–	length, distance	L	1 tassoo (Indian, Calcutta) $= 3.8125 \times 10^{-2}$ m	Obsolete Indian traditional unit of length used before 1920. 1 tassoo (Indian, Calcutta) = 1/24 guz (Indian, Calcutta) (E)	Indian
tat (Annamese)	–	length, distance	L	1 tat (Annamese) $= 4.7 \times 10^{-2}$ m	Obsolete Annameseian traditional unit of length used before 1914. 1 tat (Annamese) = 1/10 thuoc (Annamese) (E)	Annamese
tat (Ethiopian)	–	length, distance	L	1 tat (Ethiopian) $= 2.5 \times 10^{-2}$ m	Obsolete Ethiopian traditional unit of length used before 1963. 1 tat (Ethiopian) = 5/98 kend (Ethiopian) (E)	Ethiopian
tau	τ	chemical shift	nil	$\tau = 10 - 10^6[(\nu - \nu_0)/\nu_0]$ (E)	Obsolete unit of chemical shift used in NMR spectroscopy. ν_0 is the resonance frequency of a reference molecule such as tetramethylsilane (TMS) for proton-NMR resonance spectra. This unit is no longer used. $\tau = 10 - \delta$ (E)	INT
tavola (Italian)	–	surface, area	L^2	1 tavola (Italian) = 38 m^2	Obsolete Italian unit of area. 1 tavola (Italian) = 1/100 giornata (E)	Italian
tce (tonne coal equivalent)	tce	energy, work, heat	ML^2T^{-2}	1 tce = 29.288×10^9 J (E)	Large unit of energy employed in the oil industry and economics to express energy balances. 1 tce = 7 gigacalories (therm.) (E) 1 tce = 7/10 toe (E)	INT
tchang (Thai)	–	mass	M	1 tchang (Thai) = 1.2 kg	Obsolete Thai traditional unit of mass used before 1923.	Thai

					1 tchang (Thai) = 1280 grani (Thai) (E)	
tcharka (Russian)	–	capacity, volume	L^3	1 tcharka (Russian) $= 1.229941 \times 10^{-4}$ m^3	Obsolete Russian unit of capacity for liquid substances used before 1917. 1 tcharka = 1/100 vedro (E)	Russian
tchast (Russian, dry)	–	capacity, volume	L^3	1 tchast (Russian, dry) $= 1.09328067 \times 10^{-4}$ m^3	Obsolete Russian unit of capacity for dry substances used before 1917. tchast (Russian, dry) = 1/30 garnetz (E)	Russian
tcheirek (Persian)	–	mass	M	1 tcheirek (Persian) = 0.736 kg	Obsolete Persian traditional unit of mass used before 1933. 1 tcheirek (Persian) = 80 dirhem (Persian) (E)	Persian
tcheki (Turkish)	–	mass	M	1 tcheki (Turkish) = 225.808 kg	Obsolete Turkish traditional unit of mass used before 1933. 1 tcheki (Turkish) = 176 oka (Turkish) (E)	Turkish
tchetverik (Russian, dry)	–	capacity, volume	L^3	1 tchetverik (Russian, dry) $= 26.2387360001 \times 10^{-3}$ m^3	Obsolete Russian unit of capacity for dry substances used before 1917. 1 tchetverik (Russian, dry) = 8 garnetz (E)	Russian
tchetvert (Russian, dry)	–	capacity, volume	L^3	1 tchetvert (Russian, dry) $= 209.909888001 \times 10^{-3}$ m^3	Obsolete Russian unit of capacity for dry substances used before 1917. 1 tchetvert (Russian, dry) = 64 garnetz (E)	Russian
tchevert (Russian)	–	length, distance	L	1 tchevert (Russian) = 0.1778 m	Obsolete Russian unit of length used before 1917. 1 tchevert = 7/12 foute (E)	Russian
tchi (Chinese)	–	length, distance	L	1 tchi (Chinese) = 0.32 m	Obsolete Chinese unit of length used in ancient times. Base unit of the Chinese system of length.	Chinese
tchin (Chinese)	–	mass	M	1 tchin (Chinese) = 596.816 $\times 10^{-3}$ kg	Obsolete Chinese unit of mass.	Chinese
teacupful (UK)	tcf	volume, capacity	L^3	1 teacupful (UK) $= 147.867647812 \times 10^{-6}$ m^3 (E)	Obsolete British unit of volume used in food recipes for measuring the capacity of liquids. The teacupful exhibits the same volume as an imperial gill. 1 teacupful (UK) = 5 fluid ounces (US) (E)	UK

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
teaspoon (metric)	–	capacity, volume	L^3	1 teaspoon (metric) = 5×10^{-6} m^3	Obsolete American unit of capacity employed in pharmacy. 1 teaspoon (metric) = 5 cm^3 (E) 1 teaspoon (metric) = 1/3 tablespoon (metric) (E)	US
teaspoon (US)	–	capacity, volume	L^3	1 teaspoon (US) = $4.92892159373 \times 10^{-6}$ m^3	Obsolete American unit of capacity employed in pharmacy. 1 teaspoon (US) = 1/6 fl oz (US) (E) 1 teaspoon (US) = 1/3 tablespoon (US) (E)	US
teaspoonful (UK)	tspf	volume, capacity	L^3	1 teaspoonful (UK) = $3.551634375 \times 10^{-6}$ m^3 (E)	Obsolete British unit of volume used in food recipes. 1 teaspoonful (UK) = 1/8 fluid ounce (UK) (E)	US
teaspoonful (US)	tspf	volume, capacity	L^3	1 teaspoonful (US) = $4.9289215375 \times 10^{-6}$ m^3 (E)	Obsolete American unit of volume used in food recipes. 1 teaspoonful (US) = 1/3 tablespoon (US) (E) 1 teaspoonful (US) = 1/48 cup (US)(E) 1 teaspoonful (US) = 1/6 fluid ounce (US) (E) In Britain, a teaspoonful equals 1/8 Imperial fluid ounce or approximately 3.55 millilitres. In metric kitchens, a teaspoon is exactly 5 millilitres.	US
techma (hyl, mug, metric slug, TME, par, techma)	techma	mass	M	1 techma = 9.80665 kg (E)	Obsolete technical metric unit of mass employed by mechanical engineers (base unit of the metric gravitational system). It was equal to the mass which under an acceleration of 1 $m.s^{-2}$ gives a force of 1 kgf. The name TME derived from the German acronym Technische Mass Einheit.	German

technical atmosphere	at	pressure, stress	$ML^{-1}T^{-2}$	1 at = 9.80665 × 10^4 Pa (E)	Obsolete MKpS pressure and stress derived unit. Obsolete. 1 at = 1 kgf.cm^{-2} (E) 1 atm = 1.033227453 at	MKpS
teman (Saudi Arabian)	–	capacity, volume	L^3	1 teman (Saudi Arabian) = 85 × 10^{-3} m^3	Obsolete Saudi Arabian traditional unit of capacity used for dry substances before 1962. 1 teman (Saudi Arabian) = 12/5 kella (Saudi Arabian) (E)	Saudi Arabian
temen (Libyan)	–	capacity, volume	L^3	1 temen (Libyan) = 31.848 ×10^{-3} m^3	Obsolete Libyan traditional unit of capacity used for dry substances before 1927. 1 temen (Libyan) = 4 orba (Libyan) (E)	Libyan
tempon (chronon)	–	time, period, duration	T	1 tempon = 9.39963701488 × 10^{-24} s (E)	Obsolete unit of time employed in atomic physics. It corresponds to the time needed by light to cover a distance equal to the electron radius.	
ten (Egyptian)	–	surface, area	L^2	1 ten (Egyptian) = 274.05225 m^2	Obsolete Egyptian unit of area used in ancient times. 1 ten (Egyptian) = 10 pekeis (E)	Egyptian
ten (Persian)	–	surface, area	L^2	1 ten (Persian) = 147.456 m^2	Obsolete Persian unit of area used in ancient times. 1 ten (Persian) = 10 gar (E)	Persian
ten hundred (herrings)	–	quantity of herrings	nil	1 ten hundred (herrings) = 1320 herrings (E)	Obsolete British unit used by fishermen to measure the number of herrings. 1 ten hundred (herrings) = 330 warps (E)	UK
tenab (Indian, Bombay)	–	surface area	L^2	1 tenab (Indian, Bombay) = 1175.8041 m^2	Obsolete Indian traditional unit of surface used in land measurements before 1920. 1 tenab (Indian, Bombay) = 2500 square guz (Indian, Bombay) (E)	Indian
tenab (Indian, Calcutta)	–	surface area	L^2	1 tenab (Indian, Calcutta) = 2093.0625 m^2	Obsolete Indian traditional unit of surface used in land measurements before 1920. 1 tenab (Indian, Calcutta) = 2500 square guz (Indian, Calcutta)	Indian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
tenth (US, wine)	–	capacity, volume	L^3	1 tenth (US, wine) = $378.541178400 \times 10^{-6}$ m^3 (E)	Obsolete American unit of capacity used before 1979 for measuring the capacity of spirits and alcoholic beverages, especially wine. 1 tenth (US, wine) = 1/10 gallon (US, liq.) (E) 1 tenth (US, wine) = 12.8 fluid ounces (US) (E)	US
tenthmetre	Å	length, distance	L	1 tenthmetre = 10^{-10} m (E)	Old unit of length used in atomic spectroscopy and exactly equal to the angström. 1 tenthmetre = 1 Å (E)	UK, US
TEQ (International toxic equivalent quantity)	TEQ, I-TEQ	dimensionless quantity to measure the toxicological effect of dioxins	nil	I-TEQ = $\sum_i TEF_i \times C_i$ with i = PCDD or PCDF substance (see note)	The international toxic equivalent quantity (denoted I-TEQ or TEQ) is a dimensionless unit used to measure the toxicological effect of dioxins. Dioxins denote a group of chemical substances that are ubiquitously present environmental contaminants and comprise two main categories: (i) the polychlorodibenzo-para-dioxins (PCDDs), and (ii) the polychlorodibenzofurans (PCDFs), which, like the polychlorinated biphenyls (PCBs) and polybrominated biphenyls (PBBs) are members of the large class of halogenated polycyclic aromatic hydrocarbons. The concentration of each PCDD and PCDF substance in a mixture can be converted into an international toxic equivalent quantity (I- TEQ), by multiplying the concentration of the PCDD or PCDF by its TEF. Accordingly, the TEF is defined as the ratio of the toxic potential of and individual compound over the toxic potential of the reference compound	INT

TEQ (International toxic equivalent quantity) *(continued)*					2,3,7,8- TCDD. Thus, the TEQ indicates the quantity of 2,3,7,8- TCDD necessary to produce the same toxic effect as that likely to be induced by the congener studied at the dose measured. For instance, 30 ng of a congener with a TEF of 0.1 has the same effect as 3 ng of 2,3,7,8-TCDD. The TEF concept is based on the hypothesis that the doses and effects, both acute and chronic, are additive. It is therefore possible to compute the sum of the TEQ of each component of a mixture to estimate the overall toxicity.	
teragram	Tg	mass	M	1 Tg = 10^9 kg (E)	Multiple of the SI base unit. 1 Tg = 10^{12} g (E)	SI
terametre	Tm	length, distance	L	1 Tm = 10^{12} m (E)	Multiple of the SI base unit.	SI
tercia (Costa-Rican)	–	length, distance	L	1 tercia (Costa-Rican) = 0.27976666667 m	Obsolete Costa-Rican traditional unit of length used before 1912. 1 tercia (Costa-Rican) = 1/3 vara (Costa-Rican) (E)	Costa-Rican
tercia (Costa-Rican)	–	length, distance	L	1 tercia (Guatemalan) = 0.278633333 m	Obsolete Guatemalan traditional unit of length used before 1912. 1 tercia (Guatemalan) = 1/3 vara (Guatemalan) (E)	Guatemalan
tercia (Honduran)	–	length, distance	L	1 tercia (Honduran) = 0.27093333333 m	Obsolete Honduran traditional unit of length used before 1912. 1 tercia (Honduran) = 1/3 vara (Honduran) (E)	Honduran
tercio (Mexican)	–	mass	M	1 tercio (Mexican) = 73.63941440 kg	Obsolete Mexican traditional unit of mass used before 1896. 1 tercio (Mexican) = 160 libbra (Mexican) (E)	Mexican

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
termin (Algerian)	–	length, distance	L	1 termin (Algerian) = 5.8375×10^{-2} m to 7.7875×10^{-2} m	Obsolete traditional Algerian unit of length used before 1843. 1 termin (Algerian) = 1/8 pic (Algerian) (E)	Algerian
termino (Libyan)	–	mass	M	1 termino (Libyan) = 4.00625×10^{-3} kg	Obsolete Libyan traditional unit of mass used before 1927. 1 termino (Libyan) = 1/128 rottolo (Libyan) (E)	Libyan
tertian (US, liq.)		volume, capacity	L^3	1 tertian (US, liq.) = $317.97458956 \times 10^{-3}$ m^3 (E)	Obsolete American unit of volume for measuring the capacity of liquids. The tertian, like the tierce, was named after the Latin for 1/3. 1 tertian (US, liq.) = 1/3 tun (E) 1 tertian (US, liq.) = 2 tierces (E) 1 tertian (US, liq.) = 84 gal (US, liq.) (E)	US
tesla	T	magnetic induction field, magnetic flux density	$MI^{-1}T^{-2}$	**SI derived unit** 1 T = 1 $Wb.m^{-2}$ = 1 $kg.A^{-1}.s^{-2}$ (E)	The tesla is the magnetic flux density of a magnetic flux of one weber per square metre. The unit is named after the Yugoslav scientist N. Tesla (1857–1943).	SI
tex	tex	linear mass density	ML^{-1}	1 tex = 10^{-6} $kg.m^{-1}$ (E)	Unit of linear mass density employed in the textile industry. It is temporarily maintained with the SI. 1 tex = 1 $g.(1000\ m)^{-1}$ (E)	SI
thaan (Chinese)	–	length, distance	L	1 thaan (Chinese) = 46 080 m	Obsolete Chinese unit of length used in ancient times. 1 thaan = 144 000 tchi (E)	Chinese
thang (Cambodian)	–	capacity, volume	L^3	1 thang (Cambodian) = 30 m^3	Obsolete Cambodian traditional unit of capacity used before 1914. 1 thang (Cambodian) = 30 muoi (Cambodian) (E)	Cambodian

that (Annamese)	–	length, distance	L	1 that (Annamese) = 14.1 m	Obsolete Annameseian traditional unit of length used before 1914. 1 that (Annamese) = 30 thuoc (Annamese) (E)	Annamese
thebs (Egyptian) [Egyptian finger]	–	length, distance	L	1 thebs (Egyptian) $= 2.61750 \times 10^{-2}$ m	Obsolete Egyptian unit of length used in ancient times. 1 finger = 1/20 Royal cubit (E)	Egyptian
therm (EEG)	–	energy, work, heat	ML^2T^{-2}	1 therm (EEG) $= 1.05505585262 \times 10^8$ J	Obsolete British and American unit of heat and energy employed in energy resource and reserve assessment. 1 therm = 10^5 Btu (IT) (E)	UK, US
therm (US)	–	energy, work, heat	ML^2T^{-2}	1 therm (US) = 1.054804×10^8 J	Obsolete American unit of heat and energy employed in energy resource and reserve assessment. 1 therm = 10^5 Btu (E)	US
thermie (15°C)	$th_{15°C}$	energy, work, heat	ML^2T^{-2}	1 $thermie_{15°C} = 4.1855 \times 10^6$ J	Obsolete French unit of heat. 1 thermie = 10^6 cal (15°C)	French
third	–	Frequency ratio of two notes	nil	(see note)	Dimensionless unit used in music to describe the frequency ratio between two notes. Two notes differ by one minor third if the higher note has frequency exactly 6/5 times the frequency of the lower one, or by a major third if the higher note has frequency exactly 5/4 times the frequency of the lower one.	Music
thou (mil)	thou, mil	length, distance	L	1 thou = 2.54×10^{-5} m (E)	Obsolete British and American submultiple of the inch. 1 thou = 10^{-3} inch (E) 1 thou = 10^{-2} calibre (E) 1 thou = 1 mil (E)	UK, US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
thousand (French)	‰ (FRA)	plane angle	α	1 thousand (FRA) = $9.999996667 \times 10^{-4}$ rad	Unit of plane angle employed in the French artillery. One millième is equal to a plane angle under which it is possible to observe a difference of height of 1 m at 1000 m. 1 (FRA) = $5.72957604145 \times 10^{-2}$ ° 1 (FRA) = $6.36619560160 \times 10^{-2}$ grade	French
thousand (NATO)	‰ (NATO), milangle	plane angle	α	1 thousand (NATO) = $9.81747704247 \times 10^{-4}$ rad	Unit of plane angle employed in the artillery. It is equal to the 6400th part of the circle. 1 (NATO) = 0.05625 ° (E) 1 (NATO) = 0.0625 grade (E)	INT
thousand (US before 1945)	‰ (US), milangle	plane angle	α	1 thousand (US) = $1.57079632680 \times 10^{-3}$ rad	Obsolete unit of plane angle employed in the American artillery before World War II. It is equal to the 4000th part of the circle. 1 (US) = 0. 090 ° (E) 1 (US) = 0. 10 grade (E)	US
thousand (USSR)	‰ (URSS)	plane angle	α	1 thousand (USSR) = $9.97331001140 \times 10^{-4}$ rad	Obsolete unit of plane angle employed in the Soviet artillery. It is equal to the 6300th part of the circle. 1‰ (USSR) = 0.0571428571429° 1‰ (USSR) = 0.0634920634921 grade	Russian
thousand mass unit (^{12}C)	TMU (^{12}C)	mass	M	1 TMU(^{12}C) = $1.492419113 \times 10^{-10}$ J.c^{-2}	Unit of mass employed in nuclear physics. It is defined by the Einstein equation $E = mc^2$, where m is expressed in atomic units of mass u(^{12}C). 1 TMU(^{12}C) = 931.4943367 MeV.c^{-2}	
thousand mass unit (^{16}O)	TMU (^{16}O)	mass	M	1 TMU(^{16}O) = $1.49194477 \times 10^{-10}$ J.c^{-2}	Unit of mass employed in nuclear physics. It is defined by the Einstein equation $E = mc^2$, where m is expressed in atomic mass units u(^{16}O). 1 TMU(^{16}O) = 931.1982752 MeV.c^{-2}	

thousand mass unit (^{1}H)	TMU (^{1}H)	mass	M	1 TMU(^{1}H) = $1.504097345 \times 10^{-10}$ J.c^{-2}	Unit of mass employed in nuclear physics. It is defined by the Einstein equation $E = mc^2$, where m is expressed in atomic mass units u(^{1}H). 1 TMU(^{1}H) = 938.783 312 6 MeV.c^{-2}	
thsan (Chinese)	–	length, distance	L	1 thsan (Chinese) = 46 080 m	Obsolete Chinese unit of length used in ancient times. 1 thsan = 144 000 tchi (E)	Chinese
thuoc (Annamese)	–	surface area	L^2	1 thuoc (Annamese) = 33.135 m^2	Obsolete Annameseian traditional unit of surface area used in land measurements before 1914. 1 thuoc (Annamese) = 6 square ngu (Annamese) (E)	Annamese
thuoc deruong (Annamese)	–	length, distance	L	1 thuoc deruong (Annamese) = 0.470 m	Obsolete Annameseian traditional unit of length used before 1914.	Annamese
thuoc moc (Annamese)	–	length, distance	L	1 thuoc moc (Annamese) = 0.425 m	Obsolete Annameseian traditional unit of length used before 1914.	Annamese
thuoc vai (Annamese)	–	length, distance	L	1 thuoc vai (Annamese) = 0.644 m	Obsolete Annameseian traditional unit of length used before 1914.	Annamese
tical (Burmese)	–	mass	M	1 tical (Burmese) = 16.32×10^{-3} kg	Obsolete Burmese traditional unit of mass used before 1920. 1 tical (Burmese) = 64 ruay (Burmese) (E)	Burmese
tierce (Irish)	–	capacity, volume	L^3	1 tierce (Irish) = $149.764655309 \times 10^{-3}$ m^3	Obsolete traditional Irish unit of capacity for liquids used before the adoption of the Weights and Measures Act of 1824. 1 tierce (Irish) = 42 gallons (Irish) (E)	Irish
tierce (US, liq.)	–	volume, capacity	L^3	1 tierce (US, liq.) = $158.987294928 \times 10^{-3}$ m^3 (E)	Obsolete American unit of volume. The unit is named after the French, itself derived from the Latin *tertius* meaning 1/3. 1 tierce (US, liq.) = 1/3 butt (E) 1 tierce (US, liq.) = 42 gal (US, liq.) (E)	US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
timbang (Indonesian)	–	mass	M	1 timbang (Indonesian) = 308.8065125 kg	Obsolete Indonesian traditional unit of mass used before 1923. 1 timbang (Indonesian) = 5 picul (Indonesian) (E)	Indonesian
timber	–	Dimensionless unit of quantity	nil	1 timber = 40 entities (E)	Dimensionless British and American unit of quantity for furs equal to 2 score or 40. This unit, which persisted at least into the nineteenth century, originated because furs were shipped in bundles of 40 pressed between two boards or timbers.	UK, US
timber (UK)	–	capacity, volume	L^3	1 timber (UK) = 4.672279688 m^3	Old British and American unit of capacity used by carpenters. 1 timber (UK) = 13.75 bfm (E) 1 timber (UK) = 165 ft^3 (E) 1 timber (UK) = 285 120 in^3 (E)	UK, US
time zone	TZ	length, distance	L	(see note)	Obsolete British and American unit of length used to express the distance at a given latitude between two locations on the Earth using their differences in longitude. On the average, a time zone spans 15° longitude, despite the fact that actual time zones have irregular boundaries, so this is only an approximate unit of length.	UK, US
timer (UK)	–	dimensionless unit of quantity	nil	1 timer (UK) = 40 entities (E)	Obsolete British unit of quantity. 1 timer (UK) = 2 scores (UK) (E) 1 timer (UK) = 1 flock (UK) (E)	UK
tipree (Indian)	–	capacity, volume	L^3	1 tipree (Indian) = $860.156250 \times 10^{-6}$ m^3	Obsolete Indian traditional unit of capacity used before 1920. 1 tipree (Indian) = 5/8 raik (Indian) (E)	Indian

tithe (UK)	–	Dimensionless unit of quantity	nil	1 tithe (UK) = 1/10 (E)	Dimensionless British unit of proportion equal to 1/10. The word 'tithe' is named after the Anglo-Saxon word for a tenth.	UK
TME (hyl, mug, par, metric slug)	–	mass	M	1 TME = 9.80665 kg (E)	Obsolete technical metric unit of mass employed by mechanical engineers (base unit of the metric gravitational system). It was equal to the mass which under an acceleration of 1 $m.s^{-2}$ gives a force of 1 kgf. The name TME derived from the German acronym Technische Mass Einheit.	German
to (Japanese)	–	capacity, volume	L^3	1 to (Japanese) = $18.0390683696 \times 10^{-3}$ m^3	Obsolete Japanese unit of capacity. 1 to (Japanese) = 10 shô (E)	Japanese
to (Chinese)	–	capacity, volume	L^3	1 to (Chinese) = 10.3544×10^{-3} m^3	Obsolete Chinese unit of capacity used in ancient times. 1 to (Chinese) = 10 tcheng (E)	Chinese
toa (Annamese)	–	capacity, volume	L^3	1 toa (Annamese) = 56.52×10^{-3} m^3	Obsolete Annameseian traditional unit of capacity used before 1914. 1 toa (Annamese) = 2 hao (Annamese) (E)	Annamese
tod (UK, wool)	–	mass	M	1 tod (UK, wool) = 12.70058636 kg (E)	Obsolete British unit of mass used for weighing wool. The unit is named after the old German word, *tod*, meaning a load. 1 tod (UK, wool) = 28 pounds avdp. (E) 1 tod (UK, wool) = 2 stones (UK) 1 tod (UK, wool) = 1 quarter (UK) (E)	UK
toe (tonne oil equivalent)	toe	energy, work, heat	ML^2T^{-2}	1 toe = 4.184×10^{10} J (E)	Large unit of energy employed in the oil industry and economics to express energy balances. 1 toe = 10 gigacalories (therm.) (E) 1 toe = 10/7 tce (E)	INT

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
tog	tog	heat insulation coefficient (thermal resistance multiplied by area)	$M^{-1}T^{3}\Theta$	1 tog = 0.1 $W^{-1}.m^{2}.K$ (E)	Obsolete unit of heat insulation coefficient employed in the British textile industry. One tog corresponds to the heat-insulation coefficient of clothing which conserves a temperature difference of 0.1 °C between its surfaces when the heat flux is equal to 1 $W\,m^{-2}.s^{-1}$. 1 tog = 0.1 RSI (E) 1 tog = 0.116263888 $(kcal_{15}/h)^{-1}.m^{2}.°C$ 1 tog = 0.645910493827 clo	UK
toise (d'ordonance)	–	length, distance	L	1 toise (d'ordonance) = 1.94904 m	Obsolete French unit of length used before the revolution in 1789. 1 toise (d'ordonance) = 6 pieds (E)	French
toise (de Pérou)	T	length, distance	L	1 toise (de Pérou) = 1.9490365 m	Obsolete French unit of length employed in France during the Ancien Régime before the French Revolution (1789). It was used in geodetic measurements. The name is derived from the latin *ex tensa* meaning distance. 1 toise (de Pérou) = 6 pieds (Paris)	French
toise (du Châtelet)	T	length, distance	L	1 toise (du Châtelet) = 1.949090 m	Old French unit of length used before the French Revolution (1789)	French
toise (Haitian)	–	length, distance	L	1 toise (Haitian) = 1.9488 m	Obsolete Haitian traditional unit of length used before 1920. 1 toise (Haitian) = 1624/99 aunes (Haitian) (E)	Haitian
toise (metric)	T	length, distance	L	1 toise (metric) = 2 m (E)	Obsolete unit of length employed in France from 1812 to 1840. 1 toise (metric) = 6 pieds (metric) (E)	French
toise (Swiss)	–	length, distance	L	1 toise (Swiss) = 1.80 m (E)	Obsolete traditional Swiss unit of length used before 1877. 1 toise (Swiss) = 6 pieds (Swiss) (E)	Swiss

toise cube (Haitian)	–	capacity, volume	L^3	1 toise cube (Haitian) = 7.40119442227 m^3	Obsolete Haitian traditional unit of capacity used before 1920. 1 toise cube (Haitian) = 80 barils (Haitian) (E)	Haitian
tola (Indian)	–	mass	M	1 tola (Indian) = 11.750×10^{-3} kg	Obsolete Indian unit of mass used in ancient times. 1 tola (Indian) = 1/4 pala (E)	Indian
tolah (Indian)	–	mass	M	1 tolah (Indian) = 11.663×10^{-3} kg	Obsolete Indian traditional unit of mass used before 1920. 1 tolah (Indian) = 1/80 seer (Indian) (E)	Indian
tomin (Mexican)	–	mass	M	1 tomin (Mexican) = $599.279088542 \times 10^{-6}$ kg	Obsolete Mexican traditional unit of mass used before 1896. 1 tomin (Mexican) = 1/768 libbra (Mexican) (E)	Mexican
tomin (Spanish)	–	mass	M	1 tomin (Spanish) = $5.99079427083 \times 10^{-4}$ kg	Obsolete Spanish unit of mass. 1 tomin (Spanish) = 1/768 libra (E)	Spanish
tomme (Danish)	–	length, distance	L	1 tomme (Danish) = 2.6154750×10^{-2} m	Obsolete Danish traditional unit of length used before 1912. 1 tomme (Danish) = 1/12 fod (Danish) (E)	Danish
ton (Latvian)	–	mass	M	1 ton (Latvian) = 100.56 kg	Obsolete Latvian traditional unit of mass. 1 ton (Latvian) = 240 pfund (Latvian) (E)	Latvian
ton (American commercial unit of refrigeration)	CTR (US)	power	ML^2T^{-3}	1 CTR (US) = 3 516.85284206 W	Obsolete American unit of power employed in refrigeration and cryogenics. It was equal to the heat absorbed by the melting of one short ton (2000 lb) of ice at 0°C (32°F) in 24 hours. 1 CTR (US) = 12 000 Btu (IT).h^{-1} (E) 1 CTR (US) = 12 660.670236 kJ.h^{-1}	US
ton (assay UK)	(UK) AT	mass fraction	nil	1 ton (assay UK) = $30.6122448980 \times 10^{-6}$	Obsolete British unit of mass fraction used by assayers and jewellers in the assaying of gold and silver. It was equal to the mass *(continued overleaf)*	UK

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
ton (assay UK) *(continued)*					expressed in UK long tons [2240 lb (av.)] of the ore of a precious metal needed to give one troy ounce of pure precious metal. In other words, it was the mass of an ore which gives 30.612 mg of precious metal (gold or silver) by kilogram. 1 ton (assay UK) = (3000/98) ppm wt (E)	
ton (assay US)	(US) AT	mass fraction	nil	1 ton (assay US) $= 34.2857142857 \times 10^{-6}$	Obsolete American unit of mass used by assayers and jewellers in the assaying of gold and silver. It was equal to the mass expressed in US short tons [2000 lb (av.)] of the ore of a precious metal needed to give one troy ounce of pure precious metal. In other words, it was the mass of an ore which gives 34.28 mg of precious metal (gold or silver) by kilogram. 1 ton (assay US) = (3000/87.5) ppm wt (E)	US
ton (British commercial unit of refrigeration)	CTR (UK)	power	ML^2T^{-3}	1 CTR (UK) = W	Obsolete British unit of power employed in cryogenics. It was equal to the heat absorbed by the melting of one long ton (2240 lb) of ice at 0°C (32°F) in 24 hours. 1 CTR (UK) = 13 440 Btu (IT).h^{-1} (E) 1 CTR (UK) = 1.12 = 2240/2000 CTR (US) (E)	UK
ton (Cypriot)	–	mass	M	1 ton (Cypriot) = 1016.04690880 kg	Obsolete Cypriot traditional unit of mass used before 1972. 1 ton (Cypriot) = 800 oke (Cypriot) (E)	Cypriot
ton (Estonian)	–	mass	M	1 ton (Estonian) = 110.40 kg	Obsolete traditional Estonian unit of mass used before 1900. 1 ton (Estonian) = 240 pfund (Estonian) (E)	Estonian

ton (register)	–	capacity, volume	L^3	1 register ton = 2.831684659 m^3	Obsolete British unit of capacity. 1 register ton = 100 ft^3 (E) 1 register ton = 1/10 rods (UK)	UK
ton (UK, freight)	–	volume, capacity	L^3	1 ton (UK, freight) = 1.13267386368 m^3	Obsolete British unit of capacity used in the Navy. 1 ton (UK, freight) = 40 cubic feet (E) 1 ton (UK, freight) = 1 ton (UK, measurement) (E)	UK
ton (UK, long, 2240 lb)	UK ton, lg ton	mass	M	1 long ton (UK) = 1016.04690880 kg (E)	British unit of mass in the avoirdupois system. The name derives from tun, denoting a large barrel used in the wine trade and named from the French *tonnerre* meaning thunder in turn named after the rumbling it produced when rolled. 1 long ton (UK) = 2240 lb (av.) (E) 1 long ton (UK) = 20 cwt (E) 1 long ton (UK) = 80 quarters (UK, av.) (E) 1 long ton (UK) = 160 stone (UK, av.) (E)	UK
ton (UK, measurement)	–	volume, capacity	L^3	1 ton (UK, measurement) = 1.13267386368 m^3	Obsolete British unit of capacity used in the Navy. 1 ton (UK, measurement) = 40 cubic feet (E) 1 ton (UK, freight) = 1 ton (UK, measurement) (E)	UK
ton (UK, shipping)	–	mass	M	1 ton (UK, shipping) = 1169.698141 kg	Obsolete British unit of mass employed in navigation (mercantile marine) and which corresponds to the mass of 40.3 ft^3 of sea water. (with a mean density of 1025 $kg.m^{-3}$)	UK
ton (US, shipping)	–	mass	M	1 ton (US, shipping) = 1219.040246 kg	Obsolete American unit of mass employed in navigation to describe the size of the vessels. It is equal to the mass which occupies 42 ft^3 of sea water. (with a mean density of 1025 $kg.m^{-3}$)	US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
ton (UK, timber)	–	volume, capacity	L^3	1 ton (UK, timber) = 1.13267386368 m^3	Obsolete British unit of capacity used to measure petroleum products. 1 ton (UK, timber) = 40 cubic feet (E)	UK
ton (UK, water)	–	volume, capacity	L^3	1 ton (UK, water) = 1.01832460800 m^3	Obsolete British unit of capacity used in the Navy. 1 ton (UK, water) = 224 gallons (UK) (E)	UK
ton (US, displacement)	–	volume, capacity	L^3	1 ton (US, displacement) = 991.0896310720 m^3	Obsolete American unit of capacity used in the Navy. 1 ton (US, displacement) = 35 cubic feet (E)	US
ton (US, seawater)	–	volume, capacity	L^3	1 ton (US, seawater) = 991.0896310720 m^3	Obsolete American unit of capacity used in the Navy. 1 ton (US, seawater) = 35 cubic feet (E)	US
ton (US, short, 2000 lb)	–	mass	M	1 short ton (US) = 907.184740 kg (E)	American unit of mass in the avoirdupois system. 1 short ton (US) = 2000 lb (US) (E) 1 short ton (US) = 20 short cwt (US) (E)	US
ton-force (metric)	–	force, weight	MLT^{-2}	1 ton-force (metric) = 9806.65 N (E)	Obsolete metric unit of force. 1 ton-force (metric)= 1000 kgf (E)	MTS
ton-force (short)	–	force, weight	MLT^{-2}	1 ton-force (short) = 8896.44323052 N	American unit of force. 1 ton-force (short) = 2000 lbf (E)	US
ton-force (long)	–	force, weight	MLT^{-2}	1 ton-force (long) = 9964.01641818 N	British unit of force. 1 ton-force (long) = 2240 lbf (E)	UK
ton force per square inch	tsi, TSI, tonf. in^{-2}	pressure, stress	MLT^{-2}	1 tonf.in^{-2} = 1.37895145863 $\times 10^7$ Pa	American unit of stress used in mechanical engineering. 1 lbf.in^{-2} = 2000 lbf.in^{-2} (E) 1 tonf.in^{-2} = 2 ksi (E) 1 tonf.in^{-2} = 13.7895145863 MPa	US

tondal	tdl	force, weight	MLT^{-2}	1 tondal = 309.691097802 N	Obsolete British submultiple unit of force in the FPS sys tems. It corresponds to the force which accelerates a long ton at 1 $ft.s^{-2}$. 1 tondal = 1 $ton.ft.s^{-2}$ (E) 1 tondal = 2240 $lbft.s^{-2}$ (E)	UK, US
tonde (Danish)	–	surface area	L^2	1 tonde (Danish) = 28369.7903370 m^2	Obsolete Danish traditional unit of surface area used in land measurements before 1912. 1 tonde (Danish) = 2000 square ruthe (Danish) (E)	Danish
tønde (Danish)	–	volume, capacity	L^3	1 tønde (Danish) = 138.960 $\times 10^{-3}$ m^3 (E)	Obsolete Danish unit of volume used to measure the capacity of liquids. The unit was named after the German word *tonne* meaning barrel. 1 tønde (Danish) = 144 pots (Danish) (E) 1 tønde (Danish) = 8 skaeppes (Danish) (E)	Danish
tondeland (Danish)	–	surface area	L^2	1 tondeland (Danish) = 5516.23 m^2	Obsolete Danish traditional unit of surface area used in land measurements before 1912. It was defined as the amount of land that can be sown with one barrel of seed by one man in one day.	Danish
tone (or step)	–	frequency ratio of two notes	nil	(see note)	Dimensionless unit used in music to describe the frequency ratio between two notes, also named step. Two notes differ by a step if the higher note has frequency exactly 21/6 = 1.12246 times the frequency of the lower one.	Music
tonel (Brazilian)	–	capacity, volume	L^3	1 tonel (Brazilian) = 958.32 $\times 10^{-3}$ m^3	Obsolete Brazilian traditional unit of capacity used before 1874. 1 tonel (Brazilian) = 180 alquiera (Brazilian) (E)	Brazilian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
tonel (Brazilian, Bahia)	–	capacity, volume	L^3	1 tonel (Brazilian, Bahia) $= 634.32 \times 10^{-3}$ m^3	Obsolete Brazilian traditional unit of capacity used before 1874. 1 tonel (Brazilian, Bahia) = 180 alquiera (Brazilian, Bahia) (E)	Brazilian
tonel (Brazilian, common)	–	capacity, volume	L^3	1 tonel (Brazilian, common) $= 652.680 \times 10^{-3}$ m^3	Obsolete Brazilian traditional unit of capacity used before 1874. 1 tonel (Brazilian, common) = 180 alquiera (Brazilian, common) (E)	Brazilian
tonel (Brazilian, salt)	–	capacity, volume	L^3	1 tonel (Brazilian, salt) $= 733.68 \times 10^{-3}$ m^3	Obsolete Brazilian traditional unit of capacity used before 1874. 1 tonel (Brazilian, salt) = 180 alquiera (Brazilian, salt) (E)	Brazilian
tonelada (Argentinian)	–	mass	M	1 tonelada (Argentinian) = 918.80 kg	Obsolete Argentinian traditional unit of mass used before 1887. 1 tonelada (Argentinian) = 2000 libra (Argentinian) (E)	Argentinian
tonelada (Argentinian)	–	capacity, volume	L^3	1 tonelada (Argentinian) $= 60.3839 \times 10^{-3}$ m^3	Obsolete Argentinian traditional unit of capacity used for dry substances before 1887. 1 tonelada (Argentinian) = 7 fanega (Argentinian) (E)	Argentinian
tonelada (Brazilian)	–	mass	M	1 tonelada (Brazilian) = 793.2384 kg	Obsolete Brazilian traditional unit of mass used before 1874. 1 tonelada (Brazilian) = 1728 libra (Brazilian) (E)	Brazilian
tonelada (Colombian)	–	mass	M	1 tonelada (Colombian) = 1000 kg	Obsolete Colombian traditional unit of mass used before 1854. 1 tonelada (Venezuelan) = 2000 libbra (Venezuelan) (E)	Colombian
tonelada (Spanish)	–	mass	M	1 tonelada (Spanish) = 920.186 kg	Obsolete Spanish unit of mass. 1 tonelada (Spanish) = 2000 libra (E)	Spanish

tonelada (Venezuelan)	–	mass	M	1 tonelada (Venezuelan) = 1000 kg	Obsolete Venezuelan traditional unit of mass used before 1914. 1 tonelada (Venezuelan) = 2000 libbra (Venezuelan) (E)	Venezuelan
tonne (metric)	t	mass	M	1 t = 10^3 kg (E)	Obsolete MTS base unit of mass.	MTS
tonne (Estonian)	–	capacity, volume	L^3	1 tonne (Estonian) = 137.760 × 10^{-3} m^3	Obsolete traditional Estonian unit of capacity used before 1900. 1 tonne (Estonian) = 12 hulmit (Estonian) (E)	Estonian
tonne (Latvian)	–	capacity, volume	L^3	1 tonne (Latvian) = 137.7216 × 10^{-3} m^3	Obsolete Latvian traditional unit of capacity. 1 tonne (Latvian) = 108 stoof (Latvian) (E)	Latvian
tonne coal equivalent	tce	energy, work, heat	ML^2T^{-2}	1 tce = 2.9288 × 10^{10} J (E)	Large unit of energy employed in the oil industry and economics to express energy balances. 1 tce = 7/10 toe (E) 1 tce = 7 gigacalories (therm.) (E)	INT
tonne oil equivalent	toe	energy, work, heat	ML^2T^{-2}	1 toe = 4.184 × 10^{10} J (E)	Large unit of energy employed in oil industry and economics to express energy balances. 1 toe = 10/7 tce (E) 1 toe = 10 gigacalories (therm.) (E)	INT
tonneau de jauge	–	capacity, volume	L^3	1 tonneau de jauge = 2.8316846592 m^3	Obsolete French unit of volume employed before the French Revolution in navigation. 1 tonneau de jauge = 100 ft^3 (E)	French
tonneau de mer	–	capacity, volume	L^3	1 tonneau de mer = 1.41584232660 m^3 (E)	Obsolete French unit of capacity used in mercantile shipping. 1 tonneau de mer = 1/2 tonneau de jauge (E)	French
tonnelada (Paraguayan)	–	mass	M	1 tonnelada (Paraguayan) = 918 kg	Obsolete Paraguayan traditional unit of mass used before 1899. 1 tonnelada (Paraguayan) = 2000 libbra (Paraguayan) (E)	Paraguayan

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
tonnelada (Portuguese)	–	capacity, volume	L^3	1 tonnelada (Portuguese) $= 858 \times 10^{-3}$ m^3	Obsolete Portuguese unit of capacity used for liquid substances. 1 tonnelada (Portuguese) = 52 almude (E)	Portuguese
tonni (Moroccan)	–	length, distance	L	1 tonni (Morocan) = 0.07625 m	Obsolete traditional Moroccan unit of length used before 1923. 1 tonni (Morocan) = 1/8 pic (Moroccan) (E)	Moroccan
tonnland (Estonian, Livonian)	–	surface area	L^2	1 tonnland (Estonian, Livonian) = 5194 m^2	Obsolete traditional Estonian unit of surface area used before 1900 in land measurements. 1 tonnland (Estonian, Livonian) = 7/5 lofstelle (Estonian, Livonian) (E)	Estonian
tonnland (Estonian, Reval)	–	surface area	L^2	1 tonnland (Estonian, Reval) = 5462.7 m^2	Obsolete traditional Estonian unit of surface area used before 1900 in land measurements.	Estonian
tonnstelle (Latvian)	–	surface area	L^2	1 tonnstelle (Latvian) = 5202.4 m^2	Obsolete Latvian traditional unit of surface area used in land measurements. 1 tonnstelle (Latvian) = 35 kapp (Latvian) (E)	Latvian
top (Somalian)	–	length, distance	L	1 top (Somalian) = 3.92 m	Obsolete Somalian traditional unit of length used before 1950. 1 top (Somalian) = 7 cubito (Somalian) (E)	Somalian
topo (Peruvian)	–	surface area	L^2	1 topo (Peruvian) = 2705.99583387 m^2	Obsolete Peruvian traditional unit of surface area used in land measurements before 1869. 1 topo (Peruvian) = 3872 square vara (Peruvian) (E)	Peruvian
torr (mmHg at 0°C)	Torr, torr	pressure, stress	$ML^{-1}T^{-2}$	1 torr = 133.3223684 Pa	Obsolete unit of pressure employed in physics to measure small pressures. It is equal to the pressure exerted by a column of mercury one millimetre high, measured	INT

					at 0°C (32°F). The unit is named after the Italian scientist E. Torricelli (1608–1647). 1 torr = 1 mmHg (0°C) 760 torr = 1 atm (E) 1 torr = (101325/760) Pa (E)	
totchka (Russian calibre)	–	length, distance	L	1 totchka (Russian) = 2.54×10^{-4} m	Obsolete Russian unit of length used before 1917. 1 totchka (Russian) = 1/1200 foute (E)	Russian
tou (Chinese)	–	length, distance	L	1 tou (Chinese) = 1.44×10^{5} m	Obsolete Chinese unit of length used in ancient times. 1 tou = 450 000 tchi (E)	Chinese
toumnah (Egyptian)	–	capacity, volume	L^3	1 toumnah (Egyptian) = 257.81250×10^{-6} m^3	Obsolete Egyptian traditional unit of capacity used before 1891. 1 toumnah (Egyptian) = 1/8 keddah (Egyptian) (E)	Egyptian
tovar (Bulgarian)	–	mass	M	1 tovar (Bulgarian) = 127.0058636 kg	Obsolete Bulgarian unit of mass. 1 tovar (Bulgarian) = 100 okas (Bulgarian) (E)	Bulgarian
tovar (Yugoslavian)	–	mass	M	1 tovar (Yugoslavian) = 128.00 kg	Obsolete traditional Yugoslavian unit of mass used before 1883. 1 tovar (Yugoslavian) = 100 oka (Yugoslavian) (E)	Yugoslavian
townsend	Td	gradient of electric field strength	$MT^{-3}I^{-1}$	1 townsend = 10^{21} $V.m^{-2}$ (E)	Obsolete cgs unit. The unit is named after J. Townsend (1868-1957). 1 townsend = 10^{17} $V.cm^{-2}$ (E)	cgs
township (US)	–	surface, area	L^2	1 township (US) = 93 239 571.9722 m^2	Obsolete American unit of area 1 township (US) = 36 square miles (US, statute) (E)	US
trabucco (Italian)	–	length, distance	L	1 trabucco (Italian) = 3.082620 m	Obsolete Italian unit of length. 1 trabucco (Italian) = 6 piedi liprando (E)	Italian
tracks per inch	TPI	reciprocal length	L^{-1}	1 TPI = 39.3700787402 m^{-1}	Unit used in computer science for measuring the data storage of floppy disks.	INT

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
Tralles degree	°Tr	specific gravity of liquids, hydrometre index, hydrometre degree	nil	1 °Tr = 0.01 ethanol (E)	Obsolete British and American dimensionless unit used in determining the densities of aqueous ethanol solutions. It corresponds to the percentage per volume of ethanol in the solution. 1 °Tr = 1%vol ethanol (E)	UK, US
travel-hour (boat)	–	length, distance	L	1 travel-hour (boat) = 6500 m	Obsolete British unit of length commonly used in fluvial navigation by explorers.	UK
travel-hour (camel)	–	length, distance	L	1 travel-hour (camel) = 3700 m to 4415 m	Obsolete unit of length commonly used in desert regions such as North Africa and Middle-East by explorers assuming an average velocity of 63–75 camel paces per minute with one camel pace equal circa 0.978 metres.	North Africa, Middle East
travel-hour (horse)	–	length, distance	L	1 travel-hour (horse) = 5000 m	Obsolete British unit of length commonly used in flat regions by explorers.	UK
travel-hour (man)	–	length, distance	L	1 travel-hour (man) = 4828 m (E)	Obsolete British unit of length commonly used in flat regions by explorers assuming an average velocity of 105.6 paces per minute with one man pace equal 2.5 feet. 1 travel-hour (man) = 264 feet per minute (E) 1 travel-hour (man) = 15 840 feet per hour (E) 1 travel-hour (man) = 3 miles per hour (E)	UK
triennium	–	time, duration, period	T	1 triennium = 9.46728×10^7 s (E)	Common unit of time equal to 3 years. 1 triennium = 3 years (E)	INT
triens (Roman)	–	mass	M	1 triens (Roman) = 109×10^{-3} kg	Obsolete Roman unit of mass used in ancient times. 1 triens (Roman) = 4 unciae (Roman) (E)	Roman

trimester (quarter)	–	time, duration, period	T	1 trimester = 7.8894 $\times 10^6$ s (E)	Unit of time, another name for the quarter. 1 trimester = 1/4 year (E) 1 trimester = 1 quarter (E) 1 trimester = 3 months (E)	INT
troland (luxon)	–	luminous luminance	$J.L^{-2}$	1 troland = 10^4 cd.m^{-2} (E)	Obsolete unit of luminous luminance employed in ophtalmology. It was equal to the retinal luminous luminance received by eyes by one surface having a luminous luminance of one candela per square centimetre. The optical aperture of eyes is about one square millimetre.	
truong (Annamese)	–	length, distance	L	1 truong (Annamese) = 4.7 m	Obsolete Annameseian traditional unit of length used before 1914. 1 truong (Annamese) = 10 thuoc (Annamese) (E)	Annamese
truss (UK)	–	mass	M	1 truss (UK) = 16.329325320 kg	Obsolete British unit of mass used by farmers. 1 truss (UK) = 36 pounds (UK, straw) (E)	UK
tscharik (Turkmenian)	–	mass	M	1 tscharik (Turkmenian) = 2 kg	Obsolete Turkmenian traditional unit of mass used before 1920. 1 tscharik (Turkmenian) = 4 mimtscha (Turkmenian) (E)	Turkmenian
tsouen (Chinese) [cun]	–	length, distance	L	1 tsouen (Chinese) = 3.2×10^{-2} m	Obsolete Chinese unit of length used in ancient times. 1 cun = 1/10 tchi (E) 1 cun = 3.2 cm (E)	Chinese
tsubo (Japanese)	–	surface, area	L^2	1 tsubo = 3.30578512397 m^2	Obsolete Japanese unit of area. 1 tsubo = 1 bu (E) 1 tsubo = 100/30.25 m^2	Japanese
tub (UK)	–	mass	M	1 tub (UK) = 38.10175908 kg	Obsolete British unit of mass. 1 tub (UK) = 84 lb (E)	UK

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
tub (UK, butter)	–	mass	M	1 tub (UK, butter) = 38.10175908 kg (E)	Obsolete British unit of mass used for weighing butter and cheese. 1 tub (UK, butter) = 84 lb (E) 1 tub (UK, butter) = 3/2 firkins (E) 1 tub (UK, butter) = 10.5 cloves (E)	UK
tuba (Indian)	–	mass	M	1 tuba (Indian) = 4.70 kg	Obsolete Indian unit of mass used in ancient times. 1 tuba (Indian) = 100 pala (E)	Indian
tukeas (Saudi Arabian)	–	mass	M	1 tukeas (Saudi Arabian) $= 33.75 \times 10^{-3}$ kg	Obsolete Saudi Arabian traditional unit of mass used before 1962. 1 tukeas (Saudi Arabian) = 1/2000 kantar (Saudi Arabian) (E)	Saudi Arabian
tum (Swedish) [Swedish inch]	–	length, distance	L	1 tum (Swedish) $= 2.4741667 \times 10^{-2}$ m	Obsolete Swedish unit of length. 1 tum (Swedish) = 1/12 fot (E)	Swedish
tumblerful	–	capacity, volume	L^3	1 tumblerful (UK) $= 284.130750 \times 10^{-6}$ m^3 (E)	Obsolete British unit of capacity used in food recipes. 1 tumblerful (UK) = 1/2 pint (UK) (E) 1 breakfast cup (UK) = 1 tumblerful (UK) (E)	UK
tun (Irish)	–	capacity, volume	L^3	1 tun (Irish) $= 898.587931855 \times 10^{-3}$ m^3	Obsolete traditional Irish unit of capacity for liquids used before the adoption of the Weights and Measures Act of 1824. 1 tun (Irish) = 252 gallons (Irish) (E)	Irish
tun (UK, beer)	–	capacity, volume	L^3	1 tun (UK, beer) $= 998.168842368 \times 10^{-3}$ m^3	Obsolete British unit of capacity used for measuring alcoholic beverages between 1803 and 1824. 1 tun (UK, beer) = 216 gallons (UK, beer) (E)	UK

tun (US, liq.)	–	capacity, volume	L^3	1 tun (US, liq.) = 953.923769600 × 10^{-3} m^3	Obsolete American unit of capacity. 1 tun (US, liq.) = 252 gallons (US) (E) 1 tun (US, liq.) = 8 barrels (US) (E) 1 tun (US, liq.) = 4 hogsheads (US) (E)	US
tun (US, wine)	–	volume, capacity	L^3	1 tun (US, wine) = 953.923769568 ×10^{-3} m^3 (E)	Obsolete American unit of volume used to measure the capacity of wine. 1 tun (US, wine) = 252 gallons (US, wine) (E) 1 tun (US, wine) = 2 pipes (US, wine) (E) 1 tun (US, wine) = 3 puncheons (US, wine) (E)	US
tundagslatta (Icelandic)	–	surface area	L^2	1 tundagslatta (Icelandic) = 3191.60141294 m^2	Obsolete Icelandic traditional unit of surface area used in land measurements before 1907. 1 tundagslatta (Icelandic) = 900 ferfaomur (Icelandic) (E)	Icelandic
tunland (Swedish)	–	surface, area	L^2	1 tunland (Swedish) = 4936.378160 m^2	Obsolete Swedish unit of area. 1 tunland (Swedish) = 56 000 square fot (E)	Swedish
tunna (Finnish)	–	capacity, volume	L^3	1 tunna (Finnish) = 163.49 ×10^{-3} m^3	Obsolete Finnish traditional unit of capacity used for liquids before 1892. 1 tunna (Finnish) = 63 kannor (Finnish) (E)	Finnish
tunna (Swedish, dry)	–	capacity, volume	L^3	1 tunna (Swedish, dry) = 146.561067570 × 10^{-3} m^3	Obsolete Swedish unit of capacity for dry substances. 1 tunna (Swedish, dry) = 56 kanna (E)	Swedish
tunna smjors (Icelandic)	–	mass	M	1 tunna smjors (Icelandic) = 112 kg (E)	Obsolete Icelandic traditional unit of mass used before 1907. 1 tunna smjors (Icelandic) = 224 pund (Icelandic) (E)	Icelandic
tunnland (Swedish)	–	surface area	L^2	1 tunnland (Swedish) = 0.4936378160 × 10^4 m^2	Obsolete traditional Swedish unit of surface area used after a decree of 1665. 1 tunnland (Swedish) = 56 000 kvardratfot (E)	Swedish

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
turn	tr, rev	plane angle	α	1 tr = 6.283185307 rad (E)	1 tr = 2π rad (E) 1 tr = 360° (E)	UK, US
Twaddell degree	°Tw	specific gravity of liquids, hydrometer index, hydrometer degree	nil	$^{\circ}\mathrm{Tw} = 200 \times \left[d^{60^{\circ}\mathrm{F}}_{60^{\circ}\mathrm{F}} - 1\right]$	Obsolete British hydrometer unit introduced in 1830 for liquids heavier than water. Each degree corresponds to 1/200th of the specific gravity (SG) above unity, for instance 10° Tw means SG = 1.050. It is always used for densities greater than water.	UK
twenty foot equivalent unit	TEU, TEQ	capacity, volume	L^3	1 TEU = 36.2455636378 m^3	Obsolete American and British unit of capacity employed in marine applications. 1 TEU = 20 × 8 × 8 ft^3	UK, US
typp	–	specific length	$M^{-1}L$	1 typp = 2015.90692542 $m.kg^{-1}$	Obsolete American and British unit employed in the textile industry. The name of the unit is derived from the English acronym: **t**housand **y**ard **p**er **p**ound. 1 typp = 1000 $yd.lb^{-1}$ (E)	UK, US
U-factor	U-factor	heat transfer coefficient (thermal conductance divided by area)	$MT^{-3}\Theta^{-1}$	1 U factor = 5.678263337 $W.m^{-2}.K^{-1}$	Obsolete British and American unit: heat transfer coefficient employed in civil and building engineering. 1 U-factor = 1 $Btu.h^{-1}.ft^{-2}.°F^{-1}$ 1 U-factor = 1 $(R\text{-value})^{-1}$ (E) 1 U-factor = 5.678263337 USI	UK
uckin (Libyan)	–	mass	M	1 uckin (Libyan) = 32.05 × 10^{-3} kg	Obsolete Libyan traditional unit of mass used before 1927. 1 uckin (Libyan) = 1/16 rottolo (Libyan) (E)	Libyan
uckir (Tunisian)	–	mass	M	1 uckir (Tunisian) = 31.495 × 10^{-3} kg	Obsolete Tunisian traditional unit of mass used before 1895. 1 uckir (Tunisian) = 1/2000 cantaro (Egyptian) (E)	Tunisian

ueba (Libyan)	–	capacity, volume	L^3	1 ueba (Libyan) = 127.392 $\times 10^{-3}$ m^3	Obsolete Libyan traditional unit of capacity used for dry substances before 1927. 1 ueba (Libyan) = 16 orba (Libyan) (E)	Libyan
ukkia (Algerian)	–	mass	M	1 ukkia (Algerian) = 34.13 $\times 10^{-3}$ kg	Obsolete traditional Algerian unit of mass used before 1843. 1 ukkia (Algerian) = 1/16 rottolo (Algerian, thary)	Algerian
uncia (Roman ounce)	–	mass	M	1 uncia (Roman ounce) = 27.25 $\times$ 10^{-3} kg	Obsolete Roman unit of mass used in ancient times. 1 uncia (Roman ounce) = 1/12 libra (Roman pound) (E)	Roman
uncia (Roman inch)	–	length, distance	L	1 uncia (Roman inch) = 2.453333 $\times$ 10^{-2} m	Obsolete Roman unit of length employed in ancient times. 1 uncia (Roman inch) = 1/12 common pes (E)	Roman
uncja (Polish)	–	mass	M	1 uncja (Polish) = 25.3440 $\times 10^{-3}$ kg	Obsolete traditional Polish unit of mass used before 1919. 1 uncja (Polish) = 1/16 funt (Polish) (E)	Polish
unglee (Indian, Bombay)	–	length, distance	L	1 unglee (Indian, Bombay) = 1.42875 $\times$ 10^{-3} m	Obsolete Indian traditional unit of length used before 1920. 1 unglee (Indian, Bombay) = 1/48 guz (Indian, Bombay) (E)	Indian
unglee (Indian, Calcutta)	–	length, distance	L	1 unglee (Indian, Calcutta) = 1.90625 $\times$ 10^{-2} m	Obsolete Indian traditional unit of length used before 1920. 1 unglee (Indian, Calcutta) = 1/48 guz (Indian, Calcutta) (E)	Indian
unit (British Columbia)	–	surface area	L^2	1 unit = 250 000 m^2 (E)	Canadian unit of land surface area used by prospectors in British Columbia for reporting mineral exploration claims. One unit corresponds exactly to the surface area of a rectangular plot having 500 metres on any one side and encompasses a total surface area of 25 hectares. 1 unit = 25 hectares (E)	CAN

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
unit of entropy (entropy unit)	ue, eu	molar entropy	$ML^2T^{-2}\Theta^{-1}N^{-1}$	1 ue = 4.184 $J.K^{-1}.mol^{-1}$ (E)	1 ue = 1 $cal_{th}.K^{-1}.mol^{-1}$ (E)	
unit pole	–	magnetic induction flux	$ML^2T^{-2}I^{-1}$	1 unit pole = 1.256637×10^{-7} Wb	Obsolete British and American unit of magnetic flux.	UK, US
unité de masse	UdM, udm	mass	M	1 UdM = 9.80665 kg (E)	Obsolete MKpS base unit of mass.	MKpS
universal time (Temps Universel)	UT	time, period, duration	T	(see note)	Universal time corresponds to GMT increased by 12 hours. It is described by the symbol UT_0. It is possible to calculate UT_1 introducing corrections for small displacements of the Earth around its axis of revolution. It is possible to calculate UT_2 introducing corrections for seasonal variations of the Earth's revolution.	
universal time coordinated (Temps Universel Coordonné)	UTC	time, period, duration	T	(see note in column 6)	Universal time coordinated replaced GMT on January 1st, 1972. It corresponds to the TAI fitted to one second to ensure approximate scale concordance with UT_1. Universal time coordinated is based on emitted coordinated time rate signals and standard frequencies. The international abbreviation UTC is employed in all languages. UTC = TAI − 10 seconds (SI)	INT
untz (Swedish)	–	mass	M	1 untz (Swedish) = $26.56748141 \times 10^{-3}$ kg	Obsolete Swedish unit of mass used before 1889. 1 untz (Swedish) = 1/16 skålpund (Swedish) (E)	Swedish
unze (Austrian)	–	mass	M	1 unze (Austrian) = 3.5000625×10^{-2} kg	Obsolete Austrian unit of mass for general use. 1 unze (Austrian) = 1/16 pfund (E)	Austrian

unze (Austrian, apothecary)	–	mass	M	1 unze (Austrian, apothecary) = 3.5000625×10^{-2} kg	Obsolete Austrian unit of mass used in pharmacy. 1 unze (Austrian, apothecary) = 1/12 pfund (Austrian, apothecary) (E)	Austrian
unze (Danish)	–	mass	M	1 unze (Danish) = 31.250×10^{-3} kg (E)	Obsolete Danish traditional unit of mass used before 1912. 1 unze (Danish) = 1/16 pund (Danish) (E)	Danish
unze (Dutch)	–	mass	M	1 unze (Dutch) = $3.076048250 \times 10^{-2}$ kg	Obsolete Dutch unit of mass. 1 unze (Dutch) = 1/16 pond (Dutch) (E)	Dutch
unze (German)	–	mass	M	1 unze (German) = $29.231937500 \times 10^{-3}$ kg	Obsolete German unit of mass. 1 unze (German) = 1/16 pfund (German) (E)	German
uqqa (Cypriot)	–	mass	M	1 uqqa (Cypriot) = 1.270058636 kg	Obsolete Cypriot traditional unit of mass used before 1972. 1 uqqa (Cypriot) = 25/11 rottolo (Cypriot) (E)	Cypriot
urna (Roman)	–	capacity, volume	L^3	1 urna (Roman) = 13.182720×10^{-3} m^3	Obsolete Roman unit of volume employed in ancient times. It was used for capacity measurements of liquids. 1 urna (Roman) = 24 sextarius (E)	Roman
urub (Persian)	–	length, distance	L	1 urub (Persian) = 0.1143 m	Obsolete Persian traditional unit of length used before 1933. 1 urub (Persian) = 2 gireh (Persian) (E)	Persian
urumb (Turkish)	–	length, distance	L	1 urumb (Turkish) = $9.44246558 \times 10^{-2}$ m	Obsolete Turkish traditional unit of length used before 1933. 1 urumb (Turkish) = 1/8 pic (Turkish) (E)	Turkish
USI	USI	heat transfer coefficient (thermal conductance divided by area)	$MT^{-3}\Theta^{-1}$	1 USI = 1 $W.m^{-2}.K^{-1}$ (E)	Unit of the heat transfer coefficient employed in the British and American building engineering. One USI corresponds to the reciprocal of the heat insulation coefficient of a wall which conserves a temperature difference of 1°C *(contined overleaf)*	UK, US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
USI *(continued)*					between its faces when the heat flux is equal to one $W.m^{-2}$.	
USP	USP	mass	M	(see note)	American unit of mass used to measure the mass of a vitamin or drug based on its expected biological effects. USP is the acronym for the *United States Pharmacopoeia*. For each substance to which this unit applies, the US Food and Drug Administration has determined the biological effect associated with a dose of 1 USP unit.	US
uzan (Guinean)	–	mass	M	1 uzan (Guinean) = 8.0250×10^{-3} kg	Obsolete Guinean traditional unit of mass used before 1906. 1 uzan (Guinean) = 1/8 benda (Guinean) (E)	Guinean
vac	vac	pressure, stress	$ML^{-1}T^{-2}$	1 vac = 100 Pa (E)	Obsolete unit of pressure. 1 vac = 1 millibar (E)	
vakia (Saudi Arabian)	–	capacity, volume	L^3	1 vakia (Saudi Arabian) = 59.375×10^{-6} m^3	Obsolete Saudi Arabian traditional unit of capacity used for liquids before 1962. 1 vakia (Saudi Arabian) = 1/16 nusfiah (Saudi Arabian) (E)	Saudi Arabian
vakias (Saudi Arabian)	–	mass	M	1 vakias (Saudi Arabian) = 33.75×10^{-3} kg	Obsolete Saudi Arabian traditional unit of mass used before 1962. 1 vakias (Saudi Arabian) = 1/2000 kantar (Saudi Arabian) (E)	Saudi Arabian
vara (Argentinian)	–	length, distance	L	1 vara (Argentinian) = 0.866 m	Obsolete Argentinian traditional unit of length used before 1887. 1 vara (Argentinian) = 3 pie (Argentinian) (E)	Argentinian

vara (Brazilian)	–	length, distance	L	1 vara (Brazilian) = 1.1111111111 m	Obsolete Brazilian traditional unit of length used before 1874. 1 vara (Brazilian) = 10/3 pe (Brazilian) (E) 1 vara (Brazilian) = 10/9 m (E)	Brazilian
vara (Colombian)	–	length, distance	L	1 vara (Colombian) = 0.8 m	Obsolete Colombian traditional unit of length used before 1854. 1 vara (Colombian) = 1/6250 milla (Colombian) (E)	Colombian
vara (Colombian)	–	length, distance	L	1 vara (Colombian) = 0.800 m (E)	Obsolete traditional Colombian unit of length defined by Law of May 25, 1836.	Colombian
vara (Costa-Rican)	–	length, distance	L	1 vara (Costa-Rican) = 0.8393 m	Obsolete Costa-Rican traditional unit of length used before 1912. 1 vara (Costa-Rican) = 36 pulgada (Costa-Rican) (E)	Costa-Rican
vara (Guatemalan)	–	length, distance	L	1 vara (Guatemalan) = 0.8359 m	Obsolete Guatemalan traditional unit of length used before 1912. 1 vara (Guatemalan) = 36 pulgada (Guatemalan) (E)	Guatemalan
vara (Honduran)	–	length, distance	L	1 vara (Honduran) = 0.8128 m	Obsolete Honduran traditional unit of length used before 1912. 1 vara (Honduran) = 36 pulgada (Honduran) (E)	Honduran
vara (Mexican)	–	length, distance	L	1 vara (Mexican) = 0.838 m	Obsolete Mexican traditional unit of length used before 1896. 1 vara (Mexican) = 3 pie (Mexican) (E)	Mexican
vara (Paraguayan)	–	length, distance	L	1 vara (Paraguayan) = 0.866 m	Obsolete Paraguayan traditional unit of length used before 1899. 1 vara (Paraguayan) = 3 piede (Paraguayan) (E)	Paraguayan
vara (Paraguayan, old)	–	length, distance	L	1 vara (Paraguayan, old) = 0.83856 m	Obsolete Paraguayan traditional unit of length used before 1899. 1 vara (Paraguayan, old) = 3 piede (Paraguayan, old) (E)	Paraguayan

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
vara (Peruvian)	–	length, distance	L	1 vara (Peruvian) = 0.83598 m	Obsolete Peruvian traditional unit of length used before 1869. 1 vara (Peruvian) = 3 pie (Peruvian) (E)	Peruvian
vara (Portuguese)	–	length, distance	L	1 vara (Portuguese) = 1.0950 m	Obsolete Portuguese unit of length. 1 vara (Portuguese) = 10/3 pe (E)	Portuguese
vara (Spanish)	–	length, distance	L	1 vara (Spanish) = 0.835905 m	Obsolete Spanish unit of length.	Spanish
vara (Texas)	–	length, distance	L	1 vara (Texas) = 0.8466666667 m	Obsolete American unit of length used in Texas early in the 1900. 1 vara (Texas) = 33 1/3 inches (E)	US
vara (Venezuelan)	–	length, distance	L	1 vara (Venezuelan) = 0.8 m	Obsolete Venezuelan traditional unit of length used before 1857. 1 vara (Venezuelan) = 1/6280 vara (Venezuelan) (E)	Venezuelan
varahan (Ceylon and Madras)	–	mass	M	1 varahan (Ceylon and Madras) = 35.436875×10^{-3} kg	Obsolete Ceylonese and Madrasian traditional unit of mass used before 1920. 1 varahan (Ceylon and Madras) = 1/8 seer (Ceylon) (E)	Ceylon
vat (Dutch)	–	capacity, volume	L^3	1 vat (Dutch) = 921.600×10^{-3} m^3	Obsolete Dutch unit of capacity used for liquid substances. 1 vat (Dutch) = 768 mingelen (E)	Dutch
vedro (Russian)	–	capacity, volume	L^3	1 vedro (Russian) = 12.299410×10^{-3} m^3	Obsolete Russian unit of capacity for liquid substances used before 1917. It was equal to the volume of 30 founts of pure water at $16\frac{2}{3}$°C. 1 vedro (Russian) = 100 tcharka (E)	Russian
vedro (Russian, dry)	–	capacity, volume	L^3	1 vedro (Russian, dry) = 13.119368×10^{-3} m^3	Obsolete Russian unit of capacity for dry substances used before 1917. 1 vedro (Russian, dry) = 4 garnetz (E)	Russian
velte (de Paris)	–	capacity, volume	L^3	1 velte (de Paris) = $7.61717006780 \times 10^{-3}$ m^3	Obsolete French unit of capacity employed before the French Revolution.	French

					It served to express the capacity of liquids and grains. It varied according to the location and merchandise. 1 velte (de Paris) = 8 pintes (de Paris)	
velt (Mauritius)	–	volume, capacity	L^3	1 velt (Mauritius) $= 75.703333 \times 10^{-3}$ m^3	Obsolete unit of volume used for measuring capacity of liquids in Mauritius and Seychelles Islands. 1 velt (Mauritius) = 1/30 cash (Mauritius) (E)	Mauritius
vergée (de Paris)	–	surface, area	L^2	1 vergée (de Paris) = 1276.79982437 m^2	Obsolete French unit of area used in surveyor's measurements before the French revolution (1789). 1 vergée (de Paris) = 1/4 arpent (E) 1 vergée (de Paris) = 25 perches (Eaux et forêts) (E) 1 vergêe (de Paris) = 12 100 pieds calles (de Paris) (E)	French
vergees (Guernsey)	–	surface, area	L^2	1 vergees (Guernsey) $= 1.54165958949 \times 10^3$ m^2	Obsolete British unit of area employed in surveyor's measurements in the Channel Islands. 1 vergees (Guernsey) = (1/2.625) acre (E)	UK
vergees (Jersey)	–	surface, area	L^2	1 vergees (Jersey) $= 1.79860285440 \times 10^3$ m^2	Obsolete British unit of area employed in surveyor's measurements in the Channel Islands. 1 vergees (Jersey) = (1/2.25) acre (E)	UK
vershok (Russian)	–	length, distance	L	1 vershok (Russian) $= 4.445 \times 10^{-2}$ m (E)	Obsolete Russian unit of length used before 1917. 1 vershok (Russian) = 7/48 foute (E)	Russian
verst (Russian)	–	length, distance	L	1 verst (Russian) = 1066.8 m (E)	Obsolete Russian unit of length used before 1917. 1 verst (Russian) = 3500 foute (E)	Russian
verste (Latvian)	–	length, distance	L	1 verste (Latvian) = 1066.80 m	Obsolete Latvian traditional unit of length. 1 verste (Latvian) = 1/7 meile (Latvian) (E)	Latvian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
versum (Roman)	–	surface, area	L^2	1 versum (Roman) = 877.344400 m^2	Obsolete Roman unit of area employed in ancient times. 1 versum (Roman) = 10 000 quadratus pes (E)	Roman
viacka (Romanian, liquid)	–	capacity, volume	L^3	1 viacka (Romanian, liquid) = 14.150×10^{-3} m^3	Obsolete traditional Romanian unit of capacity used for liquids before 1884. 1 viacka (Romanian, liquid) = 10 oke (Romanian, liquid) (E)	Romanian
vierd (Dutch, dry)	–	capacity, volume	L^3	1 vierd (Dutch, dry) = 6.815×10^{-3} m^3	Obsolete Dutch unit of capacity used for dry substances. 1 vierd (Dutch, dry) = 1/4 schepel (E)	Dutch
vierding (Austrian)	–	mass	M	1 vierding (Austrian) = 1.400025×10^{-1} kg	Obsolete Austrian unit of mass for general uses. 1 vierding (Austrian) = 1/4 pfund (E)	Austrian
vierling (Dutch)	–	mass	M	1 vierling (Dutch) = $3.84506031250 \times 10^{-4}$ kg	Obsolete Dutch unit of mass. 1 vierling (Dutch) = 1/1280 ordinary pond (Dutch) (E)	Dutch
viertel (Austrian)	–	capacity, volume	L^3	1 viertel (Austrian) = 14.151×10^{-3} m^3	Obsolete Austrian unit of capacity used for liquid substances. 1 viertel (Austrian) = 10 mass (E)	Austrian
viertel (Austrian, dry)	–	capacity, volume	L^3	1 viertel (Austrian, dry) = 15.372250×10^{-3} m^3	Obsolete Austrian unit of capacity used for dry substances. 1 viertel (Austrian, dry) = 1/4 metzel (E)	Austrian
viertel (Danish, dry)	–	capacity, volume	L^3	1 viertel (Danish, dry) = $4.34768422162 \times 10^{-3}$ m^3	Obsolete Danish traditional unit of capacity used for dry substances before 1912. 1 viertel (Danish, dry) = 9/2 pott (Danish, dry) (E)	Danish
viertel (Danish, liq.)	–	capacity, volume	L^3	1 viertel (Danish, liq.) = $7.72921639400 \times 10^{-3}$ m	Obsolete Danish traditional unit of capacity used for liquids before 1912.	Danish

					1 viertel (Danish, liq.) = 8 pott (Danish, liq.) (E) 1 viertel (Danish, liq.) = 1/4 cubic fod (Danish, liq.) (E)	
vieth degree	–	specific gravity index on lactometric scale	nil	(see note)	Hydrotimeter scale used in lactometry.	
violle	–	luminous intensity	J	1 violle = 20.4 cd	Obsolete unit of luminous intensity. It was equal to the intensity of the blackbody at the temperature of platinum at melting point. It was used during the period 1884–1889.	
virgate (UK)	–	surface area	L^2	1 virgate (UK) = 121405.692672 m^2	Obsolete British unit of land surface area. It was extensively used in surveying measurements. 1 virgate (UK) =1/4 hide (UK) (E) 1 virgate (UK) = 30 acres (E)	UK
vis (Ceylon and Madras)	–	mass	M	1 vis (Ceylon and Madras) = 1.417475 kg	Obsolete Ceylonese and Madrasian traditional unit of mass used before 1920. 1 vis (Ceylon and Madras) = 5 seer (Ceylon) (E)	Ceylon
viss (Burmese)	–	mass	M	1 viss (Burmese) = 1.632 kg	Obsolete Burmese traditional unit of mass used before 1920. 1 viss (Burmese) = 3 catty (Burmese) (E)	Burmese
vistati	–	length, distance	L	1 vistati = 2.285×10^{-1} m	Obsolete Indian unit of length used in ancient times. 1 vistati = 1/2 hasta (E)	Indian
voeten (Dutch) [Dutch foot]	–	length, distance	L	1 voeten (Dutch) = 0.2830594 m	Obsolete unit of length used in Amsterdam (Netherlands)	Dutch
voie (de Paris)	–	capacity, volume	L^3	1 voie (de Paris) = 1.91952685708 m^3	Obsolete French unit of capacity employed before the French Revolution of 1789 for measuring stacked firewood. 1 voie (de Paris) = 4 pieds × 4 pieds × 3 pieds 6 pouces (E) 1 voie (de Paris) = 56 pieds cubes (de Paris) (E)	French

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
volt	V	electric potential, electric potential difference, electromotive force	$ML^2T^{-3}I^{-1}$	**SI derived unit** 1 V = 1kg.m^2.s^{-3}.A^{-1} (E)	The volt is the electric potential difference between two points of a conductor carrying a constant current of one ampere, when the power dissipated between these points is equal to one watt. The unit is named after the Italian scientist A. Volta (1745–1827).	SI
volt (int., US)	V	electric potential, electric potential difference, electromotive force	$ML^2T^{-3}I^{-1}$	1 V (int., US) = 1.000330 V	Obsolete IEUS unit of electric potential.	US, IEUS
volt (int. mean)	V	electric potential, electric potential difference, electromotive force	$ML^2T^{-3}I^{-1}$	1 V (int. mean) = 1.00034 V	Obsolete IEUS unit of electric potential introduced in 1908. It is the electromotive force of a Weston electrochemical cell measured at 20°C. It is equal to 1.0183 int. volts.	IEUS, INT
volt ampere	VA	power	ML^2T^{-3}	1 VA = 1 W (E)		
volt ampere reactive	var	reactive power	ML^2T^{-3}	1 VA = 1 W (E)	Defined by the relation: $P = UI\cos\varphi$	INT
volt per kelvin	V.K^{-1}	Thomson coefficient	$ML^2T^{-3}I^{-1}\Theta^{-1}$	**SI derived unit** 1 V.K^{-1} = 1 kg m^{2}s^{-3}A^{-1}K^{-1} (E)		SI
volt per metre	V.m^{-1}	electric field strength	$MLT^{-3}I^{-1}$	**SI derived unit** 1 V.m^{-1} = 1 kg ms^{-3}A^{-1} (E)	The volt per metre is the electric field strength SI derived unit. It is equal to the electric potential difference of one volt between two points one metre apart.	SI
volt (thermal)	K	thermal potential difference, temperature difference	Q	1 volt (thermal) = 1 K (E)	SI unit used for convenience when dealing with electrical and thermal analogies.	SI
volume unit	vu	volume of a radio signal	nil	(see note)	Subjective British and American unit used in telecommunication to describe the volume of a radio or television signal carrying complex information such as speech or music. In 1951, the former	UK, US

					American Standards Association (ASA), now ANSI, defined it as a reference signal which generates 1 milliwatt of power in a circuit having an impedance of 600 ohms. The volume of an incoming signal, in volume units, is equal to the number of decibels by which it exceeds this reference level.	
voxel	–	logical unit of visual information	nil	(see note)	The voxel is the three-dimensional equivalent of the pixel. A voxel is a unit of graphic information that defines a point in three-dimensional space. Since a pixel (i.e., picture element) defines a point in two-dimensional space with its x and y coordinates, a third z coordinate is needed. In 3-D space, each of the coordinates is defined in terms of its position, color, and density.	Computer
waag (Danish)	–	mass	M	1 waag (Danish) = 18 kg (E)	Obsolete Danish traditional unit of mass used before 1912. 1 waag (Danish) = 36 pund (Danish) (E)	Danish
waag (Swedish)	–	mass	M	1 waag (Swedish) = 70.138150900 kg	Obsolete Swedish unit of weight. 1 waag (Swedish) =165 skålpund (E)	Swedish
wah (Thai)	–	length, distance	L	1 wah (Thai) = 2 m	Obsolete Thai traditional unit of length used before 1923. 1 wah (Thai) = 1/2 sen (Thai) (E)	Thai
wakea (Abyssinian)	–	mass	M	1 wakea (Abyssinian) = 25.916666667 $\times 10^{-3}$ kg	Obsolete Abyssinian traditional unit of mass used before 1927. 1 wakea (Abyssinian) = 10 derime (Abyssinian) (E)	Abyssinian
wang (Indonesian)	–	mass	M	1 wang (Indonesian) = 804.183626302 $\times 10^{-6}$ kg	Obsolete Indonesian traditional unit of mass used before 1923. 1 wang (Indonesian) = 1/76 800 picul (Indonesian) (E)	Indonesian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
warp (herrings)	–	quantity of herrings	nil	1 warp (herrings) = 4 herrings (E)	Obsolete British unit used by fishermen to measure the number of herrings.	UK
watch	–	time, period, duration	T	1 watch = 14 400 s (E)	Obsolete unit of time used in marine navigation and in the navy. 1 watch = 8 bells (E) 1 watch = 4 h (E) 1 watch = 240 min (E)	UK, US
watch	–	time, duration, period	T	1 watch = 14 400 s (E)	Obsolete British and American unit of time, defined as the time a sentry stands watch or a ship's crew is on duty. On both land and sea, one watch is usually equal to 4 hours.1 watch = 4 hours (E) 1 watch = 8 bells (E)	UK, US
watch (dog)	–	time, duration, period	T	1 watch (dog) = 21600 s (E)	Obsolete British and American unit of time, defined as the time a sentry stands watch or a ship's crew is on duty. At sea, the evening watch (16–20 hours, or 4–8 pm) is often divided into two shorter watches called 'dog watches'. When dog watches are in effect, sailors will have watch assignments that rotate through the day instead of falling at the same hours every day. 1 watch (dog) = 6 hours (E) 1 watch (dog) = 4 bells (E)	UK, US
water column	WC	pressure. stress	$ML^{-1}T^{-2}$	1 WC = 249.081935511 Pa	Obsolete British and American unit of pressure extensively used in plumbing. It is equal to one inch of water measured at 3.98°C, and 101 325 Pa. 1 WC = 0.00245824757 atm 1 WC = 2.54 cm (H_2O) (E) 1 WC = 1/12 ft (H_2O) (E)	UK, US

water inch (US)	–	volume flow rate	L^3T^{-1}	1 water inch $= 110.40784370 \times 10^{-6}$ m^3s^{-1} (E)	Obsolete American unit of volume flow rate of water. It is equal to the volume flow rate through an opening of one inch in diameter, assuming the water just covers the opening hence the flow is only caused by gravity. 1 water inch = 14 pints (US)/min (E) 1 water inch = 2520 gallons (US, liq.)/ day	US
watt	W	power	ML^2T^{-3}	**SI derived unit** 1 W = 1 $kg.m^2.s^{-3}$ (E)	The watt is the power which gives rise to the production of energy at the rate of one joule per second. The unit is named after the British scientist J. Watt (1736–1819).	SI
watt (int. mean)	W	power	ML^2T^{-3}	1 W (int. mean) = 1.00019 W	Obsolete IEUS unit.	US
watt (int. US)	W	power	ML^2T^{-3}	1 W (int. US) = 1.000165 W	Obsolete IEUS unit.	US
watt per centimetre per celsius degree	$W.cm^{-1}.°C^{-1}$	thermal conductivity	$MLT^{-3}\Theta^{-1}$	1 $W.cm^{-1}.K^{-1} = 100$ $W.m^{-1}.K^{-1}$ (E)	Obsolete cgs unit of thermal conductivity.	cgs
watt per kelvin	$W.K^{-1}$	thermal conductance	$ML^2T^{-3}\Theta^{-1}$	**SI derived unit** 1 $W.K^{-1} = 1$ $kg.m^2.s^{-3}.K^{-1}$ (E)		SI
watt per metre per kelvin	$W.m^{-1}.K^{-1}$	thermal conductivity	$MLT^{-3}\Theta^{-1}$	**SI derived unit** 1 $W.m^{-1}.K^{-1} = 1$ $kg.m.s^{-3}.K^{-1}$ (E)		SI
watt per square metre	$W.m^{-2}$	irradiance, radiant flux received, energy flux	MT^{-3}	**SI derived unit** 1 $W.m^{-2} = 1$ $kg.s^{-3}$ (E)		SI
watt per square metre per steradian	$W.m^{-2}.sr^{-1}$	radiance	$MT^{-3}\ \Omega^{-1}$	**SI derived unit** 1 $W.m^{-2}.\ sr^{-1} = 1$ $kg.s^{-3}.sr^{-1}$ (E)		SI
watt per steradian	$W.\ sr^{-1}$	radiant intensity	$ML^2T^{-3}\ \Omega^{-1}$	**SI derived unit** 1 $W.sr^{-1} = 1$ $kg.m^2.s^{-3}.sr^{-1}$ (E)		SI
weber	Wb	magnetic induction flux	$ML^2T^{-2}I^{-1}$	**SI derived unit** 1 Wb = 1 $kg.m^2.s^{-2}.A^{-1}$ (E)	The weber is the magnetic flux which, linking a circuit of one turn, produces in it an electromotive force of one volt as it is reduced to zero at a uniform rate in one second (8th CGPM, 1948). The unit is named after the German scientist W.E. Weber (1804–1891).	SI

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
weber per metre	$Wb.m^{-1}$	magnetic potential vector	$MLT^{-2}I^{-1}$	**SI derived unit** 1 $Wb.m^{-1} = 1\ kg.m.s^{-2}.A^{-1}$ (E)		SI
week	w	time, period, duration	T	1 week = 604 800 s (E)	1 week = 7 days (E)	
Weißkopf unit (Moszkowski)	–	probability of transition	nil	(see note)	Obsolete unit employed in nuclear physics to express the nuclear quantum state's transition probability.	
wey (UK, capacity)	–	capacity, volume	L^3	1 wey (UK, capacity) = 1.45474944 m^3	Obsolete British unit of capacity. 1 wey (UK, capacity) = 40 bushels (UK) 1 wey (UK, capacity) = 80 buckets (UK) 1 wey (UK, capacity) = 320 gallons (UK)	UK
wey (UK, lead)	–	mass	M	1 wey (UK, lead) = 79.378664750 kg	Obsolete British unit of mass used in the trading of pure lead bullion and its alloys. 1 wey (UK, lead) = 14 stones (UK, lead) (E) 1 wey (UK, lead) = 175 lb (av.) (E)	UK
wey (UK, weight)	–	mass	M	1 wey (UK, weight) = 114.30527724 kg (E)	Obsolete British unit of mass employed in the weighing of wool. 1 wey (UK, weight) = 252 lb (av.) (E) 1 wey (UK, weight) = 14 stones (UK, wool) (E)	UK
wheatstone	–	electric resistance	$ML^2T^{-3}I^{-2}$	1 wheatstone = 0.0025 Ω (E)	Obsolete British unit of electric resistance. It was defined in 1843. It is equal to the electric resistance of a copper wire of one foot length and which has a mass of 100 grains.	UK
whey, Essex (UK, Butter)	–	mass	M	1 whey, Essex (UK, butter) = 107.047799320 kg (E)	Obsolete British unit of mass used for weighing butter and cheese. 1 whey, Essex (UK, butter) = 236 lb (E) 1 whey, Essex (UK, butter) = 29.5 cloves (E)	UK

whey, Suffolk (UK, Butter)	–	mass	M	1 whey, Suffolk (UK, butter) = 161.478883720 kg (E)	Obsolete British unit of mass used for weighing butter and cheese. 1 whey, Essex (UK, butter) = 356 lb (E) 1 whey, Essex (UK, butter) = 44.5 cloves (E)	UK
whiba (Tunisian)	–	capacity, volume	L^3	1 whiba (Tunisian) = 31 $\times 10^{-3}$ m^3	Obsolete Tunisian traditional unit of capacity used before 1895. 1 whiba (Tunisian) = 1/16 cafisso (Tunisian) (E)	Tunisian
whizz	–	velocity, speed	LT^{-1}	1 whizz = $3.33564095198 \times 10^{-9}$ $m.s^{-1}$	Unit of velocity suggested in 1981. Anecdotal. 1 whizz = (1/c) $m.s^{-1}$ (E)	
Winchester bushel (bushel (US))	bu (US, dry)	capacity, volume	L^3	1 bushel (US, dry) = $35.2390701669 \times 10^{-3}$ m^3	Obsolete American unit of capacity used to measure the volume of powdered or divided solid materials (flour, sand, cement, ores, etc). 1 bushel (US, dry) = 4 pecks (US, dry) (E) 1 bushel (US, dry) = 32 quart (US, dry) (E) 1 bushel (US, dry) = 64 pint (US, dry) (E) 1 Winchester bushel = 2150.42 in^3 (E) 1 bushel (US, dry) = 0.968938545648 bushel (UK)	US
wind chill index	WCI	dimensionless index for the measure of the combined cooling effect of air temperature and wind on the human body	nil	WCI = $0.045 \times ([5.27V^{0.5} + 10.45 - 0.28V)(T - 33) + 33$ with T in °C and V in $km.h^{-1}$	A measurement of the combined cooling effect of low air temperature and wind on the human body. The index was first defined by the American Antarctic explorer Paul Siple in 1939. As currently used by US meteorologists, the wind chill index is computed from the temperature T expressed in °F and the wind speed V expressed in mph using the for mula: WCI = $0.0817 \times (3.71V^{0.5} - 0.25V + 5.81)(T - 91.4) + 91.4$. For very low wind speeds, below 4 mph or 6 $km.h^{-1}$, the *WCI* is *(continued overleaf)*	INT

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
wind chill index *(continued)*					actually higher than the air temperature, but for higher wind speeds it is lower than the air temperature (source *ASHRAE Handbook*).	
wine gallon (UK)	–	volume, capacity	L^3	1 wine gallon (UK) $= 3.785411784 \times 10^{-3}$ m^3 (E)	Obsolete British unit of volume exactly equal to 231 cubic inches. The wine gallon was adopted as the official gallon for liquid measurement in the United States, so it is now usually called the US gallon. 1 wine gallon (UK) = 231 in^3 (E)	UK
wineglassful (UK)	–	volume, capacity	L^3	1 wineglassful (UK) $= 71.03268750 \times 10^{-6}$ m^3 (E)	Obsolete British unit of volume used in food recipes. 1 wineglassful (UK) = 2.5 fluid ounces (E) 1 wineglassful (UK) = 5 tablespoonfuls (E) 1 wineglassful (UK) = 0.5 gills (E)	UK
wink	–	time, period, duration	T	1 wink = $3.3333333 \times 10^{-10}$ s	Obsolete unit of time suggested in 1957. 1 wink = (1/3000) μs (E)	
wloka (Polish, Cracow)	–	surface area	L^2	1 wloka (Polish, Cracow) $= 11.2440574440 \times 10^4$ m^2	Obsolete traditional Polish unit of surface area used in land measurements before 1919. 1 wloka (Polish, Cracow) = 2.025×10^6 square stopa (Polish, Cracow) (E)	Polish
wloka (Polish, new)	–	surface area	L^2	1 wloka (Polish, new) $= 16.796160 \times 104$ m^2	Obsolete traditional Polish unit of surface area used in land measurements before 1919. 1 wloka (Polish, new) = 2.025×10^6 square stopa (Polish, new) (E)	Polish
wloka (Polish, Warsaw)	–	surface area	L^2	1 wloka (Polish, Warsaw) $= 17.95868010 \times 10^4$ m^2	Obsolete traditional Polish unit of surface area used in land measurements before 1919. 1 wloka (Polish, Warsaw) = 2.025×10^6 square stopa (Polish, Warsaw) (E)	Polish

woëbe (Persian)	–	capacity, volume	L^3	1 woëbe (Persian) $= 16.3 \times 10^{-3}$ m^3 (of water)	Obsolete unit of capacity of the Assyrio-Chaldean-Persian system used in ancient times. Measured by weight. 1 woëbe (Persian) = 1/2 amphora (E)	Persian
wogiet (Ethiopian)	–	mass	M	1 wogiet (Ethiopian) $= 31.215.6 \times 10^{-3}$ kg	Obsolete Ethiopian traditional unit of mass used before 1963. 1 wogiet (Ethiopian) = 8 kasm (Ethiopian) (E)	Ethiopian
word	–	unit of information in computer science	nil	(see note)	Unit of information used in computer science, representing the amount of data processed by a computer in a single instruction. The size of a word can vary with the computer system, but often one word is equal to 2 bytes or 16 bits.	Computer
worsted	–	specific length	$M^{-1}L$	1 worsted = 1128.907878 $m.kg^{-1}$	Obsolete American and British unit employed in the textile industry. 1 worsted = 1 lb/560 yd (E)	UK, US
wrap (UK)	–	length, distance	L	1 wrap (UK) = 73.152 m (E)	Obsolete UK unit of length used in surveyors' measurements. 1 wrap (UK) = 240 feet (E) 1 wrap (UK) = 12 ropes (E) 1 wrap (UK) = 2/3 lea (E)	UK
X unit (CuK_{α_1}) (Siegbahn unit)	UX, X	length, distance	L	1 UX (CuK_{α_1}) $= 1.00020778970 \times 10^{-13}$ m	Obsolete unit of length used in atomic spectroscopy and X-ray diffractommetry measurements. It was introduced by K.N.G. Siegbahn (1886–1977) in 1925. It was equal to the distance between lattice planes with the Miller index (200) of a calcite crystal (Island Spath) measured by X-ray diffraction using a CuK_{α_1} spectral line. This interlattice distance is accurately equal to 3029.45 UX.	
xilon (Egyptian)	–	length, distance	L	1 xilon (Egyptian) = 1.5705 m	Obsolete Egyptian unit of length used in ancient times. 1 xilon = 3 Royal cubit (E)	Egyptian

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
xylon (Greek, Attic)	–	length, distance	L	1 xylon (Greek, Attic) = 1.388520 m	Old Greek unit of length used in ancient times. 1 xylon (Greek, Attic) = 4.5 pous (E)	Attic
yabiki (Japanese)	–	length, distance	L	1 yabiki (Japanese) = $7.575757575 \times 10^{-1}$ m	Obsolete Japanese unit of length. 1 yabiki = 2.5 shaku (E)	Japanese
yan (Chinese) [yin]	–	length, distance	L	1 yin (Chinese) = 32 m	Obsolete Chinese unit of length used in ancient times. 1 yin = 100 tchi (E)	Chinese
yard	yd	length, distance	L	1 yd = 0.9144 m (E)	Legal unit in the UK system (since the WMA, 1963) and in the US system (since the USMB, 1959). 1 yard = 3 feet (E) 1 yard = 36 inches (E)	UK, US
yard (old)	yd	length, distance	L	1 yard (old) = 0.9143992 m	Obsolete British unit of length. It was used in UK before the WMA of 1963. Defined (1878) as the distance at 62°F between a pair of lines etched in gold plugs set in a bronze bar. 1 yard (old) = 3 feet (old)	UK
yard (Prussian) (ruthe)	–	length, distance	L	1 ruthe (Prussian) = 3.7662 m	Obsolete German unit of length. 1 ruthe = 12 fuss (E)	German
yard (US, survey)	yd (US)	length, distance	L	1 yd (US) = 0.914401828806 m	Obsolete American unit of length. It was adopted by the Mendenhall Order of 1893. It was equal to exactly 3600/3937 metres. Now obsolete, it was replaced by the yard described by the USMB, 1959.	US
yard (WMA 1963, scientific)	yd	length, distance	L	1 yd (WMA, 1963) = 0.9144 m (E)	Legal British and American unit of length. It was adopted by the Weights and Measures Acts of 1963 and of 1985, and the US system (since the USMB, 1959).	UK, US

					1 yard = 3 feet (E) 1 yard = 36 inches (E)	
yarn cut (wool)	–	specific length	LM^{-1}	1 yarn cut (wool) = 604.772077626 $m.kg^{-1}$	Obsolete British and American unit of specific length used to measure wool yarn in the textile industry. 1 yarn cut (wool) = 300 $yd.lb^{-1}$ (E)	UK, US
yarn number (Manches ter)	–	linear mass density	ML^{-1}	1 yarn number (Manchester) = 1.93771346819 $\times 10^{-6}$ $kg.m^{-1}$	Obsolete British unit of linear mass density used to measure silk yarn in the textile industry. 1 yarn number (Manchester) = 0.001 $dram.yd^{-1}$ (E)	UK
yarn run (cotton)	–	specific length	LM^{-1}	1 yarn run (cotton) = 1693.36181735 $m.kg^{-1}$	Obsolete British and American unit of specific length used to measure cotton yarn in the textile industry. 1 yarn run (cotton) = 840 $yd.lb^{-1}$ (E)	UK, US
yarn run (linen)	–	specific length	LM^{-1}	1 yarn run (linen) = 604.772077626 $m.kg^{-1}$	Obsolete British and American unit of specific length used to measure linen yarn in the textile industry. It was also used for hemp and ramie. 1 yarn run (linen) = 300 $yd.lb^{-1}$ (E)	UK, US
yarn run (metric)	–	specific length	LM^{-1}	1 yarn run (metric) = 1000 $m.kg^{-1}$	Obsolete British and American standardized unit of specific length used to measure yarn in the textile industry. 1 yarn run (metric) = 1 $m.g^{-1}$ (E)	UK, US
yarn run (wool)	–	specific length	LM^{-1}	1 yarn run (wool) = 3225.45108067 $m.kg^{-1}$	Obsolete British and American unit of specific length used to measure wool yarn in the textile industry. 1 yarn run (wool) = 1600 $yd.lb^{-1}$ (E)	UK, US
yarn run (worsted)	–	specific length	LM^{-1}	1 yarn run (worsted) = 1128.90787823 $m.kg^{-1}$	Obsolete British and American unit of specific length used to measure yarn in the textile industry. 1 yarn run (worsted) = 560 $yd.lb^{-1}$ (E)	UK, US

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
yava (Indian)	–	mass	M	1 yava (Indian) = 1.468750×10^{-5} kg	Obsolete Indian unit of mass used in ancient times. 1 yava (Indian) = 1/3200 pala (E)	Indian
year (365.25 days) (solar mean)	a, y	time, period, duration	T	1 year (solar mean) = 3.1557600×10^{7} s	Time period which contains 365.25 days. It corresponds conventionally to the duration of revolution of the Earth around the Sun. It could be extended to other planets of the solar system.	INT
year (anomalistic)	$a_{anom.}$	time, period, duration	T	1 year (anomalistic) = 3.15584329×10^{7} s	Obsolete unit of time employed in astronomy. It was equal to the time between two passages of the Sun at the perigee. In 1900 it was equal to 365 days 6 hours 13 minutes and 53.0 seconds. 1 year (anomalistic) = $(365.256641 + 0.27 \times 10^{-6}T)$ days, where T is the time expressed in centuries since January 1st 1900.	
year (astronomical) (Bessel year, annus fictus)	$a_{astr.}$	time, period, duration	T	1 year (Bessel) = $3.15578755901 \times 10^{7}$ s	1 year (Bessel) = 365.2531897 days.	
year (calendar) (civil year)	a, y	time, period, duration	T	1 year (calendar) = 3.1536000×10^{7} s (E)	Interval of time which contains 365 or 366 entire days. It approaches the duration of the tropical year by the use of bissextile years. The calendar year begins January 1st at 0.00 h and finishes December 31st at 24.00 h. 1 year (calendar) = 365 or 366 days (leap)	
year (eclipse)	–	time, period, duration	T	1 year (eclipse) = $2.994796800 \times 10^{7}$ s	The line of nodes is the intersection of the plane of the Earth's orbit around the Sun with the plane of the Moon's orbit around the Earth. Eclipses can only occur when the Moon and Sun are over this line. The	@

					line rotates and appearances of the Sun on the line of nodes occur every eclipse year. 1 year (eclipse) = 346.62 days (E)	
year (Gaussian)	a_{gauss}	time, period, duration	T	1 year (Gaussian) $= 3.1558196015394750 \times 10^7$ s	Time period which corresponds to the duration of revolution of the Earth around the Sun calculated from Kepler's law. 1 year (Gaussian) = 365.258 898 days	
year (Gregorian)	–	time, period, duration	T	1 year (Gregorian) $= 3.1557600 \times 10^7$ s	1 year (Gregorian) = 365.2425 days	
year (Hebrew)	–	time, duration, period	T	(see note)	The Hebrew year is based on lunar months, but synchronized to the solar calendar. The months vary irregularly between 29 and 30 days in length, and the years likewise vary. The regular year is 353, 354, or 355 days long. To keep up with the solar calendar, a leap month of 30 days is inserted every 3rd, 6th, 8th, 11th, 14th, 17th, and 19th years of a 19 year cycle. This gives leap years that last 383, 384, or 385 days. 1 year (Hebrew) = 353 or 354 or 355 days (E) 1 year (Hebrew, leap) = 383 or 384 or 385 days (E)	Hebrew
year (Islamic)	–	time, duration, period	T	(see note)	The Islamic year originated on July 16, AD 622 when Muhammad emigrated to Medina, i.e., the year of the Hegira. They need 11 leap days in 30 years to stay in sync with the lunar year which is a bit longer than the 29.5 days of the average month. The months do not keep to the same seasons, but regress through the seasons every 32.5 years. 1 year (Islamic) = 354 days (E) 1 year (Islamic, leap year) = 355 days (E)	Arabic

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
year (Julian)	–	time, period, duration	T	1 year (Julian) = 3.1556952×10^7 s	1 year (Julian) = 365.25 days	
year (sidereal)	–	time, period, duration	T	1 year (sidereal) = 3.155814954×10^7 s	Obsolete unit of time employed in astronomy. It was equal to the time between two conjunctions of the Sun with the same star. In 1900 it was equal exactly to 365 days 6 hours 9 minutes 9.54 seconds. 1 year (sidereal) = $(365.256360 + 10^{-7}T)$ days, where T is the time expressed in centuries since January 1st 1900.	
year (tropical)	a_{trop}	time, period, duration	T	1 year (tropical) = $3.15569299747 \times 10^7$ s	Obsolete unit of time employed in astronomy. It was equal to the period of one revolution of the Earth about the Sun measured between successive mean vernal equinoxes. This time interval corresponds to the mean difference of sun longitude which is time dependent in a non-linear form. Thus the tropical year is not constant and decreases by 0.530 seconds each century. Before the introduction in 1967 of atomic time, the tropical year 1900.00 served for the definition of the second and was exactly equal to 365 days 5 hours 48 minutes and 49.97 seconds. 1 year (tropical) = $(365.242199 - 0.53 \times 10^{-6}T)$ days, where T is time expressed in centuries since January 1st 1900.	
yen (Annamese)	–	mass	M	1 yen (Annamese) = 6.04 kg	Obsolete Annameseian traditional unit of mass used before 1914. 1 yen (Annamese) = 1600 dong (Annamese) (E)	Annamese

yin (Chinese) [yan]	–	length, distance	L	1 yin (Chinese) = 32 m	Obsolete Chinese unit of length used in ancient times. 1 yin = 100 tchi (E)	Chinese
yn (Chinese)	–	length, distance	L	1 yn (Chinese) = 32 m	Obsolete Chinese unit of length used in ancient times. 1 yn = 100 chi (E)	Chinese
yo (Chinese)	–	capacity, volume	L^3	1 yo (Chinese) = 2.070880×10^{-4} m^3	Obsolete Chinese unit of capacity used in ancient times. 1 yo (Chinese) = 1/5 tcheng (E)	Chinese
yoch (Cambodian)	–	length, distance	L	1 yoch (Cambodian) = 16 000 m	Obsolete Cambodian traditional unit of length used before 1914. 1 yoch (Cambodian) = 16 000 muoi (Cambodian) (E)	Cambodian
yoctogram	yg	mass	M	1 yg = 10^{-27} kg (E)	Submultiple of the SI base unit. 1 yg = 10^{-24} g (E)	SI
yoctometre	ym	length, distance	L	1 ym = 10^{-24} m (E)	Submultiple of the SI base unit.	SI
yodjana	–	length, distance	L	1 yodjana = 1.462400×10^4 m	Obsolete Indian unit of length used in ancient times. 1 yodjana = 32 000 hasta (E)	Indian
yoke	–	Dimensionless quantity unit	nil	1 yoke = 2 (E)	Dimensionless British quantity unit meaning a pair. The yoke is used in describing teams of animals, especially oxen, used to pull ploughs or wagons.	UK
yote (Thai)	–	length, distance	L	1 yote (Thai) = 16 000 m	Obsolete Thai traditional unit of length used before 1923. 1 yote (Thai) = 8000 wah (Thai) (E)	Thai
yottagram	Yg	mass	M	1 Yg = 10^{21} kg (E)	Multiple of the SI base unit. 1 Yg = 10^{24} g (E)	SI
yottametre	Ym	length, distance	L	1 Ym = 10^{24} m (E)	Multiple of the SI base unit.	SI
yrneh	yrneh	reluctance	$M^{-1}L^{-2}T^2I^2$	1 yrneh = 1 H^{-1} (E)	Obsolete practical cgs and MKS unit of reluctance. 1 yrneh = 1 $henry^{-1}$ (E)	MKS

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
yugada (Spanish)	–	surface, area	L^2	1 yugada (Spanish) = 3.21978087487 × 10^5 m^2	Obsolete Spanish unit of area. 1 yugada (Spanish) = 460 800 sq. vara (E)	Spanish
yusdrum (Turkish)	–	mass	M	1 yusdrum (Turkish) = 0.32075 kg	Obsolete Turkish traditional unit of mass used before 1933. 1 yusdrum (Turkish) = 1/4 oka (Turkish) (E)	Turkish
zak (Dutch)	–	volume, capacity	L^3	1 zak (Dutch) = 0.1 m^3 (E)	Recent Dutch unit of volume, now interpreted as a metric unit equal to the hectolitre. 1 zak (Dutch) = 100 dm^3 (E)	Dutch
zak (Dutch, dry)	–	capacity, volume	L^3	1 zak (Dutch, dry) = 81.780 × 10^{-3} m^3	Obsolete Dutch unit of capacity used for dry substances. 1 zak (Dutch, dry) = 3 schepel (E)	Dutch
zalay (Burmese)	–	capacity, volume	L^3	1 zalay (Burmese) = 126.25 ×10^{-6} m^3	Obsolete Burmese traditional unit of capacity used before 1920. 1 zalay (Burmese) = 1/4 byee (Burmese) (E)	Burmese
zar (Persian)	–	length, distance	L	1 zar (Persian) = 1.04007582938 m	Obsolete Persian traditional unit of length used before 1933. 1 zar (Persian) = 211/15 gireh (Persian) (E)	Persian
zayoot (Burmese)	–	capacity, volume	L^3	1 zayoot (Burmese) = 1.01 ×10^{-3} m^3	Obsolete Burmese traditional unit of capacity used before 1920. 1 zayoot (Burmese) = 2 byee (Burmese) (E)	Burmese
zentner (Austrian)	–	mass	M	1 zentner (Austrian) = 56.001 kg	Obsolete Austrian unit of mass for general use. 1 zentner (Austrian) = 100 pfund (E)	Austrian
zentner (Prussian)	–	mass	M	1 zentner (Prussian) = 51.448210 kg (E)	Obsolete German unit of mass. 1 zentner (Prussian) = 110 pfund (E)	German

zeptogram	zg	mass	M	1 zg = 10^{-24} kg (E)	Submultiple of the SI base unit. 1 zg = 10^{-21} g (E)	SI
zeptometre	zm	length, distance	L	1 zm = 10^{-21} m (E)	Submultiple of the SI base unit.	SI
zereth (Egyptian) [Royal Egyptian foot]	–	length, distance	L	1 zereth (Egyptian) = 3.490×10^{-1} m	Obsolete Egyptian unit of length used in ancient times. 1 zereth = 2/3 Royal cubit (E)	Egyptian
zereth (Hebrew) [Hebrew foot]	–	length, distance	L	1 zereth (Hebrew) = 2.775×10^{-1} m	Obsolete Hebrew unit of length used in ancient times. 1 zereth = 1/2 cubit (E)	Hebrew
zerteh (Persian) [Babylonian foot]	–	length, distance	L	1 zerteh (Persian) = 0.320 m	Obsolete unit of length in the Assyrio-Chaldean-Persian system used in ancient times. Base unit of the system of length.	Persian
zettagram	Zg	mass	M	1 Zg = 10^{18} kg (E)	Multiple of the SI base unit. 1 Zg = 10^{21} g (E)	SI
zettametre	Zm	length, distance	L	1 Zm = 10^{21} m (E)	Multiple of the SI base unit.	SI
zhang (Chinese)	–	length, distance	L	1 zhang (Chinese) = 3.2 m	Obsolete Chinese unit of length used in ancient times. 1 zhang = 10 chi (E)	Chinese
zhu	–	mass	M	1 zhu = $1.554208333 \times 10^{-3}$ kg	Obsolete Chinese unit of mass. 1 zhu = 1/384 jin (E)	Chinese
zoll (Austrian) [Austrian inch]	–	length, distance	L	1 zoll (Austrian) = 2.634000×10^{-2} m	Obsolete Austrian unit of length. 1 zoll (Austrian) = 1/12 fuss (E)	Austrian
zoll (German) [Prussian inch]	–	length, distance	L	1 zoll (Prussian) = $2.615475000 \times 10^{-2}$ m	Obsolete German unit of length. 1 zoll = 1/12 fuss (E)	German
zoll (Swiss)	–	length, distance	L	1 zoll (Swiss) = 2.50×10^{-2} m (E)	Obsolete traditional Swiss unit of length used before 1877. 1 zoll (Swiss) = 1/12 fuss (Swiss) (E)	Swiss
zollpfund (Austrian)	–	mass	M	1 zollpfund (Austrian) = 560.00448×10^{-3} kg	Obsolete Austrian unit of weight. 1 kg = 1.7857 zollpund (E)	Austrian
zollpfund (Prussian)	–	mass	M	1 zollpfund (Prussian) = $514.482100 \times 10^{-3}$ kg	Obsolete German unit of weight. 1 zollpund = 2 pfund (E)	German

Unit (synonym, acronym)	Symbol	Physical quantity	Dimension	Conversion factor (SI equivalent unit)	Notes, definitions, other conversion factors	System
zollpfund (Swiss)	–	mass	M	1 zollpfund (Swiss) = 500×10^{-3} kg	Obsolete Swiss unit of weight. 1 kg = 2 zollpund (E)	Swiss
zudda (Saudi Arabian)	–	capacity, volume	L^3	1 zudda (Saudi Arabian) = 7.60×10^{-3} m^3	Obsolete Saudi Arabian traditional unit of capacity used for liquids before 1962. 1 zudda (Saudi Arabian) = 8 nusfiah (Saudi Arabian) (E)	Saudi Arabian
zurbo (Syrian)	–	mass	M	1 zurbo (Syrian) = 49.0875 kg	Obsolete Syrian traditional unit of mass used before 1931. 1 zurbo (Syrian) = 55/2 rottolo (Syrian) (E)	Syrian
zuzah (Hebrew) [Talmudic system]	–	mass	M	1 zuzah (Hebrew) = 3.542000×10^{-3} kg	Obsolete Hebrew unit of mass used in ancient times. Rabbinacal or Talmudic system. 1 zuzah (Hebrew) = 1/100 mina (E)	Hebrew

4.2 Conversion Tables Listed by Physical Quantities

Note: Conversion factors shown in **bold type** are exact values.

4.2.1 Conversion Tables for Units of Mass

Table 4.2.1.1 Conversion table: units of mass: multiples and submultiples (SI)

Unit	Symbol	yg	zg	ag	fg	pg	ng	μg	mg	cg
yottagram	Yg	1E+48	1E+45	1E+42	1E+39	1E+36	1E+33	1E+30	1E+27	1E+26
zettagram	Zg	1E+45	1E+42	1E+39	1E+36	1E+33	1E+30	1E+27	1E+24	1E+23
exagram	Eg	1E+42	1E+39	1E+36	1E+33	1E+30	1E+27	1E+24	1E+21	1E+20
petagram	Pg	1E+39	1E+36	1E+33	1E+30	1E+27	1E+24	1E+21	1E+18	1E+17
teragram	Tg	1E+36	1E+33	1E+30	1E+27	1E+24	1E+21	1E+18	1E+15	1E+14
gigagram	Gg	1E+33	1E+30	1E+27	1E+24	1E+21	1E+18	1E+15	1E+12	1E+11
megagram	Mg	1E+30	1E+27	1E+24	1E+21	1E+18	1E+15	1E+12	1E+09	1E+08
kilogram	kg	1E+27	1E+24	1E+21	1E+18	1E+15	1E+12	1E+09	1E+06	1E+05
hectogram	hg	1E+26	1E+23	1E+20	1E+17	1E+14	1E+11	1E+08	1E+05	1E+04
decagram	dag	1E+25	1E+22	1E+19	1E+16	1E+13	1E+10	1E+07	1E+04	1E+03
gram	g	1E+24	1E+21	1E+18	1E+15	1E+12	1E+09	1E+06	1E+03	1E+02
decigram	dg	1E+23	1E+20	1E+17	1E+14	1E+11	1E+08	1E+05	1E+02	1E+01
centigram	cg	1E+22	1E+19	1E+16	1E+13	1E+10	1E+07	1E+04	1E+01	1
milligram	mg	1E+21	1E+18	1E+15	1E+12	1E+09	1E+06	1E+03	1	1E-01
microgram	μg	1E+18	1E+15	1E+12	1E+09	1E+06	1E+03	1	1E-03	1E-04
nanogram	ng	1E+15	1E+12	1E+09	1E+06	1E+03	1	1E-03	1E-06	1E-07
picogram	pg	1E+12	1E+09	1E+06	1E+03	1	1E-03	1E-06	1E-09	1E-10
femtogram	fg	1E+09	1E+06	1E+03	1	1E-03	1E-06	1E-09	1E-12	1E-13
attogram	ag	1E+06	1E+03	1	1E-03	1E-06	1E-09	1E-12	1E-15	1E-16
zeptogram	zg	1E+03	1	1E-03	1E-06	1E-09	1E-12	1E-15	1E-18	1E-19
yoctogram	yg	1	1E-03	1E-06	1E-09	1E-12	1E-15	1E-18	1E-21	1E-22

	dg	g	dag	hg	kg	Mg	Gg	Tg	Pg	Eg	Zg	Yg
	1E+25	1E+24	1E+23	1E+22	1E+21	1E+18	1E+15	1E+12	1E+09	1E+06	1E+03	1
	1E+22	1E+21	1E+20	1E+19	1E+18	1E+15	1E+12	1E+09	1E+06	1E+03	1	1E-03
	1E+19	1E+18	1E+17	1E+16	1E+15	1E+12	1E+09	1E+06	1E+03	1	1E-03	1E-06
	1E+16	1E+15	1E+14	1E+13	1E+12	1E+09	1E+06	1E+03	1	1E-03	1E-06	1E-09
	1E+13	1E+12	1E+11	1E+10	1E+09	1E+06	1E+03	1	1E-03	1E-06	1E-09	1E-12
	1E+10	1E+09	1E+08	1E+07	1E+06	1E+03	1	1E-03	1E-06	1E-09	1E-12	1E-15
	1E+07	1E+06	1E+05	1E+04	1E+03	1	1E-03	1E-06	1E-09	1E-12	1E-15	1E-18
	1E+04	1E+03	1E+02	1E+01	1	1E-03	1E-06	1E-09	1E-12	1E-15	1E-18	1E-21
	1E+03	1E+02	1E+01	1	1E-01	1E-04	1E-07	1E-10	1E-13	1E-16	1E-19	1E-22
	1E+02	1E+01	1	1E-01	1E-02	1E-05	1E-08	1E-11	1E-14	1E-17	1E-20	1E-23
	1E+01	1	1E-01	1E-02	1E-03	1E-06	1E-09	1E-12	1E-15	1E-18	1E-21	1E-24
	1	1E-01	1E-02	1E-03	1E-04	1E-07	1E-10	1E-13	1E-16	1E-19	1E-22	1E-25
	1E-01	1E-02	1E-03	1E-04	1E-05	1E-08	1E-11	1E-14	1E-17	1E-20	1E-23	1E-26
	1E-02	1E-03	1E-04	1E-05	1E-06	1E-09	1E-12	1E-15	1E-18	1E-21	1E-24	1E-27
	1E-05	1E-06	1E-07	1E-08	1E-09	1E-12	1E-15	1E-18	1E-21	1E-24	1E-27	1E-30
	1E-08	1E-09	1E-10	1E-11	1E-12	1E-15	1E-18	1E-21	1E-24	1E-27	1E-30	1E-33
	1E-11	1E-12	1E-13	1E-14	1E-15	1E-18	1E-21	1E-24	1E-27	1E-30	1E-33	1E-36
	1E-14	1E-15	1E-16	1E-17	1E-18	1E-21	1E-24	1E-27	1E-30	1E-33	1E-36	1E-39
	1E-17	1E-18	1E-19	1E-20	1E-21	1E-24	1E-27	1E-30	1E-33	1E-36	1E-39	1E-42
	1E-20	1E-21	1E-22	1E-23	1E-24	1E-27	1E-30	1E-33	1E-36	1E-39	1E-42	1E-45
	1E-23	1E-24	1E-25	1E-26	1E-27	1E-30	1E-33	1E-36	1E-39	1E-42	1E-45	1E-48

Table 4.2.1.2 Conversion table: units of mass (>1 kg)

Unit	Symbol	ton (UK)	lg ton (US)	ton (metric)	sh. ton (US)	kip	quintal (metric)	cwt	cental (cH)
ton (UK, shipping)	**ton (UK, ship.)**	1.151224545	1.151224545	1.169698141	1.289371491	2.578742982	11.696981410	23.02449091	25.787429824
ton (US, long)	**lg ton (US)**	**1**	**1**	1.016046909	**1.12**	**2.24**	10.160469088	**20**	**22.4**
ton (UK, short)	**ton (UK)**	**1**	**1**	1.016046909	**1.12**	**2.24**	10.160469088	**20**	**22.4**
ton (metric)	**t**	9.84206527E-01	9.84206527E-01	**1**	1.102311311	2.204622622	**10**	19.684128785	22.046226218
ton (US, short)	**sh. ton (US)**	8.92857143E-01	8.92857143E-01	9.07184740E-01	**1**	**2**	9.071847400	17.857141254	**20**
load (UK)	**load (UK)**	5.78571428E-01	5.78571428E-01	5.87855712E-01	**81/125**	**162/125**	5.878557115	11.571427533	12.960000000
kip (kilopound)	**kip**	4.46428571E-01	4.46428571E-01	**0.45359237**	**1/2**	**1**	4.535923700	8.928570627	**10**
quarter (US, long)	**lg qt (US)**	**1/4**	**1/4**	**95/374**	**7/25**	**14/25**	2.540120000	5.000004921	5.60
quarter (US, short)	**sh. qt (US)**	2.23214104E-01	2.23214104E-01	**22/97**	**1/4**	**1/2**	2.267960000	4.464281672	5.0
barrel (UK, cement)	**bbl (UK, cem.)**	1.67857143E-01	1.67857143E-01	1.70550731E-01	**1.880E-01**	**3.76E-01**	1.705507311	3.357142555	94/25
barrel (UK, salt)	**bbl (UK, salt)**	1.25	1.24994806E-01	1.270058636E-01	1.39994183E-01	2.79988366E-01	1.270005864	2.499895898	2.80
wey (UK)	**wy (UK)**	**9/80**	**9/80**	1.14305277E-01	**1.260E-01**	**2.52E-01**	1.143052772	2.249999798	63/25
quintal (metric)	**q, dt**	9.84206527E-02	9.84206527E-02	**1E-01**	1.10231131E-01	2.20462262E-01	**1**	1.968412879	2.204622622
hundredweight (gross or long)	**cwt, lg cwt**	**5E-02**	**5E-02**	5.08023500E-02	**7/125**	1.12000010E-01	5.08023500E-01	**1**	1.12
cental (centner, kintal)	**sh. cwt, cH**	4.46428571E-02	4.46428571E-02	**4.5359237E-02**	**5E-02**	**1E-01**	**4.5359237E-01**	8.92857063E-01	**1**
hundredweight (net or short)	**sh. cwt**	4.46428571E-02	4.46428571E-02	**4.5359237E-02**	**5E-02**	**1E-01**	**4.5359237E-01**	8.92857063E-01	**1**
quintal (US)	**quint (US)**	4.46428571E-02	4.46428571E-02	**4.5359237E-02**	**5E-02**	**1E-01**	**4.5359237E-01**	8.92857063E-01	**1**
bag (cement)	**bg (UK, cem.)**	4.19642857E-02	4.19642857E-02	4.26376828E-02	**4/85**	**47/50**	4.26376828E-01	8.39285639E-01	9.40E-01
pood (Russian)	**pood**	1.61217950E-02	1.61217950E-02	1.638068717E-02	1.80564104E-02	3.61128209E-02	**10/61**	3.22435872E-01	3.61128209E-01
truss (UK)	**truss (UK)**	1.60714286E-02	1.60714286E-02	1.63293253E-02	**9/500**	**9/250**	1.632932532E-01	3.21428543E-01	**9/25**
slug (geepound)	**slug**	1.43634116E-02	1.43634116E-02	1.459390294E-2	1.60870210E-02	3.21740421E-02	**7/48**	2.87268207E-01	3.21740421E-01
quarter (UK)	**qt (UK)**	**1.25E-02**	**1.25E-02**	1.27005864E-02	0.14	14/50	1.27005864E-01	0.25	**2.8E-01**
myriagram	**myg**	9.84206527E-03	9.84206527E-03	**1E-02**	1.10231131E-02	2.20462262E-02	**1E-01**	1.96841288E-01	2.20462262E-01
hyl (techma, UdM, TME, mug, par)	**hyl, TME**	9.65176894E-03	9.65176894E-03	**9.80665E-03**	1.08099812E-02	2.16199624E-02	**9.80665E-02**	1.93035362E-01	2.16199624E-01
stone (UK)	**st (UK)**	**6.25E-03**	**6.25E-03**	6.35029318E-03	**7E-03**	7/50	6.35029318E-02	1.24999989E-01	**1.40E-01**
stone (UK, wool)	**st (UK, wool)**	5.58035714E-03	5.58035714E-03	5.66990463E-03	**1/160**	**1/80**	5.669904625E-02	1.11607133E-01	**1/8**
clove (UK)	**cl (UK)**	3.57142857E-03	3.57142857E-03	3.62873896E-03	**4E-03**	**8E-03**	3.62873896E-02	7.14285650E-02	**8E-02**
kilogram	**kg**	9.84206527E-04	9.84206527E-04	**1E-03**	1.10231131E-03	2.20462262E-03	**1E-02**	1.96841288E-02	2.20462262E-02

Table 4.2.1.2 *(continued)*

Unit	Symbol	cental (cH)	pood	slug (geepound)	quarter (UK)	hyl (techma)	stone (UK)	kg	lb (1963)
ton (UK, shipping)	**ton (UK, ship.)**	25.787429824	71.407963188	80.149798272	92.09796366	119.276015867	184.195927313	1169.698141000	2578.742982383
ton (US, long)	**lg ton (US)**	**22.4**	62.027832410	69.621342396	**80**	103.607950605	**160**	1016.046908800	**2240**
ton (UK, short)	**ton (UK)**	**22.4**	62.027832410	69.621342396	**80**	103.607950605	**160**	1016.046908800	**2240**
ton (metric)	**t**	**22.046226218**	61.048197552	68.521779648	78.736522209	101.971621298	157.473044418	**1000**	2204.622621849
ton (US, short)	**sh. ton (US)**	**20**	55.381993224	62.161912854	71.428571429	92.507098754	142.857142857	907.184740000	**2000**
load (UK)	**load (UK)**	12.960000000	35.887531609	40.280919529	46.285714286	59.944599993	92.571428571	587.855711520	**1296**
kip (kilopound)	**kip**	**10**	27.690996612	31.080956427	35.714285714	46.253549377	71.428571429	453.59237	**1000**
quarter (US, long)	**lg qt (US)**	5.600006014	15.506974757	17.405354292	20.000021479	25.902015469	**40**	254.011727200	**560**
quarter (US, short)	**sh. qt (US)**	5.0	13.845487012	15.540465537	17.857128291	23.126755824	35.714285714	226.796185000	**500**
barrel (UK, cement)	**bbl (UK, cem.)**	3.76	10.411814725	11.686439615	13.428571427	17.391334564	26.857142854	170.550731100	**376**
barrel (UK, salt)	**bbl (UK, salt)**	2.8	7.753156885	8.702306194	9.999584488	12.950455697	19.999168977	127.000586360	**280**
wey (UK)	**wy (UK)**	2.52	6.978131146	7.832401020	**9**	11.655894443	**18**	114.305277240	**252**
quintal (metric)	**q, dt**	2.204622622	6.104819755	6.852177965	7.873652221	10.197162130	15.747304442	**100**	220.462262185
hundredweight (gross or long)	**cwt, lg cwt**	1.120000101	3.101391899	3.481067432	4.000000359	5.180397995	8.000000718	**50.80235**	**112**
cental (centner, kintal)	**sh. cwt, cH**	**1**	2.769099661	3.108095643	3.571428571	4.625354938	7.142857143	**45.359237**	**100**
hundredweight (net or short)	**sh. cwt**	**1**	2.769099661	3.108095643	3.571428571	4.625354938	7.142857143	**45.359237**	**100**
quintal (US)	**quint (US)**	**1**	2.769099661	3.108095643	3.571428571	4.625354938	7.142857143	**45.359237**	**100**
bag (cement)	**bg (UK, cem.)**	9.40E-01	2.602953682	2.921609904	3.357142857	4.347833641	6.714285714	42.637682780	**94**
pood (Russian)	**pood**	3.61128209E-01	**1**	1.122421012	1.289743602	1.670346143	2.579487204	16.380500000	36.112820857
truss (UK)	**truss (UK)**	9/25	9.96875878E-01	1.118914431	1.285714286	1.665127778	2.571428571	16.329325320	**36**
slug (geepound)	**slug**	3.21740421E-01	8.90931290E-01	**1**	1.149072931	1.488163644	2.298146326	14.593902940	32.174042081
quarter (UK)	**qt (UK)**	**2.8E-01**	7.75347905E-01	8.70266780E-01	**1**	1.295099383	2	12.700586360	**28**
myriagram	**myg**	2.20462262E-01	6.10481976E-01	6.85217796E-01	7.87365222E-01	1.019716213	1.574730444	**10**	22.046226218
hyl (techma, UdM, TME, mug, par)	**hyl, TME**	2.16199624E-01	5.98678307E-01	6.71969110E-01	7.72141516E-01	**1**	1.544283031	**9.80665**	21.619962435
stone (UK)	**st (UK)**	**1.40E-01**	3.87673953E-01	4.35133390E-01	**5E-01**	6.47549691E-01	**1**	6.350293180	**14**
stone (UK, wool)	**st (UK, wool)**	**1/8**	3.46137458E-01	3.88511955E-01	4.46428571E-01	5.78169367E-01	8.92857143E-01	5.669904625	**12.5**
clove (UK)	**cl (UK)**	**8E-02**	2.21527973E-01	2.48647651E-01	2.85714286E-01	3.70028395E-01	5.71428571E-01	3.62873896	**8**
kilogram	**kg**	2.20462262E-02	6.10481976E-02	6.85217796E-02	7.87365222E-02	1.01971621E-01	1.57473044E-01	**1**	2.204622622

Table 4.2.1.3 Conversion table: units of mass (<1 kg)

Unit	Symbol	kg	lb (av., old)	lb (av., 1963)
kilogram	**kg**	**1**	2.2046223414	2.2046226218
livre (de Paris)	**livre**	4.8950585E-01	1.0791846823	1.0791848196
pound (avoirdupois)	**lb (av.)**	4.53592428E-01	**1**	1.0000001272
pound (WMA, 1963)	**lb (1963)**	0.45359237	9.99999873E-01	**1**
pound (imperial standard)	**lb (IS)**	4.53592338E-01	9.99999802E-01	9.99999929E-01
pound (US)	**lb (US)**	4.53592243E-01	9.99999592E-01	9.99999720E-01
pound (apothecary, troy)	**lb (troy)**	3.73241722E-01	8.22856991E-01	8.22857095E-01
marc (de Paris)	**marc**	2.44752925E-01	5.39592341E-01	5.39592410E-01
quarteron (de Paris)	**quarteron**	1.22377500E-01	2.69796171E-01	2.69796205E-01
hectogram	**hg**	**1E-01**	2.20462234E-01	2.20462262E-01
ton (assay UK)	**AT (UK)**	3.26666700E-02	7.20176705E-02	7.20176797E-02
ounce (apothecary, troy)	**oz (troy)**	3.11034768E-02	6.85714198E-02	6.85714286E-02
once (de Paris)	**once**	3.05943750E-02	6.74490426E-02	6.74490512E-02
ton (assay US)	**AT (US)**	2.91666700E-02	6.43014923E-02	6.43015005E-02
ounce (avoirdupois)	**oz (av.)**	2.83495231E-02	6.24999920E-02	**1/16**
lot (de Paris)	**lot**	1.52971875E-02	3.37245213E-02	3.37245256E-02
dram (troy)	**dr (troy)**	3.88793460E-03	8.57142748E-03	**3/350**
drachm (apothecary)	**dr (ap.)**	3.88793460E-03	8.57142748E-03	**3/350**
gros (de Paris)	gros	3.82429688E-03	8.43113033E-03	8.43113140E-03
momme (Japan, pearl)	**momme**	**3.75E-03**	8.26733378E-03	8.26733483E-03
dram (avoirdupois)	**dr (av.)**	1.77184520E-03	3.90624950E-03	**1/256**
scruple (av.)	**scr (av.)**	1.57497351E-03	3.47222178E-03	**1/288**
pennyweight (troy)	**dwt (troy)**	1.55517384E-03	3.42857099E-03	3.42857143E-03
denier (de Paris)	**denier**	1.27476563E-03	2.81037678E-03	2.81037713E-03
gram	**g**	**1E-03**	2.20462234E-03	2.20462262E-03
glug	**glug**	**1E-03**	2.20462234E-03	2.20462262E-03
carat (old)	**ct (old)**	**2.05E-04**	4.51947580E-04	4.51947637E-04
carat (metric)	**ct**	**2E-04**	4.40924468E-04	4.40924524E-04
crith	**crith**	8.92295583E-05	1.96717478E-04	1.96717503E-04
grain (avdp, troy, apoth.)	**gr (av.)**	6.47989100E-05	1.42857125E-04	**1/7000**
grain (de Paris)	**grain**	5.31152344E-05	1.17099032E-04	1.17099047E-04
grain (jeweller's)	**gr (jew.)**	**5E-05**	1.10231117E-04	1.10231131E-04
centigram	**cg**	**1E-05**	2.20462234E-05	2.20462262E-05
milligram	**mg**	**1E-06**	2.20462234E-06	2.20462262E-06
microgram	**µg**	**1E-09**	2.20462234E-09	2.20462262E-09
gamma	**γ**	**1E-09**	2.20462234E-09	2.20462262E-09
milligamma	**γγ**	**1E-12**	2.20462234E-12	2.20462262E-12
microgamma	**γγγ**	**1E-15**	2.20462234E-15	2.20462262E-15
dalton	**Da**	1.66057000E-27	3.66092972E-27	3.66093019E-27
atomic mass unit (^{12}C)	u(^{12}C)	1.66054018E-27	3.66086399E-27	3.66086445E-27
atomic mass unit (^{16}O)	u(^{16}O)	1.66001241E-27	3.65970044E-27	3.65970090E-27
atomic mass unit (^{1}H)	u(^{1}H)	1.67353397E-27	3.68951038E-27	3.68951085E-27
a.u. of mass	$\mathbf{m_e}$	9.10938970E-31	9.10938970E-31	9.10938970E-31

	lb (US)	lb (troy)	ton (UK, assay)	oz (troy)	ton (US, assay)
	2.2046232402	2.6792290358	30.6122417743	32.1507465686	34.2857103673
	1.0791851223	1.3115094053	14.9849984709	15.7381119528	16.7831980819
	1.0000004077	1.2152780027	13.8854810637	14.5833351884	15.5517386009
	1.0000002805	1.2152778481	13.8854792974	14.5833333333	15.5517366227
	1.0000002099	1.2152777624	13.8854783178	14.5833323045	15.5517355255
	1	1.2152775072	13.8854754026	14.5833292428	15.5517322605
	8.22857326E-01	**1**	11.4257658219	12	12.7968575638
	5.39592561E-01	6.55754703E-01	7.4924992355	7.8690559764	8.3915990410
	2.69796281E-01	3.27877351E-01	3.7462496177	3.9345279882	4.1957995205
	2.20462324E-01	2.67922904E-01	3.0612241774	3.2150746569	3.4285710367
	7.20176999E-02	8.75214908E-02	**1**	1.0502578284	1.1199999863
	6.85714478E-02	**1/12**	9.521471518E-01	**1**	1.0664047970
	6.74490701E-02	8.19693378E-02	9.365624044E-01	9.83631997E-01	1.0489498801
	6.43015185E-02	7.81441891E-02	8.928571538E-01	9.37730215E-01	**1**
	6.25000175E-02	7.59548655E-02	8.678424561E-01	9.11458333E-01	9.71983539E-01
	3.37245351E-02	4.09846689E-02	4.682812022E-01	4.91815999E-01	5.24474940E-01
	8.57143098E-03	**1/96**	1.190183940E-01	**1/8**	1.33300600E-01
	8.57143098E-03	**1/96**	1.190183940E-01	**1/8**	1.33300600E-01
	8.43113377E-03	1.02461672E-02	1.170703006E-01	1.22954000E-01	1.31118735E-01
	8.26733715E-03	1.00471089E-02	1.147959067E-01	1.20565300E-01	1.28571414E-01
	3.90625110E-03	4.74717909E-03	5.424015351E-02	5.69661458E-02	6.07489712E-02
	3.47222320E-03	4.21971475E-03	4.821346978E-02	5.06365741E-02	5.39990855E-02
	3.42857239E-03	**1/240**	4.760735759E-02	**1/20**	5.33202398E-02
	2.81037792E-03	3.41538908E-03	3.902343352E-02	4.09846665E-02	4.37062450E-02
	2.20462324E-03	2.67922904E-03	3.061224177E-02	3.21507466E-02	3.42857104E-02
	2.20462324E-03	2.67922904E-03	3.061224177E-02	3.21507466E-02	3.42857104E-02
	4.51947764E-04	5.49241952E-04	6.275509564E-03	6.59090305E-03	7.02857063E-03
	4.40924648E-04	5.35845807E-04	6.122448355E-03	6.43014931E-03	6.85714207E-03
	1.96717558E-04	2.39066423E-04	2.731516813E-03	2.86879692E-03	3.05929879E-03
	1.42857183E-04	**1/5760**	1.983639900E-03	**1/480**	2.22167666E-03
	1.17099080E-04	1.42307878E-04	1.625976397E-03	1.70769444E-03	1.82109354E-03
	1.10231162E-04	1.33961452E-04	1.530612089E-03	1.60753733E-03	1.71428552E-03
	2.20462324E-05	2.67922904E-05	3.061224177E-04	3.21507466E-04	3.42857104E-04
	2.20462324E-06	2.67922904E-06	3.061224177E-05	3.21507466E-05	3.42857104E-05
	2.20462324E-09	2.67922904E-09	3.061224177E-08	3.21507466E-08	3.42857104E-08
	2.20462324E-09	2.67922904E-09	3.061224177E-08	3.21507466E-08	3.42857104E-08
	2.20462324E-12	2.67922904E-12	3.061224177E-11	3.21507466E-11	3.42857104E-11
	2.20462324E-15	2.67922904E-15	3.061224177E-14	3.21507466E-14	3.42857104E-14
	3.66093121E-27	4.44904736E-27	5.083377032E-26	5.33885652E-26	5.69338221E-26
	3.66086548E-27	4.44896748E-27	5.083285759E-26	5.33876066E-26	5.69327998E-26
	3.65970193E-27	4.44755344E-27	5.081670111E-26	5.33706382E-26	5.69147045E-26
	3.68951188E-27	4.48378080E-27	5.123062648E-26	5.38053665E-26	5.73783010E-26
	9.10938970E-31	9.10938970E-31	9.109389700E-31	9.10938970E-31	9.10938970E-31

(Continued overleaf)

Table 4.2.1.3 *(continued)* Conversion table: units of mass (<1 kg)

Unit	Symbol	ton (US, assay)	oz (av.)	dr (troy)
kilogram	**kg**	34.2857103673	35.2739619496	257.2059725490
livre (de Paris)	**livre**	**16.7831980819**	17.2669571139	125.9048956225
pound (avoirdupois)	**lb (av.)**	**15.5517386009**	16.0000020353	116.6666815075
pound (WMA, 1963)	**lb (1963)**	**15.5517366227**	16	116.6666666667
pound (imperial standard)	**lb (IS)**	**15.5517355255**	15.9999988712	116.6666584361
pound (US)	**lb (US)**	**15.5517322605**	15.9999955121	116.6666339424
pound (apothecary, troy)	**lb (troy)**	**12.7968575638**	13.1657135238	96
marc (de Paris)	**marc**	**8.3915990410**	8.6334785570	62.9524478112
quarteron (de Paris)	**quarteron**	**4.1957995205**	4.3167392785	31.4762239056
hectogram	**hg**	**3.4285710367**	3.5273961950	25.7205972549
ton (assay UK)	**AT (UK)**	**1.1199999863**	1.1522828746	8.4020626273
ounce (apothecary, troy)	**oz (troy)**	**1.0664047970**	1.0971428571	8
once (de Paris)	**once**	**1.0489498801**	1.0791848196	7.8690559764
ton (assay US)	**AT (US)**	**1**	1.0288240078	7.5018417234
ounce (avoirdupois)	**oz (av.)**	**9.71983539E-01**	**1**	**175/24**
lot (de Paris)	**lot**	**5.24474940E-01**	5.39592410E-01	3.9345279882
dram (troy)	**dr (troy)**	**1.33300600E-01**	1.37142857E-01	**1**
drachm (apothecary)	**dr (ap.)**	**1.33300600E-01**	1.37142857E-01	**1**
gros (de Paris)	**gros**	**1.31118735E-01**	1.34898102E-01	9.83631997E-01
momme (Japan, pearl)	**momme**	**1.28571414E-01**	1.32277357E-01	9.64522397E-01
dram (avoirdupois)	**dr (av.)**	**6.07489712E-02**	**1/16**	4.55729167E-01
scruple (av.)	**scr (av.)**	**5.39990855E-02**	**1/18**	4.05092593E-01
pennyweight (troy)	**dwt (troy)**	**5.33202398E-02**	5.48571429E-02	2/5
denier (de Paris)	**denier**	**4.37062450E-02**	4.49660342E-02	3.27877332E-01
gram	**g**	**3.42857104E-02**	3.52739619E-02	2.57205973E-01
glug	**glug**	**3.42857104E-02**	3.52739619E-02	2.57205973E-01
carat (old)	**ct (old)**	**7.02857063E-03**	7.23116220E-03	5.27272244E-02
carat (metric)	**ct**	**6.85714207E-03**	7.05479239E-03	5.14411945E-02
crith	**crith**	**3.05929879E-03**	3.14748004E-03	2.29503753E-02
grain (avdp, troy, apoth.)	**gr (av.)**	**2.22167666E-03**	**2/875**	**1/60**
grain (de Paris)	**grain**	**1.82109354E-03**	1.87358476E-03	1.36615555E-02
grain (jeweller's)	**gr (jew.)**	**1.71428552E-03**	1.76369810E-03	1.28602986E-02
centigram	**cg**	**3.42857104E-04**	3.52739619E-04	2.57205973E-03
milligram	**mg**	**3.42857104E-05**	3.52739619E-05	2.57205973E-04
microgram	**µg**	**3.42857104E-08**	3.52739619E-08	2.57205973E-07
gamma	**γ**	3.42857104E-08	3.52739619E-08	2.57205973E-07
milligamma	**γγ**	3.42857104E-11	3.52739619E-11	2.57205973E-10
microgamma	**γγγ**	3.42857104E-14	3.52739619E-14	2.57205973E-13
dalton	**Da**	**5.69338221E-26**	5.85748830E-26	4.27108522E-25
atomic mass unit (^{12}C)	u(^{12}C)	5.69327998E-26	5.85738313E-26	4.27107335E-25
atomic mass unit (^{16}O)	u(^{16}O)	5.69147045E-26	5.85552144E-26	4.26971586E-25
atomic mass unit (^{1}H)	u(^{1}H)	5.73783010E-26	5.90321735E-26	4.30449465E-25
a.u. of mass	$\mathbf{m_e}$	**9.10938970E-31**	9.10938970E-31	9.10938970E-31

	dr (av.)	dwt (troy)	scruple (UK)	gram	grain (av.)
	564.3833911933	643.0149313726	634.9313150924	**1000**	15432.358352941
	276.2713138230	314.7622390562	310.8052280509	489.5100000000	7554.2937373484
	256.0000325649	291.6667037686	288.0000366355	453.5924277000	7000.0008904471
	256	291.6666666667	**288**	453.59237	**7000**
	255.9999819397	291.6666460902	287.9999796822	453.5923380000	6999.9995061645
	255.9999281935	291.6665848559	287.9999192177	453.5922427700	6999.9980365411
	210.6514163807	**240**	236.9828434283	373.2417000000	**5760**
	138.1356569115	157.3811195281	155.4026140255	244.7550000000	3777.1468686742
	69.0678284558	78.6905597640	77.7013070127	122.3775000000	1888.5734343371
	56.4383391193	64.3014931373	63.4931315092	**100**	1543.2358352941
	18.4365259936	21.0051565682	20.7410917428	32.6666700000	504.1237576373
	17.5542857143	**20**	**20**	31.1034768000	**480**
	17.2669571139	19.6726399410	19.4253267532	30.5943750000	4.721433586E+02
	16.4611841244	18.7546043084	18.5188321400	29.1666700000	450.1105034020
	16	18.2291666667	18	28.3495231250	**437.5**
	8.6334785570	9.8363199705	9.7126633766	15.2971875000	236.0716792921
	2.1942857143	**5/2**	**2**	3.8879346000	**60**
	2.1942857143	**5/2**	**2**	3.8879346000	**60**
	2.1583696392	2.4590799926	2.4281658441	3.8242968750	59.0179198230
	2.1164377170	2.4113059926	2.3809924316	3.75	5.787134382E+01
	1	1.1393229167	**9/8**	1.7718451953	**875/32**
	8/9	1.0127314815	**1**	1.5749735069	24.305555556
	8.77714286E-01	**1**	9.87428571E-01	1.5551738400	**24**
	7.19456546E-01	8.19693331E-01	8.09388615E-01	1.2747656250	19.6726399410
	5.64383391E-01	6.43014931E-01	6.34931315E-01	**1**	15.4323583529
	5.64383391E-01	6.43014931E-01	6.34931315E-01	**1**	15.4323583529
	1.15698595E-01	1.31818061E-01	1.30160920E-01	2.05E-01	3.1636334624
	1.12876678E-01	1.28602986E-01	1.26986263E-01	**2E-01**	3.0864716706
	5.03596807E-02	5.73759383E-02	5.66546408E-02	8.92295583E-02	1.377022520E+00
	32/875	**1/24**	**3/73**	6.47989100E-02	**1**
	2.99773561E-02	3.41538888E-02	3.37245256E-02	5.31152344E-02	8.196933309E-01
	2.82191696E-02	3.21507466E-02	3.17465658E-02	**5E-02**	7.716179176E-01
	5.64383391E-03	6.43014931E-03	6.34931315E-03	**1E-02**	1.543235835E-01
	5.64383391E-04	6.43014931E-04	6.34931315E-04	**1E-03**	1.543235835E-02
	5.64383391E-07	6.43014931E-07	6.34931315E-07	**1E-06**	1.543235835E-05
	5.64383391E-07	6.43014931E-07	6.34931315E-07	**1E-06**	1.543235835E-05
	5.64383391E-10	6.43014931E-10	6.34931315E-10	**1E-09**	1.543235835E-08
	5.64383391E-13	6.43014931E-13	6.34931315E-13	**1E-12**	1.543235835E-11
	9.37198128E-25	1.06777130E-24	1.05434789E-24	1.66057000E-24	2.562651131E-23
	9.37195524E-25	1.06776834E-24	1.05434496E-24	1.66056539E-24	2.562644012E-23
	9.36897651E-25	1.06742896E-24	1.05400986E-24	1.66003760E-24	2.561829513E-23
	9.44529112E-25	1.07612366E-24	1.06259525E-24	1.67355937E-24	2.582696791E-23
	9.10938970E-31	9.10938970E-31	9.10938970E-31	9.10938970E-31	9.109389700E-31

Table 4.2.1.4 Conversion table for atomic units of mass

Before the modern unified definition of the atomic mass unit, the atomic mass unit was defined as follows: (i) in the **Physical System**, it was the *A*th part of the mass of a selected isotope of an atom (e.g. ^{1}H, ^{12}C, ^{16}O) of which the nuclide $^{A}_{Z}X$ has a mass number *A*; (ii) in the **Chemical System**, it was defined as the *A*th part of the mass of an atom X of an element (e.g. H, C, O) which has the natural isotopic composition. For historical reasons, the physical system was first defined from the nuclide isotope 1 of the hydrogen atom ($^{1}_{1}$H), and later from the isotope 16 of the oxygen atom ($^{16}_{8}$O). By contrast, the chemical system of microscopic mass was first defined from the hydrogen atom, and later from the oxygen atom having the natural isotopic composition of sea water. Finally, it was definitively set up from the 12th part of the mass of the isotope 12 of the carbon atom ($^{12}_{6}$C). It is defined by *u* (the old symbol *u.m.a.* is definitely obsolete even if it is still often employed).

It should be noticed that the choice of the isotope of an element as the atomic mass unit has a direct impact on the numerical values of the atomic masses of chemical elements and above all the numerical values of fundamental physical constants (e.g. Avogadro's number, Faraday's constant, Boltzmann's constant, etc). The deviation between the atomic masses depending on the choice of the standard isotope are negligible when dealing with elementary chemical computations (e.g. molecular mass calculus, etc). However, it is completely different when dealing with accurate computation as in nuclear physics (e.g. packing fraction, mass excess and nuclei binding energy computations). Generally speaking, atomic mass unit tables that one can find in old textbooks often indicate which isotope or element is taken as the standard reference. In case of doubt, one should know either at which date the table was compiled or know the accurate value of the atomic mass of one isotope or element in the different systems.

Conversion factors between physical atomic mass units (u)			
	$u(^{1}\mathrm{H})$	$u(^{12}\mathrm{C})$	$u(^{16}\mathrm{O})$
$u(^{1}\mathrm{H})$	**1**	1.007825035	1.00814545955
$u(^{12}\mathrm{C})$	0.9922357206	**1**	1.00031793668
$u(^{16}\mathrm{O})$	0.991920352894	0.999682164375	**1**

Atomic mass of the three standard isotopes in the three physical systems			
	$u(^{1}\mathrm{H})$	$u(^{12}\mathrm{C})$	$u(^{16}\mathrm{O})$
$m(^{1}\mathrm{H})$	**1**	1.007825035	1.00814545955
$m(^{12}\mathrm{C})$	11.9068286491	**12**	12.0038152401
$m(^{16}\mathrm{O})$	15.8707256463	15.99491463	**16**

Properties of the natural isotopes of the three standard chemical elements for atomic mass systems [Atomic Masses (1997)]				
Chemical element	Naturally occuring isotopes	A	Atomic mass (m_a/u) ($^{12}C = 12$)	Isotopic abundance (x/mol.%)
Hydrogen ($Z = 1$)	^{1}H	1	1.007825035	99.985
	^{2}H (D)	2	2.014101779	0.015
Carbon ($Z = 6$)	^{12}C	12	12.000000000	98.90
	^{13}C	13	13.003354826	1.10
Oxygen ($Z = 8$)	^{16}O	16	15.99491463	99.762
	^{17}O	17	16.9991312	0.038
	^{18}O	18	17.9991603	0.200

Conversion factors between chemical atomic mass units (u)			
	u(H)	**$u(^{12}C)$**	**u(O)**
u (H)	1	1.00797597651	1.00801977978
$u(^{12}C)$	0.992087136305	**1**	1.00004345666
u(O)	0.99204400980	0.999956545231	**1**

Atomic mass of the three standard elements in the three physical systems			
	$u(^{1}H)$	**$u(^{12}C)$**	**$u(^{16}O)$**
m(H)	1.00014976940	1.00797597651	1.00829644905
m(C)	11.9177798567	12.0110369031	12.0148556523
m (O)	15.8750816516	15.9993047237	16.0043914895

Atomic mass of the three standard elements in the two obsolete chemical systems and the modern system of atomic mass ($^{12}C = 12$)			
	u(H)	**$u(^{12}C)$**	**u(O)**
m(H)	1.00000000000	1.00797597651	1.00801977978
m(C)	11.9159952052	12.0110369031	12.0115588626
m (O)	15.8727044061	15.9993047237	16.0000000000

References: R. D. Vocke, Jr, *Atomic Weights of the Elements*, 1997.
K. J. R Rosman, and P. D. P. Taylor, *Isotopic Compositions of the Elements*, 1997.
G. Audi, and A. H. Wapstra, in the 1995 update to the atomic mass evaluation.

4.2.2 Conversion Tables for Units of Length

Table 4.2.2.1 Conversion table: units of length: multiples and submultiples (SI)

Unit	Symbol	Ym	Zm	Em	Pm	Tm	Gm	Mm	km	hm
yottametre	**Ym**	**1**	1E+03	1E+06	1E+09	1E+12	1E+15	1E+18	1E+21	1E+22
zettametre	**Zm**	1E-03	**1**	1E+03	1E+06	1E+09	1E+12	1E+15	1E+18	1E+19
exametre	**Em**	1E-06	1E-03	**1**	1E+03	1E+06	1E+09	1E+12	1E+15	1E+16
petametre	**Pm**	1E-09	1E-06	1E-03	**1**	1E+03	1E+06	1E+09	1E+12	1E+13
terametre	**Tm**	1E-12	1E-09	1E-06	1E-03	**1**	1E+03	1E+06	1E+09	1E+10
gigametre	**Gm**	1E-15	1E-12	1E-09	1E-06	1E-03	**1**	1E+03	1E+06	1E+07
megametre	**Mm**	1E-18	1E-15	1E-12	1E-09	1E-06	1E-03	**1**	1E+03	1E+04
kilometre	**km**	1E-21	1E-18	1E-15	1E-12	1E-09	1E-06	1E-03	**1**	1E+01
hectometre	**hm**	1E-22	1E-19	1E-16	1E-13	1E-10	1E-07	1E-04	1E-01	**1**
decametre	**dam**	1E-23	1E-20	1E-17	1E-14	1E-11	1E-08	1E-05	1E-02	1E-01
metre	**m**	1E-24	1E-21	1E-18	1E-15	1E-12	1E-09	1E-06	1E-03	1E-02
decimetre	**dm**	1E-25	1E-22	1E-19	1E-16	1E-13	1E-10	1E-07	1E-04	1E-03
centimetre	**cm**	1E-26	1E-23	1E-20	1E-17	1E-14	1E-11	1E-08	1E-05	1E-04
millimetre	**mm**	1E-27	1E-24	1E-21	1E-18	1E-15	1E-12	1E-09	1E-06	1E-05
micrometre	**μm**	1E-30	1E-27	1E-24	1E-21	1E-18	1E-15	1E-12	1E-09	1E-08
nanometre	**nm**	1E-33	1E-30	1E-27	1E-24	1E-21	1E-18	1E-15	1E-12	1E-11
picometre	**pm**	1E-36	1E-33	1E-30	1E-27	1E-24	1E-21	1E-18	1E-15	1E-14
femtometre	**fm**	1E-39	1E-36	1E-33	1E-30	1E-27	1E-24	1E-21	1E-18	1E-17
attometre	**am**	1E-42	1E-39	1E-36	1E-33	1E-30	1E-27	1E-24	1E-21	1E-20
zeptometre	**zm**	1E-45	1E-42	1E-39	1E-36	1E-33	1E-30	1E-27	1E-24	1E-23
yoctometre	**ym**	1E-48	1E-45	1E-42	1E-39	1E-36	1E-33	1E-30	1E-27	1E-26

	dam	m	dm	cm	mm	µm	nm	pm	fm	am	zm	ym
	1E+23	1E+24	1E+25	1E+26	1E+27	1E+30	1E+33	1E+36	1E+39	1E+42	1E+45	1E+48
	1E+20	1E+21	1E+22	1E+23	1E+24	1E+27	1E+30	1E+33	1E+36	1E+39	1E+42	1E+45
	1E+17	1E+18	1E+19	1E+20	1E+21	1E+24	1E+27	1E+30	1E+33	1E+36	1E+39	1E+42
	1E+14	1E+15	1E+16	1E+17	1E+18	1E+21	1E+24	1E+27	1E+30	1E+33	1E+36	1E+39
	1E+11	1E+12	1E+13	1E+14	1E+15	1E+18	1E+21	1E+24	1E+27	1E+30	1E+33	1E+36
	1E+08	1E+09	1E+10	1E+11	1E+12	1E+15	1E+18	1E+21	1E+24	1E+27	1E+30	1E+33
	1E+05	1E+06	1E+07	1E+08	1E+09	1E+12	1E+15	1E+18	1E+21	1E+24	1E+27	1E+30
	1E+02	1E+03	1E+04	1E+05	1E+06	1E+09	1E+12	1E+15	1E+18	1E+21	1E+24	1E+27
	1E+01	1E+02	1E+03	1E+04	1E+05	1E+08	1E+11	1E+14	1E+17	1E+20	1E+23	1E+26
	1	1E+01	1E+02	1E+03	1E+04	1E+07	1E+10	1E+13	1E+16	1E+19	1E+22	1E+25
	1E-01	**1**	1E+01	1E+02	1E+03	1E+06	1E+09	1E+12	1E+15	1E+18	1E+21	1E+24
	1E-02	1E-01	**1**	1E+01	1E+02	1E+05	1E+08	1E+11	1E+14	1E+17	1E+20	1E+23
	1E-03	1E-02	1E-01	**1**	1E+01	1E+04	1E+07	1E+10	1E+13	1E+16	1E+19	1E+22
	1E-04	1E-03	1E-02	1E-01	**1**	1E+03	1E+06	1E+09	1E+12	1E+15	1E+18	1E+21
	1E-07	1E-06	1E-05	1E-04	1E-03	**1**	1E+03	1E+06	1E+09	1E+12	1E+15	1E+18
	1E-10	1E-09	1E-08	1E-07	1E-06	1E-03	**1**	1E+03	1E+06	1E+09	1E+12	1E+15
	1E-13	1E-12	1E-11	1E-10	1E-09	1E-06	1E-03	**1**	1E+03	1E+06	1E+09	1E+12
	1E-16	1E-15	1E-14	1E-13	1E-12	1E-09	1E-06	1E-03	**1**	1E+03	1E+06	1E+09
	1E-19	1E-18	1E-17	1E-16	1E-15	1E-12	1E-09	1E-06	1E-03	**1**	1E+03	1E+06
	1E-22	1E-21	1E-20	1E-19	1E-18	1E-15	1E-12	1E-09	1E-06	1E-03	**1**	1E+03
	1E-25	1E-24	1E-23	1E-22	1E-21	1E-18	1E-15	1E-12	1E-09	1E-06	1E-03	**1**

Table 4.2.2.2 Conversion table: units of length (>1 m)

Unit	Symbol	mile (geograph.)	league (UK, naut.)	league (int., naut.)
hubble	hubble	1.274730715E+21	1.701671286E+21	1.702759179E+21
siriusweit	-	2.078852095E+13	2.775113894E+13	2.776888049E+13
siriometre	srm	2.015711591E+13	2.690825987E+13	2.692546256E+13
parsec	pc	4.157704190E+12	5.550227788E+12	5.553776098E+12
spat	spat	1.347419980E+08	1.798706083E+08	1.799856012E+08
astronomic unit	AU	2.015711591E+07	2.690825987E+07	2.692546256E+07
myriametre	mym	1.34741998043	1.79870608279	1.79985601152
mile (geographical)	mi (geogr.)	**1**	1.33492608757	1.33577951764
league (UK, naut.)	lg (UK, naut.)	7.491051447E-01	**1**	1.00063930886
league (int., naut.)	lg (int., naut.)	7.486265411E-01	3.452338344E-03	**1**
league (US, stat.)	lg (US, stat.)	6.505386783E-01	8.684210526E-01	8.689762419E-01
league (Canadian)	lg (Can.)	6.503996246E-01	8.682354262E-01	8.687904968E-01
lieue (metric)	lieue (metric)	5.389679922E-01	7.194824331E-01	7.199424046E-01
lieue (de Poste)	lieue (de Poste)	5.252243084E-01	7.011356311E-01	7.015838733E-01
mile (telegr., naut.)	mi (tel., naut.)	2.499892004E-01	3.337171053E-01	3.339304536E-01
mile (UK, naut.)	mi (UK, naut.)	2.497017149E-01	1.151515152E-03	3.335464363E-01
mile (US, naut.)	mi (US, naut.)	2.497017149E-01	1.151515152E-03	3.335464363E-01
mile (int., naut.)	mi (int., naut.)	2.495421804E-01	1.150779448E-03	**1/3**
mile (US, survey)	mi (US, surv.)	2.168466598E-01	1.000002000E-03	2.896593266E-01
mile (int., statute)	mi (int., stat.)	2.168466303E-01	2.894742238E-01	2.896592873E-01
mile (US, statute)	mi (US, stat.)	2.168462261E-01	**1E-03**	2.896587473E-01
kilometre	km	1.347419980E-01	6.213711922E-04	1.799856012E-01
encablure	encablure	2.964323957E-02	3.957153382E-02	3.959683225E-02
furlong (UK)	fur	2.710577826E-02	**1/8000**	3.620734341E-02
cable length (UK)	cbl (UK, naut.)	2.497017149E-02	1/30	3.335464363E-02
cable length (int.)	cbl (int.)	2.495421804E-02	1.150779448E-04	**1/30**
skein (UK)	–	1.478496996E-02	1.973684211E-02	1.974946004E-02
arpent (Québec)	–	7.878541138E-03	1.051727010E-02	1.052399388E-02
bolt (US, cloth)	–	4.928323320E-03	2.272727273E-05	6.583153348E-03
chain (engineer's) or (Ramdsden's)	ch (eng.), ch (Ramsden)	4.106936100E-03	1.893939394E-05	5.485961123E-03
shacles (UK)	–	3.696242490E-03	4.934210526E-03	4.937365011E-03
chain (surveyor's)	ch (surv.)	2.710577826E-03	**1.25E-05**	3.620734341E-03
chain (Gunter's)	ch (Gunt.)	2.710577826E-03	3.618421053E-03	3.620734341E-03
rope (UK)	rope	8.213872201E-04	3.787878788E-06	1.097192225E-03
perche (de Paris)	perche	7.878364626E-04	1.051703447E-03	1.052375810E-03
perch (pole, rod)	rod	6.776444566E-04	**3.125E-06**	9.051835853E-04
toise (metric)	toise (metric)	2.694839961E-04	3.597412166E-04	3.599712023E-04
toise (de Paris)	toise	2.626170857E-04	3.505743988E-04	3.507985241E-04
aune (de Paris)	aune	2.533887759E-04	3.382552873E-04	3.384715369E-04
fathom	fath	2.464161660E-04	1.136363636E-06	3.291576674E-04
ell	ell	1.540101038E-04	7.102272727E-07	2.057235421E-04
metre	m	1.347419980E-04	1.798706083E-04	1.799856012E-04
yard	yd	1.232080830E-04	1.644736842E-04	1.645788337E-04
pied (metric)	pied (metric)	4.446485935E-05	5.93573007E-05	5.939524838E-05
foot	ft	4.106936100E-05	5.482456140E-05	5.485961123E-05
link (engineer's)	li (eng.)	4.106936100E-05	5.482456140E-05	5.485961123E-05
span	span	3.080202075E-05	4.111842105E-05	4.114470842E-05
link (surveyor's)	li (surv.)	2.710577826E-05	3.618421053E-05	3.620734341E-05
pouce (metric)	pouce (metric)	3.705404946E-06	4.946441728E-06	4.949604032E-06
inch	in	3.422446750E-06	4.568713450E-06	4.571634269E-06

league (US, stat.)	mile (UK, naut.)	mile (US, stat.)	kilometre	cable length (UK)
1.959500268E+21	5.108277538E+21	5.878500805E+21	9.460530E+21	5.105013857E+22
3.195585696E+13	8.330664147E+13	9.586757089E+13	1.542839000E+14	8.325341682E+14
3.098526895E+13	8.077638769E+13	9.295580684E+13	1.4959787E+14	8.072477962E+14
6.391171392E+12	1.666132829E+13	1.917351418E+13	3.085678000E+13	1.665068336E+14
2.071237307E+08	5.399568035E+08	6.213711922E+08	**1E+09**	5.396118248E+09
3.098526895E+07	8.077638769E+07	9.295580684E+07	1.495979E+08	8.072477962E+08
2.07123730746	5.39956803456	6.21371192237	**10**	53.96118248377
1.53718761599	4.00733855292	4.61156284797	7.42159100000	40.04778262709
1.15151515152	3.00191792657	**38/11**	5.55955200000	**30**
1.15077944802	**3**	3.45233834407	**5.556**	29.98083298798
1	2.60692872570	**3**	4.82803200000	26.05263157895
9.997862483E-01	2.60637149028	2.99935874493	**4.827**	26.04706278492
8.284949230E-01	2.15982721382	2.48548476895	4	21.58447299351
8.073683024E-01	2.10475161987	2.42210490734	3.898	21.03406893217
3.842803030E-01	1.00179136069	1.15284090909	1.85531760000	10.01151315789
7.155183426E-04	1.00063930886	**38/33**	**1.853184**	**10**
7.155183426E-04	1.00063930886	**38/33**	**1.853184**	**10**
7.150611976E-04	**1**	1.15077944802	**1.852**	9.99361099599
6.213724350E-04	8.68977980E-01	1.00000200001	1.60934721870	8.68422789480
3.333339547E-01	8.68977862E-01	**1**	**1.609347**	8.68422671467
6.213711922E-04	8.68976242E-01	**1**	**1.609344**	8.68421052632
3.861021585E-04	5.39956803E-01	6.21371192E-01	**1**	5.39611824838
4.556722076E-02	1.18790497E-01	1.36701662E-01	**2.20E-01**	1.18714601464
7.767139903E-05	1.08622030E-01	**1/8**	2.011680000E-01	1.08552631579
3.83838383E-02	1.00063931E-01	**3/26**	1.853184000E-01	**1**
7.150611976E-05	**1/10**	1.150779448E-01	**1/5**	9.93610996E-01
1/44	5.924838013E-02	6.818181818E-02	1.097280000E-01	5.921052632E-01
1.211079587E-02	3.157198164E-02	3.633238761E-02	5.847131000E-02	3.155181029E-01
1.412207255E-05	1.974946004E-02	**1/44**	**3/82**	1.973684211E-01
1.176839379E-05	1.645788337E-02	1.893939394E-02	**3.048E-02**	1.644736842E-01
5.681818182E-03	1.481209503E-02	1.704545455E-02	**2/73**	1.480263158E-01
7.767139903E-06	1.086220302E-02	**1/80**	**2.01168E-02**	1.085526316E-01
1/240	1.086220302E-02	**1/80**	**2.01168E-02**	1.085526316E-01
2.353678758E-06	3.291576674E-03	3.787878788E-03	**6.096E-03**	3.289473684E-02
1.211052454E-03	3.157127430E-03	3.633157361E-03	5.847E-03	3.155110340E-02
1.941784976E-06	2.715550756E-03	**1/320**	5.029E-03	2.713815789E-02
4.142474615E-04	1.079913607E-03	1.242742384E-03	**2E-03**	1.079223650E-02
4.036917320E-04	1.052395572E-03	1.242742384E-03	**2E-03**	1.079223650E-02
3.895060884E-04	1.015414611E-03	1.168518265E-03	1.880547859E-03	1.014765862E-02
7.061036275E-07	9.874730022E-04	1.136363636E-03	1.828800000E-03	9.868421053E-03
4.413147672E-07	6.171706263E-04	7.102272727E-04	1.143000000E-03	6.167763158E-03
2.071237307E-04	5.399568035E-04	6.213711922E-04	**1E-03**	5.396118248E-03
1.893939394E-04	4.937365011E-04	5.681818182E-04	**9.144E-04**	4.934210526E-03
6.83508311E-05	1.781857451E-04	2.050524934E-04	**3.30E-04**	1.780719022E-03
6.313131313E-05	1.645788337E-04	1.893939394E-04	**3.048E-04**	1.644736842E-03
6.313131313E-05	1.645788337E-04	1.893939394E-04	**3.048E-04**	1.644736842E-03
4.734848485E-05	1.234341253E-04	1.420454545E-04	**2.286E-04**	1.233552632E-03
4.166666667E-05	1.086220302E-04	**1/8000**	**2.01168E-04**	1.085526316E-03
5.695902596E-06	1.484881210E-05	1.708770779E-05	**2.75E-05**	1.483932518E-04
5.260942761E-06	1.371490281E-05	1.578282828E-05	**2.54E-05**	1.370614035E-04

(Continued overleaf)

Table 4.2.2.2 *(continued)* Conversion table: units of length (>1 m)

Unit	Symbol	cable length (UK)	cable length (int.)	chain (engineer's)
hubble	hubble	5.105013857E+22	5.108277538E+22	3.103848425E+23
siriusweit	–	8.325341682E+14	8.330664147E+14	5.061807743E+15
siriometre	srm	8.072477962E+14	8.077638769E+14	4.908066601E+15
parsec	pc	1.665068336E+14	1.666132829E+14	1.012361549E+15
spat	spat	5.396118248E+09	5.399568035E+09	3.280839895E+10
astronomic unit	AU	8.072477962E+08	8.077638769E+08	4.908066601E+09
myriametre	mym	53.96118248377	53.99568034557	328.08398950131
mile (geographical)	mi (geogr.)	40.04778262709	40.07338552916	243.49051837270
league (UK, naut.)	lg (UK, naut.)	**30**	30.01917926566	**182.4**
league (int., naut.)	lg (int., naut.)	29.98083298798	**30**	182.28346456693
league (US, stat.)	lg (US, stat.)	26.05263157895	26.06928725702	**158.4**
league (Canadian)	lg (Can.)	26.04706278492	26.06371490281	158.36614173228
lieue (metric)	lieue (metric)	21.58447299351	21.59827213823	131.23359580053
lieue (de Poste)	lieue (de Poste)	21.03406893217	21.04751619870	127.88713910761
mile (telegr., naut.)	mi (tel., naut.)	10.01151315789	10.01791360691	**60.87**
mile (UK, naut.)	mi (UK, naut.)	**10**	10.00639308855	**60.8**
mile (US, naut.)	mi (US, naut.)	**10**	10.00639308855	**60.8**
mile (int., naut.)	mi (int., naut.)	9.99361099599	**10**	60.76115485564
mile (US, survey)	mi (US, surv.)	8.68422789480	8.68977979860	52.80010560039
mile (int., statute)	mi (int., stat.)	8.68422671467	8.68977861771	52.80009842520
mile (US, statute)	mi (US, stat.)	8.68421052632	8.68976241901	**52.8**
kilometre	km	5.39611824838	5.39956803456	32.80839895013
encablure	encablure	1.18714601464	1.18790496760	7.21784776903
furlong (UK)	fur	1.08552631579	1.08622030238	**6.6**
cable length (UK)	cbl (UK, naut.)	**1**	1.00063930886	**6.08**
cable length (int.)	cbl (int.)	9.993610996E-01	**1**	6.07611548556
skein (UK)	–	5.921052632E-01	5.924838013E-01	**3.6**
arpent (Québec)	–	3.155181029E-01	3.157198164E-01	1.91835006562
bolt (US, cloth)	–	1.973684211E-01	1.974946004E-01	**1.20**
chain (engineer's) or (Ramsden's)	ch (eng.), ch (Ramsden's)	1.644736842E-01	1.645788337E-01	**1**
shacles (UK)	–	1.480263158E-01	1.481209503E-01	**9E-01**
chain (surveyor's)	ch (surv.)	1.085526316E-01	1.086220302E-01	**2/3**
chain (Gunter's)	ch (Gunt.)	1.085526316E-01	1.086220302E-01	**2/3**
rope (UK)	rope	3.289473684E-02	3.291576674E-02	**2E-01**
perche (de Paris)	perche	3.155110340E-02	3.157127430E-02	1.918307087E-01
perch (pole, rod)	rod	2.713815789E-02	2.715550756E-02	**1/6**
toise (metric)	toise (metric)	1.079223650E-02	1.079913607E-02	6.561679790E-02
toise (de Paris)	toise	1.051723196E-02	1.052395572E-02	6.394477034E-02
aune (de Paris)	aune	1.014765862E-02	1.015414611E-02	6.169776440E-02
fathom	fath	9.868421053E-03	9.874730022E-03	**6E-02**
ell	ell	6.167763158E-03	6.171706263E-03	**3/80**
metre	m	5.396118248E-03	5.399568035E-03	3.280839895E-02

chain (surveyor's)	metre	yard	foot	inch
4.702800644E+23	9.4605297E+24	1.034616142E+25	3.103848E+25	3.724618E+26
7.669405671E+15	1.54283900E+17	1.687269248E+17	5.061808E+17	6.074169E+18
7.4364645E+15	1.4959787E+17	1.636022200E+17	4.908067E+17	5.889680E+18
1.533881134E+15	3.0856780E+16	3.374538495E+16	1.012362E+17	1.214834E+18
4.970969538E+10	**1E+12**	1.093613298E+12	3.280840E+12	3.937008E+13
7.436464547E+09	1.4959787E+11	1.636022200E+11	4.908067E+11	5.889680E+12
497.09695378987	**1E+04**	1.093613298E+04	3.280840E+04	3.937008E+05
368.92502783743	7.421591E+03	8116.350612423	2.434905E+04	**2.921886E+05**
276.36363636364	5559.552	**6080**	**18240**	2.18880E+05
276.18706752565	**5556**	6076.115485564	1.822835E+04	**2.187402E+05**
240	4828.032	**5280**	**15840**	1.90080E+05
239.94869959437	**4827**	5278.871391076	1.583661E+04	1.900394E+05
198.83878151595	**4000**	4374.453193351	1.312336E+04	1.574803E+05
193.76839258729	**3898**	4262.904636920	1.278871E+04	1.534646E+05
2029/22	1855.3176	**2029**	**6087**	**73044**
3040/33	1853.184	**6080/3**	**6080**	**72960**
3040/33	1853.184	**6080/3**	**6080**	**72960**
92.06235584188	**1852**	2025.371828521	6076.115486	7.291339E+04
80.00016000060	1609.3472187	1760.003520013	5280.010560	6.336013E+04
80.00014912909	**1609.347**	1760.003280840	5280.009843	6.336012E+04
80	**1609.344**	**1760**	**5280**	63360
49.70969537899	**1000**	1093.613298338	3280.839895	3.937008E+04
10.93613298338	**220**	240.594925634	721.78477690	8661.41732283
10	**201.168**	**220**	**660**	7920
304/33	**185.3184**	**608/3**	**608**	7296
9.20623558419	**185.2**	202.53718285214	607.611549	7291.33858268
5.45454545455	109.728	**120**	**360**	4320
2.90659100851	58.47131	63.94500218723	191.83500656	2302.02007874
20/11	36.576	**40**	**120**	**1440**
50/33	**30.48**	**100/3**	**100**	**1200**
15/11	**27.432**	**30**	**90**	**1080**
1	**20.1168**	**22**	**66**	**792**
1	**20.1168**	**22**	**66**	**792**
10/33	**6.096**	**20/3**	**20**	**240**
2.906525889E-01	5.847	6.394	19.183	230.197
2.5E-01	**5.0292**	**5.5**	**16.5**	**198**
9.941939076E-02	**2**	2.18722659668	6.56167979	78.74015748
9.688601567E-02	1.949036600	2.13149234471	6.394477034	76.73372441
9.348146121E-02	1.880547859	2.05659214653	6.16977644	74.03731728
1/11	**1.8288**	**2**	6	72
5.681818182E-02	**1.143**	**1.25**	3.75	45
4.970969538E-02	**1**	1.093613298	3.280839895	39.37007874

Table 4.2.2.3 Conversion table: units of length (<1 m)

Unit	Symbol	metre	yard	foot
metre	**m**	**1**	1.0936132983	3.2808398950
yard (US)	**yd (US)**	0.91440183	1.0000020013	3.0000060039
yard (1963)	**yd**	**0.9144**	**1**	3
yard (old)	**yd (old)**	0.9143992000	9.99999125E-01	2.9999973753
pace (UK)	**pace (UK)**	**0.762**	**5/6**	**5/2**
pas (de Paris)	**pas**	0.6240000000	6.82414698E-01	2.0472440945
coudée (de Paris)	**coudée**	0.5	5.46806649E-01	1.6404199475
cubit (UK)	**cu (UK)**	**0.4572**	**1/2**	**3/2**
pied (de Paris)	**pied**	0.3248394000	3.55248688E-01	1.0657460630
pied (metric)	**pied (metric)**	**0.333**	3.64173228E-01	1.0925196850
foot (old)	**ft (old)**	0.3048799700	3.33420790E-01	1.0002623688
foot (US, survey)	**ft (US, survey)**	0.3048006096	0.3333340000	1.0000020000
foot (WMA, 1963)	**ft**	**0.3048**	**1/3**	**1**
link (engineer's)	**lk (engineer's)**	**0.3048**	**1/3**	**1**
cup (US)	**cup (US)**	0.2365882	2.58736002E-01	7.76208005E-01
nail (UK)	**nail (UK)**	**2.29E-01**	**1/4**	**3/4**
span (UK)	**sp (UK)**	**2.2860E-01**	**2.5E-01**	**7.5E-01**
link (surveyor's)	**lk (surveyor's)**	**2.011680E-01**	**2.20E-01**	**6.6E-01**
cup (metric)	**cup (metric)**	**1/5**	2.18722660E-01	6.56167979E-01
hand (UK)	**hd (UK)**	**1.016E-01**	**1/9**	**1/3**
palm (UK)	**plm (UK)**	**7.62E-02**	**1/12**	**1/4**
pouce (metric)	**pouce (metric)**	**2.75E-02**	3.00743657E-02	9.02230971E-02
pouce (de Paris)	**pouce**	2.706995E-02	2.96040573E-02	8.88121719E-02
inch (US, survey)	**in (US, survey)**	2.54000508E-02	2.77778333E-02	8.33335000E-02
inch	**in**	**2.54E-02**	**1/36**	**1/12**
inch (old)	**in (old)**	2.53999800E-02	2.77777559E-02	8.33332677E-02
centimetre	**cm**	**1E-02**	1.09361330E-02	3.28083990E-02
barleycorn (UK)	-	8.46666667E-03	**1/108**	**1/36**
ligne (de Paris)	**ligne**	2.55830000E-03	2.79779090E-03	8.39337270E-03
ligne (metric)	**ligne (metric)**	**2.30E-03**	2.51531059E-03	7.54593176E-03
line (UK), button	**li (UK)**	2.11666667E-03	**1/432**	**1/144**
millimetre	**mm**	**1E-03**	1.09361330E-03	3.28083990E-03
baromil	**baromil**	7.500626793E-04	8.20278521E-04	2.46083556E-03
line (US)	**li (US)**	**6.35E-04**	**1/1440**	**1/480**
iron	**iron**	5.3E-04	5.79615048E-04	1.73884514E-03
arcmin	**arcmin**	2.90888209E-04	3.18119213E-04	9.54357640E-04
calibre (centinch)	**cin**	**2.54E-04**	**1/3600**	**1/1200**
mil	**mil**	**2.54E-05**	2.77777778E-05	8.33333333E-05
thou (millinch)	**thou**	**2.54E-05**	2.77777778E-05	8.33333333E-05
micrometre	µm	**1E-06**	1.09361330E-06	3.28083990E-06
micron	µ	**1E-06**	1.09361330E-06	3.28083990E-06
microinch	µin	**2.54E-08**	2.77777778E-08	8.33333333E-08
millimicron	**m**µ	**1E-09**	1.09361330E-09	3.28083990E-09
nanometre (nanon)	**nm**	**1E-09**	1.09361330E-09	3.28083990E-09
ångström* (star)	Å*	1.00001482E-10	1.09362950E-10	3.28088851E-10
X unit	**XU**	1.00020779E-10	1.09384054E-10	3.28152162E-10
ångström	Å	**1E-10**	1.09361330E-10	3.28083990E-10
1st Bohr radius	a_0	5.29177249E-11	5.78715277E-11	1.73614583E-10
a.u. of length	**a.u.**	5.29177249E-11	5.78715277E-11	1.73614583E-10
bicron (sigma)	µµ	**1E-12**	1.09361330E-12	3.28083990E-12
picometre	**pm**	**1E-12**	1.09361330E-12	3.28083990E-12
electron radius	r_0	2.81794092E-15	3.08173766E-15	9.24521299E-15
fermi	**F**	**1E-15**	1.09361330E-15	3.28083990E-15
femtometre	**fm**	**1E-15**	1.09361330E-15	3.28083990E-15
attometre	**am**	**1E-18**	1.09361330E-18	3.28083990E-18

inch	cm	mm	calibre (cin)	mil (thou)
39.3700787402	**1E+02**	**1E+03**	3937.007874016	3.93700787E+04
36.0000720472	91.4401830000	914.4018300000	3600.007204724	3.60000720E+04
36	**91.44**	**914.4**	**3600**	**3.6E+04**
35.9999685039	91.439920	914.399200	3599.996850394	3.59999685E+04
30	**76.2**	**762**	**3000**	**3E+04**
24.5669291339	62.4	624	2456.692913386	2.45669291E+04
19.6850393701	50	500	1968.503937008	1.96850394E+04
18	**45.72**	**457.2**	**1800**	**1.80E+04**
12.7889527559	32.483940	324.839400	1278.895275591	1.27889528E+04
13.1102362205	**33.3**	**333**	1311.023622047	1.31102362E+04
12.0031484252	30.487997	304.879970	1200.314842520	1.20031484E+04
12.0000240000	30.4800609601	304.8006096012	1.20000240E+03	1.20000240E+04
12	**30.48**	**304.8**	**1200**	**1.2E+04**
12	**30.48**	**304.8**	**1200**	**1.2E+04**
9.3144960630	23.658820	236.588200	931.4496062992	9.31449606E+03
9	**22.86**	**228.6**	**900**	**9000**
9	**22.86**	**228.6**	**900**	**9000**
7.92	**20.1168**	**201.168**	**792**	**7920**
7.8740157480	**2E+01**	**2E+02**	787.4015748032	7.87401575E+03
4	**10.16**	**101.6**	**400**	**4000**
3	**7.62**	**76.2**	**300**	**3000**
1.0826771654	**2.75**	**27.5**	108.2677165354	1082.677165354
1.06574606E+00	2.70699500E+00	2.70699500E+01	1.06574606E+02	1.06574606E+03
1.00000200E+00	2.54000508E+00	2.54000508E+01	1.00000200E+02	1.00000200E+03
1	**2.54**	**25.4**	**1E+02**	**1E+03**
9.99999213E-01	2.5399980000	25.3999800000	99.9999212598	999.9992125984
3.93700787E-01	**1**	**10**	39.3700787402	393.7007874016
1/3	8.46666667E-01	8.46666667E+00	**100/3**	1000/3
1.00720472E-01	2.55830000E-01	2.55830000E+00	1.00720472E+01	1.00720472E+02
9.05511811E-02	**20/87**	**23/10**	9.0551181102	90.5511811024
1/12	2.11666667E-01	2.1166666667	**25/3**	**250/3**
3.93700787E-02	**1E-01**	**1**	3.9370078740	39.3700787402
2.95300267E-02	7.50062679E-02	7.50062679E-01	2.9530026743	29.5300267432
1/40	**6.35E-02**	**6.35E-01**	2.5	25
2.08661417E-02	5.30E-02	5.3E-01	2.0866141732	20.8661417323
1.14522917E-02	2.90888209E-02	2.90888209E-01	1.14522917E+00	1.14522917E+01
1E-02	**2.54E-02**	**2.54E-01**	**1**	**10**
1E-03	**2.54E-03**	**2.54E-02**	**1E-01**	**1**
1E-03	**2.54E-03**	**2.54E-02**	**1E-01**	**1**
3.93700787E-05	**1E-04**	**1E-03**	3.93700787E-03	3.93700787E-02
3.93700787E-05	**1E-04**	**1E-03**	3.93700787E-03	3.93700787E-02
1E-06	**2.54E-06**	**2.54E-05**	**1E-04**	**1E-03**
3.93700787E-08	**1E-07**	**1E-06**	3.93700787E-06	3.93700787E-05
3.93700787E-08	**1E-07**	**1E-06**	3.93700787E-06	3.93700787E-05
3.93706622E-09	1.00001482E-08	1.00001482E-07	3.93706622E-07	3.93706622E-06
3.93782594E-09	1.00020779E-08	1.00020779E-07	3.93782594E-07	3.93782594E-06
3.93700787E-09	**1E-08**	**1E-07**	3.93700787E-07	3.93700787E-06
2.08337500E-09	5.29177249E-09	5.29177249E-08	2.08337500E-07	2.08337500E-06
2.08337500E-09	5.29177249E-09	5.29177249E-08	2.08337500E-07	2.08337500E-06
3.93700787E-11	**1E-10**	**1E-09**	3.93700787E-09	3.93700787E-08
3.93700787E-11	**1E-10**	**1E-09**	3.93700787E-09	3.93700787E-08
1.10942556E-13	2.81794092E-13	2.81794092E-12	1.10942556E-11	1.10942556E-10
3.93700787E-14	**1E-13**	**1E-12**	3.93700787E-12	3.93700787E-11
3.93700787E-14	**1E-13**	**1E-12**	3.93700787E-12	3.93700787E-11
3.93700787E-17	**1E-16**	**1E-15**	3.93700787E-15	3.93700787E-14

(Continued overleaf)

Table 4.2.2.3 *(continued)* Conversion table: units of length (<1 m)

Unit	Symbol	mil (thou)	μm (μ)	μinch
metre	**m**	3.93700787E+04	1000000	3.93700787E+07
yard (US)	**yd (US)**	3.60000720E+04	9.14401830E+05	3.60000720E+07
yard (1963)	**yd**	**3.6E+04**	9.144E+05	**3.6E+07**
yard (old)	**yd (old)**	3.59999685E+04	9.14399200E+05	3.59999685E+07
pace (UK)	**pace (UK)**	**3E+04**	**7.62E+05**	**3E+07**
pas (de Paris)	**pas**	2.45669291E+04	**6.24E+05**	2.45669291E+07
coudée (de Paris)	**coudée**	1.96850394E+04	**5E+05**	1.96850394E+07
cubit (UK)	**cu (UK)**	**1.80E+04**	**4.572E+05**	**1.8E+07**
pied (de Paris)	**pied**	1.27889528E+04	3.24839400E+05	1.27889528E+07
pied (metric)	**pied (metric)**	1.31102362E+04	**3.33E+05**	1.31102362E+07
foot (old)	**ft (old)**	1.20031484E+04	3.04879970E+05	1.20031484E+07
foot (US, survey)	**ft (US, survey)**	1.20000240E+04	3.04800610E+05	1.20000240E+07
foot (WMA, 1963)	**ft**	**1.2E-04**	**3.048E+05**	**1.2E+07**
link (engineer's)	**lk (Ramsden's)**	**1.2E+04**	**3.048E+05**	**1.2E+07**
cup (US)	**cup (US)**	9.31449606E+03	2.36588200E+05	9.31449606E+06
nail (UK)	**nail (UK)**	**9000**	**2.286E+05**	**9E+06**
span (UK)	**sp (UK)**	**9000**	**2.286E+05**	**9E+06**
link (surveyor's)	**lk (surveyor's)**	**7920**	2.01168E+05	7.92000E+06
cup (metric)	**cup (metric)**	7.87401575E+03	**2E+05**	7.87401575E+06
hand (UK)	**hd (UK)**	**4000**	1.016E+05	**4E+06**
palm (UK)	**plm (UK)**	**3000**	7.620E+04	**3E+06**
pouce (metric)	**pouce (metric)**	1082.677165354	2.750E+04	1.08267717E+06
pouce (de Paris)	**pouce**	1.06574606E+03	2.70699500E+04	1.06574606E+06
inch (US, survey)	**in (US, survey)**	1.00000200E+03	2.54000508E+04	1.00000200E+06
inch	**in**	**1E+03**	**2.54E+04**	**1E+06**
inch (old)	**in (old)**	999.9992125984	2.53999800E+04	9.99999213E+05
centimetre	**cm**	393.7007874016	**1E+04**	3.93700787E+05
barleycorn (UK)	–	**1000/3**	8466.666667	3.33333333E+05
ligne (de Paris)	**ligne**	1.00720472E+02	2.55830000E+03	1.00720472E+05
ligne (metric)	**ligne (metric)**	90.5511811024	**2.3E+03**	9.05511811E+04
line (UK), button	**li (UK)**	**250/3**	2116.666667	8.33333333E+04
millimetre	**mm**	39.3700787402	**1000**	3.93700787E+04
baromil	**baromil**	29.5300267432	750.062679	2.95300267E+04
line (US)	**li (US)**	**25**	**635**	**2.5E+04**
iron	**iron**	20.8661417323	530	2.08661417E+04
arcmin	**arcmin**	1.14522917E+01	2.90888209E+02	1.14522917E+04
calibre (centinch)	**cin**	**10**	254	**1E+04**
mil	**mil**	**1**	25	**1000**
thou (millinch)	**thou**	**1**	25	**1000**
micrometre	μm	3.93700787E-02	**1**	3.93700787E+01
micron	μ	3.93700787E-02	**1**	3.93700787E+01
microinch	μin	**1E-03**	**2.54E-02**	**1**
millimicron	mμ	3.93700787E-05	**1E-03**	3.93700787E-02
nanometre (nanon)	**nm**	3.93700787E-05	**1E-03**	3.93700787E-02
ångström* (star)	**Å***	3.93706622E-06	1.00001482E-04	3.93706622E-03
X unit	**XU**	3.93782594E-06	1.00020779E-04	3.93782594E-03
ångström	**Å**	3.93700787E-06	**1E-04**	3.93700787E-03
1st Bohr radius	$\mathbf{a_0}$	2.08337500E-06	5.29177249E-05	2.08337500E-03
a.u. of length	**a.u.**	2.08337500E-06	5.29177249E-05	2.08337500E-03
bicron (sigma)	μμ	3.93700787E-08	**1E-06**	3.93700787E-05
picometre	**pm**	3.93700787E-08	**1E-06**	3.93700787E-05
electron radius	$\mathbf{r_0}$	1.10942556E-10	2.81794092E-09	1.10942556E-07
fermi	**F**	3.93700787E-11	**1E-09**	3.93700787E-08
femtometre	**fm**	3.93700787E-11	**1E-09**	3.93700787E-08
attometre	**am**	3.93700787E-14	**1E-12**	3.93700787E-11

	nm	Å	pm (μμ)	fm (F)	am
	1E+09	**1E+10**	**1E+12**	**1E+15**	**1E+18**
	9.14401830E+08	9.14401830E+09	9.14401830E+11	9.14401830E+14	9.14401830E+17
	9.144E+08	9.144E+09	9.144E+11	9.144E+14	9.144E+17
	9.14399200E+08	9.14399200E+09	9.14399200E+11	9.14399200E+14	9.14399200E+17
	7.62E+08	**7.62E+09**	**7.62E+11**	**7.62E+14**	**7.62E+17**
	6.24E+08	**6.24E+09**	**6.24E+11**	**6.24E+14**	**6.24E+17**
	5E+08	**5E+09**	**5E+11**	**5E+14**	**5E+17**
	4.572E+08	**4.572E+09**	**4.572E+11**	**4.572E+14**	**4.572E+17**
	3.24839400E+08	3.24839400E+09	3.24839400E+11	3.24839400E+14	3.24839400E+17
	3.330E+08	3.330E+09	**3.33E+11**	**3.33E+14**	**3.33E+17**
	3.04879970E+08	3.04879970E+09	3.04879970E+11	3.04879970E+14	3.04879970E+17
	3.04800610E+08	3.04800610E+09	3.04800610E+11	3.04800610E+14	3.04800610E+17
	3.048E+08	**3.048E+09**	**3.048E+11**	**3.048E+14**	**3.048E+17**
	3.048E+08	**3.048E+09**	**3.048E+11**	**3.048E+14**	**3.048E+17**
	2.36588200E+08	2.36588200E+09	2.36588200E+11	2.36588200E+14	2.36588200E+17
	2.286E+08	**2.286E+09**	**2.286E+11**	**2.286E+14**	**2.286E+17**
	2.286E+08	**2.286E+09**	**2.286E+11**	**2.286E+14**	**2.286E+17**
	2.01168E+08	2.01168E+09	2.01168E+11	2.01168E+14	2.01168E+17
	2E+08	**2E+09**	**2E+11**	**2E+14**	**2E+17**
	1.016E+08	1.016E+09	1.016E+11	1.016E+14	1.016E+17
	7.62E+07	**7.62E+08**	**7.62E+10**	**7.62E+13**	**7.62E+16**
	2.75E+07	2.75E+08	2.75E+10	2.75E+13	2.75E+16
	2.70699500E+07	2.70699500E+08	2.70699500E+10	2.70699500E+13	2.70699500E+16
	2.54000508E+07	2.54000508E+08	2.54000508E+10	2.54000508E+13	2.54000508E+16
	2.54E+07	**2.54E+08**	**2.54E+10**	**2.54E+13**	**2.54E+16**
	2.53999800E+07	2.53999800E+08	2.53999800E+10	2.53999800E+13	2.53999800E+16
	1E+07	**1E+08**	**1E+10**	**1E+13**	**1E+16**
	8.46666667E+06	8.46666667E+07	8.46666667E+09	8.46666667E+12	8.46666667E+15
	2.55830000E+06	2.55830000E+07	2.55830000E+09	2.55830000E+12	2.55830000E+15
	2.30E+06	**2.30E+07**	**2.3E+09**	**2.3E+12**	**2.3E+15**
	2.11666667E+06	2.11666667E+07	2.11666667E+09	2.11666667E+12	2.11666667E+15
	1E+06	**1E+07**	**1E+09**	**1E+12**	**1E+15**
	7.50062679E+05	7.50062679E+06	7.50062679E+08	7.50062679E+11	7.50062679E+14
	6.35E+05	**6.35E+06**	**6.35E+08**	**6.35E+11**	**6.35E+14**
	5.30E+05	5.30E+06	5.30E+08	5.30E+11	5.3E+14
	2.90888209E+05	2.90888209E+06	2.90888209E+08	2.90888209E+11	2.90888209E+14
	2.54E+05	**2.54E+06**	**2.54E+08**	**2.54E+11**	**2.54E+14**
	2.54E+04	**2.54E+05**	**2.54E+07**	**2.54E+10**	**2.54E+13**
	2.54E+04	**2.54E+05**	**2.54E+07**	**2.54E+10**	**2.54E+13**
	1000	**1E+04**	**1E+06**	**1E+09**	**1E+12**
	1000	**1E+04**	**1E+06**	**1E+09**	**1E+12**
	25	254	**2.54E+04**	**2.54E+07**	**2.54E+10**
	1	**10**	**1000**	**1E+06**	**1E+09**
	1	**10**	**1000**	**1E+06**	**1E+09**
	1.00001482E-01	1.00001482E+00	1.00001482E+02	1.00001482E+05	1.00001482E+08
	1.00020779E-01	1.00020779E+00	1.00020779E+02	1.00020779E+05	1.00020779E+08
	1E-01	**1**	**100**	**1E+05**	**1E+08**
	5.29177249E-02	5.29177249E-01	5.29177249E+01	5.29177249E+04	5.29177249E+07
	5.29177249E-02	5.29177249E-01	5.29177249E+01	5.29177249E+04	5.29177249E+07
	1E-03	**1E-02**	**1**	**1E+03**	**1E+06**
	1E-03	**1E-02**	**1**	**1E+03**	**1E+06**
	2.81794092E-06	2.81794092E-05	2.81794092E-03	2.81794092E+00	2.81794092E+03
	1E-06	**1E-05**	**1E-03**	**1**	**1000**
	1E-06	**1E-05**	**1E-03**	**1**	**1000**
	1E-09	**1E-08**	**1E-06**	**1E-03**	**1**

Table 4.2.2.4 Conversion table: units of length (Typography)

Unit	Symbol	m	inch	cm	pica	mm	point Didot	point (I.N.)	point (US)	mil (thou)	µm
metre	**m**	**1**	39.37007874	**100**	237.1062791	1000	2659.775877	2845.275619004	2845.275619004	3.93700787E+04	1E+06
inch	**in**	**2.54E-02**	**1**	**2.54**	6.022499489	**25.4**	67.558307270	72.270000723	72.270000723	**1000**	25400
cicéro	-	4.51278000E-03	1.77668504E-01	4.51278000E-01	1.070008474	2825/626	**12**	12.840102908	12.840102908	177.668503937	4.51278000E+03
pica	**pica**	4.21751800E-03	1.66044016E-01	4.21751800E-01	**1**	**2889/685**	11.217652636	**12**	**12**	166.044015748	4.21751800E+03
philoso-phia	–	4.13568681E-03	1.62822315E-01	4.13568681E-01	9.80597310E-01	4.135686806	**11**	11.767168836	11.767168836	162.822315189	4.13568681E+03
petit romain	–	3.38374375E-03	1.33218258E-01	3.38374375E-01	8.02306890E-01	3.383743750	**9**	9.627683593	9.627683593	133.218257882	3.38374375E+03
gaillarde	–	3.00777222E-03	1.18416229E-01	3.00777222E-01	7.13161680E-01	3.007772222	**8**	8.557940972	8.557940972	118.416229228	3.00777222E+03
petit texte	–	2.81978646E-03	1.11015215E-01	2.81978646E-01	6.68589075E-01	2.819786459	**7.5**	8.023069661	8.023069661	111.015214902	2.81978646E+03
mignonne	–	2.63180069E-03	1.03614201E-01	2.63180069E-01	6.24016470E-01	2.631800695	7	7.488198350	7.488198350	103.614200575	2.63180069E+03
point (Didot)	**pt (Didot)**	3.75971528E-04	1.48020287E-02	3.75971528E-02	8.91452100E-02	3.75971528E-01	**1**	1.069742621	1.069742621	14.802028654	375.971527800
point (I.N.)*	**pt (I.N.)**	3.51459800E-04	1.38370000E-02	3.51459800E-02	8.33333254E-02	3.51459800E-01	9.34804298E-01	**1**	**1**	13.837	351.459800000
point (US printers)	**pt (US)**	3.51459800E-04	1.38370000E-02	3.51459800E-02	8.33333254E-02	3.51459800E-01	9.34804298E-01	**1**	**1**	13.837	351.459800000

*I.N. = Imprimerie Nationale

4.2.3 Conversion Tables for Units of Area

Table 4.2.3.1 Conversion table: units of area: multiples and submultiples (SI)

Unit	Symbol	Ym^2	Zm^2	Em^2	Pm^2	Tm^2	Gm^2	Mm^2	km^2	hm^2	dam^2	m^2	dm^2	cm^2	mm^2	μm^2	nm^2	pm^2	fm^2	am^2	zm^2	ym^2
square yottametre	Ym^2	1	1E+06	1E+12	1E+18	1E+24	1E+30	1E+36	1E+42	1E+44	1E+46	1E+48	1E+50	1E+52	1E+54	1E+60	1E+66	1E+72	1E+78	1E+84	1E+90	1E+96
square zetametre	Zm^2	1E-06	1	1E+06	1E+12	1E+18	1E+24	1E+30	1E+36	1E+38	1E+40	1E+42	1E+44	1E+46	1E+48	1E+54	1E+60	1E+66	1E+72	1E+78	1E+84	1E+90
square exametre	Em^2	1E-12	1E-06	1	1E+06	1E+12	1E+18	1E+24	1E+30	1E+32	1E+34	1E+36	1E+38	1E+40	1E+42	1E+48	1E+54	1E+60	1E+66	1E+72	1E+78	1E+84
square petametre	Pm^2	1E-18	1E-12	1E-06	1	1E+06	1E+12	1E+18	1E+24	1E+26	1E+28	1E+30	1E+32	1E+34	1E+36	1E+42	1E+48	1E+54	1E+60	1E+66	1E+72	1E+78
square terametre	Tm^2	1E-24	1E-18	1E-12	1E-06	1	1E+06	1E+12	1E+18	1E+20	1E+22	1E+24	1E+26	1E+28	1E+30	1E+36	1E+42	1E+48	1E+54	1E+60	1E+66	1E+72
square gigametre	Gm^2	1E-30	1E-24	1E-18	1E-12	1E-06	1	1E+06	1E+12	1E+14	1E+16	1E+18	1E+20	1E+22	1E+24	1E+30	1E+36	1E+42	1E+48	1E+54	1E+60	1E+66
square megametre	Mm^2	1E-36	1E-30	1E-24	1E-18	1E-12	1E-06	1	1E+06	1E+08	1E+10	1E+12	1E+14	1E+16	1E+18	1E+24	1E+30	1E+36	1E+42	1E+48	1E+54	1E+60
square kilometre	km^2	1E-42	1E-36	1E-30	1E-24	1E-18	1E-12	1E-06	1	1E+02	1E+04	1E+06	1E+08	1E+10	1E+12	1E+18	1E+24	1E+30	1E+36	1E+42	1E+48	1E+54
square hectometre	hm^2	1E-44	1E-38	1E-32	1E-26	1E-20	1E-14	1E-08	1E-02	1	1E+02	1E+04	1E+06	1E+08	1E+10	1E+16	1E+22	1E+28	1E+34	1E+40	1E+46	1E+52
square decametre	dam^2	1E-46	1E-40	1E-34	1E-28	1E-22	1E-16	1E-10	1E-04	1E-02	1	1E+02	1E+04	1E+06	1E+08	1E+14	1E+20	1E+26	1E+32	1E+38	1E+44	1E+50
square metre	m^2	1E-48	1E-42	1E-36	1E-30	1E-24	1E-18	1E-12	1E-06	1E-04	1E-02	1	1E+02	1E+04	1E+06	1E+12	1E+18	1E+24	1E+30	1E+36	1E+42	1E+48
square decimetre	dm^2	1E-50	1E-44	1E-38	1E-32	1E-26	1E-20	1E-14	1E-08	1E-06	1E-04	1E-02	1	1E+02	1E+04	1E+10	1E+16	1E+22	1E+28	1E+34	1E+40	1E+46
square centimetre	cm^2	1E-52	1E-46	1E-40	1E-34	1E-28	1E-22	1E-16	1E-10	1E-08	1E-06	1E-04	1E-02	1	1E+02	1E+08	1E+14	1E+20	1E+26	1E+32	1E+38	1E+44
square millimetre	mm^2	1E-54	1E-48	1E-42	1E-36	1E-30	1E-24	1E-18	1E-12	1E-10	1E-08	1E-06	1E-04	1E-02	1	1E+06	1E+12	1E+18	1E+24	1E+30	1E+36	1E+42
square micrometre	μm^2	1E-60	1E-54	1E-48	1E-42	1E-36	1E-30	1E-24	1E-18	1E-16	1E-14	1E-12	1E-10	1E-08	1E-06	1	1E+06	1E+12	1E+18	1E+24	1E+30	1E+36
square nanometre	nm^2	1E-66	1E-60	1E-54	1E-48	1E-42	1E-36	1E-30	1E-24	1E-22	1E-20	1E-18	1E-16	1E-14	1E-12	1E-06	1	1E+06	1E+12	1E+18	1E+24	1E+30
square picometre	pm^2	1E-72	1E-66	1E-60	1E-54	1E-48	1E-42	1E-36	1E-30	1E-28	1E-26	1E-24	1E-22	1E-20	1E-18	1E-12	1E-06	1	1E+06	1E+12	1E+18	1E+24
square femtometre	fm^2	1E-78	1E-72	1E-66	1E-60	1E-54	1E-48	1E-42	1E-36	1E-34	1E-32	1E-30	1E-28	1E-26	1E-24	1E-18	1E-12	1E-06	1	1E+06	1E+12	1E+18
square attometre	am^2	1E-84	1E-78	1E-72	1E-66	1E-60	1E-54	1E-48	1E-42	1E-40	1E-38	1E-36	1E-34	1E-32	1E-30	1E-24	1E-18	1E-12	1E-06	1	1E+06	1E+12
square zeptometre	zm^2	1E-90	1E-84	1E-78	1E-72	1E-66	1E-60	1E-54	1E-48	1E-46	1E-44	1E-42	1E-40	1E-38	1E-36	1E-30	1E-24	1E-18	1E-12	1E-06	1	1E+06
square yoctometre	ym^2	1E-96	1E-90	1E-84	1E-78	1E-72	1E-66	1E-60	1E-54	1E-52	1E-50	1E-48	1E-46	1E-44	1E-42	1E-36	1E-30	1E-24	1E-18	1E-12	1E-06	1

Table 4.2.3.2 Conversion table: units of area (>1 m^2)

Unit	Symbol	township (US)	sq. mi (int., naut.)
township (US)	**township (US)**	**1**	27.1843095236
square mile (geographical)	**sq. mi (geograph.)**	5.907364417E-01	16.0587622777
square league (UK, naut.)	**sq. lg (UK, naut.)**	3.314967860E-01	9.0115112378
square league (US, naut.)	**sq. lg (US, naut.)**	3.314967860E-01	9.0115112378
square league (int., naut.)	**sq. lg (int., naut.)**	3.310733345E-01	**9**
square league (statute)	**sq. lg (stat.)**	**1/4**	6.7960773809
square league (Canadian)	**sq. lg (Canadian)**	2.498931356E-01	6.7931723453
square league (metric)	**sq. lg (metric)**	1.716009594E-01	4.6648535936
square mile (telegr., naut.)	**sq. mi (telegr., naut.)**	3.691783782E-02	1.0035859304
square mile (UK, naut.)	**sq. mi (UK, naut.)**	3.683297623E-02	1.0012790264
square mile (US, naut.)	**sq. mi (US, naut.)**	3.683297623E-02	1.0012790264
square mile (int., naut.)	**sq. mi (int., naut.)**	3.678592606E-02	**1**
circular mile (US, naut.)	**c. mi (US, naut.)**	2.892855188E-02	7.864027084E-01
circular mile (int., naut.)	**c. mi (int., naut.)**	2.889159876E-02	7.853981634E-01
square mile (US, survey)	**sq. mi (US, survey)**	2.777788889E-02	7.551227295E-01
square mile (int.)	**sq. mi (int.)**	2.777788134E-02	7.551225242E-01
square mile (US, stat.)	**sq. mi (US, stat.)**	**1/36**	7.551197090E-01
circular mile (int.)	**c. mi (int.)**	2.181669699E-02	5.930718437E-01
circular mile (statute, land)	**c. mi (stat.)**	2.181661565E-02	5.930696326E-01
kilometre	**km**	1.072505996E-02	2.915533496E-01
quarter section	**quart sect**	**1/144**	1.887799272E-01
hectare	**ha**	1.072505996E-04	2.915533496E-03
acre (Ireland)	**ac (Ireland)**	7.000448029E-05	1.903023460E-03
acre (Cunningham)	**ac (Cunningham)**	5.564458689E-05	1.512659673E-03
acre (plantation)	**ac (plantation)**	5.564458689E-05	1.512659673E-03
acre (Scotland)	**ac (Scotland)**	5.293021680E-05	1.438871397E-03
acre (US, survey)	**ac (US, survey)**	4.340295139E-05	1.179879265E-03
acre	**ac**	4.340277778E-05	1.179874545E-03
arpent (de Paris)	**arpent**	3.666758574E-05	9.967830003E-04
arpent (Québec)	**arp (Québec)**	3.666784315E-05	9.967899976E-04
vergees (Jersey)	–	1.929012346E-05	5.243886868E-04
vergees (Guernsey)	–	1.653439153E-05	4.494760173E-04
rood (UK)	**rood (UK)**	1.085069444E-05	2.949686363E-04
square chain (engineer's)	**sq. ch (eng.)**	9.963906744E-06	2.708619250E-04
square chain (Ramsden's)	**sq. ch (Ramsden's)**	9.963906744E-06	2.708619250E-04
square chain (surveyor's)	**sq. ch (surv.)**	4.340277778E-06	1.179874545E-04
square chain (Gunter's)	**sq. ch (Gunter's)**	4.340277778E-06	1.179874545E-04
skein (UK)	**skein (UK)**	1.176839379E-06	3.199156594E-05
are	**a**	1.072505996E-06	2.915533496E-05
perche (de Paris)	**perche**	3.666758574E-07	9.967830003E-06
square rod (perch, pole)	**rod^2**	2.712673611E-07	7.374215908E-06
barrel (US, petrol.) per inch	**bbl (US, petrol.).in^{-1}**	6.713182169E-08	1.824932220E-06
barrel (US, liq.) per inch	**bbl (US, liq.).in^{-1}**	5.034886627E-08	1.368699165E-06
square metre	**m^2**	1.072505996E-08	2.915533496E-07

sq. mi (int.)	sq. mi (US, stat.)	km^2	hectare
35.9998657842	36	93.2395719721	9323.9571972096
21.2664326146	21.2665119008	55.0800129713	5508.0012971281
11.9338398054	11.9338842975	30.9086184407	3090.8618440704
11.9338398054	11.9338842975	30.9086184407	3090.8618440704
11.9185956067	11.9186400419	30.8691360000	3086.9136000000
8.9999664460	**9**	23.3098929930	2330.9892993024
8.9961193412	8.9961528808	23.2999290000	2329.9929000000
6.1776115051	6.1776345367	**16**	1600
1.3290372067	1.3290421617	3.4422033969	344.2203396870
1.3259822006	1.3259871442	3.4342909379	343.4290937856
1.3259822006	1.3259871442	3.4342909379	343.4290937856
1.3242884007	1.3242933380	3.4299040000	342.99040
1.0414239851	1.0414278677	2.6972857952	269.7285795165
1.0400936778	1.0400975555	2.6938403022	269.3840302230
1.0000002718	1.0000040000	2.5899984703	258.9998470337
1	1.0000037282	2.5899977664	258.9997766409
9.999962718E-01	**1**	2.5899881103	258.9988110336
7.853981634E-01	7.854010915E-01	2.0341794889	203.4179488941
7.853952353E-01	7.853981634E-01	2.0341719051	203.4171905079
3.861007191E-01	3.861021585E-01	**1**	**100**
2.499990679E-01	**2.50E-01**	6.474970276E-01	64.7497027584
3.861007191E-03	3.861021585E-03	**1/100**	**1**
2.520151895E-03	2.520161290E-03	6.527187778E-03	6.527187778E-01
2.003197660E-03	2.003205128E-03	5.188277465E-03	5.188277465E-01
2.003197660E-03	2.003205128E-03	5.188277465E-03	5.188277465E-01
1.905480701E-03	1.905487805E-03	4.935190759E-03	4.935190759E-01
1.562500425E-03	1.562506250E-03	4.046872610E-03	4.046872610E-01
1.562494175E-03	**1/640**	4.046856422E-03	4.046856422E-01
1.320028165E-03	1.320033087E-03	3.418870000E-03	3.418870000E-01
1.320037432E-03	1.320042353E-03	3.418894000E-03	3.418894000E-01
6.944418554E-04	6.944444444E-04	1.798602854E-03	1.798602854E-01
5.952358761E-04	5.952380952E-04	1.541659589E-03	1.541659589E-01
3.906235437E-04	3.906250000E-04	1.011714106E-03	1.011714106E-01
3.586993055E-04	3.587006428E-04	9.290304000E-04	9.290304000E-02
3.586993055E-04	3.587006428E-04	9.290304000E-04	9.290304000E-02
1.562494175E-04	1.5625E-04	4.046856422E-04	4.046856422E-02
1.562494175E-04	1.5625E-04	4.046856422E-04	4.046856422E-02
4.236605970E-05	4.236621765E-05	1.097280000E-04	1.097280000E-02
3.861007191E-05	3.861021585E-05	**1E-04**	**1/100**
1.320028165E-05	1.320033087E-05	3.418870000E-05	3.418870000E-03
9.765588592E-06	9.765625000E-06	2.529285264E-05	2.529285264E-03
2.416736571E-06	2.416745581E-06	6.259342320E-06	6.259342320E-04
1.812552428E-06	1.812559186E-06	4.694506740E-06	4.694506740E-04
3.861007191E-07	3.861021585E-07	**1E-06**	**1E-04**

(Continued overleaf)

Table 4.2.3.2 *(continued)* Conversion table: units of area (>1 m^2)

Unit	Symbol	hectare	acre
township (US)	**township (US)**	9323.9571972096	**2.304E+04**
square mile (geographical)	**sq. mi (geograph.)**	5508.0012971281	13610.5676164848
square league (UK, naut.)	**sq. lg (UK, naut.)**	3090.8618440704	7637.6859504132
square league (US, naut.)	**sq. lg (US, naut.)**	3090.8618440704	7637.6859504132
square league (int., naut.)	**sq. lg (int., naut.)**	3086.9136000000	7627.9296268418
square league (statute)	**sq. lg (stat.)**	2330.9892993024	**5760**
square league (Canadian)	**sq. lg (Canadian)**	2329.9929000000	5757.5378437029
square league (metric)	**sq. lg (metric)**	1600	3953.6861034747
square mile (telegr., naut.)	**sq. mi (telegr., naut.)**	344.2203396870	850.5869834711
square mile (UK, naut.)	**sq. mi (UK, naut.)**	343.4290937856	848.6317722681
square mile (US, naut.)	**sq. mi (US, naut.)**	343.4290937856	848.6317722681
square mile (int., naut.)	**sq. mi (int., naut.)**	342.99040	847.5477363158
circular mile (US, naut.)	**c. mi (US, naut.)**	269.7285795165	666.5138353401
circular mile (int., naut.)	**c. mi (int., naut.)**	269.3840302230	665.6624354941
square mile (US, survey)	**sq. mi (US, survey)**	258.9998470337	640.0025600121
square mile (int.)	**sq. mi (int.)**	258.9997766409	640.0023860676
square mile (US, stat.)	**sq. mi (US, stat.)**	258.9988110336	**640**
circular mile (int.)	**c. mi (int.)**	203.4179488941	502.6566985875
circular mile (statute, land)	**c. mi (stat.)**	203.4171905079	502.6548245744
kilometre	**km**	**100**	247.1053814672
quarter section	**quart sect**	64.7497027584	**160**
hectare	**ha**	**1**	2.4710538147
acre (Ireland)	**ac (Ireland)**	6.527187778E-01	1.6129032258
acre (Cunningham)	**ac (Cunningham)**	5.188277465E-01	1.2820512821
acre (plantation)	**ac (plantation)**	5.188277465E-01	1.2820512821
acre (Scotland)	**ac (Scotland)**	4.935190759E-01	**50/41**
acre (US, survey)	**ac (US, survey)**	4.935190759E-01	1.0000040000
acre	**ac**	4.046872610E-01	**1**
arpent (de Paris)	**arpent**	3.418870000E-01	8.448211755E-01
arpent (Québec)	**arp (Québec)**	3.418894000E-01	8.448271061E-01
vergees (Jersey)	–	1.798602854E-01	**4/9**
vergees (Guernsey)	–	1.541659589E-01	3.809523810E-01
rood (UK)	**rood (UK)**	1.011714106E-01	**1/4**
square chain (engineer's)	**sq. ch (eng.)**	9.290304000E-02	2.295684114E-01
square chain (Ramsden's)	**sq. ch (Ramsden's)**	9.290304000E-02	2.295684114E-01
square chain (surveyor's)	**sq. ch (surv.)**	4.046856422E-02	**1/10**
square chain (Gunter's)	**sq. ch (Gunter's)**	4.046856422E-02	**1/10**
skein (UK)	**skein (UK)**	1.097280000E-02	2.711437930E-02
are	**a**	**1/100**	2.471053815E-02
perche (de Paris)	**perche**	3.418870000E-03	8.448211755E-03
square rod (perch, pole)	**rod^2**	2.529285264E-03	**1/160**
barrel (US, petrol.) per inch	**bbl (US, petrol.).in^{-1}**	6.259342320E-04	1.546717172E-03
barrel (US, liq.) per inch	**bbl (US, liq.).in^{-1}**	4.694506740E-04	1.160037879E-03
square metre	**m^2**	**1E-04**	2.471053815E-04

acre (US, surv.)	are	square rod	m^2
2.303990784E+04	9.323957197E+05	3.6864E+06	9.323957197E+07
1.361051317E+04	5.508001297E+05	2.177690819E+06	5.508001297E+07
7637.6553997000	3.090861844E+05	1.222029752E+06	3.090861844E+07
7637.6553997000	3.090861844E+05	1.222029752E+06	3.090861844E+07
7627.8991151538	3.086913600E+05	1.220468740E+06	3.086913600E+07
5759.9769600230	2.330989299E+05	**921600**	2.330989299E+07
5757.5148135745	2.329992900E+05	9.212060550E+05	2.329992900E+07
3953.6702887461	**160000**	6.325897766E+05	**1.60E+07**
850.5835811265	3.442203397E+04	1.360939174E+05	3.442203397E+06
848.6283777444	3.434290938E+04	1.357810836E+05	3.434290938E+06
848.6283777444	3.434290938E+04	1.357810836E+05	3.434290938E+06
847.5443461282	3.429904000E+04	1.356076378E+05	3.429904000E+06
666.5111692874	2.697285795E+04	1.066422137E+05	2.697285795E+06
665.6597728470	2.693840302E+04	1.065059897E+05	2.693840302E+06
640.0000000044	2.589998470E+04	1.024004096E+05	2.589998470E+06
639.9998260606	2.589997766E+04	1.024003818E+05	2.589997766E+06
639.9974400026	2.589988110E+04	**102400**	2.589988110E+06
502.6546879627	2.034179489E+04	8.042507177E+04	2.034179489E+06
502.6528139571	2.034171905E+04	8.042477193E+04	2.034171905E+06
247.1043930466	**1E+04**	3.953686103E+04	**1E+06**
159.9993600006	6.474970276E+03	**25600**	6.474970276E+05
2.4710439305	**100**	395.3686103475	**1E+04**
1.6128967742	65.2718777806	258.0645161290	6527.18777806
1.2820461539	51.8827746462	205.1282051282	5188.27746462
1.2820461539	51.8827746462	205.1282051282	5188.27746462
1.2195073171	49.3519075902	195.1219512195	4935.19075902
1	40.4687260987	160.0006400019	4046.87260987
9.999960000E-01	40.4685642240	**160**	4046.85642240
8.448177963E-01	34.1887000000	135.1713880859	3418.87000000
8.448237268E-01	34.1889400000	135.1723369705	3418.89400000
4.444426667E-01	17.9860285440	**640/9**	1798.60285440
3.809508571E-01	15.4165958949	60.9523809524	1541.65958949
2.499990000E-01	10.1171410560	**40**	1011.71410560
2.295674931E-01	9.2903040000	36.7309458219	929.0304000000
2.295674931E-01	9.2903040000	36.7309458219	929.0304000000
9.999960000E-02	4.0468564224	**16**	404.6856422400
9.999960000E-02	4.0468564224	**16**	404.6856422400
2.711427084E-02	1.0972800000	4.3383006876	109.7280000000
2.471043930E-02	**1**	3.9536861035	**100**
8.448177963E-03	3.418870000E-01	1.3517138809	34.1887
6.249975000E-03	2.529285264E-01	**1**	25.2928526400
1.546710985E-03	6.259342320E-02	**1/4**	6.2593423200
1.160033239E-03	4.694506740E-02	1.856060606E-01	4.6945067400
2.471043930E-04	**1E-02**	3.953686103E-02	**1**

Table 4.2.3.3 Conversion table: units of area (<1 m^2)

Unit	Symbol	m^2	gal (UK).in^{-1}	gal (US).in^{-1}	ft^2	gal (UK).ft^{-1}	gal (US).ft^{-1}	in^2
square metre	**m^2**	**1**	5.587216449	6.709970130	10.763910417	67.046597385	80.519641559	1550.003100006
square yard (US)	**sq. yd (US)**	8.361307045E-01	4.671643226	5.610412052	9.000036000	56.059718707	67.324944624	1296.005184016
square yard (WMA, 1963)	**sq. yd, yd^2**	8.361273600E-01	4.671624539	5.610389610	9	56.059494469	67.324675325	1296.000000000
square yard (old)	**sq. yd (old)**	8.361257141E-01	4.671615343	5.610378566	8.999982283	56.059384115	67.324542796	1295.997448820
barrel (US, petr.) per foot	**bbl (US, petr.).ft^{-1}**	5.216118600E-01	2.914358364	**7/2**	5.614583333	34.972300369	**42**	**808.5**
barrel (US, liq.) per foot	**bbl (US, liq.).ft^{-1}**	3.912088950E-01	2.185768773	**21/8**	4.210937500	26.229225277	**31.5**	**606.375**
gallon (UK) per inch	**gal (UK).in^{-1}**	1.789800000E-01	**1**	1.200950454	1.926524686	12	14.411405446	277.419554839
gallon (US) per inch	**gal (US).in^{-1}**	1.490319600E-01	8.326738183E-01	**1**	1.604166667	9.992085820	**12**	**231**
square foot (US, survey)	**ft^2(US, survey)**	9.290341161E-02	5.190714695E-01	6.233791169E-01	**1**	6.228857634	7.480549403	144.000576002
square foot	**sq. ft, ft^2**	9.2903040E-02	5.190693932E-01	6.233766234E-01	**1**	6.228832719	7.480519481	**144**
gallon (UK) per foot	**gal (UK).ft^{-1}**	1.491500000E-02	**1/12**	1.000792045E-01	1.605437239E-01	**1**	1.200950454	23.11829624
gallon (US) per foot	**gal (US).ft^{-1}**	1.241933000E-02	6.938948486E-02	**1/12**	1.336805556E-01	8.326738183E-01	**1**	19.25000000
square decimetre	**dm^2**	**1E-02**	5.587216449E-02	6.709970130E-02	1.076391042E-01	6.704659739E-01	8.051964156E-01	15.50003100
square inch	**sq. in, in^2**	6.451600E-04	3.604648564E-03	4.329004329E-03	**7E-03**	4.325578277E-02	5.194805195E-02	**1**
circular inch	**cin**	5.067074791E-04	2.831084362E-03	3.399992049E-03	5.454153912E-03	3.397301234E-02	4.079990459E-02	7.853981634E-01
square centimetre	**cm^2**	**1E-04**	5.587216449E-04	6.709970130E-04	1.076391042E-03	6.704659739E-03	8.051964156E-03	1.550003100E-01
gallon (UK) per mile (int.)	**gal (UK).mi^{-1}**	2.824805340E-06	1.578279886E-05	1.895435946E-05	3.040595163E-05	1.893935863E-04	2.274523135E-04	4.378457034E-03
gallon (US) per mile (int.)	**gal (US).mi^{-1}**	2.352141449E-06	1.314192339E-05	1.578279886E-05	2.531823984E-05	1.577030807E-04	1.893935863E-04	3.645826537E-03
square millimetre	**mm^2**	**1E-06**	5.587216449E-06	6.709970130E-06	1.076391042E-05	6.704659739E-05	8.051964156E-05	1.550003100E-03
circular millimetre	**cmm**	7.853981634E-07	4.388189537E-06	5.269998216E-06	8.453955472E-06	5.265827445E-05	6.323997860E-05	1.217369588E-03
circular mil	**cmil**	5.067074791E-10	2.831084362E-09	3.399992049E-09	5.454153912E-09	3.397301234E-08	4.079990459E-08	7.853981634E-07
square micron	**µm², μ^2**	**1E-12**	5.587216449E-12	6.709970130E-12	1.076391042E-11	6.704659739E-11	8.051964156E-11	1.550003100E-09
square nanometre	**nm^2**	**1E-18**	5.587216449E-18	6.709970130E-18	1.076391042E-17	6.704659739E-17	8.051964156E-17	1.550003100E-15
square ångström	**$Å^2$**	**1E-20**	5.587216449E-20	6.709970130E-20	1.076391042E-19	6.704659739E-19	8.051964156E-19	1.550003100E-17
square bohr (a.u.)	**a.u., a_0^2**	2.800285609E-21	1.564580181E-20	1.878983279E-20	3.014202343E-20	1.877496218E-19	2.254779935E-19	4.340451374E-18
square picometre	**pm^2**	**1E-24**	5.587216449E-24	6.709970130E-24	1.076391042E-23	6.704659739E-23	8.051964156E-23	1.550003100E-21
barn	**b**	**1E-28**	5.587216449E-28	6.709970130E-28	1.076391042E-27	6.704659739E-27	8.051964156E-27	1.550003100E-25
square fermi	**F^2**	**1E-30**	5.587216449E-30	6.709970130E-30	1.076391042E-29	6.704659739E-29	8.051964156E-29	1.550003100E-27
square femtometre	**fm^2**	**1E-30**	5.587216449E-30	6.709970130E-30	1.076391042E-29	6.704659739E-29	8.051964156E-29	1.550003100E-27
square attometre	**am^2**	**1E-36**	5.587216449E-36	6.709970130E-36	1.076391042E-35	6.704659739E-35	8.051964156E-35	1.550003100E-33
shed	**shed**	**1E-52**	5.587216449E-52	6.709970130E-52	1.076391042E-51	6.704659739E-51	8.051964156E-51	1.550003100E-49

(Continued opposite)

Table 4.2.3.3 *(continued)*

Unit	Symbol	cm^2	gal (UK) $.mi^{-1}$	gal (US).mi^{-1}	mm^2	circular mm	circular mil	μm^2
square metre	m^2	**10000**	3.540066941E+05	4.251444999E+05	**1E+06**	1.273239545E+06	1.973525241E+09	**1E+12**
square yard (US)	**sq. yd (US)**	8361.307045195	2.959958665E+05	3.554763703E+05	8.361307045E+05	1.064594678E+06	1.650125050E+09	8.361307045E+11
square yard (WMA, 1963)	**sq. yd, yd^2**	8361.273600000	2.959946826E+05	3.554749484E+05	8.361273600E+05	1.064590419E+06	1.650118450E+09	8.361273600E+11
square yard (old)	**sq. yd (old)**	8361.257140808	2.959940999E+05	3.554742486E+05	8.361257141E+05	1.064588324E+06	1.650115202E+09	8.361257141E+11
barrel (US, petr.) per foot	**bbl (US, petr.).ft^{-1}**	5216.118600000	1.846540902E+05	2.217604134E+05	5.216118600E+05	6.641368472E+05	1.029414172E+09	5.216118600E+11
barrel (US, liq.) per foot	**bbl (US, liq.).ft^{-1}**	3912.088950000	1.384905676E+05	1.663203100E+05	3.912088950E+05	4.981026354E+05	7.720606289E+08	3.912088950E+11
gallon (UK) per inch	**gal (UK).in^{-1}**	1789.800000000	6.336011811E+04	7.609236260E+04	1.789800000E+05	2.278844137E+05	3.532215477E+08	1.789800000E+11
gallon (US) per inch	**gal (US).in^{-1}**	1490.319600000	5.275831148E+04	6.336011811E+04	1.490319600E+05	1.897533849E+05	2.941183348E+08	1.490319600E+11
square foot (US, survey)	**ft^2 (US,Survey)**	929.0341	3.288842962E+04	3.949737447E+04	9.290341161E+04	1.182882975E+05	1.833472278E+08	9.290341161E+10
square foot	**sq. ft, ft^2**	929.0304	3.288829806E+04	3.949721648E+04	9.290304000E+04	1.182878244E+05	1.833464944E+08	9.290304000E+10
gallon (UK) per foot	**gal (UK).ft^{-1}**	149.150000000	5280.009842520	6341.030216701	1.491500000E+04	1.899036781E+04	2.943512898E+07	1.491500000E+10
gallon (US) per foot	**gal (US).ft^{-1}**	124.193300000	4396.525956252	5280.009842520	1.241933000E+04	1.581278208E+04	2.450986124E+07	1.241933000E+10
square decimetre	**dm^2**	**100**	3540.066941012	4251.444999464	**1E+04**	1.273239545E+04	1.973525241E+07	**1E+10**
square inch	**sq. in, in^2**	**6.4516**	228.390958766	274.286225585	**645.16**	821.443224681	1.273239545E+06	6.4516E+08
circular inch	**cin**	5.067074791	179.377839552	215.423897820	506.70747910	**645.16**	**1E+06**	5.067074791E+08
square centimetre	**cm^2**	**1**	35.400669410	42.514449995	**100**	127.323954474	1.973525241E+05	**1E+08**
gallon (UK) per mile(int.)	**gal (UK).mi^{-1}**	2.824805340E-02	**1**	1.200950454	2.824805340	3.596653865	5574.824641100	2.824805340E+06
gallon(US) per mile(int.)	**gal (US).mi^{-1}**	2.352141449E-02	8.326738183E-01	**1**	2.352141449	2.994839507	4642.010520279	2.352141449E+06
square millimetre	**mm^2**	**1E-02**	3.540066941E-01	4.251444999E-01	**1**	1.273239545	1973.525241390	**1E+06**
circular millimetre	**cmm**	7.853981634E-03	2.780362074E-01	3.339077094E-01	7.853981634E-01	**1**	1550.003100006	7.853981634E+05
circular mil	**cmil**	5.067074791E-06	1.793778396E-04	2.154238978E-04	5.067074791E-04	6.451600000E-04	**1**	506.707479097
square micron	**μm^2, μ^2**	**1E-08**	3.540066941E-07	4.251444999E-07	**1E-06**	1.273239545E-06	1.973525241E-03	**1**
square nanometre	**nm^2**	**1E-14**	3.540066941E-13	4.251444999E-13	**1E-12**	1.273239545E-12	1.973525241E-09	**1E-06**
square ångström	**$Å^2$**	**1E-16**	3.540066941E-15	4.251444999E-15	**1E-14**	1.273239545E-14	1.973525241E-11	**1E-08**
square bohr (a.u.)	**a.u., a_0^2**	2.800285609E-17	9.913198508E-16	1.190526025E-15	2.800285609E-15	3.565434373E-15	5.526434332E-12	2.800285609E-09
square picometre	**pm^2**	**1E-20**	3.540066941E-19	4.251444999E-19	**1E-18**	1.273239545E-18	1.973525241E-15	**1E-12**
barn	**b**	**1E-24**	3.540066941E-23	4.251444999E-23	**1E-22**	1.273239545E-22	1.973525241E-19	**1E-16**
square fermi	**F^2**	**1E-26**	3.540066941E-25	4.251444999E-25	**1E-24**	1.273239545E-24	1.973525241E-21	**1E-18**
square femtometre	**fm^2**	**1E-26**	3.540066941E-25	4.251444999E-25	**1E-24**	1.273239545E-24	1.973525241E-21	**1E-18**
square attometre	**am^2**	**1E-32**	3.540066941E-31	4.251444999E-31	**1E-30**	1.273239545E-30	1.973525241E-27	**1E-24**
shed	**shed**	**1E-48**	3.540066941E-47	4.251444999E-47	**1E-46**	1.273239545E-46	1.973525241E-43	**1E-40**

4.2.4 Conversion Tables for Units of Volume and Capacity

Table 4.2.4.1 Conversion table: units of volume: multiples and submultiples (SI)

Unit	Symbol	Ym^3	Zm^3	Em^3	Pm^3	Tm^3	Gm^3	Mm^3	km^3	hm^3
cubic yottametre	Ym^3	1	1E+09	1E+18	1E+27	1E+36	1E+51	1E+54	1E+63	1E+66
cubic zetametre	Zm^3	1E-09	1	1E+09	1E+18	1E+27	1E+42	1E+45	1E+54	1E+57
cubic exametre	Em^3	1E-18	1E-09	1	1E+09	1E+18	1E+33	1E+36	1E+45	1E+48
cubic petametre	Pm^3	1E-27	1E-18	1E-09	1	1E+09	1E+24	1E+27	1E+36	1E+39
cubic terametre	Tm^3	1E-36	1E-27	1E-18	1E-09	1	1E+15	1E+18	1E+27	1E+30
cubic gigametre	Gm^3	1E-51	1E-42	1E-33	1E-24	1E-15	1	1E+03	1E+12	1E+15
cubic megametre	Mm^3	1E-54	1E-45	1E-36	1E-27	1E-18	1E-03	1	1E+09	1E+12
cubic kilometre	km^3	1E-63	1E-54	1E-45	1E-36	1E-27	1E-12	1E-09	1	1E+03
cubic hectometre	hm^3	1E-66	1E-57	1E-48	1E-39	1E-30	1E-15	1E-12	1E-03	1
cubic decametre	dam^3	1E-69	1E-60	1E-51	1E-42	1E-33	1E-18	1E-15	1E-06	1E-03
cubic metre	m^3	1E-72	1E-63	1E-54	1E-45	1E-36	1E-21	1E-18	1E-09	1E-06
cubic decimetre	dm^3	1E-75	1E-66	1E-57	1E-48	1E-39	1E-24	1E-21	1E-12	1E-09
cubic centimetre	cm^3	1E-78	1E-69	1E-60	1E-51	1E-42	1E-27	1E-24	1E-15	1E-12
cubic millimetre	mm^3	1E-81	1E-72	1E-63	1E-54	1E-45	1E-30	1E-27	1E-18	1E-15
cubic micrometre	μm^3	1E-90	1E-81	1E-72	1E-63	1E-54	1E-39	1E-36	1E-27	1E-24
cubic nanometre	nm^3	1E-93	1E-84	1E-75	1E-66	1E-57	1E-42	1E-39	1E-30	1E-27
cubic picometre	pm^3	1E-108	1E-99	1E-90	1E-81	1E-72	1E-57	1E-54	1E-45	1E-42
cubic femtometre	fm^3	1E-117	1E-108	1E-99	1E-90	1E-81	1E-66	1E-63	1E-54	1E-51
cubic attometre	am^3	1E-126	1E-117	1E-108	1E-99	1E-90	1E-75	1E-72	1E-63	1E-60
cubic zeptometre	zm^3	1E-135	1E-126	1E-117	1E-108	1E-99	1E-84	1E-81	1E-72	1E-69
cubic yoctometre	ym^3	1E-144	1E-135	1E-126	1E-117	1E-108	1E-93	1E-90	1E-81	1E-78

dam^3	m^3	dm^3	cm^3	mm^3	μm^3	nm^3	pm^3	fm^3	am^3	zm^3	ym^3
1E+69	1E+72	1E+75	1E+78	1E+81	1E+90	1E+93	1E+108	1E+117	1E+126	1E+135	1E+144
1E+60	1E+63	1E+66	1E+691	1E+72	1E+81	1E+84	1E+99	1E+108	1E+117	1E+126	1E+135
1E+51	1E+54	1E+57	1E+60	1E+63	1E+72	1E+75	1E+90	1E+99	1E+108	1E+117	1E+126
1E+42	1E+45	1E+48	1E+51	1E+54	1E+63	1E+66	1E+81	1E+90	1E+99	1E+108	1E+117
1E+33	1E+36	1E+39	1E+42	1E+45	1E+54	1E+57	1E+72	1E+81	1E+90	1E+99	1E+108
1E+18	1E+21	1E+24	1E+27	1E+30	1E+39	1E+42	1E+57	1E+66	1E+75	1E+84	1E+93
1E+15	1E+18	1E+21	1E+24	1E+27	1E+36	1E+39	1E+54	1E+63	1E+72	1E+81	1E+90
1E+06	1E+09	1E+12	1E+15	1E+18	1E+27	1E+30	1E+45	1E+54	1E+63	1E+72	1E+81
1E+03	1E+06	1E+09	1E+12	1E+15	1E+24	1E+27	1E+42	1E+51	1E+60	1E+69	1E+78
1	1E+03	1E+06	1E+09	1E+12	1E+21	1E+24	1E+39	1E+48	1E+57	1E+66	1E+75
1E-03	1	11E+03	1E+06	1E+09	1E+18	1E+21	1E+36	1E+45	1E+54	1E+63	1E+72
1E-06	1E-03	1	1E+03	1E+06	1E+15	1E+18	1E+33	1E+42	1E+51	1E+60	1E+69
1E-09	1E-06	1E-03	1	1E+03	1E+12	1E+15	1E+30	1E+39	1E+48	1E+57	1E+66
1E-12	1E-09	1E-06	1E-03	1	1E+09	1E+12	1E+27	1E+36	1E+45	1E+54	1E+63
1E-21	1E-18	1E-15	1E-12	1E-09	1	1E+03	1E+18	1E+27	1E+36	1E+45	1E+54
1E-24	1E-21	1E-18	1E-15	1E-12	1E-03	1	1E+15	1E+24	1E+33	1E+42	1E+51
1E-39	1E-36	1E-33	1E-30	1E-27	1E-18	1E-15	1	1E+09	1E+18	1E+27	1E+36
1E-48	1E-45	1E-42	1E-39	1E-36	1E-27	1E-24	1E-09	1	1E+09	1E+18	1E+27
1E-57	1E-54	1E-51	1E-48	1E-45	1E-36	1E-33	1E-18	1E-09	1	1E+09	1E+18
1E-66	1E-63	1E-60	1E-57	1E-54	1E-45	1E-42	1E-27	1E-18	1E-09	1	1E+09
1E-75	1E-72	1E-69	1E-66	1E-63	1E-54	1E-51	1E-36	1E-27	1E-18	1E-09	1

Table 4.2.4.2 Conversion table: units of volume (>1 L)

Unit	Symbol	m^3	ft^3	gallon (UK)
cubic int. mile (cubem)	cu mi (int. stat.)	4.168205135E+09	1.471987752E+11	9.168765470E+11
cubic US int. mile	cu mi (int. US)	4.168181825E+09	1.471979520E+11	9.168714195E+11
acre-foot (US, survey)	ac-ft (US)	1233.4892384682	4.356026136E+04	2.713295812E+05
acre-foot	ac-ft	1233.4818375475	**43560**	2.713279532E+05
acre-inch	ac-in	102.7901531290	**3630**	2.261066277E+04
forty feet equiv. unit	FEU, FEQ	72.4911272755	**2560**	1.594581176E+04
twenty feet equiv. unit	TEU, TEQ	36.2455636378	**1280**	7.972905880E+03
decastère	dast	**10**	353.1466672149	2199.69151526190
standart (Petrograd)	std	4.67227968768	**165**	1027.7573985920
cord	cord	3.624556364	**128**	797.2905879987
last	last	2.909498	102.7479521968	639.9998064271
register ton (UK)	–	2.83168466	**100**	622.8832720499
tonneau de jauge	–	2.83168466	**100**	622.8832720499
wey (UK, capacity)	wey (UK)	1.45474944	51.37399163687	**320**
chaldron (UK)	chal (UK)	1.309274496	46.2365924732	**288**
stère	st	**1**	35.3146667215	219.9691515262
cubic metre	m^3	**1**	35.3146667215	219.9691515262
tun (US)	tu (US)	9.539237696E-01	**101/3**	209.8338022125
cubic yard	cu yd, yd^3	7.645548580E-01	**27**	168.1784834060
perche (masonry)	–	7.008419532E-01	**24.75**	154.1636097994
butt (UK)	but (UK)	0.490977936	17.33872218	**108**
cord-foot	cord-ft	4.530695455E-01	**16**	99.6613234998
puncheon (UK)	pun (UK)	3.182264400E-01	11.2380606706	**70**
quarter (UK)	qtr (UK)	2.909498880E-01	10.2747983274	**64**
seam (UK)	seam (UK)	2.909498880E-01	10.2747983274	**64**
muid (de Paris)	muid	**0.274**	9.6762186817	60.2715475182
hogshead (US, liquid)	hhd, hg (US)	2.384809424E-01	8.4218750000	52.45845055313
barrel (UK, alcohol)	bbl (UK, alc.)	2.273046000E-01	8.0271861933	**50**
cran (mease)	cran	1.704784500E-01	6.0203896449	**37.5**
barrel (UK, beer)	bbl (UK, beer)	1.636593120E-01	5.7795740591	**36**
barrel (US, petrol.)	bbl (Petrol.)	1.589872949E-01	5.6145833333	34.9723003688
coomb (UK)	cmb (UK)	1.454749440E-01	5.13739916369	**32**
barrel (UK, wine)	bbl (UK, wine)	1.432018980E-01	5.0571273018	**31.5**
barrel (US, liquid)	bbl (US, liq.)	1.192404712E-01	4.2109375000	26.2292252766
barrel (US, dry)	bbl (US, dry)	1.154550594E-01	4.0772569444	25.3965514583
sack (UK)	sk (UK)	1.090833300E-01	3.85304937277	**24**
bag (UK)	bg (UK)	1.091061600E-01	3.85304937277	**24**
decistère	dst	**1E-01**	3.5314666721	21.9969151526
barrel (US, cranb.)	bbl (US, cranb.)	9.547100000E-02	3.3715265466	21.0006748654
kilderkin (UK)	kil (UK)	8.182965600E-02	2.8897870296	**18**
firkin (UK)	fir (UK)	4.091482800E-02	1.4448935148	**9**
bushel (UK)	bu (UK)	3.636873600E-02	1.2843497909	**8**
bushel (US, dry)	bu (US, dry)	3.523907200E-02	1.2444560833	7.7515087684
Winchester bushel	bu (Winchester)	3.523907200E-02	1.2444560833	7.7515087684
firkin (US, liquid)	fir (US, liq.)	3.406870606E-02	1.2031250000	7.4940643647
cubic foot	cu. ft, ft^3	2.831684659E-02	**1**	6.2288327187
bucket (UK)	bk (UK)	1.818436800E-02	6.421748955E-01	**4**
peck (UK)	pk (UK)	9.092184000E-03	3.210874477E-01	**2**
peck (US, dry)	pk (US, dry)	8.809768000E-03	3.111140208E-01	1.9378771921
gallon (imperial, UK)	gal (UK)	4.546092000E-03	1.605437239E-01	**1**
gallon (Canadian, liquid)	gal (Can.)	4.546092000E-03	1.605437239E-01	**1**
gallon (US, dry)	gal (US, dry)	4.404884000E-03	1.555570104E-01	9.689385961E-01
gallon (US, liquid)	gal (US, liq.)	3.785411784E-03	1.336805556E-01	8.326738183E-01
board foot measure	B.M., fbm	2.359737216E-03	**1/12**	5.190693932E-01
pottle (UK)	pot (UK)	2.273046000E-03	8.027186193E-02	**1/2**
quart (UK)	qt (UK)	1.136523000E-03	4.013593097E-02	**1/4**
quart (US, dry)	qt (US, dry)	1.101221000E-03	3.888925260E-02	2.422346490E-01
litre (1964)	L, l	**1E-03**	3.531466672E-02	2.199691515E-01
cubic decimetre	dm^3	**1E-03**	3.531466672E-02	2.199691515E-01

gallon (US, dry)	gallon (US, liq.)	dm^3, l	in^3	cm^3
9.462689904E+11	1.101123305E+12	4.168205135E+12	2.543594835E+14	4.168205135E+15
9.462636985E+11	1.101117147E+12	4.168181825E+12	2.543580611E+14	4.168181825E+15
2.800276326E+05	3.258533837E+05	1.233489238E+06	7.527213163E+07	1.233489238E+09
2.800259525E+05	3.258514286E+05	1.233481838E+06	7.527168000E+07	1.233481838E+09
2.33354604E+04	2.715428571E+04	1.027901531E+05	6.272640000E+06	1.027901531E+08
1.645698894E+04	1.915012987E+04	7.249112728E+04	**4423680**	7.249112728E+07
8.228494471E+03	9.575064935E+03	3.624556364E+04	**2211840**	3.624556364E+07
2270.20734257701	2641.72052358148	**10000**	6.102374409E+05	**1E+07**
1060.70436535446	1234.2857142857	4672.279688	**285120**	4.672279688E+06
822.84944706285	957.5064935065	3624.556364	**221184**	3.624556364E+06
660.51637228131	768.6080579919	2909.498	177548.4613961350	2.909498000E+06
642.85113069947	748.0519482633	2831.68466	**172800**	2.831684660E+06
642.85113069947	748.0519482633	2831.68466	**172800**	2.831684660E+06
330.25828602978	384.3041452317	1454.74944	8.877425755E+04	1.454749440E+06
297.23245742680	345.8737307085	1309.274496	7.989683179E+04	1.309274496E+06
227.02073425770	264.1720523581	**1000**	6.102374409E+04	**1E+06**
227.0207342577	264.1720523581	**1000**	6.102374409E+04	**1E+06**
216.56047459320	**252**	953.9237696	**58212**	9.539237696E+05
173.56980523982	201.9740259740	764.554858	**46656**	7.645548580E+05
159.10565481407	185.1428571555	700.8419532	**42768**	7.008419532E+05
111.46217153505	129.702649	490.977936	29961.31192	4.909779360E+05
102.85618088286	119.6883116883	453.0695455	**27648**	4.530695455E+05
72.24400006901	84.0665317694	318.22644	19419.3688387377	3.182264400E+05
66.05165720596	76.8608290463	290.949888	17754.8515097030	2.909498880E+05
66.05165720596	76.8608290463	290.949888	17754.8515097030	2.909498880E+05
62.20368118661	72.3831423461	**274**	16720.5058819566	**274000**
54.14011864830	**63**	238.4809424	**14553**	2.384809424E+05
51.60285719215	60.04752269245	227.3046	13870.97774195550	2.273046000E+05
38.70214289411	45.0356420193	170.47845	10403.2333064666	1.704784500E+05
37.15405717835	43.2342163386	163.659312	9987.1039742080	1.636593120E+05
36.09341243220	**42**	158.9872949	**9702**	1.589872949E+05
33.02582860298	38.4304145232	145.47494	8.877425755E+03	1.454749440E+05
32.50980003106	37.8299392962	143.201898	8738.7159774320	1.432018980E+05
27.07005932415	**31.5**	119.2404712	**7276.5**	1.192404712E+05
26.21069236148	**30.5**	115.4550594	**7045.5**	1.154550594E+05
24.76417767188	28.8228108924	109.106208	6.658069316E+03	1.091062080E+05
24.76936055524	28.8228108924	109.106208	6658.0693161386	1.091062080E+05
22.70207342577	26.4172052358	**100**	6102.3744094732	**1E+05**
21.67389652032	25.2207700107	95.471	5825.9978724682	9.547100000E+04
18.57702858918	21.6171081693	81.829656	4993.5519871040	8.182965600E+04
9.28851429459	10.8085540846	40.914828	2496.7759935520	4.091482800E+04
8.25645715074	9.6076036308	36.368736	2219.3564387129	3.636873600E+04
8	9.3091779734	35.239072	2150.4201118639	3.523907200E+04
8	9.3091779734	35.239072	2150.4201118639	3.523907200E+04
7.73430266404	**9**	34.06870606	2079.0000000000	3.406870606E+04
6.42851130518	7.4805194805	28.31684659	**1728**	2.831684659E+04
4.12822857537	4.8038018154	18.184368	1109.6782193564	1.818436800E+04
2.06411428769	2.4019009077	9.092184	554.8391096782	9092.184
2	2.3272944934	8.809768	537.6050279660	8809.768
1.03205714384	1.2009504538	4.546092	277.4195548391	4546.092
1.03205714384	1.2009504538	4.546092	277.4195548391	4546.092
1	1.1636472467	4.404884	268.8025139830	4404.884
8.59366963E-01	**1**	3.785411784	**231**	3785.411784
5.35709275E-01	6.233766234E-01	2.359737216	144	2359.737216
5.16028572E-01	6.004752269E-01	2.273046	138.7097774196	2273.046
2.58014286E-01	3.002376135E-01	1.136523	69.3548887098	1136.523
1/4	2.909118117E-01	1.101221	67.2006284957	1101.221
2.27020734E-01	2.641720524E-01	**1**	61.0237440947	**1000**
2.27020734E-01	2.641720524E-01	**1**	61.0237440947	**1000**

Table 4.2.4.3 Conversion table: units of volume (<1 L)

Unit	Symbol	m^3	ft^3	dm^3, L	pint (UK)
litre (old)	**L (old)**	1.000002800E-03	3.531476561E-02	1.0000028	1.75975814
litre (1964)	**L, l**	**1E-03**	3.531466672E-02	**1**	1.759753212
cubic decimetre	**dm^3**	**1E-03**	3.531466672E-02	**1**	1.759753212
quart (US liquid)	**qt (US, liq.)**	9.463529460E-04	3.342013889E-02	9.463529460E-01	1.665347637
chopine (UK)	**ch (UK)**	5.682615000E-04	2.006796548E-02	5.682615000E-01	**1**
pint (UK)	**pt (UK)**	5.682615000E-04	2.006796548E-02	5.682615000E-01	**1**
pint (US, dry)	**pt (US, dry)**	5.506105000E-04	1.944462630E-02	5.506105000E-01	9.689385961E-01
chopine (US, dry)	**ch (US, dry)**	5.506105000E-04	1.944462630E-02	5.506105000E-01	9.689385961E-01
chopine (US, liquid)	**ch (US, liq.)**	4.731764730E-04	1.671006944E-02	4.731764730E-01	8.326738183E-01
pint (US, liquid)	**pt (US, liq.)**	4.731764730E-04	1.671006944E-02	4.731764730E-01	8.326738183E-01
démiard	–	2.841300000E-04	1.003395626E-02	2.841300000E-01	4.999986802E-01
noggin (UK)	**ng (UK)**	1.420653750E-04	5.016991371E-03	1.420653750E-01	**1/4**
gill, roquille (UK)	**gi (UK)**	1.420653750E-04	5.016991371E-03	1.420653750E-01	**1/4**
gill, roquille (US)	**gi (US, liq.)**	1.18294125E-04	4.177513185E-03	1.182941183E-01	2.081684546E-01
decilitre	**dl, dL**	**1E-04**	3.531466672E-03	**1E-01**	1.759753212E-01
fluid ounce (US)	**fl. oz (US)**	2.957352956E-05	1.044379340E-03	2.957352956E-02	5.204211364E-02
fluid ounce (UK)	**fl. oz (UK)**	2.841307500E-05	1.003398274E-03	2.841307500E-02	**1/20**
cubic inch	**cu. in, in^3**	1.63870640E-05	5.787037037E-04	1.638706400E-02	2.883718851E-02
tablespoon (metric)	–	1.50E-05	5.297200008E-04	1.50E-02	2.639629818E-02
tablespoon (US)	–	1.478677000E-05	5.221898544E-04	1.478677000E-02	2.602106601E-02
centilitre	**cl, cL**	**1E-05**	3.531466672E-04	**1E-02**	1.759753212E-02
teaspoon (metric)	–	**5E-06**	1.765733336E-04	**5E-03**	8.798766061E-03
teaspoon (US)	–	4.928922000E-06	1.740632377E-04	4.928922000E-03	8.673686322E-03
fluid dram (US)	**fl. dr (US, liq.)**	3.696691195E-06	1.305474175E-04	3.696691195E-03	6.505264205E-03
fluid drachm (UK)	**fl. dr (UK)**	3.551634375E-06	1.254247843E-04	3.551634375E-03	**1/160**
fluid scruple (UK)	**fl. sc (UK)**	1.183878125E-06	4.180826142E-05	1.183878125E-03	**1/480**
Mohr centicube	**cc**	1.002380000E-06	3.539871563E-05	1.002380000E-03	1.763941425E-03
cubic centimetre	**cm^3**	**1E-06**	3.531466672E-05	**1E-03**	1.759753212E-03
millilitre	**ml, mL**	**1E-06**	3.531466672E-05	**1E-03**	1.759753212E-03
minim (US, liquid)	**min (US, liq.)**	6.161151992E-08	2.175790292E-06	6.161151992E-05	1.084210701E-04
minim (UK)	**min (UK)**	5.919390625E-08	2.090413071E-06	5.919390625E-05	**1/9600**
microlitre	µl, µL	**1E-09**	3.531466672E-08	**1E-06**	1.759753212E-06
lambda	**λ**	**1E-09**	3.531466672E-08	**1E-06**	1.759753212E-06

pint (US dry)	fl. oz (US)	fl. oz (UK)	in^3	cm^3	mm^3
1.81617096	33.814117384	35.195162794	61.023914967	1000.0028001	1.00000280E+06
1.816165874	33.814022702	35.195064244	61.023744095	**1000**	**1E+06**
1.816165874	33.814022702	35.195064244	61.023744095	**1000**	**1E+06**
2	32	33.30695273	**57.75**	946.3529460	9.463529460E+05
1.032057144	19.215207262	**20**	34.677444355	568.2615	5.682615E+05
1.032057144	19.215207262	**20**	34.677444355	568.2615	5.682615E+05
1	18.618355947	19.378771921	33.600314248	550.610500000	5.506105000E+05
1	18.618355947	19.378771921	33.600314248	550.610500000	5.506105000E+05
8.593669627E-01	**16**	16.653476366	**28.875**	473.176473000	4.731764730E+05
8.593669627E-01	**16**	16.653476366	**28.875**	473.176473000	4.731764730E+05
5.160272098E-01	9.607578270	9.999973604	17.338676410	284.130000000	2.841300000E+05
2.580142860E-01	4.803801815	**5**	8.669361089	142.065375000	1.420653750E+05
2.580142860E-01	4.803801815	**5**	8.669361089	142.065375000	1.420653750E+05
2.148417407E-01	**4**	4.163369092	**7.21875**	118.294118250	1.182941183E+05
1.816165874E-01	3.381402270	3.519506424	6.102374409	**100**	1.000000000E+05
5/93	**1**	1.040842273	1.804687500	29.573529563	2.957352956E+04
5.160285719E-02	9.607603631E-01	**1**	1.733872218	28.413075000	2.841307500E+04
2.976162641E-02	5.541125541E-01	5.767437703E-01	**1**	16.387064000	1.638706400E+04
2.724248811E-02	5.072103405E-01	5.279259637E-01	9.153561614E-01	**15**	1.500000000E+04
2.685522706E-02	5.000001765E-01	5.204213201E-01	9.023440685E-01	14.786770000	1.478677000E+04
1.816165874E-02	3.381402270E-01	3.519506424E-01	6.102374409E-01	**10**	**10000**
9.080829370E-03	1.690701135E-01	1.759753212E-01	3.051187205E-01	**5**	**5000**
8.951739932E-03	1.666666804E-01	1.734737264E-01	3.007812748E-01	4.928922000	4928.922000000
19/2830	**1/8**	1.301052841E-01	2.255859375E-01	3.696691195	3696.691195313
6.450357149E-03	1.200950454E-01	**1/8**	2.167340272E-01	3.551634375	3551.634375000
2.150119050E-03	4.003168179E-02	**1/24**	7.224467574E-02	1.183878125	1183.878125000
1.820488349E-03	3.389450008E-02	3.527882850E-02	6.116898061E-02	1.002380000	1002.380000000
1.816165874E-03	3.381402270E-02	3.519506424E-02	6.102374409E-02	**1**	**1000**
1.816165874E-03	3.381402270E-02	3.519506424E-02	6.102374409E-02	**1**	**1000**
1.118967399E-04	**1/480**	2.168421402E-03	3.759765625E-03	6.161152E-02	61.611519922
1.075059525E-04	2.001584090E-03	**1/480**	3.612233787E-03	5.919391E-02	59.193906250
1.816165874E-06	3.381402270E-05	3.519506424E-05	6.102374409E-05	**1E-03**	**1**
1.816165874E-06	3.381402270E-05	3.519506424E-05	6.102374409E-05	**1E-03**	**1**

4.2.5 Conversion Table for Units of Linear Density

Table 4.2.5 Conversion table: units of linear mass density

Unit	Symbol	$kg.m^{-1}$	denier	drex	poumar	tex	$gr.(100\ yd)^{-1}$	$gr.(120\ yd)^{-1}$
kilogram per metre	$kg.m^{-1}$	**1**	9.0009001E+06	**1E+07**	2.0159069E+06	**1E+06**	1.4111348E+11	1.6933618E+11
tex	**tex**	**1E-06**	9.000900090	**10**	2.015906925	**1**	1.4111348E+05	1.6933618E+05
poumar	–	4.9605465E-07	4.464938325	4.960546479	**1**	0.496054648	**70000**	**84000**
denier	**denier**	1.1110E-07	**1**	1.111	2.2396726E-01	0.111100000	1.5677708E+04	1.8813250E+04
drex	**drex**	**1E-07**	9.0009E-01	**1**	2.0159069E-01	**0.1**	1.4111348E+04	1.6933618E+04
grain (av.) per 100 yards	$gr.(100\ yd)^{-1}$	7.0864950E-12	6.3784833E-05	7.0864950E-05	1.4285714E-05	7.0864950E-06	**1**	**1.2**
grain (av.) per 120 yards	$gr.(120\ yd)^{-1}$	5.9054125E-12	5.3154028E-05	5.9054125E-05	1.1904762E-05	5.9054125E-06	8.3333333E-01	**1**

Unit	Symbol	$kg.m^{-1}$	$kg.dm^{-1}$	$kg.cm^{-1}$	$t.km^{-1}$	$lb.in^{-1}$	$lb.ft^{-1}$	UK $ton.mi^{-1}$
ton (metric) per metre	$t.m^{-1}$	**1000**	**100**	**10**	**1000**	55.997414595	671.968975140	1583.926869660
kilogram per centimetre	$kg.cm^{-1}$	**100**	**10**	**1**	**100**	5.599741459	67.196897514	158.392686966
pound per inch	$lb.in^{-1}$	17.85796732	1.785796732	1.7857967E-01	17.857967323	**1**	**12**	28.285714280
kilogram per decimetre	$kg.dm^{-1}$	**10**	**1**	**0.1**	**10**	5.5997415E-01	6.719689751	15.839268697
pound per foot	$lb.ft^{-1}$	1.488163944	1.4881639E-01	1.4881639E-02	1.488163944	8.3333333E-02	**1**	2.357142857
UK ton per 1000 yards	$(UK)\ ton.\ (1000\ yd)^{-1}$	1.111162411	1.1111624E-01	1.1111624E-02	1.111162411	6.2222222E-02	7.4666667E-01	1.760000000
kilogram per metre	$kg.m^{-1}$	**1**	**0.10**	**0.01**	**1**	5.5997415E-02	6.7196898E-01	1.583926870
ton (metric) per kilometre	$t.km^{-1}$	**1**	**0.10**	**0.01**	**1**	5.5997415E-02	6.7196898E-01	1.583926870
UK ton per mile	UK $ton.mi^{-1}$	6.3134228E-01	6.3134228E-02	6.3134228E-03	6.3134228E-01	3.5353535E-02	4.2424242E-01	**1**
pound per yard	$lb.yd^{-1}$	4.9605465E-01	4.9605465E-02	4.9605465E-03	4.9605465E-01	2.7777778E-02	3.3333333E-01	7.8571429E-01

4.2.6 Conversion Table for Units of Surface Mass Density

Table 4.2.6 Conversion table: units of surface mass density

Unit	Symbol	lb.in^{-2}	oz.in^{-2}	g.cm^{-2}	lb.ft^{-2}	kg.m^{-2}	lb.yd^{-2}
pound per square inch	**lb.in^{-2}**	**1**	16.000000071	70.306957964	144	703.069579639	1296
(UK) ounce per square inch	**oz.in^{-2}**	6.249999972E-02	**1**	4.394184853	8.999999960	43.941848534	80.999999643
gram per square centimetre	**kg.cm^{-2}**	1.422334331E-02	2.275734939E-01	**1**	2.048161436	**10**	18.433452926
pound per square foot	**lb.ft^{-2}**	6.944444444E-03	1.111111116E-01	4.882427636E-01	**1**	4.882427636	**9**
kilogram per square metre	**kg.m^{-2}**	1.422334331E-03	2.275734939E-02	**0.1**	2.048161436E-01	**1**	1.843345293
pound per square yard	**lb.yd^{-2}**	7.716049383E-04	1.234567907E-02	5.424919596E-02	1.111111111E-01	5.424919596E-01	**1**
(UK) ounce per square foot	**oz.ft^{-2}**	4.340277759E-04	6.944444444E-03	3.051517259E-02	6.249999972E-02	3.051517259E-01	5.624999975E-01
(UK) ounce per square yard	**oz.yd^{-2}**	4.822530843E-05	7.716049383E-04	3.390574733E-03	6.944444414E-03	3.390574733E-02	6.249999972E-02
milligram per square centimetre	**mg.cm^{-2}**	1.422334331E-05	2.275734939E-04	**1E-03**	2.048161436E-03	**1E-02**	1.843345293E-02
gram per square metre	**g.m^{-2}**	1.422334331E-06	2.275734939E-05	**1E-04**	2.048161436E-04	**1E-03**	1.843345293E-03
(UK) ton per square mile (int.)	**UK ton.(mi (int.))$^{-2}$**	5.579787778E-07	8.927660484E-06	3.922979047E-05	8.034894400E-05	3.922979047E-04	7.231404960E-04
pound per acre	**lb.ac^{-1}**	1.594225079E-07	2.550760138E-06	1.120851156E-05	2.295684114E-05	1.120851156E-04	2.066115702E-04
kilogram per hectare	**kg.ha^{-1}**	1.422334331E-07	2.275734939E-06	**1E-05**	2.048161436E-05	**1E-04**	1.843345293E-04

Unit	Symbol	lb.yd^{-2}	oz.ft^{-2}	mg.cm^{-2}	UK ton.(mi (int.))$^{-2}$	lb.acre^{-1}	kg.ha^{-1}
pound per square inch	**lb.in^{-2}**	**1296**	2304.000010159	70306.957963916	1.792182857E+06	6.27264E+06	7.030695796E+06
(UK) ounce per square inch	**oz.in^{-2}**	80.999999643	**144**	4394.184853370	1.120114281E+05	3.920399983E+05	4.394184853E+05
gram per square centimetre	**g.cm^{-2}**	18.433452926	32.770583124	**1000**	2.549083204E+04	8.921791216E+04	100000
pound per square foot	**lb.ft^{-2}**	**9**	16.000000071	488.242763638	1.244571428E+04	**43560**	48824.276363831
kilogram per square metre	**kg.m^{-2}**	1.843345293	3.277058312	**100**	2549.083204126	8921.791216197	10000
pound per square yard	**lb.yd^{-2}**	**1**	1.777777786	54.249195960	1382.857142585	4840	5424.919595981
(UK) ounce per square foot	**oz.ft^{-2}**	5.624999975E-01	**1**	30.515172593	777.857139274	2722.499987996	3051.517259285
(UK) ounce per square yard	**oz.yd^{-2}**	6.249999972E-02	1.111111111E-01	3.390574733	86.428571030	302.499998666	339.057473254
milligram per square centimetre	**mg.cm^{-2}**	1.843345293E-02	3.277058312E-02	**1**	25.490832041	89.217912162	**100**
gram per square metre	g.m^{-2}	1.843345293E-03	3.277058312E-03	**1E-01**	2.549083204	8.921791216	**10**
(UK) ton per square mile (int.)	UK ton.(mi (int.))$^{-2}$	7.231404960E-04	1.285583110E-03	3.92297905E-02	**1**	3.500000001	3.922979047
pound per acre	**lb.ac^{-1}**	2.066115702E-04	3.673094598E-04	1.12085116E-02	2.857142857E-01	**1**	1.120851156
kilogram per hectare	**kg.ha^{-1}**	1.843345293E-04	3.277058312E-04	**1E-02**	2.549083204E-01	8.921791216E-01	**1**

4.2.7 Conversion Table for Units of Mass Density

Table 4.2.7 Conversion table: units of mass density

Unit	Symbol	lb.in^{-3}	kg.dm^{-3}
gram per cubic millimetre	**g.mm^{-3}**	36.127292000	**1000**
pound per cubic inch	**lb.in^{-3}**	**1**	27.679904710
UK ton per cubic yard	**UK ton. yd^{-3}**	4.801097394E-02	1.328939184
ton (metric) per cubic metre	**t.m^{-3}**	3.612729200E-02	**1**
kilogram per cubic decimetre	**kg.dm^{-3}**	3.612729200E-02	**1**
gram per cubic centimetre	**g.cm^{-3}**	3.612729200E-02	**1**
pound (avdp) per US gallon	**lb.(US gal)$^{-1}$**	4.329004311E-03	1.198264268E-01
pound (avdp) per UK gallon	**lb.(UK gal}$^{-1}$**	3.604648564E-03	9.977632877E-02
pound (avdp) per cubic foot	**lb.ft^{-3}**	5.787037037E-04	1.601846337E-02
ounce (avdp) per US gallon	**oz.(US gal)$^{-1}$**	2.705627682E-04	7.489151643E-03
ounce (avdp) per UK gallon	**oz.(UK gal)$^{-1}$**	2.252905343E-04	6.236020520E-03
kilogram per cubic metre	**kg.m^{-3}**	3.612729200E-05	**1E-03**
gram per cubic decimetre	**g.dm^{-3}**	3.612729200E-05	**1E-03**
grain (avdp) per US gallon	**gr.(US gal}$^{-1}$**	6.184291872E-07	1.711806097E-05
grain (avdp) per UK gallon	**gr.(UK gal)$^{-1}$**	5.149497949E-07	1.425376125E-05
grain (avdp) per cubic foot	**gr.ft^{-3}**	8.267195767E-08	2.288351911E-06
gram per cubic metre	**g.m^{-3}**	3.612729200E-08	**1E-06**

Unit	Symbol	oz.(US gal)$^{-1}$	oz.(UK gal)$^{-1}$
gram per cubic millimetre	**g.mm^{-3}**	1.335264724E+05	1.603586769E+05
pound per cubic inch	**lb.in^{-3}**	3.696000032E+03	4.438712897E+03
UK ton per cubic yard	**UK ton.yd^{-3}**	177.448561203	213.106929211
ton (metric) per cubic metre	**t.m^{-3}**	133.526472385	160.358676934
kilogram per cubic decimetre	**kg.dm^{-3}**	133.526472385	160.358676934
gram per cubic centimetre	**g.cm^{-3}**	133.526472385	160.358676934
pound (avdp) per US gallon	**lb.(US gal)$^{-1}$**	**16**	19.215207265
pound (avdp) per UK gallon	**lb.(UK gal)$^{-1}$**	13.322781208	**16**
pound (avdp) per cubic foot	**lb.ft^{-3}**	2.138888907	2.568699593
ounce (avdp) per US gallon	**oz.(US gal)$^{-1}$**	**1**	1.200950449
ounce (avdp) per UK gallon	**oz.(UK gal)$^{-1}$**	8.326738218E-01	**1**
kilogram per cubic metre	**kg.m^{-3}**	1.335264724E-01	1.603586769E-01
gram per cubic decimetre	**g.dm^{-3}**	1.335264724E-01	1.603586769E-01
grain (avdp) per US gallon	**gr.(US gal)$^{-1}$**	2.285714296E-03	2.745029609E-03
grain (avdp) per UK gallon	**gr.(UK gal)$^{-1}$**	1.903254458E-03	2.285714296E-03
grain (avdp) per cubic foot	**gr.ft^{-3}**	3.055555582E-04	3.669570847E-04
gram per cubic metre	**g.m^{-3}**	1.335264724E-04	1.603586769E-04

	g.cm^{-3}	lb.(US gal)$^{-1}$	lb.(UK gal)$^{-1}$	lb.ft^{-3}	oz.(US gal)$^{-1}$
	1000	8.345404487E+03	1.002241726E+04	6.242796058E+04	1.335264724E+05
	27.679904710	**231**	277.419554839	**1728**	3.696000032E+03
	1.328939184	11.090535026	13.319183017	82.962962963	177.448561203
	1	8.345404487	10.022417264	62.427960576	133.526472385
	1	8.345404487	10.022417264	62.427960576	133.526472385
	1	8.345404487	10.022417264	62.427960576	133.526472385
	1.198264268E-01	**1**	1.200950449	7.480519449	**16**
	9.977632877E-02	8.326738218E-01	**1**	6.228832719	13.322781208
	1.601846337E-02	1.336805561E-01	1.605437239E-01	**1**	2.138888907
	7.489151643E-03	6.249999972E-02	7.505940272E-02	4.675324635E-01	**1**
	6.236020520E-03	5.204211363E-02	6.249999972E-02	3.893020432E-01	8.326738218E-01
	1E-03	8.345404487E-03	1.002241726E-02	6.242796058E-02	1.335264724E-01
	1E-03	8.345404487E-03	1.002241726E-02	6.242796058E-02	1.335264724E-01
	1.711806097E-05	1.428571429E-04	1.715643498E-04	1.068645636E-03	2.285714296E-03
	1.425376125E-05	1.189534031E-04	1.428571429E-04	8.898332455E-04	1.903254458E-03
	2.288351911E-06	1.909722230E-05	2.293481770E-05	1.428571429E-04	3.055555582E-04
	1E-06	8.345404487E-06	1.002241726E-05	6.242796058E-05	1.335264724E-04

	kg.m^{-3}	grain.(US gal)$^{-1}$	grain.(UK gal)$^{-1}$	grain.ft^{-3}	g.m^{-3}
	1E+06	5.841783141E+07	7.015692085E+07	4.369957240E+08	**1E+09**
	2.767990471E+04	1.617000007E+06	1.941936884E+06	1.2096E+07	2.767990471E+07
	1.328939184E+03	7.763374518E+04	9.323428112E+04	5.807407407E+05	1.328939184E+06
	1000	5.841783141E+04	7.015692085E+04	4.369957240E+05	**1E+06**
	1000	5.841783141E+04	7.015692085E+04	4.369957240E+05	**1E+06**
	1000	5.841783141E+04	7.015692085E+04	4.369957240E+05	**1E+06**
	119.826426810	**7000**	8.406653141E+03	5.236363614E+04	1.198264268E+05
	99.776328768	5.828716753E+03	**7000**	4.360182903E+04	9.977632877E+04
	16.018463374	935.763892844	1.123806067E+03	**7000**	1.601846337E+04
	7.489151643	437.499998071	525.415819021	3.272727244E+03	7.489151643E+03
	6.236020520	364.294795441	437.499998071	2.725114302E+03	6.236020520E+03
	1	58.417831411	70.156920849	436.995724033	**1E+03**
	1	58.417831411	70.156920849	436.995724033	**1E+03**
	1.711806097E-02	**1**	1.200950449	7.480519449	17.118060973
	1.425376125E-02	8.326738218E-01	**1**	6.228832719	14.253761253
	2.288351911E-03	1.336805561E-01	1.605437239E-01	**1**	2.288351911
	1E-03	5.841783141E-02	7.015692085E-02	4.369957240E-01	**1**

4.2.8 Conversion Table for Units of Specific Gravity

Table 4.2.8 Conversion table: hydrometer degrees

Liquids heavier than pure water ($d > 1$) $d = \dfrac{a}{(b - {}^{\circ}\text{Bé})}$ or ${}^{\circ}\text{Bé} = b - \dfrac{a}{d}$

Hydrometer degree	Symbol	*a*	*b*	Specific gravity
Balling	°Balling	200	200	17.5°C/17.5°C
Baumé (US)	°Bé (US)	145	145	60°F/60°F
Baumé (old)	°Bé (old)	146.78	146.78	17.5°C/17.5°C
Baumé (Gerlach)	°Bé (Gerlach)	146.3	146.3	15°C/15°C
Baumé (rational)	°Bé (rat.)	144.3	144.3	15°C/15°C
Baumé (12.5°C)	°Bé (12.5°C)	145.88	135.88	12.5°C/12.5°C
Baumé-Lunge	°Bé (Lunge)	144.32	144.32	12.5°C/12.5°C
Baumé (French)	°Bé (Fr.)	144.32	144.32	15°C/15°C
Baumé (Holland)	°Bé (Nederl.)	144	144	12.5°C/12.5°C
Baumé (NIST)	°Bé (NIST)	145	145	60°F/60°F
Brix	°Brix	400	400	60°F/60°F
Cartier	°Cart	136.8	126.1	12.5°C/12.5°C
Fisher	°Fisher	400	400	60°F/60°F
Gay-Lussac	°GL	**100**	**100**	12.5°C/12.5°C
Beck	°Beck	170	170	12.5°C/12.5°C
Stoppani	°Stop	166	166	60°F/60°F

(Continued opposite)

Table 4.2.8 *(continued)*

Liquids lighter than pure water ($d < 1$) $d = \dfrac{a}{(b + {}^{\circ}\text{Bé})}$ or ${}^{\circ}\text{Bé} = \dfrac{a}{d} - b$

Hydrometer degree	Symbol	*a*	*b*	Specific gravity
API	°API	141.5	131.5	60°F/60°F
Balling	°Balling	200	200	17.5°C/17.5°C
Baumé (US)	°Bé (US)	140	130	60°F/60°F
Baumé (old)	°Bé (anc.)	146.78	146.78	17.5°C/17.5°C
Baumé (Gerlach)	°Bé (Gerlach)	146.3	146.3	15°C/15°C
Baumé (rational)	°Bé (rat.)	144.3	144.3	15°C/15°C
Baumé (Holland)	°Bé (Nederl.)	144	144	12.5°C/12.5°C
Baumé (NIST)	°Bé (NIST)	145	145	60°F/60°F
Brix	°Brix	400	400	60°F/60°F
Beck	°Beck	170	170	12.5°C/12.5°C
Fisher	°Fisher	400	400	60°F/60°F
Gay-Lussac	°GL	**100**	**100**	12.5°C/12.5°C

4.2.9 Conversion Table for Units of Time

Table 4.2.9 Conversion table: units of time

Unit	Symbol	second (s)	minute (min)
gigan, eon, billion years	**Ga, eon**	3.1557600000E+16	**5.2596E+14**
megayear, cron, million years	**Ma, cron**	3.1557600000E+13	**5.2596E+11**
millenium (1000 y)	–	3.1557600000E+10	**5.2596E+08**
century (100 y)	–	3.1557600000E+09	**5.2596E+07**
anomalistic year (1900)	a. anomal	3.1558432900E+07	5.2597388167E+05
Gaussian year	**a. gauss**	3.1558368787E+07	5.2597281312E+05
sidereal year (1900)	**a. sider**	3.1558149500E+07	5.2596915833E+05
astronomical year (Bessel)	**a. astr**	3.1557875590E+07	5.2596459317E+05
Gregorian year	**a. greg**	3.1557600000E+07	5.2596000000E+05
year (365.25 days)	**a, y**	3.1557600000E+07	5.2596000000E+05
Julian year	**a. jul**	3.1556952000E+07	5.2594920000E+05
tropical year	**a. trop**	3.1556925975E+07	5.2594876625E+05
civil year (calandar)	**a. civil**	3.1536000000E+07	5.2560000000E+05
month (30 days)	**m**	2.5920000000E+06	4.3200000000E+04
mean solar day	–	**86400**	**1440**
day (24 h)	**j, d**	**86400**	**1440**
stellar day	–	86164.098900	1436.068315
sidereal day	–	86164.090500	1436.068175
hour (60 min)	**h**	**3600**	**60**
cé	**Cé**	**86.4**	**1.44**
minute (60 s)	**min**	60	**1**
second (SI)	**s**	**1**	1.6666666667E-02
blink	**blink**	**0.864**	**1.44E-02**
shake	**shake**	**1E-08**	1.6666666667E-10
wink	**wink**	3.3333333333E-12	5.5555555556E-14
u.a. of time	**u.a**	2.4188843380E-17	4.0314738967E-19
chronon, tempon	–	**1E-23**	1.6666666667E-25

	hour (h)	day (j, d)	month (m)	year (a, y)
	8.7660000000E+12	**3.6525E+11**	**1.2175E+10**	**1E+09**
	8.7660000000E+09	**3.6525E+08**	**1.2175E+07**	**1E+06**
	8.7660000000E+06	**3.6525E+05**	**12175**	**1000**
	8.7660000000E+05	**3.6525E+04**	**1217.5**	**100**
	8.7662313611E+03	3.6525964005E+02	1.2175321335E+01	1.0000263930
	8.7662135519E+03	3.6525889800E+02	1.2175296600E+01	1.0000243614
	8.7661526389E+03	3.6525635995E+02	1.2175211998E+01	1.0000174126
	8.7660765528E+03	3.6525318970E+02	1.2175106323E+01	1.0000087329
	8766	**365.25**	**12.175**	**1**
	8766	**365.25**	**12.175**	**1**
	8765.82	**365.2425**	**12.17475**	9.9997946612E-01
	8.7658127708E+03	365.2421987813	12.1747399594	9.9997864143E-01
	8760	365	12.1666666667	9.9931553730E-01
	720	30	**1**	8.2135523614E-02
	24	**1**	3.3333333333E-02	2.7378507871E-03
	24	**1**	3.3333333333E-02	2.7378507871E-03
	23.9344719167	9.9726966319E-01	3.3242322106E-02	2.7303755324E-03
	23.9344695833	9.9726956597E-01	3.3242318866E-02	2.7303752662E-03
	1	4.1666666667E-02	1.3888888889E-03	1.1407711613E-04
	2.40E-02	**1E-03**	3.3333333333E-05	2.7378507871E-06
	1.6666666667E-02	6.9444444444E-04	2.3148148148E-05	1.9012852688E-06
	2.77777778E-04	1.15740741E-05	3.8580246914E-07	3.1688087814E-08
	2.40E-04	**1E-05**	3.3333333333E-07	2.7378507871E-08
	2.7777777778E-12	1.1574074074E-13	3.8580246914E-15	3.1688087814E-16
	9.2592592593E-16	3.8580246914E-17	1.2860082305E-18	1.0562695938E-19
	6.7191231611E-21	2.7996346505E-22	9.3321155015E-24	7.6649819315E-25
	2.7777777778E-27	1.1574074074E-28	3.8580246914E-30	3.1688087814E-31

4.2.11 Conversion Table for Units of Kinematic Viscosity

Table 4.2.11 Conversion table: units of kinematic viscosity

Unit	Symbol	$m^2.s^{-1}$	$ft^2.s^{-1}$	$in^2.s^{-1}$	$m^2.h^{-1}$	St, $cm^2.s^{-1}$
square metre per second	$m^2.s^{-1}$	1	10.763910000	1550.003100000	3600	10000
square foot per second	$ft^2.s^{-1}$	9.290304000E-02	1	144	334.450944000	929.030400000
square inch per second	$in^2.s^{-1}$	6.451600000E-04	6.944444176E-03	1	2.322576000	6.451600000
square metre per hour	$m^2.h^{-1}$	2.777777778E-04	2.989975000E-03	4.305564167E-01	1	2.777777778
square centimetre per second	$cm^2.s^{-1}$	1E-04	1.076391000E-03	1.550003100E-01	0.36	1
stokes	St	1E-04	1.076391000E-03	1.550003100E-01	0.36	1
square foot per hour	$ft^2.h^{-1}$	2.580640000E-05	2.777777670E-04	4E-02	9.290304000E-02	2.580640000E-01
square millimetre per second	$mm^2.s^{-1}$	1E-06	1.076391000E-05	1.550003100E-03	3.60E-03	1E-02
centistokes	cSt	1E-06	1.076391000E-05	1.550003100E-03	3.60E-03	1E-02
square inch per hour	$in^2.h^{-1}$	1.792111111E-07	1.929012271E-06	2.777777778E-04	6.451600000E-04	1.792111111E-03
millistokes	mSt	1E-07	1.076391000E-06	1.550003100E-04	3.60E-04	1E-03

Unit	Symbol	St, $cm^2.s^{-1}$	$ft^2.h^{-1}$	cSt, $mm^2.s^{-1}$	$in^2.h^{-1}$	mSt
square metre per second	$m^2.s^{-1}$	10000	38750.1	1E+06	5.58001E+06	1E+07
square foot per second	$ft^2.s^{-1}$	929.030400000	3600	9.29030E+04	5.18400E+05	9.29030E+05
square inch per second	$in^2.s^{-1}$	6.451600000	25	645.16	3600	6451.600000000
square metre per hour	$m^2.h^{-1}$	2.777777778	10.763916667	277.777777778	1550.003100000	2777.777777778
square centimetre per second	$cm^2.s^{-1}$	1	3.875010000	100	558.001116000	1000
stokes	St	1	3.875010000	100	558.001116000	1000
square foot per hour	$ft^2.h^{-1}$	2.580640000E-01	1	25.806400000	144	258.064000000
square millimetre per second	$mm^2.s^{-1}$	1E-02	3.875010000E-02	1	5.580011160	10
centistokes	cSt	1E-02	3.875010000E-02	1	5.580011160	10
square inch per hour	$in^2.h^{-1}$	1.792111111E-03	6.944448477E-03	1.792111111E-01	1	1.792111111
millistokes	mSt	1E-03	3.875010000E-03	1E-01	0. 55800	1

4.2.10 Conversion Table for Units of Dynamic Viscosity

Table 4.2.10 Conversion table: units of dynamic viscosity

Unit	Symbol	lbf.h.ft^{-2}	kip.s.m^{-2}	lbf.s.ft^{-2}	pdl.s.ft^{-2}	pascal second	poise	centipoise
pound force hour per square foot	**lbf.h.ft^{-2}**	**1**	4.8824276364	**3600**	115826.5748031500	172368.9323292090	1723689.3232920900	172368932.3292090000
kilopound hour per square metre	**kip.s.m^{-2}**	2.0481614362E-01	**1**	737.3381170411	23723.1523801866	**35303.94**	353039.4000000000	35303940.0000000000
pièze second	**pz.s**	5.8015095092E-03	2.8325450360E-02	20.8854342332	671.9689751395	**1000**	**10000**	1000000
sthène second per square metre	**sth.s.m^{-2}**	5.8015095092E-03	2.8325450360E-02	20.8854342332	671.9689751395	**1000**	**10000**	1000000
pound force second per square foot	**lbf.s.ft^{-2}**	2.7777777778E-04	1.3562298990E-03	**1**	32.1740485564	47.8802589803	478.8025898034	47880.2589803358
kilopound second per square metre	**kip.s.m^{-2}**	5.6893373228E-05	2.7777777778E-04	2.0481614362E-01	6.5897645501	**9.80665**	**98.0665**	**9806.65**
poundal second per square foot	**pdl.s.ft^{-2}**	8.6335972699E-06	4.2152913912E-05	3.1080950172E-02	**1**	1.4881639436	14.8816394357	1488.1639435696
newton second per square metre	**N.s.m^{-2}**	5.8015095092E-06	2.8325450360E-05	2.0885434233E-02	6.7196897514E-01	**1**	**10**	**1000**
pascal-second	**Pa.s**	5.8015095092E-06	2.8325450360E-05	2.0885434233E-02	6.7196897514E-01	**1**	**10**	**1000**
dyne second per square centimetre	**dyn.s**	5.8015095092E-07	2.8325450360E-06	2.0885434233E-03	6.7196897514E-02	**1E-01**	**1**	**100**
barye second	**barye.s**	5.8015095092E-07	2.8325450360E-06	2.0885434233E-03	6.7196897514E-02	**1E-01**	**1**	**100**
poise	**P, Po**	5.8015095092E-07	2.8325450360E-06	2.0885434233E-03	6.7196897514E-02	**1E-01**	**1**	**100**
millipascal second	**mPa.s**	5.8015095092E-09	2.8325450360E-08	2.0885434233E-05	6.7196897514E-04	**1E-03**	**0.01**	**1**
centipoise	**cP, cPo**	5.8015095092E-09	2.8325450360E-08	2.0885434233E-05	6.7196897514E-04	**1E-03**	**0.01**	**1**
millipoise	**mP, mPo**	5.8015095092E-10	2.8325450360E-09	2.0885434233E-06	6.7196897514E-05	**1E-04**	**0.001**	**0.1**

4.2.12 Conversion Table for Units of Linear Velocity

Table 4.2.12 Conversion table: units of linear velocity

Unit	Symbol	km.s^{-1}	m.s^{-1}	yd.s^{-1}	knot (UK)	knot (int.)	mph	ft.s^{-1}	km.h^{-1}
kilometre per second	**km.s^{-1}**	**1**	**1000**	1093.613298338	1942.606762430	1943.844492441	2236.932122159	3280.839895013	**3600**
metre per second	**m.s^{-1}**	**1E-03**	**1**	1.09361329834	1.94260676243	1.94384449244	2.23693212216	3.28083989501	**3.6**
yard per second	**yd.s^{-1}**	**9.144E-04**	**0.9144**	**1**	1.77631962357	1.77745140389	2.04545073250	**3**	3.291840000
UK knot	**UK knot**	5.14772222E-04	5.14772222E-01	5.629617478E-01	**1**	1.00063714903	1.15151051948	1.68888524351	1.853184
international knot	**knot (int.)**	5.14444444E-04	5.14444444E-01	5.626032857E-01	9.993632567E-01	**1**	1.15077730284	1.68780985710	1.852
mile per hour	**mph**	4.47040833E-04	4.47040833E-01	4.888898002E-01	8.684245459E-01	8.689778618E-01	**1**	1.46666940070	1.609344
foot per second	**ft.s^{-1}**	**3.048E-04**	**0.3048**	3.333333333E-01	5.921065412E-01	5.924838013E-01	6.818169108E-01	**1**	1.097280
kilometre per hour	**km.h^{-1}**	2.77777778E-04	2.77777778E-01	3.037814718E-01	5.396129896E-01	5.399568035E-01	6.213700339E-01	9.113444153E-01	**1**
decimetre per second	**dm.s^{-1}**	**1E-04**	**1E-01**	1.093613298E-01	1.942606762E-01	1.943844492E-01	2.236932122E-01	3.280839895E-01	**3.6E-01**
inch per second	**in.s^{-1}**	**2.54E-05**	**2.54E-02**	2.777777778E-02	4.934221177E-02	4.937365011E-02	5.681807590E-02	8.333333333E-02	9.1440E-02
yard per minute	**yd.min^{-1}**	1.524E-05	1.52400000E-02	1.666666667E-02	2.960532706E-02	2.962419006E-02	3.409084554E-02	**5E-02**	5.4864E-02
foot per minute	**ft.min^{-1}**	5.080E-06	5.08000000E-03	5.555555556E-03	9.868442353E-03	9.874730022E-03	1.136361518E-02	1.666666667E-02	1.8288E-02
centimetre per second	**cm.s^{-1}**	**1E-05**	**1E-02**	1.093613298E-02	1.942606762E-02	1.943844492E-02	2.236932122E-02	3.280839895E-02	**3.6E-02**
millimetre per second	**mm.s^{-1}**	**1E-06**	**1E-03**	1.093613298E-03	1.942606762E-03	1.943844492E-03	2.236932122E-03	3.280839895E-03	**3.6E-03**
inch per minute	**in.min^{-1}, ipm**	4.23333333E-07	4.23333333E-04	4.629629630E-04	8.223701961E-04	8.228941685E-04	9.469679317E-04	1.388888889E-03	1.52400000E-03
metre per hour	**m.h^{-1}**	2.77777778E-07	2.77777778E-04	3.037814718E-04	5.396129896E-04	5.399568035E-04	6.213700339E-04	9.113444153E-04	**1E-03**
yard per hour	**yd.h^{-1}**	**2.54E-07**	**2.54E-04**	2.777777778E-04	4.934221177E-04	4.937365011E-04	5.681807590E-04	8.333333333E-04	9.144E-04
foot per hour	**ft.h^{-1}**	8.46666667E-08	8.46666667E-05	9.259259259E-05	1.644740392E-04	1.645788337E-04	1.893935863E-04	2.777777778E-04	**3.048E-04**
inch per hour	**in.h^{-1}, iph**	7.05555556E-09	7.05555556E-06	7.716049383E-06	1.370616993E-05	1.371490281E-05	1.578279886E-05	2.314814815E-05	**2.54E-05**

(Continued opposite)

Table 4.2.12 *(continued)*

Unit	Symbol	km.h^{-1}	dm.s^{-1}	in.s^{-1}	ft.min^{-1}	in.min^{-1}	yd.h^{-1}	ft.h^{-1}	in.h^{-1}
kilometre per second	**km.s^{-1}**	**3600**	**1E+04**	39370.078740158	1.96850394E+05	2.36220472E+06	3.937007874E+06	1.181102362E+07	1.417322835E+08
metre per second	**m.s^{-1}**	**3.6**	10.0	39.37007874016	196.85039370079	2362.204724409	3.937007874E+03	1.181102362E+04	1.417322835E+05
yard per second	**yd.s^{-1}**	3.291840000	**9.144**	**36**	**180**	**2160**	**3600**	**10800**	**129600**
UK knot	**UK knot**	1.853184	5.147722222	20.26662292213	101.33311461067	1215.997375328	2026.662292213	6.079986877E+03	7.295984252E+04
international knot	**knot (int.)**	1.852	5.144444444	20.25371828521	101.26859142607	1215.223097113	2025.371828521	6.076115486E+03	7.291338583E+04
mile per hour	**mph**	1.609344	4.470408333	17.60003280840	88.00016404199	1056.001968504	1760.003280840	5.280009843E+03	6.336011811E+04
foot per second	**ft.s^{-1}**	1.097280	**3.048**	**12**	**60**	**720**	**1200**	**3600**	**43200**
kilometre per hour	**km.h^{-1}**	**1**	2.777777778	10.93613298338	54.68066491689	656.16797900263	1093.613298338	3.280839895E+03	3.937007874E+04
decimetre per second	**dm.s^{-1}**	**3.6E-01**	**1**	3.93700787402	19.68503937008	236.22047244095	393.70078740158	1.181102362E+03	1.417322835E+04
inch per second	**in.s^{-1}**	9.1440E-02	2.540E-1	**1**	5	60	**100**	300	3600
yard per minute	**yd.min^{-1}**	5.4864E-02	1.524E-01	**6E-01**	3	36	60	180	2160
foot per minute	**ft.min^{-1}**	1.8288E-02	5.080E-02	**2E-01**	**1**	12	**20**	60	720
centimetre per second	**cm.s^{-1}**	**3.6E-02**	**1E-01**	3.937007874E-01	1.96850393701	23.62204724409	39.37007874016	118.11023622047	1417.322834646
millimetre per second	**mm.s^{-1}**	**3.6E-03**	**1E-02**	3.937007874E-01	1.968503937E-01	2.362204724409	3.937007874016	11.811023622047	141.7322834646
inch per minute	**in.min^{-1}, ipm**	1.52400000E-03	4.23333333E-03	1.666666667E-02	8.333333333E-02	**1**	1.66666666667	**5**	**60**
metre per hour	**m.h^{-1}**	**1E-03**	2.77777778E-03	1.093613298E-02	5.468066492E-02	6.561679790E-01	1.09361329834	3.28083989501	39.37007874016
yard per hour	**yd.h^{-1}**	**9.144E-04**	**2.54E-03**	**1E-02**	**5E-02**	**6E-01**	**1**	**3**	**36**
foot per hour	**ft.h^{-1}**	**3.048E-04**	8.46666667E-04	3.333333333E-03	1.666666667E-02	**2E-01**	3.333333333E-01	**1**	**12**
inch per hour	**in.h^{-1}, iph**	**2.54E-05**	7.05555556E-05	2.777777778E-04	1.388888889E-03	1.666666667E-02	2.777777778E-02	8.333333333E-02	**1**

4.2.13 Conversion Table for Units of Angular Velocity

Table 4.2.13 Conversion table: units of angular velocity

Unit	Symbol	$tr.s^{-1}$	$rad.s^{-1}$	$tr.min^{-1}$, rpm	
turn per second	$\mathbf{tr.s^{-1}}$	**1**	6.2831853072	**60**	
revolutions per second	**rps**	**1**	6.2831853072	**60**	
radian per second	$\mathbf{rad.s^{-1}}$	1.591549431E-01	**1**	9.5492965855	
turn per minute	$\mathbf{tr.min^{-1}}$	1.666666667E-02	1.047197551E-01	**1**	
revolutions per minute	**rpm**	1.666666667E-02	1.047197551E-01	**1**	
degree per second	$\mathbf{^{\circ}.s^{-1}}$	2.777777778E-03	1.745329252E-02	1.666666667E-01	
radian per minute	$\mathbf{rad.min^{-1}}$	2.652582385E-03	1.666666667E-02	1.591549431E-01	
grade per second	$\mathbf{gon.s^{-1}}$	**2.50E-03**	1.570796327E-02	**1.50E-01**	
degree per minute	$\mathbf{^{\circ}.min^{-1}}$	4.629629630E-05	2.908882087E-04	2.777777778E-03	
grade per minute	$\mathbf{gon.min^{-1}}$	4.166666667E-05	2.617993878E-04	**2.50E-03**	

	$^{\circ}.s^{-1}$	$rad.min^{-1}$	$^{\circ}.min^{-1}$	$gon.min^{-1}$
	360	376.9911184308	**21600**	**24000**
	360	376.9911184308	**21600**	**24000**
	57.2957795131	60	3437.7467707849	3819.7186342055
	6	6.2831853072	**360**	**400**
	6	6.2831853072	**360**	**400**
	1	1.0471975512	**60**	66.6666666667
	9.549296586E-01	**1**	57.2957795131	63.6619772368
	9E-01	9.424777961E-01	**54**	**60**
	1.666666667E-02	1.745329252E-02	**1**	1.1111111111
	1.50E-02	1.570796327E-02	**9E-01**	**1**

4.2.14 Conversion Table for Units of Force

Table 4.2.14 Conversion table: units of force and weights

Unit	Symbol	ton-force (long)	ton-force (metric)	ton-force (short)
ton-force (long)	–	**1**	1.016046909	**1.12**
ton-force (metric)	–	9.842065276E-01	**1**	1.102311311
ton-force (short)	–	8.928571429E-01	9.071847400E-01	**1**
kip-force	**kipf**	4.464285714E-01	**4.5359237E-01**	**5E-01**
funal	**funal**	**1E-01**	**1E-01**	1.124044715E-01
sthène	**sn**	**1E-01**	**1E-01**	1.124044715E-01
slug-force	**slugf**	1.436341521E-02	1.459390363E-02	1.608702504E-02
kilogram-force	**kgf**	9.842065276E-04	**1E-03**	1.102311311E-03
pound-force	**lbf**	4.464285714E-04	4.5359237E-04	**5E-04**
newton	**N**	**1E-04**	**1E-04**	1.124044715E-04
ounce-force	**ozf**	2.790178571E-05	2.834952313E-05	**3.125E-05**
poundal	**pdl**	1.387542418E-05	1.409808185E-05	1.554047509E-05
crinal	**crinal**	**1E-05**	**1E-05**	1.124044715E-05
pond	**p**	9.842065276E-07	**1E-06**	1.102311311E-06
dyne	**dyn**	**1E-09**	**1E-09**	1.124044715E-09
u.a. of force	**u.a**	8.268482492E-12	8.401166076E-12	9.260700391E-12

Unit	Symbol	pound-force	newton	ounce-force
ton-force (long)	–	**2240**	9964.016418184	3.584E+04
ton-force (metric)	–	2204.622621849	9806.65	3.527396195E+04
ton-force (short)	–	**2000**	8896.443230521	**3.2E+04**
kip-force	**kipf**	**1000**	4448.221615261	**1.6E+04**
funal	**funal**	224.808943100	**1000**	3596.943089595
sthène	**sn**	224.808943100	**1000**	3596.943089595
slug-force	**slugf**	32.174050076	143.117305000	514.784801221
kilogram-force	**kgf**	2.204622622	**9.80665**	35.273961950
pound-force	**lbf**	**1**	4.448221615	**16**
newton	**N**	2.248089431E-01	**1**	**3.59694309**
ounce-force	**ozf**	**6.25E-02**	2.780138510E-01	**1**
poundal	**pdl**	3.108095017E-02	1.382549544E-01	4.972952027E-01
crinal	**crinal**	2.248089431E-02	**1E-01**	3.596943090E-01
pond	**p**	2.204622622E-03	**9.80665E-03**	3.527396195E-02
dyne	**dyne**	2.248089431E-06	**1E-05**	3.596943090E-05
u.a. of force	**u.a**	1.852140078E-08	8.238729530E-08	2.963424125E-07

	kip-force	sthène	slug-force	kg-force
	2.24	9.964016418	69.621325095	1016.046908800
	2.204622622	9.80665	68.521762620	**1000**
	2	8.896443231	62.161897407	907.184740000
	1	4.448221615	31.080948703	**453.59237**
	2E-01	**1**	6.987275229	101.971621298
	2E-01	**1**	6.987275229	101.971621298
	3.217405008E-02	1.431173050E-01	**1**	14.593903627
	2.204622622E-03	**9.80665E-03**	6.852176262E-02	**1**
	1E-03	4.448221615E-03	3.108094870E-02	4.5359237E-01
	2.248089431E-04	**1E-03**	6.987275229E-03	1.019716213E-01
	6.25E-05	2.780138510E-04	1.942559294E-03	2.834952313E-02
	3.108095017E-05	1.382549544E-04	9.660254179E-04	1.409808185E-02
	2.248089431E-05	**1E-04**	6.987275229E-04	1.019716213E-02
	2.204622622E-06	9.80665E-06	6.852176262E-05	**1E-03**
	2.248089431E-09	**1E-08**	6.987275229E-08	1.019716213E-06
	1.852140078E-11	8.238729530E-11	5.756627076E-10	8.401166076E-09

	poundal	crinal	pond	dyne
	7.206986877E+04	9.964016418E+04	1.016046909E+06	9.964016418E+08
	7.093163528E+04	98066.5	**1E+06**	9.80665E+08
	6.434809711E+04	8.896443231E+04	9.071847400E+05	8.896443231E+08
	3.217404856E+04	4.448221615E+04	**4.5359237E+05**	4.448221615E+08
	7233.013851210	**1E+04**	1.019716213E+05	**1E+08**
	7233.013851210	**1E+04**	1.019716213E+05	**1E+08**
	1035.169449413	1431.17305	1.459390363E+04	1.431173050E+07
	70.931635284	**98.0665**	**1E+03**	**9.80665E+05**
	32.174048556	44.482216153	**453.59237**	4.448221615E+05
	7.233013851	**10**	101.971621298	**1E+05**
	2.010878035	2.780138510	28.349523125	2.780138510E+04
	1	1.382549544	14.098081850	1.382549544E+04
	7.233013851E-01	**1**	10.197162130	**1E+04**
	7.093163528E-02	9.80665E-02	**1**	**9.80665E+02**
	7.233013851E-05	**1E-04**	1.019716213E-03	**1**
	5.959084481E-07	8.238729530E-07	8.401166076E-06	8.238729530E-03

4.2.15 Conversion Table for Units of Pressure and Stress

Table 4.2.15 Conversion table: units of pressure and stress

Unit	Symbol	atm	bar
gigapascal	**GPa**	9.86923267E+03	**1E+04**
kilogram-force per square millimetre	**kgf.mm^{-2}**	96.784110535	**98.0665**
kip-force per square inch	**KSI, ksi, kipf.in^{-2}**	68.045963910	68.94757293
megapascal	**MPa**	9.869232667	**10**
standard atmosphere	**atm**	**1**	1.01325
bar	**bar**	9.86923267E-01	**1**
kilogram-force per square centimetre	**at, kgf.cm^{-2}**	9.67841105E-01	**0.980665**
foot of mercury (0°C, 32°F)	**ftHg (0°C, 32°F)**	4.01049739E-01	4.06363648E-01
foot of mercury (15.56°C, 60°F)	**ftHg (15.56°C, 60°F)**	3.99962376E-01	4.05261878E-01
metre of water (4°C, 39.2°F)	**mH$_2$O (4°C, 32°F), mCE**	9.67812070E-02	9.80635580E-02
metre of water (15.56°C, 60°F)	**mH$_2$O (15.56°C, 60°F), mCE**	9.66894557E-02	9.79705910E-02
pound-force per square inch	**PSI, psi, lbf.in^{-2}**	6.80459639E-02	6.89475729E-02
inch of mercury (0°C, 32°F)	**inHg (0°C, 32°F)**	3.34208116E-02	3.38636373E-02
inch of mercury (15.56°C, 60°F)	**inHg (15.56°C, 60°F)**	3.33301980E-02	3.37718231E-02
foot of water (4°C, 39.2°F)	**ftH$_2$O (4°C, 39.2°F)**	2.94989119E-02	2.98897725E-02
foot of water (15.56°C, 60°F)	**ftH$_2$O (15.56°C, 60°F)**	2.94709461E-02	2.98614361E-02
centimetre of mercury (0°C, 32°F)	**cmHg (0°C, 32°F)**	1.31578947E-02	1.33322368E-02
centimetre of mercury (15.56°C, 60°F)	**cmHg (15.56°C, 60°F)**	1.31221252E-02	1.32959934E-02
sthène per square metre	**sn.m^{-2}**	9.86923267E-03	**0.01**
pièze	**pz**	9.86923267E-03	**0.01**
kilogram-force per square decimetre	**kgf.dm^{-2}**	9.67841105E-03	9.80665E-03
ounce-force per square inch	**OSI, osi, ozf.in^{-2}**	4.25287273E-03	4.30922329E-03
inch of water (4°C, 39.2°F)	**inH$_2$O (4°C, 39.2°F)**	2.45824266E-03	2.49081437E-03
inch of water (15.56°C, 60°F)	**inH$_2$O (15.56°C, 60°F)**	2.45591217E-03	2.48845301E-03
torr	**torr, mmHg (0°C, 32°F)**	1.31578947E-03	1.33322368E-03
millimetre of mercury (0°C, 32°F)	**torr, mmHg (0°C, 32°F)**	1.31578947E-03	1.33322368E-03
millimetre of mercury (4°C, 39.2°F)	**mmHg (4°C, 39.2°F)**	1.31221252E-03	1.32959934E-03
millibar, hectopascal	**mbar, hPa**	9.86923267E-04	**1E-03**
centimetre of water (4°C, 39.2°F)	**cmH$_2$O (4°C, 39.2°F)**	9.67812070E-04	9.80635580E-04
centimetre of water (15.56°C, 60°F)	**cmH$_2$O (15.56°C, 60°F)**	9.66894557E-04	9.79705910E-04
pound-force per square foot	**PSF, psf, lbf.ft^{-1}**	4.72541416E-04	4.78802590E-04
kilogram-force per square metre	**kgf.m^{-2}**	9.67841105E-05	**9.80665E-05**
millimetre of water (4°C, 39.2°F)	**mmH$_2$O (4°C, 39.2°F)**	9.67814006E-05	9.80637541E-05
millimetre of water (15.56°C, 60°F)	mmH$_2$O (15.56°C, 60°F)	9.66894557E-05	9.79705910E-05
pascal	**Pa**	9.86923267E-06	**1E-05**
newton per square metre	**N.m^{-2}**	9.86923267E-06	**1E-05**
barye	**barye**	9.86923267E-07	**1E-06**
dyne per square centimetre	**dyn.cm^{-2}**	9.86923267E-07	**1E-06**
microbar	**μbar**	9.86923267E-07	**1E-06**

at, kgf.cm^{-2}	psi, PSI	inHg (0°C)	ftH$_2$O (4°C)	pièze
1.01971621E+04	1.45037738E+05	2.95300267E+05	3.34561931E+05	**1E+06**
100	1.42233433E+03	2.89590637E+03	3.28093176E+03	**9806.65**
70.306957964	**1000**	2.03602367E+03	2.30672331E+03	6.89475729E+03
10.197162130	145.037737730	295.300267432	334.561931047	**1000**
1.033227453	14.695948776	29.921299598	33.899487663	**101.325**
1.019716213	14.503773773	29.530026743	33.456193105	**100**
1	14.223343307	28.959063676	32.809317611	**98.0665**
4.14375600E-01	5.893806417	12	13.595380671	40.636364777
4.13252107E-01	5.877826593	11.967394087	13.558519639	40.526187771
9.99970000E-02	1.422291661	2.895819490	3.280833333	9.806355801
9.99022000E-02	1.420943288	2.893074171	3.277723010	9.797059096
7.03069580E-02	**1**	2.036023673	2.306723314	6.894757293
3.45313000E-02	4.91150535E-01	**1**	1.132948389	3.386363731
3.44376756E-02	4.89818883E-01	9.97282841E-01	1.129876637	3.377182314
3.04790856E-02	4.33514498E-01	8.82645781E-01	**1**	2.988977248
3.04501906E-02	4.33103514E-01	8.81809007E-01	9.99049973E-01	2.986143613
1.35950981E-02	1.93367747E-01	3.93701310E-01	4.46045890E-01	1.333223684
1.35581400E-02	1.92842080E-01	3.92631040E-01	4.44833321E-01	1.329599336
1.01971621E-02	1.45037738E-01	2.95300267E-01	3.34561931E-01	**1**
1.01971621E-02	1.45037738E-01	2.95300267E-01	3.34561931E-01	**1**
1E-02	1.42233433E-01	2.89590637E-01	3.28093176E-01	**9.80665E-01**
4.39418485E-03	6.24999997E-02	1.27251479E-01	1.44170206E-01	4.30922329E-01
2.53992380E-03	3.61262082E-02	7.35538151E-02	8.33331667E-02	2.49081437E-01
2.53751588E-03	3.60919595E-02	7.34840839E-02	8.32541644E-02	2.48845301E-01
1.35950981E-03	1.93367747E-02	3.93701310E-02	4.46045890E-02	1.33322368E-01
1.35950981E-03	1.93367747E-02	3.93701310E-02	4.46045890E-02	1.33322368E-01
1.35581400E-03	1.92842080E-02	3.92631040E-02	4.44833321E-02	1.32959934E-01
1.01971621E-03	1.45037738E-02	2.95300267E-02	3.34561931E-02	**1E-01**
9.99970000E-04	1.42229166E-02	2.89581949E-02	3.28083333E-02	9.80635580E-02
9.99022000E-04	1.42094329E-02	2.89307417E-02	3.27772301E-02	9.79705910E-02
4.88242764E-04	6.94444444E-03	1.41390533E-02	1.60189119E-02	4.78802590E-02
1E-04	1.42233433E-03	2.89590637E-03	3.28093176E-03	**9.80665E-03**
9.99972000E-05	1.42229451E-03	2.89582528E-03	3.28083990E-03	9.80637541E-03
9.99022000E-05	1.42094329E-03	2.89307417E-03	3.27772301E-03	9.79705910E-03
1.01971621E-05	1.45037738E-04	2.95300267E-04	3.34561931E-04	**1E-03**
1.01971621E-05	1.45037738E-04	2.95300267E-04	3.34561931E-04	**1E-03**
1.01971621E-06	1.45037738E-05	2.95300267E-05	3.34561931E-05	**1E-04**
1.01971621E-06	1.45037738E-05	2.95300267E-05	3.34561931E-05	**1E-04**
1.01971621E-06	1.45037738E-05	2.95300267E-05	3.34561931E-05	**1E-04**

(Continued overleaf)

Table 4.2.15 *(continued)* Conversion table: units of pressure and stress

Unit	Symbol	pièze	ozf.in^{-2}
gigapascal	**GPa**	**1E+06**	2.32060381E+06
kilogram-force per square millimetre	**kgf.mm^{-2}**	**9806.65**	2.27573494E+04
kip-force per square inch	**KSI, ksi, kipf.in^{-2}**	6.89475729E+03	**1.60E+04**
megapascal	**MPa**	**1000**	2.32060381E+03
standard atmosphere	**atm**	101.325	235.135181445
bar	**bar**	**100**	232.060381392
kilogram-force per square centimetre	**at, kgf.cm^{-2}**	**98.0665**	227.573493917
foot of mercury (0°C, 32°F)	**ftHg (0°C, 32°F)**	40.636364777	94.300903086
foot of mercury (15.56°C, 60°F)	**ftHg (15.56°C, 60°F)**	40.526187771	94.045225904
metre of water (4°C, 39.2°F)	**mH$_2$O (4°C, 32°F), mCE**	9.806355801	22.756666671
metre of water (15.56°C, 60°F)	**mH$_2$O (15.56°C, 60°F), mCE**	9.797059096	22.735092704
pound-force per square inch	**PSI, psi, lbf.in^{-2}**	6.894757293	**16**
inch of mercury (0°C, 32°F)	**inHg (0°C, 32°F)**	3.386363731	7.858408591
inch of mercury (15.56°C, 60°F)	**inHg (15.56°C, 60°F)**	3.377182314	7.837102159
foot of water (4°C, 39.2°F)	**ftH$_2$O (4°C, 39.2°F)**	2.988977248	6.936232001
foot of water (15.56°C, 60°F)	**ftH$_2$O (15.56°C, 60°F)**	2.986143613	6.929656256
centimetre of mercury (0°C, 32°F)	**cmHg (0°C, 32°F)**	1.333223684	3.093883966
centimetre of mercury (15.56°C, 60°F)	**cmHg (15.56°C, 60°F)**	1.329599336	3.085473291
sthène per square metre	**sn.m^{-2}**	**1**	2.320603814
pièze	**pz**	**1**	2.320603814
kilogram-force per square decimetre	**kgf.dm^{-2}**	**9.80665E-01**	2.275734939
ounce-force per square inch	**OSI, osi, ozf.in^{-2}**	4.30922329E-01	**1**
inch of water (4°C, 39.2°F)	**inH$_2$O (4°C, 39.2°F)**	2.49081437E-01	5.78019333E-01
inch of water (15.56°C, 60°F)	**inH$_2$O (15.56°C, 60°F)**	2.48845301E-01	5.77471355E-01
torr	**torr, mmHg (0°C, 32°F)**	1.33322368E-01	3.09388397E-01
millimetre of mercury (0°C, 32°F)	**torr, mmHg (0°C, 32°F)**	1.33322368E-01	3.09388397E-01
millimetre of mercury (15.56°C, 39.2°F)	**mmHg (15.56°C, 39.2°F)**	1.32959934E-01	3.08547329E-01
millibar, hectopascal	**mbar, hPa**	**1E-01**	2.32060381E-01
centimetre of water (4°C, 39.2°F)	**cmH$_2$O (4°C, 39.2°F)**	9.80635580E-02	2.27566667E-01
centimetre of water (15.56°C, 60°F)	**cmH$_2$O (15.56°C, 60°F)**	9.79705910E-02	2.27350927E-01
pound-force per square foot	**PSF, psf, lbf.ft^{-1}**	4.78802590E-02	1.11111112E-01
kilogram-force per square metre	**kgf.m^{-2}**	9.80665E-03	2.27573494E-02
millimetre of water (4°C, 39.2°F)	**mmH$_2$O (4°C, 39.2°F)**	9.80637541E-03	2.27567122E-02
millimetre of water (15.56°C, 60°F)	**mmH$_2$O (15.56°C, 60°F)**	9.79705910E-03	2.27350927E-02
pascal	**Pa**	**1E-03**	2.32060381E-03
newton per square metre	**N.m^{-2}**	**1E-03**	2.32060381E-03
barye	**barye**	**1E-04**	2.32060381E-04
dyne per square centimetre	**dyn.cm^{-2}**	**1E-04**	2.32060381E-04
microbar	**μbar**	**1E-04**	2.32060381E-04

	inH_2O (4°C)	torr, mmHg(0°C)	cmH_2O (4°C)	pascal	barye
	4.01474317E+06	7.50061683E+06	1.01974477E+07	**1E+09**	**1E+10**
	3.93711811E+04	7.35559240E+04	1.00002800E+05	**9.80665E+06**	9.80665E+07
	2.76806798E+04	5.17149326E+04	7.03089266E+04	6.89475729E+06	6.89475729E+07
	4.01474317E+03	7.50061683E+03	1.01974477E+04	**1E+06**	**1E+07**
	406.793851960	**760**	1.03325638E+03	**101325**	1.01325E+06
	401.474317256	750.061682704	1.01974477E+03	**1E+05**	**1E+06**
	393.711811332	735.559240069	1.00002800E+03	**9.80665E+04**	**9.80665E+05**
	163.144568048	304.797801439	414.387202842	4.06366039E+04	4.06363648E+05
	162.702235663	303.971405929	413.263678583	4.05261878E+04	4.05261878E+05
	39.369999998	73.553717329	**100**	9.80637541E+03	9.80635580E+04
	39.332676118	73.483986313	99.904997340	9.79705910E+03	9.79705910E+04
	27.680679769	51.714932572	70.308926614	6.89475729E+03	6.89475729E+04
	13.595380671	25.399816787	34.532266903	3.38638366E+03	3.38636373E+04
	13.558519639	25.330950494	34.438639882	3.37718231E+03	3.37718231E+03
	12	22.419173042	**30.48**	2.98898323E+03	2.98897725E+04
	11.988599681	22.397919028	30.451043189	2.98614361E+03	2.98614361E+04
	5.352550684	**10**	13.595478737	1.33322368E+03	1.33322368E+04
	5.337999858	9.972815155	13.558519639	1.32959934E+03	1.32959934E+04
	4.014743173	7.500616827	10.197447658	**1000**	10000
	4.014743173	7.500616827	10.197447658	**1000**	10000
	3.937118113	7.355592401	10.000280008	**980.665**	**9.80665E+03**
	1.730042478	3.232183271	4.394307894	430.922328923	4.30922329E+03
	1	1.868264420	**2.54**	249.081935511	2.49081437E+03
	9.99049973E-01	1.866493252	2.537586932	248.845301046	2.48845301E+03
	5.35255068E-01	**1**	1.359547874	133.322368421	1.33322368E+03
	5.35255068E-01	**1**	1.359547874	133.322368421	1.33322368E+03
	5.33799986E-01	9.97281516E-01	1.355851964	132.959933631	1.32959934E+03
	4.01474317E-01	7.50061683E-01	1.019744766	**100**	**1000**
	3.93700000E-01	7.35537173E-01	**1**	98.063754138	980.635580050
	3.93326761E-01	7.34839863E-01	9.99049973E-01	97.970590963	979.705909630
	1.92226943E-01	3.59131476E-01	4.88256435E-01	47.880258980	478.802589803
	3.93711811E-02	7.35559240E-02	1.00002800E-01	9.80665	98.0665
	3.93700787E-02	7.35538644E-02	**0.1**	9.806375414	98.063754138
	3.93326761E-02	7.34839863E-02	9.99049973E-02	9.797059096	97.970590963
	4.01474317E-03	7.50061683E-03	1.01974477E-02	**1**	**10**
	4.01474317E-03	7.50061683E-03	1.01974477E-02	**1**	**10**
	4.01474317E-04	7.50061683E-04	1.01974477E-03	**0.1**	**1**
	4.01474317E-04	7.50061683E-04	1.01974477E-03	**0.1**	**1**
	4.01474317E-04	7.50061683E-04	1.01974477E-03	**0.1**	**1**

4.2.16 Conversion Table for Units of Energy, Heat and Work

Table 4.2.16 Conversion table: units of energy, heat and work

Unit	Symbol	toe (tep)	tce (tec)	kWh
megaton (TNT)	**Mt (TNT)**	9.983281586E+12	1.427108228E+13	1.161111111E+15
Q unit	**Q**	2.519703845E+12	3.601911915E+12	2.930555556E+14
kiloton (TNT)	**kt (TNT)**	9.983281586E+09	1.427108228E+10	1.161111111E+12
quad (quadrillion Btu)	**quad**	2.519837241E+09	3.602102604E+09	2.930710702E+11
barrel oil equivalent	**bboe**	14.616670647	20.894503243	**1700**
ton oil equivalent	**toe (tep)**	**1**	1.429498122	116.305555556
ton coal equivalent	**tce (tec)**	6.995462145E-01	**1**	81.361111111
therm (EEG)	**therm (EEG)**	2.519837241E-01	3.602102604E-01	29.307107017
therm (US)	**therm (US)**	2.519235730E-01	3.601242745E-01	29.300111111
thermie (15°C)	**th (15°C)**	9.996417483E-03	1.428986002E-02	1.162638889
kilowatt-hour	**kWh**	8.598041557E-03	1.229088426E-02	**1**
kilocalorie (therm.)	**kcal (therm.)**	9.992834965E-06	1.428473882E-05	1.162222222E-03
Celsius heat unit	**Chu**	4.535896824E-06	6.484055992E-06	5.275500000E-04
pound centigrade unit (15°C)	**pcu (15°C)**	4.535705756E-06	6.483782861E-06	5.275277778E-04
Celsius heat unit (15°C)	**Chu (15°C)**	4.535705756E-06	6.483782861E-06	5.275277778E-04
British thermal unit (39.2°F, 4°C)	**Btu (39.2°F)**	2.530857416E-06	3.617855924E-06	2.943527778E-04
British thermal unit (mean)	**Btu (mean)**	2.521781705E-06	3.604882212E-06	2.932972222E-04
British thermal unit (ISO/TC 12)	**Btu (ISO)**	2.519847146E-06	3.602116763E-06	2.930722222E-04
British thermal unit (Intern. Steam Tables)	**Btu (IT)**	2.519837241E-06	3.602102604E-06	2.930710702E-04
British thermal unit (UK, gas industry)	**Btu (Gas)**	2.519130642E-06	3.601092523E-06	2.929888889E-04
British thermal unit (thermochemical)	**Btu (therm.)**	2.518151421E-06	3.599692728E-06	2.928750000E-04
British thermal unit (60°F, 15.56°C)	**Btu (60°F)**	2.518934798E-06	3.600812564E-06	2.929661111E-04
British thermal unit (Gas Inspec. Act Reg.)	**Btu (GIAR)**	2.518784332E-06	3.600597474E-06	2.929486111E-04
litre-atmosphere	**L.atm**	2.419990447E-07	3.459371799E-07	2.814583333E-05
kilogram-force-metre	**kgf-m**	2.342166229E-08	3.348122226E-08	2.724069444E-06
calorie (4°C)	**cal (4°C)**	1.004179604E-08	1.435472858E-08	1.167916667E-06
calorie (mean)	**cal. mean**	1.000721280E-08	1.430529191E-08	1.163894444E-06
calorie (Intern. Steam Tables)	**cal (IT)**	9.999379030E-09	1.429409355E-08	1.162983333E-06
calorie (15°C)	**cal (15°C)**	9.996417483E-09	1.428986002E-08	1.162638889E-06
calorie (thermochemical)	**cal. therm**	9.992834965E-09	1.428473882E-08	1.162222222E-06
calorie (20°C)	**cal (20°C)**	9.987819441E-09	1.427756914E-08	1.161638889E-06
foot-pound force (duty)	**ft-lbf**	3.238160851E-09	4.628944856E-09	3.766160968E-07
joule (international)	**J (int.)**	2.388738954E-09	3.414697849E-09	2.778236111E-07
joule	**J**	2.388344877E-09	3.414134517E-09	2.777777778E-07
foot-poundal	**ft-pdl**	1.006451161E-10	1.438720044E-10	1.170558614E-08
erg	**erg**	2.388344877E-16	3.414134517E-16	2.777777778E-14
billion electronvolt	**BeV**	3.826552018E-19	5.470048925E-19	4.450492583E-17
prout	**prout**	7.078576546E-23	1.011881188E-22	8.232777778E-21
hartree (u.a. of energy)	**E_H, a.u.**	4.359748200E-18	4.359748200E-18	4.359748200E-18
rydberg	**Ry**	2.179874100E-18	2.179874100E-18	2.179874100E-18
electronvolt	**eV**	3.826552018E-28	5.470048925E-28	4.450492583E-26
frigorie	**fg**	-9.996417483E-06	-1.428986002E-05	-1.162638889E-03

kcal (therm)	pcu (15°C)	Btu (ISO)	joule (J)	erg
9.990439771E+17	2.201042599E+18	3.961859989E+18	**4.18E+21**	**4.18E+28**
2.521510516E+17	5.555263019E+17	9.999431312E+17	**1.055E+21**	**1.055E+28**
9.990439771E+14	2.201042599E+15	3.961859989E+15	**4.18E+18**	**4.18E+25**
2.521644007E+14	5.555557120E+14	9.999960691E+14	1.055055853E+18	1.055055853E+25
1.462715105E+06	3.222579116E+06	5.800617974E+06	**6.12E+09**	**6.12E+16**
1.000717017E+05	2.204728556E+05	3.968494683E+05	**4.187E+08**	**4.187E+15**
7.000478011E+04	1.542309515E+05	2.776145432E+05	**2.929E+08**	**2.929E+15**
2.521644007E+04	5.555557120E+04	9.999960691E+04	1.055055853E+08	1.055055853E+15
2.521042065E+04	5.554230952E+04	9.997573598E+04	1.054804000E+08	1.054804000E+15
1000.358508604	2.203938708E+03	3.967072963E+03	4.185500000E+06	4.185500000E+13
860.420650096	1.895634774E+03	3412.128220196	**3.60E+06**	**3.60E+13**
1	2.203148860	3.965651243	**4184**	4.1840E+10
4.539149140E-01	1.000042125	1.800068243	1899.18	1.899180000E+10
4.538957935E-01	**1**	1.799992417	1899.1	1.8991E+10
4.538957935E-01	**1**	1.799992417	1899.10	1.899100000E+10
2.532672084E-01	5.579853615E-01	1.004369420	1059.6700	1.059670000E+10
2.523589866E-01	5.559844137E-01	1.000767729	1055.8700	1.055870000E+10
2.521653920E-01	5.555578958E-01	**1**	1055.0600	1.055060000E+10
2.521644007E-01	5.555557120E-01	9.999960691E-01	1055.055852620	1.055055853E+10
2.520936902E-01	5.553999263E-01	9.997156560E-01	1054.7600	1.054760000E+10
2.519956979E-01	5.551840345E-01	9.993270525E-01	1054.3500	1.054350000E+10
2.520740918E-01	5.553567479E-01	9.996379353E-01	1054.6780	1.054678000E+10
2.520590344E-01	5.553235743E-01	9.995782230E-01	1054.6150	1.054615000E+10
2.421725621E-02	5.335422042E-02	9.603719220E-02	**101.3250**	1.013250000E+09
2.343845602E-03	5.163840767E-03	9.294874225E-03	**9.80665**	**9.80665E+07**
1.004899618E-03	2.213943447E-03	3.985081417E-03	4.20450	4.204500000E+07
1.001438815E-03	2.206318783E-03	3.971357079E-03	4.19002	4.190020000E+07
1.000654876E-03	2.204591649E-03	3.968248251E-03	4.18674	4.186740000E+07
1.000358509E-03	2.203938708E-03	3.967072963E-03	4.18550	4.185500000E+07
1E-03	2.203148860E-03	3.965651243E-03	4.184	4.184E+07
9.994980880E-04	2.202043073E-03	3.963660834E-03	4.18190	4.181900000E+07
3.240482668E-04	7.139265696E-04	1.285062412E-03	1.355817948	1.355817948E+07
2.390451721E-04	5.266520984E-04	9.479697837E-04	1.000165	1.000165000E+07
2.390057361E-04	5.265652151E-04	9.478133945E-04	**1**	**1E+07**
1.007172803E-05	2.218951614E-05	3.994096079E-05	4.214011009E-02	4.214011009E+05
2.390057361E-11	5.265652151E-11	9.478133945E-11	**1E-07**	**1**
3.829295722E-14	8.436508504E-14	1.518565134E-13	1.602177330E-10	1.602177330E-03
7.083652008E-18	1.560633985E-17	2.809129339E-17	2.963800000E-14	2.963800000E-07
4.359748200E-18	4.359748200E-18	4.359748200E-18	4.359748200E-18	4.359748200E-18
2.179874100E-18	2.179874100E-18	2.179874100E-18	2.179874100E-18	2.179874100E-18
3.829295722E-23	8.436508504E-23	1.518565134E-22	1.602177330E-19	1.602177330E-12
-1.000358509	-2.203938708	-3.967072963E+00	-4.185500000E+03	-4.185500000E+10

4.2.17 Conversion Table for Units of Power

Table 4.2.17 Conversion table: units of power

Unit	Symbol	HP (boiler)
megawatt	**MW**	101.941995005
horsepower (boiler)	**HP (boiler)**	**1**
commercial ton of refrigeration (UK)	**CTR (UK)**	3.998875295E-01
commercial ton of refrigeration (US)	**CTR (US)**	3.585096080E-01
kilowatt	**kW**	1.019419950E-01
poncelet	**poncelet**	9.997094653E-02
horsepower (water)	**HP (water)**	7.605311178E-02
horsepower (electric)	**HP (electric)**	7.604872827E-02
horsepower (UK)	**BHP, hp**	7.601814568E-02
horsepower (550 ft.lbf.s^{-1})	**HP (550)**	7.601813258E-02
horsepower (cheval vapeur)	**HP, cv**	7.497820990E-02
horsepower (metric)	**HP (metric)**	7.497820990E-02
donkey	**donkey**	2.548549875E-02
prony	**prony**	9.997094653E-03
British thermal unit (39°F) per minute	**Btu (39°F).min^{-1}**	1.800414564E-03
British thermal unit (mean) per minute	**Btu (mean).min^{-1}**	1.793958238E-03
British thermal unit (ISO) per minute	**Btu (ISO).min^{-1}**	1.792582021E-03
British thermal unit (IT) per minute	**Btu (IT).min^{-1}**	1.792574974E-03
British thermal unit (60°F) per minute	**Btu (60°F).min^{-1}**	1.791932990E-03
British thermal unit (therm.) per minute	**Btu (therm.).min^{-1}**	1.791375707E-03
kilogram-force metre per second	**kgf.m.s^{-1}**	9.997094653E-04
foot pound-force per second	**ft.lbf.s^{-1}**	1.382147865E-04
watt (int. mean)	**W (int. mean)**	1.019613640E-04
watt (int. US)	**W (int. US)**	1.019588154E-04
volt-ampere	**VA**	1.019419950E-04
watt	**W**	1.019419950E-04
British thermal unit (39°F) per hour	**Btu (39°F).h^{-1}**	3.000690940E-05
British thermal unit (mean) per hour	**Btu (mean).h^{-1}**	2.989930396E-05
British thermal unit (ISO) per hour	**Btu (ISO).h^{-1}**	2.987636701E-05
British thermal unit (IT) per hour	**Btu (IT).h^{-1}**	2.987624957E-05
British thermal unit (60°F) per hour	**Btu (60°F).h^{-1}**	2.986554984E-05
British thermal unit (therm.) per hour	**Btu (therm.).h^{-1}**	2.985626179E-05
foot poundal per second	**ft.pdl.s^{-1}**	4.295846893E-06
foot pound-force per minute	**ft.lbf.min^{-1}**	2.303579775E-06
inch ounce-force per second	**in.ozf.s^{-1}**	9.598249064E-07
clusec	**clusec**	1.325245935E-07
calorie (4°C) per hour	**cal.(4°C).h^{-1}**	1.190597550E-07
calorie (mean) per hour	**cal.(mean).h^{-1}**	1.186497216E-07
calorie (IT) per hour	**cal.(IT).h^{-1}**	1.185568412E-07
calorie (15°C) per hour	**cal.(15°C).h^{-1}**	1.185217278E-07
calorie (therm.) per hour	**cal.(therm.).h^{-1}**	1.184792520E-07
foot pound-force per hour	**ft.lbf.h^{-1}**	3.776360287E-08
erg per second	**erg.s^{-1}**	1.019419950E-11
abwatt (emu of power)	**emu**	1.019419950E-12

CTR (UK)	CTR (US)	HP (water)	HP (metric)
254.926666825	284.349408553	1340.405311758	1.359621155E+03
2.500703138	2.789325523	13.148705906	13.337203722
1	1.115416492	5.258003521	5.333381447
8.965261019E-01	**1**	4.713937400	4.781515678
2.549266668E-01	2.843494086E-01	1.340405312	1.359621155
2.499976597E-01	2.788515127E-01	1.314488575	1.333332880
1.901862553E-01	2.121368858E-01	**1**	1.014335845
1.901752935E-01	2.121246588E-01	9.999423626E-01	1.014277382
1.900988155E-01	2.120393540E-01	9.995402410E-01	1.013869495
1.900987827E-01	2.120393174E-01	9.995400688E-01	1.013869321
1.874982448E-01	2.091386346E-01	9.858664313E-01	9.999996601E-01
1.874982448E-01	2.091386346E-01	9.858664313E-01	9.999996601E-01
6.373166671E-02	7.108735214E-02	3.351013279E-01	3.399052888E-01
2.499976597E-02	2.788515127E-02	1.314488575E-01	1.333332880E-01
4.502302351E-03	5.021942296E-03	2.367312161E-02	2.401249582E-02
4.486156995E-03	5.003933500E-03	2.358822928E-02	2.392638649E-02
4.482715485E-03	5.000094783E-03	2.357013380E-02	2.390803160E-02
4.482697864E-03	5.000075128E-03	2.357004115E-02	2.390793762E-02
4.481092452E-03	4.998284425E-03	2.356159989E-02	2.389937534E-02
4.479698853E-03	4.996729982E-03	2.355427234E-02	2.389194275E-02
2.499976597E-03	2.788515127E-03	1.314488575E-02	1.333332880E-02
3.456341504E-04	3.855260317E-04	1.817345580E-03	1.843398765E-03
2.549751029E-04	2.844034349E-04	1.340659989E-03	1.359879483E-03
2.549687297E-04	2.843963262E-04	1.340626479E-03	1.359845493E-03
2.549266668E-04	2.843494086E-04	1.340405312E-03	1.359621155E-03
2.549266668E-04	2.843494086E-04	1.340405312E-03	1.359621155E-03
7.503837251E-05	8.369903827E-05	3.945520269E-04	4.002082637E-04
7.476928325E-05	8.339889167E-05	3.931371546E-04	3.987731081E-04
7.471192475E-05	8.333491305E-05	3.928355634E-04	3.984671933E-04
7.471163106E-05	8.333458547E-05	3.928340192E-04	3.984656270E-04
7.468487420E-05	8.330474042E-05	3.926933315E-04	3.983229224E-04
7.466164755E-05	8.327883303E-05	3.925712057E-04	3.981990458E-04
1.074263781E-05	1.198251538E-05	5.648482741E-05	5.729458516E-05
5.760569173E-06	6.425433862E-06	3.028909300E-05	3.072331275E-05
2.400237155E-06	2.677264109E-06	1.262045541E-05	1.280138031E-05
3.314046669E-07	3.696542311E-07	1.742526905E-06	1.767507502E-06
2.977331030E-07	3.320964134E-07	1.565481704E-06	1.587924207E-06
2.967077313E-07	3.309526969E-07	1.560090296E-06	1.582455509E-06
2.964754647E-07	3.306936230E-07	1.558869037E-06	1.581216743E-06
2.963876567E-07	3.305956804E-07	1.558407342E-06	1.580748429E-06
2.962814372E-07	3.304772015E-07	1.557848840E-06	1.580181920E-06
9.443556022E-08	1.053349813E-07	4.965425081E-07	5.036608648E-07
2.549266668E-11	2.843494086E-11	1.340405312E-10	1.359621155E-10
2.549266668E-12	2.843494086E-12	1.340405312E-11	1.359621155E-11

(Continued overleaf)

Table 4.2.17 *(continued)* Conversion table: units of power

Unit	Symbol	HP (metric)
megawatt	**MW**	1.359621155E+03
horsepower (boiler)	**HP (boiler)**	13.337203722
commercial ton of refrigeration (UK)	**CTR (UK)**	5.333381447
commercial ton of refrigeration (US)	**CTR (US)**	4.781515678
kilowatt	**kW**	1.359621155
poncelet	**poncelet**	1.333332880
horsepower (water)	**HP (water)**	1.014335845
horsepower (electric)	**HP (electric)**	1.014277382
horsepower (UK)	**BHP, hp**	1.013869495
horsepower (550 ft.lbf.s^{-1})	**HP (550)**	1.013869321
horsepower (cheval vapeur)	**HP, cv**	9.999996601E-01
horsepower (metric)	**HP (metric)**	9.999996601E-01
donkey	**donkey**	3.399052888E-01
prony	**prony**	1.333332880E-01
British thermal unit (39°F) per minute	**Btu (39°F).min^{-1}**	2.401249582E-02
British thermal unit (mean) per minute	**Btu (mean).min^{-1}**	2.392638649E-02
British thermal unit (ISO) per minute	**Btu (ISO).min^{-1}**	2.390803160E-02
British thermal unit (IT) per minute	**Btu (IT).min^{-1}**	2.390793762E-02
British thermal unit (60°F) per minute	**Btu (60°F).min^{-1}**	2.389937534E-02
British thermal unit (therm.) per minute	**Btu (therm.).min^{-1}**	2.389194275E-02
kilogram-force metre per second	**kgf.m.s^{-1}**	1.333332880E-02
foot pound-force per second	**ft.lbf.s^{-1}**	1.843398765E-03
watt (int. mean)	**W (int. mean)**	1.359879483E-03
watt (int. US)	**W (int. US)**	1.359845493E-03
volt-ampere	**VA**	1.359621155E-03
watt	**W**	1.359621155E-03
British thermal unit (39°F) per hour	**Btu (39°F).h^{-1}**	4.002082637E-04
British thermal unit (mean) per hour	**Btu (mean).h^{-1}**	3.987731081E-04
British thermal unit (ISO) per hour	**Btu (ISO).h^{-1}**	3.984671933E-04
British thermal unit (IT) per hour	**Btu (IT).h^{-1}**	3.984656270E-04
British thermal unit (60°F) per hour	**Btu (60°F).h^{-1}**	3.983229224E-04
British thermal unit (therm.) per hour	**Btu (therm.).h^{-1}**	3.981990458E-04
foot poundal per second	**ft.pdl.s^{-1}**	5.729458516E-05
foot pound-force per minute	**ft.lbf.min^{-1}**	3.072331275E-05
inch ounce-force per second	**in.ozf.s^{-1}**	1.280138031E-05
clusec	**clusec**	1.767507502E-06
calorie (4°C) per hour	**cal.(4°C).h^{-1}**	1.587924207E-06
calorie (mean) per hour	**cal.(mean).h^{-1}**	1.582455509E-06
calorie (IT) per hour	**cal.(IT).h^{-1}**	1.581216743E-06
calorie (15°C) per hour	**cal.(15°C).h^{-1}**	1.580748429E-06
calorie (therm.) per hour	**cal.(therm.).h^{-1}**	1.580181920E-06
foot pound-force per hour	**ft.lbf.h^{-1}**	5.036608648E-07
erg per second	**erg.s^{-1}**	1.359621155E-10
abwatt (emu of power)	**emu**	1.359621155E-11

	ft.lbf.s^{-1}	watt	Btu (mean).h^{-1}	ft.lbf.min^{-1}
	7.375621493E+05	**1E+06**	3.409510641E+06	4.425372896E+07
	7.235115903E+03	9.809500000E+03	3.344559463E+04	4.341069542E+05
	2.893232624E+03	3.922696721E+03	1.337447621E+04	1.735939575E+05
	2.593858567E+03	3.516800000E+03	1.199056702E+04	1.556315140E+05
	737.562149277	**1000**	3.409510641E+03	4.425372896E+04
	723.301385121	**980.665**	3.343587752E+03	4.339808311E+04
	550.253078533	746.043000000	2.543641547E+03	3.301518471E+04
	550.221363361	746.000000000	2.543494938E+03	3.301328180E+04
	550.000094716	745.700000000	2.542472085E+03	3.300000568E+04
	550	745.699871582	2.542471647E+03	**33000**
	542.476038841	735.498750000	2.507690814E+03	3.254856233E+04
	542.476038841	735.498750000	2.507690814E+03	3.254856233E+04
	184.390537319	**250**	852.377660129	1.106343224E+04
	72.330138512	**98.0665**	334.358775228	4.339808311E+03
	13.026208045	17.661166667	60.215935674	781.572482725
	12.979495776	17.597833333	**60**	778.769746557
	12.969538687	17.584333333	59.953971606	778.172321216
	12.969487704	17.584264210	59.953735931	778.169262266
	12.964842875	17.577966667	59.932264389	777.890572475
	12.960810868	17.572500000	59.913625730	777.648652090
	7.233013851	9.806650000	33.435877523	433.980831073
	1	1.355817948	4.622675721	**60**
	7.377022861E-01	1.000190000	3.410158448	44.262137165
	7.376838470E-01	1.000165000	3.410073210	44.261030822
	7.375621493E-01	**1**	3.409510641	44.253728957
	7.375621493E-01	**1**	3.409510641	44.253728957
	2.171034674E-01	2.943527778E-01	1.003598928	13.026208045
	2.163249296E-01	2.932972222E-01	**1**	12.979495776
	2.161589781E-01	2.930722222E-01	9.992328601E-01	12.969538687
	2.161581284E-01	2.930710702E-01	9.992289322E-01	12.969487704
	2.160807146E-01	2.929661111E-01	9.988710731E-01	12.964842875
	2.160135145E-01	2.928750000E-01	9.985604288E-01	12.960810868
	3.108095017E-02	4.214011009E-02	1.436771538E-01	1.864857010
	1/60	2.259696581E-02	7.704459536E-02	**1**
	1/144	9.415402419E-03	3.210191473E-02	4.166666667E-01
	9.588307941E-04	1.3E-03	4.432363833E-03	5.752984764E-02
	8.614111268E-04	1.167916667E-03	3.982024302E-03	5.168466761E-02
	8.584444880E-04	1.163894444E-03	3.968310493E-03	5.150666928E-02
	8.577724869E-04	1.162983333E-03	3.965204050E-03	5.146634921E-02
	8.575184377E-04	1.162638889E-03	3.964029663E-03	5.145110626E-02
	8.572111202E-04	1.162222222E-03	3.962609033E-03	5.143266721E-02
	2.732240437E-04	3.704420624E-04	1.263026153E-03	1.639344262E-02
	7.375621493E-08	**1E-07**	3.409510641E-07	4.425372896E-06
	7.375621493E-09	**1E-08**	3.409510641E-08	4.425372896E-07

4.2.18 Conversion Table for Units of Plane and Solid Angle

Table 4.2.18 Conversion table: units of plane and solid angle

Unit	Symbol	radian (rad)	
round	**tr, r**	6.283185307180	
circumference	**circ**	6.283185307180	
plane angle	–	3.141592653590	
right angle	⊥	1.570796326795	
quadrant	**quadr**	1.570796326795	
sign	**sign**	5.235987756E-01	
radian	**rad**	**1**	
degree	°	1.7453292520E-02	
grade (gon)	**g**	1.5707963268E-02	
percent	%	9.9996666867E-03	
thousandth (US)	‰ (US)	1.5707963270E-03	
thousandth (French)	‰ (Fra.)	9.9999966000E-04	
thousandth (USSR)	‰ (USSR)	9.9733101100E-04	
thousandth (NATO)	‰ (NATO)	9.8174770400E-04	
minute of angle	′	2.9088820867E-04	
minute (new)	**c**	1.5707963268E-04	
second of angle	″	4.8481368111E-06	
second (new)	**cc**	1.5707963268E-06	

Unit	Symbol	steradian (sr)	
spat	**spat**	12.5663	
steradian	**sr**	**1**	
square degree	$(^\circ)^2$	3.046174198E-04	
square gon	$(\mathbf{g})^2$	2.467401101E-04	

	degree (°)	minute (′)	second (″)	grade (g)
	360	**2.16E+04**	1.2960E+06	**400**
	360	**2.16E+04**	1.2960E+06	**400**
	180	**10800**	6.4800E+05	**200**
	90	**5400**	3.2400E+05	**100**
	90	**5400**	3.2400E+05	**100**
	30	**1800**	1.0800E+05	33.33333333
	57.295779513082	3437.74677078494	206264.806247096	63.661977236758
	1	**60**	**3600**	1.11111
	0.90	**54**	**3240**	**1**
	5.729386977E-01	34.376321861009	2062.579311660550	6.365985530E-01
	0.09	**5.40**	**324**	**0.10**
	5.729576003E-02	3.437745601951	206.264736117062	6.366195559E-02
	5.714285771E-02	3.428571462469	205.714287748136	6.349206412E-02
	5.624999999E-02	3.374999999152	202.499999949092	6.249999998E-02
	1.666666667E-02	**1**	**60**	1.851851852E-02
	9.00E-03	**0.54**	**32.4**	**0.01**
	2.777777778E-04	1.666666667E-02	**1**	3.086419753E-04
	9.00E-05	**5.40E-03**	**0.324**	**1E-04**

	spat	square degree $(°)^2$	square gon $(g)^2$
	1	41252.72943435	50929.29558517
	7.957791872E-02	3282.80635	4052.847344
	2.424082027E-05	**1**	1.234568
	1.963506443E-05	8.100000002E-01	**1**

4.2.19 Conversion Table for Units of Thermal Conductivity

Table 4.2.19 Conversion table: units of thermal conductivity

Unit	Symbol	cal (IT). $cm^{-1}.°C^{-1}$	cal (therm.). $cm^{-1}.°C^{-1}$	$W.cm^{-1}.K^{-1}$
cal (IT) per centimetre per second per Celsius degree	**cal (IT). $cm^{-1}.°C^{-1}$**	**1**	1.000654876	4.18674
cal (therm.) per centimetre per second per Celsius degree	**cal (therm.). $cm^{-1}.°C^{-1}$**	9.993455529E-01	**1**	4.184
watt per centimetre per kelvin	**$W.cm^{-1}.K^{-1}$**	2.388493195E-01	2.390057361E-01	**1**
Btu (IT) per inch per hour per Fahrenheit degree	**Btu (IT). $in^{-1}.h^{-1}.°F$**	4.960618261E-02	4.963866849E-02	2.076881890E-01
Btu (therm.) per inch per hour per Fahrenheit degree	**Btu (therm.). $in^{-1}.h^{-1}.°F^{-1}$**	4.957298820E-02	4.960545234E-02	2.075492126E-01
Btu (IT) per foot per hour per Fahrenheit degree	**Btu (IT). $ft^{-1}.h^{-1}.°F^{-1}$**	4.133848551E-03	4.136555708E-03	1.730734908E-02
Btu (therm.) per foot per hour per Fahrenheit degree	**Btu (therm.). $ft^{-1}.h^{-1}.°F^{-1}$**	4.131082350E-03	4.133787695E-03	1.729576772E-02
joule per second per centimetre per kelvin	**$J.s^{-1}.cm^{-1}.K^{-1}$**	2.388493195E-03	2.390057361E-03	**1E-02**
watt per metre per kelvin	**$W.m^{-1}.K^{-1}$**	2.388493195E-03	2.390057361E-03	**1E-02**

	Btu (IT).in^{-1}. h^{-1}.°F	Btu (therm.).in^{-1}. h^{-1}.°F^{-1}	Btu (IT).ft^{-1}. h^{-1}.°F^{-1}	Btu (therm.).ft^{-1}. h^{-1}.°F^{-1}	W.m^{-1}.K^{-1}
	20.158777544	20.172275999	241.905330523	242.067311993	418.674
	20.145584689	20.159074311	241.747016272	241.908891734	418.4
	4.814910299	4.818134396	57.778923583	57.817612747	**100**
	1	1.000669607	12	12.008035282	20.768818898
	9.993308412E-01	**1**	11.991970094	12	20.754921260
	8.333333333E-02	8.338913391E-02	**1**	1.000669607	1.730734908
	8.327757010E-02	8.333333333E-02	9.993308412E-01	**1**	1.729576772
	4.814910299E-02	4.818134396E-02	5.777892358E-01	5.781761275E-01	**1**
	4.814910299E-02	4.818134396E-02	5.777892358E-01	5.781761275E-01	**1**

4.2.20 Conversion Tables for Units of Concentration

Table 4.2.20.1 Conversion table: units of concentration

Physical quantities	Symbol	Equation		
Molarity (molar concentration)	c_i	$c_i = \frac{n_i}{V_{sol}}$	c_i n_i V_{Sol}	molarity in mol.m^{-3}, amount of substance in mol, volume of the solution in m^3.
Particle density	C_i	$C_i = \frac{N_i}{V}$	C_i N_i V	density of particles i in m^{-3}, number of particles i, volume of the solution in m^3.
Molality of solute	b_i	$b_i = \frac{n_i}{M_s}$	b_i n_i M_s	molality in mol.kg^{-1}, amount of substance in mol, mass of solvent in kg.
Normality (number of equivalents)	N_i	$N_i = \frac{Z_i n_i}{V_{Sol}}$	N_i n_i Z_i V_{Sol}	normality of the species i in eq.m^{-3}, amount of substance in mol, valency of the ionic species i, volume of the solution in m^3.
Mass fraction	w_i	$w_i = \frac{m_i}{\sum_{i=1}^{n} m_i}$	w_i m_i	mass fraction of the species i, mass of the species i in kg.
Volumetric fraction	ϕ_i	$\phi_i = \frac{v_i}{\sum_{i=1}^{n} v_i}$	ϕ_i v_i	volumetric fraction of the species i, volume of the species i in m^3.
Molar fraction	x_i	$x_i = \frac{n_i}{\sum_{i=1}^{n} n_i}$	x_i n_i	molar fraction of the species i, amount of substance of the species i.
Atomic fraction	a_i	$a_i = \frac{N_i}{\sum_{i=1}^{n} N_i}$	a_i N_i	atomic fraction of the atom i, number of atoms.

Table 4.2.20.2 Conversion table: equations between various quantities used to measure concentration

	Molar fraction $[x_i]$	**Mass fraction $[w_i]$**	**Molality $[m_i]$**	**Molarity $[c_i]$**
Molar fraction $[x_i]$	x_i	$\dfrac{1}{1+\dfrac{M_i}{M_S}\cdot\left[\dfrac{w_S}{w_i}+\sum\limits_{j\neq1}^{S-1}\dfrac{w_j}{w_i}\left(\dfrac{M_S}{M_j}-1\right)\right]}$	$\dfrac{1}{1+\dfrac{1}{m_iM_S}+\sum\limits_{j\neq1}^{S-1}\dfrac{m_j}{m_i}}$	$\dfrac{1}{1+\dfrac{1}{M_S}\left(\dfrac{\rho}{c_i}-M_i\right)+\sum\limits_{j\neq1}^{S-1}\dfrac{c_j}{c_i}\left(1-\dfrac{M_j}{M_S}-1\right)}$
Mass fraction $[w_i]$	$\dfrac{1}{1+\dfrac{M_S}{M_{Si}}\cdot\left[\dfrac{1-x_i}{x_i}+\sum\limits_{j\neq1}^{S-1}\dfrac{x_j}{x_i}\left(\dfrac{M_j}{M_S}-1\right)\right]}$	w_i	$\dfrac{1}{1+\dfrac{1}{m_iM_i}\cdot\left(1+\sum\limits_{j\neq1}^{S-1}m_jM_i\right)}$	$\dfrac{c_iM_i}{\rho}$
Molality $[m_i]$	$\dfrac{1}{M_S\left(\dfrac{1-x_i}{x_i}-\sum\limits_{j\neq1}^{S-1}\dfrac{x_j}{x_i}\right)}$	$\dfrac{1}{M_i\left(\dfrac{1-w_i}{w_i}+\sum\limits_{j\neq1}^{S-1}\dfrac{w_j}{w_i}\right)}$	m_i	$\dfrac{1}{\dfrac{1}{c_i}\left(\rho-\sum\limits_{j\neq1}^{S-1}c_jM_j\right)-M_i}$
Molarity $[c_i]$	$\dfrac{\rho}{M_i+M_S.\left[\dfrac{1-x_i}{x_i}+\sum\limits_{j\neq1}^{S-1}\dfrac{x_j}{x_i}\left(\dfrac{M_j}{M_S}-1\right)\right]}$	$\dfrac{c_iM_i}{\rho}$	$\dfrac{1}{M_j+\dfrac{1}{m_i}\cdot\left(1+\sum\limits_{j\neq1}^{S-1}m_jM_j\right)}$	c_i

Notes: The mixture comprises c component systems with a single solvent (S) and (S – 1) solutes (i) and ρ is the density of the final solution in $kg.m^{-3}$; M_i is the molar mass of solute i in $kg.mol^{-1}$. For the particular case of binary mixtures (i.e. $c = 2$) the simple relation can be easily obtained by equating the summations to zero.

4.2.21 Conversion Table for Units of Temperature

Table 4.2.21 Conversion table: units of temperature

Temperature scale	T [K]	t_C [°C]	$t_{Ré}$ [°Ré]	t_F [°F]	t_R [°R]
Absolute temperature T (K)	T	$T - 273.15$	$\frac{4}{5}(T - 273.15)$	$\frac{9}{5}(T - 273.15) + 32$	$\frac{9}{5}T$
Celsius temperature t_C (°C)	$t_C + 273.15$	t_C	$\frac{4}{5}t_C$	$\frac{9}{5}t_C + 32$	$\frac{9}{5}t_C + 491.67$
Réaumur temperature $t_{Ré}$ (°Ré)	$\frac{5}{4}t_{Ré} + 273.15$	$\frac{5}{4}t_{Ré}$	$t_{Ré}$	$\frac{9}{4}t_{Ré} + 32$	$\frac{9}{4}t_{Ré} + 491.67$
Fahrenheit temperature t_F (°F)	$\frac{5}{9}(t_F - 32) + 273.15$	$\frac{5}{9}(t_F - 32)$	$\frac{4}{9}(t_F - 32)$	t_F	$t_F + 459.67$
Rankine temperature t_R (°R)	$\frac{5}{9}t_R$	$\frac{5}{9}(t_R - 491.67)$	$\frac{4}{9}t_R - 491.67$	$t_R - 459.67$	t_R

Unit (symbol)	**K**	**°C**	**°Ré**	**°F**	**°R**
1 kelvin (K)	**1**	**1**	4/5	9/5	9/5
1 Celsius degree (°C)	**1**	**1**	4/5	9/5	9/5
1 Réamur degree (°Ré)	5/4	5/4	**1**	9/4	9/4
1 Fahrenheit degree (°F)	5/9	5/9	4/9	**1**	**1**
1 Rankine degree (°R)	5/9	5/9	4/9	**1**	1

4.2.22 Conversion Table for Electrical Units

Table 4.2.22 Conversion table: units used in electricity

Electric potential						
Unit	**Symbol**	**esu cgs**	**V (int. mean)**	**V (int. US)**	**volt**	**emu cgs**
statvolt	**esu cgs**	**1**	299.6905632	299.6935591	**299.792458**	2.997925E+10
u.a. of potential	**u.a.**	9.076744759	27.20214749	27.2024194	27.21139622	2.7211396
volt (int. mean)	**V (int. mean)**	3.336775E-03	**1**	1.000009997	1.00034	1.000340E+08
volt (int. US)	**V (int. US)**	3.336742E-03	9.999900E-01	**1**	1.00033	1.000330E+08
volt	**V**	3.335641E-03	9.996601E-01	9.996701E-01	**1**	**1E+08**
abvolt	**emu cgs**	3.335641E-11	9.996601E-09	9.996701E-09	**1E-08**	**1**

Electric charge						
Unit	**Symbol**	**faraday**	**Ah**	**emu cgs**	**coulomb**	**esu cgs**
faraday (C12)	**F**	**1**	2.680147E+01	9.648531E+03	9.648531E+04	2.875317E+14
ampere-hour	**Ah**	3.731138E-02	**1**	**360**	**3600**	1.072820E+13
abcoulomb	**emu cgs**	1.036427E-04	2.777778E-03	**1**	**10**	2.980057E+10
coulomb	**C**	1.036427E-05	2.777778E-04	1.000000E-01	**1**	2.980057E+09
statcoulomb	**esu cgs, Fr**	3.457149059	9.265669311E-14	3.335640952	3.335640952	**1**
u.a. charge	**u.a.**	1.660540E-24	4.450493E-23	1.602177E-20	1.602177E-19	4.774579E-10

Electric current intensity						
Unit	**Symbol**	**emu cgs**	**ampere**	**A (int. mean)**	**A (int. US)**	**esu cgs**
abampere	**emu cgs**	**1**	**10**	10.00150023	10.00165027	2.997925E+10
biot	**biot**	**1**	**10**	10.00150023	10.00165027	2.997925E+10
ampere	**A**	**0.1**	**1**	1.000150023	1.000165027	2.997925E+09
amp. (int. mean)	**A (int. mean)**	9.998500E-02	0.99985	**1**	1.000015002	2.997476E+09
amp. (int. US)	**A (int. US)**	9.998350E-02	0.999835	9.999850E-01	**1**	2.997431E+09
u.a. of current	**u.a.**	6.623621E-04	6.623621E-03	6.624615E-03	6.624714E-03	1.985712E+07
statampere	**esu cgs**	3.335640E-11	3.335640E-10	3.336140E-10	3.336190E-10	**1**

Electric capacitance						
Unit	**Symbol**	**emu cgs**	**farad**	**F (int.)**	**esu cgs**	**"cm"**
abfarad	**emu cgs**	**1**	**1E+09**	1.000490E+09	8.98473E+20	**9E+20**
farad	**F**	**1E-09**	**1**	1.00049024	8.98473E+11	**9E+11**
farad (int.)	**F (int.)**	9.9951E-10	0.99951	**1**	8.98032E+11	8.995590E+11
jar	**jar**	1.111111E-18	1.111111E-09	1.111656E-09	998.3028851	**1000**
statfarad	**esu cgs**	1.113000E-21	1.113000E-12	1.113546E-12	**1**	1.0017
"cm"	**"cm"**	1.111111E-21	1.111111E-12	1.111656E-12	0.998302885	**1**
puff	**puff**	**1E-21**	**1E-12**	1.000490E-12	0.898472597	0.9

Electric resistance						
Unit	**Symbol**	**esu cgs**	**Ω (int. US)**	**Ω (int. mean)**	**ohm**	**emu cgs**
statohm	**esu cgs**	**1**	8.987552^{11}	8.987552^{20}	8.987552	8.987552
preece	**preece**	1.11272E-06	9.995052E+05	9.995102E+05	**1E+06**	**1E+15**
lenz	**lenz**	8.90175E-08	7.996042E+04	7.996082E+04	8E+04	**8E+13**
ohm (int. US)	**Ω (int. US)**	1.11327E-12	**1**	1.000004998	1.000495	1.000495E+09
ohm (Int. mean)	**Ω (int. mean)**	1.11326E-12	9.999950E-01	**1**	1.00049	1.000490E+09
ohm	**Ω**	1.11272E-12	0.999505245	0.99951024	**1**	**1E+09**
ohm (legal)	**Ω (legal)**	1.1096E-12	9.967066E-01	0.996711611	0.9972	9.972000E+08
jacobi	–	7.1214E-13	6.396834E-01	0.639686554	0.64	6.4E+08
wheatstone	–	2.7818E-15	2.498763E-03	0.002498776	**2.50E-03**	**2.50E+06**
abohm	**emu cgs**	**1E-21**	**1E-09**	**1E-09**	**1E-09**	**1**

4.2.23 Conversion Table for Units Used in Magnetism

Table 4.2.23 Conversion table: units used in magnetism

Magnetic field					
Unit	**Symbol**	**praoersted**	**Oe**	**A.m^{-1}**	**lenz**
praoersted	–	**1**	143.999049	11459.08	11459.08
oersted	**Oe**	6.944490E-03	**1**	79.57747	79.57747
ampere per metre	**A.m^{-1}**	8.726704E-05	1.256637E-02	**1**	**1**
lenz	**lenz**	8.726704E-05	1.256637E-02	**1**	**1**

Magnetic induction field strength					
Unit	**Symbol**	**tesla**	**gauss**	**u.a.**	**gamma**
u.a.	**u.a.**	2.35052E+15	2.35052E+09	**1**	2.35052E+14
weber per square metre	**Wb.m^{-2}**	**1**	10000	42543.77755E-06	**1E+09**
tesla	**T**	**1**	10000	42543.77755E-06	**1E+09**
gauss	**G**	**1E-04**	**1**	4.254377755E-10	**1E+05**
maxwell per square centimetre	**Mx.cm^{-2}**	**1E-04**	**1**	4.254377755E-15	**1E+05**
line per square centimetre	**line.cm^{-2}**	**1E-04**	**1**	4.254377755	**1E+05**
gamma	**γ**	**1E-09**	**1E-05**	4.25438E-15	**1**

Magnetic flux					
Unit	**Symbol**	**weber**	**kapp line**	**unit pole**	**maxwell**
weber	**Wb**	**1**	1.666667E+04	7.957748E+06	**1E+08**
kapp line	–	**6E-05**	**1**	477.4648526	6000
unit pole	**unit pole**	1.256637E-07	2.094395E-03	**1**	12.56637
maxwell	**Mx**	**1E-08**	1.666667E-04	7.957748E-02	**1**
line	**line**	**1E-08**	1.666667E-04	7.957748E-02	**1**

Electric inductance					
Unit	**Symbol**	**esu cgs**	**henry**	**"cm"**	**emu cgs**
stathenry	**esu cgs**	**1**	8.98755E+11	8.987552E+20	8.987552E+20
henry (int. US)	**H (int. US)**	1.113201E-12	1.000495	1.000495E+09	1.000495E+09
henry (int. mean)	**H (int. mean)**	1.113195E-12	1.00049	1.000490E+09	1.000490E+09
henry	**H**	1.112650E-12	**1**	**1E+09**	**1E+09**
mic	**mic**	1.112650E-18	**1E-06**	1000	1000
cm	**cm**	1.112650E-21	**1E-09**	**1**	**1**
abhenry	**emu cgs**	1.112650E-21	**1E-09**	**1**	**1**

Magnetomotive force					
Unit	**Symbol**	**A-turn**	**emu cgs**	**ampere**	**gilbert**
ampere-turn	**A-turn**	**1**	286.477	2864.77	3600
abampere-turn	**emu cgs**	3.490682E-03	**1**	**10**	**12.56644508**
ampere	**A**	3.490682E-04	0.1	**1**	1.256644508
gilbert	**Gb**	2.777780E-04	7.957747E-02	7.957700E-01	**1**

4.2.24 Conversion Table for Photometric Units

Table 4.2.24 Conversion table: units used in photometry

Luminous intensity					
Unit	**Symbol**	**carcel**	**candle (int.)**	**candela**	**Hefner unit**
carcel	**carcel**	**1**	9.810000672	**10**	11.07419712
candle (int.)	**Cd (int.)**	0.101936792	**1**	1.019367992	1.128868131
candela	**cd**	0.1	0.981000067	**1**	1.107419712
Hefner unit	**HK**	0.0903	0.885843061	0.903	**1**

Illuminance					
Unit	**Symbol**	**phot**	**Ft-C**	**lux**	**nox**
phot	**ph**	**1**	929.030436	**1E+04**	**1E+07**
foot-candle	**ft-C**	**1.076391E-03**	**1**	10.76391	10763.91
lux	**lx**	**1E-04**	9.290304E-02	**1**	**1E+03**
skot	**skot**	**1E-07**	9.290304E-05	**1E-03**	**1**
nox	**nox**	**1E-07**	9.290304E-05	**1E-03**	**1**

Luminous luminance					
Unit	**Symbol**	**lambert**	**ft-L**	**cd.m^{-2}**	**asb**
stilb	**sb**	3.141592654	2918.635164	**1E+04**	31415.92654
luxon (troland)	**luxon**	3.141592654	2918.635164	**1E+04**	31415.92654
lambert	**L**	**1**	**929.0304271**	3183.098862	**1E+04**
foot-lambert	**ft-L**	1.076391E-03	**1**	3.426259	10.7639101
candela per square metre	**cd.m^{-2}**	3.141593E-04	2.918635E-01	**1**	3.141592654
nit	**nit**	3.141593E-04	2.918635E-01	**1**	3.141592654
apostilb	**asb**	**1E-04**	9.290304E-02	3.183099E-01	**1**
blondel	**Bl**	**1E-04**	9.290304E-02	3.183099E-01	**1**

4.2.25 Conversion Table for Units Used in Nuclear Sciences

Table 4.2.25 Conversion table: units used in nuclear sciences

Radioactivity					
Unit	**Symbol**	**curie**	**rutherford**	**Mache unit**	**becquerel**
curie	**Ci**	**1**	37000	2.7777777E+09	**3.70E+10**
rutherford	**Rd**	2.702703E-05	**1**	7.507507507E+04	**1E+06**
Mache unit	**Mache**	3.567568E-10	1.332E-05	**1**	13.32
becquerel	**Bq**	2.702703E-11	**1E-06**	7.507507E-02	**1**
stat	**stat**	3.630000E-27	1.343100E-24	1.0083333E-17	1.343100E-16

Absorbed dose					
Unit	**Symbol**	**gray**	**rad**	**g-rad**	**erg.g^{-1}**
gray	**Gy**	**1**	**100**	**100**	**10000**
rad	**rad**	**1E-02**	**1**	**1**	**100**
erg per gram	**erg.g^{-1}**	**1E-04**	**1E-02**	**1E-02**	**1**
gram-rad	**g-rad**	**1E-02**	**1**	**1**	**100**

Dose equivalent			
Unit	**Symbol**	**sievert**	**rem**
sievert	**Sv**	**1**	**100**
rem	**rem**	**0.01**	**1**

Exposure					
Unit	**Symbol**	**C.kg^{-1}**	**B unit**	**D unit**	**röntgen**
coulomb per kg	**C.kg^{-1}**	**1**	7.751937984	38.75968992	3875.968992
pastille dose (B unit)	**B unit**	1.29E-01	**1**	5	**500**
D unit	**D unit**	2.58E-02	2E-01	**1**	100
röntgen	**R**	**2.58E-04**	**2E-03**	1E-02	**1**

4.2.26 Conversion Table for Energy Equivalents for Electromagnetic Radiation

Table 4.2.26 Conversion table: energy equivalents for electromagnetic radiation

	Energy (E)			Wavelength (λ)				Wavenumber (σ)			Frequency (ν)			Temperature (T)	
	J	cal	eV	m	cm	mm	nm	m^{-1}	cm^{-1}	kayser	Hz	kHz	MHz	K	°R
J	1	2.390057E-01	6.241510E+18	1.986445E-25	1.986445E-23	1.986445E-22	1.986445E-16	5.034118E+24	5.034118E+22	5.034118E+22	1.509190E+33	1.509190E+30	1.509190E+27	7.242964E+22	1.303733E+23
cal	4.184000E+00	1	2.611448E+19	4.747719E-26	4.747719E-24	4.747719E-23	4.747719E-17	2.106275E+25	2.106275E+23	2.106275E+23	6.314453E+33	6.314453E+30	6.314453E+27	3.030456E+23	5.454821E+23
eV	1.602176E-19	3.829294E-20	1	1.239842E-06	1.239842E-04	1.239842E-03	1.239842E+03	8.065545E+05	8.065545E+03	8.065545E+03	2.417989E+14	2.417989E+11	2.417989E+08	1.160451E+04	2.088811E+04
m	1.986445E-25	4.747719E-26	1.239842E-06	1	1.000000E+02	1.000000E+03	1.000000E+09	1.000000E+00	1.000000E-02	1.000000E-02	2.997925E+08	2.997925E+05	2.997925E+02	1.438775E-02	2.589795E-02
cm	1.986445E-23	4.747719E-24	1.239842E-04	1.000000E-02	1	1.000000E+01	1.000000E+07	1.000000E+02	1.000000E+00	1.000000E+00	2.997925E+10	2.997925E+07	2.997925E+04	1.438775E+00	2.589795E+00
mm	1.986445E-22	4.747719E-23	1.239842E-03	1.000000E-03	1.000000E-01	1	1.000000E+06	1.000000E+03	1.000000E+01	1.000000E+01	2.997925E+11	2.997925E+08	2.997925E+05	1.438775E+01	2.589795E+01
nm	1.986445E-16	4.747719E-17	1.239842E+03	1.000000E-09	1.000000E-07	1.000000E-06	1	1.000000E+09	1.000000E+07	1.000000E+07	2.997925E+17	2.997925E+14	2.997925E+11	1.438775E+07	2.589795E+07
m^{-1}	1.986445E-25	4.747719E-26	1.239842E-06	1.000000E+00	1.000000E+02	1.000000E+03	1.000000E+09	1	1.000000E-02	1.000000E-02	2.997925E+08	2.997925E+05	2.997925E+02	1.438775E-02	2.589795E-02
cm^{-1}	1.986445E-23	4.747719E-24	1.239842E-04	1.000000E-02	1.000000E+00	1.000000E+01	1.000000E+07	1.000000E+02	1	1.000000E+00	2.997925E+10	2.997925E+07	2.997925E+04	1.438775E+00	2.589795E+00
kayser	1.986445E-23	4.747719E-24	1.239842E-04	1.000000E-02	1.000000E+00	1.000000E+01	1.000000E+07	1.000000E+02	1.000000E+00	1	2.997925E+10	2.997925E+07	2.997925E+04	1.438775E+00	2.589795E+00
Hz	6.626069E-34	1.583668E-34	4.135667E-15	2.997925E+08	2.997925E+10	2.997925E+11	2.997925E+17	3.335641E-09	3.335641E-11	3.335641E-11	1	1.000000E-03	1.000000E-06	4.799238E-11	8.638628E-11
kHz	6.626069E-31	1.583668E-31	4.135667E-12	2.997925E+05	2.997925E+07	2.997925E+08	2.997925E+14	3.335641E-06	3.335641E-08	3.335641E-08	1.000000E+03	1	1.000000E-03	4.799238E-08	8.638628E-08
MHz	6.626069E-28	1.583668E-28	4.135667E-09	2.997925E+02	2.997925E+04	2.997925E+05	2.997925E+11	3.335641E-03	3.335641E-05	3.335641E-05	1.000000E+06	1.000000E+03	1	4.799238E-05	8.638628E-05
K	1.380650E-23	3.299833E-24	8.617342E-05	1.438775E-02	1.438775E+00	1.438775E+01	1.438775E+07	6.950356E+01	6.950356E-01	6.950356E-01	2.083664E+10	2.083664E+07	2.083664E+04	1	1.800000E+00
°R	7.670279E-24	1.833241E-24	4.787412E-05	2.589795E-02	2.589795E+00	2.589795E+01	2.589795E+07	3.861309E+01	3.861309E-01	3.861309E-01	1.157591E+10	1.157591E+07	1.157591E+04	5.555556E-01	1

$E = h\nu = hc/\lambda = hc\sigma = h\omega/2\pi = kT$

4.2.27 Conversion Table for Ideal Gas Constant in Various Units

Table 4.2.27 Conversion table: ideal gas constant in various units

Selected units ($PV = nRT$)			Pressure (P)												
vol (V)	temp (T)	mol (n)	Pa	atm	bar	barye	pieze	cmHg (0°C)	mmHg (0°C)	mH_2O (4°C)	cmH_2O (4°C)	inHg (0°C)	ftH_2O (4°C)	$lbf.in^{-2}$	$ozf.in^{-2}$
m^3	K	mol	8.314510000E+00	8.205783370E-05	8.314510000E-05	8.314510000E+01	8.314510000E-03	6.236395361E-03	6.236395361E-02	8.478678053E-04	8.478678053E-02	2.455273764E-03	2.781718521E-03	1.205917721E-03	4.635566261E+04
	°R	lb-mol	2.095221276E+03	2.067822626E-02	2.095221276E-02	2.095221276E+04	2.095221276E+00	1.571545196E+00	1.571545196E+01	2.136590929E-01	2.136590929E+01	6.187185810E-01	7.009812760E-01	3.038861539E-01	1.168143048E+07
L	K	mol	8.314510000E+03	8.205783370E-02	8.314510000E-02	8.314510000E+04	8.314510000E+00	6.236395361E+00	6.236395361E+01	8.478678053E-01	8.478678053E+01	2.455273764E+00	2.781718521E+00	1.205917721E+00	4.635566261E+07
	°R	lb-mol	2.095221276E+06	2.067822626E+01	2.095221276E+01	2.095221276E+07	2.095221276E+03	1.571545196E+03	1.571545196E+04	2.136590929E+02	2.136590929E+04	6.187185810E+02	7.009812760E+02	3.038861539E+02	1.168143048E+10
cm^3	K	mol	8.314510000E+06	8.205783370E+01	8.314510000E+01	8.314510000E+07	8.314510000E+03	6.236395361E+03	6.236395361E+04	8.478678053E+02	8.478678053E+04	2.455273764E+03	2.781718521E+03	1.205917721E+03	4.635566261E+10
	°R	lb-mol	2.095221276E+09	2.067822626E+04	2.095221276E+04	2.095221276E+10	2.095221276E+06	1.571545196E+06	1.571545196E+07	2.136590929E+05	2.136590929E+07	6.187185810E+05	7.009812760E+05	3.038861539E+05	1.168143048E+13
ft^3	K	mol	2.936241496E+02	2.897845049E-03	2.936241496E-03	2.936241496E+03	2.936241496E-01	2.202362237E-01	2.202362237E+00	2.994216897E-02	2.994216897E+00	8.670717470E-02	9.823546249E-02	4.258658240E-02	1.637034776E+06
	°R	lb-mol	7.399204106E+04	7.302446687E-01	7.399204106E-01	7.399204106E+05	7.399204106E+01	5.549859482E+01	5.549859482E+02	7.545299658E+00	7.545299658E+02	2.184984048E+01	2.475492014E+01	1.073163825E+01	4.125258243E+08
in^3	K	mol	5.073825305E+05	5.007476245E+00	5.073825305E+00	5.073825305E+06	5.073825305E+02	3.805681946E+02	3.805681946E+03	5.174006798E+01	5.174006798E+03	1.498299979E+02	1.697508792E+02	7.358961439E+01	2.828796092E+09
	°R	lb-mol	1.278582470E+08	1.261862788E+03	1.278582470E+03	1.278582470E+09	1.278582470E+05	9.590157186E+04	9.590157186E+05	1.303827781E+04	1.303827781E+06	3.775652435E+04	4.277650200E+04	1.854427089E+04	7.128446243E+11

4.2.28 Conversion Table for Dimensions for Permeability Coefficients

Owing to the numerous definitions of the permeability coefficient existing in the scientific and technical literature, it is important to always consider Darcy's equation as the basic relation when dealing with these quantities. Actually, for a given pressure difference, that is, for a given pressure gradient expressed in $Pa.m^{-1}$, accross a permeable membrane having a thickness δ, in m, the flux J_X of the fluid (e.g., gas, liquid) having a dynamic or absolute viscosity, μ, expressed in Pa.s passing through the membrane is given by the so-called Darcy's equation:

$$J_X = -\frac{K_X}{\mu}\nabla P$$

The proportional coefficient, K_X, is the called the permeability coefficient of the membrane and it is expressed in a unit depending of the unit adopted for the flux (i.e., mass, volume, or molar basis). Morever, in certain textbooks, the permeability coefficient is also defined as the ratio K_X/μ, or more rarely $K_X/\mu\delta$. The table below summarizes all the possible dimensions used to expressed the permeability coefficient according to its definitions and dimension adopted for the flux.

Table 4.2.28 Dimensions of the permeability coefficient (example of non-SI units)

Physical quantity	Mass basis $[X] = [M]$	Volume basis $[X] = [V]$	Molar basis $[X] = [N]$
$[J_X]$	$[M.L^{-2}.T^{-1}]$	$[L^3.L^{-2}.T^{-1}]$	$[N.L^{-2}.T^{-1}]$
$[\mu]$	$[M.L^{-1}.T^{-1}]$	$[M.L^{-1}.T^{-1}]$	$[M.L^{-1}.T^{-1}]$
$[\Delta P/\delta]$	$[M.L^{-2}.T^{-2}]$	$[M.L^{-2}.T^{-2}]$	$[M.L^{-2}.T^{-2}]$
$[K_X]$	$[K_m] = [M.L^{-1}]$ (e.g., $cm.s^{-1}$)	$[K_v] = [L^2]$ (e.g., darcy, darce)	$[K_n] = [N.L^{-1}]$
K_X/μ	[T] (e.g., perm-inch)	$[M^{-1}.L^3.T]$	$[N.M^{-1}.T]$
$[K_X/\mu\delta]$	$[T.L^{-1}]$ (e.g., perm)	$[M^{-1}.L^2.T]$ (e.g., barrer)	$[NM^{-1}.L^{-1}.T]$

4.2.29 Conversion Table for International Kinematic Viscosity Indices

Table 4.2.29 Conversion table: international kinematic viscosity indices

Kinematic viscosity	Saybolt universal seconds (SUS) (1)		Saybolt Furol seconds (SFS) (2)		Redwood seconds		Engler degrees
(ν/cSt)	(100°F)	(210°F)	(122°F)	(210°F)	(70°F)	(200°F)	all temp.
1.77	–	32.00	–	–	–	–	–
1.80	–	32.10	–	–	–	–	–
1.81	32.00	32.20	–	–	–	–	–
1.83	32.01	32.23	–	–	–	–	–
2	32.62	32.85	–	–	30.2	31.2	1.14
3	36.03	36.28	–	–	32.7	33.7	1.22
4	39.14	39.41	–	–	35.3	36.3	1.31
5	42.35	42.65	–	–	37.9	38.9	1.40
6	45.56	45.88	–	–	40.5	41.5	1.48
7	48.77	49.11	–	–	43.2	44.2	1.56
8	52.09	52.45	–	–	46.0	46.9	1.65
9	55.50	55.89	–	–	48.9	49.7	1.75
10	58.91	59.32	–	–	51.7	52.0	52.6
11	62.43	62.86	–	–	54.8	55.6	1.93
12	66.04	66.50	–	–	57.9	58.8	2.02
14	73.57	74.09	–	–	64.4	65.3	2.22
15	77.39	77.93	–	–	–	–	–
20	97.77	98.45	–	–	–	–	–
25	119.3	120.1	–	–	–	–	–
30	141.3	142.3	–	–	–	–	–
35	163.7	164.9	–	–	–	–	–
40	186.3	187.6	–	–	–	–	–
45	209.1	210.5	–	–	–	–	–
48	223.0	225	25.3	–	–	–	–
50	232.1	233.8	26.1	25.2	–	–	–
55	255.2	257.0	–	–	–	–	–
60	278.3	280.2	30.6	29.8	–	–	–
65	301.4	303.5	–	–	–	–	–
70	324.4	326.7	35.1	–	–	–	–
75	347.6	350.0	–	–	–	–	–
80	370.8	373.4	39.6	–	–	–	–
85	393.9	396.7	–	–	–	–	–
90	417.1	420.0	44.1	–	–	–	–
95	440.3	443.4	–	–	–	–	–
100	463.5	466.7	48.6	–	–	–	–
120	556.2	560.1	–	–	–	–	–
125	–	583.4	60.1	–	–	–	–

Kinematic viscosity	Saybolt universal seconds (SUS) ([1])		Saybolt Furol seconds (SFS) ([2])		Redwood seconds		Engler degrees
(ν/cSt)	(100°F)	(210°F)	(122°F)	(210°F)	(70°F)	(200°F)	all temp.
140	648.9	653.4	–	–	–	–	–
150	–	700.1	71.7	–	–	–	–
160	741.6	–	–	–	–	–	–
175	–	–	83.8	83.7	–	–	–
180	834.2	–	–	–	–	–	–
200	926.9	–	95.0	95.6	–	–	–
220	1019.6	–	–	–	–	–	–
225	–	–	106.7	107.5	–	–	–
240	1112.3	–	–	–	–	–	–
250	–	–	118.4	119.4	–	–	–
260	1205.0	–	–	–	–	–	–
275	–	–	130.1	131.4	–	–	–
280	1297.7	–	–	–	–	–	–
300	1390.4	–	141.8	143.5	–	–	–
320	1483.1	–	–	–	–	–	–
325	–	–	153.6	155.5	–	–	–
340	1575.8	–	–	–	–	–	–
350	–	–	165.3	167.6	–	–	–
360	1668.5	–	–	–	–	–	–
380	1761.2	–	–	–	–	–	–
400	1853.9	–	188.8	191.8	–	–	–
420	1946.6	–	–	–	–	–	–
425	–	–	200.6	204.0	–	–	–
440	2039.3	–	–	–	–	–	–
450	–	–	212.4	216.1	–	–	–
460	2132.0	–	–	–	–	–	–
–	–	–	224.1	228.3	–	–	–
480	2224.7	–	–	–	–	–	–
500	2317.4	–	235.9	240.5	–	–	–
525	–	–	247.7	252.8	–	–	–
550	–	–	259.5	265.0	–	–	–
575	–	–	271.3	277.2	–	–	–
600	–	–	283.1	289.5	–	–	–
625	–	–	294.9	301.8	–	–	–
650	–	–	306.7	314.1	–	–	–
675	–	–	318.4	326.4	–	–	–
700	–	–	330.2	338.7	–	–	–
725	–	–	342.0	351.0	–	–	–
750	–	–	353.8	363.4	–	–	–
775	–	–	365.5	375.7	–	–	–
800	–	–	377.4	388.1	–	–	–

Table 4.2.29 Conversion table: international kinematic viscosity indices *(continued)*

Kinematic viscosity	**Saybolt universal** seconds (SUS) ([1])		**Saybolt Furol** seconds (SFS) ([2])		**Redwood** seconds		**Engler** degrees
(ν/cSt)	(100°F)	(210°F)	(122°F)	(210°F)	(70°F)	(200°F)	all temp.
825	–	–	389.2	400.5	–	–	–
875	–	–	412.7	425.3	–	–	–
900	–	–	424.5	437.7	–	–	–
925	–	–	436.3	450.1	–	–	–
950	–	–	448.1	462.5	–	–	–
975	–	–	459.9	474.9	–	–	–
1000	–	–	471.7	487.4	–	–	–
1025	–	–	483.5	499.8	–	–	–
1050	–	–	495.2	512.3	–	–	–
1075	–	–	507.0	524.8	–	–	–
1100	–	–	518.8	537.2	–	–	–
1125	–	–	530.6	549.7	–	–	–
1150	–	–	542.4	562.2	–	–	–
1175	–	–	554.2	574.7	–	–	–
1200	–	–	566.0	587.2	–	–	–
1225	–	–	577.8	599.7	–	–	–
1250	–	–	589.5	612.2	–	–	–
1275	–	–	601.3	624.8	–	–	–
1300	–	–	613.1	637.3	–	–	–

Notes (from ASTM D2161): ([1]) to convert Saybolt universal seconds SUS (100°F) to SUS meaured at another temperature t (°F) use the following equation: SUS (t) = SUS (100°F) $[1 + 0.000061 \times (t - 100)]$. At 100°F for kinematic viscosities above 500 cSt, it is necessary to use SUS (100°F) =4.6324 $\times \nu$ (cSt) and at 210°F above 139.8 cSt use SUS (210°F) = 4.664 $\times \nu$ (cSt). ([2]) At 122°F for kinematic viscosities above 1300 cSt use SFS (122°F)= 0.4717 cSt, and at 210°F $\log_{10}(\text{SFS} - 2.87) = 1.0276 \times [\log_{10}(\nu/\text{cSt})] - 0.3975$.

4.2.30 Conversion Table for Standard Sieve Designation Series

Table 4.2.30 Conversion table: standard sieve designation series (ISO, ASTM, CSA, Tyler, AFNOR, BS, and DIN)

ISO (1)	USA (2), Canada (3)	Tyler (4)	France (5)		UK (6)		Germany (7)	Nominal wire diameter	
			Opening	No.	Nominal aperture	No.	Opening	mm	in
125 mm	5 in	–	125 mm	–	–	–	–	8.00	0.315
106 mm	4.24 in	–	106 mm	–	–	–	–	6.40	0.252
100 mm	4 in (*)	–	100 mm	–	–	–	–	6.30	0.248
90 mm	$3\frac{1}{2}$ in	–	90 mm	–	–	–	–	6.08	0.2394
75 mm	3 in	–	75 mm	–	–	–	–	5.80	0.2283
63 mm	$2\frac{1}{2}$ in	–	63 mm	–	–	–	–	5.50	0.2165
53 mm	2.12 in.	–	53 mm	–	–	–	–	5.15	0.2028
50 mm	2 in (*)	–	50 mm	–	–	–	–	5.05	0.1988
45 mm	$1\frac{3}{4}$ in	–	45 mm	–	–	–	–	4.85	0.1909
37.5 mm	$1\frac{1}{2}$ in	–	37.5 mm	–	–	–	–	4.59	0.1807
31.5 mm	$1\frac{1}{4}$ in	–	31.5 mm	–	–	–	–	4.23	0.1665
26.5 mm	1.06 in	1.050 in	26.5 mm	–	–	–		3.9	0.1535
25.0 mm	1 in (*)	–	25.0 mm	–	–	–	25 mm	3.8	0.1496
22.4 mm	$\frac{7}{8}$ in	0.883 in	22.4 mm	–	–	–	–	3.5	0.1378
19.0 mm	$\frac{3}{4}$ in	0.742 in	19.0 mm	–	–	–	20 mm	3.3	0.1299
–	–	–	–	–	–	–	18 mm	–	–

Table 4.2.30 Standard sieve designation series (ISO, ASTM, CSA, Tyler, AFNOR, BS, and DIN) *(continued)*

ISO (1)	USA (2), Canada (3)	Tyler (4)	France (5)		UK (6)		Germany (7)	Nominal wire diameter	
			Opening	No.	Nominal aperture	No.	Opening	mm	in
16.0 mm	5/8 in	0.624 in	16.0 mm	–	–	–	16 mm	3.0	0.1181
13.2 mm	0.530 in	0.525 in	13.2 mm	–	–	–	–	2.75	0.1083
12.5 mm	1/2 in (*)	–	12.5 mm	–	–	–	12.5 mm	2.67	0.1051
11.2 mm	7/16 in	0.441 in	11.2 mm	–	–	–	–	2.45	0.0965
				–	–	–	10.0 mm		
9.50 mm	3/8 in	0.371 in	9.5 mm	–	–	–	–	2.27	0.0894
8.00 mm	5/16 in	2.5 mesh	8.0 mm	–	–	–	8.0 mm	2.07	0.0815
6.70 mm	0.265 in	3 mesh	6.7 mm	–	–	–	–	1.87	0.0736
6.30 mm	1/4 in (*)	–	6.3 mm	–	–	–	6.3 mm	1.82	0.0717
5.60 mm	No. $3\frac{1}{2}$	3.5 mesh	5.60 mm	–	–	–	–	1.68	0.0661
–	–	–	5.00 mm	38	–	–	5.00 mm	–	–
4.75 mm	No. 4	4 mesh	–	–	–	–	–	1.54	0.0606
4.00 mm	No. 5	5 mesh	4.00 mm	37	–	–	4.00 mm	1.37	0.0539
3.35 mm	No. 6	6 mesh	–	–	3.35 mm	5	–	1.23	0.0484
–	–	–	3.15 mm	36	–	–	3.15 mm	–	–
2.80 mm	No. 7	7 mesh	–	–	2.80 mm	6	–	1.10	0.0430
–	–	–	2.50 mm	35	–	–	2.50 mm	–	–

2.36 mm	No. 8	8 mesh	–	–	2.40 mm	7	–	1.00	0.0394
2.00 mm	No. 10	9 mesh	2.00 mm	34	2.00 mm	8	2.00 mm	0.90	0.0354
1.70 mm	No. 12	10 mesh	–	–	1.68 mm	10	–	0.81	0.0319
–	–	–	1.60 mm	33	–	–	1.60 mm	–	–
1.40 mm	No. 14	12 mesh	–	–	1.40 mm	12		0.725	0.0285
–	–	–	1.25 mm	32	–	–	1.25 mm	–	–
1.18 mm	No. 16	14 mesh	–	–	1.20 mm	14	–	0.65	0.0256
1.00 mm	No. 18	16 mesh	1.00 mm	31	1.00 mm	16	1.00 mm	0.58	0.02285
850 µm	No. 20	20 mesh	–	–	850 µm	18	–	0.51	0.0201
–	–	–	800 µm	30	–	–	800 µm	–	–
710 µm	No. 25	24 mesh	710 µm	–	710 µm	22	–	0.45	0.0177
–	–	–	630 µm	29	–	–	630 µm	–	–
600 µm	No. 30	28 mesh	–	–	600 µm	25	–	0.39	0.0154
500 µm	No. 35	32 mesh	500 µm	28	500 µm	30	500 µm	0.34	0.0134
425 µm	No. 40	35 mesh	–	–	420 µm	36	–	0.29	0.0114
–	–	–	400 µm	27	–	–	400 µm		
355 µm	No. 45	42 mesh	–	–	355 µm	44	–	0.247	0.0097
–	–	–	–	26	–	–	315 µm	–	–
300 µm	No. 50	48 mesh	–	–	300 µm	52	–	0.215	0.0085
250 µm	No. 60	60 mesh	250 µm	25	250 µm	60	250 µm	0.18	0.0071
212 µm	No. 70	65 mesh	–	–	210 µm	72	–	0.152	0.006
–	–	–	200 µm	24	–	–	200 µm	–	–

Table 4.2.30 Standard sieve designation series (ISO, ASTM, CSA, Tyler, AFNOR, BS, and DIN) *(continued)*

ISO (1)	USA (2), Canada (3)	Tyler (4)	France (5)		UK (6)		Germany (7)	Nominal wire diameter	
			Opening	No.	Nominal aperture	No.	Opening	mm	in
180 µm	No. 80	80 mesh	–	–	180 µm	85	–	0.131	0.0052
–	–	–	160 µm	23	–	–	160 µm	–	–
150 µm	No. 100	100 mesh	–	–	150 µm	100	–	0.11	0.0043
125 µm	No. 120	115 mesh	–	22	125 µm	120	125 µm	0.091	0.0036
106 µm	No. 140	150 mesh	–	–	105 µm	150	–	0.076	0.003
–	–	–	100 µm	21	–	–	100 µm	–	–
90 µm	No. 170	170 mesh	–	–	90 µm	170	90 µm	0.064	0.0025
–	–	–	80 µm	20	–	–	80 µm	–	–
75 µm	No. 200	200 mesh	75 µm		75 µm	200	–	0.053	0.0021
63 µm	No. 230	250 mesh	63 µm	19	63 µm	240	63 µm	0.044	0.0017
–	–	–	–	–	–	–	56 µm	–	–
53 µm	No. 270	270 mesh	53 µm		53 µm	300		0.037	0.0015
–	–	–	50 µm	18	–	–	50 µm	–	–
45 µm	No. 325	325 mesh	–	–	45 µm	350	45 µm	0.03	0.012
38 µm	No. 400	400 mesh	38 µm	–	–	–	40 µm	0.025	0.001

Notes: (1) Standard designations for test sieve apertures recommended by the *International Organization for Standardization*. (2) Standard sieve designation in a fourth-root of two series according to **ASTM E11-95**. (3) **CSA No. 8-GP-1d**. (4) Standard sieve in a square-root of two series according to Tyler standard screen scale sieve series. (5) Geometric progression of 1.125 according to **NF-X11-501 (1975)** and **NF X11-504 (1975)**. (6) **BS-410 (1976)**. (7) **DIN 4188 (1977)**. (*) These sieves are not in the fourth root of two series, but they have been included because they are in common usage.

4.2.31 Conversion Table for International Standard Wire and Sheet Gauges

Table 4.2.31 Conversion table: international standard wire and sheet gauges

Original scale	American wire gauge (AWG)	US steel wire gauge (Stl. WG)	Birmagham wire gauge (BWG)	US standard gauge	Birmingham gauge (BG)	Imperial or British wire gauge (IWG)
Synonyms	Brown & Sharpe wire gauge (B&S)	Washburn & Moen or Roebling or Am. steel & wire gauge (AWG)	Stubs iron wire gauge (SIW)	–	–	Standard wire gauge (SWG)
Applications	Iron and nonferrous wire and plate	Steel wire	Steel wire or iron or brass wire	Steel sheet and plate	Sheet and hoop metal	Aluminium sheet and plate
Gauge No.	in	in	in	in	in	in
0000000	–	0.4900	–	–	–	0.500
000000	–	0.4615	–	–	–	0.464
00000	–	0.4305	–	–	–	0.432
0000	0.460	0.3938	0.454	–	0.5416	0.400
000	0.410	0.3625	0.425	–	0.5000	0.372
00	0.365	0.3310	0.380	–	0.4452	0.348
0	0.325	0.3065	0.340	–	0.3964	0.324
1	0.289	0.2830	0.300	–	0.3532	0.300
2	0.258	0.2625	0.284	–	0.3147	0.276
3	0.229	0.2437	0.259	0.239	0.2804	0.252
4	0.204	0.2253	0.238	0.224	0.2500	0.232
5	0.182	0.2070	0.220	0.209	0.2225	0.212

Table 4.2.31 Conversion table: international standard wire and sheet gauges *(continued)*

Original scale	American wire gauge (AWG)	US steel wire gauge (Stl. WG)	Birmagham wire gauge (BWG)	US standard gauge	Birmingham gauge (BG)	Imperial or British wire gauge (IWG)
Synonyms	Brown & Sharpe wire gauge (B&S)	Washburn & Moen or Roebling or Am. steel & wire gauge (AWG)	Stubs iron wire gauge (SIW)	–	–	Standard wire gauge (SWG)
Applications	Iron and nonferrous wire and plate	Steel wire	Steel wire or iron or brass wire	Steel sheet and plate	Sheet and hoop metal	Aluminium sheet and plate
Gauge No.	in	in	in	in	in	in
6	0.162	0.1920	0.203	0.194	0.1981	0.192
7	0.144	0.1770	0.180	0.179	0.1764	0.176
8	0.128	0.1620	0.165	0.164	0.1570	0.160
9	0.114	0.1483	0.148	0.150	0.1398	0.144
10	0.102	0.1350	0.134	0.135	0.1250	0.128
11	0.091	0.1205	0.120	0.120	0.1113	0.116
12	0.081	0.1055	0.109	0.105	0.0991	0.104
13	0.072	0.0915	0.095	0.090	0.0882	0.092
14	0.064	0.0800	0.083	0.075	0.0785	0.080
15	0.057	0.0720	0.072	0.067	0.0699	0.072
16	0.051	0.0625	0.065	0.060	0.0625	0.064
17	0.045	0.0540	0.058	0.054	0.0556	0.056
18	0.040	0.0475	0.049	0.0478	0.0495	0.048
19	0.036	0.0410	0.042	0.0418	0.0440	0.040

20	0.032	0.0348	0.035	0.0359	0.0392	0.036
21	0.0285	0.0317	0.032	0.0329	0.0349	0.032
22	0.0253	0.0286	0.028	0.0299	0.0313	0.028
23	0.0226	0.0258	0.025	0.0269	0.0278	0.024
24	0.0201	0.0230	0.0220	0.0239	0.0248	0.022
25	0.0179	0.0204	0.020	0.0209	0.0220	0.020
26	0.0159	0.0181	0.018	0.0188	0.0196	0.018
27	0.0142	0.0173	0.016	0.0172	0.0175	0.0164
28	0.0126	0.0162	0.014	0.0156	0.0156	0.0148
29	0.0113	0.0150	0.013	0.0141	0.0139	0.0136
30	0.0100	0.0140	0.012	0.0125	0.0123	0.0124
31	0.0089	0.0132	0.010	0.0109	0.0110	0.0116
32	0.0080	0.0128	0.009	0.0102	0.0098	0.0108
33	0.0071	0.0118	0.008	0.0094	0.0087	0.0100
34	0.0063	0.0104	0.007	0.0086	0.0077	0.0092
35	0.0056	0.0095	0.005	0.0078	0.0069	0.0084
36	0.0050	0.0090	0.004	0.0070	0.0061	0.0076
37	0.0045	0.0085	–	0.0066	0.0054	0.0068
38	0.0040	0.0080	–	0.0062	0.0048	0.0060
39	0.0035	0.0075	–	–	0.0043	0.0052
40	0.0031	0.0070	–	–	0.0039	0.0048
41	–	0.0066	–	–	0.0034	0.0044

Table 4.2.31 Conversion table: international standard wire and sheet gauges *(continued)*

Original scale	American wire gauge (AWG)	US steel wire gauge (Stl. WG)	Birmagham wire gauge (BWG)	US standard gauge	Birmingham gauge (BG)	Imperial or British wire gauge (IWG)
Synonyms	**Brown & Sharpe wire gauge (B&S)**	**Washburn & Moen or Roebling or Am. steel & wire gauge (AWG)**	**Stubs iron wire gauge (SIW)**	–	–	**Standard wire gauge (SWG)**
Applications	**Iron and nonferrous wire and plate**	**Steel wire**	**Steel wire or iron or brass wire**	**Steel sheet and plate**	**Sheet and hoop metal**	**Aluminium sheet and plate**
Gauge No.	**in**	**in**	**in**	**in**	**in**	**in**
42	–	0.0062	–	–	0.0031	0.0040
43	–	0.0060	–	–	0.0027	0.0036
44	–	0.0058	–	–	0.0024	0.0032
45	–	0.0055	–	–	0.0022	0.0028
46	–	0.0052	–	–	0.0019	0.0024
47	–	0.0050	–	–	0.0017	0.0020
48	–	0.0048	–	–	0.0015	0.0016
49	–	0.0046	–	–	0.0014	0.0012
50	–	0.0044	–	–	0.0012	0.0010

Notes: (1) The *American Wire Gauge* (AWG) is the most common based on geometric interpolation between gauge 0000, which is 0.460 inches exactly, and gauge 36 which is 0.005 inch exactly (ASTM B258). Therefore, the diameter of a wire is given in inches by the following equation: D (in) = $(1/200)92^{[(36-g)/39]}$, for the repeated zero values, negative numbers must be used in the equation (i.e., (-3) instead of 000, etc.). Note that $92^{(1/39)}$ is close to $2^{(1/6)}$, hence diameter is approximately halved for every 6 gauges. The rounding rule specifies that gauges up to 44 are indicated with up to 4 significant figures, but no closer than 0.0001 inch. Gauges from 44 to 56 must be rounded to the nearest 0.00001 inch. In addition to being used to measure wire thickness, this gauge is also used to measure the thickness of sheets of aluminum, copper, and most metals other than steel, iron and zinc. (2) The *U.S. Standard Gauge* used for sheet metal was established in 1893 for purposes of taxation and was based on the weight of the metal and not on the thickness. For instance, 16-gauge is listed as ca. 0.0625 inch thick and 40 oz./ft^2 assuming a density of wrought iron of 0.2778 lb./in^3. Later steel has almost entirely superseded wrought iron for sheet use and gauge values were calculated with a density of 0.2833 lb./in3. There is no equation for converting gauge to thickness or weight.

4.2.32 Conversion Table for Normal Pipe Sizes (NPS)

Table 4.2.32 Conversion table: normal pipe sizes (NPS)

Designation						Cross-sectional area		Circumference		Flow rates at $u = 1$ ft.s^{-1}							
Nominal pipe size (/in)	Outside diameter (OD/in)	Iron pipe size (IPS)	Schedule No.	Wall thickness (w/in)	Inside diameter (ID/in)	Metal (A_w/in^2)	Flow (A_f/ft^2)	Outside (C_o/ft)	Inside (C_i/ft)	Volume flow rate (/US gal.min^{-1})	Mass flow rate (/lb.h^{-1})	Moment of inertia (I/in^4)	Weight of plain end pipe (lb/ft)	Weight of water (lb/ft)	External surface (ft^2.ft^{-1})	Internal surface (ft^2/ft)	Section modulus (in^3)
1/8	0.405	S	10	0.049	0.307	0.054802	0.000514	0.1060	0.0804	0.2307	115.528	0.00088462	0.1896	0.0321	0.1060	0.0804	0.0044
	0.405	ST, S	40	0.068	0.269	0.071993	0.000395	0.1060	0.0704	0.1771	88.698	0.00106363	0.2491	0.0246	0.1060	0.0704	0.0053
	0.405	XS, S	80	0.095	0.215	0.092520	0.000252	0.1060	0.0563	0.1132	56.661	0.001215769	0.3201	0.0157	0.1060	0.0563	0.0060
1/4	0.540	S	10	0.065	0.410	0.096997	0.000917	0.1414	0.1073	0.4115	206.052	0.002786836	0.3356	0.0572	0.1414	0.1073	0.0103
	0.540	ST, S	40	0.088	0.364	0.124960	0.000723	0.1414	0.0953	0.3243	162.410	0.003312189	0.4323	0.0451	0.1414	0.0953	0.0123
	0.540	XS, S	80	0.119	0.302	0.157391	0.000497	0.1414	0.0791	0.2233	111.795	0.003765611	0.5445	0.0311	0.1414	0.0791	0.0139
3/8	0.675	S	10	0.065	0.545	0.124564	0.001620	0.1767	0.1427	0.7271	364.084	0.005859575	0.4309	0.1011	0.1767	0.1427	0.0174
	0.675	ST, S	40	0.091	0.493	0.166957	0.001326	0.1767	0.1291	0.5950	297.922	0.007290523	0.5776	0.0828	0.1767	0.1291	0.0216
	0.675	XS, S	80	0.126	0.423	0.217317	0.000976	0.1767	0.1107	0.4380	219.326	0.008618692	0.7518	0.0609	0.1767	0.1107	0.0255
1/2	0.840	S	5	0.065	0.710	0.158258	0.002749	0.2199	0.1859	1.2340	617.911	0.011965273	0.5475	0.1716	0.2199	0.1859	0.0285
	0.840	S	10	0.083	0.674	0.197389	0.002478	0.2199	0.1765	1.1121	556.838	0.014309202	0.6829	0.1547	0.2199	0.1765	0.0341
	0.840	ST, S	40	0.109	0.622	0.250319	0.002110	0.2199	0.1628	0.9471	474.231	0.017091841	0.8660	0.1317	0.2199	0.1628	0.0407
	0.840	XS, S	80	0.147	0.546	0.320037	0.001626	0.2199	0.1429	0.7298	365.422	0.020076653	1.1072	0.1015	0.2199	0.1429	0.0478
	0.840		160	0.188	0.464	0.385084	0.001174	0.2199	0.1215	0.5270	263.903	0.022163887	1.3322	0.0733	0.2199	0.1215	0.0528
	0.840	XXS		0.294	0.252	0.504301	0.000346	0.2199	0.0660	0.1555	77.841	0.024241246	1.7447	0.0216	0.2199	0.0660	0.0577

Table 4.2.32 Conversion table: normal pipe sizes (NPS) *(continued)*

Designation						Cross-sectional area		Circumference		Flow rates at $u = 1$ ft.s^{-1}							
Nominal pipe size (/in)	Outside diameter (OD/in)	Iron pipe size (IPS)	Schedule No.	Wall thickness (w/in)	Inside diameter (ID/in)	Metal (A_w/in^2)	Flow (A_f/ft^2)	Outside (C_o/ft)	Inside (C_i/ft)	Volume flow rate (/US gal.min^{-1})	Mass flow rate (/lb.h^{-1})	Moment of inertia (I/in^4)	Weight of plain end pipe (lb/ft)	Weight of water (lb/ft)	External surface (ft^2.ft^{-1})	Internal surface (ft^2.ft^{-1})	Section modulus (in^3)
3/4	1.050	S	5	0.065	0.920	0.201140	0.004616	0.2749	0.2409	2.0720	1037.492	0.024500166	0.6959	0.2882	0.2749	0.2409	0.0467
	1.050	S	10	0.083	0.884	0.252147	0.004262	0.2749	0.2314	1.9130	957.885	0.029689659	0.8723	0.2661	0.2749	0.2314	0.0566
	1.050	ST, S	40	0.113	0.824	0.332635	0.003703	0.2749	0.2157	1.6621	832.269	0.037036326	1.1508	0.2312	0.2749	0.2157	0.0705
	1.050	XS, S	80	0.154	0.742	0.433490	0.003003	0.2749	0.1943	1.3478	674.865	0.04478662	1.4997	0.1875	0.2749	0.1943	0.0853
	1.050		160	0.219	0.612	0.571735	0.002043	0.2749	0.1602	0.9169	459.105	0.052779888	1.9779	0.1275	0.2749	0.1602	0.1005
	1.050	XXS		0.308	0.434	0.717967	0.001027	0.2749	0.1136	0.4611	230.881	0.057924502	2.4838	0.0641	0.2749	0.1136	0.1103
1	1.315	S	5	0.065	1.185	0.255254	0.007659	0.3443	0.3102	3.4375	1721.257	0.049989182	0.8831	0.4781	0.3443	0.3102	0.0760
	1.315	S	10	0.109	1.097	0.412975	0.006564	0.3443	0.2872	2.9459	1475.103	0.075694018	1.4287	0.4098	0.3443	0.2872	0.1151
	1.315	ST, S	40	0.133	1.049	0.493877	0.006002	0.3443	0.2746	2.6938	1348.839	0.087342988	1.7086	0.3747	0.3443	0.2746	0.1328
	1.315	XS, S	80	0.179	0.957	0.638824	0.004995	0.3443	0.2505	2.2420	1122.620	0.10560855	2.2100	0.3118	0.3443	0.2505	0.1606
	1.315		160	0.250	0.815	0.836449	0.003623	0.3443	0.2134	1.6260	814.187	0.125124935	2.8937	0.2262	0.3443	0.2134	0.1903
	1.315	XXS		0.358	0.599	1.076328	0.001957	0.3443	0.1568	0.8783	439.808	0.140462617	3.7236	0.1222	0.3443	0.1568	0.2136
1 1/4	1.660	S	5	0.065	1.530	0.325705	0.012768	0.4346	0.4006	5.7305	2869.405	0.103747099	1.1268	0.7971	0.4346	0.4006	0.1250
	1.660	S	10	0.109	1.442	0.531115	0.011341	0.4346	0.3775	5.0903	2548.822	0.160494972	1.8374	0.7080	0.4346	0.3775	0.1934
	1.660	ST, S	40	0.140	1.380	0.668531	0.010387	0.4346	0.3613	4.6620	2334.357	0.194709629	2.3128	0.6484	0.4346	0.3613	0.2346
	1.660	XS, S	80	0.191	1.278	0.881465	0.008908	0.4346	0.3346	3.9983	2002.031	0.241790457	3.0495	0.5561	0.4346	0.3346	0.2913
	1.660		160	0.250	1.160	1.107411	0.007339	0.4346	0.3037	3.2940	1649.396	0.28385723	3.8311	0.4582	0.4346	0.3037	0.3420
	1.660	XXS		0.382	0.896	1.533713	0.004379	0.4346	0.2346	1.9653	984.068	0.341099298	5.3060	0.2734	0.4346	0.2346	0.4110

1 1/2	1.900	S	5	0.065	1.770	0.374713	0.017087	0.4974	0.4634	7.6693	3840.215	0.157915963	1.2963	1.0667	0.4974	0.4634	0.1662
	1.900	S	10	0.109	1.682	0.613299	0.015430	0.4974	0.4403	6.9257	3467.856	0.246819099	2.1217	0.9633	0.4974	0.4403	0.2598
	1.900	ST, S	40	0.145	1.610	0.799457	0.014138	0.4974	0.4215	6.3454	3177.319	0.309894435	2.7658	0.8826	0.4974	0.4215	0.3262
	1.900	XS, S	80	0.200	1.500	1.068142	0.012272	0.4974	0.3927	5.5080	2757.983	0.391206825	3.6953	0.7661	0.4974	0.3927	0.4118
	1.900		160	0.281	1.338	1.429233	0.009764	0.4974	0.3503	4.3825	2194.428	0.48238794	4.9445	0.6096	0.4974	0.3503	0.5078
	1.900	XXS		0.400	1.100	1.884956	0.006600	0.4974	0.2880	2.9621	1483.182	0.567842872	6.5211	0.4120	0.4974	0.2880	0.5977
2	2.375	S	5	0.065	2.245	0.471710	0.027489	0.6218	0.5877	12.3380	6177.912	0.31488568	1.6319	1.7161	0.6218	0.5877	0.2652
	2.375	S	10	0.109	2.157	0.775955	0.025376	0.6218	0.5647	11.3897	5703.078	0.499194541	2.6845	1.5842	0.6218	0.5647	0.4204
	2.375	ST, S	40	0.154	2.067	1.074532	0.023303	0.6218	0.5411	10.4590	5237.089	0.66574708	3.7174	1.4547	0.6218	0.5411	0.5606
	2.375	XS, S	80	0.218	1.939	1.477259	0.020506	0.6218	0.5076	9.2038	4608.554	0.867921342	5.1106	1.2802	0.6218	0.5076	0.7309
	2.375		160	0.344	1.687	2.194918	0.015522	0.6218	0.4417	6.9669	3488.504	1.164210956	7.5934	0.9690	0.6218	0.4417	0.9804
	2.375	XXS		0.436	1.503	2.655915	0.012321	0.6218	0.3935	5.5300	2769.026	1.311297275	9.1883	0.7692	0.6218	0.3935	1.1043
2 1/2	2.875	S	5	0.083	2.709	0.728020	0.040026	0.7527	0.7092	17.9650	8995.536	0.710015541	2.5186	2.4988	0.7527	0.7092	0.4939
	2.875	S	10	0.120	2.635	1.038611	0.037869	0.7527	0.6898	16.9970	8510.798	0.987254486	3.5931	2.3641	0.7527	0.6898	0.6868
	2.875	ST, S	40	0.203	2.469	1.704050	0.033248	0.7527	0.6464	14.9229	7472.247	1.529553897	5.8952	2.0756	0.7527	0.6464	1.0640
	2.875	XS, S	80	0.276	2.323	2.253540	0.029432	0.7527	0.6082	13.2102	6614.659	1.924234825	7.7962	1.8374	0.7527	0.6082	1.3386
	2.875		160	0.375	2.125	2.945243	0.024629	0.7527	0.5563	11.0542	5535.118	2.352743033	10.1892	1.5375	0.7527	0.5563	1.6367
	2.875	XXS		0.552	1.771	4.028452	0.017107	0.7527	0.4636	7.6780	3844.556	2.870792005	13.9366	1.0679	0.7527	0.4636	1.9971
3	3.500	S	5	0.083	3.334	0.890990	0.060626	0.9163	0.8728	27.2108	13625.117	1.301155138	3.0824	3.7848	0.9163	0.8728	0.7435
	3.500	S	10	0.120	3.260	1.274230	0.057965	0.9163	0.8535	26.0163	13026.995	1.821957737	4.4083	3.6186	0.9163	0.8535	1.0411
	3.500	ST, S	40	0.216	3.068	2.228470	0.051338	0.9163	0.8032	23.0420	11537.713	3.017156595	7.7095	3.2049	0.9163	0.8032	1.7241
	3.500	XS, S	80	0.300	2.900	3.015929	0.045869	0.9163	0.7592	20.5876	10308.727	3.894318253	10.4338	2.8635	0.9163	0.7592	2.2253
	3.500		160	0.438	2.624	4.213366	0.037554	0.9163	0.6870	16.8554	8439.888	5.03902122	14.5763	2.3444	0.9163	0.6870	2.8794
	3.500	XXS		0.600	2.300	5.466371	0.028852	0.9163	0.6021	12.9499	6484.324	5.992509447	18.9112	1.8012	0.9163	0.6021	3.4243

Table 4.2.32 Conversion table: normal pipe sizes (NPS) *(continued)*

Designation						Cross-sectional area		Circumference		Flow rates at $u = 1$ ft.s^{-1}							
Nominal pipe size (/in)	Outside diameter (OD/in)	Iron pipe size (IPS)	Schedule No.	Wall thickness (w/in)	Inside diameter (ID/in)	Metal (A_w/in^2)	Flow (A_f/ft^2)	Outside (C_o/ft)	Inside (C_i/ft)	Volume flow rate (/US gal.min^{-1})	Mass flow rate (/lb.h^{-1})	Moment of inertia (I/in^4)	Weight of plain end pipe (lb/ft)	Weight of water (lb/ft)	External surface (ft^2.ft^{-1})	Internal surface (ft^2.ft^{-1})	Section modulus (in^3)
3 1/2	4.000	S	5	0.083	3.834	1.021366	0.080174	1.0472	1.0037	35.9844	18018.277	1.959718301	3.5335	5.0051	1.0472	1.0037	0.9799
	4.000	S	10	0.120	3.760	1.462726	0.077109	1.0472	0.9844	34.6088	17329.448	2.755189826	5.0604	4.8137	1.0472	0.9844	1.3776
	4.000	ST, S	40	0.226	3.548	2.679540	0.068659	1.0472	0.9289	30.8161	15430.367	4.7877186	9.2700	4.2862	1.0472	0.9289	2.3939
	4.000	XS, S	80	0.318	3.364	3.678415	0.061722	1.0472	0.8807	27.7027	13871.423	6.280088791	12.7257	3.8532	1.0472	0.8807	3.1400
4	4.500	S	5	0.083	4.334	1.151742	0.102448	1.1781	1.1346	45.9820	23024.322	2.809787651	3.9845	6.3956	1.1781	1.1346	1.2488
	4.500	S	10	0.120	4.260	1.651221	0.098980	1.1781	1.1153	44.4252	22244.786	3.962682954	5.7125	6.1791	1.1781	1.1153	1.7612
	4.500	ST, S	40	0.237	4.026	3.174048	0.088405	1.1781	1.0540	39.6787	19868.111	7.232600247	10.9808	5.5189	1.1781	1.0540	3.2145
	4.500	XS, S	80	0.337	3.826	4.407438	0.079839	1.1781	1.0016	35.8344	17943.162	9.610493984	15.2477	4.9842	1.1781	1.0016	4.2713
	4.500		120	0.438	3.624	5.589383	0.071631	1.1781	0.9488	32.1504	16098.500	11.66203052	19.3367	4.4718	1.1781	0.9488	5.1831
	4.500		160	0.531	3.438	6.621029	0.064467	1.1781	0.9001	28.9349	14488.412	13.27096053	22.9058	4.0246	1.1781	0.9001	5.8982
	4.500	XXS		0.674	3.152	8.101300	0.054188	1.1781	0.8252	24.3211	12178.154	15.28366215	28.0268	3.3828	1.1781	0.8252	6.7927
5	5.563	S	5	0.109	5.345	1.867633	0.155820	1.4564	1.3993	69.9368	35019.058	6.947126594	6.4612	9.7275	1.4564	1.3993	2.4976
	5.563	S	10	0.134	5.295	2.285465	0.152918	1.4564	1.3862	68.6345	34366.948	8.425364661	7.9067	9.5464	1.4564	1.3862	3.0291
	5.563	ST, S	40	0.258	5.047	4.299866	0.138929	1.4564	1.3213	62.3558	31223.073	15.16218316	14.8756	8.6731	1.4564	1.3213	5.4511
	5.563	XS, S	80	0.375	4.813	6.111969	0.126345	1.4564	1.2600	56.7077	28394.927	20.67065381	21.1447	7.8875	1.4564	1.2600	7.4315
	5.563		120	0.500	4.563	7.952942	0.113561	1.4564	1.1946	50.9696	25521.722	25.73171238	27.5136	7.0894	1.4564	1.1946	9.2510
	5.563		160	0.625	4.313	9.695740	0.101458	1.4564	1.1291	45.5375	22801.738	30.02585227	33.5429	6.3338	1.4564	1.1291	10.7948
	5.563	XXS		0.750	4.063	11.340364	0.090037	1.4564	1.0637	40.4114	20234.975	33.63476715	39.2326	5.6208	1.4564	1.0637	12.0923

6	6.625	S	5	0.109	6.407	2.231297	0.223891	1.7344	1.6773	100.4893	50317.434	11.84543793	7.7193	13.9771	1.7344	1.6773	3.5760
	6.625	S	10	0.134	6.357	2.732538	0.220410	1.7344	1.6643	98.9270	49535.147	14.39741611	9.4534	13.7598	1.7344	1.6643	4.3464
	6.625	ST, S	40	0.280	6.065	5.581354	0.200627	1.7344	1.5878	90.0476	45089.005	28.14217857	19.3090	12.5247	1.7344	1.5878	8.4958
	6.625	XS, S	80	0.432	5.761	8.404942	0.181019	1.7344	1.5082	81.2468	40682.233	40.49067267	29.0773	11.3006	1.7344	1.5082	12.2236
	6.625		120	0.562	5.501	10.704682	0.165048	1.7344	1.4402	74.0788	37093.031	49.61059692	37.0334	10.3036	1.7344	1.4402	14.9768
	6.625		160	0.719	5.187	13.340503	0.146744	1.7344	1.3580	65.8632	32979.308	59.02805225	46.1521	9.1609	1.7344	1.3580	17.8198
	6.625	XXS		0.864	4.897	15.637290	0.130794	1.7344	1.2820	58.7044	29394.714	66.33263554	54.0980	8.1652	1.7344	1.2820	20.0249
8	8.625	S	5	0.109	8.407	2.916165	0.385487	2.2580	2.2009	173.0185	86634.552	26.4401847	10.0886	24.0652	2.2580	2.2009	6.1311
	8.625	S	10	0.148	8.329	3.941430	0.378367	2.2580	2.1805	169.8228	85034.422	35.41445076	13.6356	23.6207	2.2580	2.1805	8.2120
	8.625		20	0.250	8.125	6.577710	0.360059	2.2580	2.1271	161.6059	80919.982	57.72197132	22.7559	22.4778	2.2580	2.1271	13.3848
	8.625		30	0.277	8.071	7.264606	0.355289	2.2580	2.1130	159.4649	79847.943	63.35266362	25.1323	22.1800	2.2580	2.1130	14.6905
	8.625	ST, S	40	0.322	7.981	8.399255	0.347410	2.2580	2.0894	155.9283	78077.097	72.4892406	29.0576	21.6881	2.2580	2.0894	16.8091
	8.625		60	0.406	7.813	10.483225	0.332938	2.2580	2.0454	149.4328	74824.649	88.73629824	36.2672	20.7846	2.2580	2.0454	20.5765
	8.625	XS, S	80	0.500	7.625	12.762720	0.317108	2.2580	1.9962	142.3279	71267.042	105.7162035	44.1533	19.7964	2.2580	1.9962	24.5139
	8.625		100	0.594	7.437	14.986698	0.301664	2.2580	1.9470	135.3960	67796.083	121.4855369	51.8472	18.8322	2.2580	1.9470	28.1706
	8.625		120	0.719	7.187	17.858113	0.281723	2.2580	1.8816	126.4462	63314.667	140.6812986	61.7810	17.5874	2.2580	1.8816	32.6218
	8.625		140	0.812	7.001	19.930754	0.267330	2.2580	1.8329	119.9860	60079.899	153.7217018	68.9514	16.6889	2.2580	1.8329	35.6456
	8.625	XXS		0.875	6.875	21.303925	0.257794	2.2580	1.7999	115.7060	57936.792	161.984728	73.7020	16.0936	2.2580	1.7999	37.5617
	8.625		160	0.906	6.813	21.970458	0.253165	2.2580	1.7836	113.6285	56896.535	165.887386	76.0079	15.8046	2.2580	1.7836	38.4666
10	10.750	S	5	0.134	10.482	4.469054	0.599261	2.8143	2.7442	268.9668	134678.214	62.96752202	15.4609	37.4106	2.8143	2.7442	11.7149
	10.750	S	10	0.165	10.420	5.486870	0.592192	2.8143	2.7279	265.7944	133089.709	76.86381442	18.9821	36.9694	2.8143	2.7279	14.3002
	10.750		20	0.250	10.250	8.246681	0.573027	2.8143	2.6834	257.1924	128782.475	113.7139958	28.5298	35.7729	2.8143	2.6834	21.1561
	10.750		30	0.307	10.136	10.071949	0.560352	2.8143	2.6536	251.5033	125933.781	137.4197837	34.8444	34.9816	2.8143	2.6536	25.5665
	10.750	ST, S	40	0.365	10.020	11.908285	0.547599	2.8143	2.6232	245.7796	123067.812	160.7342418	41.1973	34.1855	2.8143	2.6232	29.9040

Table 4.2.32 Conversion table: normal pipe sizes (NPS) *(continued)*

Designation						Cross-sectional area		Circumference		Flow rates at $u = 1$ ft.s^{-1}							
Nominal pipe size (/in)	Outside diameter (OD/in)	Iron pipe size (IPS)	Schedule No.	Wall thickness (w/in)	Inside diameter (ID/in)	Metal (A_w/in^2)	Flow (A_f/ft^2)	Outside (C_o/ft)	Inside (C_i/ft)	Volume flow rate (/US gal.min^{-1})	Mass flow rate (/lb.h^{-1})	Moment of inertia (I/in^4)	Weight of plain end pipe (lb/ft)	Weight of water (lb/ft)	External surface (ft^2.ft^{-1})	Internal surface (ft^2.ft^{-1})	Section modulus (in^3)
	10.750	XS, S	60	0.500	9.750	16.100662	0.518486	2.8143	2.5525	232.7125	116524.774	211.9501255	55.7010	32.3680	2.8143	2.5525	39.4326
	10.750	S	80	0.594	9.562	18.952173	0.498683	2.8143	2.5033	223.8246	112074.424	245.1870374	65.5660	31.1318	2.8143	2.5033	45.6162
	10.750		100	0.719	9.312	22.658074	0.472948	2.8143	2.4379	212.2738	106290.628	286.4488169	78.3867	29.5252	2.8143	2.4379	53.2928
	10.750		120	0.844	9.062	26.265801	0.447894	2.8143	2.3724	201.0289	100660.053	324.5178144	90.8678	27.9611	2.8143	2.3724	60.3754
	10.750	XXS	140	1.000	8.750	30.630528	0.417584	2.8143	2.2907	187.4246	93848.026	367.8056415	105.9678	26.0689	2.8143	2.2907	68.4290
	10.750		160	1.125	8.500	34.017558	0.394063	2.8143	2.2253	176.8676	88561.893	399.3076627	117.6854	24.6005	2.8143	2.2253	74.2898
12	12.750	S	5	0.156	12.438	6.172174	0.843779	3.3379	3.2563	378.7141	189631.352	122.3889423	21.3529	52.6754	3.3379	3.2563	19.1983
	12.750	S	10	0.180	12.390	7.108168	0.837279	3.3379	3.2437	375.7967	188170.548	140.4194507	24.5911	52.2696	3.3379	3.2437	22.0266
	12.750		20	0.250	12.250	9.817477	0.818464	3.3379	3.2070	367.3521	183942.132	191.8242975	33.9640	51.0950	3.3379	3.2070	30.0901
	12.750		30	0.330	12.090	12.876132	0.797223	3.3379	3.1652	357.8187	179168.492	248.4534906	44.5456	49.7690	3.3379	3.1652	38.9731
	12.750	ST, S	40	0.375	12.000	14.578953	0.785398	3.3379	3.1416	352.5112	176510.900	279.3350253	50.4366	49.0308	3.3379	3.1416	43.8173
	12.750		40	0.406	11.938	15.744607	0.777303	3.3379	3.1254	348.8780	174691.666	300.2086607	54.4692	48.5255	3.3379	3.1254	47.0916
	12.750	XS, S	80	0.500	11.750	19.242255	0.753014	3.3379	3.0761	337.9762	169232.890	361.5439319	66.5695	47.0091	3.3379	3.0761	56.7128
	12.750		60	0.562	11.626	21.518829	0.737205	3.3379	3.0437	330.8804	165679.843	400.4201853	74.4455	46.0222	3.3379	3.0437	62.8110
	12.750		80	0.688	11.374	26.070997	0.705592	3.3379	2.9777	316.6918	158575.279	475.6822423	90.1939	44.0487	3.3379	2.9777	74.6168
	12.750		100	0.844	11.062	31.568809	0.667413	3.3379	2.8960	299.5558	149994.849	562.1819755	109.2139	41.6652	3.3379	2.8960	88.1854
	12.750	XXS	120	1.000	10.750	36.913714	0.630296	3.3379	2.8143	282.8963	141653.062	641.6641636	127.7048	39.3481	3.3379	2.8143	100.6532
	12.750		140	1.125	10.500	41.086141	0.601320	3.3379	2.7489	269.8914	135141.158	700.5508098	142.1395	37.5392	3.3379	2.7489	109.8903

	12.750		160	1.312	10.126	47.144800	0.559246	3.3379	2.6510	251.0072	125685.415	781.1256239	163.0998	34.9126	3.3379	2.6510	122.5295
14	14.000	S	5	0.156	13.688	6.784785	1.021898	3.6652	3.5835	458.6595	229661.941	162.5640079	23.4723	63.7950	3.6652	3.5835	23.2234
	14.000	S	10	0.188	13.624	8.157635	1.012364	3.6652	3.5668	454.3805	227519.334	194.5664244	28.2217	63.1998	3.6652	3.5668	27.7952
	14.000		10	0.250	13.500	10.799225	0.994020	3.6652	3.5343	446.1470	223396.608	255.3004225	37.3605	62.0546	3.6652	3.5343	36.4715
	14.000		20	0.312	13.376	13.416662	0.975843	3.6652	3.5018	437.9887	219311.577	314.3837206	46.4156	60.9199	3.6652	3.5018	44.9120
	14.000	ST	30	0.375	13.250	16.051575	0.957545	3.6652	3.4688	429.7760	215199.270	372.7602077	55.5312	59.7776	3.6652	3.4688	53.2515
	14.000		40	0.438	13.124	18.661550	0.939420	3.6652	3.4359	421.6410	211125.884	429.4948558	64.5606	58.6461	3.6652	3.4359	61.3564
	14.000	XS		0.500	13.000	21.205750	0.921752	3.6652	3.4034	413.7110	207155.154	483.7561813	73.3623	57.5431	3.6652	3.4034	69.1080
	14.000		60	0.594	12.812	25.017018	0.895285	3.6652	3.3542	401.8318	201206.913	563.113276	86.5476	55.8908	3.6652	3.3542	80.4448
	14.000		80	0.750	12.500	31.219577	0.852212	3.6652	3.2725	382.4991	191526.584	687.3184998	108.0057	53.2018	3.6652	3.2725	98.1884
	14.000		100	0.938	12.124	38.491283	0.801714	3.6652	3.1741	359.8340	180177.639	825.1361385	133.1625	50.0493	3.6652	3.1741	117.8766
	14.000		120	1.094	11.812	44.356662	0.760982	3.6652	3.0924	341.5523	171023.549	930.1684705	153.4541	47.5065	3.6652	3.0924	132.8812
	14.000		140	1.250	11.500	50.069133	0.721312	3.6652	3.0107	323.7472	162108.101	1027.199555	173.2166	45.0300	3.6652	3.0107	146.7428
	14.000		160	1.406	11.188	55.628696	0.682704	3.6652	2.9290	306.4187	153431.296	1116.646448	192.4502	42.6198	3.6652	2.9290	159.5209
16	16.000	S	5	0.165	15.670	8.208275	1.339261	4.1888	4.1024	601.1023	300986.509	257.3031981	28.3969	83.6074	4.1888	4.1024	32.1629
	16.000	S	10	0.188	15.624	9.338874	1.331410	4.1888	4.0904	597.5784	299221.984	291.9036609	32.3083	83.1172	4.1888	4.0904	36.4880
	16.000		10	0.250	15.500	12.370021	1.310360	4.1888	4.0579	588.1306	294491.276	383.6639349	42.7947	81.8031	4.1888	4.0579	47.9580
	16.000		20	0.312	15.376	15.377015	1.289479	4.1888	4.0254	578.7582	289798.263	473.2481905	53.1975	80.4995	4.1888	4.0254	59.1560
	16.000	ST	30	0.375	15.250	18.407769	1.268432	4.1888	3.9924	569.3117	285068.168	562.0841165	63.6826	79.1856	4.1888	3.9924	70.2605
	16.000	XS	40	0.500	15.000	24.347343	1.227185	4.1888	3.9270	550.7987	275798.281	731.9420009	84.2308	76.6106	4.1888	3.9270	91.4928
	16.000		60	0.656	14.688	31.622216	1.176665	4.1888	3.8453	528.1238	264444.394	932.3362639	109.3986	73.4568	4.1888	3.8453	116.5420
	16.000		80	0.844	14.312	40.186198	1.117193	4.1888	3.7469	501.4309	251078.597	1157.44624	139.0261	69.7441	4.1888	3.7469	144.6808
	16.000		100	1.031	13.938	48.484322	1.059567	4.1888	3.6490	475.5666	238127.722	1364.433194	167.7339	66.1466	4.1888	3.6490	170.5541
	16.000		120	1.219	13.562	56.605339	1.003171	4.1888	3.5505	450.2543	225453.259	1556.391545	195.8290	62.6259	4.1888	3.5505	194.5489

Table 4.2.32 Conversion table: normal pipe sizes (NPS) *(continued)*

Designation						Cross-sectional area		Circumference		Flow rates at $u = 1$ ft.s^{-1}							
Nominal pipe size (/in)	Outside diameter (OD/in)	Iron pipe size (IPS)	Schedule No.	Wall thickness (w/in)	Inside diameter (ID/in)	Metal (A_w/in^2)	Flow (A_f/ft^2)	Outside (C_o/ft)	Inside (C_i/ft)	Volume flow rate (/US gal.min^{-1})	Mass flow rate (/lb.h^{-1})	Moment of inertia (I/in^4)	Weight of plain end pipe (lb/ft)	Weight of water (lb/ft)	External surface (ft^2.ft^{-1})	Internal surface (ft^2.ft^{-1})	Section modulus (in^3)
	16.000		140	1.438	13.124	65.785440	0.939420	4.1888	3.4359	421.6410	211125.884	1760.744743	227.5880	58.6461	4.1888	3.4359	220.0931
	16.000		160	1.594	12.812	72.140907	0.895285	4.1888	3.3542	401.8318	201206.913	1894.363163	249.5750	55.8908	4.1888	3.3542	236.7954
18	18.000	S	5	0.165	17.670	9.245000	1.702944	4.7124	4.6260	764.3346	382720.862	367.6210241	31.9835	106.3114	4.7124	4.6260	40.8468
	18.000	S	10	0.188	17.624	10.520113	1.694090	4.7124	4.6140	760.3602	380730.795	417.2575202	36.3949	105.7586	4.7124	4.6140	46.3619
	18.000		10	0.250	17.500	13.940817	1.670335	4.7124	4.5815	749.6982	375392.105	549.1375104	48.2289	104.2756	4.7124	4.5815	61.0153
	18.000		20	0.312	17.376	17.337369	1.646747	4.7124	4.5490	739.1116	370091.110	678.2437064	59.9795	102.8031	4.7124	4.5490	75.3604
	18.000	ST		0.375	17.250	20.763964	1.622952	4.7124	4.5160	728.4313	364743.227	806.6313337	71.8340	101.3176	4.7124	4.5160	89.6257
	18.000		30	0.438	17.124	24.165621	1.599329	4.7124	4.4831	717.8287	359434.265	932.2362104	83.6022	99.8429	4.7124	4.4831	103.5818
	18.000	XS		0.500	17.000	27.488936	1.576250	4.7124	4.4506	707.4703	354247.570	1053.16985	95.0993	98.4021	4.7124	4.4506	117.0189
	18.000		40	0.562	16.876	30.788098	1.553340	4.7124	4.4181	697.1872	349098.571	1171.485932	106.5129	96.9718	4.7124	4.4181	130.1651
	18.000		60	0.750	16.500	40.644355	1.484893	4.7124	4.3197	666.4664	333715.920	1514.63729	140.6112	92.6989	4.7124	4.3197	168.2930
	18.000		80	0.938	16.124	50.278539	1.417989	4.7124	4.2213	636.4378	318679.859	1835.114431	173.9411	88.5222	4.7124	4.2213	203.9016
	18.000		100	1.156	15.688	61.172037	1.342340	4.7124	4.1071	602.4841	301678.388	2179.687146	211.6277	83.7996	4.7124	4.1071	242.1875
	18.000		120	1.375	15.250	71.814845	1.268432	4.7124	3.9924	569.3117	285068.168	2498.090589	248.4470	79.1856	4.7124	3.9924	277.5656
	18.000		140	1.562	14.876	80.664023	1.206979	4.7124	3.8945	541.7298	271257.264	2749.107424	279.0612	75.3492	4.7124	3.8945	305.4564
	18.000		160	1.781	14.438	90.748168	1.136950	4.7124	3.7799	510.2987	255518.949	3019.962021	313.9478	70.9775	4.7124	3.7799	335.5513
20	20.000	S	5	0.188	19.624	11.701352	2.100402	5.2360	5.1376	942.7260	472045.767	574.1717187	40.4814	131.1238	5.2360	5.1376	57.4172
	20.000	S	10	0.218	19.564	13.548043	2.087578	5.2360	5.1218	936.9700	469163.639	662.7957435	46.8701	130.3232	5.2360	5.1218	66.2796

	20.000		10	0.250	19.500	15.511614	2.073942	5.2360	5.1051	930.8498	466099.096	756.4335382	53.6632	129.4720	5.2360	5.1051	75.6434
	20.000	ST	20	0.375	19.250	23.120158	2.021105	5.2360	5.0396	907.1349	454224.447	1113.470443	79.9853	126.1735	5.2360	5.0396	111.3470
	20.000	XS	30	0.500	19.000	30.630528	1.968950	5.2360	4.9742	883.7259	442503.020	1456.864506	105.9678	122.9175	5.2360	4.9742	145.6865
	20.000		40	0.594	18.812	36.213654	1.930178	5.2360	4.9250	866.3240	433789.442	1706.322506	125.2829	120.4971	5.2360	4.9250	170.6323
	20.000		60	0.812	18.376	48.948074	1.841744	5.2360	4.8108	826.6323	413914.844	2256.742944	169.3383	114.9763	5.2360	4.8108	225.6743
	20.000		80	1.031	17.938	61.440250	1.754993	5.2360	4.6962	787.6956	394418.318	2771.615161	212.5556	109.5606	5.2360	4.6962	277.1615
	20.000		100	1.281	17.438	75.332373	1.658520	5.2360	4.5653	744.3955	372736.896	3315.019162	260.6161	103.5380	5.2360	4.5653	331.5019
	20.000		120	1.500	17.000	87.179196	1.576250	5.2360	4.4506	707.4703	354247.570	3754.154134	301.6007	98.4021	5.2360	4.4506	375.4154
	20.000		140	1.750	16.500	100.334615	1.484893	5.2360	4.3197	666.4664	333715.920	4215.621574	347.1126	92.6989	5.2360	4.3197	421.5622
	20.000		160	1.969	16.062	111.536087	1.407105	5.2360	4.2050	631.5528	316233.796	4586.836818	385.8646	87.8427	5.2360	4.2050	458.6837
22	22.000	S	5	0.188	21.624	12.882591	2.550348	5.7596	5.6611	1144.6757	573166.901	766.189973	44.5680	159.2130	5.7596	5.6611	69.6536
	22.000	S	10	0.218	21.564	14.917777	2.536215	5.7596	5.6454	1138.3323	569990.587	884.8163508	51.6088	158.3307	5.7596	5.6454	80.4379
	22.000		10	0.250	21.500	17.082410	2.521183	5.7596	5.6287	1131.5854	566612.247	1010.264407	59.0974	157.3923	5.7596	5.6287	91.8422
	22.000	ST	20	0.375	21.250	25.476353	2.462891	5.7596	5.5632	1105.4224	553511.829	1489.670027	88.1367	153.7533	5.7596	5.5632	135.4245
	22.000	XS	30	0.500	21.000	33.772121	2.405282	5.7596	5.4978	1079.5655	540564.632	1952.450747	116.8363	150.1568	5.7596	5.4978	177.4955
	22.000		60	0.875	20.250	58.070377	2.236544	5.7596	5.3014	1003.8307	502642.368	3244.909136	200.8973	139.6229	5.7596	5.3014	294.9917
	22.000		80	1.125	19.750	73.778340	2.127461	5.7596	5.1705	954.8708	478126.965	4030.430018	255.2398	132.8130	5.7596	5.1705	366.4027
	22.000		100	1.375	19.250	89.093604	2.021105	5.7596	5.0396	907.1349	454224.447	4758.503319	308.2237	126.1735	5.7596	5.0396	432.5912
	22.000		120	1.625	18.750	104.016169	1.917476	5.7596	4.9087	860.6230	430934.815	5432.000652	359.8491	119.7041	5.7596	4.9087	493.8182
	22.000		140	1.875	18.250	118.546035	1.816574	5.7596	4.7778	815.3351	408258.067	6053.719997	410.1159	113.4050	5.7596	4.7778	550.3382
	22.000		160	2.125	17.750	132.683202	1.718399	5.7596	4.6469	771.2712	386194.205	6626.385705	459.0241	107.2762	5.7596	4.6469	602.3987
24	24.000	S	5	0.218	23.564	16.287512	3.028485	6.2832	6.1690	1359.2784	680623.697	1151.59029	56.3475	189.0621	6.2832	6.1690	95.9659
	24.000	S	10	0.250	23.500	18.653206	3.012056	6.2832	6.1523	1351.9048	676931.560	1315.342506	64.5317	188.0365	6.2832	6.1523	109.6119
	24.000	ST	20	0.375	23.250	27.832547	2.948311	6.2832	6.0868	1323.2939	662605.371	1942.29867	96.2881	184.0570	6.2832	6.0868	161.8582

Table 4.2.32 Conversion table: normal pipe sizes (NPS) *(continued)*

Designation						Cross-sectional area		Circumference		Flow rates at $u = 1$ ft.s^{-1}							
Nominal pipe size (/in)	Outside diameter (OD/in)	Iron pipe size (IPS)	Schedule No.	Wall thickness (w/in)	Inside diameter (ID/in)	Metal (A_w/in^2)	Flow (A_f/ft^2)	Outside (C_o/ft)	Inside (C_i/ft)	Volume flow rate (/US gal.min^{-1})	Mass flow rate (/lb.h^{-1})	Moment of inertia (I/in^4)	Weight of plain end pipe (lb/ft)	Weight of water (lb/ft)	External surface (ft^2.ft^{-1})	Internal surface (ft^2.ft^{-1})	Section modulus (in^3)
	24.000	XS		0.500	23.000	36.913714	2.885247	6.2832	6.0214	1294.9890	648432.404	2549.353351	127.7048	180.1201	6.2832	6.0214	212.4461
	24.000		30	0.562	22.876	41.381549	2.854221	6.2832	5.9889	1281.0633	641459.458	2843.20044	143.1615	178.1832	6.2832	5.9889	236.9334
	24.000		40	0.688	22.624	50.386924	2.791683	6.2832	5.9229	1252.9946	627404.778	3425.823883	174.3161	174.2791	6.2832	5.9229	285.4853
	24.000		60	0.969	22.062	70.111046	2.654710	6.2832	5.7758	1191.5168	596621.360	4656.82756	242.5526	165.7282	6.2832	5.7758	388.0690
	24.000		80	1.219	21.562	87.242151	2.535744	6.2832	5.6449	1138.1211	569884.862	5675.755356	301.8185	158.3014	6.2832	5.6449	472.9796
	24.000		100	1.531	20.938	108.070910	2.391100	6.2832	5.4816	1073.2003	537377.438	6851.694628	373.8767	149.2715	6.2832	5.4816	570.9746
	24.000		120	1.812	20.376	126.306652	2.264463	6.2832	5.3344	1016.3616	508916.933	7824.550066	436.9641	141.3658	6.2832	5.3344	652.0458
	24.000		140	2.062	19.876	142.113575	2.154693	6.2832	5.2035	967.0933	484247.083	8625.00946	491.6489	134.5131	6.2832	5.2035	718.7508
	24.000		160	2.344	19.312	159.472471	2.034145	6.2832	5.0559	912.9877	457155.073	9458.245897	551.7029	126.9875	6.2832	5.0559	788.1872
30	30.000	S	5	0.250	29.500	23.365595	4.746477	7.8540	7.7231	2130.3670	1066726.464	2585.184074	80.8344	296.3129	7.8540	7.7231	172.3456
	30.000	S	10	0.312	29.376	29.099492	4.706659	7.8540	7.6906	2112.4951	1057777.577	3206.308209	100.6711	293.8271	7.8540	7.6906	213.7539
	30.000	ST		0.375	29.250	34.901131	4.666370	7.8540	7.6576	2094.4121	1048722.965	3829.444787	120.7422	291.3119	7.8540	7.6576	255.2963
	30.000	XS	20	0.500	29.000	46.338492	4.586943	7.8540	7.5922	2058.7632	1030872.687	5042.207122	160.3103	286.3535	7.8540	7.5922	336.1471
	30.000		30	0.625	28.750	57.677678	4.508199	7.8540	7.5267	2023.4203	1013175.631	6224.007205	199.5388	281.4377	7.8540	7.5267	414.9338
32	32.000		10	0.250	31.500	24.936392	5.411884	8.3776	8.2467	2429.0223	1216270.421	3142.374984	86.2687	337.8529	8.3776	8.2467	196.3984
	32.000	ST		0.312	31.376	31.059846	5.369360	8.3776	8.2142	2409.9362	1206713.552	3898.890767	107.4531	335.1982	8.3776	8.2142	243.6807
	32.000	XS	20	0.375	31.250	37.257325	5.326322	8.3776	8.1812	2390.6194	1197041.152	4658.4755	128.8936	332.5114	8.3776	8.1812	291.1547
	32.000		30	0.500	31.000	49.480084	5.241442	8.3776	8.1158	2352.5225	1177965.104	6138.622958	171.1788	327.2125	8.3776	8.1158	383.6639

	32.000		40	0.625	30.750	61.604668	5.157243	8.3776	8.0503	2314.7316	1159042.278	7583.390299	213.1244	321.9562	8.3776	8.0503	473.9619
	32.000			0.688	30.624	67.678250	5.115066	8.3776	8.0173	2295.8009	1149563.245	8298.323664	234.1363	319.3231	8.3776	8.0173	518.6452
	32.000			0.750	30.500	73.631078	5.073727	8.3776	7.9849	2277.2467	1140272.672	8993.345864	254.7304	316.7424	8.3776	7.9849	562.0841
	32.000			0.875	30.250	85.559312	4.990892	8.3776	7.9194	2240.0678	1121656.288	10369.05339	295.9967	311.5712	8.3776	7.9194	648.0658
	32.000			1.000	30.000	97.389372	4.908739	8.3776	7.8540	2203.1948	1103193.126	11711.07201	336.9234	306.4425	8.3776	7.8540	731.9420
	32.000			1.125	29.750	109.121257	4.827267	8.3776	7.7885	2166.6279	1084883.184	13019.95627	377.5104	301.3564	8.3776	7.7885	813.7473
34	34.000		5	0.250	33.500	26.507188	6.120924	8.9012	8.7703	2747.2616	1375620.539	3774.375068	91.7029	382.1168	8.9012	8.7703	222.0221
	34.000		10	0.312	33.376	33.020200	6.075695	8.9012	8.7378	2726.9613	1365455.688	4684.652863	114.2350	379.2932	8.9012	8.7378	275.5678
	34.000	ST		0.375	33.250	39.613520	6.029908	8.9012	8.7048	2706.4107	1355165.500	5599.278189	137.0449	376.4349	8.9012	8.7048	329.3693
	34.000	XS	20	0.500	33.000	52.621677	5.939574	8.9012	8.6394	2665.8658	1334863.682	7383.479047	182.0473	370.7955	8.9012	8.6394	434.3223
	34.000		30	0.625	32.750	65.531659	5.849921	8.9012	8.5739	2625.6269	1314715.085	9127.587399	226.7100	365.1986	8.9012	8.5739	536.9169
	34.000	40		0.688	32.624	72.001081	5.804994	8.9012	8.5409	2605.4624	1304618.265	9991.614247	249.0913	362.3940	8.9012	8.5409	587.7420
	34.000			0.750	32.500	78.343467	5.760950	8.9012	8.5085	2585.6940	1294719.710	10832.2084	271.0331	359.6444	8.9012	8.5085	637.1887
	34.000			0.875	32.250	91.057100	5.672661	8.9012	8.4430	2546.0670	1274877.556	12497.94261	315.0165	354.1327	8.9012	8.4430	735.1731
	34.000			1.000	32.000	103.672558	5.585054	8.9012	8.3776	2506.7461	1255188.623	14125.38597	358.6603	348.6635	8.9012	8.3776	830.9051
	34.000			1.125	31.750	116.189841	5.498128	8.9012	8.3121	2467.7312	1235652.911	15715.12983	401.9645	343.2369	8.9012	8.3121	924.4194
36	36.000			0.250	33.500	136.462931	6.120924	9.4248	8.7703	2747.2616	1375620.539	20625.09266	472.1003	382.1168	9.4248	8.7703	1145.8385
	36.000		10	0.312	33.376	142.975943	6.075695	9.4248	8.7378	2726.9613	1365455.688	21535.37046	494.6323	379.2932	9.4248	8.7378	1196.4095
	36.000	ST		0.375	33.250	149.569263	6.029908	9.4248	8.7048	2706.4107	1355165.500	22449.99578	517.4423	376.4349	9.4248	8.7048	1247.2220
	36.000	XS	20	0.500	33.000	162.577420	5.939574	9.4248	8.6394	2665.8658	1334863.682	24234.19664	562.4446	370.7955	9.4248	8.6394	1346.3443
	36.000		30	0.625	32.750	175.487402	5.849921	9.4248	8.5739	2625.6269	1314715.085	25978.30499	607.1074	365.1986	9.4248	8.5739	1443.2392
	36.000		40	0.750	32.500	188.299210	5.760950	9.4248	8.5085	2585.6940	1294719.710	27682.926	651.4304	359.6444	9.4248	8.5085	1537.9403
	36.000			0.875	32.250	201.012842	5.672661	9.4248	8.4430	2546.0670	1274877.556	29348.6602	695.4139	354.1327	9.4248	8.4430	1630.4811
	36.000			1.000	32.000	213.628300	5.585054	9.4248	8.3776	2506.7461	1255188.623	30976.10356	739.0577	348.6635	9.4248	8.3776	1720.8946

Table 4.2.32 Conversion table: normal pipe sizes (NPS) *(continued)*

Designation						Cross-sectional area		Circumference		Flow rates at $u = 1\ \mathrm{ft.s^{-1}}$							
Nominal pipe size (/in)	Outside diameter (OD/in)	Iron pipe size (IPS)	Schedule No.	Wall thickness (w/in)	Inside diameter (ID/in)	Metal (A_w/in^2)	Flow (A_f/ft^2)	Outside (C_o/ft)	Inside (C_i/ft)	Volume flow rate (/US gal.min^{-1})	Mass flow rate (/lb.h^{-1})	Moment of inertia (I/in^4)	Weight of plain end pipe (lb/ft)	Weight of water (lb/ft)	External surface (ft^2.ft^{-1})	Internal surface (ft^2.ft^{-1})	Section modulus (in^3)
	36.000			1.125	31.750	226.145584	5.498128	9.4248	8.3121	2467.7312	1235652.911	32565.84743	782.3618	343.2369	9.4248	8.3121	1809.2137
42	42.000			0.250	33.500	504.029271	6.120924	10.9956	8.7703	2747.2616	1375620.539	90922.15528	1743.7142	382.1168	10.9956	8.7703	4329.6264
	42.000	ST		0.375	33.250	517.135603	6.029908	10.9956	8.7048	2706.4107	1355165.500	92747.0584	1789.0562	376.4349	10.9956	8.7048	4416.5266
	42.000	XS	20	0.500	33.000	530.143760	5.939574	10.9956	8.6394	2665.8658	1334863.682	94531.25926	1834.0586	370.7955	10.9956	8.6394	4501.4885
	42.000		30	0.625	32.750	543.053743	5.849921	10.9956	8.5739	2625.6269	1314715.085	96275.36761	1878.7213	365.1986	10.9956	8.5739	4584.5413
	42.000		40	0.750	32.500	555.865550	5.760950	10.9956	8.5085	2585.6940	1294719.710	97979.98861	1923.0444	359.6444	10.9956	8.5085	4665.7137
	42.000			1.000	32.000	581.194641	5.585054	10.9956	8.3776	2506.7461	1255188.623	101273.1662	2010.6716	348.6635	10.9956	8.3776	4822.5317
	42.000			1.250	31.500	606.131033	5.411884	10.9956	8.2467	2429.0223	1216270.421	104415.5412	2096.9403	337.8529	10.9956	8.2467	4972.1686
	42.000			1.500	31.000	630.674725	5.241442	10.9956	8.1158	2352.5225	1177965.104	107411.7891	2181.8504	327.2125	10.9956	8.1158	5114.8471

5 Fundamental Constants

5.1 Fundamental Mathematical Constants

The knowledge of fundamental mathematical constants is needed to compute accurately several conversion factors. In spite of the increased use of computers in most of scientific calculus, it seems to be very important to remind the reader of some approximate values of a selection of numerical mathematical constants. Accurate values are given in several mathematical treatises and handbooks.[13, 14] Numerical values of the following constants are accurate to the number of significant digits given below.

Table 5-1 Fundamental mathematical constants

Pi[14]	π	$\approx$ **3.14159**26535897932384626433 . . .
Naperian (natural) logarithm base	e	$\approx$ **2.71828**18284590452353602874 . . .
Square root of two	$\sqrt{2}$	$\approx$ **1.41421**35623730950488016887 . . .
Square root of three	$\sqrt{3}$	$\approx$ **1.73205**08075688772935274463 . . .
Naperian (natural) logarithm of two	$\ln 2$	$\approx$ **0.69314**71805599453094172321 . . .
Naperian (natural) logarithm of ten	$\ln 10$	$\approx$ **2.30258**50929940456840179914 . . .
Briggsian (common) logarithm of two	$\log_{10} 2$	$\approx$ **0.30102**99956639811952137388 . . .
Euler's constant	γ	$\approx$ **0.57721**56649015328606065120 . . .
Gold number	ϕ	$\approx$ **1.61803**39887498948482045868 . . .

[13] Abramowitz, M., and Stegun, I.A., *Handbook of Mathematical Functions, with Formulas, Graphs, and Mathematics Tables*, Dover Publications Inc., New York, 1972.
[14] Rade, L., and Westergren, B., *Beta Mathematics Handbook*, 2nd ed., CRC Press, Boca Raton, FL, 1990.
[15] A mnemonic for π, based on the number of letters in English words, is "How I like a drink, alcoholic of course, after the heavy lectures involving quantum mechanics!"

F. Cardarelli, *Encyclopaedia of Scientific Units, Weights and Measures*

5.2 Fundamental Physical Constants

The numerical values of fundamental physical constants were recommended by CODATA task group on fundamental constants in 1986[16] and were recently revised and updated in 1998.[17] For each constant the standard deviation uncertainty in the least significant digits is given in parentheses.

Table 5-2 Universal constants (CODATA, 1998)

speed of light in vacuum	c_0	$c_0 = 2.99792458 \times 10^8$ m.s^{-1} (defined)
permeability of vacuum	μ_0	$\mu_0 = 4\pi \times 10^{-7}$ H.m^{-1} (defined)
permittivity of vacuum	$\varepsilon_0 = 1/\mu_0 c^2$	$\varepsilon_0 = 8.85418781758 \times 10^{-12}$ F.m^{-1}
Characteristic impedance of vacuum	$Z_0 = (\mu_0/\varepsilon_0)^{1/2}$	$Z_0 = 376.730313461\ \Omega$
Newtonian gravitational constant	G	$G = 6.673(10) \times 10^{-11}$ N.kg^{-2}.m^2
Planck's constant	h	$h = 6.62606876(52) \times 10^{-34}$ J.s $h = 4.13566727(16) \times 10^{-15}$ eV.s
Planck's constant (rationalized)	$\hbar = h/2\pi$	$\hbar = 1.054571596(82) \times 10^{-34}$ J.s $\hbar = 6.58211889(26) \times 10^{-16}$ eV.s
elementary electric charge	e	$e = 1.602176462(63) \times 10^{-19}$ C
standard acceleration of gravity	g_n	$g_n = 9.80665$ m.s^{-2} (defined)
Planck's mass	$m_p = (\hbar c/G)^{1/2}$	$m_p = 2.17671(12) \times 10^{-8}$ kg
Planck's length	$L_p = \hbar/m_p c = (\hbar G/c^3)^{1/2}$	$L_p = 1.6160(12) \times 10^{-35}$ m
Planck's time	$t_p = L_p/c = (\hbar G/c^5)^{1/2}$	$t_p = 5.3906(40) \times 10^{-44}$ s
quantum of magnetic flux	$\Phi_0 = h/2e$	$\Phi_0 = 2.067833636(81) \times 10^{-15}$ Wb
Fermi's coupling constant	$G_F/(\hbar c)^3$	$G_F/(\hbar c)^3 = 1.16639(1)$ GeV^2
Sinus squared of weak mixing angle	$\sin^2\theta_w$	$\sin^2\theta_w = 0.2235(23)$

[16] Cohen, E.R., and Taylor, B.N., *Journal of Research of the National Bureau of Standards*, **92** (1987) 85. Cohen, E. R., and Taylor, B. N., The 1986 Adjustment of the Fundamental Physical Constants, *CODATA Bull.*, **63** (1986)1–49. Taylor, B.N., and Cohen, E.R., Recommended values of the fundamental physical constants: a status report, *J. Research NIST*, Sept–Oct (1995).

[17] Mohr, P. J., and Taylor, B. N., *CODATA Recommended Values of the Fundamental Constants*: 1998. *J. Phys. Chem. Ref. Data*, **28** (6) (1999) 1713–1852. *Rev. Mod. Phys.* **72** (2) (2000) 351–495.

Table 5-3 Physico-chemical constants (CODATA, 1998)

Avogadro's number	N_A, L	$N_A = 6.02214199(47) \times 10^{23}$ mol^{-1}
atomic mass unit	u, u.m.a.	$u = 1.66053873(13) \times 10^{-27}$ kg $u = 931.494013(37)$ MeV.c^{-2}
Faraday's constant	$F = N_A \times e$	$F = 96485.3415(39)$ C.mol^{-1}
Boltzmann's constant	$k = R/N_A$	$k = 1.3806503(24) \times 10^{-23}$ J.K^{-1} $k = 8.617342(15) \times 10^{-5}$ eV.K^{-1}
ideal gas constant	R	$R = 8.314472(15)$ J.K^{-1}.mol^{-1}
molar Planck constant	$N_A h$	$N_A h = 3.990312689(30) \times 10^{-10}$ J.s.mol^{-1}
standard atmosphere	P_0	$P_0 = 101325$ Pa (defined)
standard molar volume (STP) (Ideal gas)	$V_0 = RT_0/P_0$	$V_0 = 22.413996(39) \times 10^{-3}$ m^3.mol^{-1} [273.15 K, 1 atm] $V_1 = 22.710981(40) \times 10^{-3}$ m^3.mol^{-1} [273.15 K, 100 kPa]
Loschsmidt's constant	$n_0 = N_A/V_m$	$n_0 = 2.6867775(47) \times 10^{25}$ m^{-3}
Sackur–Tetrode constant (absolute entropy)[18]	S_0/R	$S_0/R = -1.1517048(44)$ [T = 1 K, P = 100 kPa] $S_0/R = -1.1648678(44)$ [T = 1 K, P = 101325 Pa]
Stefan–Boltzmann constant	$\sigma = (\pi^2/60)\left(k^4/\hbar^3 c^2\right)$	$\sigma = 5.670400(40) \times 10^{-8}$ W.m^{-2}.K^{-4}
first radiation constant	$c_1 = 2\pi hc^2$	$c_1 = 3.74177107(29) \times 10^{-16}$ W.m^{-2}
second radiation constant	$c_2 = hc/k$	$c_2 = 0.014387752(25)$ m.K
Wien displacement law constant	$b = c_2/4.96511423$	$b = 2.8977686(51) \times 10^{-3}$ m.K

[18] $S_0/R = 5/2 + \ln\left[\left(2\pi m_0 kT/h^2\right)^{3/2} kT/P_0\right]$

Table 5-4 Electromagnetic and atomic constants (CODATA,1998)

electron rest mass	m_e	$m_e = 9.10938188(72) \times 10^{-31}$ kg $m_e = 5.485799110(12) \times 10^{-4}$ u $m_e = 0.510998902(21)$ MeV.c^{-2}
Bohr magneton (B.M., β, μ_β)	$\mu_\beta = e\hbar/2m_e$	$\mu_\beta = 9.27400899(37) \times 10^{-24}$ J.T^{-1} $\mu_\beta = 5.788381749(43) \times 10^{-5}$ eV.T^{-1}
fine structure constant	$\alpha = \mu_0 e^2 c/2h$	$\alpha = 7.297352533(27) \times 10^{-3}$ $\alpha^{-1} = 137.03599976(50)$
Rydberg constant	$R_\infty = E_h/2hc$	$R_\infty = 1.0973731568548(83) \times 10^7$ m^{-1}
Rydberg	$R_y = R_\infty hc$	$R_y = 2.17987190(17) \times 10^{-18}$ J $R_y = 13.60569172(53)$ eV
first Bohr atomic radius	$a_0 = 4\pi\varepsilon_0\hbar^2/m_0e^2$	$a_0 = 0.5291772083(19) \times 10^{-10}$ m
quantized Hall resistance (Von Klitzing constant)	$h/e^2 = \mu_0 c/2\alpha$	$h/e^2 = 25812.807572(95)\ \Omega$
proton rest mass	M_p	$m_p = 1.67262158(13) \times 10^{-27}$ kg
nuclear magneton (N.M., β_N, μ_β)	$\mu_N = e\hbar/2m_p$	$\mu_p = 5.05078317(20) \times 10^{-27}$ J.T^{-1} $\mu_N = 3.152451238(24) \times 10^{-8}$ eV.T^{-1}
Hartree energy	$E_h = \hbar^2/m_0{a_0}^2$	$E_h = 4.35974381(34) \times 10^{-18}$ J $E_h = 27.2113834(11)$ eV
Josephson constant	$K_J = 2e/h$	$K_J = 4.83597898(19) \times 10^{14}$ Hz.V^{-1}
quantum of circulation	$h/2m_e$	$h/2m_e = 3.63694751627(27) \times 10^{-4}$ m^2.s^{-1}
quantum of magnetic flux	$h/2e = \emptyset_0$	$\emptyset_0 = 2.067833636(81) \times 10^{-15}$ Wb
quantum of conductance	$G_0 = 2e^2/h$	$G_0 = 7.748091696(28) \times 10^{-5}$ S

Table 5-5 Electron constants (CODATA, 1998)

electron rest mass	m_e	$m_e = 9.10938188(72) \times 10^{-31}$ kg $m_e = 5.485799110(12) \times 10^{-4}$ u $m_e = 0.510998902(21)$ MeV.c^{-2}
electron molar mass	M_e	$M_e = 5.485799110(12) \times 10^{-7}$ kg.mol^{-1}
electron-proton rest mass ratio	m_e/m_p	$m_e/m_p = 5.446170232(12) \times 10^{-4}$
electron-neutron rest mass ratio	m_e/m_n	$m_e/m_n = 5.438673462(12) \times 10^{-4}$
electron-muon rest mass ratio	m_e/m_μ	$m_e/m_\mu = 4.83633210(15) \times 10^{-3}$
electron-deuteron rest mass ratio	m_e/m_d	$m_e/m_d = 2.7244371170(58) \times 10^{-4}$
electron-helion rest mass ratio	m_e/m_α	$m_e/m_\alpha = 1.37093354(3) \times 10^{-4}$
electron-tau rest mass ratio	m_e/m_τ	$m_e/m_\tau = 2.87555(47) \times 10^{-4}$
electron specific charge	e/m_e	$e/m_e = -1.758820174(71) \times 10^{11}$ C.kg^{-1}
electron classical radius	$r_e = a_0\alpha^2$	$r_e = 2.817940285(31) \times 10^{-15}$ m
electron Thomson cross section	$\sigma_e = (8\pi/3){r_e}^2$	$\sigma_e = 0.665245854(15) \times 10^{-28}$ m^2
electron Compton wavelength	$\Lambda_C = h/m_0c$	$\Lambda_C = 2.426310215(18) \times 10^{-12}$ m
electron Compton rationalized wavelength	$\lambda\!\!\!^{-}_C = \Lambda_C/2\pi$ $= \hbar/m_0c$	$\lambda\!\!\!^{-}_C = 3.861592642(28) \times 10^{-13}$ m
magnetic moment of electron	μ_e	$\mu_e = 9.28476362(37) \times 10^{-24}$ J.T^{-1} $\mu_e = 1.0011596521869(41)$ B $\mu_e = 1838.2819660(39)$ N
electron magnetic moment anomaly	$a_e = (\mu_e/\mu_B) - 1$	$a_e = 1.1596521869(41) \times 10^{-3}$
electron Landé factor (*g*-factor)	$g_e = 2(1 + a_e)$	$g_e = 2.0023193043737(82)$
electron-proton magnetic moment ratio	μ_e/μ_p	$\mu_e/\mu_p = 658.2106875(66)$
electron-muon magnetic moment ratio	μ_e/μ_μ	$\mu_e/\mu_\mu = 206.7669720(63)$
electron gyromagnetic ratio	$\gamma_e = 4\pi\mu_e/h$	$\gamma_e = 1.760589794(71) \times 10^{-11}$ s^{-1}.T^{-1} $\gamma_e/2\pi = 28\,024.9540(11)$ MHz.T^{-1}
electron-neutron magnetic moment ratio	μ_e/μ_n	$\mu_e/\mu_n = 960.92050(23)$
electron-deuteron magnetic moment ratio	μ_e/μ_d	$\mu_e/\mu_d = -2143.923498(23)$
electron-shielded proton ratio magnetic moment (H_2O sphere at 298.15 K)	μ_e/μ'_p	$\mu_e/\mu'_p = -658.2275954(71)$
electron shielded helion magnetic moment ratio (g as sphere at 298.15 K)	μ_e/μ_α	$\mu_e/\mu_\alpha = 864.058255$

Table 5-6 Proton constants (CODATA, 1998)

proton rest mass	m_p	$m_p = 1.67262158(13) \times 10^{-27}$ kg $m_p = 1.00727646688(13)$ u $m_p = 938.271998(38)$ MeV.c^{-2}
proton molar mass	M_p	$M_p = 1.00727646688(13) \times 10^{-3}$ kg.mol^{-1}
specific charge of proton	e/m_p	$e/m_p = 9.57883408(38) \times 10^{7}$ C.kg^{-1}
proton-electron rest mass ratio	m_p/m_e	$m_p/m_e = 1836.1526675(39)$
proton-muon rest mass ratio	m_p/m_μ	$m_p/m_\mu = 8.88024408(27)$
proton-tau rest mass ratio	m_p/m_τ	$m_p/m_\tau = 0.527994(86)$
proton-neutron rest mass ratio	m_p/m_n	$m_p/m_n = 0.99862347855(58)$
proton magnetic moment	μ_p	$\mu_p = 1.410606633(58) \times 10^{-26}$ J.T^{-1} $\mu_p = 1.521032203(15) \times 10^{-3}$ μ_B
proton Compton wavelength	$\Lambda_{C,p} = h/m_p c$	$\Lambda_{C,p} = 1.321409847(10) \times 10^{-15}$ m
proton Compton rationalized wavelength	$\lambda\!\!\!^{-}_{C,p} = \Lambda_{C,p}/2\pi$ $= \hbar/m_p c$	$\lambda\!\!\!^{-}_{C,p} = 2.103089089(16) \times 10^{-16}$ m
proton gyromagnetic ratio	γ_p	$\gamma_p = 2.675221212(11) \times 10^{8}$ s^{-1}.T^{-1}
proton Landé factor	g_p	$g_p = 5.585694675(57)$
proton-shielded magnetic moment (H_2O sphere at 298.15 K)	μ'_p	$\mu'_p = 1.410570399(59) \times 10^{-26}$ J.T^{-1} $\mu'_p = 1.520993132(16) \times 10^{-3}$ μ_B
proton shielding corretion	σ'_p	$\sigma'_p = 25.687(15) \times 10^{-6}$
proton shielded gyromagnetic ratio	γ'_p	$\gamma'_p = 2.67515341(11) \times 10^{8}$ s^{-1}.T^{-1}

Table 5-7 Neutron constants (CODATA, 1998)

neutron rest mass	m_n	$m_n = 1.67492716(13) \times 10^{-27}$ kg $m_n = 1.00866491578(55)$ u $m_n = 939.565330(38)$ MeV.c^{-2}
neutron molar mass	M_n	$Mn = 1.00866491578(55) \times 10^{-3}$ kg.mol^{-1}
neutron-proton rest mass ratio	m_n/m_p	$m_n/m_p = 1.00137841887(58)$
neutron-electron rest mass ratio	m_n/m_e	$m_n/m_e = 1838.6836550(40)$
neutron mean life time	τ	$\tau = 889.1(21)$ s
neutron Compton wavelength	$\Lambda_{C,n} = h/m_n c$	$\Lambda_{C,n} = 1.319590898(10) \times 10^{-15}$ m
neutron Compton rationalized wavelength	$\lambda\!\!\!^{-}_{C,n} = \Lambda_{C,n}/2\pi$ $= \hbar/m_n c$	$\lambda\!\!\!^{-}_{C,n} = 2.100194142(16) \times 10^{-16}$ m
neutron magnetic moment	μ_n	$\mu_n = 0.96623640(23) \times 10^{-26}$ J.T^{-1} $\mu_n = 1.04187563(25) \times 10^{-3}\ \mu_B$ $\mu_n = 1.91304275(45)\ \mu_N$
neutron-electron magnetic moment ratio	μ_n/μ_e	$\mu_n/\mu_e = 1.04066882(25) \times 10^{-3}$
neutron-proton magnetic moment ratio	μ_n/μ_p	$\mu_n/\mu_p = -0.68497934(16)$
neutron-muon rest mass ratio	m_n/m_μ	$m_n/m_\mu = 8.89248478(27)$
neutron-tau rest mass ratio	m_n/m_τ	$m_n/m_\tau = 0.528722(86)$
neutron-shielded proton magnetic moment ratio (H_2O, sphere 298.15 K)	μ_n/μ'_p	$\mu_n/\mu'_p = 0.68499694(16)$
neutron gyromagnetic ratio	γ_n	$\gamma_n = 1.83247188(44) \times 10^{-8}$ s^{-1}.T^{-1}
neutron Landé factor (g-factor)	g_n	$g_n = -3.82608545(90)$

Table 5-8 Muon (+) constants (CODATA, 1998)		
muon rest mass	m_μ	$m_\mu = 1.88353109(16) \times 10^{-28}$ kg $\mu_\mu = 0.1134289168(34)$ u $\mu_\mu = 105.658389(34)$ MeV.c^{-2}
muon molar mass	M_μ	$M_\mu = 0.1134289168(34) \times 10^{-3}$ kg.mol^{-1}
muon mean life time	τ	$\tau = 2.19703(4) \times 10^{-6}$ s
muon-electron rest mass ratio	m_μ/m_e	$m_\mu/m_e = 206.7682657(63)$
muon-tau rest mass ratio	m_μ/m_τ	$m_\mu/m_\tau = 5.94572(97) \times 10^{-2}$
muon-proton rest mass ratio	m_μ/m_p	$m_\mu/m_p = 0.1126095173(34)$
muon-neutron rest mass ratio	m_μ/m_n	$m_\mu/m_n = 0.1124545079(34)$
muon magnetic moment	μ_μ	$\mu_\mu = 4.49044813(20) \times 10^{-26}$ J.T^{-1} $\mu_\mu = 4.84197085(15) \times 10^{-3}\ \mu_B$ $\mu_\mu = 8.89059770(27)\ \mu_N$
muon magnetic moment anomaly	$a_\mu = \left[\frac{\mu_\mu}{(e\hbar/2m_\mu)}\right] - 1$	$a_\mu = 1.16591602(64) \times 10^{-3}$
muon Landé factor (g-factor)	$g_\mu = 2(1 + a_\mu)$	$g_\mu = 2.0023318320(13)$
muon-proton magnetic moment ratio	μ_μ/μ_p	$\mu_\mu/\mu_p = -3.18334539(10)$

Table 5-9 Deuteron constants (CODATA, 1998)		
deuteron rest mass	m_d	$m_d = 3.34358309(26) \times 10^{-27}$ kg $m_d = 2.013553212171(35)$ u $m_d = 1875.612762(75)$ MeV.c^{-2}
deuteron molar mass	M_d	$M_d = 2.013553212171(35)$ u
deuteron-electron rest mass ratio	m_d/m_e	$m_d/m_e = 3670.4829550(78)$
deuteron-proton rest mass ratio	m_d/m_p	$m_d/m_p = 1.99900750083(41)$
deuteron magnetic moment	μ_d	$\mu_d = 0.433073457(18) \times 10^{-26}$ J.T^{-1} $\mu_d = 0.4669754556(30) \times 10^{-3}\ \mu_B$ $\mu_d = 0.8574382284(94)\ \mu_N$
deuteron-electron magnetic moment ratio	μ_d/μ_e	$\mu_d/\mu_e = 0.4664345537(50) \times 10^{-3}$
deuteron-proton magnetic moment ratio	μ_d/μ_p	$\mu_n/\mu_p = 0.3070122083(45)$
deuteron-neutron magnetic moment ratio	μ_d/μ_n	$\mu_n/\mu_n = -0.44820652(11)$

Table 5-10 Helion constants (CODATA, 1998)

Constant	Symbol	SI value
Helion rest mass	m_h	$m_h = 5.00641174(3) \times 10^{-27}$ kg $m_h = 3.01493223469(86)$ u $m_h = 2808.39132(11)$ MeV/c^2
Helion molar mass	$M_h = N_A m_h$	$M_h = 3.01493223469(86) \times 10^{-3}$ kg.mol^{-1}
Helion-electron rest mass ratio	m_h/m_e	$m_d/m_e = 5495.885238(12)$
Helion-proton rest mass ratio	m_h/m_p	$m_d/m_p = 2.99315265850(93)$
Helion shielded magnetic moment (gas sphere 298.15K)	μ'_h	$\mu'_h = -1.074552967(45) \times 10^{-26}$ J.T^{-1} $\mu'_h = -1.158671474(14) \times 10^{-3}$ μ_B $\mu'_h = -2.127497718(25)$ μ_N
Shielded helion-proton magnetic moment ratio (gas sphere 298.15K)	μ'_h/μ_p	$\mu'_h/\mu_p = -0.761766563(12)$
Shielded helion-shielded proton magnetic moment ratio (gas sphere 298.15K)	μ'_h/μ'_p	$\mu'_h/\mu'_p = -0.7617861313(33)$
Shielded helion gyromagnetic ratio	$\gamma_h = 4\pi\mu_h/h$	$\gamma_h = 2.037894764(85) \times 10^8$ s^{-1}T^{-1}

Table 5-11 Alpha particle constants (CODATA, 1998)

Constant	Symbol	SI value
Alpha particle rest mass	m_α	$m_\alpha = 6.64465598(52) \times 10^{-27}$ kg $m_\alpha = 4.0015061747(10)$ u $m_\alpha = 3727.37904(15)$ MeV/c^2
Alpha particle molar mass	$M_\alpha = N_A m_\alpha$	$M_\alpha = 4.0015061747(10) \times 10^{-3}$ kg.mol^{-1}
Alpha particle-electron rest mass ratio	m_α/m_e	$m_\alpha/m_p = 7294.299508(16)$
Alpha particle-proton rest mass ratio	m_α/m_p	$m_\alpha/m_p = 3.9725996846(11)$

6 Appendices

6.1 Greek Alphabet

Numerous symbols of units or prefixes and physical quantities are described by a letter derived from the Greek alphabet. So, the complete Greek alphabet is listed in ***Table 6-1***.

Table 6-1 The Greek alphabet

Capital letter	Small letter	Appellation	Capital letter	Small letter	Appellation
A	α	alpha	O	o	omicron
B	β	beta	Π	π, ϖ	pi (dorian pi)
Γ	γ	gamma	P	ρ	rho
Δ	δ	delta	Σ	σ	sigma
E	ε	epsilon	T	τ	tau
Φ	ϕ, φ	phi	Υ	υ	upsilon
H	η	eta	Ξ	ξ	ksi, xi
I	ι	iota	Ψ	ψ	psi
K	κ	kappa	Z	ζ	zeta
Λ	λ	lambda	Θ	θ, ϑ	theta
M	μ	mu	X	χ	chi
N	ν	nu	Ω	ω	omega

Greek small letters listed by Latin alphabetical order:

$$\alpha - \beta - \gamma - \delta - \varepsilon - \zeta - \eta - \theta - \iota - \kappa - \chi - \lambda - \mu - \nu - \xi - o - \pi - \varpi - \rho - \sigma - \tau - \upsilon - \phi - \psi - \omega$$

6.2 Roman Numerals

The ancient Roman notation for numerals uses seven letters and a bar. A letter with a bar placed over it represents a thousand times as much as it does without the bar.

e.g.: $\bar{\mathrm{V}}$ is equal to 5000

F. Cardarelli, *Encyclopaedia of Scientific Units, Weights and Measures*

The old signs used for Roman numerals are listed below.

Table 6-2 Roman numerals

I	1	LXX	70
II	2	LXXX	80
III	3	XC	90
IV	4	IC	99
V	5	C	100
VI	6	CC	200
VII	7	CCC	300
VIII	8	CD	400
IX	9	D	500
X	10	DC	600
XX	20	DCC	700
XXX	30	DCCC	800
XL	40	CM	900
L	50	XM	990
LX	60	M	1000

Rule 1: If no letter precedes a letter of greater value, add the numbers represented by all the letters.

e.g.: XX is equal to 20, VII is equal to 7

Rule 2: If a letter precedes a letter of greater value, subtract the smaller from the greater; add the remainder or remainders thus obtained to the numbers represented by the other letters.

e.g.: IX is equal to 9, MCMXCVI is equal to 1996

6.3 Rules about Large Numbers (>1 000 000)

In France (since May 3rd, 1961), but also in Germany, the UK and other countries, large numbers expressed in powers of ten are given by the ***n rule***. The powers of ten are written as: $\mathbf{10^{6n}}$. For example, we get according to this rule 10^6: one million, 10^{12}: one billion, 10^{18}: one trillion, 10^{24}: one quadrillion, 10^{36}: one sextillion, etc.
In the USA, but also in Italy, the ***Latin rule*** or **(*n*−1) rule** remains in use for large numbers expressed in powers of ten. The powers of ten are written as: $\mathbf{10^{3n}}$ and the number is named (n – 1)illion. For example, we get: 10^6: one million, 10^9: one billion, 10^{12}: one trillion, 10^{15}: one quadrillion, 10^{18}: one quintillion, 10^{21} one sextillion, etc.

Note for French readers: the French word *milliard* ($=10^9$) has no legal validity, but it came into use in France as a translation of the American word billion. Other names ending in 'illiard' for numbers of the form 10^{6n+3} are: 10^9 milliard, 10^{15} billiard, 10^{21} trilliard, and 10^{27} quadrilliard.

Power of ten	UK, France (*n* rule)	USA, Italy (Latin rule)
10^6	million	million
10^9	(*milliard*)	billion
10^{12}	billion	trillion
10^{15}	billiard	quadrillion
10^{18}	trillion	quintillion
10^{21}	trilliard	sextillion

The name centillion ($n = 100$) is used sometimes. A centillion is 10^{303} in the American system and 10^{600} in the European system. In addition the googol is the number 10^{100}.

6.4 Date and Time Numerical Representation

The numerical representation of dates and times is very useful for data exchange in computers. Legal rules and procedures are given in the following ISO Standard: **ISO 8601: 1988 [Data elements and interchange formats, information interchange, representation of dates and times].**

For example, the numerical representation of the date **September 19th, 1995** should be written as:

1995-09-19

When exchanging data in electronic files, the separation between digits could be replaced by a blank space or omitted. This does not cause any confusion:

1995 09 19 or **95 09 19** or **19950919**

The numerical representation of time for **5 h 45 min 30 s p.m.** should be written as:

17 : 45 : 30

- the first number is written in two digits ranging from 00 to 23,
- the second number is composed of two digits ranging from 00 to 59,
- the third number is composed of two digits ranging from 00 to 59.

Time can also be written as a decimal number (according to second, minute or hour):

17 : 45 : 30.0 s; 17 : 45.5 min; 17.75833 h

Time and date can also appear together, for example September 19th, 1995 at 5 h 45 min and 30 s p.m should be written as follows:

1995 09 19 17 : 45 : 30 or in compressed mode 19950919174530.

If the time refers to the Universal Time Coordinate (UTC) the capital letter Z which describes the Greenwich meridian should be written at the end of the numerical time representation. If the previous described time corresponds to the time in New York City (USA), according to the time difference between the American city and the Greenwich meridian time (5 h) the time in UTC should be written as follows:

22 : 45 : 30 Z

6.5 National, Regional and International Standardization Bodies

This field covers standards and standardization bodies, both national and international.

6.5.1 International Standards Bodies

Table 6-3 International standards bodies

Acronym	Name	Address (headquarters)
BIPM	Bureau International des Poids et Mesures	Pavillon de Breuteuil, F-92312 Sèvres, Cedex FRANCE Telephone: +33 1 45 07 70 70 Fax: +33 1 45 34 20 21 E-mail: info@bipm.org Internet: http://www.bipm.fr.org
CIE	Commission Internationale de l'Éclairage	CIE Central Bureau, Kegelgasse 27, A-1030 Wien, Austria Telephone: +43 1 71 43 18 70 Fax: +43 1 71 30 83 818 E-mail: cieeb@ping.at Internet: http://members.eunet.at/cie/
CODATA	Committee on Data for Science and Technology	51, Boulevard de Montmorency, F-75016 Paris, FRANCE Telephone: +33 1 45 25 04 96 Fax: +33 1 45 88 14 66 E-mail: codata@dial.oleane.com Internet: http://www.codata.org
COPANT	Pan American Standards Commission	Av. Pte., roque Soenz Pena 501 7 Piso OF716, Buenos Aires, ARGENTINA E-mail: copant@viptel.com Internet: http://www.copant.org
EPO	European Patent Office	Erhardtstrasse, 27, D-80331 München, GERMANY Telephone: +49 89 23990 Fax: +49 89 23994560 Internet: http://www.epo.org
IAEA	International Atomic Energy Agency	P.O. Box 100, Wagramerstrasse 5, A-1400 Vienna, AUSTRIA Telephone: +43 1 2600-0 Fax: +43 1 2600-7 E-mail: official.mail@iaea.org Internet: http://www.iaea.org
IEC	International Electrotechnical Commission	3 rue de Varembé, P.O. Box 131, CH-1211 Geneva 20, SWITZERLAND E-mail: info@iec.ch Internet: http://www.iec.ch
ISO	International Organization for Standardization	1, rue de Varembe, Case Postale 56, CH-1211 Geneva 20, SWITZERLAND Telephone: +41 22 749 01 11 Fax: +41 22 733 34 30 E-mail: central@iso.org Internet: http://www.iso.org
ITU	International Telecommunication Union	Place des Nations, CH-1211 Geneva 20, SWITZERLAND Telephone: +41 22 730 6666 +41 22 730 5554 Fax: +41 22 730 5337 E-mail: helpdesk@itu.ch Internet: http://www.itu.ch/
IUCr	International Union of Crystallography	2 Abbey Square, Chester CH1 2HU, UK Telephone: +44 1 244 345 431 Fax: +44 1 244 344 843 E-mail: secretariat@iucr.org Internet: http://www.iucr.org

Table 6-3 *(continued)* International Standards bodies

Acronym	Name	Address (headquarters)
IUPAC	International Union of Pure and Applied Chemistry	Bank Court Way, Cowley Centre, Oxford OX4 3YF, UK Telephone: +44 01 865 747 774 Fax: +44 01 865 747 510 E-mail: secretariat@iupac.org Internet: http://www.iupac.org
IUPAP	International Union of Pure and Applied Physics	Department of Physics, University of Manitoba, 301 Allen Building, Winnipeg MB R3T 2N2, Canada. Telephone: +1 (204) 474 9817 Fax: +1 (204) 269 8489 E-mail: barber@physics.umanitoba.ca Internet: http.//www.iupap.org
NATO	North Atlantic Treaty Organization	Military Commitee, Conference of National Armament Directors, B-1110 Brussels, BELGIUM Internet: http.//www.nato.org

6.5.2 National Standards Bodies Worldwide

Today, most countries have a national standards organization that both leads and standardizes activities and acts within its own country as sales agents and an information centre for other national standardization bodies. The addresses of standardization bodies for countries around the world are as follows:

6.5.2.1 National Standards Bodies

The following table lists the ISO committee members, correspondent members [*] and subscribing members [#]. Each national standards body is completely described as follows: abbreviation, name, address, telephone and facsimile numbers, and where available, e-mail address and internet server.

Table 6-4 National standards bodies worldwide

Acronym	Name	Address (headquarters)
ABBS	Antigua and Barbuda Bureau of Standards [#]	P.O. Box 1550, Redcliffe Street, St. John's ANTIGUA AND BARBUDA Telephone: + 1 809 462 15 32 Fax: + 1 809 462 16 25
ABNT	Associaçao Brasileira de Normas Téchnicas	Av. 13 de Maio, No.13, 28o andar, Caxa Postal 1680, 200003-900, Rio de Janeiro-RJ, BRAZIL Telephone: +55 21 39 74 23 00 Fax: +55 21 22 20 17 62 E-mail: abnt@abnt.org.br Internet: http://www.abnt.org.br
AENOR	Asociación Española de Normalización y Certificación	Genova 8 ES-28004 Madrid, SPAIN Telephone: + 34 1 432 60 00 Fax: + 34 1 310 49 76 E-mail: aenor@aenor.es Internet: http://www.aenor.es

Table 6-4 *(continued)* National standards bodies worldwide

Acronym	Name	Address (headquarters)
AFNOR	Association Française de Normalisation	11, avenue Francis de Pressensé F-93571 Saint- Denis La Plaine Cedex, FRANCE Telephone: +33 1 41 62 80 00 Fax: +33 1 49 17 90 00 E-mail: uari@afnor.fr Internet: http://www.afnor.fr/
ANSI (ASA)	American National Standards Institute (previously American Standards Association and US of America Standards Institute)	25 West 43rd Street, 4th floor, New York, New York, 10036, USA Telephone: +1 212 642 49 00 Fax: +1 212 398 00 23 Internet: http://www.ansi.org E-mail: info@ansi.org
ASRO	Asociatia de Standardizare din Romania	Str. Mendeleev 21-25 RO-70168 Bucuresti 1 Telephone: +40 1 211 32 96 Fax: +40 1 210 08 33 E-mail: irs@kappa.ro
AZGOST	Azerbaijan State Standardization and Metrology Centre	Mardanov Gardashlary, 124 370078 Baku, AZERBAIJAN Telephone: +99 412 40 51 54 Fax: +99 412 40 37 98 E-mail: ahundov@azerin.com
BASMP	Institute for Standardization, Metrology and Intellectual Property of Bosnia and Herzegovina	Hamdije Cemerlica 2 (ENERGOINVEST building) 71000 Sarajevo, BOSNIA and HERZE GOVINA Telephone: +387 33 65 06 55 Fax: +387 33 65 06 56 E-mail: zsmp@bih.net.ba
BDS	Bulgarian State Agency for Standardization and Metrology	21, 6th September Str., 1000 Sofia, BULGARIA Telephone: +359 2 989 84 88 Fax: +359 2 986 17 07 E-mail: mail@sasm.orbitel.bg
BELST	State Committee for Standardization, Metrology and Certification of Belarus	Starovilensky Trakt 93, Minsk 220053, BELARUS Telephone: +375 172 37 52 13 Fax: +375 172 37 25 88 E-mail: belgiss@mail.belpak.by
BIS	Bureau of Indian Standards	Manak Bhavan, 9 Bahadur Sha Zafar Marg, New Delhi 110002, INDIA Telephone: +91 11 323 79 91 Fax: +91 11 323 93 99 E-mail: bisird@vsnl.net Internet: http://www.bis.org.in
BNM	Bureau de Normes de Madagascar	B.P. 1316 Antananarivo 101, MADAGASCAR Telephone: +261 20 22 238 60 Fax: +261 20 22 264 26
BNSI	Barbados National Standards Institution [*]	Flodden Culloden Road, St. Michael, BARBADOS Telephone: + 1 809 426 38 70 Fax: + 1 809 436 14 95 E-mail: office@bnsi.com.bb
BOBS	Botswana Bureau of Standards	Plot No. 14391, New Lobatse Road Gaborone West Industrial, Private Bag BO 48 Gaborone, BOTSWANA Telephone: +267 56 40 44 Fax: +267 56 40 42 E-mail: infoc@hq.bobstandards.bw

Table 6-4 *(continued)* National standards bodies worldwide

Acronym	Name	Address (headquarters)
BPS	Bureau of Products Standards	Department of Trade and Industry, 361 Sen. Gil J. Puyat Avenue, Makati, Metro Manila 1200, THE PHILIPPINES Telephone: +63 2 890 49 65 Fax: +63 2 890 51 31 E-mail: bps@dti.gov.ph Internet: http://www.dti.gov.ph/bps
BSI	British Standards Institution	389 Chiswick High Road, London W4 4AL, UK Telephone: +44 208 996 90 00 Fax: +44 208 996 74 00 E-mail: standards.international@bsi-global.com Internet: http://www.bsi-global.com
BSMD	Directorate of Standards and Metrology [*]	Ministry of Commerce Building 170 road 103 block 317 Diplomatic area PO Box 5479, BAHRAIN Telephone: + 973 52 30 30 Fax: + 973 53 07 30 E-mail: bsmd@batelco.com.bh
BSN	Badan Standardisasi Nasional	Manggala Wanabakti Blok 4, 4th Floor Jl. Jen deral Gatot Subroto 10, Jakarta 12710, INDONESIA Telephone: +62 21 574 70 43 Fax: +62 21 574 70 45 E-mail: bsn@bsn.or.id Internet: http://www.bsn.or.id
BSTI	Bangladesh Standards and Testing Institution	116/A, Tejgaon Industrial Area, Dhaka 1208, BANGLADESH Telephone: +880 2 88 14 62 Fax: +880 2 913 15 81 E-mail: bsti@bangla.net
CCNQ	Cellule de la Normalisation et de la Qualité	Ministère du développement industriel et com mercial, Direction du développement industriel, Yaoundé, CAMEROUN Telephone: +237 22 11 20 Fax: +237 22 95 86 E-mail: mindic.coop@camnet.cm
CEBENOR	Centre Béninois de Normalisation et de Gestion de la Qualité	Boulevard du Canada - Von Pharmacie Vodjé Quartier Cadjéhoun, Cotonou 02 BP 1101, BENIN Telephone: +229 30 10 36 Fax: +229 30 30 24 E-mail: cebenor@intnet.bj Internet: http:/www.industriebeninoise.org
CODINORM	Côte d'Ivoire Normalisation	Angle Rue du Commerce/Bd Botreau Roussel 5e Etage, Immeuble le Général Abidjan Plateau, CÔTE d'IVOIRE Telephone: +225 20 21 55 12 Fax: +225 20 21 56 11 E-mail: codinorm@africaonline.co.ci
COGUANOR	Comision Guatemalteca de Normas	8a. Avenida 10-43, Zona 1 GUATEMALA Telephone: +502 238 33 30 Ext. 1703 Fax: +502 238 330 Ext. 1775 E-mail: mbeteta@mail.mineco.gob.gt Internet: http://www.mineco.gob.gt/coguanor

Table 6-4 *(continued)* National standards bodies worldwide

Acronym	Name	Address (headquarters)
COHCIT	Consejo Hondureo de Ciencia y Tecnologia	Colonia Alameda Avenida Julio Lozano Dìaz, Casa No. 1354 Tegucigalpa, Apartado Postal 4458, M.D.C. HONDURAS Telephone: +504 232 56 69 Fax: +504 239 66 09 E-mail: cincanor@cohcit.gob.hn
CONACYT	Consejo Nacional de Ciencia y Tecnologia	Colonia Médica Ave. Dr. E. Alvarez y Pasaje Dr. Guillermo Rodrìguez Pacas no. 51 San Salvador, SALVADOR Telephone: +503 226 28 00 Fax: +503 225 62 55 E-mail: evanegas@conacyt.gob.sv Internet: http://www.conacyt.gob.sv
COPANIT	Comisión Panameña de Normas Industri ales y Técnicas	Ministerio de Comercio e Industrias Edificio Plaza Edison, Tercer Piso Avenida Ricardo J. Alfaro y Calle El Paical Apartado Postal 9658, Panama, Zona 4, PANAMA Telephone: +507 360 06 00 Ext. 2388 to 2394 Fax: +507 360 07 21 E-mail: dgnti@mici.gob.pa Internet: http://www.mici.gob.pa
COSQC	Central Organization for Standardization and Quality Control	Council of Ministers P.O. Box 13032 Al-Jaderiya, Baghdad, IRAQ Telephone: +964 1 778 05 95 Fax: +964 1 718 73 51 E-mail: cosqc@uruklink.net
CPRU	Construction Planning and Research Unit [*]	Ministry of Development, Brunei Darussalam, BRUNEI DARUSSALAM Telephone: + 673 2 38 10 33 Fax: + 673 2 38 15 41 E-mail: modcpru@brunet.bn Internet: http://www.mod.gov.bn
CPTTM	Macau Productivity and Technology Trans fer Center	Rua de Xangai, 175Edificio Associao Comercial de Macau, 6 andar, MACAU Telephone: +853 781 313 Fax: +853 788 233 E-mail: cpttm@cpttm.org.mo
CSBTS	China State Bureau of Technical Supervision	4, Zhichun Road, Haidan District, P.O. Box 8010, Beijing 100088, PEOPLE'S REPUBLIC OF CHINA Telephone: +86 10 20324 24 Fax: +86 10 203 37 37 E-mail: csbts@mail.csbts.cn.net Internet: http://www.csbts.cn.net
CSNI	Czech Standard Institute	Biskupsky dvur 5, 110 02 Praha 1, CZECH REPUBLIC Telephone: +42 02 21 80 21 11 Fax: +42 02 21 80 23 11 E-mail: internat.dept@csni.cz Internet: http://www.csni.cz
CSK	Committee for Standardization of the Dem ocratic People's Republic of Korea	Zung Gu Yok Seungli-Street, Pyongyang, DEMOCRATIC PEOPLE'S REPUBLIC of KOREA Telephone: +85 02 57 15 76 Fax: +85 02 381 44 80

Table 6-4 *(continued)* National standards bodies worldwide

Acronym	Name	Address (headquarters)
CSNQ	Comores Service de la Normalisation et de la Qualité	Direction générale de l'industrie et de l'artisanat B.P. 474 Moroni, COMORES Telephone: +269 74 42 32 Fax: +269 73 01 44 E-mail: minieco@snpt.km
CYS	Cyprus Organization for Standards and Control of Quality	Ministry of Commerce, Industry and Tourism, Nicosia 1421, CYPRUS Telephone: +357 2 86 71 90 Fax: +357 2 75 41 03 E-mail: mcicys@cytanet.com.cy
DBOS	Dominican Bureau of Standards	28 Kennedy Avenue, First Floor P.O. Box 1015 Roseau DOMINICA Telephone: +0 1 767 448 16 85 Fax: +0 1 767 449 92 17 E-mail: standards@cwdom.dm
DGN	Dirección General de Normas	Calle Puente de Tecamachalco No.6 Lomas de Tecamachalco, Seccion Fuentes, Naucalpan de Juárez, 53 950, MEXICO Telephone: +52 5 729 94 80 Fax: +52 5 729 94 84 E-mail: cidgn@economia.gob.mx Internet: http://www.economia-normas.gob.mx
DGSM	Directorate General for Specifications and Measurements [*]	Ministry of Commerce and Industry, P.O. Box 550 - Postal code No. 113, Muscat, Oman Telephone: + 968 70 32 38 Fax: + 968 79 59 92 E-mail: dgsm123@omantel.net.om Internet: http://www.mocioman.org
DIGENOR	Direccion General de Normas y Sistemas de Calidad	Edificio de Oficinas Gubernamentales Juan Pablo Duarte, Piso 11 Santo Domingo SANTO DOMINGO Telephone: +1 809 686 22 05 Fax: +1 809 688 38 43 E-mail:digenor@codetel.net.do
DIN	Deutsches Institut für Normung	Burggrafenstrasse 6, D-10787 Berlin, GERMANY Telephone: +49 30 26 01 0 Fax: +49 30 26 01 12 31 E-mail: directorate.international@din.de Internet: http://www.din.de
DPS	Drejtoria e Standardizimit dhe Cilesise	Rruga Mine Peza Str. Nr 143/3 P.O. Box 98, Tirana, ALBANIA Telephone: +355 42 2 62 55 Fax: +355 42 471 77 E-mail: dsc@icc.al.eu.org
DS	Dansk Standardiseringsraad	Kollegievej 6, DK-2920 Charlottenlund, DENMARK Telephone: +45 39 96 61 01 Fax: +45 39 96 61 02 E-mail: dansk.standard@ds.dk Internet: http://www.ds.dk/

Table 6-4 *(continued)* National standards bodies worldwide

Acronym	Name	Address (headquarters)
DSM	Department of Standards Malaysia	Ministry of Science, Technology & the Environ ment of Malaysia Level 1 & 2, Block C4, Parcel C Federal Government Administrative Centre Putrajaya 62502, MALAYSIA Telephone: +60 3 88 85 80 00 Fax: +60 3 88 88 50 60 E-mail: central@dsm.gov.my Internet: http://www.dsm.gov.my
DSTU	State Committee of Standardization, Metrology and Certification of Ukraine	174 Gorkiy Street, GSP, Kiev-6, 252650, UKRAINE Telephone: +380 44 226 29 71 Fax: +380 44 226 29 70 E-mail: dstu@issi.kiev.ua Internet: http://www.dstu.gov.ua
DZNM	State Office for Standardization and Metrology	Ulica grada Vukovara 78, 10000 Zagreb, CROATIA Telephone: +385 1 610 63 20 Fax: +385 1 610 93 20 E-mail: ured.ravnatelja@dznm.hr Internet: http://www.dznm.hr
ELOT	Hellenic Organization for Standardization	313. Acharnon Street, GR-111 45, Athens, GREECE Telephone: +30 1 21 20 100 Fax: +30 1 21 20 131 E-mail: elotinfo@elot.gr Internet: http://www.elot.gr
EOS	Egyptian Organization for Standardization and quality Control	16 Tadreeb EL-Modarrebeen Street El-Ameriya Cairo, EGYPT Telephone: +20 2 603 13 49 Fax: +20 2 259 34 80 E-mail: moi@idsc.net.eg Internet: http://www.eos.org.eg
EVS	Eesti Standardikeskus (National Standards Board of Estonia) [*]	Aru 10, EE-10317 Tallinn, Estonia Telephone: +372 605 50 50 Fax: +372 605 50 70 E-mail: info@evs.ee Internet: http://www.evs.ee
FASONORM	Direction de la Normalisation et de la Promotion de la Qualité	Office National du Commerce Extérieur B.P. 389 Ouagadougou 1, BURKINA FASO Telephone: +226 33 33 82 Fax: +226 31 14 69 E-mail: fasonorm@fasonet.bf
FONDO NORMA (former COVENIN)	Fondo para la Normalizacion y Certifica cion de la Calidad	Avenida Andrès Bello-Edf. Torre Fondo, Comùn, Piso 11 y 12, Apartado Postal 51116 Caracas 1050, VENEZUELA Telephone: +58 212 575 41 11 Fax: +58 212 574 13 12 E-mail: central@fondonorma.org.ve Internet: http://www.fondonorma.org.ve
FTSQCO	Fiji Trade Standards and Quality Control Office [#]	Ministry of Commerce, Industry and Tourism, Nabati House, Government Buildings, P.O. Box 2118 Suva, Fiji Telephone: + 679 30 54 11 Fax: + 679 30 26 17 E-mail: hwong@govnet.gov.fj

Table 6-4 *(continued)* National standards bodies worldwide

Acronym	Name	Address (headquarters)
GDBS	Grenada Bureau of Standards [#]	Lagoon Road St. George's, GRENADA Telephone: +1 473 440 58 86 Fax: +1 473 440 55 54 E-mail: gdbs@caribsurf.com Internet: http://www.spiceisle.com/ homepages/ gdbs
GNBS	Guyana National Bureau of Standards [#]	Sophia Exhibition Centre, Sophia Complex, P.O. Box 10926, Greater Georgetown, GUYANA Telephone: + 592 2 590 41 Fax: + 592 2 574 55 E-mail: gnbs@sdnp.org.gy Internet: http://www.sdnp.org.gy/gnbs
GOST R	State Comittee of the Russian Federation for Standardization, Metrology and Certification	Leninsky Prospekt 9, Moskva, 117049, RUSSIA Telephone: +7 095 236 40 44 Fax: +7 095 237 60 32 E-mail: info@gost.ru Internet: http://www.gost.ru
GSB	Ghana Standards Board	P.O. Box M 245, Accra, GHANA Telephone: +233 21 50 00 65 Fax: +233 21 50 00 92 E-mail: gsbnep@ghana.com
IANOR	Institut Algérien de Normalisation	5 et 7 rue Abou Hamou Moussa, B.P. 104 R.P Alger, ALGERIA Telephone: +213 21 64 20 75 Fax: +213 21 64 17 61 E-mail: ianor@wissal.dz Internet: http://www.ianor.org.dz
IBN/BIN	Institut Belge de Normalisation/ Belgisch Instituut voor Normalisatie	29, avenue de la Brabanconne, B-1040 Bruxelles 4, BELGIUM Telephone: +32 2 738 01 11 Fax: +32 2 733 42 64 E-mail: voorhof@ibn.be Internet: http://www.ibn.be
IBNORCA	Instituto Boliviano de Normalización y Calidad [#]	Calle Ricardo Mujia N' 665 entre Av. Victor Sanjines y C. Luis Uria de la Oliva, Zona: Sopo cachi, Casilla 5034, La Paz, BOLIVIA Telephone: + 591 2 31 72 62 Fax: + 591 2 31 72 62 E-mail: ibnorca@ceibo.entelnet.bo Internet: http://www.ibnorca.org
ICONTEC	Instituto Colombiano de Normas Téchnicas y Certificacion	Carrera 37 52-95, Edificio ICONTEC, P.O. Box 14237, Santafé de Bogotá, COLOMBIA Telephone: +57 1 315 03 77 Fax: +57 1 222 14 35 E-mail: isocol@icontec.org.co Internet: http://www.icontec.org.co
INDECOPI	Instituto Nacional de Defensa de la Compe tencia y de la Protección de la Propiedad Intelectual [*]	Calle La Prosa 138, San Borja, Lima 41, PERU Telephone: + 51 1 224 78 00 Fax: + 51 1 224 03 48 E-mail: farrunategui@indecopi.gob.pe Internet: http://www.indecopi.gob.pe

Table 6-4 *(continued)* National standards bodies worldwide

Acronym	Name	Address (headquarters)
INEN	Instituto Ecuatoriano de Normalización	Calle Baquerizo Moreno No. E8-29 (454) y Almagro Edificio INEN, Casilla 17-01-3999, Quito, ECUADOR Telephone: +593 2 56 56 26 Fax: +593 2 56 78 15 E-mail: inen1@inen.gov.ec Internet: http://www.ecua.net.ec/inen/
INN	Instituto Nacional de Normalización	Matías Cousino 64 - 6o piso, Castilla 995-Correo Central, Santiago, CHILE Telephone: +56 2 441 03 30 Fax: +56 2 441 04 27 E-mail: inn@inn.cl Internet: http://www.inn.cl
INNOQ	National Institute of Standardization and Quality [*]	C.P. 2983, Maputo, MOZAMBIQUE Telephone: +258 1 30 38 22 Fax: +258 1 30 36 58 E-mail: innoq@emilmoz.com
INNORPI	Institut National de la Normalisation et de la Propriété Industrielle	B.P. 23, 1012 Tunis-Belvédère, TUNISIA Telephone: +216 1 78 59 22 Fax: +216 1 78 15 63 E-mail: inorpi@email.ati.tn
INTENCO	Instituto de Normas Téchnicas de Costa Rica	Barrio González Flores Ciudad Cientifica de la Universidad de Costa Rica, San Pedro de Montes de Oca, San José, COSTA RICA Telephone: +506 283 45 22 Fax: +506 283 48 31 E-mail: carodriguez@inteco.or.cr Internet: http://www.inteco.or.cr
INTN	Instituto Nacional de Tecnología y Normalización [#]	Av. Artigas 3973 Casilla de Correo 967, Asunción, PARAGUAY Telephone: + 595 21 29 01 60 Fax: + 595 21 29 08 73 E-mail: intn@intn.gov.py
IPQ	Instituto Português da Qualidade	Rua Antonio Giro, 2 P-2829-513 Monte de Caparica, PORTUGAL Telephone: +351 1 294 81 00 Fax: +351 1 294 81 01 E-mail: ipq@mail.ipq.pt Internet: http://www.ipq.pt
IRAM	Instituto Argentino de Racionalización de Materiales	Chile 1192, 1098 Buenos Aires, ARGENTINA Telephone: +54 11 43 46 06 02 Fax: +54 11 43 46 06 05 E-mail: iram-iso@iram.org.ar Internet: http://www.iram.com.ar
ISC	Ministry of Industry, Mines and Energy [#]	Technical Department, 45 Blvd Norodom, Phnom Penh, Cambodia Telephone: +855 12 92 95 22 Fax: +855 23 98 23 03 E-mail: isc@bigpond.com.kh
ISIRI	Intitute of Standards and Industrial Research of Iran	P.O. Box 14155-6139, Teheran, Islamic Repub lic of IRAN Telephone: +98 261 22 60 31 Fax: +98 261 22 50 15 E-mail: standard@isiri.or.ir Internet: http://www.isiri.org

Table 6-4 *(continued)* National standards bodies worldwide

Acronym	Name	Address (headquarters)
IST	Icelandic Council of Standardization	Laugavegi 178 IS-105 Reykjavik, ICELAND Telephone: +354 520 71 50 Fax: +354 520 71 71 E-mail: stadlar@stadlar.is Internet: http://www.stadlar.is
ITCHK SAR	Industry Department[*]	36/F., Immigration Tower, 7 Gloucester Road, Wan Chai Hong Kong, HONG KONG Telephone: + 852 28 29 48 67 Fax: + 852 28 24 13 02 E-mail: psib@itc.gov.hk Internet: http://www.info.gov.hk/itc
JBS	Jamaica Bureau of Standards	6 Winchester Road, P.O. Box 113, Kingston 10, JAMAICA Telephone: +1 876 926 31 40-7 Fax: +1 876 929 47 36 E-mail: info@jbs.org.jm Internet: http://www.jbs.org.jm
JISC (JIS)	Japanese Industrial Standards Committee	Ministry of Economy, Trade and Industry, Tokyo 100 - 8901, JAPAN Telephone: +81 3 35 01 94 71 Fax:+81 3 35 80 86 37 E-mail: isojisc@meti.go.jp Internet: http://www.jisc.org/
JISM	Jordanian Institution for Standards and Metrology [*]	P.O. Box 941287, Amman 11194, JORDAN Telephone: + 962 6 68 01 39 Fax: + 962 6 68 10 99 E-mail: jism@nic.net.jo Internet: http://www.jism.gov.jo
KATS	Korean Agency for Technology and Standards	Ministry of Commerce, Industry and Energy 2, Joongang-dong, Kwachon-city Kyunggi-do 427- 716 PEOPLE's REPUBLIC of KOREA Telephone: +82 2 509 73 99 Fax: +82 2 503 79 77 E-mail: standard@ats.go.kr Internet: http://www.ats.go.kr
KAZMEMST	Committee for Standardization, Metrology and Certification	Pushkin str. 166/5 473000 Astana, KAZAKHSTAN Telephone: +7 317 2 39 50 84 Fax: +7 317 2 39 50 66 E-mail: kazinst@memst.kz Internet: http://www.memst.kz
KEBS	Kenya Bureau of Standards	Off Mombasa Road, Behind Belle Vue Cinema, P.O. Box 54974, Nairobi, KENYA Telephone: +254 2 50 22 10/19 Fax: +254 2 50 32 93 E-mail: kebs@africaonline.co.ke Internet: http://www.kebs.org
KOWSMD	Public Authority for Industry Standards and Industrial Services Affairs [*]	Post Box 4690 Safat, 13048 Kuwait City, KUWAIT Telephone: +965 431 84 51 Fax: +965 431 81 59 E-mail: kowsmd@pai.gov.kw
KYRGYZST	State Inspection for Standardization and Metrology [*]	197 Panfilova str., 720040 Bishkek, KYRGYZSTAN Telephone: +996 31 2 22 78 84 Fax: +996 31 2 66 13 67 E-mail: gost@kmc.bishkek.gov.kg Internet: http://www.kmc.bishkek.gov.kg

Table 6-4 *(continued)* National standards bodies worldwide

Acronym	Name	Address (headquarters)
LIBNOR	Lebanese Standards Institution [*]	Gedco Center 3, Bloc B, 9th & 10th floor She hab Avenue, between Mekalles & Hayek roundabouts Sin El Fil - Dekwaneh P.O. Box 55120 Beirut, LEBANON Telephone: +961 1 48 59 27 Fax: +961 1 48 59 29 E-mail: libnor@cnrs.edu.lb Internet: http://www.libnor.com
LNCSM	Libyan National Centre for Standardization and Metrology	Industrial Research, Centre Building, P.O. Box 5178, Tripoli, LIBYA Telephone: +218 21 369 30 74 Fax: +218 21 369 30 71
LSQAS	Standards and Quality Assurance Section	Ministry of Industry, Trade and Marketing P.O. Box 747 Maseru 100, LESOTHO Telephone: +266 31 28 02 Fax: +266 31 03 26 E-mail: lessqa@leo.co.ls
LST	Lithuanian Standards Board [*]	T. Kosciusko g.30, 2600 Vilnius, LITHUANIA Telephone: +370 2 70 93 60 Fax: +370 2 22 62 52 E-mail: lstboard@lsd.lt Internet: http://www.lsd.lt
LVS	Latvian National Center of Standardization and Metrology [*]	157, Kr. Valdemara Street, 1013 Riga, LATVIA Telephone: +371 7 37 13 08 Fax: +371 7 37 13 24 E-mail: lvs@lvs.lv Internet: http://www.lvs.lv
MBS	Malawi Bureau of Standards	P.O. Box 946 Blantyre, MALAWI Telephone: +265 67 04 88 Fax: +265 67 07 56 E-mail: mbs@malawi.net
MNCSM	Mongolian National Centre for Standard ization and Metrology	P.O. Box 48, Ulaanbatar, 211051, MONGOLIAN PEOPLE's REPUBLIC Telephone: +976 1 35 83 49 Fax: +976 1 35 80 32 E-mail: mncsm@mongol.net Internet: http://www.nmstandard.com
MOLDST	Moldavian Department of Standardization and Metrology	Str. Coca 28 Chisinau 2064, REPUBLIC of MOLDOVA Telephone: +373 2 74 85 88 Fax: +373 2 75 05 81 E-mail: moldovastandard@ standart.mldnet.com Internet: http://www.ournet.md/~standard
MSA	Malta Standards Authority	Second Floor, Evans Building Merchants Street, Valletta, VLT 03, MALTA Telephone: +356 21 24 24 20 Fax: +356 21 24 24 06 E-mail: info@msa.org.mt Internet: http://www.msa.org.mt
MLIDNI	Direction Nationale des Industries	Boîte postale 278, Bamako, MALI Telephone: +223 22 06 63 Fax: +223 22 61 37 E-mail: dnind@datatech.toolnet.org

Table 6-4 *(continued)* National standards bodies worldwide

Acronym	Name	Address (headquarters)
MSB	Mauritius Standards Bureau	Villa Lane, Moka, MAURITIUS Telephone: +230 433 36 48 Fax: +230 433 51 50 E-mail: msb@intnet.mu
MSIT	Major State Inspection of Turkmenistan [*]	Seydi, 14, 744000 Ashgabat, TURKMENISTAN Telephone: + 993 1 251 14 94 Fax: + 993 1 251 04 98 E-mail: nmsit@online.tm
MSZT	Magyar Szabványügyi Testület	Üllöi út 25, Pf. 24, H-1450 Budapest 9, HUNGARY Telephone: +36 1 456 68 00 Fax: +36 1 456 68 23 E-mail: isoline@mszt.hu Internet: http://www.mszt.hu
NBSM	Nepal Bureau of Standards and Metrology [*]	P.O. Box 985, Sundhara, Kathmandu, NEPAL Telephone: +977 1 35 06 89 Fax: +977 1 35 06 89 E-mail: nbsm@ccsl.com.np
NC	Oficina Nacional de Normalización	Calle E No.261 entre 11 y 13, Vedado, La Habana 10400, CUBA Telephone: +53 7 30 00 22 Fax: +53 7 33 80 48 E-mail: nc@ncnorma.cu
NISIT	National Institute of Standards and Industrial Technology [*]	P.O. Box 3042, National Capital District, Boroko Papua, NEW GUINEA Telephone: +675 323 18 52 Fax: +675 325 87 93 E-mail: nisit@datec.com.pg
NNI	Nederlands Normalisatie-Instituut	Vlinderweg 6,P.O. Box 5059, NL-2600 GB Delft, NEDERLANDS Telephone: +31 15 2 69 03 90 Fax: +31 15 2 69 01 90 E-mail: info@nen.nl Internet: http://www.nen.nl
NSAI	National Standards Authority of Ireland	Glasnevin House, Ballymun Road, Dublin 9, IRELAND Telephone: +353 1 807 38 00 Fax: +353 1 807 38 38 E-mail: nsai@nsai.ie Internet: http://www.nsai.ie
NSF	Norges Standardiserings Forbund	Drammensveien 145A, Postboks 353 Skoyen, N- 0213 Oslo, NORWAY Telephone: +47 22 04 92 00 Fax: +47 22 04 92 11 E-mail: firmapost@standard.no Internet: http://www.standard.no/
NSIQO	Namibia Standards Information and Qual ity Office	Ministry of Trade and Industry Goethe Street, Private Bag 13340 Windhoek, NAMIBIA Telephone: +264 61 283 71 11 Fax: +264 61 22 02 27 E-mail: ndishishi@mti.gov.na

Table 6-4 *(continued)* National standards bodies worldwide

Acronym	Name	Address (headquarters)
OCC	Office Congolais de Contrôle	98, Avenue du Port B.P. 8806 Kinshasa I, Com mune de la Gombe , The DEMOCRATIC REPUBLIC of CONGO Telephone: +243 88 051 27 Fax: +243 12 219 74 E-mail: occ_dir@yahoo.fr
ON	Österreichlishes Normungs-institut	Heinestrasse 38, Postfach 130, A-1021 Wien 2, AUSTRIA Telephone: +43 1 213 00 Fax: +43 1 213 00 650 E-mail: elisabeth.stampfl-blaha@on-norm.at Internet: http://www.on-norm.at
ORN	Office Rwandais de Normalisation	B.P. 6185 Kigali RWANDA Telephone: +250 829 45 Fax: +250 833 05 E-mail: pointfoc@rwandatel1.rwanda1.com
PASI	Palestine Standards Institution	P.O. Box 2258 Alburg Elakhdar Bldg. Nuzha Street Ramallah, PALESTINE Telephone: +972 2 298 41 44 Fax:+972 2 296 44 33 E-mail: standards@psi.gov.ps
PKN	Polish Committee for Standardization	ul. Swietokrzyska 14B, P.O. Box 411, 00-950 Warszawa, POLAND Telephone: +48 22 556 75 91 Fax: +48 22 556 77 86 E-mail: pl.isonb@pkn.com.pl Internet: http://www.pkn.pl
PSB	Singapore Productivity and Standards Board	1 Science Park Drive, Singapore, 118221, SINGAPORE Telephone: +65 278 66 66 Fax: +65 776 12 80 E-mail: cfs@psb.gov.sg Internet: http://www.psb.gov.sg
PSI	Pakistan Standards Institution	39 Garden Road, Saddar, Karachi-74400, PAKI STAN Telephone: +92 21 772 95 27 Fax: +92 21 772 81 24 E-mail: pakqltyk@super.net.pk
QS	Department of Standards, Measurements and Consumer Protection [*]	Ministry of Finance, Economy and Commerce, P.O. Box 1968, Doha, QATAR Telephone: + 974 40 85 55 Fax: + 974 42 54 49 E-mail: standard@qatar.net.qa
QSAE	Quality and Standards Authority of Ethio pia	P.O. Box 2310, Addis Ababa, ETHIOPIA Telephone: +251 1 46 05 25 Fax: +251 1 46 08 80 E-mail: qsae@telecom.net.et
SABS	South African Bureau of Standards	1 DrLategan Rd, Groenkloof, Private Bag, X191 Pretoria 0001, SOUTH AFRICA Telephone: +27 12 48 79 11 Fax: +27 12 344 15 68 E-mail: info@sabs.co.za Internet: http://www.sabs.co.za

Table 6-4 *(continued)* National standards bodies worldwide

Acronym	Name	Address (headquarters)
SAI	Standards Australia International Ltd.	286 Sussex Street (corner of Bathurst Street) GPO Box 5420 Sydney, NSW 2001, AUSTRALIA Telephone: +61 2 82 06 60 00 Fax: +61 2 82 06 60 01 E-mail: intsect@standards.com.au Internet: http://www.standards.com.au
SARM	Department for Standardization, Metrology and Certification [*]	Komitas Avenue 49/2, 375051 Yerevan, ARMENIA Telephone: + 374 2 23 56 00 Fax: + 374 2 28 56 20 E-mail: sarm@sarm.am Internet: http://www.sarm.am
SASMO	Syrian Arab Organization for Standardization and Metrology	P.O. Box 11836, Damascus, SYRIAN ARAB REPUBLIC Telephone: + 963 11 512 82 13 Fax: +963 11 512 82 14 E-mail: sasmo@net.sy
SASO	Saudi Arabian Standards Organization	Imam Saud Bin Abdul Aziz Bin Mohammed Road (West End), P.O. Box 3437 Riyadh 11471, SAUDI ARABIA Telephone: +966 1 452 00 00 Fax: +966 1 452 00 86 E-mail: saso@saso.org.sa Internet: http://www.saso.org.sa
SAZ	Standards Association of Zimbabwe	Northend Close, Northridge Park Borrowdale P.O. Box 2259, Harare, ZIMBABWE Telephone: +263 4 88 20 17 Fax: +263 4 88 20 20 E-mail: sazinfo@mweb.co.zw
SBS	Seychelles Bureau of Standards	Pointe Larue Mahé, P.O. Box 953 Victoria SEYCHELLES Telephone: +248 38 04 00 Fax: +248 37 51 51 E-mail: sbsorg@seychelles.net Internet: http://www.seychelles.net/sbsorg
SCC	Standards Council of Canada/ Association Canadienne de Normalisation	270 Albert Street, Suite 200, Ottawa, Ontario, K1P 6N7, CANADA Telephone: +1 613 238 32 22 Fax: +1 613 569 78 08 Internet: http://www.scc.ca/ E-mai: info@scc.ca
SEE	Service de l'Energie de l'Etat Organisme Luxembourgeois de Normalisation	34 avenue de la Porte-Neuve B.P. 10 L-2010 Luxembourg, LUXEMBOURG Telephone: +352 46 97 46 1 Fax: +352 46 97 46 39 E-mail: see.normalisation@eg.etat.lu Internet: http://www.see.lu
SFS	Suomen Standardisoimislütto	P.O. Box 116, FIN-00241 Helsinski, FINLAND Telephone: +358 0 149 93 31 Fax: +358 0 146 49 25 E-mail: efs@sfs.fi Internet: http://www.sfs.fi

Table 6-4 *(continued)* National standards bodies worldwide

Acronym	Name	Address (headquarters)
SII	Standards Institution of Israel	42 Chaim Levanon Sreet, University State, Tel Aviv 69977, ISRAEL Telephone: +972 3 646 51 54 Fax: +972 3 641 96 83 E-mail: iso/iec@sii.org.il Internet: http://www.sii.org.il
SIS	Standardiserings-kommissione n i Sverige	St Eriksgatan 115, Box 6455, S-118 80 Stockholm, SWEDEN Telephone: +46 8 55 55 20 00 Fax: +46 8 55 55 20 01 E-mail: info@sis.se Internet: http://www.sis.se
SIST	Slovenian Institute for Standardization	Ministry of Science and Technology, Smartinska 140 SI-1000 Ljubljana, SLOVENIA Telephone: +386 1 478 30 13 Fax: +386 1 478 30 94 E-mail: sist@sist.si Internet: http://www.sist.si
SLBS	Saint Lucia Bureau of Standards [#]	Heraldine Rock Building 4th floor, John Campton Highway, Castries, SAINT LUCIA Telephone: +1 758 453 00 49 Fax: +1 758 452 35 61 E-mail: slbs@candw.lc Internet: http://www.slbs.org.lc
SLSI	Sri Lanka Standards Institution	17 Victoria Place Off Elvitigala Mawatha, P.O. Box 17, Colombo 8, SRI LANKA Telephone: +94 1 67 15 74 Fax: +94 1 67 15 79 E-mail: dgslsi@sltnet.lk Internet: http://www.nsf.ac.lk/slsi
SNIMA	Service de Normalisation Industrielle Marocaine	Ministère de l'Industrie du Commerce, de l'Énergie et des Mines, Angle Avenue Kamal Zebdi et Rue Dadi Secteur 21 Hay Riad 10100 Rabat, MOROCCO Telephone: +212 37 71 62 14 Fax: +212 37 71 17 98 E-mail: snima@mcinet.gov.ma Internet: http://www.mcinet.gov.ma
SNV	Schweizerische Normen-Vereinigung	Burglistrasse 29 CH-8400 Winterthur SWITZERLAND Telephone: +41 1 254 54 54 Fax: +41 1 254 54 74 E-mail: info@snv.ch Internet: http://www.snv.ch
SNZ	Standards New Zealand	Standards House, 155 The Terrace, Wellington 6001, NEW ZEALAND Telephone: +64 4 498 59 90 Fax: +64 4 498 59 94 E-mail: nelson.procter@ standards.co.nz Internet: http://www.standards.co.nz
SON	Standards Organization of Nigeria	Federal Secretariat Complex, Phase 1, 9th Floor, Ikoyi, Lagos, NIGERIA Telephone: +234 1 26 96 178 Fax: +234 1 26 96 178 E-mail: son@sononline-ng.org Internet: http://www.sononline-ng.org

Table 6-4 *(continued)* National standards bodies worldwide

Acronym	Name	Address (headquarters)
SSMO	Sudanese Standards and Metrology Organi zation	P.O. Box 13573 Khartoum, SUDAN Telephone: +249 11 77 74 80 Fax: +249 11 77 48 52 E-mail: ssmo@sudanmail.net
SSUAE	Directorate of Standardization and Metrology [*]	Ministry of Finance and Industry, El Falah Street, P.O. Box 433, Abu Dhabi, United Arab Emirates Telephone: +971 2 674 77 88 Fax: +971 2 677 97 71 E-mail: standard.mofi@uae.gov.ae Internet: http://www.uae.gov.ae
SUTN	Slovak Standards Institution	P.O. Box 246 Karlovesk 63 SK-840 00 Bratislava 4 Bratislava, SLOVAKIA Telephone: +421 2 60 29 44 74 Fax: +421 2 65 41 18 88 E-mail: ms_post@sutn.gov.sk Internet: http://www.sutn.gov.sk
SZS	Savezni zavod za standardizaciju	Kneza Milosa 20, Post fah 609, YU-11000 Beo grad, YUGOSLAVIA Telephone: +381 11 361 31 50 Fax: +381 11 361 73 41 E-mail: jus@szs.sv.gov.yu
TBS	Tanzania Bureau of Standards	Ubungo Area, Morogoro Road/Sam Nujoma Road, P.O. Box 9524, Dar es Salaam, TANZANIA Telephone: +255 22 245 02 98 Fax: +255 22 245 09 59 E-mail: tbsinfo@uccmail.co.tz
TCVN	Directorate for Standards and Quality	70, Tran Hung Dao Street, Hanoi, VIETNAM Telephone: +84 4 822 16 14 Fax: +84 4 942 24 18 E-mail: qhqt1@hn.vnn.vn Internet: http://tcvn.gov.vn
TISI	Thai Industrial Standards Institute	Ministry of Industry, Rama VI Street, Bangkok 10400, THAILAND Telephone: +66 2 202 34 00-2 Fax: +66 2 247 87 41 E-mail: thaistan@tisi.go.th Internet: http://www.tisi.go.th
TSE	Türk Standardlari Enstitüsü	Necatibey Cad. 112, Bakanlikdar, 06100 Ankara, TURKEY Telephone: +90 312 417 83 30 Fax: +90 312 425 43 99 E-mail: usm@tse.org.tr Internet: http://www.tse.org.tr
TTBS	Trinidad and Tobago Bureau of Standards	1-2 Century Drive, Trincity Industrial Estate, Tunapuna, TRINIDAD AND TOBAGO Telephone: +1 868 662 88 27 Fax: +1 868 663 43 35 E-mail: ttbs@ttbs.org.tt Internet: http://www.ttbs.org.tt
UNBS	Uganda National Bureau of Standards	P.O. Box 6329, Kampala, Uganda Telephone: + 256 41 22 23 69 Fax: +256 41 28 61 23 E-mail: unbs@afsat.com Internet: http://www.unbs.org

Table 6-4 *(continued)* National standards bodies worldwide

Acronym	Name	Address (headquarters)
UNI	Ente Nazionale Italiano di Unificazione	Via Battislotti Sassi 11/b, I-20133 Milano, ITALY Telephone: +39 2 70 02 41 Fax: +39 2 70 10 61 49 E-mail: uni@uni.com Internet: http://www.uni.com
UNIT	Instituto Uruguayo de Normas Técnicas	Pza. Independencia 812, Piso 2, Montevideo, URUGUAY Telephone: +598 2 91 20 48 Fax: +598 2 92 16 81 E-mail: unit-iso@unit.org.uy Internet: http://www.unit.org.uy
UZGOST	Uzbek State Centre for Standardization, Metrology and Certification	Ulitsa Farobi, 333-A, 700049 Tachkent, UZBEKISTAN Telephone: +998 71 144 48 31 Fax: +998 71 144 80 29 E-mail: uzgost@naytov.com
ZSM	Zavod za standardizacija i metrologija	Ministry of Economy, Samoilova 10, 91000 Skopje, MACEDONIA Telephone: +389 223 91 15 Fax: +389 211 02 63 E-mail: zsm@zsm.gov.mk

6.5.2.2 US Standards and Standardizations Bodies, Technical Associations and Societies

The list below provides the full names and addresses of American and international standards bodies, professional and technical associations and societies whose acronyms are used in the designations listed in the ANSI catalogue.

Table 6-5 US and international standards bodies, professional associations and societies

Acronym	Name	Address (headquarters)
AA	The Aluminum Association, Inc.	900 19th Street NW, Washington DC 20006, USA Telephone: (202) 862-5100 Fax: (202) 862-5164 Internet: http://www.aluminum.org/
AAEE	American Academy of Environmental Engineers	130 Holiday Court, Suite 100 Annapolis, MD 21401 USA Telephone: (410) 266-3311 Fax: (410) 266-7653 Internet: http://www.enviro-engrs.org/
AAS	American Astronomical Society	2000 Florida Avenue, Suite 400, Washington, DC 20009-1231, USA Telephone: (202) 328-2010 Fax: 1 (202) 234-2560 E-mail: aas@aas.org Internet: http://www.aas.org/
AATCC	American Association of Textile Chemists and Colorists	One Davis Drive, P.O. Box 12215 Research Triangle Park, NC 27709-2215, USA Telephone: (919) 549-8141 Fax: (919) 549-8933 Internet: http://www.aatcc.org/

Table 6-5 *(continued)* US and international standards bodies, professional associations and societies

Acronym	Name	Address (headquarters)
ABGA	Abrasive Grain Association	30200 Detroit Road Cleveland, OH 44145, USA Telephone: (216) 899-0010
ACA	American Crystallographics Association	PO Box 96, Ellicott station, Buffalo NY 14205-0096, USA Telephone: (716) 856-9600 ext. 379 Fax: (716) 852-4846 E-mail: aca@hwi.buffalo.edu Internet: http://www.hwi.buffalo.edu/ACA/
ACerS	The Amercan Ceramic Society	P.O. Box 6136 Westerville, OH 43086-6136, USA Telephone: (614) 890-4700 Fax: (614) 899-6109 E-mail: info@acers.org Internet: http://www.ceramics.org/
ACI	American Concrete Institute	P.O. Box 19150, Detroit, MI 48219, USA Telephone: (313) 930-9277 Fax: (313) 930-9088 E-mail: service@cssinfo.com Internet: http://www.cssinfo/info/aci.html
ACS	The American Chemical Society	1155 16th Street, N.W., Washington, DC 20036, USA Telephone: (202) 872-4600 Internet: http://www.acs.org/
ACSB	The American Society for Cell Biology	8120 Woodmont Avenue, Suite 750, Bethesda, MD 20814-2762, USA Telephone: (301) 347-9300 Fax: (301) 347-9310 Internet: http://www.ascb.org/
ADA	American Dental Association	211E. Chicago Avenue, Chicago, IL 60611, USA Telephone: (312) 440-2500 Fax: (312) 440-2800 Internet: http://www.ada.org/
ADDA	American Design Drafting Association	P.O. Box 11937 Columbia, SC 29211, USA Telephone: (803) 771-0008 Fax: (803) 771-4272 Internet: http://www.adda.org/
AES	The American Electrophoresis Society	3338 Carlyle Terrace, Lafayette, CA 94549, USA Telephone: (925) 284-7186 Fax: (925) 283-5621 Internet: http://www.aesociety.org/
AESF	The American Electroplaters and Surface Fin ishers Society, Inc. (formerly the American Electroplaters' Society)	12644 Research Parkway, Orlando FL 32826-3298, USA Telephone: (407) 281-6441 Fax: (407) 281-6446 Internet: http://www.aesf.org/
AFMA	American Fiber Manufacturers Association	Internet: http://www.afma.org/
AFPA	American Forest and Paper Association	1111 19th Street, NW Suite 800 Washington, DC 20036, USA Telephone: (202) 463-2700 E-mail: info@afandpa.org Internet: http://www.afandpa.org/

Table 6-5 *(continued)* US and international standards bodies, professional associations and societies

Acronym	Name	Address (headquarters)
AGA	American Gas Association	400 N Capitol Street N.W., Washington DC 20001, USA Telephone: (202) 824-7000 Fax: (202) 824-7115 Internet: http://www.aga.org/
AGI	American Geological Institute	4220 King Street, Alexandria, VA 22302-1502, USA Internet: http://www.agiweb.org/
AGU	American Geophysical Union	2000 Florida Avenue N.W., Washington, DC 20009-1277, USA Telephone: (202) 462-6900 Fax: (202) 328-0566 E-mail: service@agu.org Internet: http://www.agu.org/
AHA	The American Hydrogen Association	1739 W. 7th Avenue, Mesa, AZ 85202-1906, USA Telephone: (480) 827-7915 Internet: http://www.clean-air.org/
AIA	The American Institute of Architects	1735 New York Avenue, NW Washington DC 20006, USA Telephone: 1-800-AIA-3837 Fax: (202) 626-7547 Internet: http://www.aia.org/
AIAA	American Institute of Aeronautics and Astronautics	Suite 500, 1801 Alexander Bell Drive, Reston, VA 20191-4344 USA Telephone: (703) 264-7500 Fax: (703) 264-7551 Internet: http://www.aiaa.org/
AIChE	American Institute of Chemical Engineers	3 Park Avenue, New York, NY10016-5901, USA Telephone: (212) 591-7338 Fax: (212) 591-8888 E-mail: xpress@aiche.org Internet: http://www.aiche.org/
AIE	American Institute of Engineers, Inc.	1018 Appian Way, El Sobrante, CA 94803-3142, USA Telephone: (510) 223-8911 Fax: (510) 223-8911 E-mail: aie@members-aie.org Internet: http://www.members-aie.org/
AIME	American Institute of Mining, Metallurgical, and Petroleum Engineers	3 Park Avenue, New York, NY10016-5998, USA Telephone: (212) 419 7676 Fax: (212) 419 7671 E-mail: aimeny@aimeny.org Internet: http://www.aimeny.org/
AIOA	American Iron Ore Association	Suite 915, 614 West Superior Avenue, Cleve land, OH 44113-1383, USA E-mail: information@aioa.org Internet: http://www.aioa.org/
AIP	American Institute of Physics	One Physics Ellipse, College Park, MD 20740-3843, USA Telephone: (301) 209-3100 Fax: (301) 209-0843 E-mail: aipinfo@aip.org Internet: http://www.aip.org/

Table 6-5 *(continued)* US and international standards bodies, professional associations and societies

Acronym	Name	Address (headquarters)
AISC	American Institute of Steel Construction	One East Wacker Drive, Suite 3100 Chicago, IL 60601-2001, USA Telephone: (312) 670-2400 Fax: (312) 670-5403 Internet: http://www.aisc.org/
AISE	Association of Iron and Steel Engineers	Three Gateway Center, Suite 1900, Pittsburgh, PA 15222-1004, USA Telephone: (412) 281-6323 Fax: (412) 281-4657 Internet: http://www.aise.org/
AISI	American Iron and Steel Institute	1101, 17th Street NW, Suite 1300 Washington D.C. 20036, USA Telephone: (202) 452-7100 Internet: http://www.steel.org/
AMS	American Meteorological Society	45, Beacon Street MA 02108-3693, Boston, USA Telephone: (617) 227-2425 Fax: (617) 742-8718 E-mail: amsinfo@ametsoc.org Internet: http://www.ametsoc.org/
AMSA	American Meat Science Association	1111 North Dunlap Avenue, Savoy, Illinois 61874 USA Telephone: (217) 356-5368 Fax: (217) 398-4119 Internet: http://www.meatscience.org/
ANMC	American National Metric Council	4340 East West Highway, Suite 401 Bethesda MD 20814-4411 USA Telephone: (301) 718-6508 Fax: (301) 656-0989 E-mail: anmc@paimgmt.com Internet: http://lamar.colostate.edu/~hillger/anmc.htm
ANS	American Nuclear Society	555 North Kensington Avenue, La Grange Park, IL 60526, USA Telephone: (708) 352-6611 Fax: (708) 579-0499 E-mail: nucleus@ans.org Internet: http://www.ans.org/
ANSI	American National Standard Institute	1819 L Street, NW, Washington, DC 20036, USA. Telephone: (202) 293-8020 Fax: (202) 293-9287 Internet: http://www.ansi.org/
APHA	American Public Health Association	800, I Street N.W., Washington D.C., 20001-3710 USA Telephone: (202) 777-APHA Fax: (202) 777-2534 E-mail: comments@apha.org Internet: http://www.apha.org/
API	American Petroleum Institute	1220 L Street NW, Washington D.C., 20005-4070, USA Telephone: (202) 682-8000 Internet: http://www.api.org/

Table 6-5 *(continued)* US and international standards bodies, professional associations and societies

Acronym	Name	Address (headquarters)
APS	American Physical Society	One Physics Ellipse, College Park, MD 20740-3844, USA Telephone: (301) 209-3200 Fax: (301) 209-0865 E-mail: opa@aps.org Internet: http:// aps.org/
ASA	Acoustical Society of America	Suite 1NO1, 2 Huntington Quadrangle Melville, NY 11747-4502, USA Telephone: (516) 576 2360 Fax: (516) 576 2377 E-mail: asa@aip.org Internet: http://asa.aip.org/
ASAE	American Society of Agricultural Engineers	2950 Niles Road, St Joseph, MI 49085, USA Telephone: (616) 429-0300 Fax: (616) 429-3852 Internet: http://www.asae.org/
ASAG	American Society for Agronomy	677 S.Segoe Road, Madison WI 53711, USA Telephone: (608) 273-8080 Internet: http://www.agronomy.org/
ASCE	American Society of Civil Engineers	1801 Alexander Bell Drive, Reston, VA 20191 USA Telephone: (800) 548-2723 Fax: (202) 289-6797 Internet: http://www.asce.org/
ASEE	American Society for Engineering Education	1818 N Street, N.W., Washington, DC 20036 USA Telephone: (202) 331-3500 Fax: (202) 265-8504 Internet: http://www.asee.org/
ASGHE	American Society for Gravitational and Space Biology	Internet: http://asgsb.indstate.edu/
ASHE	American Society for Healthcare Engineering	One North Franklin, 27th Floor, Chicago, IL 60606 USA Telephone: (312) 422-3800 Fax: (312) 422-4571 E-mail: ashe@aha.org Internet: http://www.ashe.org/
ASHRAE	American Society of Heating, Refrigerating and Air-Conditionning Engineers, Inc.	1791 Tullie Circle, N. E., Atlanta, GA 30329, USA Telephone: (404) 636-8400 Fax: (404) 321-5478 Internet: http://www.ashrae.org/
ASLO	American Society of Limnology and Oceanography	Internet: http://www.aslo.org/
ASM	American Society for Metals	9639 Kinsman Road, Materials Park, OH 44073-0002, USA Telephone: (440) 338-5151 Fax: (440) 338-4634 Internet: http://www.asminternational.org/
ASME	The American Society of Mechanical Engineers	Three Park Avenue, New York, NY 10016-5990, USA Telephone: (973)882-1167 E-mail: infocentral@asme.org Internet: http://www.asme.org/

Table 6-5 *(continued)* US and international standards bodies, professional associations and societies

Acronym	Name	Address (headquarters)
ASMS	The American Society for Mass Spectrometry	201 Don Diego Avenue, Santa Fe, NM 87505, USA Telephone: (505) 989-4517 Fax: (505) 989-1073 E-mail: office@asms.org Internet: http://www.asms.org/
ASNE	American Society of Naval Engineers	1452 Duke Street Alexandria, Virginia, 22314- 3458 Telephone: (703) 836-6727 Fax: (703) 836-7491 E-mail: asnehq@navalengineers.org Internet: http://www.navalengineers.org
ASQ	American Society for Quality	600 North Plankinton Avenue P.O. Box 3005, Milwaukee, WI 53201-3005, USA Telephone: (414) 272-8575 Fax: (414) 272-1734 E-mail: cs@asq.org Internet: http://www.asq.org/
ASSE	American Society of Safety Engineers	1800 E. Oakton St., Des Plaines, IL 60018 USA Telephone: (847) 699-2929 Fax: (847) 768-3434 E-mail: customerservice@asse.org Internet: http://www.asse.org/
ASTM	American Society for Testing and Materials	100 Barr Harbor Drive PO Box C700 W. Con shohocken PA 19428-2959 USA Telephone: (202) 862-5100 Internet: http://www.astm.org/
AVS	American Vacuum Society	120 Wall Street-32 floor, New York, NY 10005, USA Telephone: (212) 248-0200 Fax: (212) 248-0245 Internet: http://www.vacuum.org/
AWS	American Welding Society	550, NW LeJeune Road, P.O. Box 351040, Miami, Florida, FL 33126, USA Telephone: (305) 443-9353 Fax: (305) 443-7559 Internet: http://www.amweld.org/
AWWA	American Water Works Association	6666 West Quincy Avenue, Denver CO 80235, USA Telephone: (303) 347-7711 Internet: http://www.awwa.org/
AZA	American Zinc Association	1112 Sixteenth Street N.W. Suite 240 Washing ton DC 20036, USA Telephone: (202) 835-0164 Fax: (202) 835-0155 Internet: http://www.zinc.org/
CDA	Copper Development Association	260 Madison Avenue, New York, NY 10016, USA Telephone: (212) 251-7200 Fax: (212) 251-7234 E-mail: info@ccopper.org Internet: http://www.copper.org/

Table 6-5 *(continued)* US and international standards bodies, professional associations and societies

Acronym	Name	Address (headquarters)
DIS	Ductile Iron Society	28938 Lorain Road, Suite 202; North Olmsted, Ohio 44070, USA Telephone: (440) 734-8040 Fax: (440) 734-8182 E-mail: jhall@ductile.org Internet: http://www.ductile.org/
ECS	Electrochemical Society (formerly The Amer ican Electrochemical Society)	65 South Main Street, Pennington, Building D, NJ 08534-2839, USA Telephone: (609) 737-1902 Fax: (609) 737-2743 E-mail: ecs@electrochem.org Internet: http://www.electrochem.org/
EPRI	Electric Power Research Institute	3412 Hillview Avenue, Palo Alto, CA 94304-1395, USA Telephone: (415) 855-2000 E-mail: askepri@epri.com Internet: http://www.epri.com/
GI	Gold Institute	1112 16th Street, N.W., Suite 240, Washington D.C. 20036, USA Telephone: (202) 835-0185 Fax: (202) 835-0155 E-mail: info@goldinstitute.org Internet: http://www.goldinstitute.org/
GSA	The Geological Society of America	3300 Penrose Place, Boulder, P.O. Box 9140, CO 80301-9140, USA Telephone: (303) 447-2020 Fax: (303) 472-1988 E-mail: web@geosociety.org Internet: http://www.geosociety.org/
HFES	Human Factors and Ergonomics Society	P.O. Box 1369, Santa Monica, CA 90406-1369 USA Telephone: (310) 394-1811 Fax: (310) 394-2410 Email: info@hfes.org Internet: http://www.hfes.org/
IEA	Illuminating Engineering Society of North America	120 Wall Street, Floor 17 New York, NY 10005 USA Telephone: (212) 248-5000 Fax: (212) 248-5017/18 E-mail: iesna@iesna.org Internet: http://www.iesna.org/
IEEE	Institute of Electrical and Electronics Engineers	445 Hoes Lane, PO Box 1331, Piscataway, NJ 08855-1331, USA Telephone: (732) 981-0060 Fax: (732) 981-1721 E-mail: customer-service@ieee.org Internet: http://www.ieee.org/
ILZRO	International Lead-Zinc Research organization, Inc.	2525 Meridian Parkway - Post Office Box 12036, Research Triangle Park, NC 27709-2036, USA Telephone: (919) 361-4647 Fax: (919) 361-1957 E-mail: rputnam@ilzro.org Internet: http://www.ilzro.org/

Table 6-5 *(continued)* US and international standards bodies, professional associations and societies

Acronym	Name	Address (headquarters)
IMA	International Magnesium Association	6731 Whittier Avenue Suite C-100, McLean, Virginia 22101, USA Telephone: (703) 442-888 Fax: (703) 821-1824 E-mail: ima@bellatlantic.net Internet: http://www.intlmag.org/
IMAPS	International Microelectronics And Packaging Society	611 2nd Street, N.E., Washington, D.C. 20002, USA Telephone: (202) 548-4001 Fax: (202) 548-6115 Internet: http://www.imaps.org/
IMOA	International Molybdenum Association	2 Baron's Gate, 33 Rothschild Road, London SW4 5HT, UK Telephone: +44 20 8742 2274 Fax: +44 20 8742 7345 E-mail: enquires@imoa.org.uk Internet: http://www.imoa.org.uk/
IPMI	International Precious Metals Institute	4400 Bayou Blvd., Suite 18 Pensacola, FL 32503-1908, USA Telephone: (850) 476-1156 Fax: (850) 476-1548 E-mail: mail@ipmi.org Internet: http://www.ipmi.org/
ISA	Instrument Society of America	67 Alexander Drive, Research Triangle Park, NC 27709, USA Telephone: (919) 549-8411 Fax: (919) 549-8288 E-mail: info@isa.org Internet: http://ww.isa.org/
ISOE	The International Society for Optical Engi neering	1000 20th St. Po Box 10 Bellingham WA 98225-6705 USA Telephone: (360) 676-3290 Fax: (360) 647-1445 E-mail: spie@spie.org Internet: http://www.spie.org/
ITA	International Titanium Association	350 Interlocken Blvd., Suite 390, Broomfield, CO 80021-3485 USA Telephone: (303) 404-2221 Fax: (303) 404-9111 E-mail: info@titanium.org Internet: http://www.titanium.org/
ITIA	International Tungsten Industry Association	2 Baron's Gate, 33 Rothschild Road, London SW4 5HT, UK Telephone: +44 20 8742 2274 Fax: +44 20 8742 7345 E-mail: enquires@itoa.org.uk Internet: http://www.itoa.org.uk/
ITRI	International Tin Research Institute	Kingston Lane, Uxbridge, Middx, UB8 3PJ, UK Telephone: +44 (0)1895 272406 Fax: +44 (0)1895 251841 Internet: http://www.tintechnology.com/

Table 6-5 *(continued)* US and international standards bodies, professional associations and societies

Acronym	Name	Address (headquarters)
IZA	International Zinc Association	168 Avenue de Tervueren B-1150 Brussels Belgium Telephone: + 32 2 776 00 70 Fax: + 32 2 776 00 89 E-mail: email@iza.com Internet: http://www.iza.com/
LDA	Lead Development Association International	42 Weymount Street, London W1N 3LQ, UK Telephone: +44 0171 499 8422 Fax: +44 0171 493 1555 Internet: http://www.ldaint.org/
MIA	Marble Institute of America	30 Eden Alley Suite 301, Columbus, Ohio 43215 USA Tel: 614-228-6194 Fax: 614-461-1497 Internet: http://www.marble-institute.com/
MRS	Materials Research Society	06, Keystone Drive, Warrendale PA 15086-7573 USA Telephone: (724) 779-3003 Fax: (724) 779-8313 E-mail: info@mrs.org Internet: http://www.mrs.org/
MSA	Mineralogical Society of America	1015 Eighteenth Street NW, Suite 601 Wash ington, DC 20036-5212 USA Telephone: (202) 775-4344 Fax: (202) 775-0018 E-mail: j_a_speer@minsocam.org Internet: http://www.minsocam.org/
MTS	Marine Technology Society	5565 Sterrett Place #108, Columbia MD 21044 Telephone: (410) 884-5330 Fax: (410) 884-9060 Internet: http://www.mtsociety.org/
NACE	National Association of Corrosion Engineers	1440 South Creek Drive, Houston, TX 77084-4906, USA Telephone: (281) 228-6200 Fax: (281) 228-6300 Internet: http://www.nace.org/
NASA	National Aeronautics and Space Administration	Headquarters Washington DC, USA Internet: http://www. nasa.gov/
NFPA	National Fire Protection Association	1 Batterymarch Park Quincy, MA 02269-9101 USA Telephone: (617) 770-3000 Fax: (617) 770-0700 Internet: http://www.nfpa.org/
NHA	National Hydrogen Association	1800 M Street N.W., Suite 300 Washington, DC 20036-5802, USA Telephone: (202) 223-5547 Fax: (202) 223-5537 Internet: http://www.hydrogenus.com/
NiDI	Nickel Development Institute	214 King Street West, Suite 510 Toronto ON, Canada M5H 3S6 Telephone: (416) 591-7999 Fax: (416) 591-7987 Internet: http://www.nidi.org/

Table 6-5 *(continued)* US and international standards bodies, professional associations and societies

Acronym	Name	Address (headquarters)
NIST	National Institute for Standards and Technology	100 Bureau Drive, Stop 3460, Gaithersburg, MD 20899-3460, USA Telephone: (301) 975-6478 Fax: (301) 975-8295 E-mail: inquiries@nist.gov Internet: http://www.nist.gov/
NSF	National Science Foundation	4201 Wilson Boulevard, Arlington, VA 22230, USA Tel: (703) 292-5111 Fax: (703) 292-5090 Internet: http://www.nsf.gov/
NSPE	National Society of Professional Engineers	1420 King Street, Alexandria, VA 22314-2794, USA Telephone: (703) 684-2800 Fax: (703) 836-4875 Internet: http://www.nspe.org/
OSA	Optical Society of America	2010 Massachusetts Avenue, NW, Washington, DC 20036-1023 USA Telephone: (202) 223-8130 Fax: (202) 223-1096 E-mail: info@osa.org Internet: http://www.osa.org/
OSHA	Occupational Safety and Health Administration US Department of Labor	200 Constitution Avenue, N.W. Washington, D.C. 20210 Telephone: (202) 219-7162 Internet: http://www.osha.gov/
SAE	Society for Automotive Engineers	400, Commonwealth Drive, Warrendale, PA., 15096-0001, USA Telephone: (724) 776-4841 Fax: (724) 776-5760 Internet: http://www.sae.org/
SAME	Society of American Military Engineers	607 Prince Street, Alexandria, VA 22314-3117, USA Telephone: (703) 549-3800 Fax: (703) 684-0231 E-mail: same@same.org Internet: http://www.same.org/
SCC	Society of Cosmetic Chemists	120 Wall Street Suite 2400 New York, NY 10005-4088, USA Telephone: (212) 668-1500 Fax: (212) 668-1504 Internet: http://www.scconline.org/
SEG	Society of Exploration Geophysicists	8801 South Yale, PO Box 702740, Tulsa OK 74170-2740, USA Telephone: (918) 497-5500 Fax: (918) 497-5557 E-mail: web@seg.org Internet: http://www.seg.org/
SI	Salt Institute	700 N. Fairfax Street, Suite 600 Fairfax Plaza, Alexandria, VA 22314-2040, USA Telephone: (703) 549-4648 Fax: (703) 548-2194 Internet: http://www.saltinstitute.org/

Table 6-5 *(continued)* US and international standards bodies, professional associations and societies

Acronym	Name	Address (headquarters)
SIAM	Society for Industrial and Applied Mathemat ics	3600 University City Science Center, Philadel phia, PA 19104-2688 USA Telephone: (215) 382-9800 Fax: (215) 386-7999 E-mail: service@siam.org Internet: http://www.siam.org/
SILVI	Silver Institute	1112 16th Street, NW Suite 240, Washington DC 20036 USA Telephone: (202) 835-0185 Fax: (202) 835-0155 Internet: http://www.silverinstitute.org/
SIM	Society of Industrial Microbiology	3929 Old Lee Highway, Suite 92A, Fairfax VA 22030-2421, USA Telephone: (703) 691-3357 Fax: (703) 691-7991 E-mail: info@simhq.org Internet: http://www.simhq.org/
SME	Society of Manufacturing Engineers	One SME Drive, P.O. Box 930, Dearborn, MI 48121-0930, USA Telephone: (313) 271-1500 Fax: (313) 271-2861 Internet: http://www.sme.org/
SME	Society for Mining, Metallurgy, and Explora tion	8307 Shaffer Parkway, Littleton, CO 80127-4102, USA Telephone: (303) 973-9550 Fax: (303) 973-3845 E-mail: sme@smenet.org Internet: http://www.smenet.org/
SNAME	Society of Naval Architects and Marine Engi neers	601 Pavonia Avenue, Jersey City, NJ 07306 USA Telephone: (201) 798-4800 Fax: (201) 798-4975 Internet: http://www.sname.org/
SPE	Society of Petroleum Engineers	P.O. Box 833836, Richardson, TX 75083-3836, USA Telephone: (972) 952-9393 Fax: (972) 952-9435 E-mail: spedal@spe.org Internet: http://www.spe.org/
STDA	Selenium Tellurium Development Associa tion	Information Centre: 301 Borgtstraat B 1850 Grimbergen (Belgium) Telephone: +32 2 252 1490 Fax: +32 2 252 2775 E-mail: palmieri@pandora.be Internet: http://www.stda.be/
SVC	Society of Vacuum Coaters	71 Pinon Hill Place NE Albuquerque, NM 87122-1914 USA, USA Telephone: (505) 856-7188 Fax: (505) 856-6716 E-mail: svcinfo@svc.org Internet: http://www.svc.org/
TIC	Tantalum Niobium International Study Center	Washington Street, 40, Brussel B-1050 Bel gium Telephone: (02) 649 51 58 Fax: (02) 649 64 47 E-mail: tantniob@agoranet.be Internet: http://www.tanb.org

Table 6-5 *(continued)* US and international standards bodies, professional associations and societies

Acronym	Name	Address (headquarters)
TMS	The Mineral, Metals, and Materials Society	4184 Thorn Hill Road, Warrendale, PA 15086- 7514 USA Telephone: (724) 776-9000 Fax: (724) 776-3770 E-mail: tmsgeneral@tms.org Internet: http://www.tms.org/
TSI	The Sulphur Institute	1140 Connecticut Avenue, N.W., Suite 612 Washington, DC 20036 , USA Telephone: (202) 331-9660 Fax: (202) 293-2940 E-mail: sulphur@sulphurinstitute.org Internet: http://www.sulphurinstitute.org/
USGS	U.S. Geological Survey	12201 Sunrise Valley Drive Reston, VA 20192, USA Telephone: (703) 648-4000 Internet: http://www.usgs.gov/
USMA	U.S. Metric Association, Inc.	Sugarloaf Star Route, Boulder, Colorado, 80302, USA Internet: http://lamar.colostate.edu/~hillger/
USP	U.S. Pharmacopeia	12601 Twinbrook Parkway, Rockville, MD 20852, USA Telephone: (301) 881-0666 Fax: (301) 816-8148 Internet: http://www.usp.org/
USPTO	U.S. Patent and Trade Mark Office	Crystal Plaza 3, Room 2C02, Washington, DC 20231, USA Telephone: (703) 308-4357 Internet: http://www.uspto.gov/

6.6 Acceleration Due to Gravity at any Latitude and Elevation

If φ is the latitude and h the elevation in metres the acceleration in SI units is given by Helmert's equation (International Association of Geodesy (1930)):

$$g\ (\mathrm{m.s^{-2}}) = 9.780356\left[1 + (5.2884 \times 10^{-3} \sin^2 \varphi) - (5.9 \times 10^{-6} \sin^2 2\varphi)\right] - 3.086 \times 10^{-8} \mathrm{h\ (m)}$$

6.7 International Practical Temperature Scale (IPTS, 1968)

The International Practical Temperature Scale of 1968 (IPTS, 1968) amended in 1975 is defined by a set of extrapolation based on the following reference temperatures which are given in degrees Celsius and in kelvins:

Table 6-6 International Practical Temperature Scale of 1968

State of equilibrium	T_{68} (K)	t_{68} (°C)
hydrogen triple point	13.81	−259.34
hydrogen liquid-gas equilibrium at a pressure of 333 330.6 Pa	17.042	−256.108
hydrogen liquid-gas equilibrium (boiling point of hydrogen)	20.28	−252.87
neon liquid-gas equilibrium (boiling point of neon)	27.102	−246.048
oxygen triple point	54.361	−218.789
argon liquid-gas equilibrium (boiling point of argon)	83.798	−189.352
oxygen liquid-gas equilibrium (boiling point of oxygen)	90.188	−182.962
water[19] triple point	273.16	0.01
gallium triple point	302.9169 ± 0.0005	29.7669 ± 0.0005
water liquid-gas equilibrium (boiling point of water)	373.15	100.0
tin solid-liquid equilibrium (freezing point of tin)	505.1181	231.9681
zinc solid-liquid equilibrium (freezing point of zinc)	692.73	419.58
silver solid-liquid equilibrium (freezing point of silver)	1235.08	961.93
gold solid-liquid equilibrium (freezing point of gold)	1337.58	1064.43

[19] The water used must have the isotopic composition of sea water.

6.8 International Temperature Scale (ITS-90) [adopted at the 78th session of the CIPM (1989)]

Table 6-7 Fixed points in the International Temperature Scale of 1990 (ITS-90)

State of equilibrium	T_{90} (K)	t_{90} (°C)
helium[20] at saturated vapor pressure	3 to 5	−270.15 to −268.15
hydrogen[21] triple point	13.8033	−259.3467
hydrogen liquid-gas equilibrium (boiling point of hydrogen) at a pressure of 33 321.3 Pa	17.035	−256.115
hydrogen liquid-gas equilibrium (boiling point of hydrogen) at a pressure of 101 292 Pa	20.27	−252.88
neon triple point	24.5561	−248.5939
oxygen triple point	54.3584	−218.7916
argon triple point	83.8058	−189.3442
mercury triple point	234.3156	−38.8344
water[22] triple point	273.16	0.01
gallium triple point	302.9146	29.7646
indium solid-liquid equilibrium (freezing point of indium)	429.7458	156.5985
tin solid-liquid equilibrium (freezing point of tin)	505.078	231.928
zinc solid-liquid equilibrium (freezing point of zinc)	692.677	419.527
aluminium solid-liquid equilibrium (freezing point of aluminium)	933.473	660.323
silver solid-liquid equilibrium (freezing point of silver)	1234.93	961.78
gold solid-liquid equilibrium (freezing point of gold)	1337.33	1064.18
copper solid-liquid equilibrium (freezing point of copper)	1357.77	1084.62
Secondary reference points to extend the scale (IPTS-68)		
platinum solid-liquid equilibrium (freezing point of platinum)	2042	1769
rhodium solid-liquid equilibrium (freezing point of rhodium)	2236	1963
iridium solid-liquid equilibrium (freezing point of iridium)	2720	2447
tungsten solid-liquid equilibrium (melting point of tungsten)	3660	3387

[20] Isotopic natural composition except for 3-He.
[21] The hydrogen used must have the equilibrium composition of the molecules ortho-hydrogen and para-hydrogen.
[22] The water used must have the isotopic composition of sea water.

6.9 French-English Lexicon for Units

Table 6-8 French-English lexicon for units

Unit (UK, US)	translation
acre	acre
area	aire
bag	sac
barleycorn	grain d'orge
barrel	barril
beer	bière
board	planche
bolt	boulon
bucket	seau
bushel	boisseau
butt	barrique, fût, futaille, tonneau
cable length	encablure
calibre, caliber	calibre
capacity	capacité, volume
chain	chaîne
chaldron	chaudron
chopine	chope
cubic	cube
cubit	coudée
cup	coupe
drachm	petit verre
dram	goutte
dry	sec, sèche
ell	aune
fathom	brasse
fluid	fluide
foot	pied
furlong	long sillon
gallon	gallon
gill	gill
grain	grain
hay	foin
hock	jarret
hogshead	barrique, muid, tonneau
hundredweight	centpoids

Unit (UK, US)	translation
inch	pouce
league	lieue
line	ligne
link	chaînon, maillon
load	charge
mile	mille
minim	goutte
nail	ongle
ounce	once
pace	pas
palm	paume
peck	picotin
perch	perche
pint	pinte
point	point
pound	livre
quart	quart
quarter	quartier
rope	cordon
roquille	roquille
scruple (denier)	scripulum
seam	veine (mine)
span	empan
spirit	alcool, spiritueux
square	carré, quaré
stone	pierre, pavé
straw	paille
tablespoon	cuillère à soupe
teaspoon	petite cuillère
ton	tonne
township	canton
tumb	tambour
tun	fût
truss	botte
wine	vin
yard	verge

6.10 French-English Lexicon for Physical Quantities

The nomenclature for intensive properties according to French and English is the following:

- **Flux of the quantity *X***: $J_X = \dfrac{\partial X}{A\partial t}$
- Specific quantities (= mass basis): the adjective specific in the Engish term for an intensive physical quantity should be avoided if possible and should in all cases be restricted to the meaning divided by mass (mass of the system, if this consists of more than one component or more than one phase). In French, the adjective *massique* is used in the sense of divided by mass to express this concept.

  Examples:

Physical quantity	Symbol	Grandeur
specific volume	$v = V/m$	volume massique
specific energy	$e = E/m$	énergie massique
specific heat capacity	$c_p = C_p/m$	capacité thermique massique

- **Molar quantities** (= mole basis): The adjective molar in English which describes an intensive physical quantity should be restricted to the meaning divided by the amount of substance (the amount of substance of the system, if this consists of more than one component or more than one phase).

  Examples:

Physical quantity	Symbol	Grandeur
molar volume	$v_m = V/n$	volume molaire
molar energy	$e_m = E/n$	energie molaire
molar heat capacity	$c_{m,p} = C_p/n$	capacité thermique molaire

- **Density quantities**: the English term density for an intensive physical quantity (when it is not modified by the adjective linear or surface) usually implies division by volume for scalar quantities and division by area for a vector quantity denoting flow or flux. In French, the adjectives *volumique*, *surfacique* or *linéique* as appropriate are used with the name of a scalar quantity to express division by volume, area or length, respectively.

  Examples:

Physical quantity	Symbol	Grandeur
mass density	$\rho = m/V$	mass volumique
energy density	$e_v = E/V$	energie volumique
current density	$j = i/A$	densité de courant
surface charge density	$\sigma = Q/A$	charge surfacique

Table 6-9 French-English lexicon for physical quantities

English name	Nom Français
abundance	abondance
acoustic impedance	impédance acoustique
area	aire
capacitance	capacité
circumference	circonférence
coefficient of diffusion	coefficient de diffusion
coefficient of heat transfer	coefficient de transfert thermique
depth	profondeur
diameter	diamètre
distance	distance
dose equivalent	équivalent de dose
duration	durée
electric charge	charge électrostatique
electric current density	densité de courant électrique
electric current intensity	intensité de courant électrique
electric dipole moment	moment dipolaire électrique
electric field strength	champ électrique
electric inductance	inductance électrique
electric potential	potentiel électrique
electric potential difference	différence de potentiel électrique
electric quadrupole moment	moment quadrupolaire électrique
electric resistance	résistance électrique
electric resistivity	résistivité électrique
electrical conductance	conductance électrique
electrical conductivity	conductivité électrique
electrokinetic potential	potentiel électrocinétique
electromotive force	force électromotrice
energy	énergie
energy density	énergie volumique
energy of electromagnetic radiation	energy d'un rayonnement électromagnétique
entropy	entropie
enzymatic activity	activité enzymatique
exposure	exposition
fluence rate	débit de fluence
force	force
fraction	titre
heat	chaleur
heat insulation coefficient	coefficient d'isolation thermique
high	hauteur
hydrodynamic permeability	permeabilité hydrodynamique
hydrometre degree	degré aréométrique

Table 6-9 *(continued)* French-English lexicon for physical quantities

English name	Nom Français
hydrometer index	indice aréométrique
illuminance	éclairement lumineux
index of kinematic viscosity	indice de viscosité cinématique
interfacial tension	tension interfaciale
irradiance	radiance énergétique
length	longueur
linear mass density	masse linéique
linear momentum, momentum	moment linéaire, impulsion, quantité de mouvement
linear rate of corrosion	vitesse de corrosion linéaire
luminous flux	flux lumineux
luminous intensity	intensité lumineuse
luminous luminance	luminance lumineuse
magnetic dipole moment	moment mangnetique dipolaire
magnetic field strength	champ magnétique
magnetic flux density	densité de flux magnétique
magnetic induction field	champ d'induction magnétique
magnetizability	aimantation
mass	masse
mass flow rate	débit massique
molar density	densité molaire
molar electric charge	charge électrique molaire
molar entropy	entropie molaire
molar heat capacity	capacité thermique molaire
molarity, molar concentration	molarité
moment of a force	moment d'une force
normality	normalité
optical rotatory power	pouvoir rotatoire
period	periode
plane angle	angle plan
polarizability	polarisation
power	puissance
pressure	pression
quadratic moment of a plane area	moment quadratique d'une aire plane
quantity of electricity	quantité d'électricité
radiating power	puissance rayonnée
radioactivity	activité radioactive
radius	rayon
rate of exposure	débit d'exposition
solid angle	angle solide
specific acoustic impedance	impédance acoustique volumique
specific gravity	densité

Table 6-9 *(continued)* French-English lexicon for physical quantities

English name	Nom Français
specific heat capacity	capacité thermique massique
specific length	longueur massique
specific linear mass	masse linéique
specific volume	volume massique
speed	vitesse
stress	contrainte
surface	surface
surface tension	tension superficielle
temperature	température
thermal conductance	conductance thermique
thermal conductivity	conductivité thermique
thermal diffusivity	diffusivité thermique
thickness	épaisseur
time	temps
torque	couple
velocity	célérité
volume	volume
volume flow rate	débit volumique
wave length	longueur d'onde
wave number	nombre d'onde
weight	poids
width, breath	largeur
work	travail
yield, efficiency	rendement

6.11 International Clothing and Shoe Sizes (US, UK, Europe, and Japan)

Table 6-10 International clothing and shoe sizes

International women's clothing and shoes sizes							
Dresses, sweaters, shirts				Shoes			
Europe	USA	UK	Japan	Europe	USA	UK	Japan
34	5	6	4	35	4	2.5	21.5
36	6–7	7–8	5	36	5	3.5	22.0
38	8–9	9–10	7	37	6	4.5	22.5
40	10–11	11–12	9	38	7	5.5	23.5
42	12	14	11	39	8	6.5	24.5
44	14	15–16	13	40	9	7	–
46	16	18	–	41	10	8	–
48	18	20	–	42	11	9	–

Table 6-10 *(continued)* International clothing and shoe sizes

International men's clothing sizes				
Shirts, suits, overcoats, sweaters			**Underwear**	
Europe	**US/UK**	**Japan**	**US**	**Europe**
34	$13\frac{1}{2}$	S	34	5
36	14	36	36	6
37	$14\frac{1}{2}$	37	–	–
38	15	38/M	38	7
39	$15\frac{1}{2}$	39	–	–
40	16	41/L	40	8
41	$16\frac{1}{2}$	42	–	–
42	17	43	42	9
43	$17\frac{1}{2}$	44/LL		
44	34	S	44	10
46	36		46	11
48	38	M	48	12
50	40	L	–	–
52	42	–	–	–
54	44	LL	–	–
56	46		–	–

In addition to the sizes above, clothing sometimes uses approximate size measures, such as XS (Extra Small), S (Small), M (Medium), L (Large), and XL (Extra Large). These letters are especially common on T–shirts. Each letter may represent a range of two or three numbered sizes. Underwear comes in small, medium, large, or extra–large sizes. Pajamas are marked in sizes A, B, C, and D. The smallest is A and the largest is D. Suits are sold according to chest measurement and waist measurement in short, medium, or long lengths. Trousers are sold according to waist measurements (in inches) and inseam measurement (length of the seam in inches from the crotch seam to the bottom of the cuff). Shirts are sold according to neck measurement (in inches) and sleeve length if long sleeved (number of inches from the centre of the top back, across the shoulder, and down the arm of the bottom of the cuff). For example, 15×32 means 15 inches around the neck and 32-inch sleeve length. Sizes for gloves, socks, and stockings are the same in both the US and Europe. Sock sizes correspond to the length of the foot.

International men's hats sizes			
US	**UK**	**Europe**	**Japan**
$6\frac{3}{4}$	$6\frac{5}{8}$	54	54
6	$6\frac{3}{4}$	55	55
7	6	56	56
7	7	57	57
$7\frac{1}{4}$	7	58	58
$7\frac{1}{2}$	7	60	60

Note that men's hat sizes measure the diameter of the hat as if it were deformed into a perfect circle, while women's hat sizes measure the circumference directly.

International shoes sizes (US, UK, Europe, Japan)						
Europe/ Argentina	UK/US men	US women	Spain	France	Japan	Equivalent length (cm)
34.5	2	4	–	35	21.5	23
35	2.5	4.5	34	36	22	23.5
35.5	3	5	–	37	22.5	24
36	3.5	5.5	35	37.5	23	24.5
36.5	4	6	–	38	23.5	25
37	4.5	6.5	36	38.5	24	25.5
37.5	5	7	37	39	24.5	26
38.5	5.5	7.5	–	40	–	26.5
39	6	8	38	41	–	27
39.5	6.5	8.5	–	41.5	–	27.5
40	7	9	39	42	–	28
40.5	7.5	9.5	–	–	–	28.5
41	8	10	–	–	–	29
41.5	8.5	10.5	–	–	–	29.5
42.5	9	11	–	–	–	30
43	9.5	11.5	–	–	–	30.5
43.5	10	12	–	–	–	31
44	10.5	12.5	–	–	–	31.5
45	11	13	–	–	–	32
46	11.5	13.5	–	–	–	32.5
46.5	12	14	–	–	–	33
–	12.5	14.5	–	–	–	33.5
–	13	15	–	–	–	34

Notes: In the US, each whole shoe size differs by 1/3 of an inch while in Europe, whole shoe sizes differ by 2/3 cm. This makes the correspondences between US and European shoe sizes only approximative. European shoe sizes are the same for men and women while in the US a woman's shoe is about 1 to 1.5 sizes greater than the same length men's shoe. In the US, infant shoe sizes run from 0 (4 inches) to 13 (8.25 inches). These correspond to European sizes 15 to 31. Boy's shoe sizes run from 1 (8.5 inches) to 12 (12.25 inches). Girl's shoe sizes run from 1 (8.25 inches) to 9.5 (11 inches). Add 1 to the boy's size to get the equivalent girl's size.

6.12 Common Time Acronyms

Table 6-11 Common time acronyms

am	ante meridiem	before noon
pm	post meridiem	after noon
AD	anno domini	in the year of the Lord
CE	common era	–
a	annum	year
AUC	at urbe condita	from the founding of the city
BC	–	before Christ
BCE	–	before common era
BP	–	before present (e.g., 1952)
BID	bis in die	twice a day
QD	quaque die	once a day
QH	quaque ora	once an hour
QID	quarter in die	four times a day
TID	ter in die	three times a day

6.13 Old Alchemical Symbols Used in Astronomy, Chemistry, and Biology

Table 6-12 Old alchemical symbols

Symbol	Designation (planet, element)
☉	Sun, gold
☿	Mercury
♀	Venus, copper, female sex
♁	Earth, terra
☾, ☽	Moon, silver
♂	Mars, iron, male sex
♃	Jupiter, tin
♄	Saturn, lead
♌	arsenic
△	sulphur

6.14 International Geological Time Scale

Table 6-13 International Geological Time Scale

Era	Period	Epoch	Age	Ma
CENOZOIC	QUATERNARY	Holocene	Versilien	0.01
		Pleistocene	Tyrrhenian	0.05
			Sicilian	0.5
			Calabrian	1.8
	NEOGENE	Pliocene	Piacenzian	3.6
			Zanclean	5.3
		Miocene	Messinian	7.1
			Tortonian	11.2
			Serravallian	14.8
			Langhian	16.4
			Burdigalian	20.5
			Aquitanian	23.8
	PALEOGENE	Oligocene	Chattian	28.5
			Rupelian (Stampian)	33.7
		Eocene	Priabonian	37.0
			Bartonian	41.3
			Lutetian	49.0
			Ypresian	54.8
		Paleocene	Thanetian	57.9
			Selandian	61.0
			Danian-Montian	65.0
MESOZOIC	CRETACEOUS	Senonian	Maastrichtian	71.3
			Campanian	83.5
			Santonian	85.8
			Conician	89
			Turonian	93.5
			Cenomanian	99
		Middle	Albian	112
			Aptian	121
		Neocomian	Barremian	127
			Hauterivian	132
			Valanginian	137
			Berriasian	144
	JURASSIC	Malm	Tithonian (Portlandian)	151
			Kimmeridgian	154
			Oxfordian	159

Table 6-13 *(continued)* International Geological Time Scale

Era	Period	Epoch	Age	Ma
MESOZOIC *(continued)*	JURASSIC *(continued)*	Dogger	Callovian	164
			Bathonian	169
			Bajocian	176
			Aalenian	180
		Lias	Toarcian	190
			Pliensbachian	195
			Sinemurian	202
			Hettangian	206
	TRIASSIC	Rhaetian	Rhaetian	210
		Keuper	Norian	221
			Carnian	227
		Mushelkalk	Ladinian	234
			Anisian	242
		Bundsanstein	Spathian	245
			Nammalian	246
		Scythian	Griesbachian	248
PALEOZOIC	PERMIAN	Thuringian	Tatarian	248
			Ufimian-Kazanian	252
		Saxonian	Kungurian	256
			Artinkian	260
		Autunian	Sakmarian	269
			Asselian	282
	CARBONIFEROUS	Pennsylvanian	Gzelian (Stephanian)	290
			Kasimovian	296
			Moscovian	303
			Bashkirian (Westphalian)	311
		Mississippian	Serpukhovian (Namurian)	323
			Viean	327
			Tournaisian	342
	DEVONIAN	Late	Famennian	354
			Frasnian	364
		Middle	Givetian	370
			Eifelian (Couvinian)	380
		Early	Wenlockian	423
			Llandoverian	428

Table 6-13 *(continued)* International Geological Time Scale

Era	Period	Epoch	Age	Ma
PALEOZOIC *(continued)*	ORDOVICIAN	Late	Ashgillian	443
			Caradocian	449
		Middle	Llandeilian	458
			Llanvirnian	464
		Early	Arenigian	470
			Tremadocian	485
	CAMBRIAN	Postdamian	Dolgellian	490
			Maentwrogian	500
			Menevian	530
		Acadian	Solvan	536
			Lenian	554
		Georgian	Atdabanian	560
			Tommotian	570
PRECAMBRIAN (ANTE-PHANEROZOIC)	ALGONKIAN (PROTEROZOIC)	Vendian	Poundian	580
			Wonokanian	590
			Mortensnesian	600
			Smalfjordian	610
		Sinian	Sturtian	800
		Riphean	Karatau	1050
			Yurmatin	1350
			Burzyan	1650
		Animikean		2200
		Huronian		2450
	ARCHEAN	Laurentian	Randian	2800
			Swazian	3500
		Keewatinien	Isuan	3800
		Hadean	Imbrian	3850
			Nectarian	3950
			Cryptic	4560

6.15 Old Symbols Used in the British System

In some of the oldest British textbooks used in pharmacy, it is possible to find old notations for British units of weights and capacity (apothecaries' units). Symbols were usually used for writing the quantities of units of the apothecaries' system on prescriptions. Occasionally abbreviations were used. These old symbols were taken directly from ancient times (e.g. the Middle Ages), when alchemy and cabalistic beliefs were one discipline. Some of these symbols used capital letters from the Cyrillic alphabet.

Table 6-14 Obsolete symbols for British apothecaries' units

Old symbol	Unit, name	
℈ ap		scruple apoth.
℈ i, j	1	scruple apoth.
℈ i, ss	3/2	scruple apoth. (semis)
℈ ii, jj	2	scruple apoth.
ʒ ap		drachm apoth.
ʒ i, j	1	drachm apoth.
ʒ i, ss	3/2	drachm apoth. (semis)
ʒ ii, jj	2	drachm apoth.
℥ ap		ounce apoth.
℥ i, j	1	ounce apoth.
℥ i, ss	3/2	ounce apoth. (semis)
℥ ii, jj	2	ounce apoth.
Cong.		gallon (from Latin *Congius*)
O.		pint (from Latin *Octarius*)
f ʒ ℥		fluid dram
f ʒ		fluid ounce
♍		minim or drop

6.16 Electromagnetic Spectrum

Table 6-15 Electromagnetic spectrum

Electromagnetic radiation			Wavelength range	Wave number range	Energy range
Ionizing radiation[23]	Gamma rays (γ-rays)		100 000 to 0.1 fm	1 000 to 10 nm^{-1}	12.4 MeV to 12.4 keV
	X-rays	hard (HXR)	0.1 to 1.0 nm	10 000 to 1000 μm^{-1}	12.40 to 1.24 keV
		soft (SXR)	1.0 to 10 nm	1 000 to 100 μm^{-1}	1240 to 124 eV
	Ultraviolet (UV)	extreme (EUV)	10 to 100 nm	100 to 5.556 μm^{-1}	124 to 12.4 eV
		vacuum (VUV)	100 to 180 nm	100 to 55.56 μm^{-1}	12.4 to 6.89 eV
Non-ionizing		far-UV (FUV)	180 to 200 nm	55 556 to 50 000 cm^{-1}	6.89 to 6.20 eV
		near-UV (NUV)	200 to 380 nm	50 000 to 26 316 cm^{-1}	6.20 to 3.26 eV
	Visible light (Vis)		380 to 780 nm	26 316 to 12 821 cm^{-1}	3.26 to 1.59 eV
	Infra-red (IR)	near (NIR)	0.78 to 2.5 μm	12 821 to 4 000 cm^{-1}	1.59 to 0.496 eV
		medium (MIR)	2.5 to 50 μm	4 000 to 200 cm^{-1}	0.496 to 0.025 eV
		far (FIR)	50 to 1000 μm	200 to 10 cm^{-1}	25 to 1.24 meV
	Microwaves (MW)		0.1 to 100 cm	10 to 0.01 cm^{-1}	1240 to 1.24 μeV
	Radiowaves (RW)		1 to 1 000 m	1 to 0.001 m^{-1}	1240 to 1.24 neV

[23] In radioprotection, an electromagnetic radiation is defined as ionizing if its energy is above 12 eV, i.e., if it is able to ionize both atoms and molecules constituting living matter.

6.17 Standard Paper Sizes (ISO and US)

ISO Standard Paper Sizes: ISO standard paper size is an international paper sizes designation grouped into three series, denoted respectivelyby A*n*, B*n*, and C*n*. Increasing the number *n* by 1 halves the surface area of the sheet, i.e., for example, an A5 sheet is an A4 sheet cut in half. By definition the preferred number series begin by the basic sheet denoted: A0 which is 841 mm × 1189 mm, and hence exhibits a surface area of one square meter exactly and the ratio between the height (*h*) and width (*w*) of a sheet is always the square root of two (i.e., $\sqrt{2}$). The basic relationships between the A0 and other A*n* format is given by the two equations listed in table. For example, the A4 sheet (i.e., the standard size for business letters) exhibits a surface area of 1/16 square meter. The surface area of a B*n* sheet is the area of the A*n* sheet multiplied by the square root of two. For instance, a B5 sheet exhibits a surface area $\sqrt{2}$ times that of an A5 sheet. Finally, the C*n* size, intended mostly for envelopes, has a surface area equal to the fourth root of two (i.e., $\sqrt[4]{2}$) times the surface area of the A*n* sheet.

Table 6-16 ISO standard paper sizes: designation and formulae

ISO paper sheet format	Width (w, m)	Height (l, m)	Surface area (S, m^2)
An	$2^{-\left(\frac{n}{2}+\frac{1}{4}\right)}$	$2^{\left(\frac{1}{4}-\frac{n}{2}\right)}$	2^{-n}
Bn	$2^{\frac{n}{2}}$	$2^{\left(\frac{1}{2}-\frac{n}{2}\right)}$	$2^{-n+\frac{1}{2}}$
Cn	$2^{-\frac{n}{2}-\frac{1}{8}}$	$2^{-\frac{n}{2}+\frac{3}{8}}$	$2^{-n+\frac{1}{4}}$

$S(\mathrm{A0}) = 1\ \mathrm{m}^2$ (E) (by definition); $S(\mathrm{A}n) = 2S(\mathrm{A}n+1)$; and
$S(\mathrm{A}n) = h(\mathrm{A}n) \times w(\mathrm{A}n) = \sqrt{2}w^2(\mathrm{A}n) = 2^{-\mathrm{n}} \times S(\mathrm{A0})$
$h(\mathrm{A}n) = \sqrt{2}\mathrm{w}(\mathrm{A}n)$ and $l(\mathrm{A}n) = \sqrt{2}l(\mathrm{A}n+1)$ (rounded to the nearest mm)
$S(Bn) = \sqrt{2}S(An)$ and $S(\mathrm{C}n) = \sqrt[4]{2}S(\mathrm{A}n)$

Table 6-17 ISO An, Bn, and Cn paper sheet formats

An series		Bn series		Cn series	
4A0	1682 × 2378	–	–	–	–
2A0	1189 × 1682	–	–	–	–
A0	841 × 1189	B0	1000 × 1414	C0	917 × 1297
A1	594 × 841	B1	707 × 1000	C1	648 × 917
A2	420 × 594	B2	500 × 707	C2	458 × 648
A3	297 × 420	B3	353 × 500	C3	324 × 458
A4	210 × 297	B4	250 × 353	C4	229 × 324
A5	148 × 210	B5	176 × 250	C5	162 × 229
A6	105 × 148	B6	125 × 176	C6	114 × 162
A7	74 × 105	B7	88 × 125	C7	81 × 114
A8	52 × 74	B8	62 × 88	C8	57 × 81
A9	37 × 52	B9	44 × 62	C9	40 × 57
A10	26 × 37	B10	31 × 44	C10	28 × 40

Table 6-18 US paper sizes

Standard designation	Dimensions
letter size	8.5 in × 11 in
legal size	8.5 in × 14 in
ledger size (Tabloid)	11 in × 17 in
executive size	7.25 in × 10.5 in
A paper	8.5 in × 11 in
B paper	11 in × 17 in
C paper	17 in × 22 in
D paper	22 in × 34 in
E paper	34 in × 44 in

6.18 International Country Code Designations

Table 6-19 International country code designations (ISO, IANA, UN, and IOC)

Country name	ISO 2-alpha	ISO 3-alpha	IANA Internet	UN	IOC	UN/ISO numeric
Afghanistan	AF	AFG	.af	AFG	AFG	004
Albania	AL	ALB	.al	AL	ALB	008
Algeria	DZ	DZA	.dz	DZ	ALG	012
American Samoa	AS	ASM	.as		ASA	016
Andorra	AD	AND	.ad	AND	AND	020
Angola	AO	AGO	.ao		ANG	024
Anguilla	AI	AIA	.ai			660
Antarctica	AQ	ATA	.aq			010
Antigua and Barbuda	AG	ATG	.ag		ANT	028
Argentina	AR	ARG	.ar	RA	ARG	032
Armenia	AM	ARM	.am	ARM	ARM	051
Aruba	AW	ABW	.aw		ARU	533
Ascension Island			.ac			
Australia	AU	AUS	.au	AUS	AUS	036
Austria	AT	AUT	.at		AUT	040
Azerbaijan	AZ	AZE	.az	AZ	AZE	031
Bahamas	BS	BHS	.bs	BS	BAH	044
Bahrain	BH	BHR	.bh	BRN	BRN	048
Bangladesh	BD	BGD	.bd	BD	BAN	050
Barbados	BB	BRB	.bb	BDS	BAR	052
Belarus	BY	BLR	.by		BLR	112
Belgium	BE	BEL	.be	B	BEL	056
Belize	BZ	BLZ	.bz		BIZ	084
Benin	BJ	BEN	.bj		BEN	204
Bermuda	BM	BMU	.bm		BER	060
Bhutan	BT	BTN	.bt		BHU	064
Bolivia	BO	BOL	.bo	BOL	BOL	068
Bosnia and Herzegovina	BA	BIH	.ba	BIH	BIH	070
Botswana	BW	BWA	.bw		BOT	072
Bouvet Island	BV	BVT	.bv			074
Brazil	BR	BRA	.br	BR	BRA	076
British Indian Ocean Territory	IO	IOT	.io			086
Brunei Darussalam	BN	BRN	.bn	BRU	BRU	096
Bulgaria	BG	BGR	.bg	BG	BUL	100
Burkina Faso	BF	BFA	.bf		BUR	854
Burundi	BI	BDI	.bi	RU	BDI	108
Cambodia	KH	KHM	.kh	K	CAM	116

Table 6-19 *(continued)* International country code designations (ISO, IANA, UN, and IOC)

Country name	ISO 2-alpha	ISO 3-alpha	IANA Internet	UN	IOC	UN/ISO numeric
Cameroon	CM	CMR	.cm	CAM	CMR	120
Canada	CA	CAN	.ca	CDN	CAN	124
Cape Verde	CV	CPV	.cv		CPV	132
Cayman Islands	KY	CYM	.ky		CAY	136
Central African Republic	CF	CAF	.cf	RCA	CAF	140
Chad (Tchad)	TD	TCD	.td	TCH	CHA	148
Channel Islands						830
Chile	CL	CHL	.cl	RCH	CHI	152
China	CN	CHN	.cn	RC	CHN	156
Christmas Island	CX	CXR	.cx			162
Cocos (Keeling) Islands	CC	CCK	.cc			166
Colombia	CO	COL	.co	CO	COL	170
Comoros	KM	COM	.km		COM	174
Congo (Republic of)	CG	COG	.cg	RCB	CGO	178
Congo (The Democratic Republic of)	CD	COD	.cd	ZRE	COD	180
Cook Islands	CK	COK	.ck		COK	184
Costa Rica	CR	CRI	.cr	CR	CRI	188
Côte D'ivoire (Ivory Coast)	CI	CIV	.ci	CI	CIV	384
Croatia (Hrvatska)	HR	HRV	.hr	HR	CRO	191
Cuba	CU	CUB	.cu	CU	CUB	192
Cyprus	CY	CYP	.cy	CY	CYP	196
Czech Republic	CZ	CZE	.cz	CZ	CZE	203
Denmark	DK	DNK	.dk	DK	DEN	208
Djibouti	DJ	DJI	.dj		DJI	262
Dominica	DM	DMA	.dm		DMA	212
Dominican Republic	DO	DOM	.do	DOM	DOM	214
East Timor (Formerly Portuguese Timor)	TP	TMP	.tp			626
Ecuador	EC	ECU	.ec	EC	ECU	218
Egypt	EG	EGY	.eg	ET	EGY	818
El Salvador	SV	SLV	.sv	ES	ESA	222
Equatorial Guinea	GQ	GNQ	.gq		GEQ	226
Eritrea	ER	ERI	.er		ERI	232
Estonia	EE	EST	.ee	EST	EST	233
Ethiopia	ET	ETH	.et	ETH	ETH	231
Faeroe Islands	FO	FRO	.fo			234
Falkland Islands (Malvinas)	FK	FLK	.fk			238

Table 6-19 *(continued)* International country code designations (ISO, IANA, UN, and IOC)

Country name	ISO 2-alpha	ISO 3-alpha	IANA Internet	UN	IOC	UN/ISO numeric
Fiji	FJ	FJI	.fj	FJI	FIJ	242
Finland	FI	FIN	.fi	FIN	FIN	246
France	FR	FRA	.fr	F	FRA	250
France (metropolitan excludes overseas territories)	FX	FXX	.fx	F		249
French Guyana	GF	GUF	.gf			254
French Polynesia	PF	PYF	.pf			258
French Southern Territories	TF	ATF	.tf			260
Gabon	GA	GAB	.ga	GAB	GAB	266
Gambia	GM	GMB	.gm		GAM	270
Georgia	GE	GEO	.ge	GE	GEO	268
Germany (Deutschland)	DE	DEU	.de	D	GER	276
Ghana	GH	GHA	.gh	GH	GHA	288
Gibraltar	GI	GIB	.gi			292
Greece	GR	GRC	.gr	GR	GRE	300
Greenland	GL	GRL	.gl			304
Grenada	GD	GRD	.gd		GRN	308
Guadeloupe	GP	GLP	.gp			312
Guam	GU	GUM	.gu		GUM	316
Guatemala	GT	GTM	.gt	GCA	GUA	320
Guernsey			.gg			
Guinea	GN	GIN	.gn	RG	GUI	324
Guinea-bissau	GW	GNB	.gw		GBS	624
Guyana	GY	GUY	.gy	GUY	GUY	328
Haiti	HT	HTI	.ht	RH	HAI	332
Heard Island and Mcdonald Islands	HM	HMD	.hm			334
Honduras	HN	HND	.hn		HON	340
Hong Kong	HK	HKG	.hk		HKG	344
Hungary	HU	HUN	.hu	H	HUN	348
Iceland	IS	ISL	.is	IS	ISL	352
India	IN	IND	.in	IND	IND	356
Indonesia	ID	IDN	.id	RI	INA	360
Iran (Islamic Republic of Iran)	IR	IRN	.ir	IR	IRI	364
Iraq	IQ	IRQ	.iq	IRQ	IRQ	368
Ireland	IE	IRL	.ie	IRL	IRL	372
Isle of Man			.im			833
Israel	IL	ISR	.il	IL	ISR	376
Italy	IT	ITA	.it	I	ITA	380

Table 6-19 *(continued)* International country code designations (ISO, IANA, UN, and IOC)

Country name	ISO 2-alpha	ISO 3-alpha	IANA Internet	UN	IOC	UN/ISO numeric
Jamaica	JM	JAM	.jm	JA	JAM	388
Japan	JP	JPN	.jp	J	JPN	392
Jersey			.je			
Jordan (Hashemite Kingdom of Jordan)	JO	JOR	.jo	HKJ	JOR	400
Kazakhstan	KZ	KAZ	.kz	KZ	KAZ	398
Kenya	KE	KEN	.ke		KEN	404
Kiribati	KI	KIR	.ki			296
Korea (Democratic Peoples Republic of Korea)	KP	PRK	.kp		PRK	408
Korea (South Korea)	KR	KOR	.kr	ROK	KOR	410
Kuwait	KW	KWT	.kw	KWT	KUW	414
Kyrgyzstan	KG	KGZ	.kg	KS	KGZ	417
Lao People's Democratic Republic	LA	LAO	.la	LAO	LAO	418
Latvia	LV	LVA	.lv	LV	LAT	428
Lebanon	LB	LBN	.lb	RL	LIB	422
Lesotho	LS	LSO	.ls	LS	LES	426
Liberia	LR	LBR	.lr	LB	LBR	430
Libya (Libyan Arab Jamahirya)	LY	LBY	.ly	LAR	LBA	434
Liechtenstein (Fürstentum Liechtenstein)	LI	LIE	.li	FL	LIE	438
Lithuania	LT	LTU	.lt	LT	LTU	440
Luxembourg	LU	LUX	.lu	L	LUX	442
Macao	MO	MAC	.mo			446
Macedonia (Former Yugoslav Republic of Macedonia)	MK	MKD	.mk	MK	MKD	807
Madagascar	MG	MDG	.md	RM	MAD	450
Malawi	MW	MWI	.mw	MW	MAW	454
Malaysia	MY	MYS	.my	MAL	MAS	458
Maldives	MV	MDV	.mv		MDV	462
Mali	ML	MLI	.ml	RMM	MLI	466
Malta	MT	MLT	.mt	M	MLT	470
Marshall Islands	MH	MHL	.mh			584
Martinique	MQ	MTQ	.mq			474
Mauritania	MR	MRT	.mr	RIM	MTN	478
Mauritius	MU	MUS	.mu	MS	MRI	480
Mayotte	YT	MYT	.yt			175
Mexico	MX	MEX	.mx	MEX	MEX	484

Table 6-19 *(continued)* International country code designations (ISO, IANA, UN, and IOC)

Country name	ISO 2-alpha	ISO 3-alpha	IANA Internet	UN	IOC	UN/ISO numeric
Micronesia (Federated States of Micronesia)	FM	FSM	.fm		FSM	583
Moldova	MD	MDA	.md	MD	MDA	498
Monaco	MC	MCO	.mc	MC	MON	492
Mongolia	MN	MNG	.mn	MGL	MGL	496
Montserrat	MS	MSR	.ms			500
Morocco	MA	MAR	.ma	MA	MAR	504
Mozambique (Moçambique)	MZ	MOZ	.mz	MOC	MOZ	508
Myanmar (Formerly Burma)	MM	MMR	.mm		MYA	104
Namibia	NA	NAM	.na	NAM	NAM	516
Nauru	NR	NRU	.nr		NRU	520
Nepal	NP	NPL	.np	NEP	NEP	524
Netherlands	NL	NLD	.nl	NL	NED	528
Netherlands Antilles	AN	ANT	.an	NA	AHO	530
New Caledonia	NC	NCL	.nc			540
New Zealand	NZ	NZL	.nz	NZ	NZL	554
Nicaragua	NI	NIC	.ni	NIC	NCA	558
Niger	NE	NER	.ne	RN	NIG	562
Nigeria	NG	NGA	.ng		NGR	566
Niue	NU	NIU	.nu			570
Norfolk Island	NF	NFK	.nf			574
Northern Mariana Islands	MP	MNP	.mp			580
Norway	NO	NOR	.no	N	NOR	578
Oman	OM	OMN	.om		OMA	512
Pakistan	PK	PAK	.pk	PK	PAK	586
Palau	PW	PLW	.pw		PLW	585
Palestinian Territories	PS	PSE	.ps		PLE	275
Panama	PA	PAN	.pa	PA	PAN	591
Papua New Guinea	PG	PNG	.pg	PNG	PNG	598
Paraguay	PY	PRY	.py	PY	PAR	600
Peru	PE	PER	.pe	PE	PER	604
Philippines	PH	PHL	.ph	RP	PHI	608
Pitcairn	PN	PCN	.pn			612
Poland	PL	POL	.pl	PL	POL	616
Portugal	PT	PRT	.pt	P	POR	620
Puerto Rico	PR	PRI	.pr		PUR	630
Qatar	QA	QAT	.qa	QA	QAT	634
Réunion	RE	REU	.re			638
Romania	RO	ROU	.ro	RO	ROM	642

Table 6-19 *(continued)* International country code designations (ISO, IANA, UN, and IOC)

Country name	ISO 2-alpha	ISO 3-alpha	IANA Internet	UN	IOC	UN/ISO numeric
Russian Federation	RU	RUS	.ru	RU	RUS	643
Rwanda	RW	RWA	.rw	RWA	RWA	646
Saint Helena	SH	SHN	.sh			654
Saint Kitts and Nevis	KN	KNA	.kn		SKN	659
Saint Lucia	LC	LCA	.lc		LCA	662
Saint Pierre and Miquelon	PM	SPM	.pm			666
Saint Vincent and the Grenadines	VC	VCT	.vc		VIN	670
Samoa (Formerly Western Samoa)	WS	WSM	.ws	WS	SAM	882
San Marino (Republic of)	SM	SMR	.sm	RSM	SMR	674
Sao Tome And Principe	ST	STP	.st		STP	678
Saudi Arabia (Kingdom of Saudi Arabia)	SA	SAU	.sa	SA	KSA	682
Senegal	SN	SEN	.sn	SN	SEN	686
Seychelles	SC	SYC	.sc	SY	SEY	690
Sierra Leone	SL	SLE	.sl		SLE	694
Singapore	SG	SGP	.sg	SGP	SIN	702
Slovakia (Slovak Republic)	SK	SVK	.sk	SK	SVK	703
Slovenia	SI	SVN	.si	SLO	SLO	705
Solomon Islands	SB	SLB	.sb		SOL	90
Somalia	SO	SOM	.so	SO	SOM	706
South Africa (Zuid Afrika)	ZA	ZAF	.za	ZA	RSA	710
South Georgia and the South Sandwich Islands	GS	SGS	.gs			239
Spain (España)	ES	ESP	.es	E	ESP	724
Sri Lanka	LK	LKA	.lk		SRI	144
Sudan	SD	SDN	.sd	SUD	SUD	736
Suriname	SR	SUR	.sr	SME	SUR	740
Svalbard and Jan Mayen	SJ	SJM	.sj			744
Swaziland	SZ	SWZ	.sz	SD	SWZ	748
Sweden	SE	SWE	.se	S	SWE	752
Switzerland (Confederation of Helvetia)	CH	CHE	.ch	CH	SUI	756
Syrian Arab Republic	SY	SYR	.sy	SYR	SYR	760
Taiwan	TW	TWN	.tw		TPE	158

Table 6-19 *(continued)* International country code designations (ISO, IANA, UN, and IOC)

Country name	ISO 2-alpha	ISO 3-alpha	IANA Internet	UN	IOC	UN/ISO numeric
Tajikistan	TJ	TJK	.tj	TJ	TJK	762
Tanzania	TZ	TZA	.tz		TAN	834
Thailand	TH	THA	.th	T	THA	764
Togo	TG	TGO	.tg	TG	TOG	768
Tokelau	TK	TKL	.tk			772
Tonga	TO	TON	.to		TGA	776
Trinidad and Tobago	TT	TTO	.tt	TT	TRI	780
Tunisia	TN	TUN	.tn	TN	TUN	788
Turkey	TR	TUR	.tr	TR	TUR	792
Turkmenistan	TM	TKM	.tm	TM	TKM	795
Turks and Caicos Islands	TC	TCA	.tc			796
Tuvalu	TV	TUV	.tv			798
Uganda	UG	UGA	.ug		UGA	800
Ukraine	UA	UKR	.ua	UA	UKR	804
United Arab Emirates	AE	ARE	.ae		UAE	784
United Kingdom (Great Britain)	GB	GBR	.uk	GB	GBR	826
United States	US	USA	.us	USA	USA	840
United States Minor Outlying Islands	UM	UMI	.um			581
Uruguay	UY	URY	.uy	ROU	URU	858
Uzbekistan	UZ	UZB	.uz	UZ	UZB	860
Vanuatu	VU	VUT	.vu		VAN	548
Vatican City (Holy See)	VA	VAT	.va	V	VAT	336
Venezuela	VE	VEN	.ve	YV	VEN	862
Vietnam	VN	VNM	.vn	VN	VIE	704
Virgin Islands, British	VG	VGB	.vg		IVB	92
Virgin Islands, US	VI	VIR	.vi		ISV	850
Wallis and Futuna	WF	WLF	.wf			876
Western Sahara (Formerly Spanish Sahara)	EH	ESH	.eh			732
Yemen	YE	YEM	.ye		YEM	887
Yugoslavia	YU	YUG	.yu	YU	YUG	891
Zambia	ZM	ZMB	.zm		ZAM	894
Zimbabwe	ZW	ZWE	.zw		ZIM	716

ISO = International Organization for Standardization (Geneva); UN = United Nations (New York); IANA = Internet Assigned Number Authority; IOC = International Olympic Comittee (Paris).

6.19 International Currency Codes

Table 6-20 International currency codes by countries with approximate exchange rates in US dollars

Country name	Currency name	ISO country code	USD/unit	Unit/USD
Algeria	Algerian dinar	DZD	0.012905	77.49
Argentina	Argentine peso	ARS	0.28409	3.52
Australia	Australian dollar	AUD	0.5603	1.7848
Austria	Austrian schilling[24]	ATS	0.068654	14.566
Bahamas	Bahamas dollar	BSD	1.0101	0.99
Barbados	Barbados dollar	BBD	0.50251	1.99
Belgium	Belgian franc[24]	BEF	0.023418	42.701
Bermuda	Bermuda dollar	BMD	1.001	0.999
Brazil	Brazilian real	BRL	0.36819	2.716
Bulgaria	Bulgarian lev	BGL	0.48424	2.0651
Canada	Canadian dollar	CAD	0.64516	1.55
Chile	Chilian peso	CLP	0.001496	668.45
China	Chinese yuan (Ren minbi)	CNY	0.12085	8.275
Colombia	Colombian peso	COP	0.0004207	2377.2
Costa Rica	Costa Rica colon	CRC	0.0027947	357.83
Cyprus	Cyprian pound	CYP	1.6314	0.61297
Czech Republic	Czech koruna	CZK	0.031073	32.182
Denmark	Danish kroner	DKK	0.12702	7.873
Eastern Caribbean	Eastern Caribbean dollar	XCD	0.37037	2.7
Egypt	Egyptian pound	EGP	0.21575	4.635
European Monetary Union	Euro	EUR	0.9447	1.0585
Fiji	Fijian dollar	FJD	0.4712	2.1222
Finland	Finnish markka[24]	FIM	0.15889	6.2938
France	French franc[24]	FRF	0.14402	6.9435
Germany	German Deutschemark[24]	DEM	0.48302	2.0703
Greece	Greek drachma	GRD	0.0027724	360.7
Hong Kong	Hong Kong dollar	HKD	0.12821	7.8
Hungary	Hungarian forint	HUF	0.0039075	255.92
Iceland	Icelandic krona	ISK	0.011173	89.505
India	Indian rupee	INR	0.020408	49
Indonesia	Indonesian rupiah	IDR	0.0001155	8660
Ireland	Irish punt[24]	IEP	1.1995	0.83368
Israel	Israeli new shekel	ILS	0.20182	4.955
Italy	Italian lira[24]	ITL	0.0004879	2049.6
Jamaica	Jamaican dollar	JMD	0.020665	48.39

Table 6-20 *(continued)* International currency codes by countries with approximate exchange rates in US dollars

Country name	Currency name	ISO country code	USD/unit	Unit/USD
Japan	Japanese yen	JPY	0.0080441	124.32
Jordan	Jordanian dinar	JOD	1.4184	0.705
Lebanon	Lebanon pound	LBP	0.0006605	1514
Lithuania	Lithuanian litas	LTL	0.27311	3.6615
Luxembourg	Luxembourg franc[24]	LUF	0.021368	46.8
Malaysia	Malaysian ringgit	MYR	0.26316	3.8
Mexico	Mexican pesos	MXP	0.10289	9.7195
New Zealand	New Zealand dollar	NZD	0.4845	2.064
Norway	Norwegian kroner	NOK	0.12687	7.8823
Pakistan	Pakistan rupee	PKR	0.016625	60.15
Panama	Panamanian Balboa	PAB	1	1
Philippines	Filipino peso	PHP	0.019818	50.46
Poland	Polish zloty	PLZ	0.24879	4.0195
Portugal	Portuguese escudo[24]	PTE	0.0047121	212.22
Romania	Romanian leu	ROL	2.994E-05	33404
Russia	Russian ruble	RUB	0.031832	31.415
Saudi Arabia	Saudi Arabian riyal	SAR	0.26665	3.7503
Singapore	Singapore dollar	SGD	0.5591	1.7886
Slovakia	Slovak koruna	SKK	0.021117	47.355
South Africa	South African rand	ZAR	0.09542	10.48
South Korea	Korean won	KRW	0.0008157	1226
Spain	Spanish peseta[24]	ESP	0.0056778	176.13
Sri Lanka	Sri Lankan Rupee	LKR	0.010379	96.35
Sudan	Sudanese pound	SDP	0.0005882	1700
Sweden	Swedish krona	SEK	0.10334	9.677
Switzerland	Swiss franc	CHF	0.64016	1.5621
Taiwan	New Taiwan dollar	TWD	0.029446	33.961
Thailand	Thai baht	THB	0.023714	42.17
The Netherlands	Dutch guilder[24]	NLG	0.42869	2.3327
Trinidad & Tobago	Trinidad & Tobago dollar	TTD	0.16367	6.11
Turkey	Turkish lira	TRL	6.329E-07	1580000
United Kingdom	British pound sterling	GBP	1.4736	0.67861
United States	United States dollar	USD	1	1
Venezuela	Venezuelan bolivar	VEB	0.0008396	1191
Zambia	Zambian kwacha	ZMK	0.0002261	4422.5

[24] standardized exchange rate for European currency units replaced by the euro.

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7.1 Specific References

These references, which contain formulae, definitions, and conversions factors, are books specializing in scientific units and their conversion. They are listed according to their publication dates. For books which were published before 1900 see section 7.4.

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ISO 31–5: 1992	Quantities and units – Part 5: Electricity and magnetism
ISO 31–6: 1992	Quantities and units – Part 6: Light and related electromagnetic radiations
ISO 31–7: 1992	Quantities and units – Part 7: Acoustics
ISO 31–8: 1992	Quantities and units – Part 8: Physical chemistry and molecular physics
ISO 31–9: 1992	Quantities and units – Part 9: Atomic and nuclear physics
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ISO 1151–1: 1988 Flight dynamics – Concepts, quantities and symbols – Part 1: Aircraft motion relative to the air

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ISO 1151–3: 1989 Flight dynamics – Concepts, quantities and symbols – Part 3: Derivatives of forces, moments and their coefficients

ISO 1151–4: 1994 Flight dynamics – Concepts, quantities, and symbols – Part 4: Concepts and quantities used in the study of aircraft stability and control

ISO 1151–5: 1987 Flight dynamics – Concepts, quantities and symbols – Part 5: Quantities used inmeasurements

ISO 1151–6: 1982 Terms and symbols for flight dynamics – Part 6: Aircraft geometry

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ISO 1151–8: 1992 Flight dynamics – Concepts, quantities and symbols – Part 8: Concepts and quantities used in the study of the dynamic behaviour of the aircraft

ISO 1151–9: 1993 Flight dynamics – Concepts, quantities and symbols – Part 9: Models of atmospheric motions along the trajectory of the aircraft

ISO 3002–1: 1982 Basic quantities in cutting and grinding – Part 1: Geometry of the active part of cutting tools – General terms, reference systems, tool and working angles, chip breakers

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