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Introduction

Air master's latest update of this catalogue is meant to provide technical support to design consultants and contractors for the entire range of air master equipment. This millennium edition is our effort to place critical product information within your reach.

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At air masters our progressive growth is attributed to the hands-on approach by the top management in all aspects of commercial and technical management.

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We at air master's are committed to providing you with the ultimate in prod-ucts and services.

This catalogue is an effort in that direc-tion. With a need to constantly upgrade product information we have sought to provide detailed specifications for our products within your reach.

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Chapter 1

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1.1 Introduction

It is a unique challenge for mechanical engineers to design and select the air distribution items. The selection and choice of air distribution equipment involves product efficiency to meet space requirement as well as architectural features which compliment the interior design.

In the modern HVAC system, the wrongly chosen air out lets leads to failure of the entire HVAC system. The considerations while doing a perfect and competitive selection of air outlet are occupant comfort, energy conservation, air quality and the cost. It is the foremost purpose of this Air Distribution Engineering section. The details provided in this section are reffered from ASHRAE Handbooks and Standards.

1.2 Glossary of terms and definitions

Grille:

A louvered covering for an opening through which air passes (Generally installed in a side wall).

Return:

An outlet for return or exhaust air.

Damper:

A device used to control the volume of air passing through an outlet or inlet.

Register:

A grille which is equipped with a damper and control valve and directs air in a non spreading pattern.

Diffuser:

A circular, square or rectangular outlet discharging supply air in a spreading pattern (Generally installed in a ceiling).

Aspect ratio:

Ratio of the length to the width of rectangular opening.

Slotted outlet:

A long narrow air distribution outlet comprised of deflecting members, located in the ceiling , side wall or sill with an aspect ratio greater than 10. Designed to distribute supply air in varying directions and planes and arranged to promote mixing of primary air and secondary room air.

Free area:

Total minimum area of the opening in air outlet through which air can pass.

Effective area (Ak) Or area factor:

The calculated area of an outlet based on the average measured velocity between the fins.

Terminal velocity:

The point at which the discharged air from an outlet decreases to a given speed, generally accepted as 0.25 m/sec.

Envelope:

The outer boundary of the air stream moving at a perceptible velocity (Ex: 0.50 m/sec envelope).

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Stratified zone:
A region in which room air velocity is less than 0.075 m/sec (15 FPM).

Stratification boundary:
The boundary between room air currents moving faster than 0.075 m/sec (15 FPM) and stratified zone.

Primary air:
The air coming directly from the outlet.

Secondary air:
The room air which is picked up and carried along by the primary air.

Total air:
Mixture of primary and secondary air.

No of air changes:
Number of times per hour of extracting the exhausted air from the conditioned space and replacing it by an equal amount of processed air. The volume of changed air is equal to the conditioned space volume.

1.3 Performance factors

Draft:
Draft is defined as an unwanted local cooling to human body due to movement of air and lower space air temperature. Study proves that air velocity fluctuations create draft.

Table 1 shows that air velocities in relation to occupant reaction and comfort.

Table 1. Room air velocity in relation to occupants reaction for comfort:

Room air velocity		Reaction	Recommended application
M/sec	Fpm		
0.000 - 0.081	0 - 16	Complaints of stagnant air	None
0.081- 0.127	16 - 25	Ideal design	All commercial applications.
0.127 - 0.254	25 - 50	Probable favorable but 0.25 m/sec is approaching maximum tolerable velocity for seated persons.	All commercial applications
0.254 - 0.330	50 - 65	Unfavorable – Light papers are blown off from desk.	
0.330 - 0.381	65 - 75	Upper limit for people moving about slowly-favorable	Retail and department store.
0.381 - 1.524	75 - 300	Some factory air conditioning installations – favorable	Factory air conditioning higher velocities for spot cooling.

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Table 2 gives information about the effects of local air velocities on the preferred indoor air temperature and the thermal comfort of occupants.

Table 2. Local air velocity Vs thermal comfort:

Local air velocity		Local air velocity (Tx)	Tx - Ta	Percentage objecting	Comfort level
M/sec	FPM				
0.41	80	24	0	20%	80%
0.3	60	23.3	-1	20%	80%
0.2	40	22.8	-2	20%	80%
0.076	15	21.7	-4	20%	80%
0.3	60	24	0	10%	90%
0.2	40	24	0	5%	95%
0.15	30	24	0	Neutral	100%
0.076	15	24	0	Warm	–

Where T_x = Local temperature in degree C.
T_a = Ambient temperature in degree C.

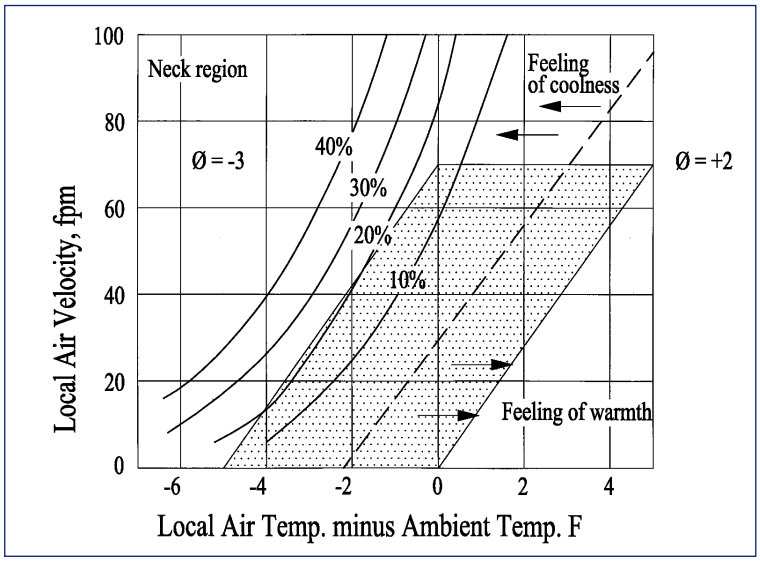

Fig1. Comfort chart with ADP1 parallelogram.

Ex: At an air velocity of 0.41 m/sec (80 fpm), local temperature has to be maintained at 24°C to achieve 80% comfort. Same comfort can be maintained at a local air velocity of 0.076 m/sec (15 fpm) with a temperature of 21.7°C.

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Throw or Blow, in meters (T_v):

Throw is the horizontal distance that an air-stream travels from the outlet face to a point where the velocity of the air-stream has reduced to a definite minimum specified value. In general this is 0.25,0.5 or 0.75m/sec and is measured at 2 mt above the floor. Throw depends both on supply outlet velocity and supply volume flow, changes by controlling any one of these factors. Throw is independent of the temperature difference between the supply air and the room air.

Drop or Rise in meters:

The vertical distance in meters between the center of the outlet and the bottom of the airstream at the end of the horizontal throw. Drop can be controlled by utilizing the surface effect of the ceiling. Drop is directly proportional to the supply air volume of a given outlet where as inversely proportional to the supply air temperature. Drop is less for the outlets located in or near the ceiling than the outlets located on exposed ductworks. Since the drop is greater with a large quantity of air from a given outlet, multiple outlets with smaller quantities of air can be used to reduce the drop. Drop can be reduced by arching the air upward from a side wall outlet which will be more effective if the outlets are located some distance below the ceiling.

Spread :

Spread is the angle of divergence of the air-stream after it leaves the supply air outlet. Horizontal spread is divergence in the horizontal plane and vertical spread is divergence in the vertical plane. Spread is the induced angle measured in degrees. Spread always has influence on both throw and drop and flowing the supply air into a space in a spread pattern tends to reduce both the throw and the blow. An outlet discharging air uniformly forward, no diverging or converging vane setting, gives spread of about an 18 to 20 degree included angle in both planes, which is approximately equals to a spread of 0.3 meter in every three meters of throw. Though shape and type of outlets has an influence on this included angle, but generally this will be between 15 to 23 degree for all types and shapes.

Induction:

Induction is the entrainment of room air by the air ejected from the outlet and is a result of the velocity of the outlet air. The air coming directly from the outlet is called Primary air where as the room air which is picked up and carried along by the primary air is called Secondary air. The entire stream, composed of a mixture primary and secondary air, is called Total air.

Induction is expressed by the momentum equation as,

$$m_1 \times v_1 + m_2 \times v_2 = (m_1 + m_2) \times v_3 .$$

Where, m_1 = Mass of primary air.
m_2 = Mass of secondary air.
v_1 = Velocity of the Primary air.
v_2 = Velocity of the Secondary air.
v_3 = Velocity of the Total air.

Induction Ratio (IR) = Total air /primary air

$$= \frac{\text{(primary air + secondary air)}}{\text{(Primary air)}}$$

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Characteristic length (L) in meters:

Characteristic length is either the horizontal distance from the surface of the outlet to the nearest vertical opposite wall , or the horizontal distance from the surface of the outlet to the mid plane between two outlets in the direction of air flow, or distance to the closest intersection of air jets.

The ratio of throw to characteristic length Tv / L is related to the ADPI of various supply outlets and has been used as a parameter in space diffusion design. As per Air Diffusion Council, throw can be measured only when the temperature differentials i.e. difference between supply air and room air temperature cannot exceed $\pm$ 2^{0}C.

Table 4. Relationship between ADP1 AND T_{50}/L and T_{100}/L.

Terminal device	Load desnity Btu/hr.sq ft	T_{50}/L.	Maximum ADPI	For ADPI Greater than	Range of T_{50}/L.
High side wall grilles	80	1.8	68	-	-
	60	1.8	72	70	1.5 - 2.2
	40	1.6	78	70	1.2 - 2.3
	20	1.5	85	80	1.0 -1.9
Circular ceiling diffusers	80	0.8	76	70	0.7 - 1.3
	60	0.8	83	80	0.7 - 1.2
	40	0.8	88	80	0.5 - 1.5
	20	0.8	93	90	0.7 - 1.3
Still grille straight vanes	80	1.7	61	60	1.5 - 1.7
	60	1.7	72	70	1.4 - 1.7
	40	1.3	86	80	1.2 - 1.8
	20	0.9	95	90	0.8 - 1.3
Still grille spread vanes	80	0.7	94	90	0.8 - 1.5
	60	0.7	94	80	0.6 - 1.7
	40	0.7	94	-	-
	20	0.7	94	-	-
Slot diffusers	80	0.3	85	80	0.3 - 0.7
	60	0.3	88	80	0.3 - 0.8
	40	0.3	91	80	0.3 - 1.1
	20	0.3	92	80	0.3 - 1.5
Light troffer diffusers	60	2.5	86	80	<3.8
	40	1.0	92	90	<3.0
	20	1.0	95	90	<4.5
Perforated and louvered diffusers	35-160	2.0	96	90	1.4 - 2.7
				80	1.0 - 3.4

Conversion formulae: 1. BTU/Hr-sq ft = 0.317 W/sq-mt.

2. (^{0}F-32) x 5/9 = ^{0}C.

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Surface or conda effect

The induction or entrainment characteristics of a moving air stream cause a surface effect. When a primary air stream discharged from a supply outlet flows or moving adjacent to, or in contact with a wall or ceiling a lower pressure region is formed near the surface along the air flow as shown in fig 2. Consequently, induced ambient air at a comparatively higher pressure posses the air jet against the surface, even when it is a curved surface. Such a phenomenon is called the surface effect or the conda effect.

Friction between the air jet and the boundary decreases the velocity along the central axis of confined air jets. However, because of the surface effects, the throw of a confined air jet is longer, and the drop from the horizontal axis smaller, than those of free air jet.

Wherever the outlets must be moved on an exposed duct and discharge the air stream into free space i ,e free air jet, the air stream entrains air on both its upper and lower surfaces. As a result, a higher rate of entrainment is obtained and throw is shortened by about 33%. So, for these types of application air flow per unit area shall be increased.

Ceiling diffusers exhibit surface effect to a high degree because a circular air pattern blankets the entire ceiling area surrounding each outlet. Slot diffusers, which discharges the air stream across the ceiling, exhibit surface effect only if they are long enough to blanket the ceiling area. Grilles exhibit varying degree of surface effect, depending on the spread of the particular air pattern.

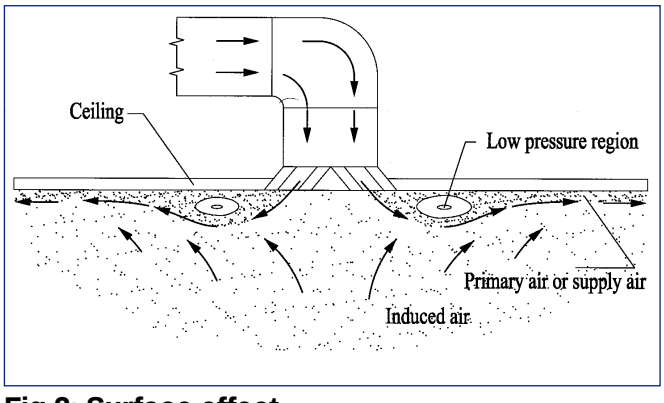

Fig 2: Surface effect.

Duct velocity:

The maximum supply air velocity in a high rise commercial building is often determined by the space available between the bottom of the beam and the suspended ceiling, as allocated generally by the architect, where the main duct traverse under the beam. After long research in HVAC & R and into consideration of energy- efficient design allows duct velocity up to 15 m/sec.

Higher air velocity results in a higher energy cost but reduction in material cost where as the lower air velocity increases the material and labour cost of the installation. Recommended maximum initial design velocity for duct and various applications are tabulated as detailed below.

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Table 5. Recommended and maximum duct velocity:

Duct type	Recommended velocities						Maximum velocities					
	Theaters, Libraries		Office buildings		Industrial buildings		Theaters, Libraries		Office buildings		Industrial buildings	
Main duct	FPM	M/sec	FPM	M/sec	FPM	M/sec	FPM	M/sec	FPM	M/sec	FPM	M/sec
Rectangular duct	1000	5.0	2200	11.18	3000	15.2	1800	9.15	2500	12.7	3500	17.78
Round duct	1200	6.0	2400	12.2	4000	20.33	2100	10.67	3200	16.26	6500	33.0
Branch duct												
Rectangular duct	500	2.5	1600	8.13	2500	12.70	800	4.1	2000	10.16	3000	15.25
Round duct	600	3.0	2000	10.16	3000	15.25	1000	5.1	2500	12.7	4000	20.33

Supply outlet velocity:

For a specific supply volume flow in a conditioned space, the volume flow rate per supply out let (V_{sout}) in CFM determines the number of outlets in the conditioned space. Both flow rate and supply outlet velocity affect the throw of supply air stream. The volume of flow rate per supply out let depends mainly on the throw required to provide a satisfactory space air diffusion design. The air flow rate at supply out let has a significantly greater influence than velocity at supply outlet. In case of slot diffusers velocity at supply outlet has only a minor influence.

Table: 6. Recommended delivery velocities.

Applications	Recommended delivery velocities. (m/sec).
Broad casting studios, sound and recording studios	1.5-2.5
Concert hall, auditoriums, library, class rooms.	2.5-3.5
Apartments, residenses, hotels, dining rooms, public buildings	2.5-4.5
Large offices, restaurants, hotels, dining-rooms, public buildings.	3.5-5.5
Corridors, computer rooms, café tarias, wash rooms, department stores.	4.5-6.0
Average factories, work shops, garages, ware houses.	5.0-10.0

1.4 Air jets and jet temperature:

An Air Jet is an air stream that discharges from an outlet with a significantly higher velocity than that of the surrounding air, and moves along its central axis until its terminal velocity reduces to a value that equal or approximately equals the velocity of the ambient air. Because of the turbulence of air particles, air jets tend to spread. They also rise or fall depending on the buoyancy of the air stream. The outer boundary of an air jet moving at a perceptible velocity such as 0.75 ,0.5 and 0.25 m/sec is called envelope.

In general, air jets can be classified as free or confined, isothermal or non-isothermal and axial or radial.

Free air jet whose envelope (outer boundary) is not confined by the enclosure of the conditioned space.

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Confined air jet whose envelope is confined by the ceiling, floor, walls, windows and furniture of the conditioned space.

Isothermal air jet is one whose temperature is equal or nearly equal to the temperature of the ambient air.

Non-isothermal air jet is one whose temperature is different from that of the ambient air in the conditioned space.

Axial air jet projects in one direction.

Radial air jet projects radially in all directions.

Free isothermal jets:

In any free isothermal jet, there are four zones along the central axis viz core zone, transition zone, main zone and terminal zone as shown in the fig.3.

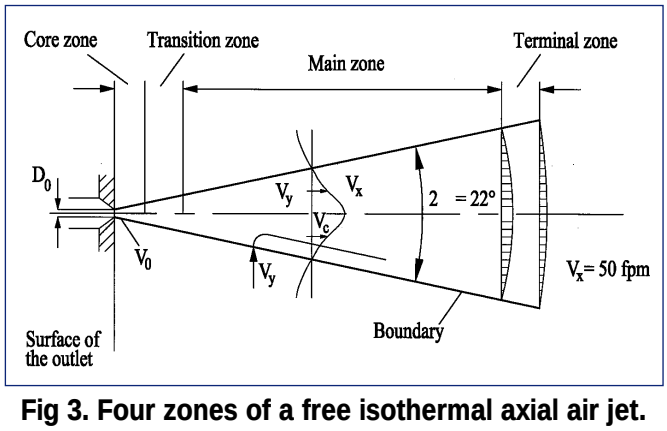

Fig 3. Four zones of a free isothermal axial air jet.

Core zone:

In the core zone, the central axis velocity remains unchanged. This zone extends about $4D_0$. (D_0 indicates the diameter or the circular equivalent of supply outlet in meter from the surface of the outlet.

Transition zone:

In the transition zone, the central axis velocity decreases inversely with the square root of the distance from the surface of the outlet. This zone extends about $8D_0$.

Main zone:

In the main zone, the turbulent flow is fully developed and the maximum velocity decreases inversely with the distances from the surface of the outlet. Even when the air jet is discharged from rectangular duct, the cross section of the air stream becomes circular in the main zone. This zone extends about 25 to 100 D_0 in length.

Terminal zone:

In the terminal zone, the maximum velocity decreases rapidly to a value less than 0.25m/sec. with in a distance of a few outlet diameters.

The following figures show how a jet of air issuing from a duct outlet behaves upon entering a room. The fig 4 shows that isothermal jet slowly diffuses into the surrounding still air and fig 5 shows non isothermal jet shows that tending to rise during heating and drop during cooling.

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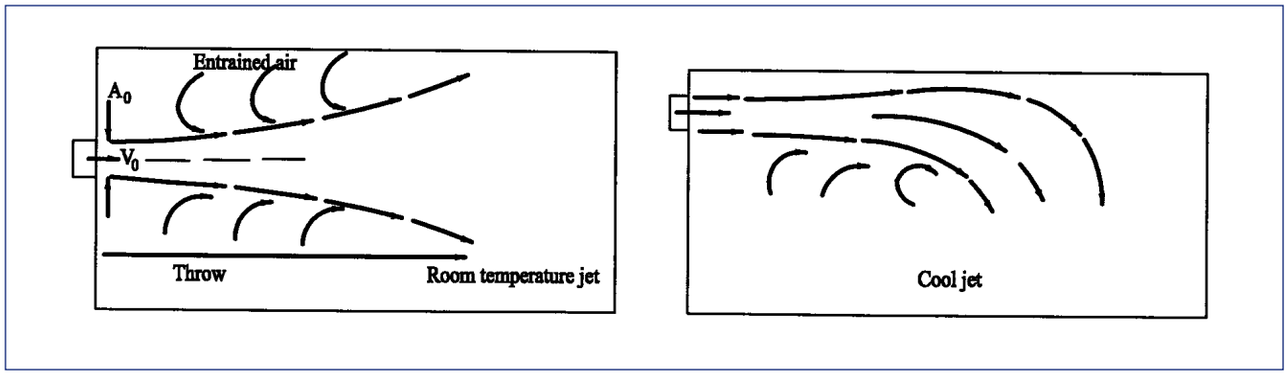

Fig: 4.isothermal jet

Fig 5. Non isothermal jet.

If the jet is round, the velocity (V) at any point in the jet at standard air conditions is given by Schlichtung as

$$V = (7.41 \times V_0 \times \sqrt{A_0}) / d\,(1 + 57.5\, R^2/d^2)^2.$$

Where
- V = velocity at any point in the jet in m/sec.
- V_0 = velocity at jet source in m/sec.
- A_0 = jet flow area at source in M^2.
- d = distance from jet source in meters.
- R = distance from jet center line in meters.

The equation shows that jet centerline velocity decreases inversely with distance from the source. One can define a jet radius in several ways e.g it could be the distance from the center line at which the velocity is 1% of the centerline velocity. The jet radius increases with distance from the source. Cool air should not have a velocity of more than 45 to 50 fpm. (0.25 m/sec) in occupied rooms for good comfort.

In the absence of manufacturer's data during preliminary design the throw can be estimated from the dimensional equation.

$$T = (K \times V_c) \Big/ \sqrt{A_{eff}}$$

Where
- T = Throw in feet.
- V_c = Flow rate in CFM.
- A_{eff} = Net flow area in square feet.
- K = Dimensional constant, varies approximately linearly between terminal velocities of 100 and 200 fpm respectively.

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Free non - isothermal jet:
When the temperature of the conditioned air discharged from a supply air outlet is different from that of the ambient air in a conditioned space. The buoyancy of the fluid particles causes the trajectory of the air jet to deviate from the axis of free isothermal jet.

Since conditioned air jets are usually either warmer or cooler than room air, they will not have a horizontal centerline. A cold air jet will descend and a warm air jet will ascend. In both the cases throw is reduced when compared with an isothermal supply.

Fig 6 shows a free cold air jet discharged horizontally from a nozzle.

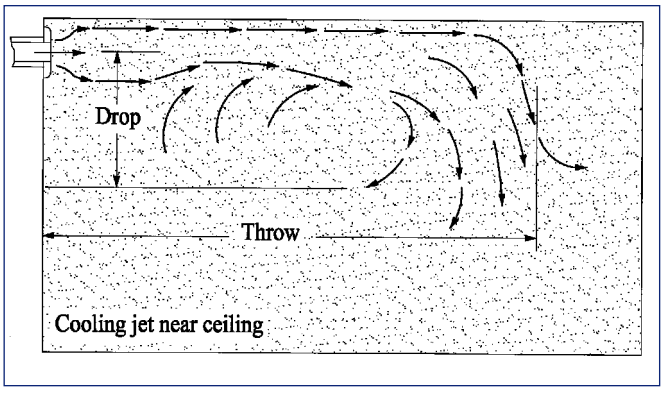

Fig 6: Cooling jet near ceiling.

Confined air jet:
In actual practice, most air jets are confined by the boundary of the room or the conditioned space. For a confined air jet, the total momentum of the fluid elements decreases gradually as distance from the outlet increases because of friction between the air stream and the boundary.

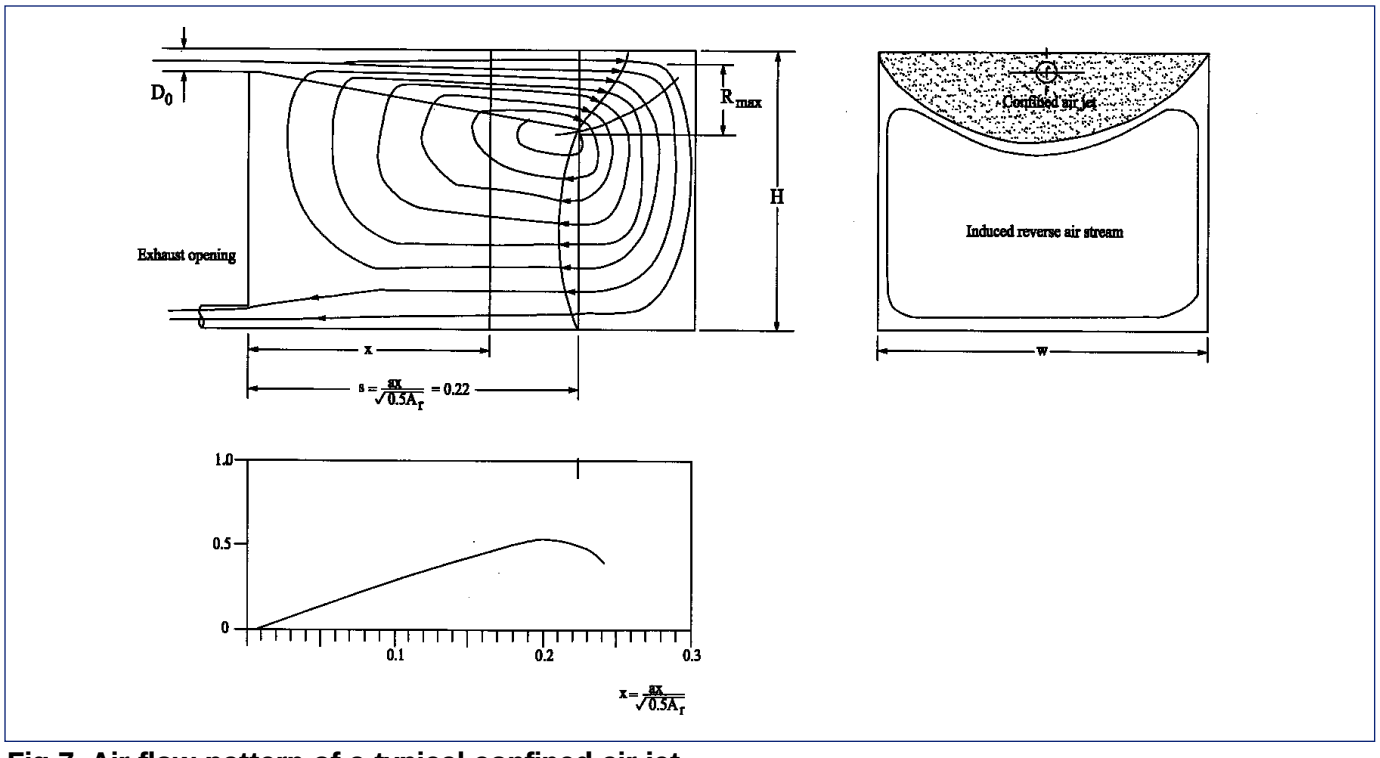

Fig 7. Air flow pattern of a typical confined air jet.

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Air flow pattern:
The flow pattern and characteristics of a confined air jet using a side wall outlet in an air conditioned room whose supply outlet is located above the occupied zone and the exhaust opening is on the same side of the supply outlet, the supply air jet clings to the surface of the ceiling and mixes with the room air. An induced reverse air stream, with more even velocity and temperature than that of the air jet covers the occupied zone.

Fig 7 shows the air flow pattern of a typical confined isothermal jet. When supply air is discharged from the circular outlet and moves along the surface of the ceiling, the transport momentum across the boundary of the air jet, therefore ambient air is induced in the air jet, and the induced circulating air flow occupies most of the enclosed space.

As the air jet moves forward, its mass flow rate increases and mean air velocity decreases until it arrives at a cross - sectional plane where dimensionless distance s= 0.22. Term s is defined as

$$s = a_x\sqrt{\sqrt{0.5}\,A_r}$$

Where a = turbulence factor.
For a circular nozzle, a = 0.076,
For a rectangular outlet with out guide vanes, a = 0.15.

When air jet terminates beyond s = 0.22 and the air stream makes a 180^0 turn, forming a reverse air stream flowing in the opposite direction. The majority of the reverse air stream turns upward and is induced by the jet again. Only a portion of it is exhausted outside the room.

The angle of divergence, the velocity profile, and the calculation of the entrainment ratio of confined jets are similar to those of free jets. Based on the principle of continuity of mass at steady state, other characteristics of confined air jets can be summarized as follows.

* If there is no infiltration into or exfiltration from the room, the mass flow rate of supply air is exactly equal to the exhaust air.

* If there is no obstructions in the room, the streamlines of the induced air are closed curves.

* If the supply outlet and exhaust inlet are located on the same side of the room, at any cross sectional plane perpendicular to the horizontal air flow, the mass flow rate of air streams flowing an opposite directions must be equal.

The volume flow rate of induced air is equal to or several times greater than the supply air at the cross sectional plane where s = 0.22.The characteristics of air stream in the occupied zone depends mainly on the induced reverse air stream. The volume flow rate and the air velocity of the reverse air stream are highest at the cross sectional plane where s= 0.22.

1.5 Selection of supply out let:

Selection of supply outlet depends on :

a. Requirement of indoor environmental control:
If the conditioned space needs less air movement or precise air temperature control, a high side outlet is not the right choice.

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b. Shape, size and ceiling height of the building:

For buildings with limited ceiling height, ceiling and slot diffusers are often the best choice. For large buildings with high ceiling, high side outlets mounted at high levels to form stratified induced re circulating flow patterns are recommended. In a perimeter zone, an overhead two way slot diffuser projected down toward the window and horizontally projected to the room, a ceiling diffuser with a throw to the inner surface of the window glass, or a sill outlet should be used.

c. Surface effect :

A good surface effect is of especially important to the VAV system because it allows the supply volume flow rate to be reduced to half or even 30 percent of the design flow.

d. Volume flow per m² of floor area:

Side wall outlets are limited to a lower volume flow per m^2 of floor area V_s/A_{fl} ($m^3/sec\text{-}m^2$) because of the higher air velocity in the occupied zone, the slot diffuser has a narrower slot width and can only project in one or two directions. Therefore, the volume flow per m^2 for a slot diffuser is smaller than that of a ceiling diffuser. Table 7 lists the volume flow per m^2, volume flow intensity for various types of supply outlets recommended by ASHRAE hand book 1992, HVAC systems and equipments.

Table:7. Volume flow intensity of supply outlets.

Type of outlets	Supply air density / unit floor area		Approximate maximum air changes per hour for 3 mt ceiling.
	CFM/FT^2	$M^3/sec/sq.mx10^{-3}$	
Grille	0.6 - 1.2	3.05 - 6.10	7
Slot diffuser	0.8 - 2.0	4.07 - 10.17	12
Perforated panel	0.9 - 3.0	4.57 - 15.25	18
Ceiling diffuser	0.9 - 5.0	4.57 - 25.41	30
Ventilating ceiling	1.0 - 10.0	5.08 - 50.82	60

e. Appearance:

The shape and configuration of out lets and inlets are closely related to the interior appearance of the building, and should be coordinated with inlets and lighting troffers.

f. Cost :

In many commercial buildings, cost is often an important factor in determining the type of supply outlet.

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1.6 Sound:

Like all the other environmental factors people react to sound in different ways. Care must be taken to protect people from the nervous tensions and physiological damage which can be caused by noise. In HVAC system, acoustical control is as important as temperature and humidity. While discussing sound, one must consider sound magnitude & frequency, and human reaction to sound.

Sound is in the form of waves which will be transmitted either in solids, liquids or gases. Sound is completely described by two terms, Frequency and magnitude. The human ear responds to sound due to the variation of pressure from the normal atmospheric pressure.

The frequency of a sound corresponds to the pitch of the sound and is equal to the frequency of the vibrating source. The magnitude of a sound relates to the energy contained in the sound wave per unit area perpendicular to the direction of travel.

The amount of energy contained in a sound is the factor used in measuring the magnitude of the sound. The magnitude of sound level is expressed as the ratio of a measured sound level above an energy reference level. The unit of sound is the dimension less “decibel” which is expressed as logarithmic functional ratios.

$$\text{Level in db} = 10 \log_{10} \frac{\text{(Measured Quantity)}}{\text{(Reference Value)}}$$

Response of the human ear:

The ear responds to frequencies in the range of 20 to 20000 Hz. The precise range differs from person to person and acuteness to hearing high frequency sound steadily falls off with age due to deterioration in the nerves and muscles operating the hearing system. Exposure to internal noise levels above 90 dBA can cause temporary or permanent hearing damage. If the exposure is continued for 8 hours in any one day the sound level should not exceed 90 dBA. The vast audible frequency range (i.e. 20 to 20000 Hz) has been subdivided into eight separate frequency ranges called OCTAVES as in order to simplify mathematical calculation. Frequency measurement and application frequency criteria to noise level problems are done in octave bands. Since sounds of the same magnitude but of different frequencies will have different degrees of loudness to human ear, a graph of sound level versus frequency is often used. This type graph is called frequency spectrum (Fig 8).

Sound levels:

There are two types of sound levels to be measured which are (1) Sound Pressure Level, L_p and (2) Sound Power Level, L_w. Though these two factors measuring sound magnitude and use the same unit of measurement i.e. decibel, they are two different quantities.

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Sound Pressure Level:

Sound pressure level is the sound level a person hears from a source of sound at the given point of observation. This will be affected by distance from the source and acoustical environment of a room. This sound level is the value of the ratio of the measured sound level to the reference sound level. This value i.e. sound pressure level is expressed in decibels by this equation.

$L_p = 10 \text{ Log}_{10} (p / 0.002)^2 = 20 \text{ Log}_{10} (p / 0.002)$

Where 'p' is sound pressure in microbars.

Sound pressure level is not used to rate the sound level by a given source because sound pressure varies with distance from the source and acoustical environment.

Sound Power Level:

Sound power level is used to rate the sound output of a sound source. The sound output of a given sound source is a constant. Sound power level will not vary or have any effect due to acoustical changes in a room.

This may be determined for any sound source and it must be measured under ideal acoustical conditions, and in this instance the measured sound pressure level equals the sound power level. Manufacturer of air conditioning equipment rates equipment noise in sound power, rather than the sound pressure level, which will be in decibels and expressed by this equation

$Lw = 10 \text{ Log}_{10} (W / 10^{-12})$.

Where 'W' is measured sound power in watts reference energy level $=10^{-12}$.

Frequency and octave bands:

In order to provide a comfortable acoustical atmosphere, the frequency as well as the magnitude of the sound must be given a careful study. Sound frequency has got direct effect in noise control due to the following obvious causes.

The human ear is more sensitive to high frequency than low frequency.

The design material used to attenuate sound depends on the frequency.

The audible frequency range includes frequencies from 20 to 20000 cycles per second. In order to simplify measuring techniques this vast frequency range has been subdivided into eight separate frequency ranges called octaves. The frequency of the upper limit of each band is twice that of the lowest frequency in each octave band. The preferred octave bands are 31.5 Hz, 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1 kHz, 2 kHz, 4 kHz, 8kHz and 16 kHz. The end bands (31.5 Hz and 16 kHz) are rarely used.

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DBA scale:

The response of the ear to sound is non-linear. At low frequencies it is less sensitive; which is why, for instance, the low frequency body vibrations cannot be heard. The ear's response varies with loudness (phon) and frequency (Hertz). When sound levels are measured, the variation in the sensitivity of the ear is to be taken into account by incorporating weighting networks in the meter. These are termed as A, B and C.

The response of the human ear to a sound level can be approximated by direct measurement or by a combination of octave band sound pressure measurement and mathematical calculation of the loudness level. The "A - scale noise level" is a direct measurement estimate of the human ear's response, which denoted as dBA. Two other methods of "loudness level" determinations of human ear response use the units of sone and phone for the total loudness and loudness level respectively. These methods use a combination of sound pressure level measurement and an equation to calculate loudness response. That is why most used weighted scale is dBA, the measuring of which corresponds to the 40 phon loudness level.

NC and NR curves:

Noise criterion curves are a method of using octave bands for assessing the back ground noise level for annoyance and speech intelligibility in a given environment, and are attempts to express equal human tolerance in each frequency band. Beranek and Kosten have carried out experiments with office workers and home dwellers using broad-band noise sources. They produced the well known Noise Criteria (NC) and Noise Rating (NR) curves. NR curves gives a slightly more stringent requirement than the NC curves in the higher frequencies. For all practical purposes, NR and NC curves may be regarded as mutually interchangeable.

However, for sound control problems where the noise level in certain octave bands is especially important, design based on octave band sound levels is necessary. NC curves provide this information. NC curves plot octave band frequencies versus sound level in decibels. NC curves are numbered and have increasing NC numbers as the allowable magnitude of the sound spectrum increases. Areas such as a concert hall will have a low NC number and factories a relatively high NC number.

The following table (Table No:8) is recommended noise criteria for different functions. Also, the following graph (Fig no 8) is Noise Criteria Curves defining the design criteria in terms of the maximum permissible sound pressure level for each frequency band.

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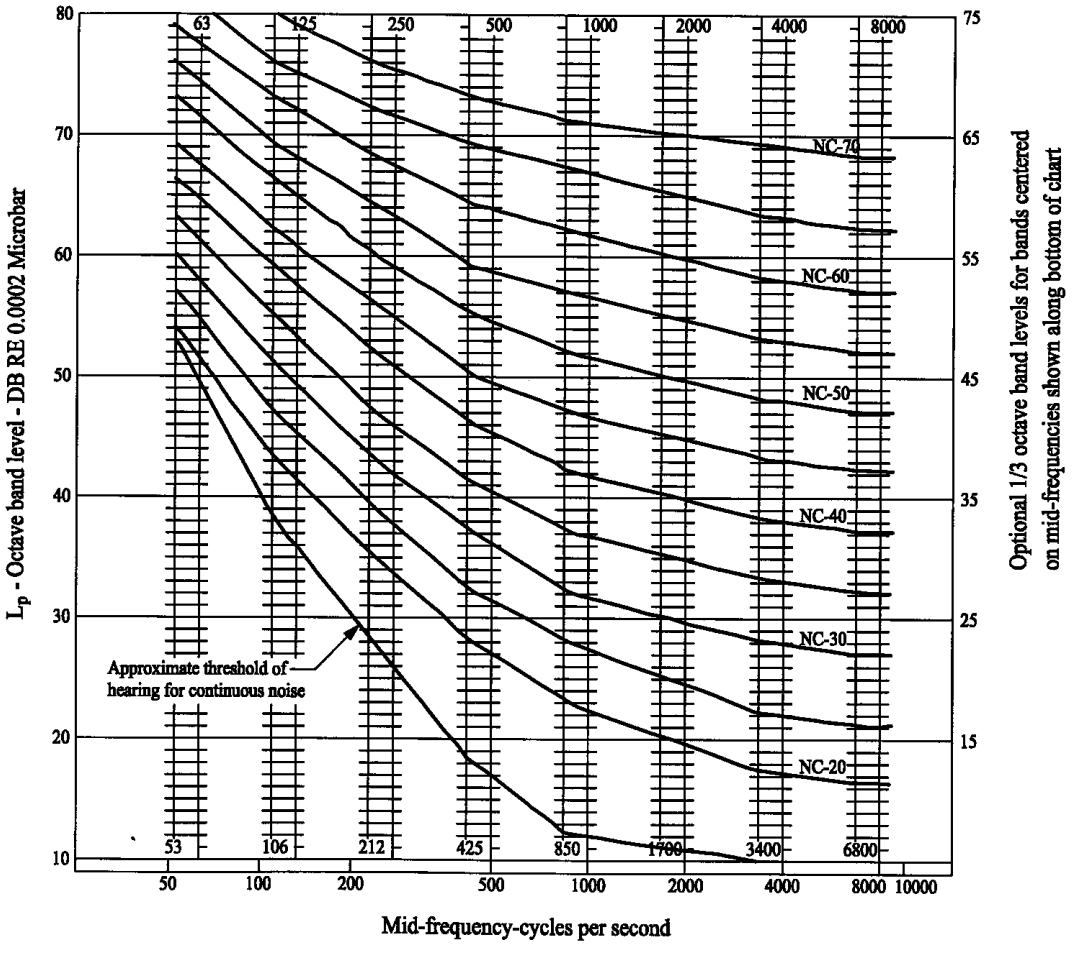

Fig:8. Frequency spectrum: Noise criteria curves defining the design criteria in terms of the maximum sound pressure level for each frequency band.

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Table:8 Range of design goals for air conditioning system sound control:

Type of area	A-Sound level decibels			NC level decibels		
	Low	Medium	High	Low	Medium	High
Residences:						
Private homes (rural and suburban)	25	30	35	20	25	30
Private homes (urban)	30	35	40	25	30	35
Apartment houses 2 and 3 family units.	35	40	45	30	35	40
Hotels:						
Individual hotel rooms and suits	35	40	45	30	35	40
Hall rooms, banquet rooms	35	40	45	30	35	40
Halls, corridors and lobbies.	40	45	50	35	40	45
Garages	45	50	55	40	45	50
Kitchens and laundries	45	50	55	40	45	50
Hospitals and clinics:						
Private rooms	30	35	40	25	30	35
Operating rooms and wards	35	40	45	30	35	40
Laboratories, halls, corridors, lobbies	40	45	50	35	40	45
and toilets	40	45	50	35	40	45
wash rooms and toilets.	45	50	55	40	45	50
Offices:						
Board rooms	25	30	35	20	25	30
Conference rooms	30	35	40	25	30	35
Executive office	35	40	45	30	35	40
Supervisor office, reception room	35	40	50	30	35	45
General open office, drafting rooms	40	45	55	35	40	50
Halls and corridors	40	50	55	35	45	55
Tabulation and computation	45	55	65	40	50	60
Auditoriums and music halls:						
Consent and opera halls	25	30	35	20	22	25
Studios for sound reproduction	25	30	35	20	22	25
Legitimate theatres, multi propose halls	30	35	40	25	27	30
Movie theatres, TV audience studios	35	40	45	30	32	35
Semi-out door amphi theatres	35	40	45	30	32	35
Lecture halls, planetariums	35	40	45	30	32	35
Lobbies	40	45	50	35	40	45
Churches and schools:						
Sanctuaries	25	30	35	20	25	30
Libraries	35	40	45	30	35	40
Schools and class rooms	35	40	45	30	35	40
Laboratories	40	45	50	35	40	45
Recreation halls	40	45	55	35	40	50
Corridors and halls	40	50	55	35	45	50
Kitchens	45	50	55	40	45	50
Public buildings:						
Public libraries, museums, court rooms	35	40	45	30	35	40
Post offices, general banking areas	40	45	45	30	35	40
Lobbies	40	45	50	35	40	45
Washrooms and toilets	45	50	55	40	45	50
Restaurants, cafeterias, lounges						
Restaurants	40	45	50	35	40	45
Cocktail lounges	40	50	55	35	45	50
Night clubs	40	45	55	35	40	45
Cafeterias	45	50	55	40	45	50
Stores retail						
Clothing stores	40	45	50	35	40	45
Department stores (upper floors)	40	45	50	35	40	45
Department stores (main floors)	45	50	55	40	45	50
Small retail stores	45	50	55	40	45	50
Supermarkets	45	50	55	40	45	50

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Table: 8. (cont) Range of design goals for air conditioning system sound control:

Type of area	A-Sound level decibels			NC level decibels		
	Low	Medium	High	Low	Medium	High
Sports active indoor:						
Coliseums	35	40	45	30	35	40
Bowling alley, gymansiums	40	45	50	35	40	45
Swimming pools	45	55	60	40	50	55
Transportation (rail, bus, plane):						
Ticket sales offices	35	40	45	30	35	40
Lounges and waiting rooms	40	50	55	35	45	50
Manufacturing areas:						
Foreman's office	45	50	55	40	45	50
Assembly lines, light machinery	50	60	70	45	60	70
Foundries, heavy machinery	60	70	80	55	63	75

Sound design:

- Sound engineering and design can minimize the sound contribution of air terminals to an occupied space.

- Where ever possible, terminals should be located over areas less sensitive to noise. This includes corridors, copy rooms, storage rooms, etc. quiet air terminals facilitate the location of terminals over unoccupied space. With quiet terminals larger zones are possible resulting in fewer terminals. This also reduces first cost and increase energy efficiency.

- The effective use of lined duct work and installation of sound attenuators up stream of air terminals can help attenuate higher frequency discharge sound.

- Sound will be reduced when silicon controlled rectifiers (SCRs) are used as a means to trim fan speed rather than mechanical devices. This form of motor control is also more energy efficient.

- The supply air terminal and the return grille location should be separated as far as possible. Radiated sound can travel directly from the terminal through the return air grille with out the benefit of ceiling attenuation.

- Designing systems to operate at low static pressure will reduce the generated sound level. This will also provide more energy efficient operation and allow the central fan to be down sized.

- Sharp edges and transitions in ducting should be minimized to reduce turbulent air flow and its

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1.7 Noise Vs Air terminal devices:

All air terminal devices (ATD) have a rated sound power level (L_w) which, when positioned in a room will give rise to a sound pressure level (L_p) in that room. The L_p in the space will vary with the room size, acoustic characteristic, and distance from the ATD, position of ATD and number of ATDs. From this it can be seen that it is inaccurate to rate an ATD by the L_p level, it is for this reason that all ATDs are related to the L_w level. With this information the resultant L_p level at any point in any type of room can be determined.

Sound power level L_w is related to sound pressure level L_p by a number of parameters, these are :

Room volume:

The level at a fixed position from an ATD will decrease as the volume increases.

Room acoustic characteristic:

Walls, Floors, Ceilings can either reflect or absorb acoustic energy depending on types of materials and room furnishings. Rooms with reflective surfaces are generally termed 'live', reverberant etc., and are characterized by long reverberation times. Rooms having absorbent surfaces are referred as dead, anechoic, etc., and have short reverberation times. Approximate acoustic characteristics of typical rooms are set out in table:9.

Table. 9. Typical room characteristic:

Rating		Use of room
1	Live	Churches, swimming baths, factories, operating theaters, large canteens and gymnasiums.
2	Medium live	School rooms, lecture theatres, art galleries and public houses.
3	Average	Standard offices, libraries, hospital wards (rooms with no special acoustic treatment)
4	Medium dead	Restaurants, offices and board rooms with absorbent ceiling and floor covering hotel bedrooms
5	Dead	Radio and T.V. studios, audio metric rooms.

Distance:

As the measuring station moves away from the ATD, the perceived L_p will drop. In the open air and anechoic rooms, the rate of fall is 6DB for each doubling of distance. This is known as the inverse square law.

Directivity:

The L_p perceived at the measuring station will depend on the positioning of the ATD in the room. Room correction charts are based on ATD positions at
Junction of two surfaces - fig. A table:10.
Flush with one surface - Fib B, table 11.

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Table :10 Room corrections for diffuser mounted at the junction with two surfaces.

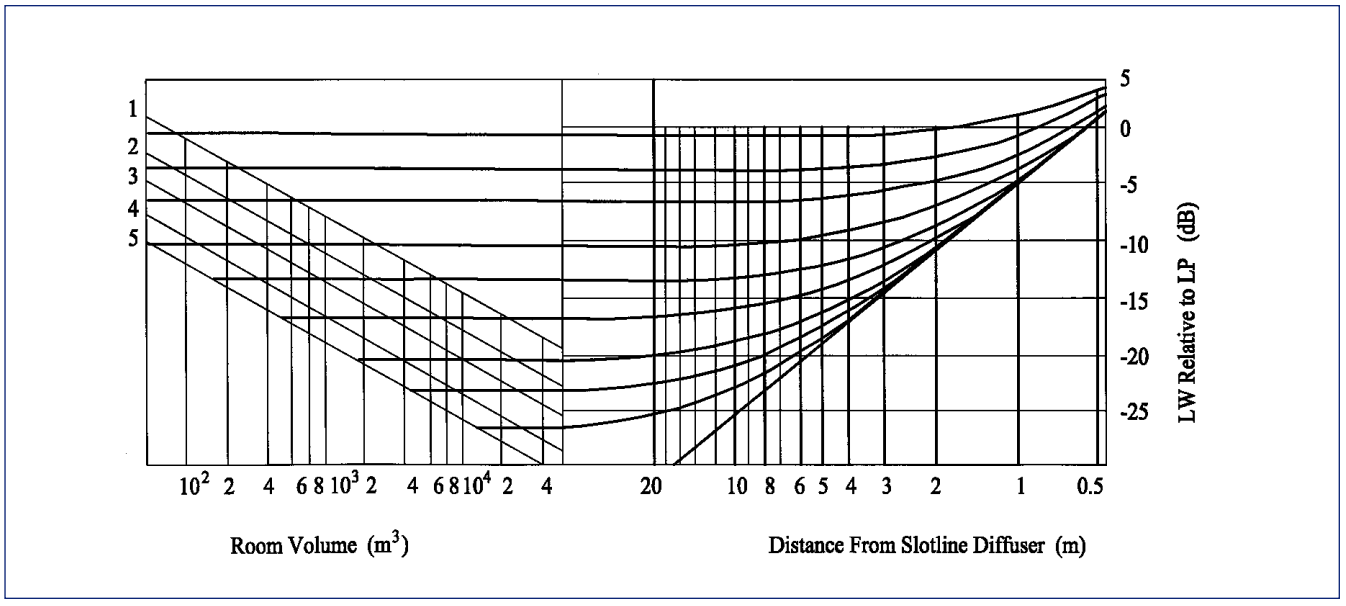
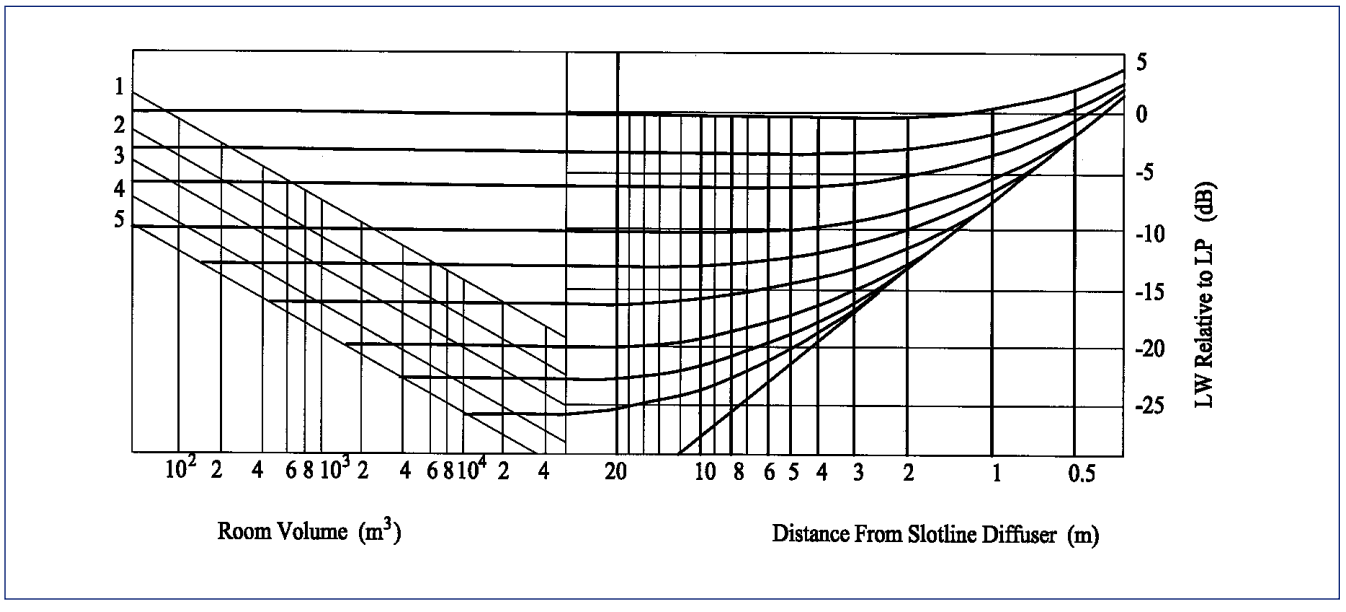


Table :11 Room corrections for diffuser mounted flush with one surface.



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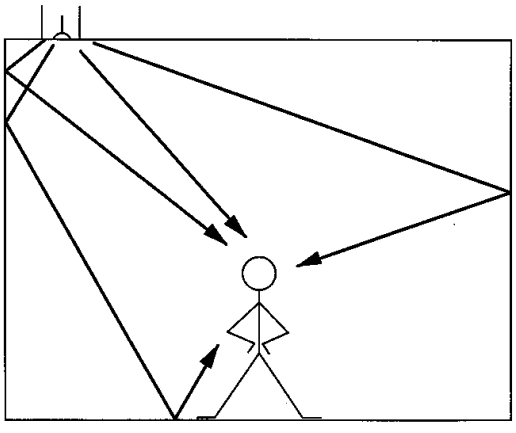

Fig. A (Table 10)

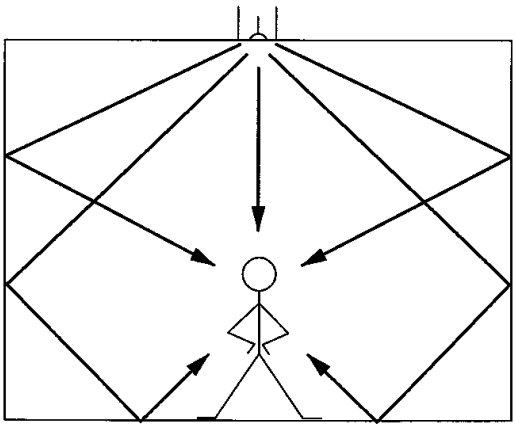

Fig. B (Table 11)

Number of ATDs :

If the number of ATDs in a room is doubled, the perceived will increase by 3dB. A second doubling will result in a further increase of 3 db. The relation between number of ATDs and dB addition is given in table12.

Table12: No of air terminal devices Vs dB addition:

No of air terminals	1	2	3	4	5	6	7	8	9	10
dB Addition	1	3	5	6	7	7	8	9	9	10

The preceding phenomena can be described in mathematical terms enabling calculations of the resultant sound pressure level as a function of frequency. A more convenient method is by the use of the room correction charts, table 10 and 11.

Example:
For a room of size 12 x 6 x 4 mt high is supplied with 1.32 m^3 /sec of air (2800 CFM). 4 slot diffuser is mounted in the center of the room across 6 meter dimension. Diffuser is 8 meters long. Find noise correction factor for a throw of 2 meters.

Assuming the room with no special acoustic treatment (choose rating 3, average room from table 9).

Room volume = 288 m^3.
Room rating = 3.
No of ATD = 1.
NR L_w for slot line = 36

With table 11, enter at 288 m^3/sec vertically upto rating line3, then horizontally along the curve upto the intersection of 2 mt distances. Then horizontally to read -6 dB.

So resultant NRL_w level is NRL_w -6 = 36-6 = 30 NR.

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Possible noise problems and solutions:

If a noise level problem occur at commissioning stage, it is recommended that the following basic procedures employed to determine if the ATD (air terminal device) is responsible.

- Shut down in rotation the various plants serving the space to identify the source that is creating the noise. Do not misled by the possible air imbalance created with in the space, i,e., supply only creating noise by air escaping through doors etc.,

- On the noisy system check position of ATD dampers. If the noise level is reduced then damper generated noise is probably the cause. Solution - consider introducing duct dampers well upstream of the ATD to provide required pressure drop for balancing. This could involve the use of secondary attenuators down stream of the new damper.

- If opening and closing the ATD damper does not result in any significant change of noise level, either the noise is entering the space through some other path i,e structure borne vibration, direct transmission through walls, ceiling or floor, duct breakout, etc., or is propagating down the duct from another noise source.

- Remove ATD plus associated damper. If the noise level reduces then the sources of the problem may well be ATD and damper. But if the noise level increases, it is likely that duct borne noise is propagating down the system from some upstream source, possible main control damper, primary fans, poorly designed duct junctions. However, should investigation indicate that noise problem is associated with the ATD/ damper/ plenum box combination, then consider remedial measures such as:

- Replacing ATD, with one of greater free area or even a larger device.

- Re- design the plenum box (possibly increasing the number of spigots).

- Increase number of ATD s.

Cost implications of remedial action should the noise problem occur with an ATD clearly emphasize the importance of total consideration at design stage to correct selection.

1.8 Air flow measurement:

Instruments for Measurement of Air Flow:

The rotating vane anemometer is usually the most suitable instrument available at present to measure air flow rate at two or more terminals. There are two general types of this instrument.

- The dial-face anemometer which requires the use of a watch. This has the advantage of giving a definite value of air velocity based upon the number of revolutions per unit time and is particularly useful for giving accurate comparative valves when measuring at terminals where the air velocity pattern is reasonably uniform and stable.

- The direct reading anemometer of the electronic type which records the air velocity almost instantaneously. This has a distinct advantage when measuring at terminals where there is unstable or non-uniform flow as any instability or random changes of velocity are immediately seen and the true mean of the velocity at a point, and therefore of a number of points, can be judged. It is also very quick to use. Also suitable is the mechanical type of direct reading anemometer with vane which rotate but not continuously.

Where a correction chart is supplied with an anemometer the correction factors should be applied to the measured indicated velocities before comparing these velocities for balancing purpose.

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Air Flow measurement for grilles:

Grilles: The gross grille area is divided into 15-30 mm squares, depending upon the size of the grille and variation in the velocity pattern. The procedures of measurement will be same for both supply and extract grills except that the degree of grille damper opening is not relevant when measuring at extract grilles.

Dial face anemometer:

- The instrument is held stationary for 10 to 15 seconds at the center of each square. The back of the instrument should touch the grille louvers which, if adjustable, should be set without deflection.
- At the end of each 10 or 15 second period the instrument is moved from one square to the next without stopping the rotation.
- On no account should 'scanning', i.e. continuous movement of the instrument across the grille, be used.
- At the end of the 10 or 15 second period at the last square, this reading is divided by the total elapsed time and the valve obtained is corrected by applying the appropriate correction factors from the calibration chart. The corrected value so found is the 'indicated velocity' at the grille.
- Design velocity is calculated by dividing the design volumetric rate of air flow at the grille by the gross area of the grilles. Express 'indicated velocity' as a percentage of 'design velocity' to give the required 'indicated percentage' of design air flow.

Direct reading anemometer:

- The instrument is again held at the center of each square with the back of the instrument touching the louvers which must be set without deflection.
- The instrument will give an immediate reading of the indicated velocity at each square and this reading will be recorded.
- When the indicated velocities at the center of all squares have been recorded, the average value of these velocities shall be calculated. This average value is the 'indicated velocity' for the whole grille.
- 'Design velocity' is calculated by dividing the design volumetric rate of air flow at the grille by the gross area of the grills. Express 'indicated velocity' as a percentage of 'design velocity' to give the required 'indicated percentage of design air flow'.
- Where all the grills are of similar type and are designed to deliver the same rate of air flow, it may then be convenient to use the hood and anemometer combination for measurement at all grills, which takes lesser time than the above.

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Air flow measurement for diffusers :

- Cones, if adjustable, should be set either all in the fully up or in the fully down position. The procedures of measurement will be same for both supply and extract diffusers.

- Measurement can be made with a hood and anemometer for the diffusers of same type and size and designed to deliver equal rates of air flow.

- Anemometer is held or fixed in the center of the hood outlet while the hood inlet must completely enclose the diffuser.

- The 'indicated velocity' at the hood outlet is measured. The 'design velocity' is calculated by dividing the design volumetric rate of air flow for the diffuser by the hood outlet area.

- Express ' indicated velocity' as a percentage of 'design velocity' to give the required 'indicated percentage of design air flow'.

- Always apply 'hood factors' which shall be derived by pilot measurement for the appropriate range of air flow rates and the indicated percentage of air flow must be corrected by the relevant factor.

- Where the diffusers are large or designed for dissimilar rates of air flow a small direct reading anemometer can sometimes be used to take three or four spot measurement of indicated velocity at equi-spaced distances about the circumference of the annulus between the intermediate and inner cones.

- The anemometer should be touching the outer rim of the smaller cone and the lower surface of the larger cone at such an angle that the air flow is approximately at right angles to the face of the anemometer.

- The anemometer must be placed in a similar position and held at the same angle for all measurements.

- If the anemometer is smaller in diameter than the width of the annulus then the lower edge of the anemometer case should be placed at the outer rim of the smaller cone, the instrument being held at the same angle as described above.

- The 'indicated velocity' is the average value of the spot measurement. The 'indicated velocity' at the hood outlet is measured.

- The 'design velocity' is calculated by dividing the design volumetric rate of air flow for the diffuser by the gross area of the diffuser discharge.

- Before adopting this method the repeatability of readings should always be checked by comparing the results obtained by anemometer at a typical terminal with pitot-static tube readings taken in the duct serving the terminal.

- Note that identical results by anemometer and pitot-static tube traverse are neither necessary nor to be expected, but a strict and constant relationship between the results is essential. Express ' indicated velocity' as a percentage of 'design velocity' to give the required 'indicated percentage of design air flow'.

Air flow measurement for linear bar grilles and Slot Diffusers:

The procedures and methods are same as diffuser as detailed above. But the other alternatives are; the anemometer and hood combination or the anemometer alone where the size of diffuser or slot permits.

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1.9 Material and construction:

General:
The material chosen and used for the construction of Grilles and Diffusers are complied to meet all Internation1 Standards such as German (DIN), British (BS), European Wrought Alloy Association (EWAA), American (ASTM) and International Standard of Organization (ISO). The technical specification in particular meets the requirement of Architectural Aluminium Extrusions.

Surface finish and tests:
Regular tests / checks are carried out throughout the entire process to ensure that the material used for the manufacture of Grilles and Diffusers meet the requirement of DIN 17611, BS 3987, as well as ISO standards.

The following tests / checks are carried out only after surfaces of extrusions are treated chemical / mechanical pre-treatment according to DIN 17611.

- Anodic Film Thickness (AFT) of extrusions is checked by Eddy Current which is according to DIN 50984 & BS 1615. The AFT thickness is in the range of class 15 - 18 micron.

- Sealing Assessment tests for anodized products are conducted regularly which are “ANO-Test” according to DIN 50949 & BS 1615 and “DRY ABSORPTION Test” according BS 1615 & ISO 2143.

- Periodic Metallic Graphic (microscopic) examinations are conducted to maintain the quality of anodic film and the metallurgy of aluminium.

Dimensions and tolerances:
- Dimension tolerances are divided into two categories namely Standard Dimensional Tolerances and Special Dimensional Tolerances. All extrusions as per Standard Dimensional Tolerances which meet DIN 1748 (Part:4), BS 1474 unless Special Dimensional Tolerances are requested.

- To ensure that dimensions and shapes are within the specified limits, “Dimensional Checks” are made in every stage of production with the help of the standard measuring tools and “Go / No-Go” gauges.

Mechanical properties and composition:
Meets DIN 1748, BS 1474 and ISO-R827
Routine checks are made according to the ISO recommendation R2142.
The general properties are as noted below.

- Minimum Yield Strength = 18 Kp / Sq.mm
- Minimum Ultimate Strength = 21 Kp / Sq.mm
- Minimum % Elongation in 50mm/4D = 8

The material i.e. Alloy composition consists of as noted below. The percent is by weight. The value is maximum where range is shown.

Percentage of Cu	= 0.03
Percentage of Fe	= 0.16 - 0.22
Percentage of Mg	= 0.47 - 0.57
Percentage of Si	= 0.39 - 0.47
Percentage of Ti	= 0.02
Percentage of Zn	= 0.025
Percentage of Cr	= 0.03
Percentage of Mn	= 0.03
Other Element %	= 0.1
Aluminium	**= Remainder**

Finish:
The standard finish is mill finish or anodized aluminium finish. Also wide range powder coated colours to RAL colour code are available upon request.

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1.10 Powder coating:

Powder coating is an excellent environmentally friendly alternative system to solvent based paints (and in some cases plating) because powder paints are free from solvents. The strain on the environment is eased leading to saving of disposal cost in addition to contributing to environment protection.

The powder is made of dry, finely ground organic resins and pigments. The powder is most commonly applied by spraying with a gun that electro statically charges the powder as it exists at the tip. In most cases, the powder is applied directly to a clean, bare metal surface, with no primer or base coat. But sometimes pre-treatment is done to pre condition the surface to be painted so that it accepts a coating which looks attractive, adheres well, lasts long and protect what's underneath. The part that is being coated is electrically grounded, causing the powder to cling to it. After coating, the part with the powder clinging to it is placed in an oven to cure. In the curing process, the powder melts and flows over the surface of the object without drips, runs or sags. The result is a highly durable and attractive finish in a wide variety of colors, glosses and textures.

Salient features:

The variety of alternative methods of applying finishes to products are being developed and found that powder coating process is the best process because this is environmental friendly. Powder coating needs no Volatile Organic Compounds (VOC) in any part of the process. This eliminates one of the major causes of air pollution today. The most common coatings are made from polyesters, urethanes or epoxies as a base. These are stable materials that have extremely low or no volatile organic compounds.

Powder coating is also an economically attractive process. Because there are no volatile, the air in the work area does not have to be ventilated outside. This can offer significant savings in heating and cooling costs. Also, with conventional solvent based coating methods, over spray is wasted material. Powder over spray on the other hand can be collected and reused, thereby achieving about 95% usage of materials.

Precautions before powder coating:

- The coated parts are cured in an oven at up to 450 degrees F, for up to 30 minute or more. Any part of the project that can not withstand this time and temperature must be removed before coating. This would include foam insulation, rubber pads or gaskets and plastic pads etc.,

- Because powder adheres electrostatically, it must be applied to a very clean surface. It will not cling well to old paint, primer, most metal fillers or rust. Chemical stripping and/or bead blasting of the surface is recommended. Sand blasting with coarse media can leave a rough textured surface that can show through the finish and in some cases cause gassing that leaves pin holes.

- Any welds, ripples, dents or pits or the metal surface can show through the coating after the powder is cured. To avoid these types of imperfections, they must be smoothed and/or removed before the powder is applied.

Performance testing of powder coating:

- Test for chalking resistance, light fastness and general degradation of the coating.
- Test for color & gloss stability together with the general degradation of the coating.
- Salt Spray test commonly known as hot salt spray test to know corrosion resistance.
- Humidity test to find out capability of coating due to high humidity.
- Impact resistant test to examine the flexibility of coating.
- Scratch testing is a method of measuring film hardness.
- Mandrel Bend Test - resistant to cracking under stress and flexibility of the film.

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1.11 Expansion and contraction of linear bar grilles and slot diffusers:

Linear bar grilles and slot diffusers, which are normally installed in ambient conditions, will expand and contract with the temperature changes in the conditioned area.

Fig:9. shows the variation in length of the grille for temperature difference. From the above fig the variation will be maximum 1mm per meter length of the grille for a temperature difference of 50^{0}C, both for heating and cooling applications.

However alignment strips available with linear bar grilles will accommodate this slight clearance.

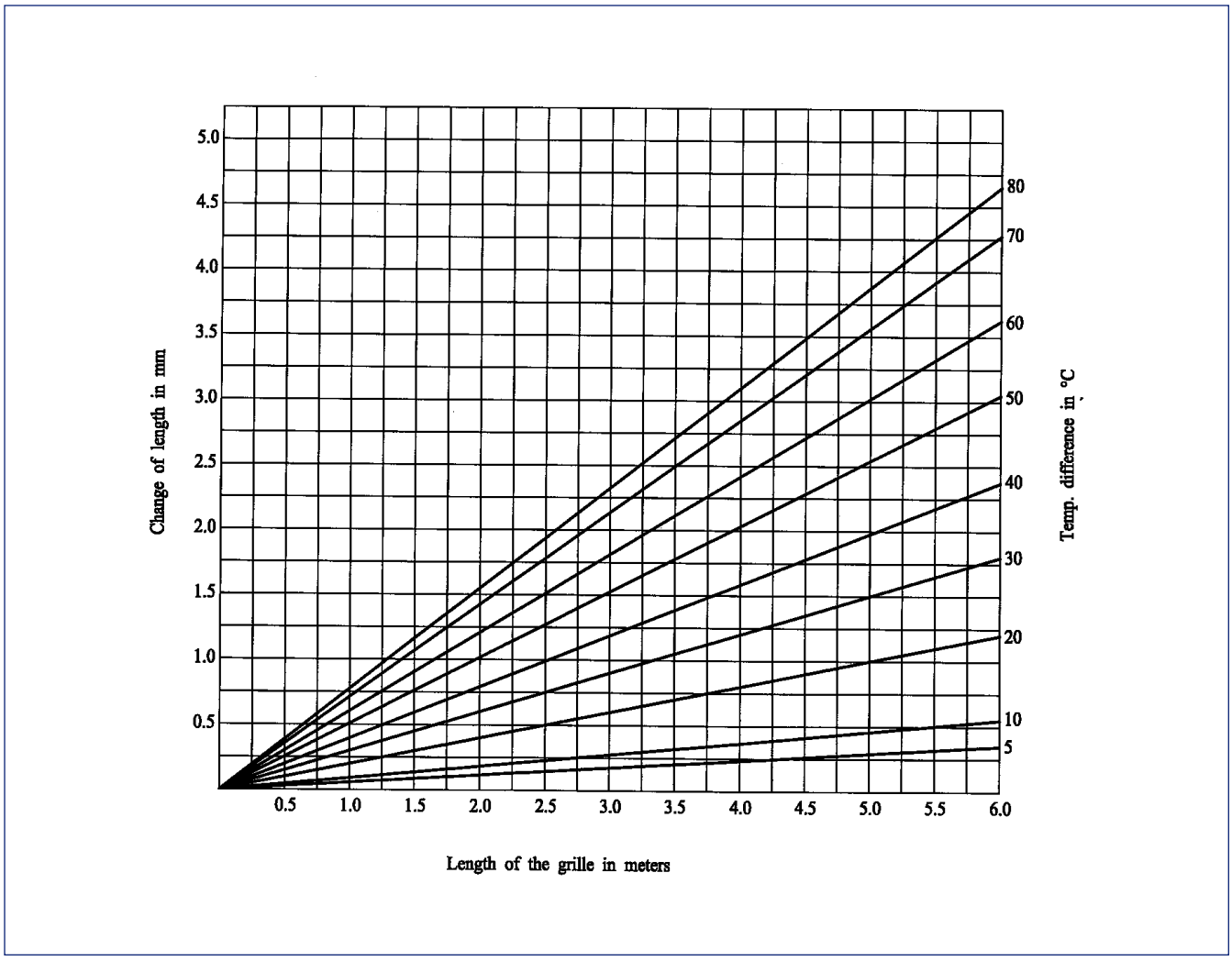

Fig:9. Variation in length Vs temperature difference.

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1.12 Table 13: weight of duct material.

a. Galvanized steel: U.S. gauge:

Gauge	Thickness		Weight per unit area		Weight per sheet of size 8 x 4 ft	
	Inch	mm	Lb/sq ft	Kg/sq mt	Lb/sheet	Kg/sheet
26	0.022	0.56	0.906	4.43	29.0	13.180
24	0.028	0.71	1.156	5.653	37.0	16.820
22	0.034	0.86	1.406	6.875	45.0	20.450
20	0.04	1.00	1.656	8.098	53.0	24.000
18	0.052	1.32	2.156	10.543	70.0	31.820
16	0.064	1.63	2.656	12.988	85.0	38.640
14	0.08	2.00	3.281	16.044	105.0	47.730

b. Aluminium B&S guage:

Gauge	Thickness		Weight per unit area		Weight per sheet of size 8 x 4 ft	
	Inch	mm	Lb/sq ft	Kg/sq mt	Lb/sheet	Kg/sheet
24	0.020	0.51	0.288	1.408	9.2	4.180
22	0.025	0.64	0.355	1.736	11.3	5.140
20	0.032	0.81	0.456	2.229	14.6	6.640
18	0.040	1.01	0.575	2.812	18.4	8.360
16	0.051	1.3	0.724	3.540	23.2	10.550
14	0.064	1.62	0.914	4.469	29.2	13.270
12	0.071	1.80	1.03	5.037	33.0	15.000

c. Stainless steel U.S. gauge: (302)

Gauge	Thickness		Weight per unit area		Weight per sheet of size 8 x 4 ft	
	Inch	mm	Lb/sq ft	Kg/sq mt	Lb/sheet	Kg/sheet
28	0.016	0.41	0.66	3.227	21.1	9.600
26	0.019	0.48	0.79	3.863	25.2	11.450
24	0.025	0.64	1.05	5.134	33.6	15.270
22	0.031	0.79	1.31	6.406	42.0	19.000
20	0.038	0.97	1.58	7.726	50.4	22.900
18	0.050	1.27	2.10	10.269	61.2	27.800
16	0.063	1.6	2.63	12.861	84.0	38.180
14	0.078	2.00	3.28	16.039	104.9	47.680

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1.13 Table 14: Unit conversions

Length	1 in = 25.4 mm 1ft = 0.3048 m				1 m = 3.2808 ft	
Area	1 in^2 = 645.16 mm^2 1 ft^2 = 0.0929 m^2				1 m^2 = 10.76 ft^2	
Volume	1 in^3 = 16387 mm^3 1 ft^3 = 0.0283 m^3 1 UK gallon (liquid) = 4.546 litre 1 US gallon (liquid) = 3.785 litre				1 cfm = 4.8 x 10^{-4} m^3/sec 1 m^3/sec = 2083.3 cfm	
Mass	1 ounce (av) = 28.3 (gramme) 1 gr (grain) = 0.0648 g 1lb = 0.4536 kg					
Force	1 lbf = 0.4536 kp 1 lbf = 0.00445 kN 1 kp = 0.00981 kN					
Pressure		lbf / in^2	lbf / ft^2	kg / m^2	kPa = 1 kN/m^2	Torr = mm Hg
	1 lbf / in^2 =	1	144	703	6.895	51.71
	1 lbf / ft^2 (psf) =	0.00694	1	4.882	0.04788	0.36
	1 kg / m^2 =	0.00142	0.2048	1	0.00981	0.0736
	1 kPa = 1 kN / m^2 =	0.145	20.556	102	1	7.50
	1 Torr = mm Hg =	0.0193	2.78	13.59	0.133	1
	1 psi = 0.068 kg / cm^2 1 kg/cm^2 = 14.7 psi					
Density	1 lbf / ft^3 (pcf) = 16.018 kg / m^3					
Energy		Btu	kcal	KJ	kWh	
	1 Btu =	1	0.252	1.055	0.00029	
	1 kcal =	3.968	1	4.187	0.001163	
	1 KJ =	0.948	0.239	1	0.000278	
	1 kWh =	3412	860	3600	1	
Thermal conductivity		Btu/ft hF	Btu in/ft^2 hF	kcal/m hK	W/m K	
	1 Btu/ft hF =	1	12	1.488	1.73	
	1 Btu in/ft^2 hF =	0.0833	1	0.124	0.144	
	1 kcal/m hK =	0.672	8.064	1	1.163	
	1 W/m K =	0.578	6.933	0.860	1	
Thermal conductance		Btu/ft^2 hF	Btu in/ft^2 hF	Kcal/m^2 hK	W/m^2 K	
	1 Btu/ft hF =	1	144	703	818	
	1 Btu in/ft^2 hF =	0.0694	1	4.882	5.678	
	1 kcal/m hK =	0.00142	0.2048	1	1.163	
	1 W/m K =	0.00122	0.1761	0.860	1	
Heat flow	1 Btu/ft h = 0.8268 kcal/m 1 Btu in/ft h = 0.9615 W/m 1 kcal/m h = 1.163 W/m				1 Btu in/ft^2 h = 2.712 kcal/m^2h 1 Btu/ft^2h = 3.155 W/m^2 1 kcal/m^2 h = 1.163 W/m^2	
Temperature	$^0F = 9/5^0C + 32$ $^0C = 5/9 (^0F - 32)$					
Velocity	1 fpm = 0.00508 m/sec 1 m/sec = 196.85 fpm					

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Chapter 2

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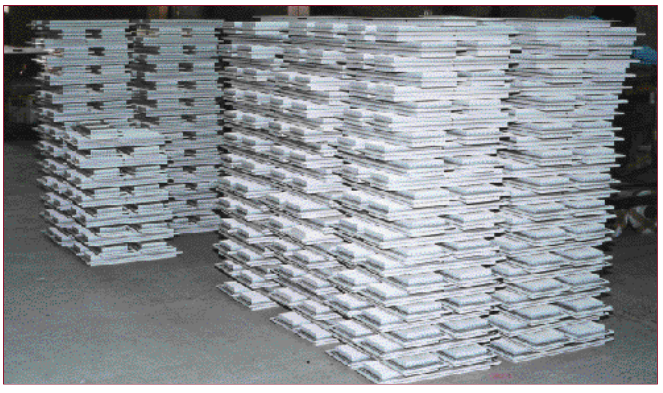
Supply air grille

– front horizontal

Model: ASG-H

Construction:

- **Frame:** High quality extruded aluminium profile with 30 mm flange width as standard. 12, 16, 24 mm flange widths are optional.
- **Blades:** Aerofoil blades from aluminium profiles.
- **Blade spacing:** 20 mm as standard.

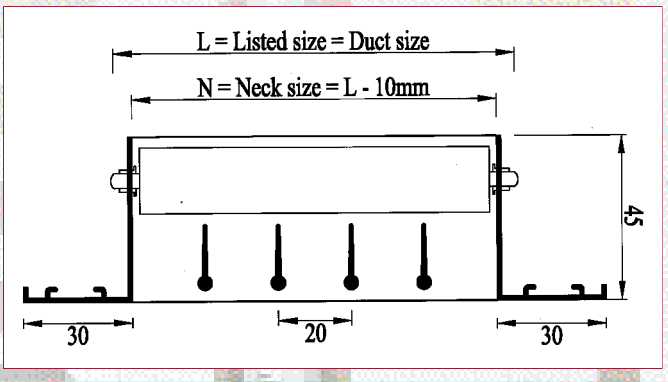


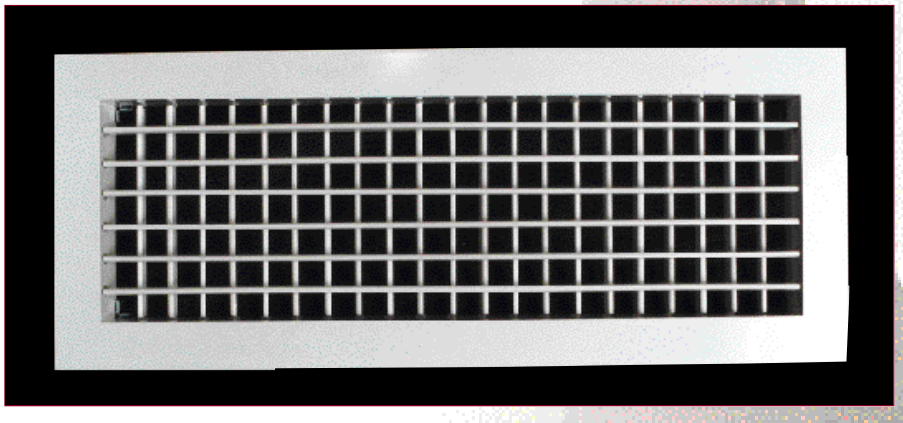
Description:

- The frame and blades are of high quality extruded aluminum profiled construction with the advantages of corrosion resistance and rigidity.
- Grilles have two sets parallel aerofoil blades with one set mounted horizontally on the front and other set vertically at the rear.
- Frame is separated from aerofoil deflection blades by nylon bushings. This method of assembly ensures quiet, smooth and rattle free operation.
- Deflection blades can be adjusted manually and individually, to provide air deflection in both horizontal and vertical planes.
- Maximum effective pressure areas can be achieved when the blades are positioned at 0^0 position.
- Foam gasket is sealed around the back of the frame as option to avoid air leakage.

Standard finishes:

- Natural anodized aluminum finish.
- Powder coated colour finish as per RAL colour codes.
- Flexibility of finishing available on request.





air master

Supply air grille

– front vertical

Model: ASG-V

Construction:

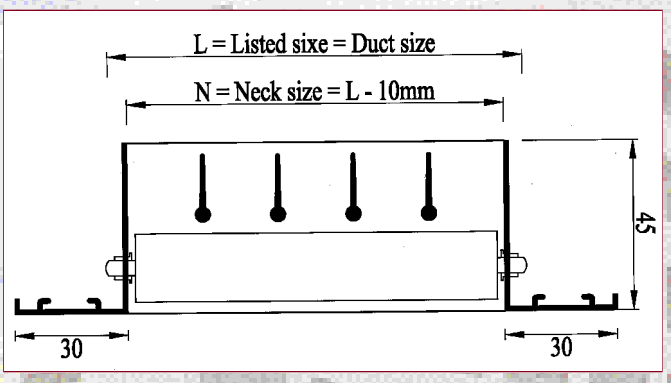
- **Frame:** High quality extruded aluminium profile with 30 mm flange width as standard. 12, 16, 24 mm flange widths are optional.
- **Blades:** Aerofoil blades from aluminium profiles.
- **Blade spacing:** 20 mm as standard.

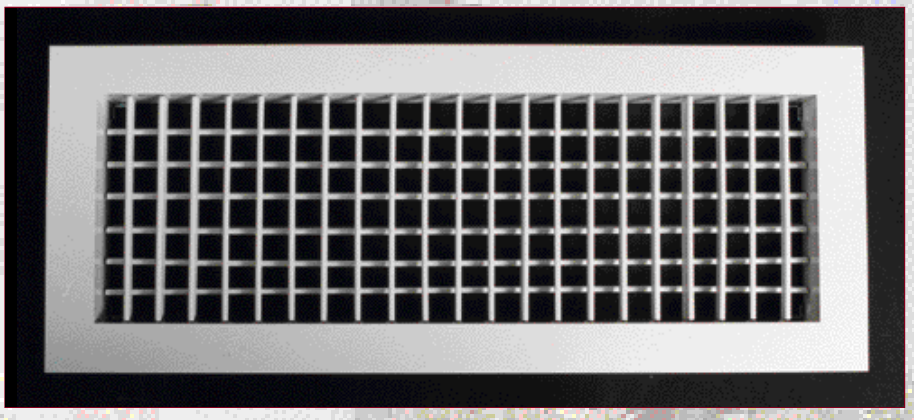
Description:

- The frame and blades are of high quality extruded aluminum profiled construction with the advantage of corrosion resistance and rigidity.
- Grilles have two sets parallel aerofoil blades with one set mounted vertically on the front and other set horizontally at the rear.
- Frame is separated from aerofoil deflection blades with nylon bushings. This method of assembly ensures quiet, smooth and rattle free operation.
- Deflection blades can be adjusted manually and individually, to provide air distribution in both vertical and horizontal planes.
- Maximum effective pressure areas can be achieved when the blades are positioned at 0^0 position.
- Foam gasket is sealed around the back of the frame as option to avoid air leakage.

Standard finishes:

- Natural anodized aluminum finish.
- Powder coated colour finish as per RAL colour codes.
- Flexibility of finishing available on request.





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Supply air register

– front horizontal

Model: ASR-H

Construction:

- **Frame:** High quality extruded aluminium profile with 30 mm flange width as standard. 12, 16, 24 mm flange widths are optional.
- **Blades:** Aerofoil blades from aluminium profiles.
- **Blade spacing:** 20 mm as standard.
- **Damper frame and blades:** High quality extruded aluminium profiles with natural aluminium finish. Black matt finish as option.

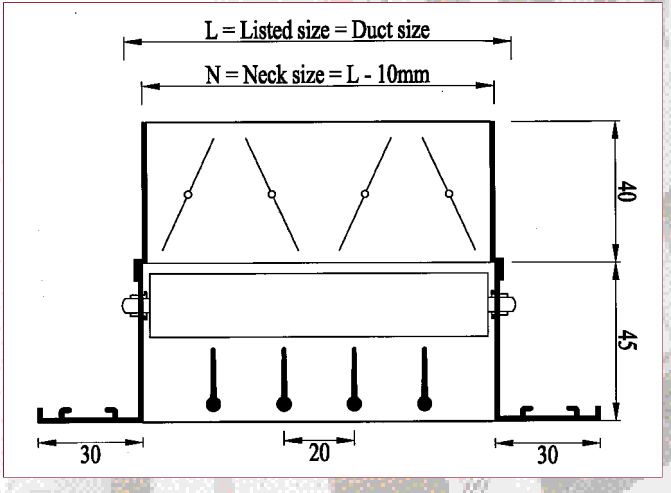
Description:

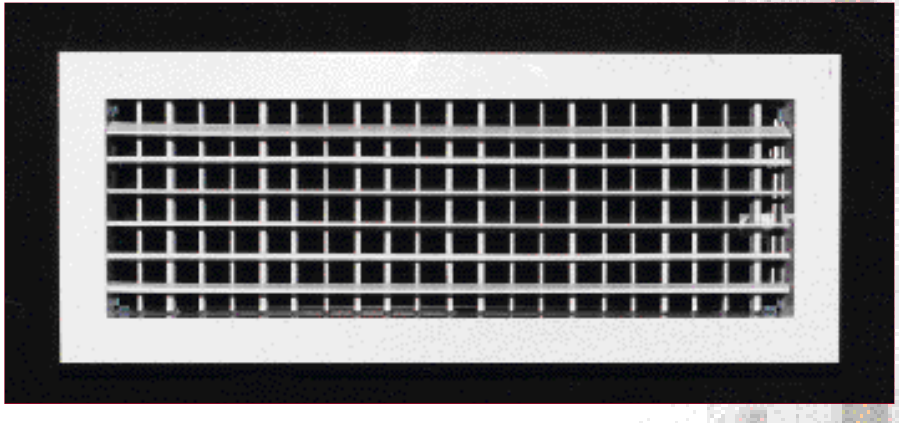
- The frame and blades are of high quality extruded aluminum profiled construction with the advantages of corrosion resistance and rigidity.
- Grilles have two sets parallel aerofoil blades with one set mounted horizontally on the front and other set vertically at the rear.
- Frame is separated from aerofoil deflection blades by nylon bushings. This method of assembly ensures quiet, smooth and rattle free operation.
- Deflection blades can be adjusted manually and individually, to provide air deflection in both horizontal and vertical planes.
- Grilles are rigidly fixed with opposed blade damper by grippers. Damper blade is screw operated from the face opening.

- Foam gasket is sealed around the back of the frame as option to avoid air leakage.

Standard finishes:

- Natural anodized aluminum finish.
- Powder coated colour finish as per RAL colour codes.
- Flexibility of finishing available on request.





air master

Supply air register

– front vertical

Model: ASR-V

Construction:

- **Frame:** High quality extruded aluminium profile with 30 mm flange width as standard. 12, 16, 24 mm flange widths are optional.
- **Blades:** Aerofoil blades from aluminium profiles.
- **Blade spacing:** 20 mm as standard.
- **Damper frame and blades:** High quality extruded aluminium profiles with natural aluminium finish. Black matt finish as option.

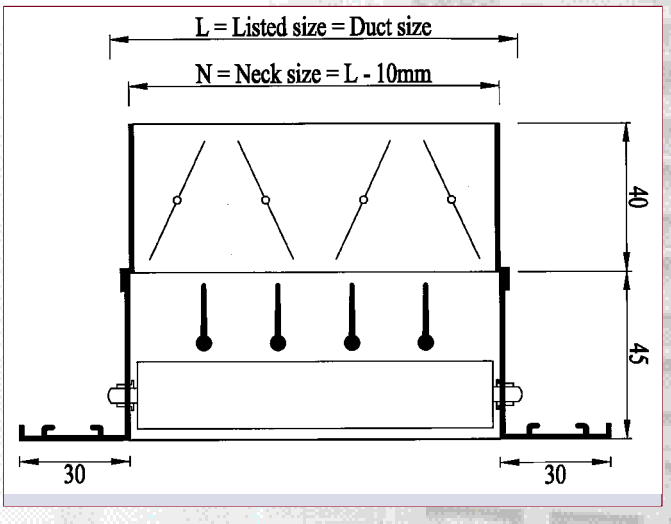
Description:

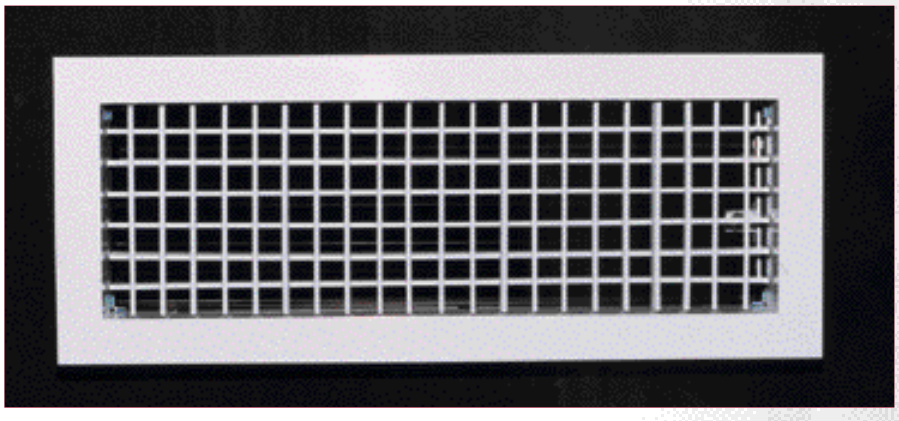
- The frame and blades are of high quality extruded aluminum profiled construction with the advantages of corrosion resistance and rigidity.
- Grilles have two sets parallel aerofoil blades with one set mounted vertically on the front and other set horizontally at the rear.
- Frame is separated from aerofoil deflection blades by nylon bushings. This method of assembly ensures quiet, smooth and rattle free operation.
- Deflection blades can be adjusted manually and individually to provide air deflection in both horizontal and vertical planes.
- Grilles are rigidly fixed with opposed blade damper by grippers. Damper blade is screw operated from the face opening.

- Foam gasket is sealed around the back of the frame as option to avoid air leakage.

Standard finishes:

- Natural anodized aluminum finish.
- Powder coated colour finish as per RAL colour codes.
- Flexibility of finishing available on request.





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Return air grille

– fixed horizontal blades

Model: ARG-H

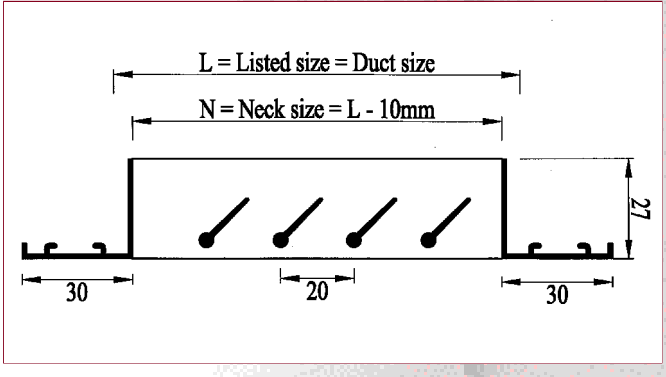
Construction:

- **Frame:** High quality extruded aluminium profile with 30 mm flange width as standard.12, 16, 24 mm flange widths are optional.
- **Blades:** Aerofoil blades from aluminium profiles.
- **Blade spacing:** 20 mm as standard.

Description:

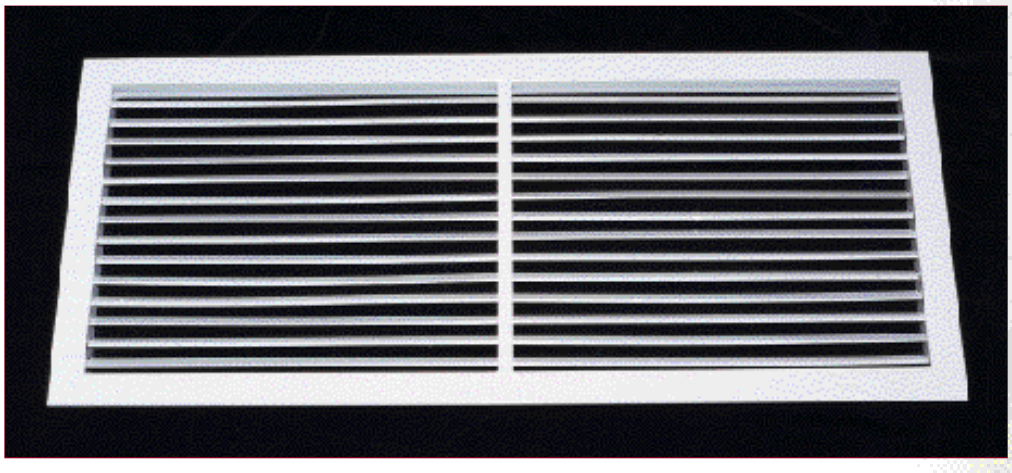
- The frame and blades are of high quality extruded aluminum profiled construction with the advantages of corrosion resistance and rigidity.
- Deflection blades are fixed rigidly to the frame at an angle of 45^0 to the horizontal plane.
- Foam gasket is sealed around the back of the frame as option to avoid air leakage.

Model: ARR-H: Return air register with fixed horizontal blades. Construction is same as ARG-H, with opposed blade damper.



Standard finishes:

- Natural anodized aluminum finish.
- Powder coated colour finish as per RAL colour codes.
- Flexibility of finishing available on request.



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Return air grille
– vertical blades
Model: ARG-V

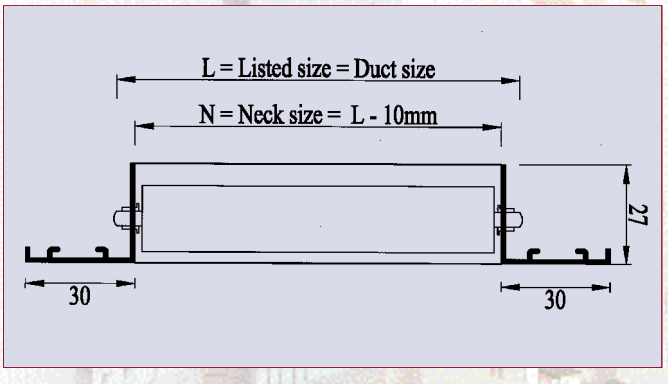
Construction:
- **Frame:** High quality extruded aluminium profile with 30 mm flange width as standard. 12, 16, 24 mm flange widths are optional.
- **Blades:** Aerofoil blades from aluminium profiles.
- **Blade spacing:** 20 mm as standard.

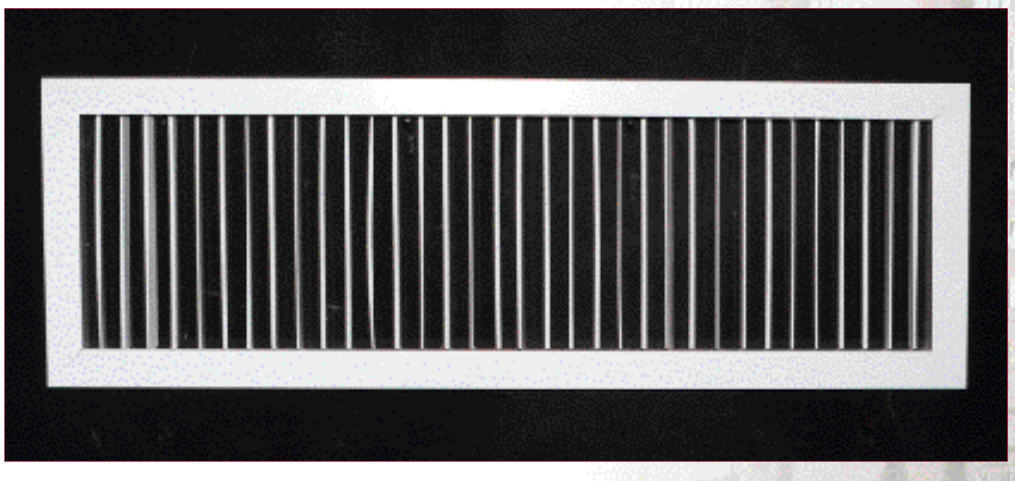
Description:
- The frame and blades are of high quality extruded aluminum profiled construction with the advantages of corrosion resistance and rigidity.
- Frame is separated from the aerofoil deflection blades with nylon bushings. This method of assembly assures quiet, smooth and rattle free operation.
- Deflection blades can be adjusted manually and individually in the vertical plane to obtain optimum air distribution.
- Maximum effective pressure areas can be achieved when the blades are positioned at 0^0 vertical position.
- Foam gasket is sealed around the back of the frame as option to avoid air leakage.

Standard finishes:
- Natural anodized aluminum finish.

- Powder coated colour finish as per RAL colour codes.
- Flexibility of finishing available on request.

Model: ARR-V: Return air register with vertical blades. Construction is same as ARG-V, with opposed blade damper.





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Return air grille

– adjustable horizontal blades

Model: ARG-HA

Construction:

- **Frame:** High quality extruded aluminium profile with 30 mm flange width as option. 12, 16, 24 mm flange widths are optional.
- **Blades:** Aerofoil blades from aluminium profiles.
- **Blade spacing:** 20 mm as standard.

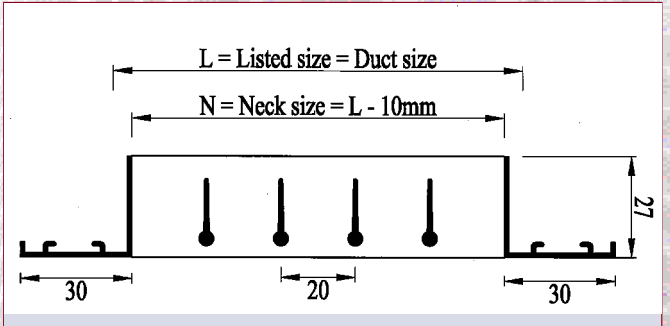
Description:

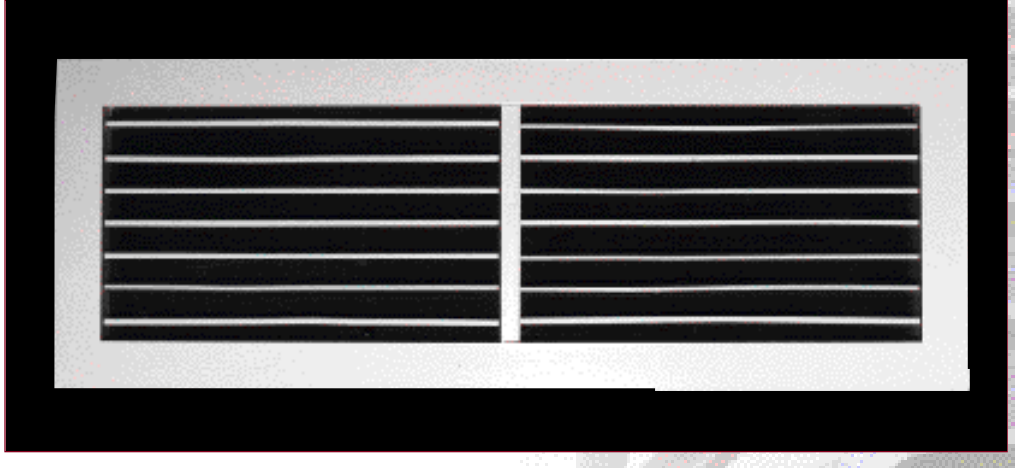
- The frame and blades are of high quality extruded aluminum profiled construction with the advantages of corrosion resistance and rigidity.
- Frame is separated from the aerofoil deflection blades with nylon bushings. This method of assembly assures quiet, smooth and rattle free operation.
- Deflection blades can be adjusted manually and individually in the horizontal plane to obtain optimum air distribution.
- Maximum effective pressure areas can be achieved when the blades are positioned at 0^0 horizontal position.
- Foam gasket is sealed around the back of the frame as option to avoid air leakage.

Standard finishes:

- Natural anodized aluminum finish.
- Powder coated colour finish as per RAL colour codes.
- Flexibility of finishing available on request.

Model: ARR-HA: Return air register with adjustable horizontal blades. Construction is same as ARG-HA, with opposed blade damper.





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Fresh air grille

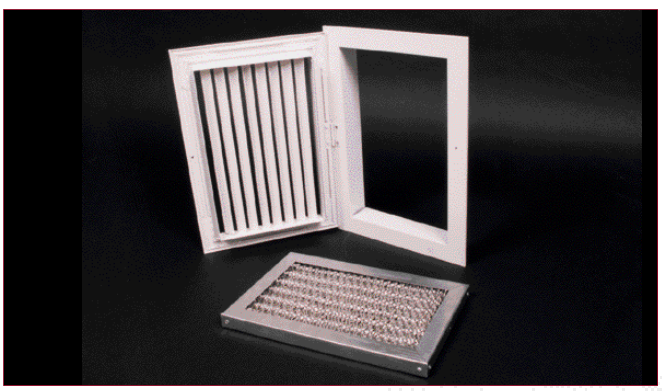
Model: AFAG

Construction:

- **Frame:** High quality extruded aluminium profile with 30 mm flange width as standard.12, 16, 24 mm flange widths are optional.
- **Blades:** Aerofoil blades from aluminium profiles.
- **Blade spacing:** 20 mm as standard.
- **Filter frame:** One mm thick aluminium sheet.
- **Filter media:** Aluminium mesh.

Description:

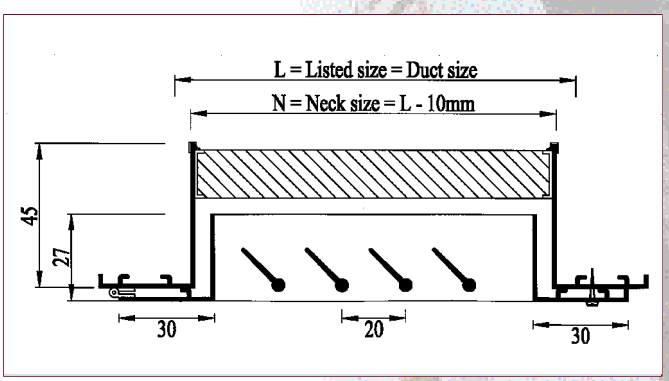
- The frame and blades are of high quality extruded aluminum profiled construction with the advantages of corrosion resistance and rigidity.
- Deflection blades are fixed rigidly to the frame at an angle of 45^0 to the horizontal plane.
- Removable 12 mm thick aluminium washable filter is placed at the back of the grille.
- Grille frame is fixed to the main frame by hinges on one side and by screw on the other side.
- Filter can be removed easily by opening the grille frame.
- Total assembly will be same as ARG-H, with removable 12 mm thick aluminium filter.
- Foam gasket is sealed around the back of the frame as option to avoid air leakage.

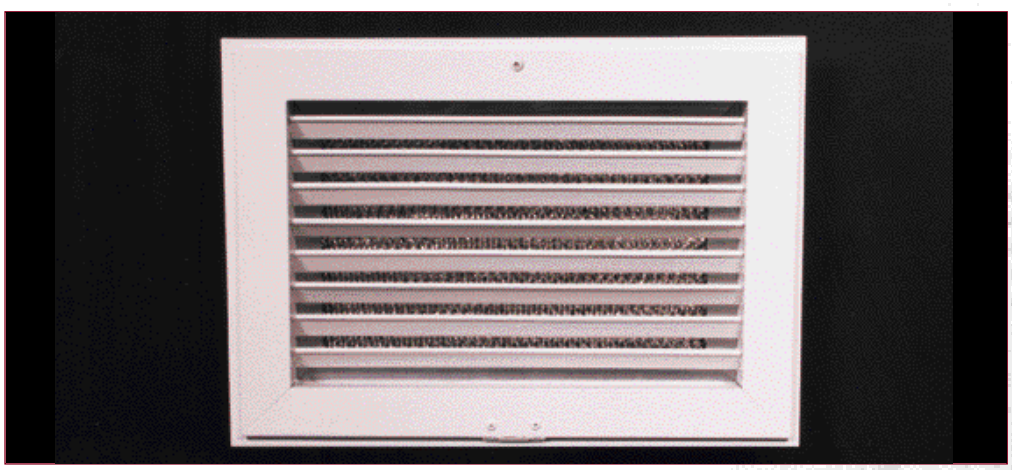


Standard finishes:

- Natural anodized aluminum finish.
- Powder coated colour finish as per RAL colour codes.
- Flexibility of finishing available on request.

Model: AFAR : Fresh air register with fixed horizontal blades. Construction is same as AFAG, with opposed blade damper.





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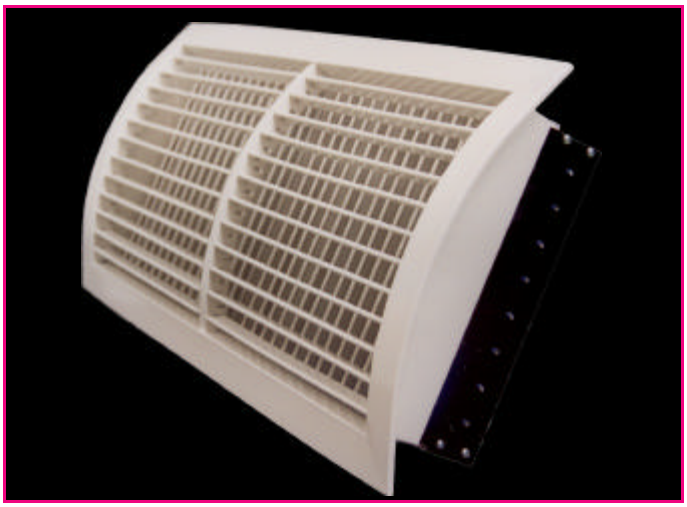
Universal Grille

Model: AUG

Construction:

- **Frame:** High quality extruded aluminium profile with 30 mm flange width as standard. 24 mm flange width as optional.
- **Blades:** Aerofoil blades from aluminium profiles.
- **Blade spacing:** 20 mm as standard.
- **Damper frame and blades:** High quality extruded aluminium profiles with natural aluminium finish. Black matt finish as option.



Description:

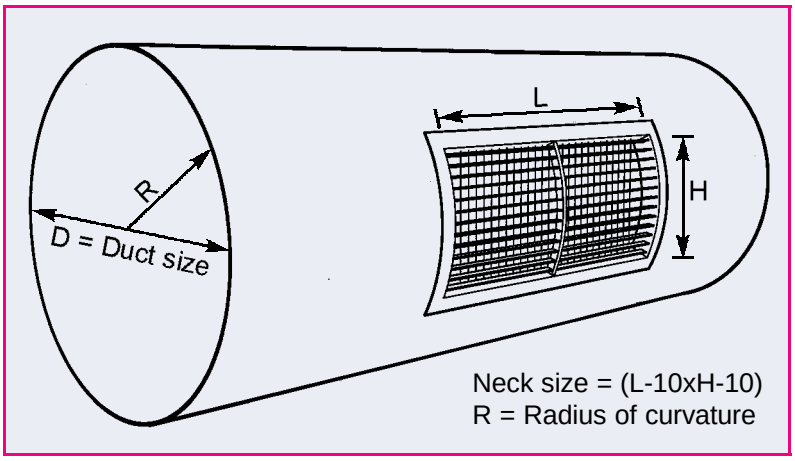
- This grille is specifically designed for direct mounting on rigid round duct, with a curved face.
- The frame and blades are of high quality extruded aluminium profiled construction with the advantages of corrosion resistance and rigidity.
- Grilles have two sets of parallel aerofoil blades with one set mounted horizontally on the front and other set vertically at the rear.
- Frame is separated from the aerofoil deflection blades by nylon bushings. This method of assembly ensures quiet, smooth and rattle free operation.
- Deflection blades can be adjusted manually and individually, to provide air deflection in both horizontal and vertical planes.
- Grilles are rigidly fixed with opposed blade damper by grippers. Damper blade is screw operated from the face opening.
- Foam gasket is sealed around the back of the frame as option to avoid air leakage.

Standard finishes:

- Natural anodized aluminium finish.
- Powder coated color finish as per RAL color codes.
- Flexibility of finishing available on request.

Air flow data:

The datas can be taken from the table 2.1 provided for normal grilles.



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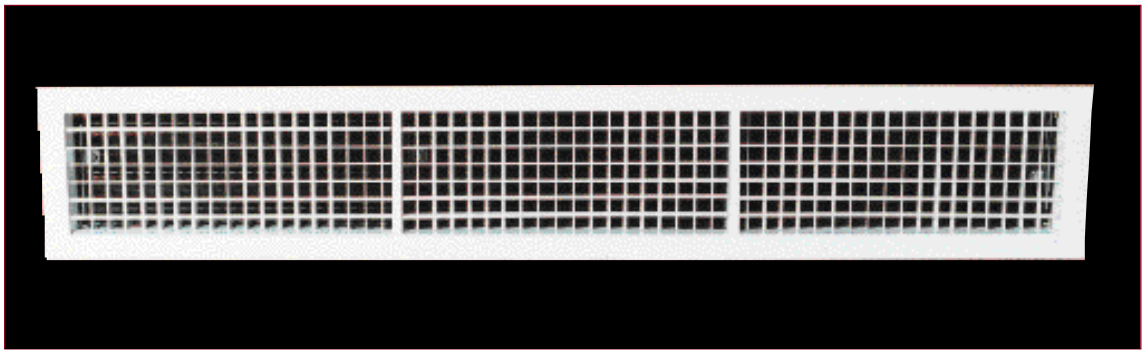
Mullion arrangement:

- **Mullion:** Aluminium profiled U-channel.
- If the length of the grille is above 500 mm, horizontal aerofoil blades are connected through a mullion, fixed at the centre of the grille for stability.
- For grilles of length 1000mm and above, two mullions will be connected vertically at equidistant.



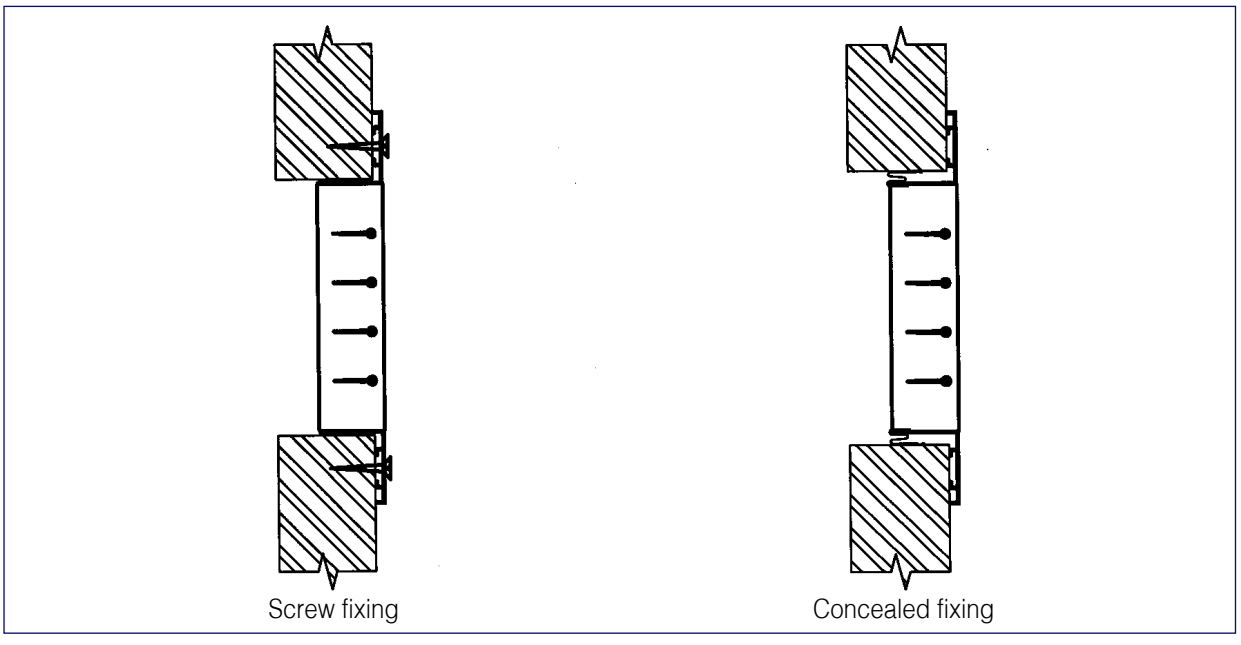
Standard sizes:

- Available in square and rectangular sizes.
- All combination of W x H.
- Non standard sizes are available as option.

W x H mm x mm	W x H mm x mm	W x H mm x mm	W x H mm x mm	W x H mm x mm
150 x 150	300 x 200	400 x 150	500 x 150	650 x 100
200 x 100	300 x 250	400 x 200	500 x 200	700 x 250
200 x 125	300 x 300	400 x 250	500 x 250	750 x 100
200 x 150	350 x 125	400 x 300	500 x 300	750 x 150
250 x 100	350 x 150	400 x 400	500 x 350	750 x 200
250 x 125	350 x 200	450 x 100	500 x 400	750 x 250
250 x 150	350 x 250	450 x 150	600 x 125	900 x 150
250 x 200	350 x 300	450 x 200	600 x 150	900 x 200
250 x 250	350 x 350	450 x 450	600 x 200	1000 x 200
300 x 100	400 x 100	500 x 100	600 x 250	1200 x 150
300 x 125	400 x 125	500 x 125	600 x 300	

air master

Fixing details:



How to order:

Model	Aerofoil blades	Size	Quantity	Finish
ASG	H = Front horizontal	Specify listed size Length x heigh in mm x mm	Specify in numbers	A = Aluminium anodized finish
ASR				
ARG	V = Front vertical			B = RAL 9010
ARR				C = Other RAL colours

Tick the required item.

Ordering example:

1. To select supply air register, front horizontal aerofoil blades of size 600 x 150 mm, Qty = 60 nos, with RAL-9010 colour finish.

   Order as: ASR - H - 600 x 150 - 60 - B.

air master

Supply air grilles and registers

Rating with 0^0 and 45^0 deflection

Models: ASG-H, ASG-V, ASR-H, ASR-V

Table 2.1 Air flow data

CFM / M^3/sec	Listed Size in mm x mm	200 x 100		250 x 100 200 x 125 150 x 150		200 x 150 250 x 125 300 x 100		250 x 150 300 x 125 400 x 100		300 x 150 350 x 125 450 x 100	
	Area factor Deflection	0.0191 0^0	0.0093 45^0	0.0199 0^0	0.0102 45^0	0.0214 0^0	0.0113 45^0	0.0246 0^0	0.0142 45^0	0.0269 0^0	0.0169 45^0
100 0.0472	Face vel Pt mm H_2O Throw in (M) N.C	2.47 0.43 4.2-5.4 15	5.08 1.45 2.7-4.8 19	2.37 0.35 3.9-5.5 <15	4.63 1.22 3.0-4.9 16	2.21 0.33 3.9-5.2 <15	4.18 1.04 3.0-4.9 <15	1.92 0.23 4.0-5.2 <15	3.32 0.69 2.7-4.6 <15		
150 0.0708	Face vel Pt mm H_2O Throw in (M) N.C	3.71 0.99 4.9-6.4 18	7.61 3.23 3.6-5.8 24	3.56 0.78 4.6-6.1 16	6.94 2.72 3.7-5.5 21	3.31 0.74 4.3-6.1 <15	6.27 2.31 3.7-5.2 16	2.87 0.53 4.3-6.1 <15	4.98 1.55 3.4-5.2 <15	2.63 0.46 4.0-5.8 <15	4.19 1.07 3.4-4.9 <15
200 0.0945	Face vel Pt mm H_2O Throw in (M) N.C	4.95 1.77 5.2-7.3 21	10.16 5.76 4.3-6.4 28	4.75 1.39 5.2-7.0 19	9.26 4.88 4.3-6.1 25	4.42 1.3 4.9-7.0 17	8.36 4.12 3.9-6.1 24	3.84 0.94 4.9-6.7 15	6.65 2.77 4.0-5.8 20	3.51 0.81 4.6-6.7 <15	5.59 1.88 4.0-5.8 15
250 0.1181	Face vel Pt mm H_2O Throw in (M) N.C	6.18 2.76 5.8-7.9 28	12.69 9.02 4.8-7.0 35	5.93 2.18 5.8-7.9 27	11.58 7.62 4.9-7.0 32	5.52 2.0 5.5-7.6 24	10.45 6.45 4.9-6.7 31	4.80 1.45 5.4-7.6 21	8.32 4.32 4.6-6.7 27	4.39 1.24 5.2-7.6 17	6.988 2.95 4.6-6.7 23
300 0.1417	Face vel Pt mm H_2O Throw in (M) N.C	7.42 3.96 5.8-8.2 34	15.24 13.21 5.2-7.3 40	7.12 3.15 5.8-8.2 31	13.89 10.92 5.2-7.3 38	6.62 2.9 5.8-8.2 28	12.54 9.27 5.2-7.3 36	5.76 2.1 5.8-8.2 26	9.98 6.22 5.2-7.3 33	5.27 1.8 5.8-8.2 23	8.38 4.24 5.2-7.3 30
350 0.1653	Face vel Pt mm H_2O Throw in (M) N.C	8.65 5.38 7.0-9.8 37	17.77 17.53 5.8-8.2 45	8.31 4.32 6.7-9.5 35	16.21 14.98 5.8-8.2 42	7.72 3.9 6.7-9.5 32	14.63 12.57 5.4-7.9 39	6.72 2.87 6.4-9.2 30	11.64 8.51 5.4-7.9 37	6.14 2.46 6.4-9.1 28	9.78 5.77 5.4-7.9 35
400 0.1889	Face vel Pt mm H_2O Throw in (M) N.C			9.49 5.61 7.6-10.4 38	18.52 19.56 6.7-9.1 45	8.83 5.13 7.3-10.4 36	16.72 16.51 6.4-8.8 42	7.68 3.76 7.0-10.1 34	13.30 11.05 6.1-8.5 40	7.022 3.2 6.7-9.8 32	11.18 7.52 6.1-8.5 38
450 0.2125	Face vel Pt mm H_2O Throw in (M) N.C							8.64 4.72 7.3-10.7 39	14.96 13.97 6.7-9.1 43	7.899 4.06 7.0-10.4 36	12.57 9.53 6.4-8.8 42
500 0.2362	Face vel Pt mm H_2O Throw in (M) N.C									8.78 5.00 7.3-10.9 40	13.97 11.74 6.7-7.4 45

- Face velocity is measured in m/sec.
- Total pressure loss is in mm of H_2O & Area factor in square meter.
- Throw (meters) is measured for a terminal velocity of 0.5 and 0.25 m/sec.
- NC based on a room attenuation of 10 dB.

air master

Supply air grilles and registers

Rating with 0^0 and 45^0 deflection

Models: ASG-H, ASG-V, ASR-H, ASR-V

Table 2.1 (Cont.) Air flow data

CFM M^3/sec	Listed Size in mm x mm	250 x 200 350 x 150 400 x 125 500 x 100		250 x 250 300 x 200 400 x 150 500 x 125 650 x 100		300 x 250 450 x 175 500 x 150 600 x 125 750 x 100		300 x 300 350 x 250 450 x 200 600 x 150		350 x 300 400 x 250 500 x 200 750 x 150	
	Area factor Deflection	0.028 0^0	0.0178 45^0	0.0324 0^0	0.022 45^0	0.039 0^0	0.0288 45^0	0.0469 0^0	0.0369 45^0	0.0528 0^0	0.0422 45^0
200 0.0945	Face vel Pt mm H_2O Throw in (M) N.C	3.38 0.64 4.5-6.7 <15	5.31 1.7 3.7-5.8 <15	2.91 0.36 4.5-6.7 <15	4.30 1.17 3.7-5.5 <15	2.42 0.23 4.6-6.7 <15	3.28 0.71 3.4-5.5 <15	2.0 0.15 4.6-6.7 <15	2.56 0.41 3.1-5.5 <15		
250 0.1181	Face vel Pt mm H_2O Throw in (M) N.C	4.22 0.99 5.2-7.6 15	6.63 2.64 4.6-6.7 21	3.65 0.58 5.2-7.6 <15	5.37 1.83 4.3-6.7 18	3.03 0.36 5.2-7.6 <15	4.1 1.12 4.3-6.4 <15	2.52 0.23 5.2-7.6 <15	3.201 0.61 3.9-6.4 <15	2.24 0.18 5.2-7.3 <15	2.79 0.41 3.6-6.0 <15
300 0.1417	Face vel Pt mm H_2O Throw in (M) N.C	5.06 1.42 5.8-8.2 20	7.96 3.81 5.2-7.3 27	4.37 0.84 5.8-8.2 17	6.44 2.62 5.2-7.3 22	3.63 0.51 5.8-8.2 <15	4.92 1.6 4.8-7.3 19	3.02 0.33 5.8-8.2 <15	3.84 0.89 4.8-7.3 <15	2.68 0.25 5.5-7.9 <15	3.36 0.58 4.9-7.0 <15
400 0.1889	Face vel Pt mm H_2O Throw in (M) N.C	6.75 2.51 6.7-9.8 29	10.6 6.73 6.4-8.8 36	5.83 1.47 6.7-9.8 24	8.59 4.67 6.1-8.5 27	4.84 0.91 6.7-9.8 19	6.56 2.87 5.8-8.5 21	4.03 0.61 6.7-9.5 <15	5.19 1.6 5.8-8.2 17	3.58 0.46 6.7-9.5 <15	4.47 1.07 5.5-8.2 <15
500 0.2362	Face vel Pt mm H_2O Throw in (M) N.C	8.44 3.91 7.3-10.9 35	13.27 10.54 6.7-9.2 42	7.29 2.28 7.3-10.9 30	10.74 7.24 6.7-9.1 32	6.06 1.45 7.6-11.0 26	8.2 4.47 6.4-9.1 28	5.036 0.94 7.9-11.3 18	6.4 2.46 6.4-9.1 24	4.47 0.71 7.6-11.3 15	5.59 1.65 8.2-9.1 19
600 0.2834	Face vel Pt mm H_2O Throw in (M) N.C			8.75 3.3 8.5-12.2 36	12.88 10.52 7.0-10.0 39	7.27 2.06 8.5-12.2 30	9.84 6.45 7.0-10.0 35	6.04 1.35 8.5-12.2 25	7.68 3.58 7.0-10.0 31	5.37 1.04 8.5-12.2 19	6.72 2.36 6.7-10.1 24
700 0.3307	Face vel Pt mm H_2O Throw in (M) N.C					8.48 2.82 9.1-13.1 36	11.48 8.76 7.6-10.9 42	7.05 1.83 9.1-13.1 32	8.96 4.83 7.6-11.0 37	6.26 1.40 9.1-13.1 25	7.84 3.25 7.6-10.9 31
800 0.3778	Face vel Pt mm H_2O Throw in (M) N.C							8.05 2.41 9.8-14.0 36	10.24 6.35 8.2-11.9 41	7.16 1.83 9.8-13.7 33	8.95 4.22 8.2-11.9 37
900 0.425	Face vel Pt mm H_2O Throw in (M) N.C							9.06 3.05 10.0-14.6 40	11.52 8.0 8.5-12.5 45	8.05 2.31 10.0-14.6 36	10.07 5.3 8.4-12.5 41

- Face velocity is measured in m/sec.
- Total pressure loss is in mm of H_2O & Area factor in square meter.
- Throw (meters) is measured for a terminal velocity of 0.5 and 0.25 m/sec.
- NC based on a room attenuation of 10 dB.

air master

Supply air grilles and registers

Rating with 0^0 and 45^0 deflection

Models: ASG-H, ASG-V, ASR-H, ASR-V

Table 2.1 (Cont.) Air flow data

CFM M^3/sec	Listed Size in mm x mm	350 x 350 400 x 300 500 x 250 600 x 200 900 x 150		400 x 400 500 x 300 600 x 250 750 x 200		500 x 350 600 x 300 700 x 250 900 x 200 1200 x 150		450 x 450 500 x 400 800 x 250 1000 x 200	
	Area factor Deflection	0.0633 0^0	0.0529 45^0	0.0827 0^0	0.072 45^0	0.0962 0^0	0.0853 45^0	0.1069 0^0	0.097 45^0
500 0.2362	Face vel P_t mm H_2O Throw in (M) N.C	3.73 0.48 7.3-10.9 <15	4.47 1.02 5.8-9.1 16	2.86 0.28 6.7-10.7 <15	3.28 0.45 5.5-9.1 <15	2.46 0.20 9.5-10.4 <15	2.77 0.31 5.2-9.1 <15	2.21 0.15 6.1-10.1 <15	2.43 0.23 4.9-8.8 <15
600 0.2834	Face vel P_t mm H_2O Throw in (M) N.C	4.47 0.71 8.2-11.9 16	5.36 1.45 6.4-10.1 20	3.43 0.41 7.6-11.6 <15	3.94 0.63 6.4-10.1 18	2.95 0.31 7.3-11.3 <15	3.32 0.43 6.1-10.1 15	2.65 0.23 7.0-10.7 <15	2.92 0.31 6.1-9.8 <15
700 0.3307	Face vel P_t mm H_2O Throw in (M) N.C	5.22 0.96 8.8-12.8 22	6.25 1.98 7.3-10.9 26	4.0 0.56 8.5-12.5 19	4.59 0.86 7.0-11.0 23	3.44 0.41 8.5-12.2 16	3.88 0.56 7.0-10.9 20	3.09 0.31 8.2-11.9 15	3.4 0.43 6.7-10.7 19
800 0.3778	Face vel P_t mm H_2O Throw in (M) N.C	5.97 1.27 9.8-13.4 30	7.14 2.59 8.2-11.9 32	4.57 0.71 9.5-13.1 26	5.25 1.14 7.9-10.6 28	3.93 0.53 9.5-13.1 21	4.43 0.74 7.9-11.6 25	3.53 0.38 9.1-12.5 20	3.89 0.56 7.6-11.3 24
900 0.425	Face vel P_t mm H_2O Throw in (M) N.C	6.71 1.60 10.1-14.6 33	8.03 3.25 8.5-12.5 36	5.14 0.91 10.1-14.3 30	5.9 1.45 8.5-12.2 33	4.42 0.68 10.1-14.0 25	4.98 0.94 8.5-12.2 30	3.98 0.48 9.8-13.7 24	4.38 0.71 8.2-12.2 29
1000 0.472	Face vel P_t mm H_2O Throw in (M) N.C	7.44 1.98 10.7-15 37	8.92 4.01 9.1-13 40	5.69 1.11 10.4-15 34	6.55 1.78 9.1-13.1 36	4.92 0.84 10.4-14.6 30	5.55 1.17 9.1-13.1 33	4.45 0.61 10.1-14.3 29	4.86 0.86 9.2-13.1 32
1100 0.519	Face vel P_t mm H_2O Throw in (M) N.C	8.18 2.39 10.9-16 40	9.81 4.88 9.8-14 45	6.25 1.35 10.7-15 36	7.21 2.16 9.8-14 40	5.41 1.02 10.7-15.0 33	6.11 1.42 9.8-14 36	4.89 0.74 10.4-14.9 32	5.35 1.07 9.8-14 35
1200 0.567	Face vel P_t mm H_2O Throw in (M) N.C			6.83 1.60 11.3-16 38	7.87 2.54 10.4-15 43	5.91 1.22 11.3-15.9 36	6.67 1.68 10.4-14.9 40	5.35 1.0 11-15.2 35	5.84 1.24 10-14.8 39
1400 0.661	Face vel P_t mm H_2O Throw in (M) N.C			7.96 2.18 12.2-17 44	9.18 3.51 11-15.5 49	6.88 1.65 12.2-16.8 41	7.77 2.28 10.9-15.2 44	6.23 1.19 11.6-16.2 40	6.81 1.73 10.4-15 43

- Face velocity is measured in m/sec.
- Total pressure loss is in mm of H_2O & Area factor in square meter.
- Throw (meters) is measured for a terminal velocity of 0.5 and 0.25 m/sec.
- NC based on a room attenuation of 10 dB.

air master

Supply air grilles and registers

Rating with 0^0 and 45^0 deflection

Models: ASG-H, ASG-V, ASR-H, ASR-V

Table 2.1 (Cont.) Air flow data

CFM / M^3/sec	Listed Size in mm x mm	600 x 400 900 x 250 800 x 300 1200 x 200		800 x 350 900 x 300 1100 x 250 1400 x 200		600 x 600 900 x 400 1000 x 350 1200 x 300		750 x 600 900 x 500 1000 x 450 1500 x 300 1200 x 375		800 x 750 900 x 700 1000 x 600 1200 x 500	
	Area factor Deflection	0.1352 0^0	0.1 45^0	0.162 0^0	0.1159 45^0	0.216 0^0	0.162 45^0	0.27 0^0	0.216 45^0	0.354 0^0	0.288 45^0
1100 0.519	Face vel Pt mm H_2O Throw in (M) N.C	3.84 0.64 9.8-14.3 30	5.19 0.98 9.2-13.2 33	3.20 0.59 9.2-13.6 28	4.48 0.84 8.6-12.8 29	2.4 0.52 8.8-13.0 25	3.2 0.76 8.1-11.3 27	1.92 0.42 7.0-9.1 20	2.4 0.62 6.2-8.3 24		
1200 0.567	Face vel Pt mm H_2O Throw in (M) N.C	4.19 0.87 10.3-14.8 32	5.67 1.09 9.8-14.0 35	3.5 0.69 9.7-14.3 30	4.89 0.92 9.1-13.2 32	2.63 0.58 9.3-13.8 27	3.5 0.81 8.4-11.9 29	2.1 0.48 7.5-10.8 24	2.63 0.71 6.8-9.4 26	1.6 0.38 6.3-9.2 20	1.97 0.51 5.7-8.1 22
1400 0.661	Face vel Pt mm H_2O Throw in (M) N.C	4.89 0.93 10.8-15.4 35	6.61 1.51 10.2-14.6 38	4.08 0.76 10.1-15.0 33	5.7 1.21 9.7-13.8 35	3.06 0.63 9.7-14.3 30	4.08 0.98 8.8-11.3 32	2.45 0.51 8.1-11.3 27	3.06 0.79 7.3-10.1 29	1.87 0.43 6.8-10.1 23	2.29 0.58 6.1-8.8 25
1600 0.756	Face vel Pt mm H_2O Throw in (M) N.C	5.59 1.03 11.5-16.9 38	7.56 1.82 10.8-15.1 40	4.67 0.84 10.6-15.4 36	6.52 1.43 10.1-14.5 37	3.5 0.71 10.1-14.8 33	4.82 1.12 9.3-12.1 34	2.8 0.63 8.8-12.1 29	3.5 0.91 7.9-10.7 31	2.13 0.51 7.3-10.9 25	2.63 0.64 6.7-9.2 28
1800 0.85	Face vel Pt mm H_2O Throw in (M) N.C	6.29 1.32 12.6-18.2 41	8.5 2.24 11.4-17.3 44	5.25 0.97 11.8-16.7 39	7.33 1.73 10.7-15.3 41	3.94 0.82 10.9-16.1 36	5.32 1.34 9.8-14.1 37	3.15 0.72 10.1-14.2 31	3.94 1.13 8.2-12.2 33	2.4 0.58 7.9-11.6 28	2.95 0.78 7.1-9.8 31
2000 0.945	Face vel Pt mm H_2O Throw in (M) N.C	6.99 1.61 13.8-19.7 44	9.78 2.53 12.4-18.6 47	5.83 1.03 13.2-18.1 41	8.15 1.92 11.6-16.5 43	4.38 0.88 12.1-17.3 39	5.83 1.52 10.3-14.8 41	3.5 0.78 10.7-15.1 33	4.38 1.23 8.8-13.1 36	2.7 0.61 8.2-11.8 28	3.28 0.83 7.4-10.4 32
2200 1.039	Face vel Pt mm H_2O Throw in (M) N.C			6.41 1.16 14.3-19.5 44	8.96 2.42 12.4-17.7 47	4.81 0.95 12.8-18.1 41	6.41 1.82 10.9-15.7 44	3.85 0.83 11.2-16.4 35	4.81 1.45 9.3-13.8 39	2.94 0.72 8.9-13.0 30	3.61 0.93 8.1-11.3 33
2400 1.134	Face vel Pt mm H_2O Throw in (M) N.C					5.25 1.13 13.7-19.2 43	7.0 2.04 11.4-16.4 46	4.2 0.93 12.2-17.3 37	5.25 1.63 9.9-14.7 42	3.2 0.81 9.5-13.8 32	3.94 1.03 8.7-12.1 35
2600 1.228	Face vel Pt mm H_2O Throw in (M) N.C					5.69 1.43 14.4-21.3 45	7.58 2.43 12.1-17.6 48	4.55 1.07 13.1-18.4 40	5.69 1.93 10.7-15.4 44	3.47 0.92 10.7-15.7 33	4.26 1.32 9.3-13.2 37

- Face velocity is measured in m/sec.
- Total pressure loss is in mm of H_2O & Area factor in square meter.
- Throw (meters) is measured for a terminal velocity of 0.5 and 0.25 m/sec.
- NC based on a room attenuation of 10 dB.

air master

Return air grille

– Fixed horizontal blades at 45^0

Models: ARG-H

Table 2.2 Air flow data

Listed size in mm x mm	Face vel m/sec.	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
	P_s mm H_2O	0.91	1.63	2.54	3.68	4.97	6.5	8.33	10.16
250x100 / 200x125 150x150	CFM	60	80	100	120	140	160	180	200
	M^3/sec.	0.0283	0.0378	0.0472	0.0567	0.0661	0.0756	0.085	0.0945
	NC	<15	16	24	27	31	36	41	46
200x150 / 250x125 300x100	CFM	81	108	135	162	189	216	243	270
	M^3/sec.	0.0383	0.051	0.0638	0.765	0.0893	0.102	0.1148	0.1275
	NC	<15	16	24	27	31	36	41	46
250x150 / 300x125 400x100	CFM	102	136	170	204	238	272	306	340
	M^3/sec.	0.0482	0.0642	0.0803	0.0964	0.1124	0.1285	0.1445	0.1606
	NC	<15	15	24	27	31	36	41	46
300x150 / 350x125 450x100	CFM	120	160	200	240	280	320	360	400
	M^3/sec.	0.0567	0.0756	0.0945	0.1134	0.1322	0.1512	0.17	0.1889
	NC	<15	15	25	28	31	36	41	47
250x200 / 350x150 400x125 / 500x100	CFM	141	188	235	282	329	376	423	470
	M^3/sec.	0.0666	0.088	0.1109	0.1332	0.1554	0.178	0.199	0.222
	NC	<15	16	24	27	31	35	40	47
250x250 / 300x200 400x150 / 500x125 600x100	CFM	162	216	270	324	378	432	486	540
	M^3/sec.	0.0765	0.102	0.1275	0.153	0.1785	0.204	0.2295	0.255
	NC	<15	16	24	27	31	35	42	47
300x250 / 450x150 500x150 / 600x125 750x100	CFM	180	270	300	360	420	480	540	600
	M^3/sec.	0.085	0.1133	0.142	0.17	0.198	0.2267	0.255	0.2833
	NC	<15	17	23	27	31	35	40	46
300x300 / 350x250 450x200 / 600x150	CFM	240	320	400	480	560	640	720	800
	M^3/sec.	0.1133	0.151	0.1889	0.2267	0.2645	0.302	0.3401	0.3778
	NC	<15	18	23	27	31	35	40	47
350x300 / 400x250 500x200 / 750x150	CFM	300	400	500	600	700	800	900	1000
	M^3/sec.	0.1416	0.1889	0.236	0.283	0.331	0.3778	0.425	0.4723
	NC	<15	19	23	27	32	36	40	48
350x350 / 400x300 500x250 / 600x200 900x150	CFM	360	480	600	720	840	960	1080	1200
	M^3/sec.	0.17	0.2267	0.283	0.34	0.3967	0.453	0.51	0.5667
	NC	<15	21	24	27	32	36	40	48
400x350 / 550x250 700x200	CFM	420	560	700	840	980	1120	1260	1400
	M^3/sec.	0.198	0.264	0.331	0.397	0.463	0.529	0.595	0.661
	NC	<15	21	24	28	33	37	41	49
400x400 / 500x300 600x250 / 800x200	CFM	480	640	800	960	1120	1280	1440	1600
	M^3/sec.	0.2267	0.3023	0.3778	0.453	0.529	0.6046	0.68	0.7556
	NC	16	22	25	29	33	38	42	49
500x350/600x300 700x250/900x200 1000x150	CFM	540	720	900	1080	1260	1440	1620	1800
	M^3/sec.	0.255	0.3401	0.4251	0.51	0.51	0.6801	0.765	0.85
	NC	17	22	25	29	34	42	43	50
450x450 / 500x400 750x250 1000x200	CFM	600	800	1000	1200	1400	1600	1800	2000
	M^3/sec.	0.2834	0.3778	0.4723	0.5668	0.6612	0.7556	0.85	0.9446
	NC	18	23	26	30	35	43	41	50
500x500 / 550x450 750x300 / 900x250 1000x200	CFM	660	880	1100	1320	1540	1760	1980	2200
	M^3/sec.	0.3117	0.4156	0.5195	0.6234	0.7273	0.8313	0.935	1.039
	NC	18	23	27	31	36	40	44	52

- Face velocity is measured in m/sec.
- P_s: static pressure loss in mm H_20
- NC based on a room attenuation of 10 dB.

air master

Return air grilles and registers

Rating with 0⁰ deflection

Models: ARG-V, ARG-HA, ARR-V, ARR-HA

Table 2.3 Air flow data

Listed size in mm x mm	Face vel m/sec.	2.5	3.0	3.5	4.0	4.5	5.00	5.50	6.00
	P_s mm H_2O	1.7	2.46	3.35	4.37	5.59	6.86	8.38	9.9
250x100 / 200x125 150x150	CFM	150	180	210	240	270	300	330	360
	M^3/sec.	0.071	0.085	0.099	0.113	0.127	0.142	0.156	0.17
	NC	<15	19	22	25	29	33	36	38
200x150 / 250x125 300x100	CFM	180	210	240	280	320	350	390	420
	M^3/sec.	0.085	0.099	0.113	0.132	0.151	0.165	0.184	0.198
	NC	<15	18	22	26	29	33	35	37
250x150 / 300x125 400x100	CFM	220	260	310	350	400	440	490	530
	M^3/sec.	0.104	0.123	0.146	0.165	0.189	0.208	0.231	0.250
	NC	16	20	25	28	31	35	38	40
300x150 / 350x125 450x100	CFM	240	290	340	390	440	490	540	590
	M^3/sec.	0.113	0.137	0.161	0.184	0.208	0.231	0.255	0.279
	NC	15	20	24	27	30	34	37	40
250x200 / 350x150 400x125 / 500x100	CFM	270	320	370	420	480	530	590	640
	M^3/sec.	0.127	0.151	0.165	0.198	0.227	0.25	0.279	0.302
	NC	<15	17	21	24	28	31	35	38
250x250 / 300x200 400x150 / 500x125 600x100	CFM	310	370	430	490	550	610	680	740
	M^3/sec.	0.146	0.165	0.203	0.231	0.259	0.288	0.321	0.349
	NC	15	19	23	26	30	34	36	39
300x250 / 450x150 500x150 / 600x125 750x100	CFM	360	440	510	580	660	730	810	800
	M^3/sec.	0.17	0.208	0.241	0.274	0.312	0.345	0.382	0.416
	NC	15	20	24	27	31	34	37	39
300x300 / 350x250 450x200 / 600x150	CFM	420	500	590	670	750	840	930	1020
	M^3/sec.	0.198	0.236	0.279	0.316	0.354	0.397	0.439	0.482
	NC	<15	15	23	27	30	34	37	40
350x300 / 400x250 500x200 / 750x150	CFM	450	540	630	720	810	900	1000	1090
	M^3/sec.	0.213	0.255	0.297	0.34	0.382	0.425	0.472	0.514
	NC	<15	16	21	25	29	33	37	40
350x350 / 400x300 500x250 / 600x200 900x150	CFM	510	620	720	820	930	1030	1140	1240
	M^3/sec.	0.241	0.293	0.340	0.387	0.439	0.486	0.538	0.586
	NC	15	20	24	29	32	37	40	43
400x400 / 500x300 600x250 / 800x200	CFM	580	700	820	940	1050	1170	1290	1400
	M^3/sec.	0.274	0.331	0.387	0.444	0.496	0.553	0.609	0.661
	NC	15	20	25	30	34	38	41	44
500x350/600x300 700x250/900x200 1000x150	CFM	660	800	930	1060	1200	1330	1470	1600
	M^3/sec.	0.312	0.378	0.439	0.501	0.567	0.628	0.694	0.756
	NC	16	22	26	32	35	39	42	45
450x450 / 500x400 750x250 1000x200	CFM	700	840	980	1120	1270	1400	1550	1690
	M^3/sec.	0.331	0.397	0.463	0.529	0.599	0.661	0.732	0.798
	NC	16	21	25	30	33	35	39	43
500x500 / 550x450 750x300 / 900x250 1000x200	CFM	800	970	1130	1280	1440	1600	1770	1930
	M^3/sec.	0.378	0.458	0.533	0.605	0.68	0.756	0.836	0.912
	NC	18	23	27	33	38	40	43	45

- Face velocity is measured in m/sec.
- P_s: static pressure loss in mm H_20
- NC based on a room attenuation of 10 dB.

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Return air grilles and registers

Rating with 45⁰ deflection

Models: ARG-V, ARG-HA, ARR-V, ARR-HA

Table 2.3 (cont.) Air flow data

Listed size in mm x mm	Face vel m/sec.	2.75	3.25	4.0	4.5	5.0	5.5	6.0	6.5
	P_s mm H_2O	2.16	3.05	4.32	5.59	7.11	8.89	10.92	12.95
250x100 / 200x125 150x150	CFM	150	180	210	240	270	300	330	360
	M^3/sec.	0.071	0.085	0.099	0.113	0.127	0.142	0.156	0.17
	NC	18	22	25	28	32	36	39	41
200x150 / 250x125 300x100	CFM	180	210	240	280	320	350	390	420
	M^3/sec.	0.085	0.099	0.113	0.132	0.151	0.165	0.184	0.198
	NC	17	21	25	29	32	36	38	40
250x150 / 300x125 400x100	CFM	220	260	310	350	400	440	490	530
	M^3/sec.	0.104	0.123	0.146	0.165	0.189	0.208	0.231	0.250
	NC	19	23	28	31	34	38	41	43
300x150 / 350x125 450x100	CFM	240	290	340	390	440	490	540	590
	M^3/sec.	0.113	0.137	0.161	0.184	0.208	0.231	0.255	0.279
	NC	18	23	27	30	33	37	40	43
250x200 / 350x150 400x125 / 500x100	CFM	270	320	370	420	480	530	590	640
	M^3/sec.	0.127	0.151	0.165	0.198	0.227	0.25	0.279	0.302
	NC	16	20	24	27	31	34	38	41
250x250 / 300x200 400x150 / 500x125 600x100	CFM	310	370	430	490	550	610	680	740
	M^3/sec.	0.146	0.165	0.203	0.231	0.259	0.288	0.321	0.349
	NC	18	22	26	29	33	37	39	42
300x250 / 450x150 500x150 / 600x125 750x100	CFM	360	440	510	580	660	730	810	800
	M^3/sec.	0.17	0.208	0.241	0.274	0.312	0.345	0.382	0.416
	NC	18	23	27	30	34	37	40	42
300x300 / 350x250 450x200 / 600x150	CFM	420	500	590	670	750	840	930	1020
	M^3/sec.	0.198	0.236	0.279	0.316	0.354	0.397	0.439	0.482
	NC	<15	18	26	30	33	37	40	43
350x300 / 400x250 500x200 / 750x150	CFM	450	540	630	720	810	900	1000	1090
	M^3/sec.	0.213	0.255	0.297	0.34	0.382	0.425	0.472	0.514
	NC	15	19	24	28	32	36	40	43
350x350 / 400x300 500x250 / 600x200 900x150	CFM	510	620	720	820	930	1030	1140	1240
	M^3/sec.	0.241	0.293	0.340	0.387	0.439	0.486	0.538	0.586
	NC	18	23	27	32	35	40	43	46
400x400 / 500x300 600x250 / 800x200	CFM	580	700	820	940	1050	1170	1290	1400
	M^3/sec.	0.274	0.331	0.387	0.444	0.496	0.553	0.609	0.661
	NC	15	20	25	30	37	41	44	47
500x350/600x300 700x250/900x200 1000x150	CFM	660	800	930	1060	1200	1330	1470	1600
	M^3/sec.	0.312	0.378	0.439	0.501	0.567	0.628	0.694	0.756
	NC	19	25	29	35	38	42	45	48
450x450 / 500x400 750x250 1000x200	CFM	700	840	980	1120	1270	1400	1550	1690
	M^3/sec.	0.331	0.397	0.463	0.529	0.599	0.661	0.732	0.798
	NC	19	24	28	33	36	38	42	46
500x500 / 550x450 750x300 / 900x250 1000x200	CFM	800	970	1130	1280	1440	1600	1770	1930
	M^3/sec.	0.378	0.458	0.533	0.605	0.68	0.756	0.836	0.912
	NC	21	26	30	36	41	43	46	48

- Face velocity is measured in m/sec.
- P_s: static pressure loss in mm H_20
- NC based on a room attenuation of 10 dB.

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Decorative Grilles

Model: AMDG

Introduction:

The application of AIR MASTER grilles has been extended from the comfort conditioning field to the aesthetic aspects of the environment they are used. AIR MASTER has developed a new generation of grilles, which can be adopted for any professional areas with aesthetic preference.

AIR MASTER decorative grilles are designed for modern interior layouts and guaranteed for an unparalled beauty and brilliance backed up with perfect technology.

So, eventually it serves the duel purpose of interior decoration and air conditioning on its own. The decorative grilles are manufactured and supplied at affordable prices.

Construction:

- **Frame:** High quality extruded aluminium profile with 25mm flange width as standard and 12, 30mm flange widths as optional.
- **Core:** Core is made up of aluminium sheet, machined to the desired design patterns required by the customer.
- **Damper frame and blades:** High quality extruded aluminium profiles with black matt finish. Natural aluminium finish as option.

Descripton:

- The frame is of high quality extruded aluminium profiled construction with the advantages of corrosion resistance and rigidity.
- The core will be the heart of the decorative grille and it is pressed aluminium sheet 3mm thickness as standard. The required designs are cut by using the most advanced laser technology.
- The decorative grilles are rigidly fixed with opposed blade damper by grippers. Damper blade is operated from the face opening.
- Foam gasket is sealed around the back of the frame as option to avoid air leakage.

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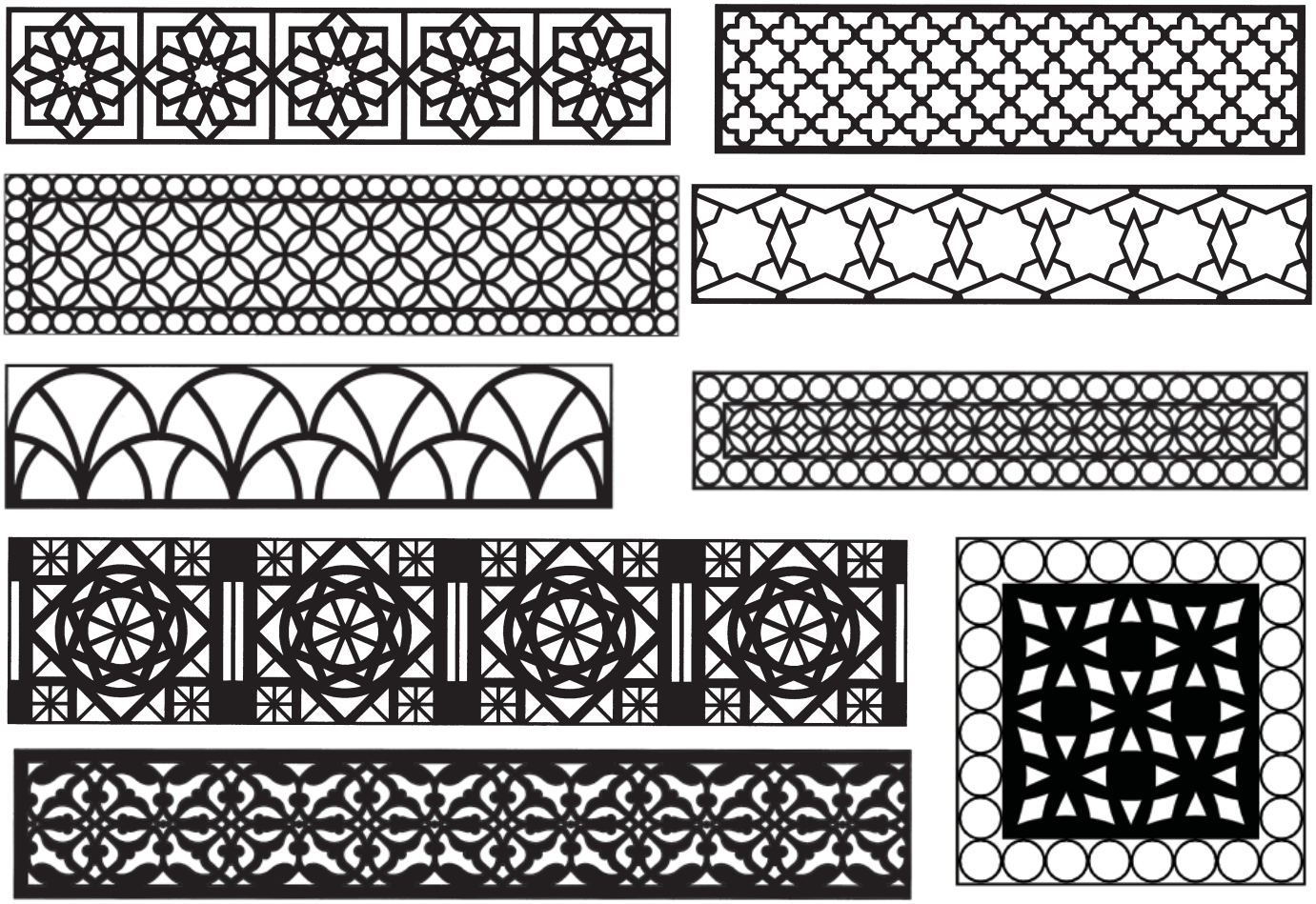
Standard finishes:

- Natural aluminium finish.
- Powder coated color finish as per RAL color codes.
- Flexibility of finishing available on request.

Other details:

- Free area mainly depends on the design pattern of core / grille. The same can be provided on request.
- Fixing methods are same as our normal grilles either by screws or concealed clips.
- These decorative grilles can be fixed on ceilings or wall.

Decorative Grille Patterns:



Chapter 3

INDEX

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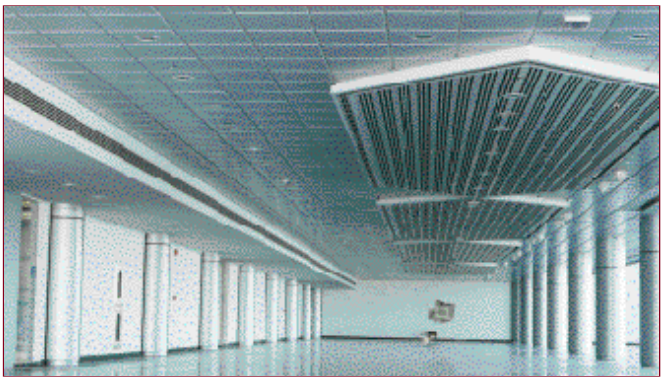
Supply air linear bar grille

Model: ASLG

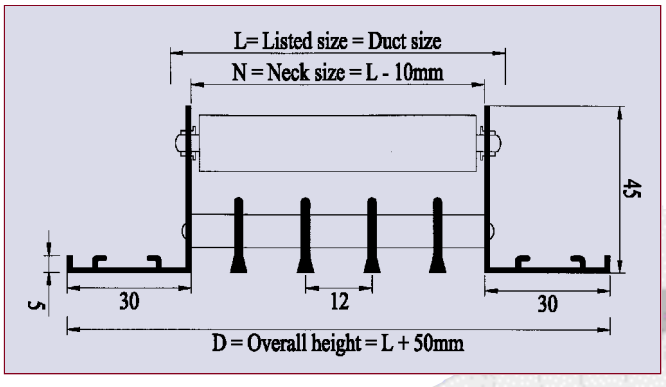


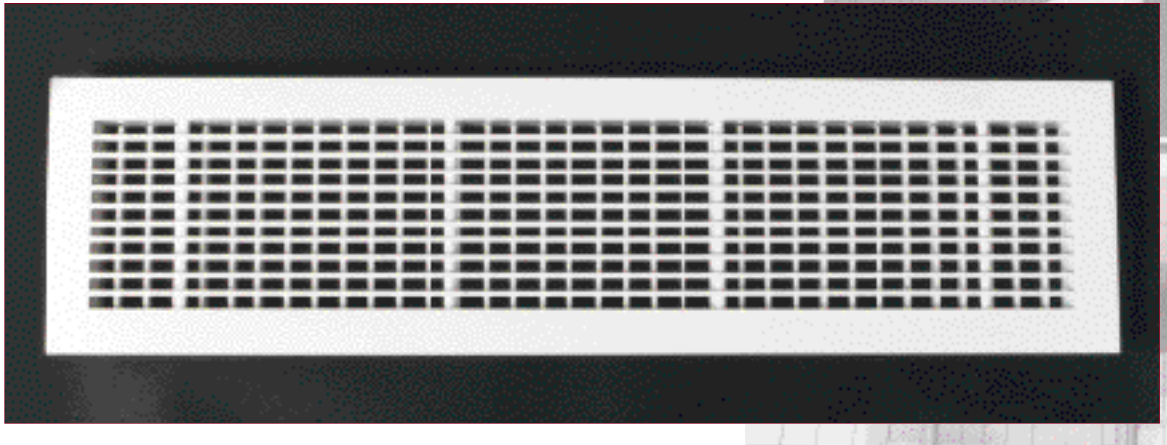
Construction:

- **Frame:** High quality extruded aluminium profile with 30 mm flange width as standard. 12, 16, 24 mm flange widths are optional.
- **Face bars:** High quality aluminium profiles of 0^0, 15^0 – 1 way throw and 15^0 – 2 way throw.
- **Bar spacing:** 12 mm as standard. 6 mm as option.
- **Grille width:** 50 mm to 300 mm with increments of 50 mm.
- **Length:** 1 meter as standard. Available from 0.2 mt to 5.8 mt in a single piece.

Description:

- Frame and face bars are of high quality extruded aluminium profiled construction with the advantages of corrosion resistance and rigidity.
- Horizontal face bars with 0^0, 15^0 – 1 way throw and 15^0 – 2 way throw are fixed rigidly to the frame with 8-mm pipes.
- Vertical aluminium aerofoil blades are fixed at the rear side of the fame by nylon bushes. These blades can be adjusted manually and individually in the vertical plane to obtain optimum air distribution.
- For perfect unbroken appearance of continuous runs, alignment strips are provided with no additional cost.
- Total structure is manufactured by mechanical assembly, assuring rigidity and to maintain straight-line appearance.
- Foam gasket is sealed around the back of the frame as option to avoid air leakage.
- Supplied with C - clamps for concealed fixing.





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Supply air linear bar register

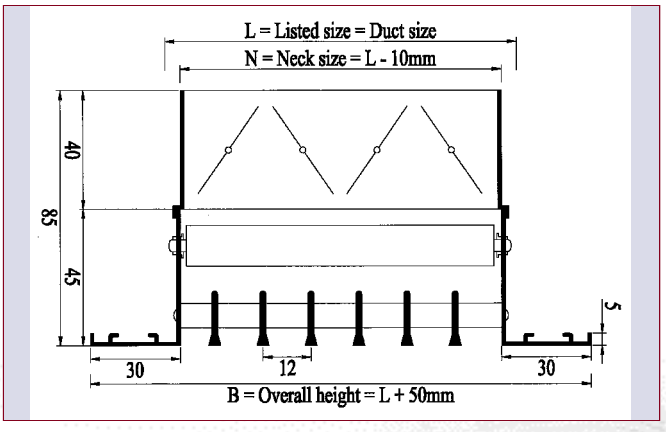
Model: ASLR

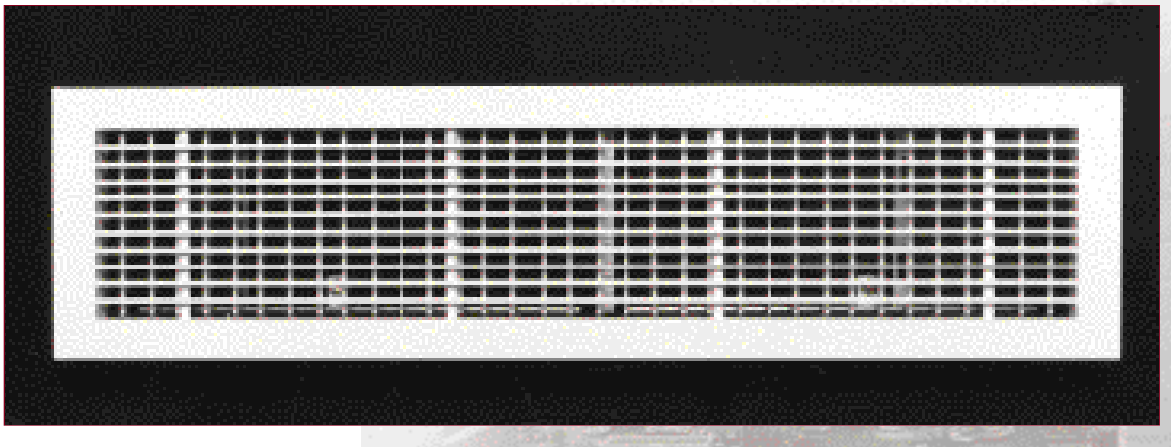
Construction:

- **Frame:** High quality extruded aluminium profile with 30 mm flange width as standard. 12, 16, 24 mm flange widths are optional.
- **Face bars:** High quality aluminium profiles of 0^0, 15^0 – 1 way throw and 15^0 – 2 way throw.
- **Bar spacing:** 12 mm as standard. 6 mm as option.
- **Grille width:** 50 mm to 300 mm with increments of 50 mm.
- **Length:** 1 meter as standard. Available from 0.2 mt to 5.8 mt in a single piece.
- **Damper frame and blades:** High quality extruded aluminium profiles with natural aluminium finish. Black matt finish as option.

Description:

- Frame and face bars are of high quality extruded aluminium profiled construction with the advantages of corrosion resistance and rigidity.
- Horizontal face bars with 0^0, 15^0 – 1 way throw and 15^0 – 2 way throw are fixed rigidly to the frame with 8-mm pipes.
- Vertical aluminium aerofoil blades are fixed at the rear side of the fame by nylon bushes. These blades can be adjusted manually and individually in the vertical plane to obtain optimum air distribution.
- Grilles are fixed rigidly with an opposed blade damper by grippers to ensure positive control over the air stream. Damper blades can be screw operated from the face opening of the grille.
- Provided with alignment strip for continuous appearance. Foam gasket is sealed around the back of the frame to avoid air leakge.
- Supplied with C- Clamps for concealed fixing.





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Return air linear bar grille

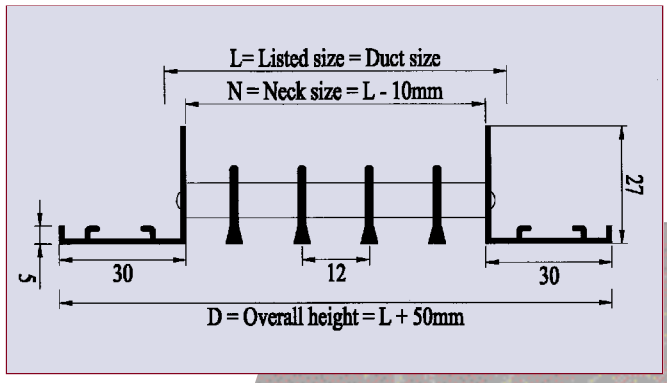
Model: ARLG

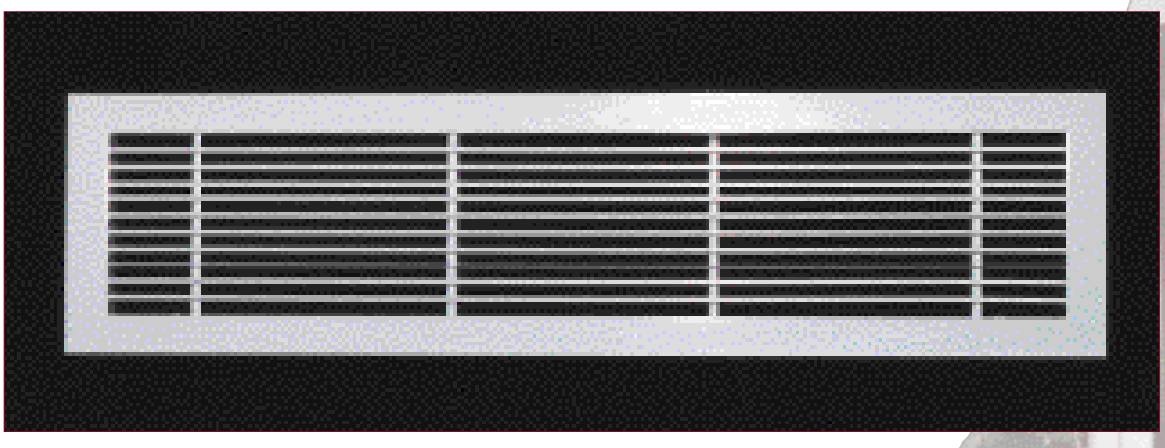
Construction:

- **Frame:** High quality extruded aluminium profile with 30 mm flange width as standard. 12, 16, 24 mm flange widths are optional.
- **Face bars:** High quality aluminium profiles of 0^0, 15^0 – 1 way throw and 15^0 – 2 way throw.
- **Bar spacing:** 12 mm as standard. 6 mm as option.
- **Grille width:** 50 mm to 300 mm with increments of 50 mm.
- **Length:** 1 meter as standard. Available from 0.2 mt to 5.8 mt in a single piece.

Description:

- Frame and face bars are of high quality extruded aluminium profiled construction with the advantages of corrosion resistance and rigidity.
- Horizontal face bars with 0^0, 15^0 – 1 way throw and 15^0 – 2 way throw are fixed rigidly to the frame with 8-mm pipes.
- For perfect unbroken appearance of continuous runs, alignment strips are provided with no additional cost.
- Total structure is manufactured by mechanical assembly, assuring rigidity and to maintain straight-line appearance.
- Foam gasket is sealed around the back of the frame as option to avoid air leakage.
- Supplied with C - clamps for concealed fixing.





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Return air linear bar Register

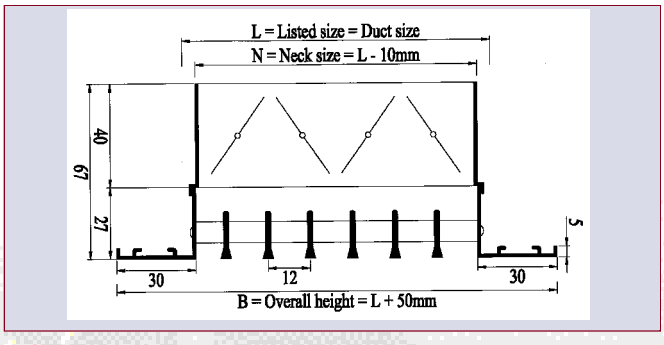
Model: ARLR

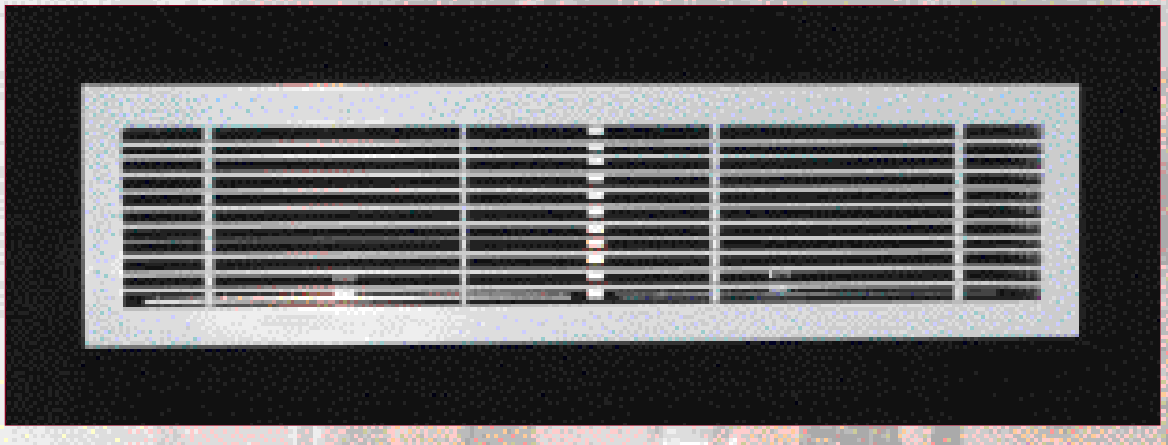
Construction:

- **Frame:** High quality extruded aluminium profile with 30 mm flange width as standard. 12, 16, 24 mm flange widths are optional.
- **Face bars:** High quality aluminium profiles of 0^0, 15^0 – 1 way throw and 15^0 – 2 way throw.
- **Bar spacing:** 12 mm as standard. 6 mm as option.
- **Grille width:** 50 mm to 300 mm with increments of 50 mm.
- **Length:** 1 meter as standard. Available from 0.2 mt to 5.8 mt in a single piece.
- **Damper frame and blades:** High quality extruded aluminium profiles with natural aluminium finish. Black matt finish as option.

Description:

- Frame and face bars are of high quality extruded aluminium profiled construction with the advantages of corrosion resistance and rigidity.
- Horizontal face bars with 0^0, 15^0 – 1 way throw and 15^0 – 2 way throw are fixed rigidly to the frame with 8-mm pipes.
- Grilles are fixed rigidly with opposed blade damper by grippers. This ensures positive control over the air stream. Damper blades can be screw operated from the face opening.
- For perfect unbroken appearance of continuous runs, alignment strips are provided with no additional cost.
- Foam gasket is sealed around the back of the frame as option to avoid air leakage.
- Supplied with C clamps for concealed fixing.





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Supply air curved linear bar grille

Model: ASLG (C)

Construction:

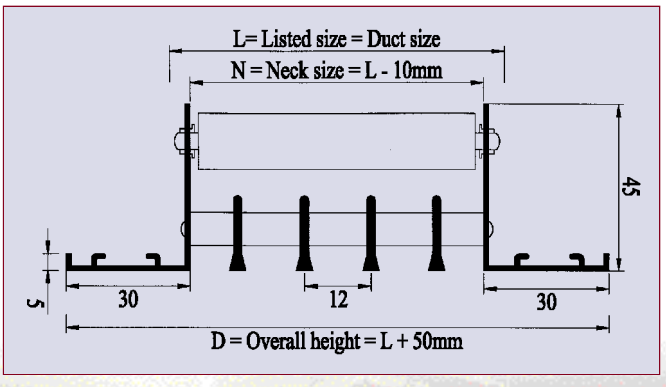
- **Frame:** High quality extruded aluminium profile with 30 mm flange width as standard. 12, 16, 24 mm flange widths are optional.
- **Face bars:** High quality aluminium profiles of 0^0 – 1 way throw and 15^0 – 2 way throw.
- **Bar spacing:** 12 mm as standard. 6 mm as option.
- **Grille width:** 50 mm to 300 mm with increments of 50 mm.
- **Length:** 1 meter as standard.

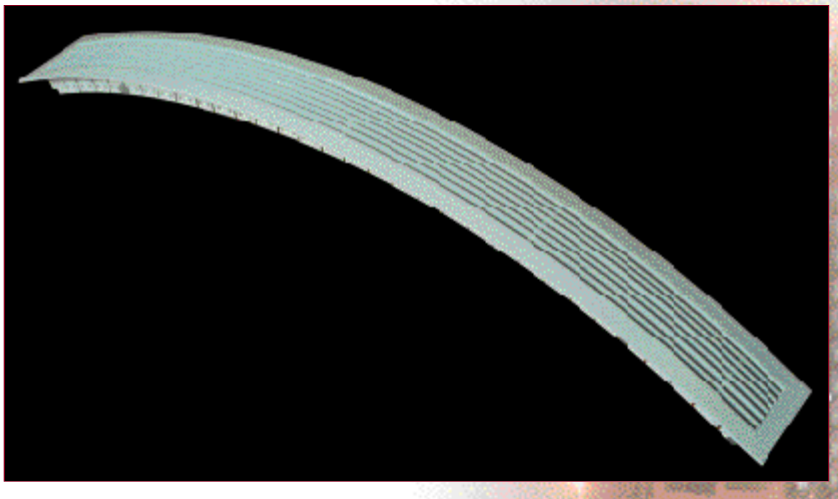
Description:

- Frame and face bars are of high quality extruded aluminium profiled construction with the advantages of corrosion resistance and rigidity.
- Horizontal face bars with 0^0 – 1 way throw and 15º – 2 way throw are fixed rigidly to the frame with 8-mm pipes.
- Vertical aluminium aerofoil blades are fixed at the rear side of the frame by nylon bushings. These blades can be adjusted manually and individually in the vertical plane to obtain optimum air distribution.
- For perfect unbroken appearance of continuous runs, alignment strips are provided with no additional cost.

- Supply and return air curved linear bar grilles are available up to a length of 3 mts with a minimum radius of curvature of 1 meter.
- Available without damper. Dampers can be provided to use in plenum boxes as option.
- Foam gasket is sealed around the back of the frame as option to avoid air leakage.
- Supplied with C clamps for concealed fixing.

Model: ARLG-C: Same as ASLG-C, without vertical aerofoil blades.





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Supply air linear bar register

with 6 mm pitch

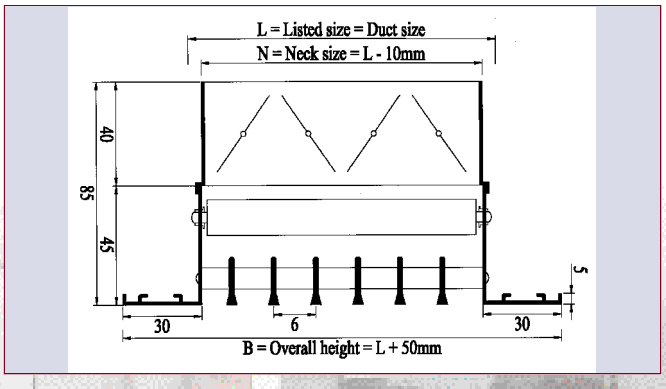
Model: ASLR (S)

Construction:

- **Frame:** High quality extruded aluminium profile with 30 mm flange width as standard. 12, 16, 24 mm flange widths are optional.
- **Face bars:** High quality aluminium profiles of 0^0, 15^0 – 1 way throw and 15^0 – 2 way throw.
- **Bar spacing:** 6 mm.
- **Grille width:** 50 mm to 300 mm with increments of 50 mm.
- **Length:** 1 meter as standard. Available from 0.2 mt to 5.8 mt in a single piece.
- **Damper frame and blades:** High quality extruded aluminium profiles with natural aluminium finish. Black matt finish as option.

Description:

- Frame and face bars are of high quality extruded aluminium profiled construction with the advantages of corrosion resistance and rigidity.
- Horizontal face bars with 0^0, 15^0 – 1 way throw and 15^0 – 2 way throw are fixed rigidly to the frame with 8-mm pipes.
- Vertical aluminium aerofoil blades are fixed at the rear side of the frame by nylon bushings. These blades can be adjusted manually and individually in the vertical plane to obtain optimum air distribution.
- Grilles are fixed rigidly with an opposed blade damper by grippers to ensure positive control over the air stream. Damper blades can be screw operated from the face opening of the grille.
- For perfect unbroken appearance of continuous runs, alignment strips are provided with no additional cost. Foam gasket is sealed around the back of the frame as option to avoid air leakage.
- Supplied with C clamps for concealed fixing.
- Also available without damper and vertical blades for return air applications.



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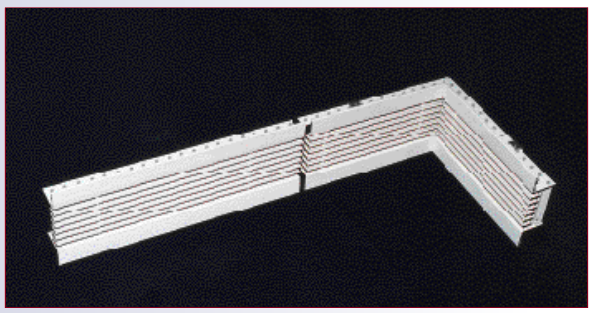
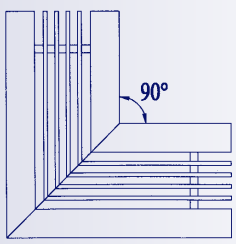


Standard finishes:

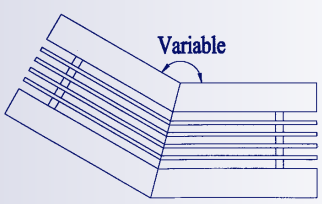
- Natural anodized aluminum finish.
- Powder coated colour finish as per RAL colour codes.
- Flexibility of finishing is available as option.



3a) 90° Horizontal

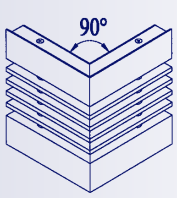
Optional mitered corners

Standard 90° horizontal mitered corner available for floor, sill and ceiling applications in 0°,15° one way throw and 15° two way throw without damper.



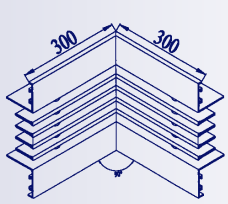
3b) Variable angle (90° - 180°)

Special horizontal mitered corner selection available for floor, sill and ceiling applications includes an angle greater than 90° and less than 180° available in 0°, 15° one way throw and 15° two way throw without damper.



3c) 90° Vertical outside

Vertical outside mitered corners are available for wall application at the junction of two outside walls with a standard angle of 90°. Available in 0°, 15° one way throw and 15° two way throw without damper.



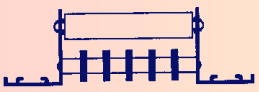
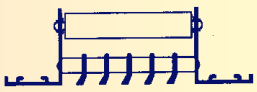
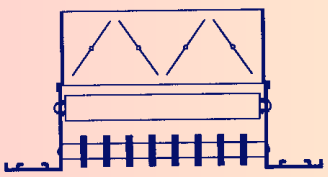
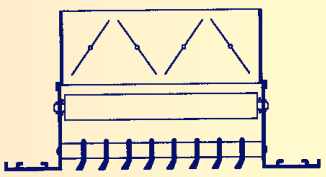
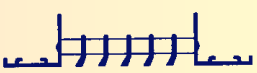
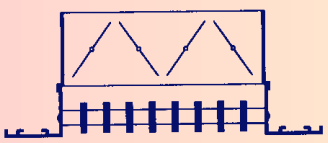
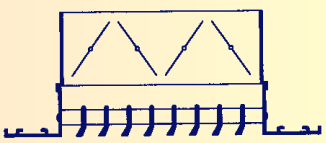
3d) 90° Vertical inside

Vertical inside mitered corners are available for wall application at the junction of two inside walls with a standard angle of 90°. Available in 0°, 15°one way throw and 15° two way throw without damper.

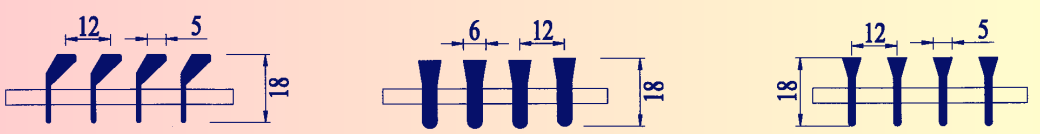
air master

Bar deflections

Standard:

MODEL	0° one way	15° one way
ASLG		
ASLR		
ARLG		
ARLR		

Optional



a) - 30° one way

b) - 15° two way

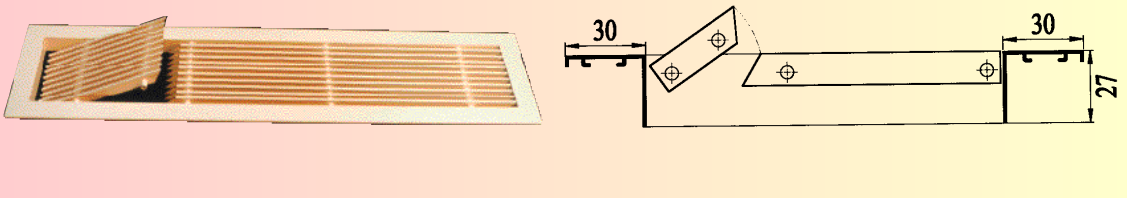
c) - 15° two way

air master

Accessories:

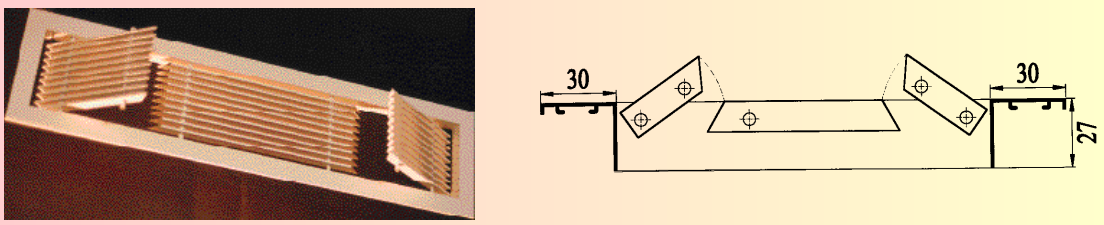
A. Linear bar grille with one side access door:

Access door will be provided either right or left side of the grille for special applications upon request. Size of the door is optional.

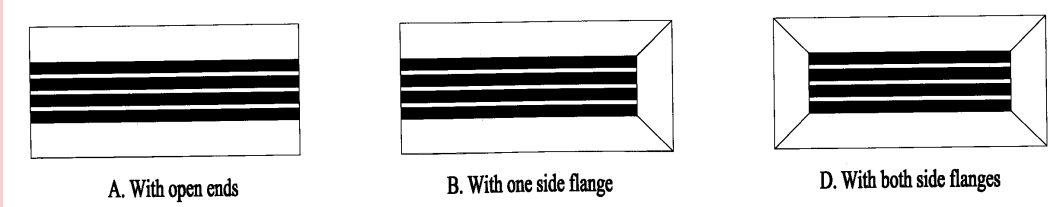


B. Linear bar grille with both side access doors:

Access door will be provided to both sides of the grille for special applications upon request. Size of the door is optional.



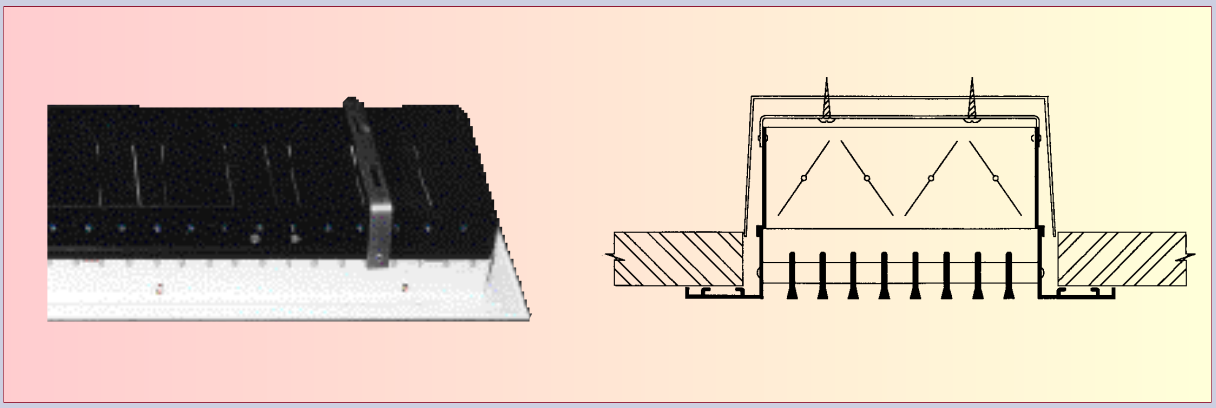
End flanges:



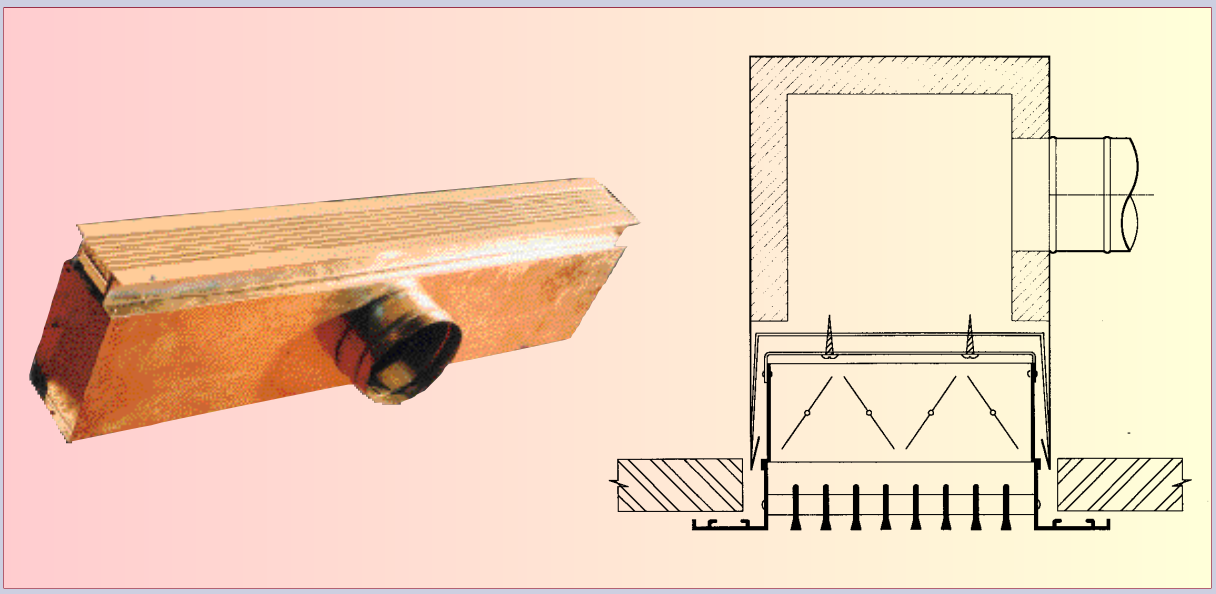
air master

Fixing details

- **C – clamp fixing:**



- **Fixing to the plenum box.**



air master

Standard Sizes:

- Grilles are available with 1 meter length as standard.
- Length from 0.2 m to 5.8 mt is available as single piece.
- Non standard sizes available as option.

Listed Width in mm	50	100	150	200	250	300

How to order:

Model	Face bars	Size	End flange details	Quantity	Finish
ASLG	$0 = 0^0$	Specify duct opening size Length x height in mm x mm	A. With open ends.	Specify in numbers.	A. Natural anodized aluminium finish.
ASLR	$1 = 15^0$ one way		B. One side end flange. Right (or) Left.		
ARLG	$2 = 15^0$ two way		C. Both sides Flanges.		B. RAL 9010
ARLR					C. Other RAL colours.

Tick the required item.

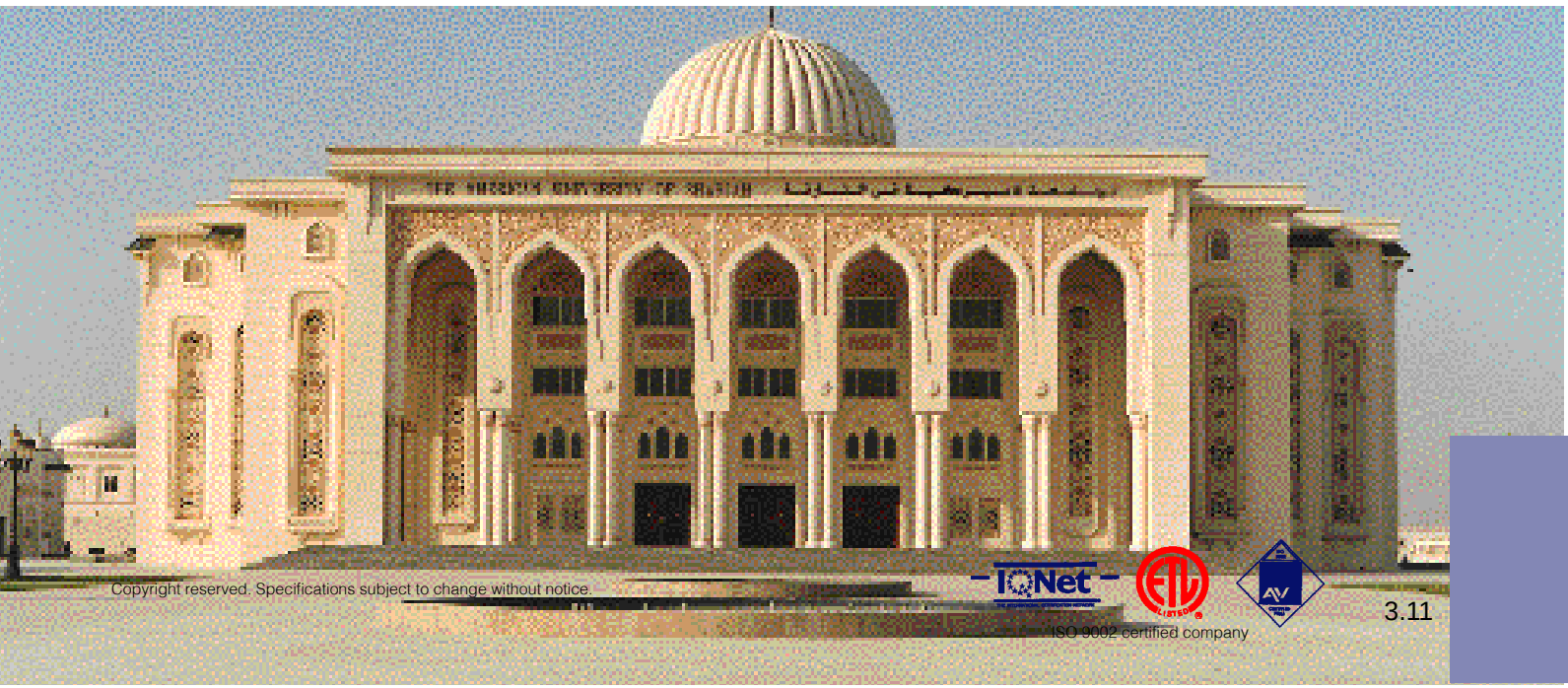
Ordering example:

1. To select supply air linear bar register with 15^0 – 2 way face bars of size 1500 x 150 mm with open ends of Quantity = 70 numbers, with white powder coated colour finish (RAL 9010).

   Order as : ASLR - 2-1500 x 150 - A – 70 - B.

2. To select supply air linear bar grille of 6 pitch, 15^0 – 1 way face bars of size 1000 x 150 mm with end flanges of Quantity = 50 numbers, with natural anodized aluminium finish.

   Order as : ASLG (S)-1-1000 x 150 - C – 50 - A.



air master

Supply linear bar register

15^0 -2 way - 12 mm spacing

Model: ASLR

Table 3.1 Air flow data

Width in mm A_k in m^2	Face Velocity in m/sec.	2.0	2.5	3.0	3.5	4.0	4.5	5.0
50 0.039	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	165 0.078 0.15 2.7-4.0-5.5 <15	207 0.098 0.21 3.4-4.3-6.0 <15	248 0.117 0.21 4.0-4.9-6.7 <15	290 0.137 0.25 4.3-5.2-7.3 16	330 0.156 0.32 4.6-5.5-7.6 22	373 0.176 0.4 4.9-5.8-8.2 25	413 0.195 0.51 4.9-6.0-8.5 30
100 0.059	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	250 0.118 0.15 3.4-4.6-7.0 <15	313 0.148 0.21 4.0-5.2-7.6 <15	375 0.177 0.21 4.6-5.8-8 <15	438 0.207 0.3 5.2-6.0-8.5 17	500 0.236 0.39 5.5-6.7-9.1 22	563 0.266 0.51 5.8-7.3-10 27	625 0.295 0.61 6-7.6-10.7 31
150 0.078	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	330 0.156 0.15 4.0-5.5-8.0 <15	413 0.195 0.21 4.6-6.0-8.8 <15	495 0.234 0.25 5.2-6.7-9.5 <15	578 0.273 0.36 5.8-7.3-10 17	660 0.312 0.46 6.4-8-10.7 23	743 0.351 0.58 6.7-8.5-11.6 28	825 0.39 0.71 7-8.8-12.2 32
200 0.097	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	410 0.194 0.2 4.5-6.1-8.8 <15	515 0.243 0.23 5.2-6.7-9.8 <15	616 0.291 0.31 6.0-7.6-10.7 16	718 0.339 0.39 6.7-8.0-11.3 21	821 0.388 0.53 7.3-8.8-11.9 26	925 0.437 0.66 7.6-9.5-12.8 31	1027 0.485 0.91 8.0-9.8-13.7 35
250 0.116	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	491 0.232 0.2 4.9-6.7-9.8 <15	614 0.29 0.25 5.5-7.6-10.7 <15	736 0.348 0.33 6.4-8.2-11.3 20	860 0.406 0.43 7.3-8.8-12.2 25	982 0.464 0.58 8.0-9.5-13.1 31	1105 0.522 0.76 8.2-10-14 34	1228 0.58 0.94 8.5-10.7-15 37
300 0.136	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	576 0.272 0.2 5.2-7.3-10.7 <15	720 0.34 0.31 6.1-8.2-11.6 18	864 0.408 0.36 7-9.1-12.2 24	1008 0.476 0.47 7.9-9.8-13.1 28	1152 0.544 0.64 8.5-10.4-14 32	1295 0.612 0.85 8.8-11-15 35	1440 0.68 1.02 9.1-11.6-16.2 40

- Data based on one meter unit length of the grille with damper in full open position.
- Face velocity is measured in m/sec.
- P_s: Static pressure loss is in mm of H_2O.
- Throw (meters) is measured for a terminal velocities of 0.75, 0.5 & 0.25 m/sec.
- NC based on a room attenuation of 10 dB.

air master

Supply linear bar register

15^0 -1 way - 12 mm spacing

Model: ASLR-1

Table 3.2 Air flow data

Width in mm A_k in m^2	Face Velocity in m/sec.	2.0	2.5	3.0	3.5	4.0	4.5	5.0
50 0.040	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	169 0.08 0.14 2.7-4.1-5.6 <15	212 0.1 0.19 3.5-4.4-6.2 <15	254 0.12 0.21 4.1-5.0-7.0 <15	296 0.14 0.25 4.5-5.4-7.7 17	339 0.16 0.31 4.8-5.8-8.1 22	381 0.18 0.39 5.1-6.1-8.9 25	423 0.2 0.5 5.2-6.4-9.3 31
100 0.065	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	275 0.13 0.14 3.5-4.7-7.1 <15	345 0.163 0.19 4.1-5.3-7.8 <15	413 0.195 0.21 4.7-5.9-8.4 15	483 0.228 0.3 5.4-6.2-9.0 18	550 0.26 0.38 5.8-7.0-9.7 23	620 0.293 0.5 6.1-7.7-10.8 27	688 0.325 0.6 6.4-8.1-11.7 32
150 0.088	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	373 0.176 0.14 4.1-5.6-8.2 <15	466 0.22 0.19 4.7-6.2-9.0 <15	559 0.264 0.25 5.4-6.9-10 16	652 0.308 0.36 6.0-7.6-10.6 18	745 0.352 0.45 6.7-8.4-11.4 24	838 0.396 0.57 7.0-8.9-12.5 29	932 0.44 0.7 7.4-9.3-13.3 34
200 0.111	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	470 0.222 0.18 4.6-6.2-9.0 <15	589 0.278 0.21 5.3-6.9-10.0 16	705 0.333 0.31 6.2-7.8-11.2 17	824 0.389 0.39 6.9-8.3-11.9 21	940 0.444 0.52 7.7-9.2-12.7 26	1058 0.499 0.65 8-9.9-13.8 32	1175 0.555 0.9 8.5-10.4-14.9 36
250 0.134	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	567 0.268 0.2 5.0-6.8-10 <15	709 0.335 0.25 5.6-7.8-11 16	851 0.402 0.33 6.6-8.4-11.9 21	993 0.469 0.42 7.6-9.2-12.9 27	1135 0.536 0.56 8.4-10-14 31	1277 0.603 0.77 8.6-10.5-15.1 35	1419 0.67 0.93 9.0-11.3-16.4 40
300 0.162	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	686 0.324 0.2 5.3-7.5-10.9 <15	857 0.405 0.3 6.2-8.4-11.9 18	1029 0.486 0.36 7.2-9.4-12.8 25	1200 0.567 0.47 8.2-10.2-13.9 30	1372 0.648 0.64 8.9-10.9-15 33	1543 0.729 0.84 9.2-11.6-16.2 37	1715 0.81 1.01 9.6-12.3-17.6 42

- Data based on one meter unit length of the grille with damper in full open position.
- Face velocity is measured in m/sec.
- P_s: Static pressure loss is in mm of H_2O.
- Throw (meters) is measured for a terminal velocities of 0.75, 0.5 & 0.25 m/sec.
- NC based on a room attenuation of 10 dB.

air master

Supply linear bar register

0^0 -12 mm spacing

Model: ASLR-0

Table 3.3 Air flow data

Width in mm A_k in m^2	Face Velocity in m/sec.	2.0	2.5	3.0	3.5	4.0	4.5	5.0
50 0.040	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	169 0.08 0.14 2.7-4.1-5.6 <15	212 0.1 0.19 3.5-4.4-6.2 <15	254 0.12 0.19 4.2-5.1-7.1 <15	296 0.14 0.23 4.6-5.6-7.9 17	339 0.16 0.28 4.9-5.6-8.3 22	381 0.18 0.36 5.4-6.4-9.3 25	423 0.2 0.46 5.5-6.8-9.8 31
100 0.065	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	275 0.13 0.14 3.5-4.7-7.1 <15	345 0.163 0.19 4.1-5.3-7.8 <15	413 0.195 0.19 4.8-6.0-8.6 15	483 0.228 0.28 5.6-6.4-9.3 18	550 0.26 0.35 5.9-7.2-10.0 23	620 0.293 0.46 6.4-8.1-11.3 27	688 0.325 0.56 6.8-8.6-12.4 32
150 0.088	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	373 0.176 0.14 4.1-5.6-8.2 <15	466 0.22 0.19 4.7-6.2-9.0 <15	559 0.264 0.23 5.5-7-10.2 16	652 0.308 0.33 6.2-7.8-10.9 18	745 0.352 0.42 6.9-8.7-11.7 24	838 0.396 0.53 7.4-9.3-13.1 29	932 0.44 0.65 7.8-9.8-14.0 34
200 0.111	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	470 0.222 0.16 4.6-6.2-9.0 <15	589 0.278 0.19 5.3-6.9-10.0 16	705 0.333 0.28 6.3-7.9-11.4 17	824 0.389 0.36 7.1-8.5-12.3 21	940 0.444 0.48 7.9-9.5-13.1 26	1058 0.499 0.6 8.4-10.4-14.5 32	1175 0.555 0.84 9.0-11.0-15.8 36
250 0.134	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	567 0.268 0.19 5.0-6.8-10 <15	709 0.335 0.23 5.6-7.8-11 16	851 0.402 0.31 6.7-8.6-12.1 21	993 0.469 0.39 7.8-9.5-13.3 27	1135 0.536 0.52 8.6-10.3-14.4 31	1277 0.603 0.71 9.0-11-15.9 35	1419 0.67 0.86 9.5-11.9-17.4 40
300 0.162	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	686 0.324 0.19 5.3-7.5-10.9 <15	857 0.405 0.28 6.2-8.4-11.9 18	1029 0.486 0.33 7.3-9.6-13.0 25	1200 0.567 0.44 8.4-10.5-14.3 30	1372 0.648 0.59 9.2-11.2-15.4 33	1543 0.729 0.78 9.6-12.2-17.0 37	1715 0.81 0.94 10.2-13-18.6 42

- Data based on one meter unit length of the grille with damper in full open position.
- Face velocity is measured in m/sec.
- P_s: Static pressure loss is in mm of H_2O.
- Throw (meters) is measured for a terminal velocities of 0.75, 0.5 & 0.25 m/sec.
- NC based on a room attenuation of 10 dB.

air master

Return linear bar register

15^0 -2 way - 12 mm spacing

Model: ARLR

Table 3.4 Air flow data

Nominal Width mm							
50	Cfm M^3/sec. -P_s in mm H_2O NC	332 0.157 0.48 <15	417 0.197 0.74 18	500 0.236 1.07 26	585 0.276 1.47 32	667 0.315 1.91 36	750 0.354 2.41 42
100	Cfm M^3/sec. -P_s in mm H_2O NC	417 0.197 0.51 15	500 0.236 0.71 20	585 0.276 0.97 27	667 0.315 1.27 32	750 0.354 1.6 35	833 0.393 1.98 40
150	Cfm M^3/sec. -P_s in mm H_2O NC	500 0.236 0.51 17	585 0.276 0.69 22	667 0.315 0.89 28	750 0.354 1.14 32	833 0.393 1.40 34	1000 0.472 2.01 38
200	Cfm M^3/sec. -P_s in mm H_2O NC	585 0.276 0.48 16	667 0.315 0.64 23	750 0.354 0.81 26	833 0.393 0.99 32	1000 0.472 1.42 35	1167 0.551 1.91 40
250	Cfm M^3/sec. -P_s in mm H_2O NC	667 0.315 0.48 19	750 0.354 0.61 23	833 0.393 0.74 25	1000 0.472 1.07 31	1167 0.551 1.45 35	1332 0.629 1.9 40
300	Cfm M^3/sec. -P_s in mm H_2O NC	750 0.354 0.5 20	833 0.393 0.64 25	1000 0.472 0.77 27	1167 0.551 1.13 31	1333 0.629 1.52 38	1500 0.708 2.0 44

- Data based on one meter unit length of the grille.
- P_s: Static pressure loss is in mm of H_2O.
- NC based on a room attenuation of 10 dB.

air master

Return linear bar register

15^0 -1 way - 12 mm spacing

Model: ARLR-1

Table 3.5 Air flow data

Nominal Width mm							
50	Cfm M^3/sec. -P_s in mm H_2O NC	332 0.157 0.46 <15	417 0.197 0.72 <18	500 0.236 1.03 25	585 0.276 1.42 31	667 0.315 1.88 31	750 0.354 2.32 40
100	Cfm M^3/sec. -P_s in mm H_2O NC	417 0.197 0.48 <15	500 0.236 0.69 19	585 0.276 0.93 24	667 0.315 1.20 31	750 0.354 1.55 34	833 0.393 1.88 38
150	Cfm M^3/sec. -P_s in mm H_2O NC	500 0.236 0.48 15	585 0.276 0.67 20	667 0.315 0.86 27	750 0.354 1.10 31	833 0.393 1.34 31	1000 0.472 1.92 37
200	Cfm M^3/sec. -P_s in mm H_2O NC	585 0.276 0.45 17	667 0.315 0.64 23	750 0.354 0.78 25	833 0.393 0.99 30	1000 0.472 1.37 34	1167 0.551 1.85 38
250	Cfm M^3/sec. -P_s in mm H_2O NC	667 0.315 0.45 19	750 0.354 0.59 22	833 0.393 0.71 24	1000 0.472 1.02 30	1167 0.551 1.36 33	1332 0.629 1.79 38
300	Cfm M^3/sec. -P_s in mm H_2O NC	750 0.354 0.48 19	833 0.393 0.6 23	1000 0.472 0.74 25	1167 0.551 1.05 30	1332 0.629 1.45 37	1500 0.708 1.8 42

- Data based on one meter unit length of the grille.
- P_s: Static pressure loss is in mm of H_2O.
- NC based on a room attenuation of 10 dB.

air master

Return linear bar register

0^0 -12 mm spacing

Model: ARLR-0

Table 3.6 Air flow data

Nominal Width mm							
50	Cfm M^3/sec. -P_s in mm H_2O NC	332 0.157 0.43 <15	417 0.197 0.69 17	500 0.236 0.99 24	585 0.276 1.37 30	667 0.315 1.83 33	750 0.354 2.23 38
100	Cfm M^3/sec. -P_s in mm H_2O NC	417 0.197 0.45 <15	500 0.236 0.66 18	585 0.276 0.89 23	667 0.315 1.14 31	750 0.354 1.48 33	833 0.393 1.78 36
150	Cfm M^3/sec. -P_s in mm H_2O NC	500 0.236 0.45 15	585 0.276 0.64 17	667 0.315 0.81 26	750 0.354 1.04 28	833 0.393 1.27 30	1000 0.472 1.83 36
200	Cfm M^3/sec. -P_s in mm H_2O NC	585 0.276 0.43 17	667 0.315 0.64 22	750 0.354 0.65 24	833 0.393 0.91 27	1000 0.472 1.4 33	1167 0.551 1.8 37
250	Cfm M^3/sec. -P_s in mm H_2O NC	667 0.315 0.43 19	750 0.354 0.56 21	833 0.393 0.66 23	1000 0.472 0.94 29	1167 0.551 1.27 32	1332 0.629 1.67 36
300	Cfm M^3/sec. -P_s in mm H_2O NC	750 0.354 0.45 19	833 0.393 0.58 22	1000 0.472 0.69 24	1167 0.551 0.98 28	1330 0.629 1.32 36	1500 0.708 1.7 40

- Data based on one meter unit length of the grille.
- P_s: Static pressure loss is in mm of H_2O.
- NC based on a room attenuation of 10 dB.

air master

Supply linear bar register

15^0 -2 way - 6 mm spacing

Model: ASLR (S)

Table 3.7 Air flow data

Width in mm A_k in m^2	Face Velocity in m/sec.	2.0	2.5	3.0	3.5	4.0	4.5	5.0
50 0.02	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	85 0.04 0.16 2.8-4.2-5.8 <15	106 0.05 0.23 3.6-4.5-6.3 <15	127 0.06 0.23 4.3-5.3-7.2 <15	148 0.07 0.28 4.6-5.6-7.9 18	169 0.08 0.36 5.1-6.0-8.4 24	190 0.09 0.45 5.4-6.4-9.0 28	212 0.1 0.59 5.4-6.6-9.4 33
100 0.035	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	148 0.07 0.16 3.6-4.8-7.3 <15	186 0.088 0.23 4.2-5.5-7.9 <15	222 0.105 0.23 4.9-6.3-8.6 17	260 0.123 0.33 5.6-6.5-9.2 20	296 0.14 0.44 6.0-7.4-10.0 25	335 0.158 0.58 6.4-8.11 29	370 0.175 0.7 6.7-8.4-11.9 34
150 0.053	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	224 0.106 0.16 4.2-5.8-8.4 <15	282 0.133 0.23 4.8-6.3-9.2 <15	337 0.159 0.28 5.6-7.2-10.3 17	394 0.186 0.4 6.3-7.9-10.8 20	449 0.212 0.52 7.0-8.8-11.8 27	504 0.238 0.66 7.4-9.4-12.8 30	561 0.261 0.82 7.8-9.8-13.5 35
200 0.067	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	284 0.134 0.22 4.7-6.4-9.2 <15	356 0.168 0.25 5.5-7-10.3 <15	426 0.201 0.34 6.5-8.2-11.6 18	498 0.235 0.43 7.2-8.6-12.2 23	567 0.268 0.6 8-9.7-13.0 29	639 0.302 0.75 8.4-10.4-14 34	709 0.335 1.05 8.9-10.9-15.2 39
250 0.085	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	360 0.17 0.22 5.1-7-10.3 15	451 0.213 0.27 5.7-7.9-11.2 17	540 0.255 0.37 6.9-8.8-12.2 23	631 0.298 0.48 7.9-9.5-13.2 28	720 0.34 0.66 8.8-10.4-14.4 35	811 0.383 0.86 9.0-11-15.4 39	900 0.425 1.08 9.4-11.9-16.6 42
300 0.103	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	436 0.206 0.22 5.4-7.7-11.2 15	546 0.258 0.34 6.4-8.6-12.2 19	654 0.309 0.40 7.6-9.8-13.2 27	764 0.361 0.52 8.5-10.6-14 31	872 0.412 0.72 9.4-11.4-15.4 37	982 0.464 0.96 9.7-12.1-16.5 40	1090 0.515 1.17 10-12.9-18 45

- Data based on one meter unit length of the grille with damper in full open position.
- Face velocity is measured in m/sec.
- P_s: Static pressure loss is in mm of H_2O.
- Throw (meters) is measured for a terminal velocities of 0.75, 0.5 & 0.25 m/sec.
- NC based on a room attenuation of 10 dB.

air master

Return linear bar register

15^0 -2 way - 6 mm spacing

Model: ARLR (S)

Table 3.8 Air flow data

Nominal Width mm							
50	Cfm M^3/sec. -P_s in mm H_2O NC	170 0.08 0.5 17	213 0.101 0.78 20	255 0.12 1.12 29	298 0.141 1.57 35	340 0.161 2.04 39	382 0.18 2.3 45
100	Cfm M^3/sec. -P_s in mm H_2O NC	247 0.117 0.54 17	296 0.139 0.75 22	347 0.164 1.02 30	395 0.187 1.36 35	445 0.21 1.7 38	494 0.233 2.13 44
150	Cfm M^3/sec. -P_s in mm H_2O NC	340 0.161 0.54 19	398 0.188 0.72 24	454 0.214 0.93 31	510 0.241 1.22 35	566 0.267 1.5 37	680 0.321 2.17 42
200	Cfm M^3/sec. -P_s in mm H_2O NC	404 0.191 0.51 18	461 0.218 0.67 25	518 0.245 0.85 29	576 0.272 1.06 35	691 0.326 1.52 38	806 0.381 2.06 44
250	Cfm M^3/sec. -P_s in mm H_2O NC	487 0.23 0.51 21	548 0.259 0.64 25	608 0.287 0.78 28	730 0.345 1.15 34	852 0.402 1.55 39	972 0.459 2.05 44
300	Cfm M^3/sec. -P_s in mm H_2O NC	570 0.269 0.53 22	633 0.299 0.67 27	760 0.359 0.81 30	887 0.419 1.21 34	1013 0.478 1.63 42	1140 0.538 2.16 47

- Data based on one meter unit length of the grille.
- P_s: Static pressure loss is in mm of H_2O.
- NC based on a room attenuation of 10 dB.

air master

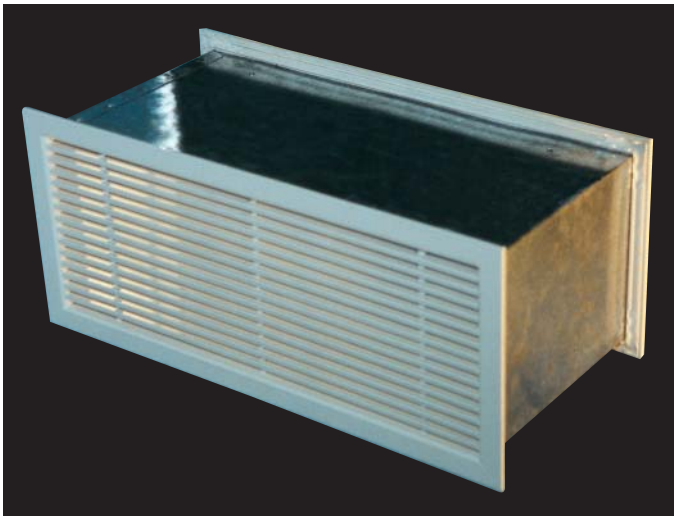
Double security bar register

- with steel housing

➤Model: AMSR-D

Construction:

- **Frame:** Heavy gauge high quality extruded aluminium profile with 30mm flange width as standard.
- **Face bars:** Heavy gauge extruded aluminium profiles of 0°, 15° - 1 way throw and 15° - 2 way throw. Steel bars are available as option.
- **Bar spacing:** 12 mm.
- **Damper frame and blades:** High quality extruded aluminium profiles with natural aluminium finish. Black matt finish as option.

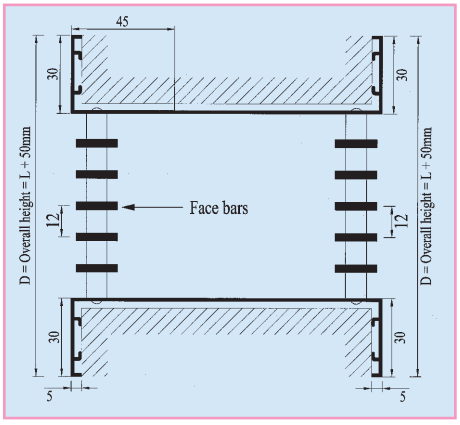


Description:

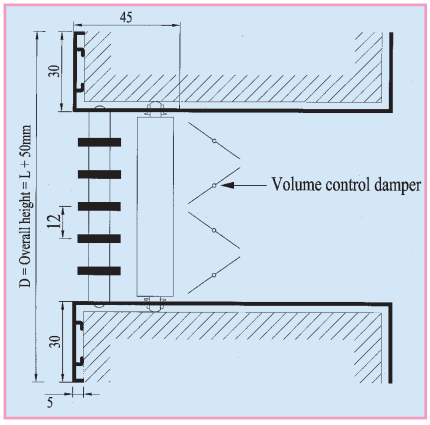
- Frame and face bars are of high quality extruded aluminium profiled construction with the advantages of corrosion resistance and rigidity.
- Horizontal face bars with 0°, 15° - 1 way throw and 15° - 2 way throw are fixed rigidly to the frame with steel rods welded to the main frame.
- Optional vertical aluminium aerofoil blades are fixed at the rear side of the frame by nylon bushings.
- Opposed blade damper is fixed to the main frame.
- Wall sleeves are made of heavy gauge galvanized steel.
- Security grilles are used in areas such as prisons, hospitals and production plants where security is of main concern

Finishes:

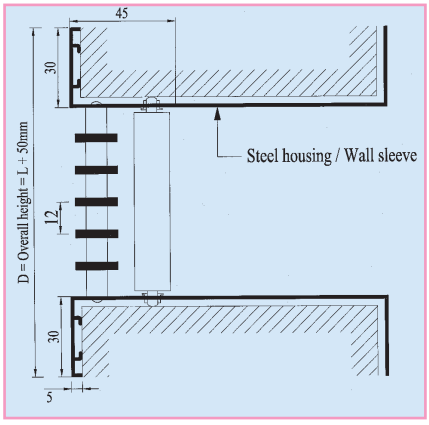
- Anodised finish.
- Powder coated as per RAL color codes.



Model: AMSG-D
Double security bar grille with steel housing.



Model: AMSR-S
Single security bar grille with volume control damper and steel housing.



Model: AMSG-S
Single security bar grille with steel housing.

Fixing:

- Rivet fixing to the wall sleeve.
- Special tamper proof screw fixing.

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Maximum Security Perforated Grille

Model: AMPSG

Construction:

- **Frame:** Resistant steel sheet of 4.5mm thick with welded corners.
- **Perforated Panel:** 4.5mm thick galvanised perforated steel sheet with 8mm holes.
- **Sleeves:** Wall sleeves are made of galvanised steel.

Optional features:

- **Damper Frame:** Galvanised steel sheet.
- **Damper Core:** High quality extruded aluminium profile with natural aluminium finish and black matt finish.

Description:

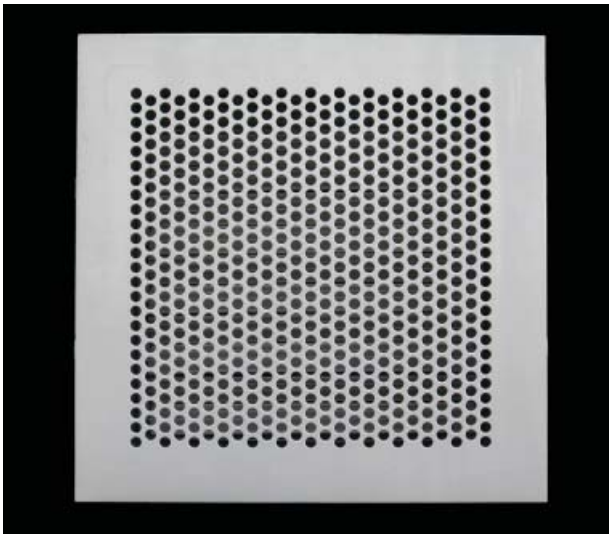
- Frame is constructed from 4.5mm thick resiatant steel and all sides welded with 4.5mm thick perforated panel having 8mm dia holes. Whole structure is hot dip galvanised with the advantages of corrosion resistance.
- Security grilles are specially designed for maximum security prisons in order to secure the ventilation openings and provide proper air transfer for the facilities.
- The design prevents the inmates from using the the grille to commit suicide
- Available with flanged edges and are supplied without fixing holes as standard.
- Available in square and rectangular sizes.

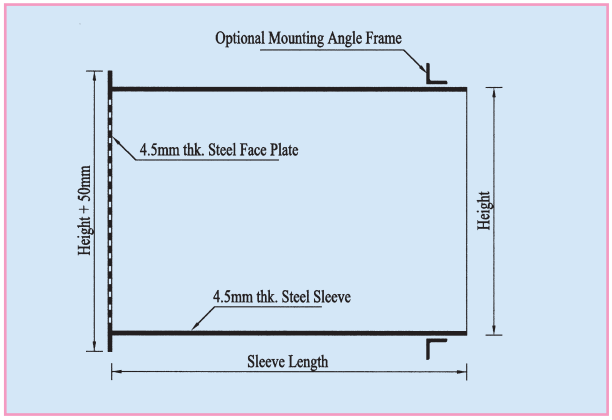
Standard finishes:

- Hot dip galvanised.
- Powder coated as per RAL color codes.

Fixing:

- 40mmx40mmx4mm Angle frame loose supplied, to be field welded on sleeve.
- Rivet fixing to the wall sleeve.
- Special tamper proof screw fixing.





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Maximum Security Perforated Grille

Model: AMPSG

Air flow data

Neck size in mm Area factor in m^2									
150x150 0.0748	Cfm M^3/sec Face Vel. m/sec P_T in mm H_2O Throw in m NC	33 0.016 1.5 0.289 1.1-3.7 <15	44 0.021 2.0 0.531 2.3-4.9 <15	55 0.026 2.5 0.820 3.1-6.0 <15	77 0.036 3.5 1.182 3.7-6.6 15	88 0.041 4.0 1.592 4.3-7.2 20	99 0.047 4.5 2.076 4.9-7.8 22	110 0.052 5.0 2.630 5.5-8.1 26	121 0.057 5.5 3.257 6.0-8.6 30
200x200 0.1454	Cfm M^3/sec Face Vel. m/sec P_T in mm H_2O Throw in m NC	64 0.030 1.5 0.265 1.4-4.6 <15	86 0.040 2.0 0.483 2.6-6.3 <15	107 0.050 2.5 0.748 4.0-7.8 15	128 0.060 3.0 1.086 4.6-8.9 18	150 0.071 3.5 1.496 5.5-9.5 20	172 0.081 4.0 1.930 6.3-10.4 22	193 0.091 4.5 2.461 6.9-11.0 25	214 0.101 5.0 3.040 7.8-11.5 30
300x300 0.3724	Cfm M^3/sec Face Vel. m/sec P_T in mm H_2O Throw in m NC	166 0.078 1.5 0.241 2.0-6.6 <15	221 0.104 2.0 0.434 3.4-8.9 <15	276 0.130 2.5 0.676 5.5-11.2 <15	331 0.156 3.0 0.989 6.6-13.3 16	386 0.182 3.5 1.327 7.8-14.4 19	442 0.209 4.0 1.737 8.9-15.3 24	497 0.234 4.5 2.219 10.1-16.5 26	552 0.260 5.0 2.726 11.2-17.3 30
450x450 0.9538	Cfm M^3/sec Face Vel. m/sec P_T in mm H_2O Throw in m NC	284 0.134 1.0 0.217 2.6-9.8 <15	426 0.201 1.5 0.386 4.6-13.0 <15	568 0.268 2.0 0.627 7.2-16.2 16	712 0.336 2.5 0.893 9.8-19.4 19	853 0.403 3.0 1.206 11.0-21.7 23	996 0.470 3.5 1.568 13.0-23.1 27	1137 0.537 4.0 2.0 14.7-24.6 30	1280 0.604 4.5 2.461 16.2-26.0 32
500x500 1.223	Cfm M^3/sec Face Vel. m/sec P_T in mm H_2O Throw in m NC	365 0.172 1.0 0.217 2.9-11.3 <15	545 0.257 1.5 0.374 5.1-14.9 <15	727 0.343 2.0 0.603 8.1-18.7 16	908 0.428 2.5 0.856 11.3-22.3 18	1090 0.514 3.0 1.158 12.9-25.3 24	1270 0.599 3.5 1.520 14.9-27.0 29	1453 0.686 4.0 1.929 16.8-28.7 32	1635 0.772 4.5 2.376 18.7-30.4 35
600x600 1.9266	Cfm M^3/sec Face Vel. m/sec P_T in mm H_2O Throw in m NC	554 0.261 1.0 0.217 3.1-12.7 <15	835 0.394 1.5 0.362 5.7-16.7 <15	1113 0.525 2.0 0.579 8.9-21.1 15	1390 0.656 2.5 0.820 12.7-25.1 20	1667 0.787 3.0 1.110 14.7-28.9 25	1944 0.917 3.5 1.472 16.7-30.9 30	2225 1.050 4.0 1.858 18.8-32.7 34	2502 1.180 4.5 2.292 21.1-34.7 38
750x750 3.184	Cfm M^3/sec Face Vel. m/sec P_T in mm H_2O Throw in m NC	939 0.443 1.0 0.217 3.6-14.9 <15	1406 0.663 1.5 0.302 6.7-19.6 <15	1871 0.883 2.0 0.509 10.4-24.8 16	2337 1.103 2.5 0.715 14.9-29.5 22	2810 1.326 3.0 1.090 17.2-34.0 27	3276 1.546 3.5 1.372 19.6-36.3 31	3741 1.766 4.0 1.768 22.1-38.5 35	4208 1.986 4.5 2.182 25.0-40.8 40

- Neck size measured in mm.
- P_T - Total pressure loss is in mm of H_2O.
- Throw (meters) is measured for a terminal velocities of 0.5 & 0.25 m/sec.
- Noice criteria (NC) is based on a room attenuation of 10dB.

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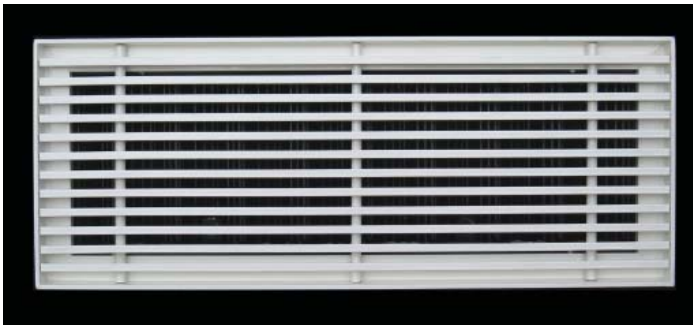
Floor Grille - Light Duty

Model: AFG-L

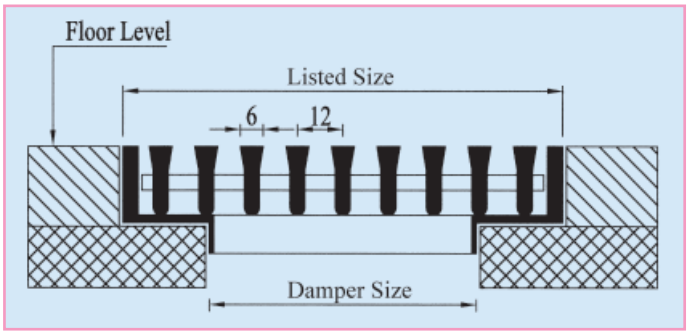


Construction:

- **Frame:** Heavy gauge high quality extruded aluminium profile.
- **Face bars:** 6mm thick high quality aluminium bars with 12mm pitch.

Description:

- Frame is constructed of high quality extruded aluminium profile with the advantages of corrosion resistance and rigidity.
- Structure is robustly constructed with face bars positioned in the frame.
- Face bars assembly is supported by heavy duty aluminium round rod.
- Applicable for installation in gymnasium, sport halls, hospitals and computer rooms.
- Suitable for sill level applications on edges of walkways, passages or raised platforms. Can be supplied in 0^{o} deflection, 15^{o} or 30^{o} one way deflection.



Standard finishes:

- Powder coated as per RAL color codes.

air master

Floor Grille - Light Duty

Model: AFG-L

Width in mm A_f in m²	Face Velocity in m/sec	2.0	2.5	3.0	3.5	4.0	4.5	5.0
50 0.021	Cfm M³/sec P_S in mm H_2O Throw in m NC	89 0.042 0.23 0.5-0.7 <20	111 0.053 0.31 0.6-1.1 20	133 0.063 0.52 0.7-1.3 22	156 0.074 0.68 0.9-2.1 25	178 0.084 0.83 1.3-2.5 27	200 0.095 1.18 1.6-3.1 29	222 0.105 1.48 2.2-3.8 30
100 0.053	Cfm M³/sec P_S in mm H_2O Throw in m NC	225 0.106 0.23 0.7-1.3 <20	281 0.133 0.31 1.3-2.8 20	337 0.159 0.52 2.3-4.1 25	393 0.186 0.68 2.5-4.8 28	449 0.212 0.83 2.8-5.4 30	505 0.239 1.18 3.5-6.4 32	561 0.265 1.48 4.1-7.3 35
150 0.082	Cfm M³/sec P_S in mm H_2O Throw in m NC	347 0.164 0.23 0.8-1.6 <20	434 0.205 0.31 1.5-3.1 20	521 0.246 0.52 2.4-4.5 25	608 0.287 0.68 2.7-5.1 27	695 0.328 0.83 3.3-6.1 30	782 0.369 1.18 4.1-6.9 33	868 0.41 1.48 4.4-7.8 35
200 0.114	Cfm M³/sec P_S in mm H_2O Throw in m NC	483 0.228 0.23 0.9-1.8 <20	604 0.285 0.31 1.7-3.7 20	724 0.342 0.52 2.5-4.8 25	845 0.399 0.68 3.1-5.4 28	966 0.456 0.83 3.5-6.7 31	1087 0.513 1.18 4.4-7.3 33	1207 0.57 1.48 4.9-8.2 35
250 0.142	Cfm M³/sec P_S in mm H_2O Throw in m NC	602 0.284 0.23 1.1-2.1 <20	752 0.355 0.31 1.8-4.1 20	902 0.426 0.52 2.7-4.9 25	1053 0.497 0.68 3.2-5.7 27	1203 0.568 0.83 3.7-6.9 30	1353 0.639 1.18 4.5-7.2 32	1504 0.71 1.48 5.1-8.3 35
300 0.171	Cfm M³/sec P_S in mm H_2O Throw in m NC	724 0.342 0.23 1.2-2.2 <20	905 0.428 0.31 1.8-4.2 20	1087 0.513 0.52 2.6-4.9 25	1268 0.598 0.68 3.0-5.5 28	1449 0.684 0.83 3.6-6.8 31	1630 0.77 1.18 4.5-7.1 33	1811 0.855 1.48 4.9-8.2 35

- Data based on one meter unit length of the grille with damper in full open position.
- Face velocity is measured in m/sec.
- P_S - Static pressure loss is in mm of H_2O.
- Throw (meters) is measured for a terminal velocities of 0.5 & 0.25 m/sec.
- Noice criteria (NC) based on a room attenuation of 10dB.

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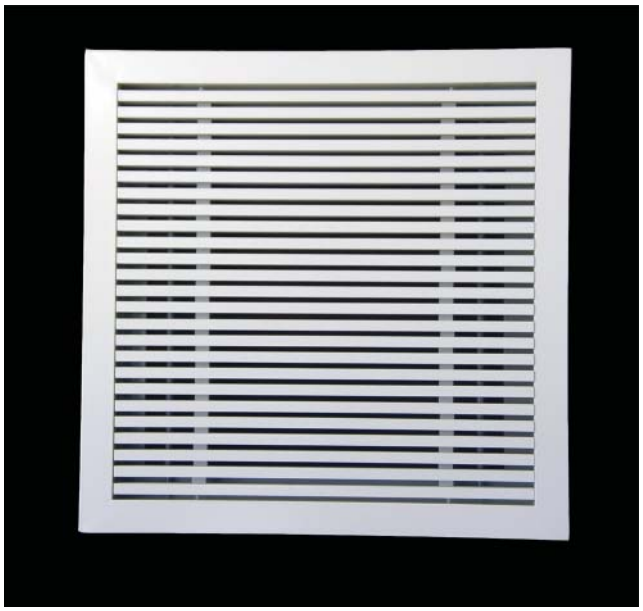
Floor Grille - Heavy Duty

Model: AFG-H

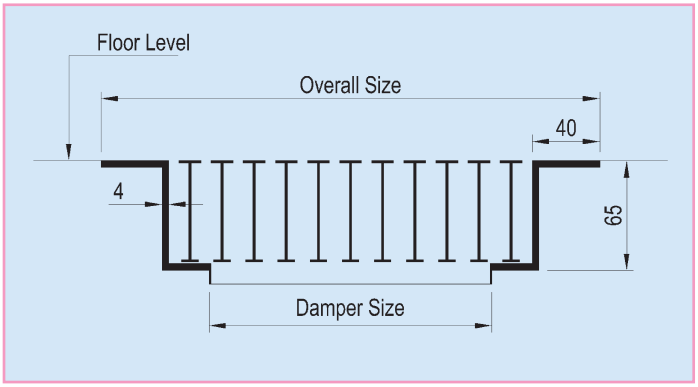
Construction:

- **Frame:** Heavy gauge high quality extruded aluminium profile 4mm thick, flange width 40mm.
- **Face bars:** 60mm high "**I**" section made up of high quality extruded aluminium.



Description:

- Frame is constructed of high quality extruded aluminium profile with the advantages of corrosion resistance and rigidity.
- Structure is robustly constructed with face bars positioned in the frame.
- Face bars assembly is reinforced with steel rods to widthstand heavy loads.
- Applicable for installation in gymnasium, sport halls, hospitals and computer rooms.
- A recess of 40mmx4mm has to be provided around the grille, in the floor to install the grill flush with the floor (or) carpet level.



Standard finishes:

- Powder coated as per RAL color codes.

Grille Size 600x600mm (Overall Size)

Air Flow in CFM **Air Flow in m³/sec**	**192** **0.091**	**383** **0.181**	**424** **0.200**	**574** **0.271**	**766** **0.362**	**957** **0.452**	**1149** **0.542**	**1340** **0.632**
Neck velocity in m/s	0.96	1.9	2.1	2.9	3.8	4.8	5.7	6.7
Pressure drop in mm of H_2O	0.123	0.360	0.480	0.603	0.960	1.55	2.29	3.00
Throw in meters	2.1	2.8	2.9	4.2	5.9	7.5	9.2	10.6
NC	<15	<20	20	25	29	31	33	34

- Data based on 600x600mm Grille.
- Face velocity is measured in m/sec.
- Noise criteria (NC) is based on room attenuation of 10db.

air master

Chapter 4

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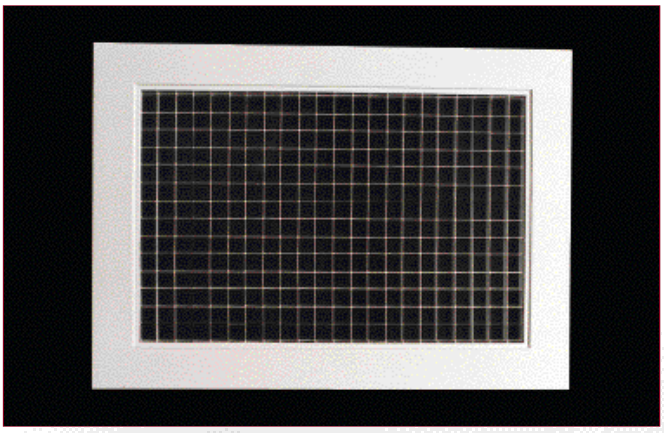
Egg crate grilles

Model: AEG



Construction:

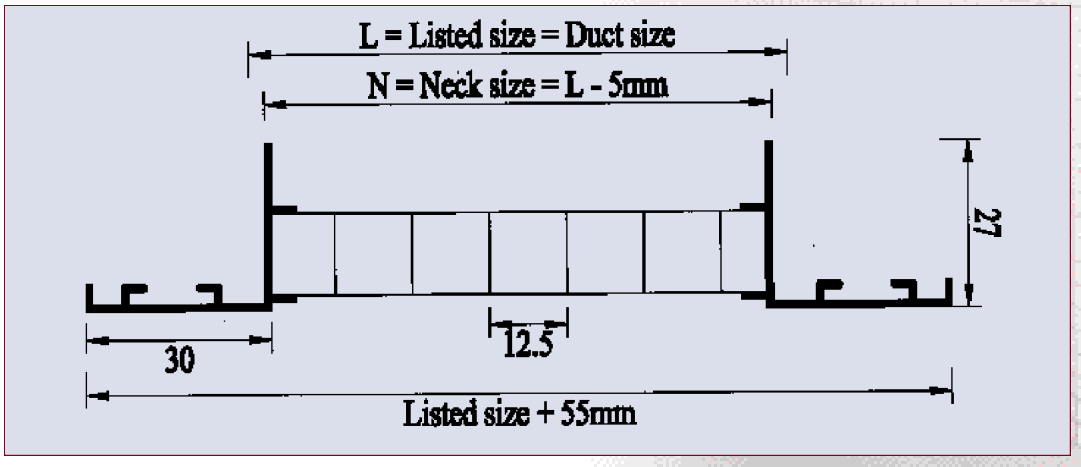
- **Frame:** High quality extruded aluminium profiles with 30 mm flange width as standard.12, 16, 24 mm flange widths are optional.
- **Egg crate core:** 12.5 mm x 12.5 mm x 12.5 mm aluminium grid.

Description:

- Frame is constructed from high quality extruded aluminium profiles wih the advantages of corrosion resistance and rigidity.
- Aluminium egg crate core of 12.5 mm x 12.5 mm x 12.5 mm size is fixed rigidly to the frame.
- Foam gasket is sealed around the back of the frame as option to avoid air leakage.
- Rigid construction provides noiseless performance.
- Designed for return and exhaust applications for conditioned space.

Standard finishes:

- Natural aluminium anodized finish.
- Powder coated colour finish as per RAL colour codes.
- Flexibility of finishing is available as option.



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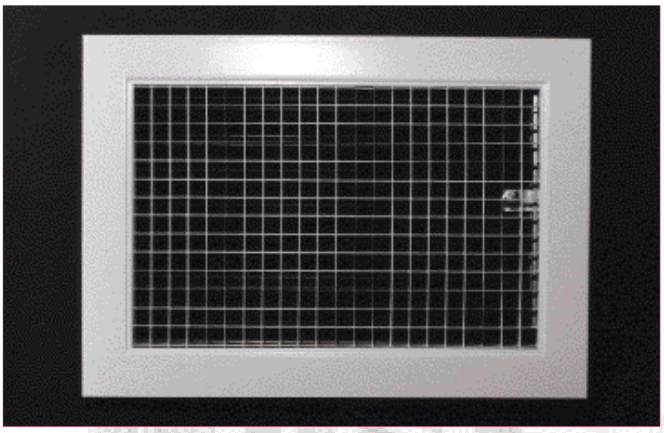
Egg crate register

Model: AER



Construction:

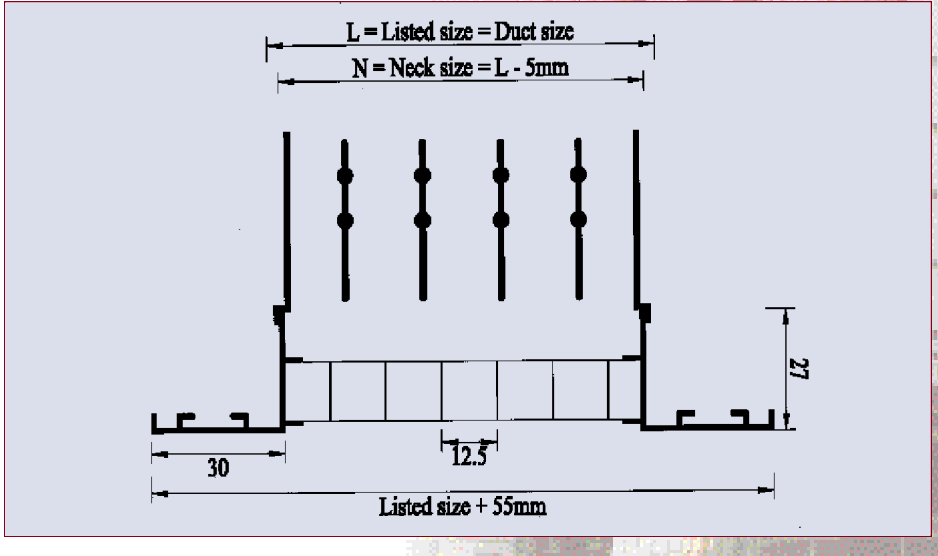
- **Frame:** High quality extruded aluminium profiles with 30 mm flange width as standard.12, 16, 24 mm flange widths are optional.
- **Egg crate core:** 12.5 mm x 12.5 mm x 12.5 mm aluminium grid.
- **Damper frame and blades:** Aluminium profiles with natural aluminium finish. Black matt finish as option.

Description:

- Frame is constructed from high quality extruded aluminium profiles wih the advantages of corrosion resistance and rigidity.
- Aluminium egg crate core of 12.5 mm x 12.5 mm x 12.5 mm size is fixed rigidly to the frame.
- Grilles fixed with opposed blade damper for controlling exhaust air flow.
- Damper blades are fixed to the frame by nylon bushes.
- Damper blades can be screw operated from the face opening.
- Foam gasket is sealed around the back of the frame as option to avoid air leakage.
- Rigid construction provides noiseless performance.
- Designed for return and exhaust applications for conditioned space.

Standard finishes:

- Natural aluminium anodized finish.
- Powder coated colour finish as per RAL colour codes.
- Flexibility of finishing is available as option.



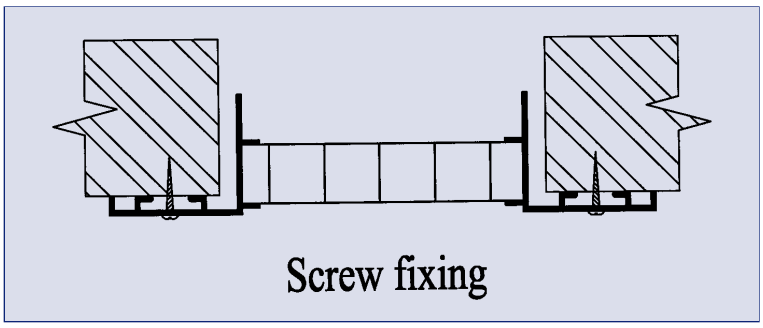
air master

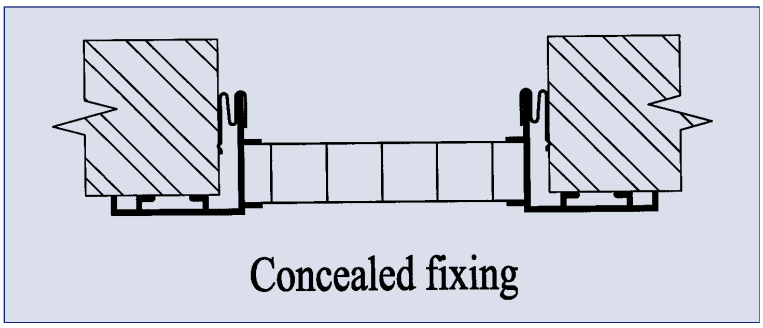
Standard Sizes:

- Available in square and rectangular sizes.
- Non standard sizes are available as option.

Width in mm	150	225	300	375	450	525	600
Height in mm	150	225	300	375	450	525	600

Fixing details:





How to order:

Model	Size	Quantity	Finish
AEG	Specify opening size in Width x heigh mm x mm	Specify in numbers	A = Aluminium anodized finish.
AER			B = RAL 9010
			C = Other RAL colours

Ordering example:

1. To select egg crate register of size 450 x 450 mm of quantity 75 nos with aluminium anodized finish.

   Order as : AER-450 x 450 - 75 - A.

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Egg crate grilles

Model: AEG

Table 4.1 Air flow data

Core velocity in m/sec.	1.25	1.5	2	2.5	3	3.5	4	4.5	5
Pressure drop in mm H_2O.	0.254	0.363	0.635	1.016	1.524	2.032	2.54	3.302	4.064
Listed size mm x mm	**Air flow in m3 / sec.**								
150 x 150	0.0298	0.035	0.047	0.059	0.071	0.0827	0.094	0.106	0.118
225 x 225	0.063	0.076	0.101	0.127	0.152	0.177	0.203	0.228	0.253
300 x 300	0.115	0.136	0.183	0.229	0.275	0.321	0.367	0.412	0.458
375 x 375	0.179	0.212	0.285	0.357	0.428	0.499	0.571	0.642	0.713
450 x 450	0.257	0.306	0.412	0.515	0.618.	0.721	0.824	0.927	1.029
525 x 525	0.351	0.417	0.561	0.701	0.842	0.982	1.122	1.263	1.403
600 x 600	0.458	0.596	0.733	0.916	1.0997	1.283	1.466	1.649	1.833

- Air flow data for non standard sizes can be interpolated from the above data.

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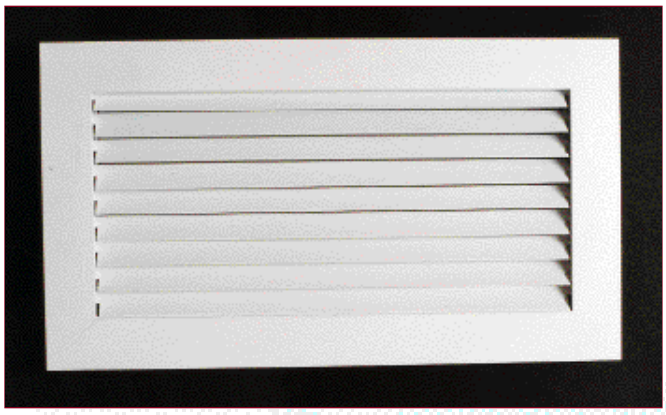
Door grille with single frame

Model: ADG-1

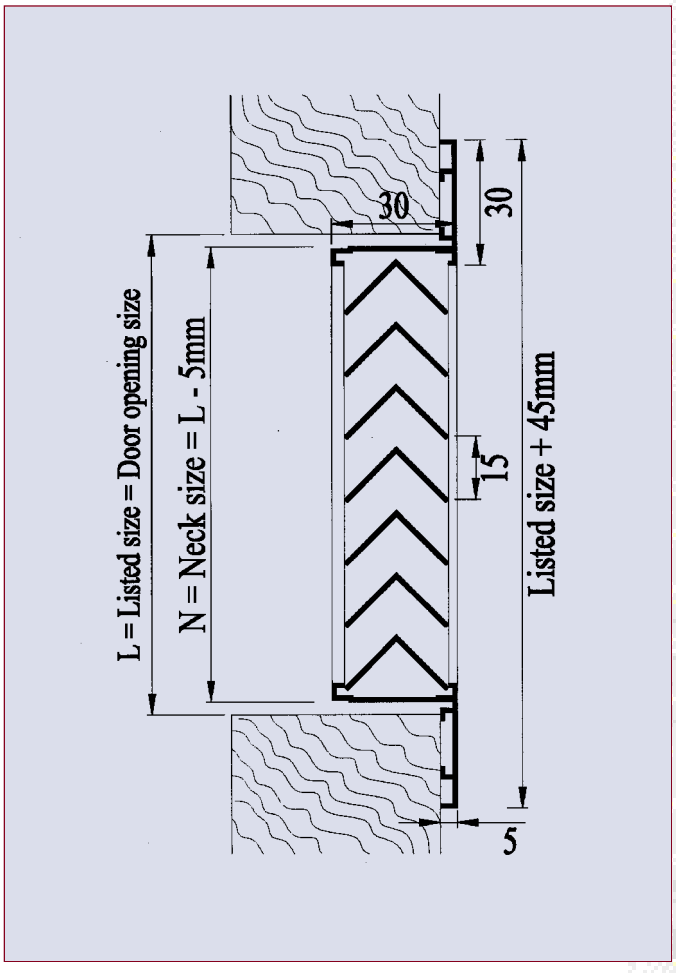


Construction:

- **Frame:** High quality extruded aluminium profiles with 30 mm flange width as standard.12, 16, 24 mm flange widths are optional.
- **Blades:** High quality extruded aluminium profiles.
- **Blade pitch:** 15mm

Description:

- Frame and blades are of high quality extruded aluminium profiled construction with the advantages of corrosion resistance and rigidity.
- Inverted "V" type horizontal blades are fixed rigidly to the frame.
- Blades are spaced at a distance of 15 mm.



- Grilles are made to with stand heavy use to which door grilles are subjected.
- Frame is fabricated to suit door thickness of 30 mm to 60 mm.
- Structure provides around 55% free area for air transmission.
- Used in facilities such as offices, hospitals, schools and toilets for transfer of air from one room to another room.
- Fire rated door grilles are available with 1/2 and 1 hour fire rating with additional cost.

Standard finishes:

- Natural aluminium anodized finish.
- Powder coated colour finish as per RAL colour codes.
- Flexibility of finish is available.

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Door grille with double frame

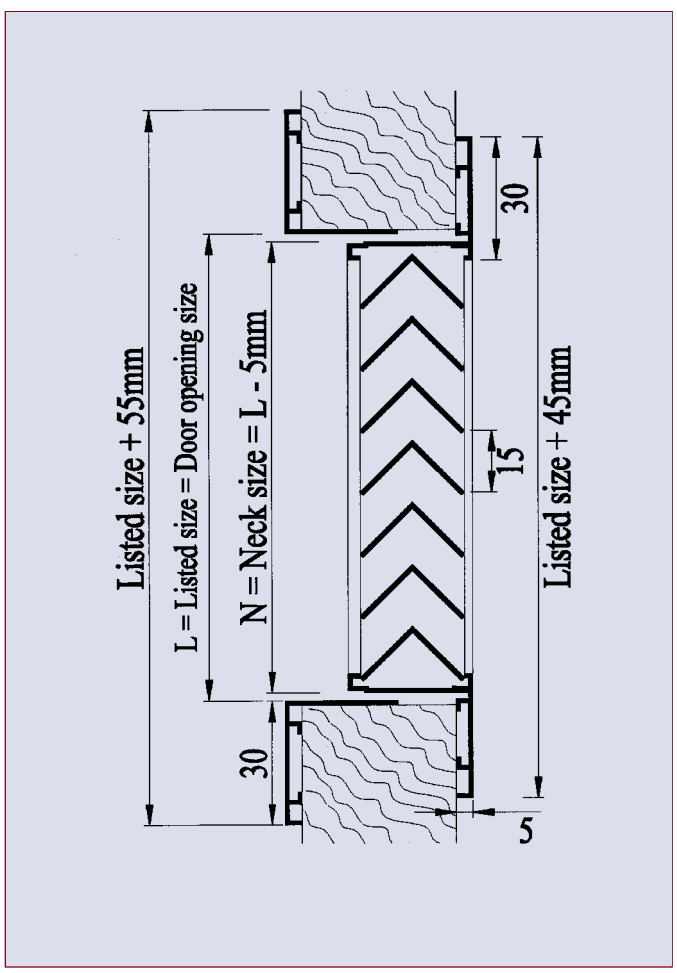
Model: ADG-2

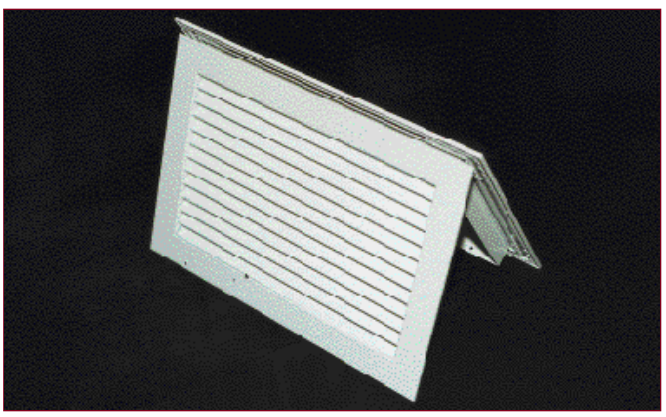
Construction:

- **Frame:** High quality extruded aluminium profiles with 30 mm flange width as standard.12, 16, 24 mm flange widths are optional.
- **Blades:** High quality extruded aluminium profiles.
- **Blade pitch:** 15mm.

Description:

- Frame and blades are of high quality extruded aluminium profiled construction with the advantages of corrosion resistance and rigidity.
- Inverted “V” type horizontal blades are fixed rigidly to the frame to avoid vibration and corrosion.
- Blades are spaced at a distance of 15 mm.
- Provided with a counter frame for fixing on both sides of the door.





- Made to with stand heavy use to which door grilles are subjected.
- Frame is fabricated to suit door thickness of 30 mm to 60 mm.
- Structure provides around 55% free area for air transmission.
- Used in facilities such as offices, hospitals, schools and toiles for transfer of air from one room to another room.
- Fire rated door grilles are available with 1/2 and 1 hour fire rating with additional cost.

Standard finishes:

- Natural aluminium anodized finish.
- Powder coated colour finish as per RAL colour codes.
- Flexibility of finish is available.

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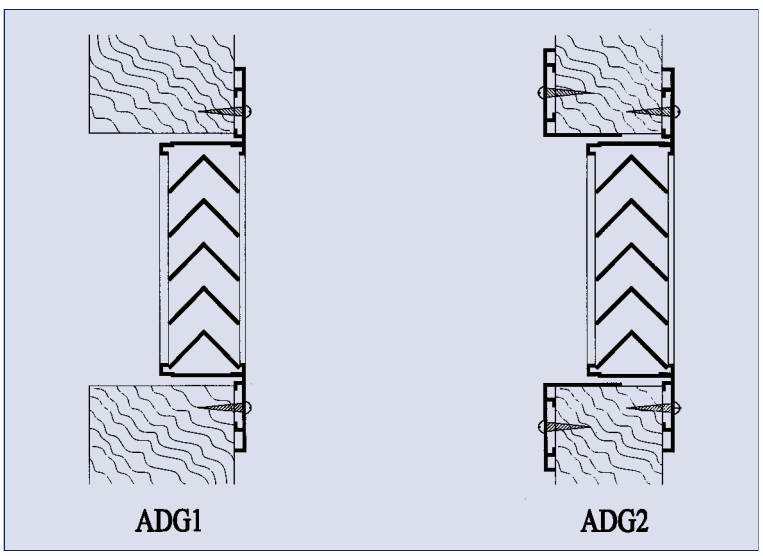
Standard Sizes:

- Available in square and rectangular sizes.
- Non standard sizes are available as option.

Width in mm	150	200	250	300	350	400	450	500
Height in mm	150	200	250	300	350	400	450	500

Fixing details:

- Screw fixing from flange to door.



How to order:

Model	Size	Quantity	Finish
ADG1	Specify door opening size Width x height In mm x mm	Specify in numbers	A = Natural aluminium andoized finish.
			B = RAL 9010.
ADG2			C = Other RAL colours

Ordering example:

1. To select door grille with double frame of size 400 x 400 of quantity 75 nos. with natural aluminium anodized finish.

   Order as : ADG2-400 x 400 – 75 – A.

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Door grilles

Model: ADG1 / ADG2

Table 5.1 Air flow data

Listed sizes In mm x mm	Area factor in m^2.	Face velocity in m/sec.							
		1.5	1.75	2	2.25	2.5	3	3.5	4
		Static pressure loss in mm of H2O.							
		0.609	0.81	1.07	1.35	1.65	2.39	3.25	4.27
		Air flow in m3 / sec.							
300 x 150	0.026	0.039	0.046	0.052	0.059	0.065	0.078	0.091	0.104
400 x 150 / 300 x 200	0.0344	0.052	0.06	0.069	0.077	0.086	0.103	0.12	0.138
500 x 150	0.0428	0.064	0.075	0.086	0.096	0.107	0.128	0.15	0.171
300 x 250 / 400 x 200 600 x 150	0.0455	0.068	0.08	0.091	0.102	0.114	0.137	0.159	0.182
400 x 250 / 750 x 150 500 x 200 / 300 x 300	0.049	0.074	0.086	0.098	0.110	0.123	0.147	0.172	0.196
350 x 350 / 600 x 200 400 x 300 / 500 x 250	0.067	0.1	0.117	0.134	0.151	0.168	0.201	0.235	0.268
450 x 350 / 600 x 250 500 x 300 / 750 x 200	0.0837	0.126	0.146	0.167	0.188	0.209	0.251	0.293	0.335
500 x 350 / 750 x 250 600 x 300	0.10	0.15	0.175	0.2	0.225	0.25	0.3	0.35	0.4
500 x 400 / 450 x 450	0.11	0.165	0.193	0.22	0.248	0.275	0.33	0.385	0.44
600 x 350	0.115	0.173	0.201	0.23	0.259	0.288	0.345	0.403	0.46
500 x 450 / 750 x 300 600 x 400	0.125	0.188	0.219	0.25	0.281	0.313	0.375	0.438	0.50
750 x 350 / 600 x 450	0.149	0.224	0.261	0.298	0.335	0.373	0.447	0.522	0.596
750 x 450	0.175	0.263	0.306	0.35	0.394	0.438	0.525	0.613	0.7
600 x 600	0.199	0.299	0.348	0.398	0.448	0.498	0.597	0.697	0.796
700 x 600 / 750 x 550	0.23	0.345	0.403	0.46	0.518	0.575	0.69	0.805	0.92

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Chapter 6

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Supply air square ceiling diffuser

– One way throw

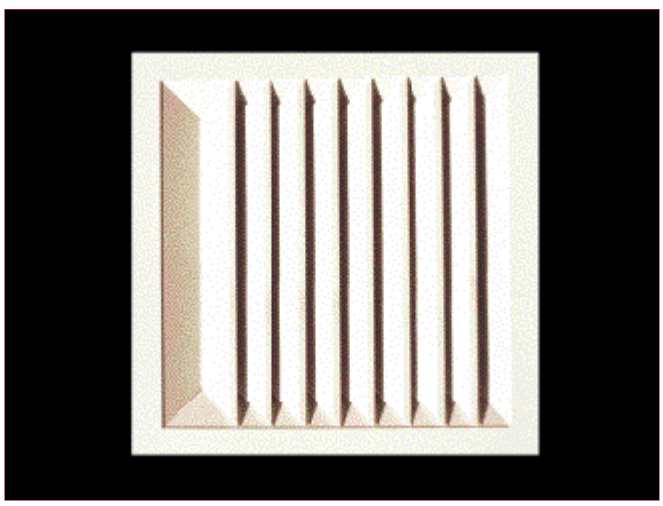
Model: ACD1+D

Construction:

- **Frame and core:** High quality extruded aluminium profile with 33 mm flange width.
- **Damper frame and core:** High quality extruded aluminium profile with natural aluminium finish. Black matt finish as option.

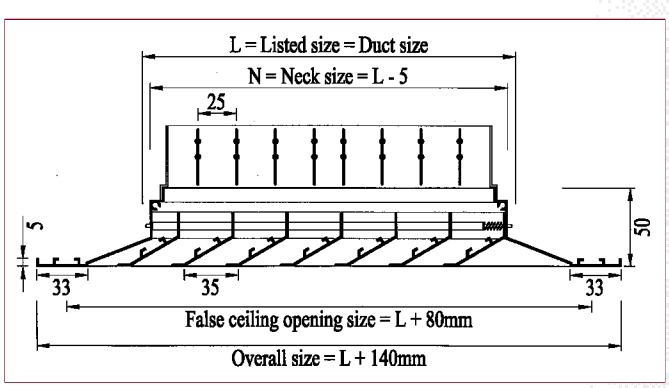
Description:

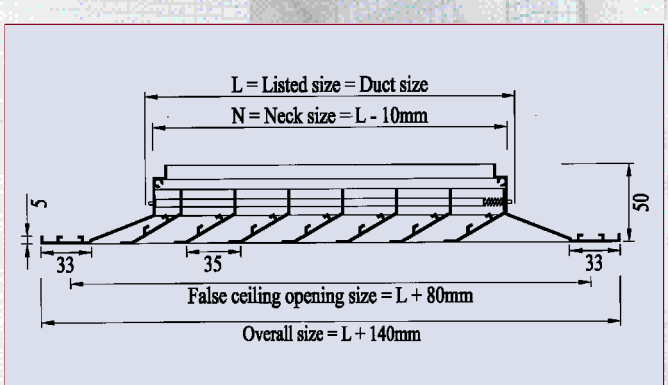
- The frame and blades are of high quality extuded aluminium profiled construction with the advantages of corrosion resistance and rigidity.
- Louvered type core is fixed to the frame with aluminium pins loaded with steel springs. Core can be easily removable and interchangeable to allow for maximum flexibility in installation, maintenance and damper adjustment.
- Damper is fixed rigidly to the frame by aluminium rivets. Fixing by spring clips as option.
- Damper blades are separated from its frame by nylon bushes.
- Opposed blade damper is screw operated from the face opening of the diffuser after removing the internal core. Lever operated damper as option.



- Discharges air horizontally in one way, either X or Y directions as per pattern arrangement.
- Foam gasket is sealed around the back of the frame as option to avoid air leakage.
- Available in rectangular sizes as option.
- Suitable for flush mounting in lay in type ceiling.

Model ACD1: Same as ACD1+D, but without opposed blade damper. Suitable for return air applications.





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Supply air square ceiling diffuser

– Two way throw

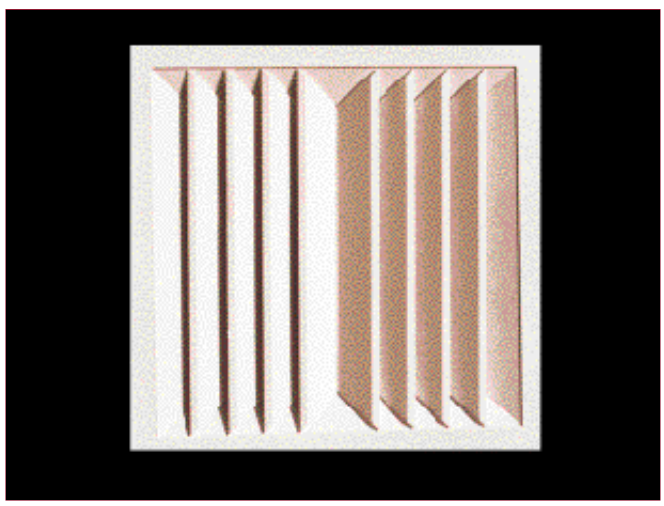
Model: ACD2+D

Construction:

- **Frame and core:** High quality extruded aluminium profile with 33 mm flange width.
- **Damper frame and core:** High quality extruded aluminium profile with natural aluminium finish. Black matt finish as option.

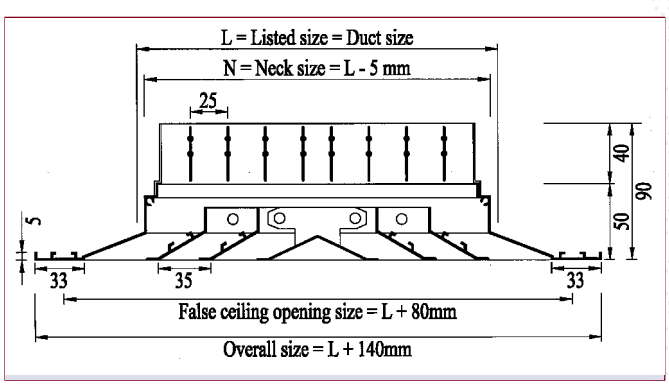
Description:

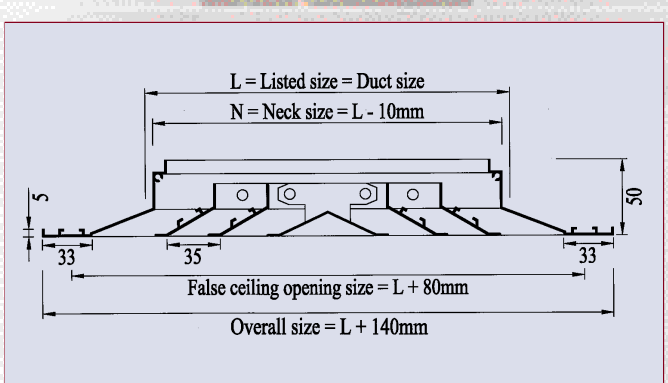
- The frame and blades are of high quality extuded aluminium profiled construction with the advantages of corrosion resistance and rigidity.
- Louvered type core is fixed to the frame with aluminium pins loaded with steel springs. Core can be easily removable and interchangeable to allow for maximum flexibility in installation, maintenance and damper adjustment.
- Damper is fixed rigidly to the frame by aluminium rivets. Fixing by spring clips as option.
- Damper blades are separated from its frame by nylon bushes.
- Opposed blade damper is screw operated from the face opening of the diffuser after removing the internal core. Lever operated damper as option.



- Discharges air in both the ways, either X or Y directions as per pattern arrangement.
- Foam gasket is sealed around the back of the frame as option to avoid air leakage.
- Available in rectangular sizes as option.
- Suitable for flush mounting in lay in type ceiling.

Model ACD2: Same as ACD2+D, but without opposed blade damper. Suitable for return air applications.





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Supply air square ceiling diffuser

– Two way corner throw

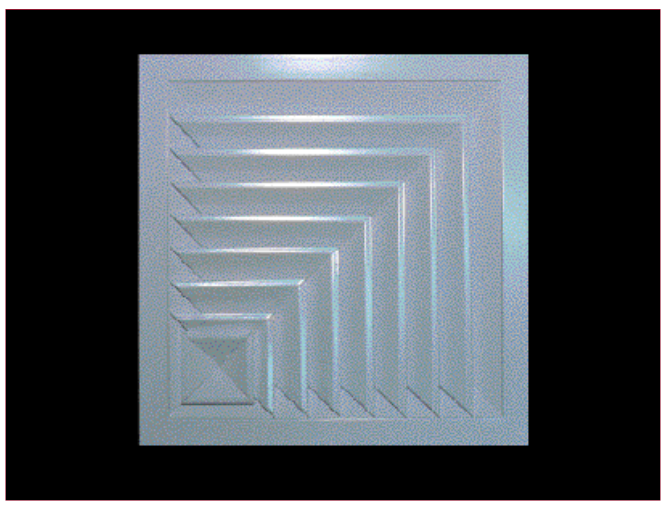
Model: ACD2C+D

Construction:

- **Frame and core:** High quality extruded aluminium profile with 33 mm flange width.
- **Damper frame and core:** High quality extruded aluminium profile with natural aluminium finish. Black matt finish as option.

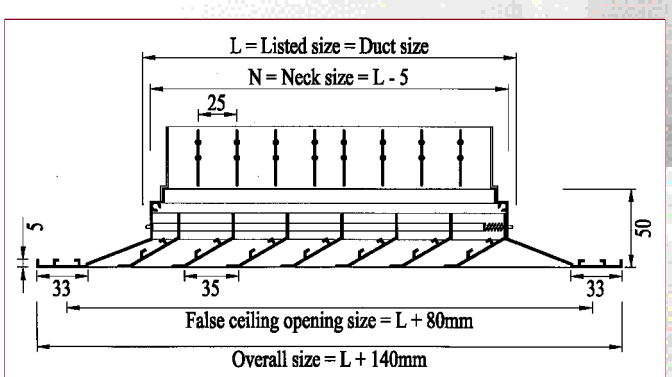
Description:

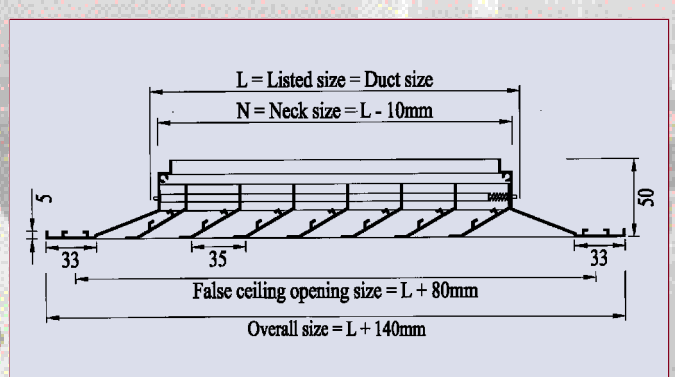
- The frame and blades are of high quality extuded aluminium profiled construction with the advantages of corrosion resistance and rigidity.
- Louvered type core is fixed to the frame with aluminium pins loaded with steel springs. Core can be easily removable and interchangeable to allow for maximum flexibility in installation, maintenance and damper adjustment.
- Damper is fixed rigidly to the frame by aluminium rivets. Fixing by spring clips as option.
- Damper blades are separated from its frame by nylon bushes.
- Opposed blade damper is screw operated from the face opening of the diffuser after removing the internal core. Lever operated damper as option.



- Discharges air in one way, equally in X and Y direction.
- Foam gasket is sealed around the back of the frame as option to avoid air leakage.
- Available in rectangular sizes as option.
- Suitable for flush mounting in lay in type ceiling.

Model ACD2C: Same as ACD2C+D, but without opposed blade damper. Suitable for return air applications.





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Supply air square ceiling diffuser

– Three way throw

Model: ACD3+D

Construction:

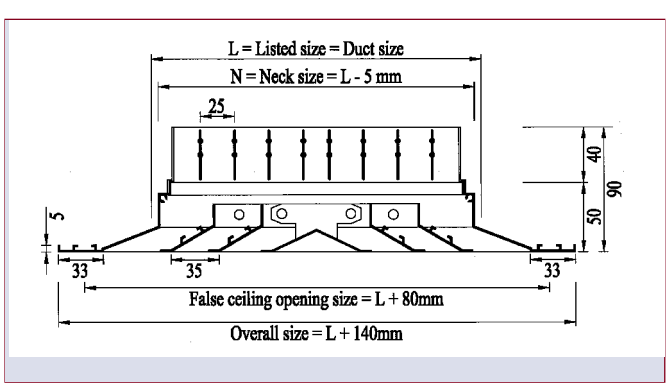
- **Frame and core:** High quality extruded aluminium profile with 33 mm flange width.
- **Damper frame and core:** High quality extruded aluminium profile with natural aluminium finish. Black matt finish as option.

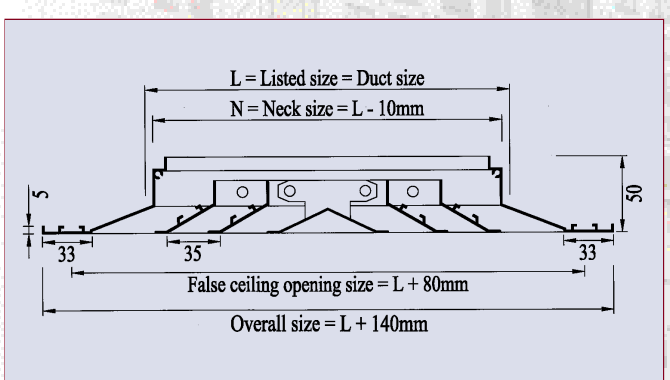
Description:

- The frame and blades are of high quality extuded aluminium profiled construction with the advantages of corrosion resistance and rigidity.
- Louvered type core is fixed to the frame with aluminium pins loaded with steel springs. Core can be easily removable and interchangeable to allow for maximum flexibility in installation, maintenance and damper adjustment.
- Damper is fixed rigidly to the frame by aluminium rivets. Fixing by spring clips as option.
- Damper blades are separated from its frame by nylon bushes.
- Opposed blade damper is screw operated from the face opening of the diffuser after removing the internal core. Lever operated damper as option.

- Frame with multicore assembly, discharges air horizontally in three directions.
- Foam gasket is sealed around the back of the frame as option to avoid air leakage.
- Available in rectangular sizes as option.
- Suitable for flush mounting in lay in type ceiling.

Model ACD3: Same as ACD3+D, but without opposed blade damper. Suitable for return air applications.





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Supply air square ceiling diffuser

– Four way throw

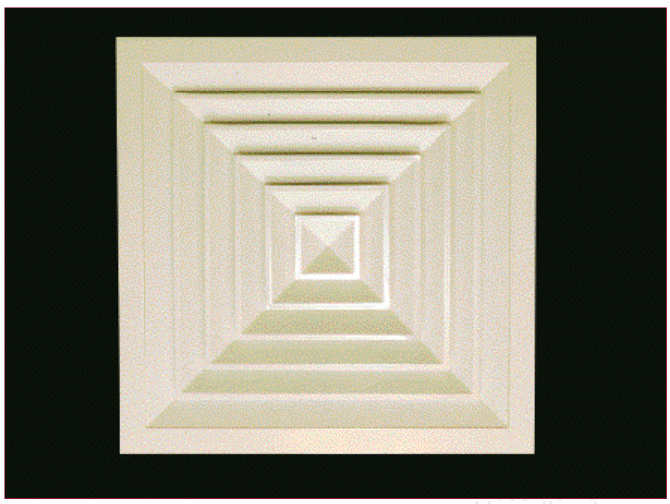
Model: ACD4+D

Construction:

- **Frame and core:** High quality extruded aluminium profile with 33 mm flange width.
- **Damper frame and core:** High quality extruded aluminium profile with natural aluminium finish. Black matt finish as option.
- **Optional diffuser frame:** Stamped aluminium core.

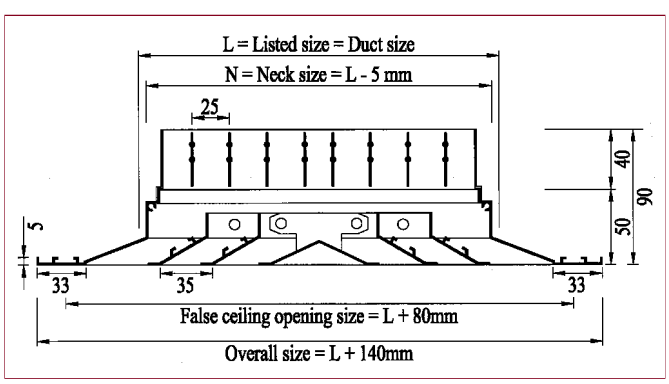
Description:

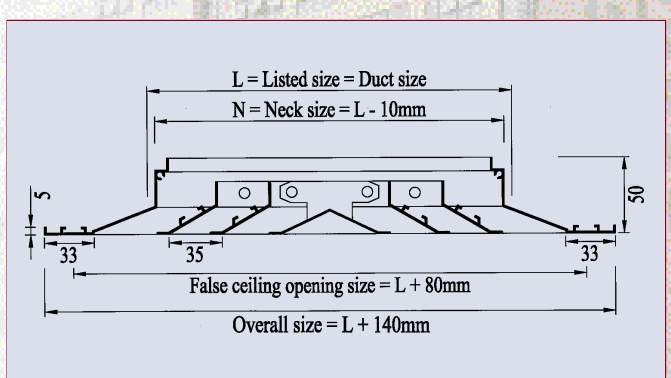
- The frame and blades are of high quality extuded aluminium profiled construction with the advantages of corrosion resistance and rigidity.
- Diffusers shall be coned type with each cone manufactured by extruded aluminium louvered profiles or one piece die formed aluminium construction – arranged in concentric cones to deflect air equally in four directions.
- Louvered type core is fixed to the frame with aluminium pins loaded with steel springs. Core can be easily removable and interchangeable to allow for maximum flexibility in installation, maintenance and damper adjustment.
- Damper is fixed rigidly to the frame by aluminium rivets. Fixing by spring clips as option.
- Damper blades are separated from its frame by nylon bushes.



- Opposed blade damper is screw operated from the face opening of the diffuser after removing the internal core. Lever operated damper as option.
- Discharge air equally in four horizontal directions.
- Foam gasket is sealed around the back of the frame as option to avoid air leakage.
- Available in rectangular sizes as option. Suitable for flush mounting in lay in type ceiling.

Model ACD4: Same as ACD4+D, but without opposed blade damper. Suitable for return air applications.





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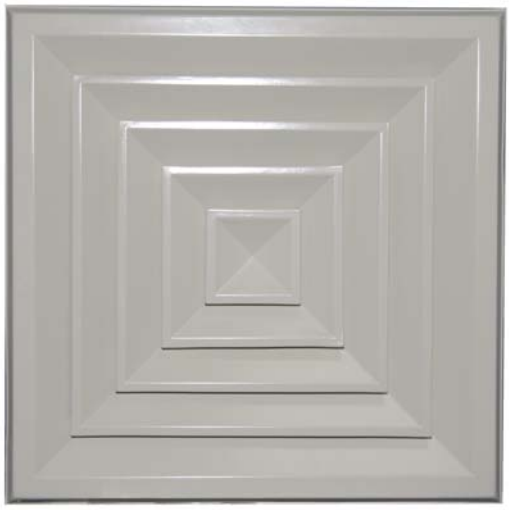
Ceiling Diffuser - Anti Smudge

Model: ACD4+D (AS)

Construction:

- **Frame and core:** High quality die formed aluminium construction as standard. High quality extruded aluminium profiles as option.
- **Damper frame and core:** High quality extruded aluminium profile with natural aluminium finish. Black matt finish as option.



Description:

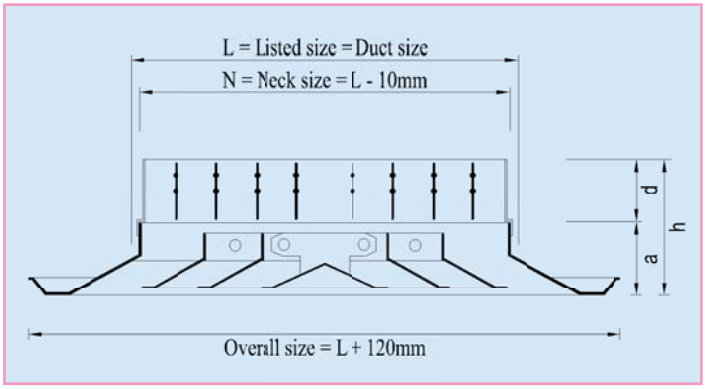
- **Outer cone design minimizes smudging by reducing the dust accumulation on the ceiling around the diffuser.**
- The frame and core are of high quality stamped aluminium construction as standard or high quality extruded aluminium profiles as option with the advantages of corrosion resistance and rigidity.
- Louvered type core is fixed to the frame with aluminium pins loaded with steel springs. Complete inner core assembly can be easily removed to allow for maximum flexibility in installation, maintenance and damper adjustment.
- Damper is fixed rigidly to the frame by aluminium rivets. Fixing by spring clips as option.
- Damper blades are separated from the frame by nylon bushes.
- Opposed blade damper is screw operated from the face opening of the diffuser after removing the inner core.
- Discharge air equally in four horizontal directions.
- Foam gasket is sealed around the back of the frame to avoid air leakage.

Standard finishes:

- Natural anodized aluminium finish.
- Powder coated colour finish as per RAL colour codes.
- Flexibility of finish is available as option.

Models ACD4(AS):

- Same as ACD4+D(AS) but without damper.
- Also available in one way, two way and three way throws.



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Supply air square ceiling diffuser

– Four way with equalizing grid

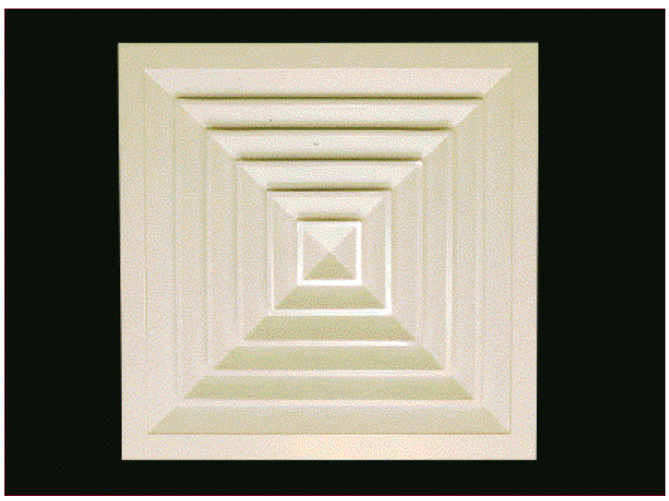
Model: ACD4+D+E

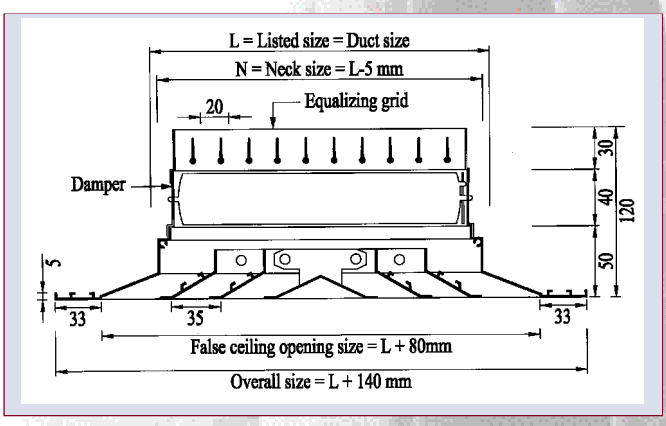
Construction:

- **Frame and core:** High quality extruded aluminium profile with 33 mm flange width.
- **Damper frame and core:** High quality extruded aluminium profile with natural aluminium finish. Black matt finish as option.
- **Equalizing grid:** High quality aluminium profile with aerofoil blades.
- **Optional diffuser frame:** Stamped aluminium core.

Description:

- The frame and blades are of high quality extuded aluminium profiled construction with the advantages of corrosion resistance and rigidity.
- Diffusers shall be coned type with each cone manufactured by extruded aluminium louvered profiles or one piece die formed aluminium construction – arranged in concentric cones to deflect air equally in four directions.
- Damper is fixed rigidly to the frame by aluminium rivets. Fixing by spring clips as option.
- Damper blades are separated from its frame by nylon bushes.
- Equalizing grid is fixed to the damper by rivets.
- Equalizing grid is manufactured from high quality aluminium profiles with aerofoil blades connected by plastic bushes. Finish will be same as damper.
- This assembly will provide uniform air distribution over the neck of the diffuser, which ensures reduction in pressure drop, noise and trubulence.
- Foam gasket is sealed around the back of the frame as option to avoid air leakage.

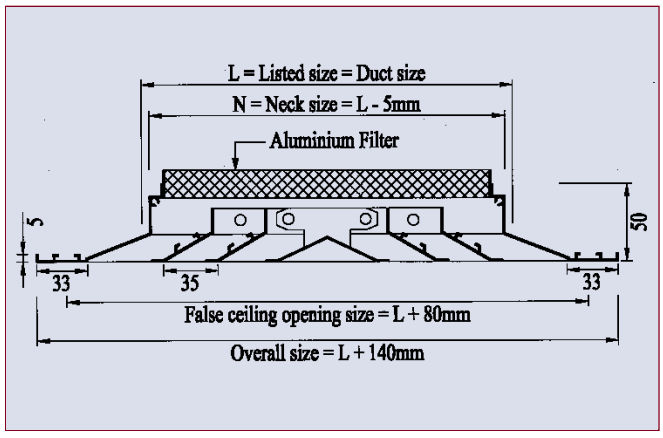




air master

Filters:

- Ceiling diffusers available with removable type washable aluminium filters with aluminium mesh as the filter media.
- Fabricated from 1 mm thick aluminium sheet with aluminium mesh as the filter media.
- Filter frame is screw fixed to the diffuser.
- Generally available in 12, 25, 40 and 50 mm thickness as standard.
- Structure will have high dust holding capacity and low resistance to air flow.
- Other insulating materials available as option.



Rectangular diffuser:

Model: ACD4R+D

Diffusers are available in rectangular sizes as per client's choice. Construction will be same as square diffusers.

air master

Combined ceilling diffuser

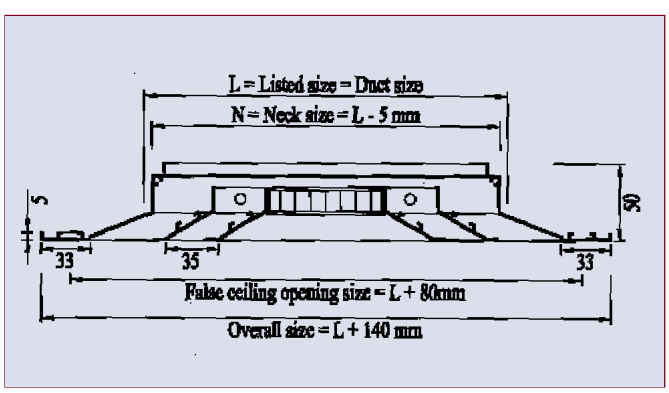
Model: ACCD

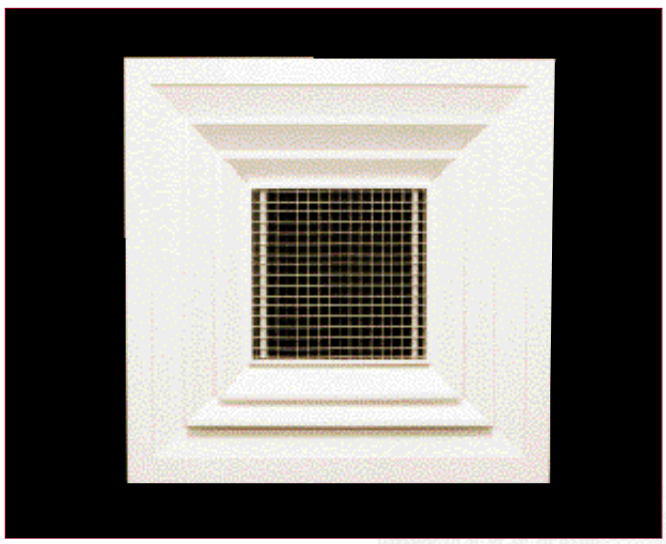
Construction:

- **Frame:** High quality extruded aluminium profile with 33 mm flange width.
- **Core:** High quality extruded aluminium profile with natural aluminium finish.
- **Return air core:** 12.5 mm x 12.5 mm x 12.5 mm aluminium egg crate grid.

Description:

- Frame and core is of high quality extruded aluminium profiled construction with the advantages of corrosion resistance and rigidity.
- Return air grid is located centrally in the diffuser.
- Supply air inner cores are mounted to the frame by 4 machine screws and two steel springs.
- Return air egg crate grid is rigidly fixed to inner core by rivets.
- Core and return air grid can be easily removed as a single piece to allow for maximum flexibility in installation and maintenance.
- Foam gasket is sealed around the back of the frame as option to avoid air leakage.





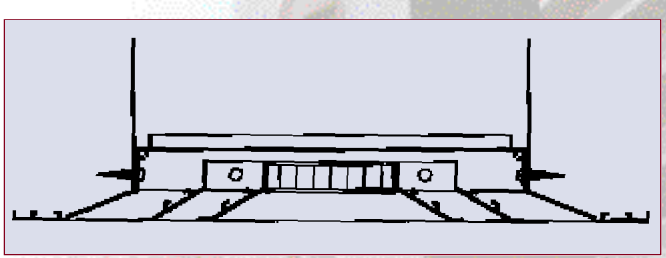
- Available in square size as standard. Rectangular sizes as option.

Standard finishes:

- Natural anodized aluminium finish.
- Powder coated colour finish as per RAL colour codes.
- Flexibility of finish is available as option.

Fixing details:

- Concealed screw fixing from neck of the diffuser to the duct.



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ACD module type ceiling diffuser

Model: ACDM

Construction:

- **Frame and core:** High quality die formed aluminium sheets with suitable flange as outer frame.
- **Damper frame and blades:** High quality extruded aluminium profile with natural finish. Black matt finish as option.

Description:

- The basic concept of having ACD module type is to replace a ceiling tile by diffuser of any neck size. Thus the alignment of tiles are not altered.
- The frame and blades are of high quality extruded aluminium profiled construction with the advantages of corrosion resistance and rigidity.
- Diffusers are coned type, each cone is manufactured as one piece die formed aluminium construction arranged in concentric pattern to deflect air in four directions.
- 3 way, 2 way, 1 way, cones are available as option and are manufatured of high quality extruded aluminium.

- Louvered type core is fixed to the outer frame, which has a constant outer size (600mm x 600mm) for different neck sizes, with steel springs core can be easily removable and interchangeable to allow for maximum flexibility in installation, maintenance and damper adjustment.
- Damper is fixed rigidly to the frame by aluminium rivets, Fixing by spring clips as option.
- Damper blades are seperated from its frame by nylon bushes.
- Opposed blade damper is screw operated from the face opening of the diffuser after removing the internal core. Lever operated damper as option.
- Discharge air equally in four horizontal directions.
- Foam gasket is sealed around the back of the frame as option to avoid air leakage.

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ACD Module return diffusers are available without damper for return air applications.

Models :

ACDM - 4	4 way
ACDM - 3	3 way
ACDM - 2	2 way
ACDM - 1	1 way

ACD Module Supply & Return Diffusers Sizes:

S.Number	Neck size in “mm”	Outer Flange size in “mm”
01.	150 x 150	600 x 600
02.	225 x 225	600 x 600
03.	300 x 300	600 x 600
04.	375 x 375	600 x 600
05.	450 x 450	600 x 600

air master

Curved blade ceiling diffuser

Adjustable pattern

Model: ACBD

Construction:

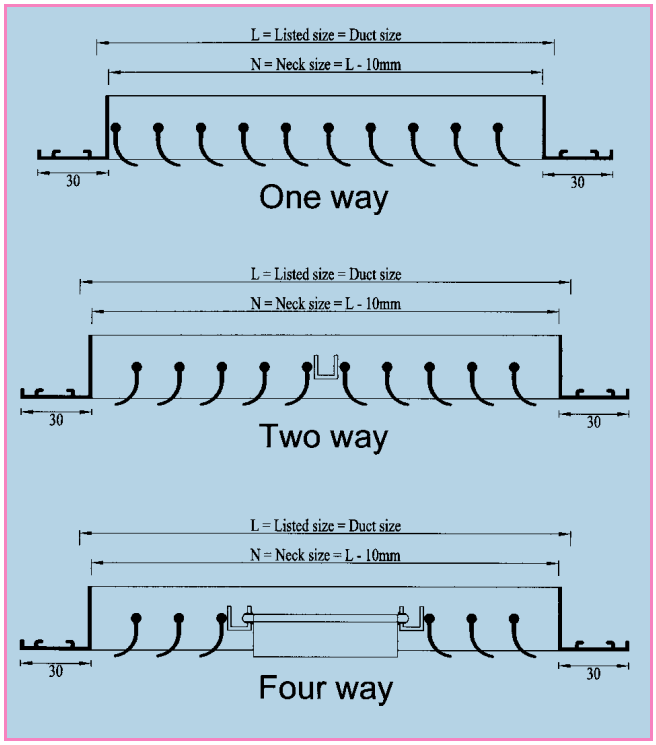
- **Frame:** High quality extruded aluminium profile with 30mm flange width.
- **Blades:** Aerofoil blades from aluminium profiles.

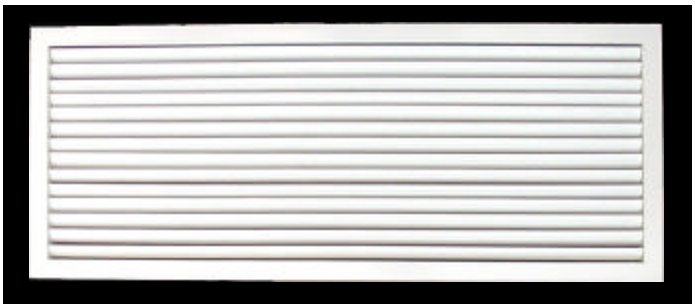
Description:

- The frame and blades are of high quality extruded aluminium profiled construction with the advantages of corrosion resistance and rigidity.
- Frame is separated from aerofoil blades by nylon bushings. This ensures quiet, smooth and rattle free operation.
- Frame gasket is sealed around the back of the frame as option to avoid air leakage.

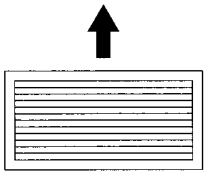
Standard finishes:

- Powder coated as per RAL color codes.
- Flexibility of finishing is available as option.

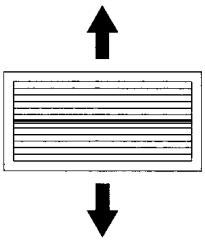




One Way



Two way



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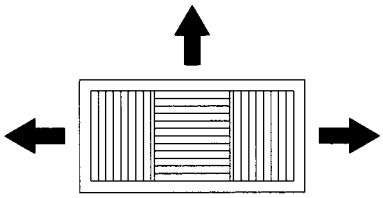
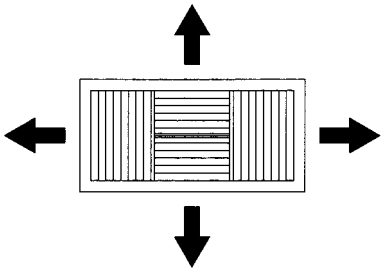


Three way



Four way

Standard sizes:

		Height					
		100	200	300	400	500	600
Length	200	x	x				
	300	x	x	x			
	400		x	x	x		
	500		x	x	x	x	
	600		x	x	x	x	x
	800		x	x	x	x	x
	1000		x	x	x	x	x
	1200			x	x	x	x

Other sizes available on request

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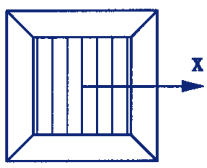
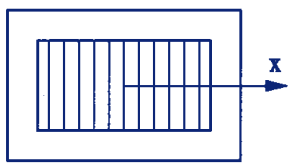
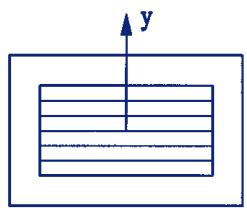
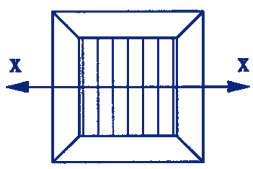
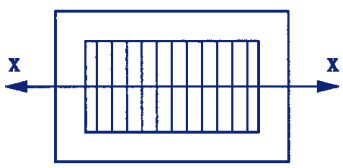
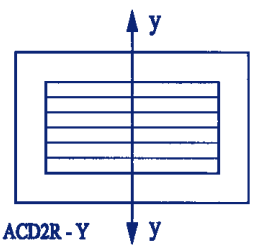
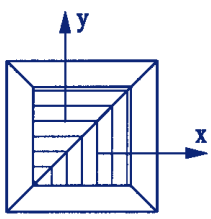
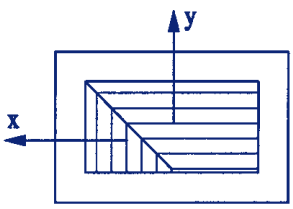
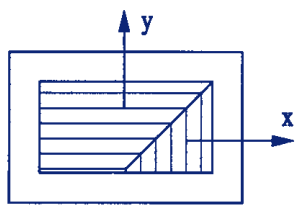
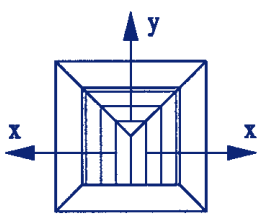
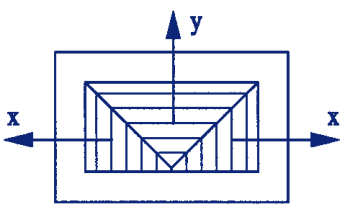
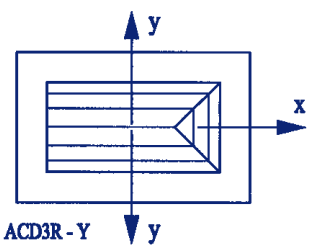
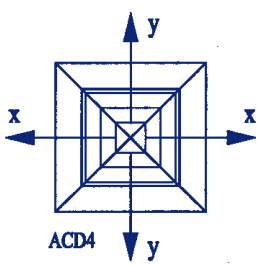
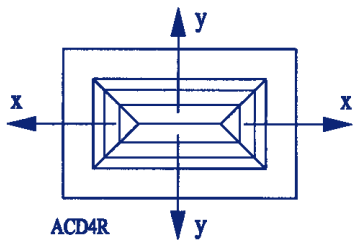
Core pattern:

Air pattern	Square	Rectangular
One way	 ACD1	 ACD1R - X  ACD1R - Y
Two way	 ACD2	 ACD2R - X  ACD2R - Y
Two way corner	 ACD2C	 ACD2R - C_1  ACD2R - C_2
Three way	 ACD3	 ACD3R - X  ACD3R - Y
Four way	 ACD4	 ACD4R

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Standard finishes:

- Natural anodized aluminium finish.
- Powder coated colour finish as per RAL colour codes.
- Flexibility of finish is available as option.

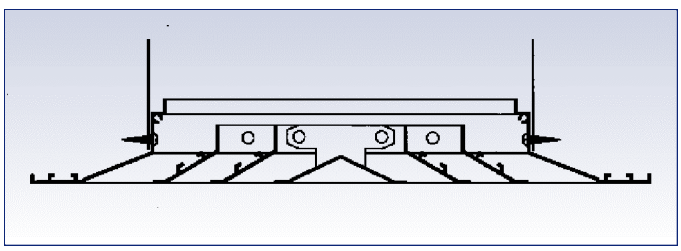
Standard sizes:

- Available in square and rectangular sizes.
- Any combination of W x D.

W = width in mm	150	225	300	375	450	525	600
D = Depth in mm	150	225	300	375	450	525	600

False ceiling sizes:

Duct size in mm x mm	150 x 150	225 x 225	300 x 300	375 x 375	450 x 450	525 x 525	600 x 600
False ceiling opening size	230 x 230	305 x 305	380 x 380	455 x 455	530 x 530	605 x 605	680 x 680



Fixing details:

- Concealed screw fixing from neck of the diffuser to the duct, after removing the inner core.

How to order:

Model	Accessories	Size	Quantity	Finish
ACD1	D = Damper	Specify duct opening size in mm x mm	Specify the quantity in numbers	A = Anodized aluminium finish
ACD2				
ACD3	F = Filter			B = RAL9010
ACD4	E = Equalizing grid			C = Other RAL colours.
ACD2C				

Selection example:

To select supply air square ceiling diffuser, four way throw, size 450 x 450, quantity 60 nos with powder coated color finish (RAL-9010).

Order as : ACD4+D-450 x 450 – 60 – B.

air master

Supply air square ceiling diffuser

– One way throw

Model: ACD1+D

Table 6.1 Air flow data

Neck size in mm x mm Area factor In m^2	Neck vel in m/sec	1.0	1.5	2.0	2.5	3.0	3.5
150 x 150 0.0098	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	47 0.023 0.69 1.3-2-2.7 <15	72 0.034 1.05 2-2.8-3.6 16	95 0.045 2.11 2.8-3.7-4.4 21	119 0.056 3.54 3.3-4.2-4.9 27	144 0.068 4.98 4-4.7-5.9 34	167 0.079 6.44 4.4-5.5-6.2 39
225 x 225 0.018	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	108 0.051 069 1.3-2-2.7 <15	161 0.076 1.37 2.0-2.8-3.9 17	214 0.101 2.8 2.9-3.7-5.2 24	269 0.127 4.26 3.8-5.3-6.8 30	322 0.152 6.05 5.1-7-9.3 36	375 0.177 8.23 7-8.6-11.6 41
300 x 300 0.03	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	191 0.09 0.69 2.4-3.5-5.5 <15	286 0.135 1.75 3.6-5.0-7.1 17	381 0.18 3.17 4.8-5.9-8.8 26	476 0.225 5.31 5.7-7.2-9.8 33	572 0.27 7.46 6.3-7.4-11 38	667 0.31 10.4 7-8.6-12.5 43
375 x 375 0.046	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	299 0.141 1.03 2.7-4.1-6.2 <15	447 0.211 2.09 4.6-6.4-8.8 18	595 0.281 3.52 6.2-7.3-10.6 28	745 0.352 5.66 7.2-8.7-12.5 35	893 0.422 8.18 7.8-9-7-14.5 40	1042 0.492 11.46 8.6-10.5-15.6 44
450 x 450 0.0695	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	430 0.203 1.03 3.5-5.2-8.5 <15	644 0.304 2.09 5.3-7.4-10.6 20	858 0.405 3.86 7.9-9.1-12.8 30	1071 0.506 6.38 8.3-10.5-5-15 36	1287 0.608 9.24 9.7-11.8-17 41	1501 0.709 11.46 10.5-13-18 44
525 x 525 0.099	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	585 0.276 1.03 4.1-5.8-9.5 15	875 0.413 2.45 6-8.8-12.6 23	1165 0.55 4.22 8.4-10.2-15 32	1461 0.69 6.74 9.8-12-17.4 37	1757 0.83 9.6 10.9-14-20 42	2033 0.96 11.83 12-14.8-21.5 45
600 x 600 0.139	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	762 0.36 1.03 4.5-6.5-11.6 16	1143 0.54 2.45 6.7-9.1-14 26	1524 0.72 4.22 9.1-12-17.1 33	1906 0.9 6.74 10.5-14-20 38	2287 1.08 9.6 12-16-23 42	2668 1.26 11.83 12.8-17.2-24 45

- Neck velocity is measured in m/sec.
- P_s: Static pressure loss across the diffuser in mm of H_2O.
- Throw (meters) is measured for a terminal velocities of 0.75, 0.5 & 0.25 m/sec.
- Noise criteria (NC) is based on room attenuation of 10 dB.

air master

Supply air square ceiling diffuser

– Two way throw

Model: ACD2+D

Table 6.2 Air flow data

Neck size in mm x mm Area factor In m^2	Neck vel in m/sec	1.0	1.5	2.0	2.5	3.0	3.5
150 x 150 0.0096	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	47 0.023 0.64 1.3-2-2.7 <15	72 0.034 0.87 2-2.8-3.6 16	95 0.045 2.02 2.8-3.7-4.4 21	119 0.056 3.41 3.2-4-4.8 27	144 0.068 4.83 3.8-4.5-5.6 34	167 0.079 6.1 4.1-5.2-6 39
225 x 225 0.0175	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	108 0.051 0.64 1.3-2-2.7 <15	161 0.076 1.29 2-2.8-3.9 17	214 0.101 2.7 2.8-3.7-5.1 24	269 0.127 4.1 3.7-5.2-6.6 30	322 0.152 5.86 4.8-6.7-9 36	375 0.177 7.77 6.7-8.2-11 41
300 x 300 0.029	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	191 0.09 0.64 2.4-3.5-5.5 <15	286 0.135 1.64 3.6-4.9-7 17	381 0.18 3.05 4.7-5.8-8.6 26	476 0.225 5.1 5.5-6.9-9.5 33	572 0.27 7.23 5.9-7.1-11 38	667 0.315 9.81 6.7-8.4-12 43
375 x 375 0.045	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	299 0.141 0.96 2.7-4.1-6.2 <15	447 0.211 1.96 4.6-6.3-8.7 18	595 0.281 3.71 6.1-7.2-10.4 28	745 0.352 5.5 6.9-8.4-12.1 35	893 0.422 7.92 7.4-9.3-14 40	1042 0.492 10.81 8.1-10-14.9 44
450 x 450 0.068	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	430 0.203 0.96 3.4-5.1-8.5 <15	644 0.304 1.96 5.3-7.4-10 20	858 0.405 4.06 8.3-10-15 30	1071 0.506 6.68 8-10.2-14.6 36	1287 0.608 8.9 9.3-11-16.3 41	1501 0.709 12.16 10-12.3-17 44
525 x 525 0.097	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	585 0.276 0.96 4.1-5.8-9.5 15	875 0.413 2.29 6-8.7-12.6 23	1165 0.55 4.06 8.3-10-15 32	1461 0.69 6.49 9.5-11.8-17 37	1757 0.83 9.31 10.4-13.4-19 42	2033 0.96 11.1 11.6-14.1-20 45
600 x 600 0.136	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	762 0.36 0.96 4.5-6.5-11 16	1143 0.54 2.29 6.6-9-14 26	1524 0.72 4.06 9-11.8-16.9 33	1906 0.9 6.49 10.2-13.6-19 38	2287 1.08 9.31 11.4-15.2-22 42	2668 1.26 11.1 12.2-16-23 45

- Neck velocity is measured in m/sec.
- P_s: Static pressure loss across the diffuser in mm of H_2O.
- Throw (meters) is measured for a terminal velocities of 0.75, 0.5 & 0.25 m/sec.
- Noise criteria (NC) is based on room attenuation of 10 dB.

air master

Supply air square ceiling diffuser

– Three way throw

Model: ACD3+D

Table 6.3 Air flow data

Neck size in mm x mm Area factor In m^2	Neck vel in m/sec	1.0	1.5	2.0	2.5	3.0	3.5
150 x 150 0.0095	Total CFM Total M^3/Sec M^3/Sec each side of X M^3/Sec in Y side P_s in mm of H_2O Throw in each side of X-(M) Throw in Y side-(M) NC	47 0.023 0.008 0.007 0.56 1.2-1.8-2.4 1.2-1.8-2.5 <15	72 0.034 0.013 0.008 0.85 1.8-2.4-3.1 1.8-2.6-3.4 16	95 0.045 0.017 0.011 1.72 2.4-3.1-3.7 2.6-3.4-4.0 21	119 0.056 0.021 0.014 2.87 2.7-3.4-4 3.0-3.7-4.4 27	144 0.068 0.025 0.018 4.06 3.1-3.7-4.6 3.5-4.1-5.0 34	167 0.079 0.03 0.019 5.29 3.4-4.3-4.9 3.7-4.7-5.4 39
225 x 225 0.0172	Total CFM Total M^3/Sec M^3/Sec each side of X M^3/Sec in Y side P_s in mm of H_2O Throw in each side of X-(M) Throw in Y side-(M) NC	108 0.051 0.019 0.013 0.56 1.2-1.8-2.4 1.2-1.8-2.5 <15	161 0.076 0.028 0.020 1.12 1.8-2.4-3.4 1.8-2.6-3.7 17	214 0.101 0.038 0.025 2.29 2.4-3.1-4.3 2.6-3.4-4.7 24	269 0.127 0.048 0.031 3.45 3.1-4.3-5.5 3.4-4.8-6.1 30	322 0.152 0.057 0.038 4.92 4.5.5-7.3 44-6.1-8.2 36	375 0.177 0.066 6.72 5.84 5.5-6.7-9.1 6.1-7.5-10.1 41
300 x 300 0.028	Total CFM Total M^3/Sec M^3/Sec each side of X M^3/Sec in Y side P_s in mm of H_2O Throw in each side of X-(M) Throw in Y side-(M) NC	191 0.09 0.033 0.024 0.56 2.1-3.1-4.9 2.1-3.3-5.2 <15	286 0.135 0.051 0.033 1.45 3.1-4.3-6.1 3.4-4.6-6.5 17	381 0.18 0.068 0.044 2.59 4.0-4.9-7.3 4.3-5.4-8.0 26	476 0.225 0./084 0.057 4.36 4.6-5.8-7.9 5.1-6.3-8.5 33	572 0.27 0.101 0.068 6.08 4.9-5.8-9.1 5.4-6.6-10.1 38	667 0.315 0.118 0.079 8.48 5.5-6.7-9.8 6.2-7.7-10.6 43
375 x 375 0.044	Total CFM Total M^3/Sec M^3/Sec each side of X M^3/Sec in Y side P_s in mm of H_2O Throw in each side of X-(M) Throw in Y side-(M) NC	299 0.141 0.053 0.035 0.84 2.4-3.7-5.5 2.5-3.9-5.8 <15	447 0.211 0.079 0.053 1.70 4.0-5.5-7.6 4.3-5.9-8.2 18	595 0.281 0.105 0.071 2.87 5.2-6.1-8.8 5.6-6.7-9.4 28	745 0.352 0.132 0.088 4.59 5.8-7-10.1 6.4-7.6-10.9 35	893 0.422 0.158 0.106 6.66 6.1-7.6-11.3 6.7-8.3-12.5 40	1042 0.492 0.185 0.122 9.35 6.7-8.2-12.2 7.4-9.1-13.4 44
450 x 450 0.067	Total CFM Total M^3/Sec M^3/Sec each side of X M^3/Sec in Y side P_s in mm of H_2O Throw in each side of X-(M) Throw in Y side-(M) NC	430 0.203 0.076 0.051 0.84 3.1-4.6-7.6 3.2-4.9-8.1 <15	644 0.304 0.114 0.076 1.70 4.6-06.4-9.1 4.9-6.8-9.5 20	858 0.405 0.151 0.103 3.16 6.6-7.6-10.7 7.2-8.7-12.5 30	1071 0.506 0.19 0.126 5.16 6.7-8.5-12.2 7.2-9.2-13.4 36	1287 0.608 0.228 0.152 7.52 7.6-9.2-13.4 8.3-10.2-15.4 41	1501 0.709 0.267 0.175 10.51 8.2-10.1-14 9.1-11.3-15.6 44
525 x 525 0.095	Total CFM Total M^3/Sec M^3/Sec each side of X M^3/Sec in Y side P_s in mm of H_2O Throw in each side of X-(M) Throw in Y side-(M) NC	585 0.276 0.103 0.07 0.84 3.7-5.2-8.5 3.9-5.6-9.2 15	875 0.413 0.155 0.103 1.99 5.2-7.6-11 5.6-8.2-11.9 23	1165 0.55 0.206 0.138 3.5 7.0-8.5-12.5 7.6-9.3-13.7 32	1461 0.69 0.259 0.172 5.46 7.9-9.8-14 8.5-10.4-15.4 37	1757 0.83 0.311 0.208 7.82 8.5-11-15.9 9.4-12.5-17.7 42	2033 0.96 0.36 0.24 9.65 9.5-11.6-16.8 10.6-13.1-17.8 45
600 x 600 0.133	Total CFM Total M^3/Sec M^3/Sec each side of X M^3/Sec in Y side P_s in mm of H_2O Throw in each side of X-(M) Throw in Y side-(M) NC	762 0.36 0.135 0.09 0.84 4-5.8-10.4 4.2-6.2-10.7 16	1143 0.54 0.202 0.136 1.99 5.8-8-12.2 6.2-8.3-13.1 26	1524 0.72 0.27 0.18 3.5 7.6-10-14.3 8.4-10.9-15.4 33	1906 0.9 0.338 0.224 5.46 8.5-11.3-16.1 9.3-12.1-17.6 38	2287 1.08 0.405 0.270 7.82 9.4-12.5-18 10.2-14.0-20 42	2668 1.26 0.472 0.316 9.65 10-13.4-19.5 11.2-15.0-21.6 45

- Neck velocity is measured in m/sec.
- P_s: Static pressure loss across the diffuser in mm of H_2O.
- Throw (meters) is measured for a terminal velocities of 0.75, 0.5 & 0.25 m/sec.
- Noise criteria (NC) is based on room attenuation of 10 dB.

air master

Supply air square ceiling diffuser

– Four way throw

Model: ACD4+D

Table 6.4 Air flow data

Neck size in mm x mm Area factor In m^2	Neck vel in m/sec	1.0	1.5	2.0	2.5	3.0	3.5
150 x 150 0.0093	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	47 0.023 0.51 1.2-1.8-2.4 <15	72 0.034 0.76 1.8-2.4-3.1 16	95 0.045 1.52 2.4-3.1-3.7 21	119 0.056 2.54 2.7-3.4-4 27	144 0.068 3.56 3.1-3.7-4.6 34	167 0.079 4.57 3.4-4.3-4.9 39
225 x 225 0.0169	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	108 0.051 0.51 1.2-1.8-2.4 <15	161 0.076 1.00 1.8-2.4-3.4 17	214 0.101 2.03 2.4-3.1-4.3 24	269 0.127 3.05 3.1-4.3-5.5 30	322 0.152 4.32 4-5.5-7.3 36	375 0.177 5.84 5.5-6.7-9.1 41
300 x 300 0.028	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	191 0.09 0.51 2.1-3.1-4.9 <15	286 0.135 1.27 3.1-4.3-6.1 17	381 0.18 2.29 4.0-4.9-7.3 26	476 0.225 3.81 4.6-5.8-7.9 33	572 0.27 5.33 4.9-5.8-9.1 38	667 0.315 7.37 5.5-6.7-9.8 43
375 x 375 0.043	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	299 0.141 0.76 2.4-3.7-5.5 <15	447 0.211 1.52 4.0-5.5-7.6 18	595 0.281 2.54 5.2-6.1-8.8 28	745 0.352 4.06 5.8-7-10.1 35	893 0.422 5.84 6.1-7.6-11.3 40	1042 0.492 8.13 6.7-8.2-12.2 44
450 x 450 0.065	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	430 0.203 0.76 3.1-4.6-7.6 <15	644 0.304 1.52 4.6-6.4-9.1 20	858 0.405 2.79 5.6-7.6-10.7 30	1071 0.506 4.57 6.7-8.5-12.2 36	1287 0.608 6.6 7.6-9.2-13.4 41	1501 0.709 9.14 8.2-10.1-14 44
525 x 525 0.093	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	585 0.276 0.76 3.7-5.2-8.5 15	875 0.413 1.78 5.2-7.6-11 23	1165 0.55 3.05 7.0-8.5-12.5 32	1461 0.69 4.83 7.9-9.8-14 37	1757 0.83 6.86 8.5-11-15.9 42	2033 0.96 8.39 9.5-11.6-16.8 45
600 x 600 0.13	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	762 0.36 0.76 4-5.8-10.4 16	1143 0.54 1.78 5.8-8-12.2 26	1524 0.72 3.05 7.6-10-14.3 33	1906 0.9 4.83 8.5-11.3-16.1 38	2287 1.08 6.86 9.4-12.5-18 42	2668 1.26 8.39 10-13.4-19.5 45

- Neck velocity is measured in m/sec.
- P_s: Static pressure loss across the diffuser in mm of H_2O.
- Throw (meters) is measured for a terminal velocities of 0.75, 0.5 & 0.25 m/sec.
- Noise criteria (NC) is based on room attenuation of 10 dB.

air master

Return air square ceiling diffuser

– One way

Model: ACD1

Table 6.5 Air flow data

Neck size in mm x mm Neck Area In m^2	Neck vel in m/sec	1.0	1.25	1.5	1.75	2.0	2.5	3.0	3.5	4.0
150 x 150 0.023	CFM M^3/sec. - P_s in mm H_2O NC	49 0.023 0.65 <15	61 0.029 1.04 <15	74 0.035 1.51 <15	85 0.04 2.06 <15	97 0.046 2.66 19	123 0.058 4.25 25	146 0.069 6.12 30	171 0.081 8.54 34	195 0.092 11.18 40
225 x 225 0.051	CFM M^3/sec. - P_s in mm H_2O NC	108 0.051 0.70 <15	135 0.064 1.14 <15	163 0.077 1.72 <15	188 0.089 2.25 16	216 0.102 3.04 21	271 0.128 4.71 28	324 0.153 6.79 34	379 0.179 9.65 40	432 0.204 12.57 45
300 x 300 0.09	CFM M^3/sec. - P_s in mm H_2O NC	193 0.09 0.81 <15	239 0.113 1.26 <15	286 0.135 1.85 16	335 0.158 2.51 21	381 0.18 3.34 25	476 0.225 5.25 32	572 0.27 7.61 38	667 0.315 10.47 43	762 0.36 13.97 48
375 x 375 0.141	CFM M^3/sec. - P_s in mm H_2O NC	298 0.141 0.91 <15	372 0.176 1.42 <15	449 0.212 2.11 19	521 0.246 2.85 25	597 0.282 3.79 32	747 0.353 5.93 38	896 0.423 8.7 43	1046 0.494 11.85 47	1194 0.564 15.64 51
450 x 450 0.203	CFM M^3/sec. - P_s in mm H_2O NC	430 0.203 0.99 <15	538 0.254 1.52 17	646 0.305 2.27 24	752 0.355 3.09 31	860 0.406 4.14 36	1076 0.508 6.46 40	1289 0.609 9.24 45	1505 0.711 12.95 48	1719 0.812 17.04 52
525 x 525 0.276	CFM M^3/sec. - P_s in mm H_2O NC	584 0.276 1.06 18	730 0.345 1.66 25	877 0.414 2.45 30	1023 0.483 3.33 36	1168 0.552 4.44 40	1461 0.69 6.99 44	1753 0.828 10.05 47	2045 0.966 13.78 51	2337 1.104 18.44 55
600 x 600 0.36	CFM M^3/sec. - P_s in mm H_2O NC	762 0.36 1.16 23	953 0.45 1.82 30	1143 0.54 2.64 36	1334 0.63 3.65 40	1524 0.72 4.79 42	1905 0.9 7.54 46	2287 1.08 10.87 49	2668 1.26 15.16 54	3049 1.44 20.12 58

- Neck velocity is measured in m/sec.
- P_s: Static pressure loss in mm of H_2O.
- Noise criteria (NC) is based on room attenuation of 10 dB.

air master

Return air square ceiling diffuser

– Two way

Model: ACD2

Table 6.6 Air flow data

Neck size in mm x mm Neck Area In m^2	Neck vel in m/sec	1.0	1.25	1.5	1.75	2.0	2.5	3.0	3.5	4.0
150 x 150 0.023	CFM M^3/sec. - P_s in mm H_2O NC	49 0.023 0.65 <15	61 0.029 1.04 <15	74 0.035 1.49 <15	85 0.04 2.04 <15	97 0.046 2.61 19	123 0.058 4.17 25	146 0.069 6.00 30	171 0.081 8.34 34	195 0.092 10.77 40
225 x 225 0.051	CFM M^3/sec. - P_s in mm H_2O NC	108 0.051 0.7 <15	135 0.064 1.14 <15	163 0.077 1.69 <15	188 0.089 2.22 16	216 0.102 2.98 21	271 0.128 4.62 28	324 0.153 6.67 34	379 0.179 9.42 40	432 0.204 12.12 45
300 x 300 0.09	CFM M^3/sec. - P_s in mm H_2O NC	193 0.09 0.80 <15	239 0.113 1.26 <15	286 0.135 1.83 16	335 0.158 2.48 21	381 0.18 3.28 25	476 0.225 5.15 32	572 0.27 7.47 38	667 0.315 10.23 43	762 0.36 13.46 48
375 x 375 0.141	CFM M^3/sec. - P_s in mm H_2O NC	298 0.141 0.90 <15	372 0.176 1.41 <15	449 0.212 2.09 19	521 0.246 2.82 25	597 0.282 3.72 32	747 0.353 5.81 38	896 0.423 8.54 43	1046 0.494 11.58 47	1194 0.564 15.07 51
450 x 450 0.203	CFM M^3/sec. - P_s in mm H_2O NC	430 0.203 0.98 <15	538 0.254 1.52 17	646 0.305 2.25 24	752 0.355 3.06 31	860 0.406 4.07 36	1076 0.508 6.33 40	1289 0.609 9.07 45	1505 0.711 12.66 48	1719 0.812 16.42 52
525 x 525 0.276	CFM M^3/sec. - P_s in mm H_2O NC	584 0.276 1.06 18	730 0.345 1.65 25	877 0.414 2.43 30	102.3 0.483 3.29 36	1168 0.552 4.36 40	1461 0.69 6.86 44	1753 0.828 9.86 47	2045 0.966 13.46 51	2337 1.104 17.77 55
600 x 600 0.36	CFM M^3/sec. - P_s in mm H_2O NC	762 0.36 1.16 23	953 0.45 1.81 30	1143 0.54 2.62 36	1334 0.63 3.62 40	1524 0.72 4.7 42	1905 0.9 7.39 46	2287 1.08 10.67 49	2668 1.26 14.81 54	3049 1.44 19.39 58

- Neck velocity is measured in m/sec.
- P_s: Static pressure loss in mm of H_2O.
- Noise criteria (NC) is based on room attenuation of 10 dB.

air master

Return air square ceiling diffuser

– Three way

Model: ACD3

Table 6.7 Air flow data

Neck size in mm x mm Neck Area In m^2	Neck vel in m/sec	1.0	1.25	1.5	1.75	2.0	2.5	3.0	3.5	4.0
150 x 150 0.023	CFM M^3/sec. - P_s in mm H_2O NC	49 0.023 0.7 <15	61 0.029 1.12 <15	74 0.035 1.48 <15	85 0.04 2.02 <15	97 0.046 2.59 19	123 0.058 4.14 25	146 0.069 5.96 30	171 0.081 8.2 34	195 0.092 10.67 40
225 x 225 0.051	CFM M^3/sec. - P_s in mm H_2O NC	108 0.051 0.76 <15	135 0.064 1.23 <15	163 0.077 1.68 <15	188 0.089 2.20 16	216 0.102 2.96 21	271 0.128 4.58 28	324 0.156 6.62 34	379 0.179 9.27 40	432 0.204 12.00 45
300 x 300 0.09	CFM M^3/sec. - P_s in mm H_2O NC	193 0.09 0.87 <15	239 0.113 1.36 <15	286 0.135 1.82 16	335 0.158 2.46 21	381 0.18 3.25 25	476 0.225 5.11 32	572 0.27 7.41 38	667 0.315 10.06 43	762 0.36 13.34 48
375 x 375 0.141	CFM M^3/sec. - P_s in mm H_2O NC	298 0.141 0.98 <15	372 0.176 1.53 <15	449 0.212 2.07 19	521 0.246 2.79 25	597 0.282 3.69 32	747 0.353 5.77 38	896 0.423 8.48 43	1046 0.494 11.38 47	1194 0.564 14.93 51
450 x 450 0.203	CFM M^3/sec. - P_s in mm H_2O NC	430 0.203 1.07 <15	538 0.254 1.63 17	646 0.305 2.22 24	752 0.355 3.03 31	860 0.406 4.04 36	1076 0.508 6.29 40	1289 0.609 9.01 45	1505 0.711 12.45 48	1719 0.812 16.26 52
525 x 525 0.276	CFM M^3/sec. - P_s in mm H_2O NC	584 0.276 1.14 18	730 0.345 1.79 25	877 0.414 2.41 30	102.3 0.483 3.26 36	1168 0.552 4.33 40	1461 0.69 6.81 44	1753 0.828 9.79 47	2045 0.966 13.24 51	2337 1.104 17.59 55
600 x 600 0.36	CFM M^3/sec. - P_s in mm H_2O NC	762 0.36 1.25 23	953 0.45 1.97 30	1143 0.54 2.59 36	1334 0.63 3.58 40	1524 0.72 4.67 42	1905 0.9 7.34 46	2287 1.08 10.59 49	2668 1.26 14.56 54	3049 1.44 19.2 58

- Neck velocity is measured in m/sec.
- P_s: Static pressure loss in mm of H_2O.
- Noise criteria (NC) is based on room attenuation of 10 dB.

air master

Return air square ceiling diffuser

– Four way

Model: ACD4

Table 6.8 Air flow data

Neck size in mm x mm Neck Area In m^2	Neck vel in m/sec	1.0	1.25	1.5	1.75	2.0	2.5	3.0	3.5	4.0
150 x 150 0.023	CFM M^3/sec. - P_s in mm H_2O NC	49 0.023 0.64 <15	61 0.029 1.02 <15	74 0.035 1.45 <15	85 0.04 1.98 <15	97 0.046 2.51 19	123 0.058 4.01 25	146 0.069 5.72 30	171 0.081 7.9 34	195 0.092 10.16 40
225 x 225 0.051	CFM M^3/sec. - P_s in mm H_2O NC	108 0.051 0.69 <15	135 0.064 1.12 <15	163 0.077 1.65 <15	188 0.089 2.16 16	216 0.102 2.87 21	271 0.128 4.44 28	324 0.153 6.35 34	379 0.179 8.89 40	432 0.204 11.43 45
300 x 300 0.09	CFM M^3/sec. - P_s in mm H_2O NC	193 0.09 0.79 <15	239 0.113 1.24 <15	286 0.135 1.78 16	335 0.158 2.41 21	381 0.18 3.15 25	476 0.225 4.95 32	572 0.27 7.11 38	667 0.315 9.65 43	762 0.36 12.7 48
375 x 375 0.141	CFM M^3/sec. - P_s in mm H_2O NC	298 0.141 0.89 <15	372 0.176 1.39 <15	449 0.212 2.03 19	521 0.246 2.74 25	597 0.282 3.58 32	747 0.353 5.59 38	896 0.423 8.13 43	1046 0.494 10.9 47	1194 0.564 14.22 51
450 x 450 0.203	CFM M^3/sec. - P_s in mm H_2O NC	430 0.203 0.97 <15	538 0.254 1.49 17	646 0.305 2.18 24	752 0.355 2.97 31	860 0.406 3.91 36	1076 0.508 6.09 40	1289 0.609 8.64 45	1505 0.711 11.94 48	1719 0.812 15.49 52
525 x 525 0.276	CFM M^3/sec. - P_s in mm H_2O NC	584 0.276 1.04 18	730 0.345 1.63 25	877 0.414 2.36 30	1023 0.483 3.2 36	1168 0.552 4.19 40	1461 0.69 6.6 44	1753 0.828 9.39 47	2045 0.966 12.7 51	2337 1.104 16.76 55
600 x 600 0.36	CFM M^3/sec. - P_s in mm H_2O NC	762 0.36 1.14 23	953 0.45 1.78 30	1143 0.54 2.54 36	1334 0.63 3.51 40	1524 0.72 4.52 42	1905 0.9 7.11 46	2287 1.08 10.16 49	2668 1.26 13.9 54	3049 1.44 18.29 58

- Neck velocity is measured in m/sec.
- P_s: Static pressure loss in mm of H_2O.
- Noise criteria (NC) is based on room attenuation of 10 dB.

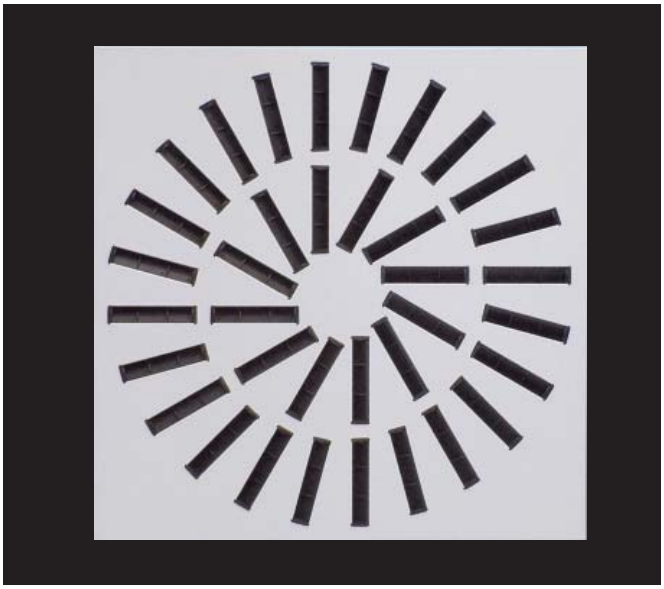
air master

Swirl diffuser - Adjustable

Model: ASD-A

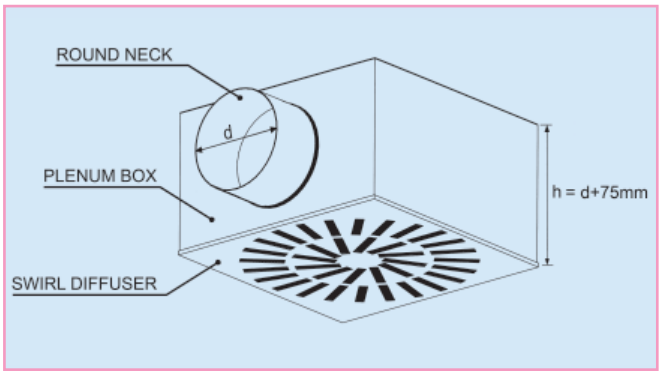
Construction:

- **Diffuser:** 1.2mm (or) 1.5mm thick aluminium sheet.
- **Diffuser Blades:** Easily rotatable plastic blades
- **Neck:** Standard size 250 dia.
- **Module:** 600mmx600mm, 595mmx595m.
- **Plenum:** 20 gauge (or) 22 gauge thick GI sheet.



Description:

- Diffuser is made by punching high quality aluminium sheet and fixed with easily rotatable plastic blades.
- The slotted circular face design with easily adjustable plastic blades provides both horizontal and vertical projection of air discharge all over the occupant area.
- Supply air jet velocity is effectively reduced due to high mixing effect.
- Ability to create either an external or internal swirl.
- Diffuser can be fixed up to a height of 4.5m.



Standard finishes:

- Powder coated as per RAL color codes.

Plenum Neck size 250dia, Module size 600x600mm

Air flow in CFM	**186**	**234**	**280**	**327**	**374**	**419**	**464**	**511**	**566**
Air flow in m^3/sec	**0.088**	**0.111**	**0.132**	**0.154**	**0.176**	**0.197**	**0.219**	**0.241**	**0.267**
Face velocity in m/sec	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0
P loss in mm of H_2O	0.410	0.640	0.922	1.26	1.64	2.05	2.46	2.96	3.57
Throw in meters	1.3-2.0	1.8-2.6	2.1-3.2	2.4-3.6	2.6-4.3	3.1-4.7	3.6-5.4	4.2-6.2	5.0-6.8
NC	<15	18	23	28	31	35	39	43	50

- Neck size measured in mm dia.
- Static pressure loss across the diffuser in mm of H_2O.
- Throw (meters) is measured for a terminal velocities of 0.5 & 0.25 m/sec.
- Noice criteria (NC) is based on room attenuation of 10dB.

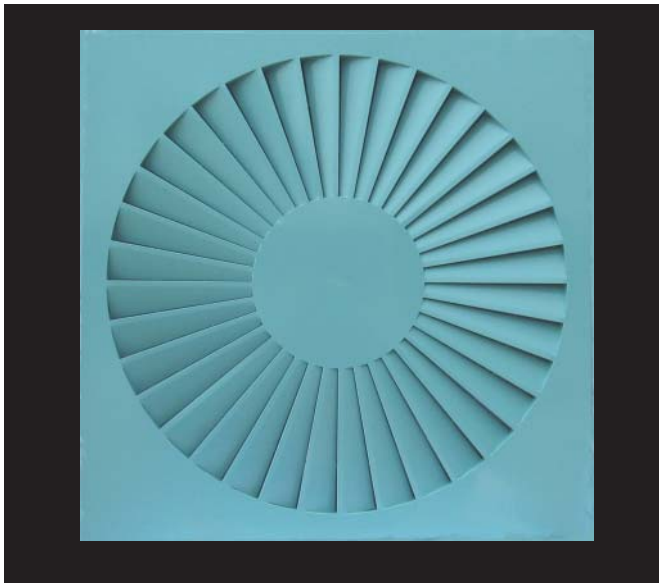
air master

Swirl diffuser - Fixed

Model: ASD-F

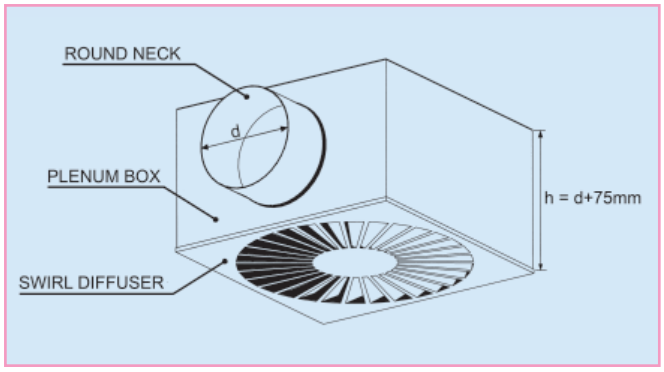
Construction:

- **Diffuser:** 1.2mm (or) 1.5mm thick aluminium sheet.
- **Neck:** Standard size 250 dia.
- **Module:** 600mmx600mm, 595mmx595m.
- **Plenum:** 20 gauge (or) 22 gauge thick GI sheet.



Description:

- Diffuser is made by punching high quality aluminium sheet.
- The slotted rotary face design and the circular pattern of the radial fixed vanes provide the swirl air horizontal distribution all over the occupant area.
- Supply air jet velocity is effectively reduced due to high mixing effect.
- The diffuser can be fixed upto a height of 4.5m.



Standard finishes:

- Powder coated as per RAL color codes.

Plenum Neck size 250dia, Module size 600x600mm

Air flow in CFM	**212**	**265**	**318**	**371**	**424**	**477**	**530**	**583**	**636**
Air flow in m^3/sec	**0.100**	**0.125**	**0.150**	**0.175**	**0.200**	**0.225**	**0.250**	**0.275**	**0.300**
Face velocity in m/sec	2	2.5	3	3.5	4	4.5	5	5.5	6
P loss in mm of H_2O	0.315	0.563	0.811	1.103	1.441	1.808	2.175	2.675	3.475
Throw in meters	0.9-1.6	1.3-2.0	1.6-2.5	2.0-2.9	2.3-3.4	2.6-3.9	3.1-4.4	3.7-5.0	4.0-5.7
NC	16	20	26	30	34	39	45	50	>50

- Neck size measured in mm dia.
- Static pressure loss across the diffuser in mm of H_2O.
- Throw (meters) is measured for a terminal velocities of 0.5 & 0.25 m/sec.
- Noice criteria (NC) is based on room attenuation of 10dB.

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Chapter 7

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Supply air linear slot diffuser

Model: ASLD

Construction:

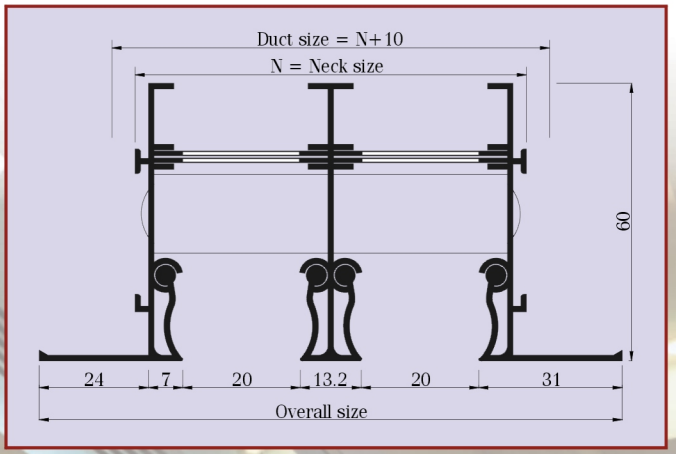
- **Frame & Blades:** High quality extruded aluminium profiles.
- **Damper:** Hit and miss damper.
- **Slot width:** 20 mm as standard. 16 mm, 25 mm and non standard sizes available as option.
- **Number of slots available:** 1,2,3,4,5,6,7,8.
- **Length:** Up to 5.8 mt available in a single piece.
- **Optional accessories:** Plenum box either unlined, internally insulated or externally insulated.

Description:

- Frame and deflection blades are made of high quality extruded aluminium profiled construction with the advantages of corrosion resistance and rigidity.
- Air distribution can be changed vertically or horizontally by means of deflection blades with out changing the air flow rate. These blades can be fully adjusted from face opening.
- Air flow rate can be adjusted by fixing hit and miss damper at the rear side of the diffuser. Damper blades are adjusted from the face opening.
- Dampers are designed in a unique way that it can be used as an equalizing grid.
- Positive alignment of adjacent sections can be made by using alignment strips.
- Foam gasket is sealed around the back of the frame as option to avoid air leakage.
- Suitable for installation for ceiling and sills.

Standard finishes:

- Natural anodized aluminium finish.
- Powder coated colour finish as per RAL colour code.
- Flexibility of finish available.



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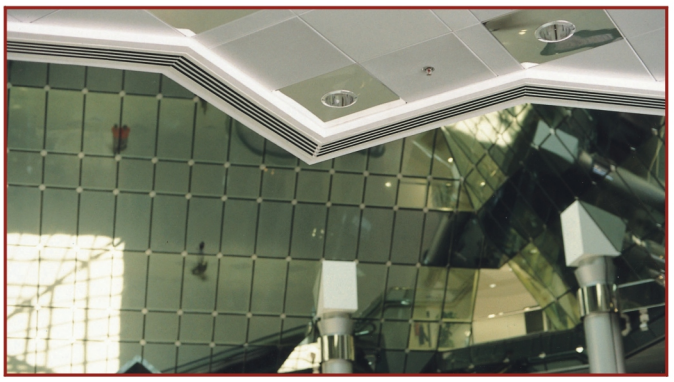
Return air linear slot diffuser

Model: ARLD



Construction:

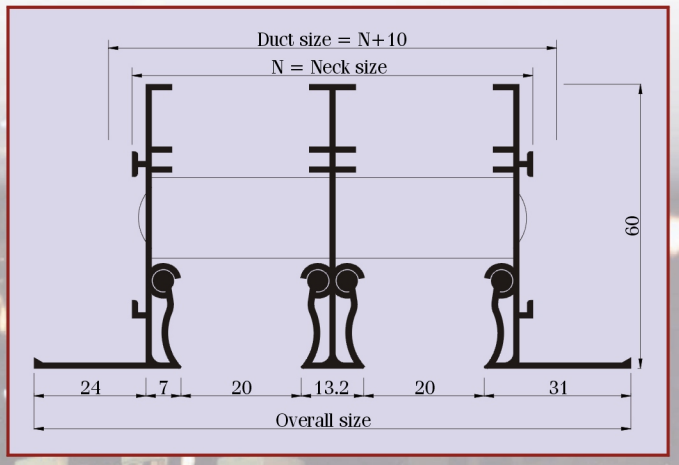
- **Frame and blades:** High quality extruded aluminium profiles.
- **Optional Damper:** Hit and miss damper.
- **Slot width:** 20 mm as standard. 16 mm, 25 mm and non standard sizes available as option.
- **Number of slots available:** 1,2,3,4,5,6,7,8.
- **Length:** Upto 5.8 mt available in a single piece.
- **Optional accessories:** Plenum box either unlined, internally insulated or externally insulated.

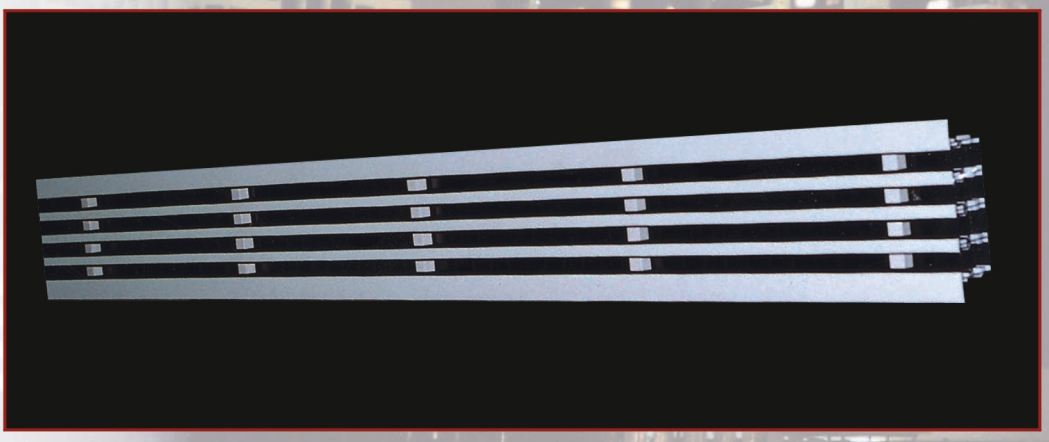
Description:

- Frame and deflection blades are made of high quality extruded aluminium profiled construction with the advantages of corrosion resistance and rigidity.
- Positive alignment of adjacent sections can be made by using alignment strips that are provided with each diffuser.
- Structure is manufactured by mechanical assembly to ensure rigidity and straight line appearance.
- Available with out hit and miss damper as standard. Damper will be provided as option.
- Foam gasket is sealed around the back of the frame as option to avoid air leakage.
- Suitable for installation into ceiling and sills.

Standard finishes:

- Natural anodized aluminium finish.
- Powder coated colour finish as per RAL colour code.
- Flexibility of finish available.





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Curved supply air linear slot diffuser

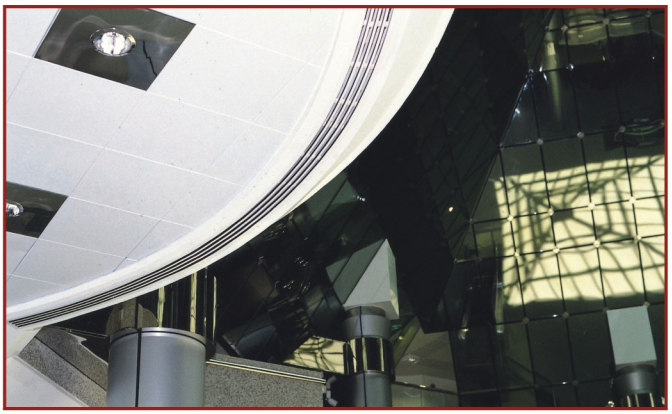
Model: ASLD (C)

Construction:

- **Frame & Blades:** High quality extruded aluminium profiles.
- **Damper:** Hit and miss damper.
- **Slot width:** 20 mm as standard. 16 mm, 25 mm and non standard sizes available as option.
- **Number of slots available:** 1,2,3,4,5,6,7,8
- **Length:** Up to 3 meters are available in a single piece.

Description:

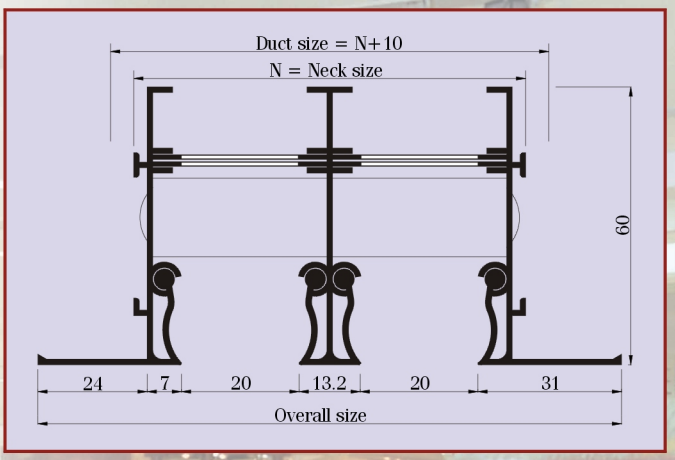
- Frame and deflection blades are made of high quality extruded aluminium profiled construction with the advantages of corrosion resistance and rigidity.
- Hit and miss damper will be fixed rigidly at the rear side of the diffuser as option.
- Positive alignment of adjacent sections can be made by using alignment strips.
- Foam gasket is sealed around the back of the frame as option to avoid air leakage.
- Suitable for installation in ceiling and sills.
- Supply and return air curved linear slot diffusers are available up to a length of 3 meters with a minimum radius of curvature of 1 meter.

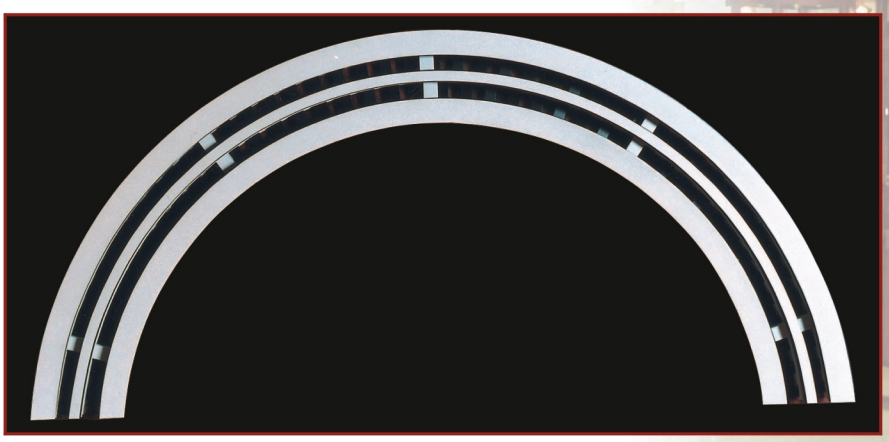


Model: ARLD(C): Same as ASLD(C), without hit and miss damper.

Standard finishes:

- Natural anodized aluminium finish.
- Powder coated colour finish as per RAL colour code.
- Flexibility of finish available.





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Slots Vs Diffuser dimensions in mm.

• 16 mm slot opening

No. of slots	1	2	3	4	5	6	7	8
Neck size in mm	39	69	99	129	160	190	220	250
Duct size in mm	49	79	109	139	170	200	230	260
Overall size	79	109	139	169	200	230	260	290

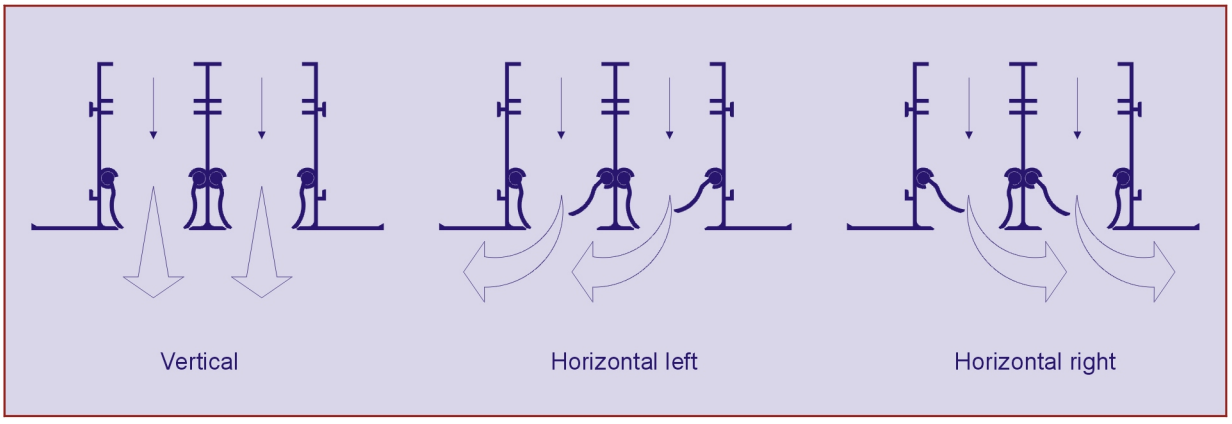
• 20 mm slot opening

No. of slots	1	2	3	4	5	6	7	8
Neck size in mm	43	77	110	145	180	214	248	282
Duct size in mm	53	87	121	155	190	224	258	292
Overall size	83	117	151	185	220	254	288	322

• 25 mm slot opening

No. of slots	1	2	3	4	5	6	7	8
Neck size in mm	48	87	126	165	205	244	283	322
Duct size in mm	58	97	136	175	215	254	293	332
Overall size	88	127	166	205	245	284	323	362

Possible air deliveries



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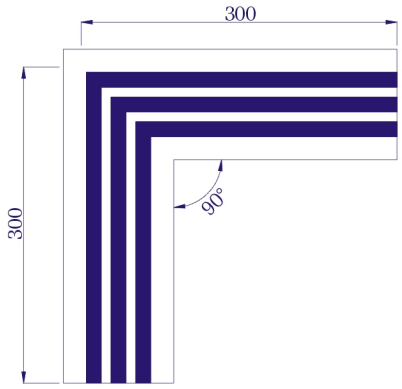
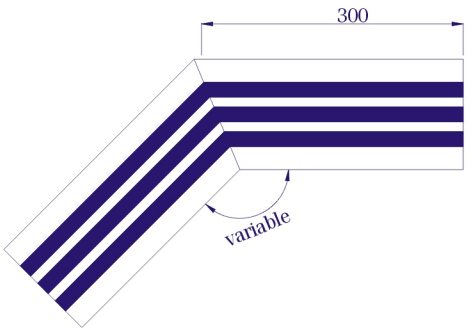
Optional mitered corners



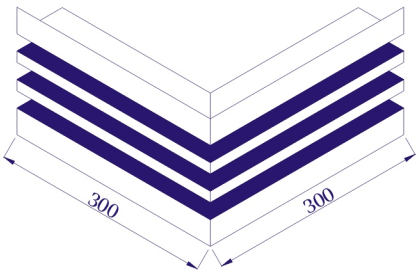
7 a.90° Mitred corner

Standard 90° horizontal mitered corners available for floor, sill and ceiling applications.



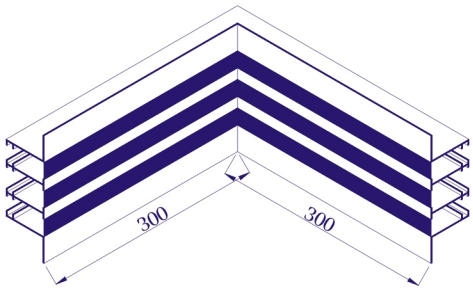
7 b. variable Mitred corner

Special horizontal mitered corners selection available for floor, sill and ceiling applications includes an angle greater than 90° and less than 180°.



7 c. Side wall - outside corner

Vertical outside mitered corners are available for wall application at the junction of two outside walls with a standard angle of 90°.



7 d. Side wall - inside corner

Vertical inside mitered corners are available for wall application at the junction of two inside walls with a standard angle of 90°.

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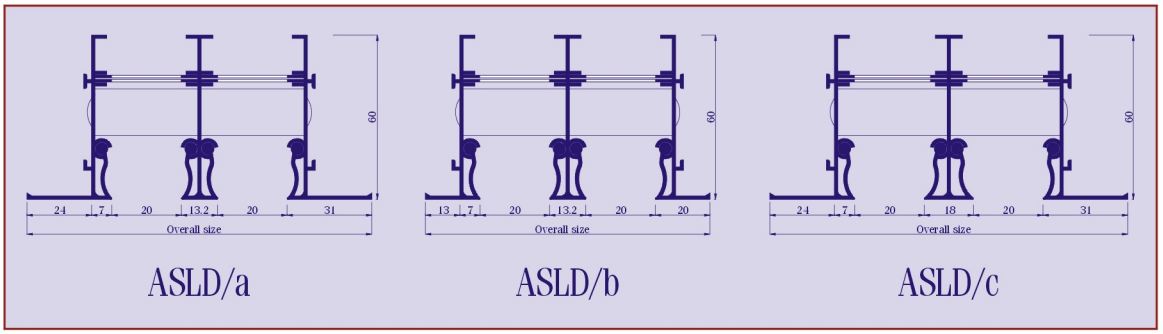
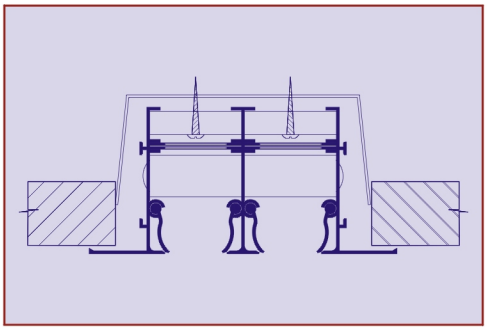
Optional profiles

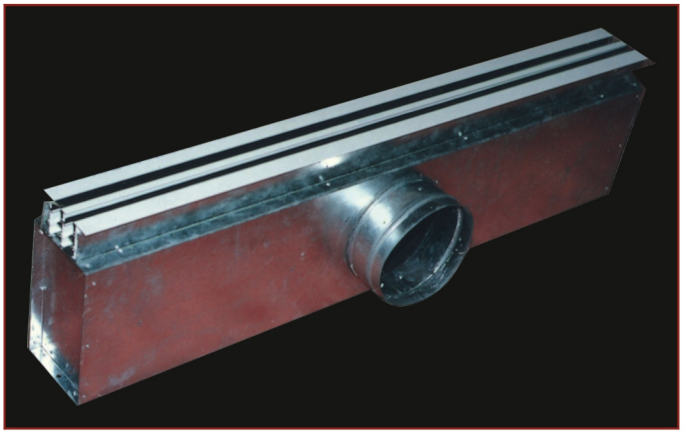


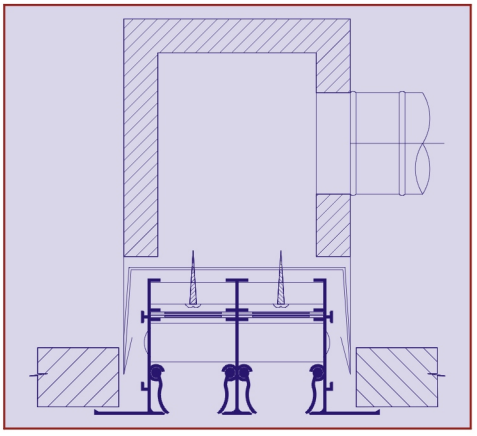
Fixing details

- **C-Clamp fixing:**



- **Fixing to the plenum box**





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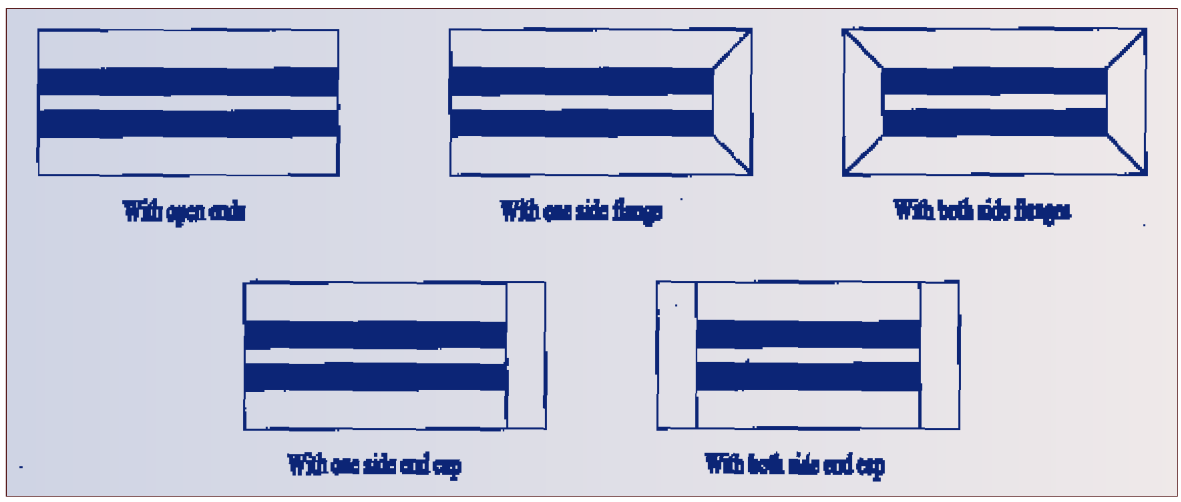
Flange models:



How to order:

Model	Optional Slot width	No of slots		Length	End flange details	Qty	Finish
ASLD	16 mm	1	5	Specify in meters	A). With open ends	Specify in numbers	A). Natural anodized Aluminium finish
		2	6		B). One side end flange		
	25 mm	3	7		C). One side end cap		B). RAL 9010
ARLD	Other size	4	8		With both sides D). Flange (or) E) caps		C). Other colours

Tick the required item.

Ordering example:

To select supply linear slot diffuser, 4 slots with a slot width of 20 mm of length 2.5 meters with open ends. Quantity 50 numbers with RAL9010 colour finish.

Order as : ASLD-4-2.5- A -50-B.

air master

Supply linear slot diffuser

20 mm slot width

Model: ASLD

Table 7.1 Air flow data

Number of slots A_k in m^2	Air flow rate per meter length Cfm	m^3/sec	Face Velocity m/sec	Throw In meters	Ps in mm H_2O	Noise Criteria (NC)
1	50	0.024	2.61	3.6 - 2.1 - 0.6	0.65	<15
	75	0.035	3.80	4.9 - 3.0 - 1.8	1.44	18
	100	0.047	5.11	6.1 - 4.3 - 2.7	2.55	30
	125	0.059	6.41	7.0 - 4.9 - 3.7	3.97	35
0.0092	150	0.071	7.72	7.6 - 5.8 - 4.6	4.37	38
	175	0.083	9.02	8.5 - 6.7 - 5.2	6.12	41
2	100	0.047	2.61	4.3 - 2.4 - 0.6	0.97	<15
	125	0.059	3.28	5.2 - 3.0 - 1.5	1.47	20
	150	0.071	3.94	6.1 - 3.9 - 2.1	2.12	28
	175	0.083	4.61	6.7 - 4.6 - 3.0	2.87	30
0.018	200	0.094	5.22	7.0 - 5.2 - 4.3	3.73	33
	250	0.118	6.55	7.9 - 6.1 - 4.9	5.78	39
3	125	0.059	2.11	4.2 - 2.2 - 0.7	0.86	<15
	150	0.071	2.53	4.9 - 2.9 - 1.4	1.21	18
	200	0.094	3.36	5.5 - 3.7 - 2.4	2.17	25
	225	0.106	3.78	6.5 - 4.4 - 3.3	2.73	29
0.028	250	0.118	4.21	7.6 - 5.3 - 4.0	3.34	34
	300	0.142	5.07	8.6 - 6.2 - 4.7	4.37	37
4	150	0.071	1.91	4.6 - 2.7 - 1.1	0.72	<15
	200	0.094	2.53	5.4 - 3.6 - 2.0	1.39	21
	250	0.118	3.17	6.1 - 4.5 - 3.1	1.98	25
	300	0.142	3.82	6.7 - 5.2 - 3.9	2.85	30
0.0372	350	0.165	4.43	7.9 - 5.6 - 4.5	3.84	35
	400	0.189	5.08	8.8 - 6.7 - 5.2	4.51	38

- Data based on one meter length of the diffuser with damper fully opened.
- Face velocity is measured in m/sec.
- P_s: Static pressure loss is in mm of H_2O. Area factor in square meters.
- Throw (meters) is measured for a terminal velocities of 0.25, 0.5 and 0.75 m/sec.
- NC based on a room attenuation of 10 dB.

air master

Supply linear slot diffuser

20 mm slot width

Model: ASLD

Table 7.1 (Cont) Air flow data

Number of slots A_k in m^2	Air flow rate per meter length Cfm	m^3/sec	Face Velocity m/sec	Throw In meters	Ps in mm H_2O	Noise Criteria (NC)
5	250	0.118	2.54	5.8 - 4.3 - 2.7	1.43	22
	300	0.142	3.05	6.4 - 4.9 - 3.6	1.89	24
	350	0.165	3.55	6.8 - 5.3 - 3.7	2.79	29
	400	0.189	4.06	7.7 - 5.5 - 4.1	3.78	34
0.0465	450	0.213	4.58	8.5 - 5.9 - 4.7	4.25	35
	500	0.236	5.07	9.1 - 6.3 - 5.2	4.72	38
6	300	0.142	2.53	6.1 - 4.3 - 2.9	1.51	22
	350	0.165	2.95	6.6 - 5.2 - 3.9	1.64	24
	400	0.189	3.37	7.3 - 5.5 - 4.3	2.33	28
	450	0.213	3.80	7.6 - 5.8 - 4.6	3.21	31
0.056	500	0.236	4.21	8.2 - 6.1 - 4.8	3.91	35
	600	0.283	5.05	9.2 - 6.7 - 5.3	4.78	40
7	350	0.165	2.54	6.1 - 4.3 - 2.9	1.62	22
	400	0.189	2.91	6.7 - 5.1 - 3.8	1.72	25
	450	0.213	3.28	7.0 - 5.3 - 4.0	2.33	28
	500	0.236	3.63	7.4 - 6.2 - 4.7	3.18	30
0.065	600	0.283	4.35	8.6 - 6.7 - 5.0	4.10	36
	700	0.331	5.09	9.4 - 7.2 - 5.6	4.82	40
8	400	0.189	2.49	6.1 - 4.6 - 3.7	1.66	22
	450	0.213	2.80	6.7 - 5.1 - 3.8	1.72	25
	500	0.236	3.10	7.1 - 5.6 - 4.3	2.34	29
	600	0.283	3.72	7.6 - 6.4 - 4.7	3.24	31
0.076	700	0.331	4.35	8.8 - 7.2 - 5.4	4.20	37
	800	0.378	4.97	9.7 - 7.8 - 5.9	4.83	40

- Data based on one meter length of the diffuser with damper fully opened.
- Face velocity is measured in m/sec.
- P_s: Static pressure loss is in mm of H_2O. Area factor in square meters.
- Throw (meters) is measured for a terminal velocities of 0.25, 0.5 and 0.75 m/sec.
- NC based on a room attenuation of 10 dB.

air master

Supply linear slot diffuser

25 mm slot width

Model: ASLD-25

Table 7.2 Air flow data

Number of slots A_k in m^2	Air flow rate per meter length Cfm	m^3/sec	Face Velocity m/sec	Throw In meters	Ps in mm H_2O	Noise Criteria (NC)
1	75	0.035	3.02	5.3 - 3.2 - 1.9	0.78	16
	100	0.047	4.05	6.6 - 4.6 - 2.8	1.53	25
	125	0.059	5.09	7.7 - 5.3 - 3.9	2.53	29
	150	0.071	6.12	8.4 - 6.3 - 4.8	3.79	33
0.0116	175	0.083	7.15	9.4 - 7.2 - 5.5	4.05	36
	200	0.094	8.10	10.5 - 8.2 - 6.1	5.49	40
2	125	0.059	2.52	5.6 - 3.2 - 1.6	0.94	<15
	150	0.071	3.03	6.6 - 4.1 - 2.2	1.36	17
	175	0.083	3.55	7.4 - 5.0 - 3.2	1.91	24
	200	0.094	4.02	7.7 - 5.6 - 4.5	2.13	28
0.0234	250	0.118	5.04	8.8 - 6.6 - 5.2	2.75	34
	300	0.142	6.07	10.0 - 7.9 - 6.0	3.93	39
3	150	0.071	2.03	4.9 - 2.9 - 1.2	0.83	<15
	200	0.094	2.68	5.6 - 3.6 - 2.2	1.28	17
	225	0.106	3.03	6.9 - 4.3 - 3.3	1.96	22
	250	0.118	3.37	7.7 - 5.3 - 3.9	2.13	27
0.035	300	0.142	4.06	8.8 - 6.3 - 4.6	2.73	32
	350	0.165	4.71	10.0 - 7.4 - 5.2	3.71	36
	400	0.189	5.40	10.6 - 7.9 - 5.6	4.15	40
4	200	0.094	1.96	5.6 - 3.6 - 1.9	0.72	<15
	250	0.118	2.46	6.3 - 4.3 - 2.8	1.39	17
	300	0.142	2.96	7.0 - 4.9 - 3.6	1.92	22
	350	0.165	3.44	7.7 - 5.5 - 4.2	2.64	28
	400	0.189	3.94	8.7 - 6.6 - 4.9	2.97	32
0.048	450	0.213	4.44	9.5 - 7.2 - 5.4	3.42	35
	500	0.236	4.92	10.0 - 7.7 - 6.0	4.18	38
	550	0.26	5.42	10.9 - 8.4 - 6.5	4.63	41

- Data based on one meter length of the diffuser with damper fully opened.
- Face velocity is measured in m/sec.
- P_s: Static pressure loss is in mm of H_2O. Area factor in square meters.
- Throw (meters) is measured for a terminal velocities of 0.25, 0.5 and 0.75 m/sec.
- NC based on a room attenuation of 10 dB.

air master

Supply linear slot diffuser

25 mm slot width

Model: ASLD-25

Table 7.2 (Cont.) Air flow data

Number of slots A_k in m^2	Air flow rate per meter length Cfm	m^3/sec	Face Velocity m/sec	Throw In meters	Ps in mm H_2O	Noise Criteria (NC)
5	300	0.142	2.45	6.6 - 4.5 - 3.5	1.42	17
	350	0.165	2.84	6.9 - 4.9 - 3.6	2.17	23
	400	0.189	3.26	7.4 - 5.2 - 3.9	2.72	26
	450	0.213	3.67	8.0 - 5.9 - 4.5	3.14	31
0.058	500	0.236	4.07	8.8 - 6.7 - 5.2	3.68	33
	550	0.260	4.48	9.6 - 7.5 - 5.8	4.10	36
	600	0.283	4.88	10.6 - 8.4 - 6.6	4.46	38
	650	0.307	5.29	11.6 - 8.8 - 7.1	4.73	41
6	350	0.165	2.32	6.9 - 5.2 - 3.8	1.49	17
	400	0.189	2.66	7.6 - 5.6 - 4.2	1.84	21
	450	0.213	3.0	8.0 - 5.9 - 4.5	2.21	24
	500	0.236	3.32	8.8 - 6.3 - 4.9	2.94	28
0.071	600	0.283	3.98	9.2 - 6.8 - 5.2	3.69	32
	700	0.331	4.66	10.7 - 8.4 - 6.5	4.26	37
	800	0.378	5.32	12.0 - 9.1 - 7.4	5.13	41
7	400	0.189	2.30	7.0 - 5.3 - 4.0	1.51	17
	450	0.213	2.60	7.8 - 5.9 - 4.5	1.93	22
	500	0.236	2.88	7.9 - 6.2 - 4.7	2.23	24
	600	0.283	3.45	9.0 - 6.6 - 5.3	3.14	29
0.082	700	0.331	4.04	9.6 - 7.1 - 5.6	3.97	34
	800	0.378	4.61	11.0 - 8.9 - 7.0	4.47	38
	900	0.425	5.18	12.2 - 9.4 - 7.5	5.34	42
8	500	0.236	2.51	7.2 - 5.6 - 4.2	1.82	18
	600	0.283	3.01	8.5 - 6.3 - 5.0	3.05	28
	700	0.331	3.52	9.3 - 6.8 - 5.5	3.18	31
	800	0.378	4.02	9.8 - 7.4 - 6.0	4.12	35
0.094	900	0.425	4.52	11.3 - 9.2 - 7.3	4.63	39
	1000	0.472	5.02	12.5 - 9.6 - 7.8	5.34	43

- Data based on one meter length of the diffuser with damper fully opened.
- Face velocity is measured in m/sec.
- P_s: Static pressure loss is in mm of H_2O. Area factor in square meters.
- Throw (meters) is measured for a terminal velocities of 0.25, 0.5 and 0.75 m/sec.
- NC based on a room attenuation of 10 dB.

air master

Supply linear slot diffuser

16 mm slot width

Model: ASLD-16

Table 7.3 Air flow data

Number of slots A_k in m^2	Air flow rate per meter length Cfm	m^3/sec	Face Velocity m/sec	Throw In meters	Ps in mm H_2O	Noise Criteria (NC)
1	30	0.014	1.94	2.5 - 1.5 - 0.4	0.51	<15
	50	0.024	3.33	4.1 - 2.5 - 1.4	1.34	18
	75	0.035	4.86	5.6 - 3.8 - 2.3	2.62	29
	100	0.047	6.53	6.8 - 4.7 - 3.3	4.41	36
0.0072	125	0.059	8.19	7.4 - 5.0 - 3.8	5.10	40
	150	0.071	9.86	8.1 - 5.8 - 4.4	7.42	43
2	50	0.024	1.71	3.0 - 1.6 - 0.6	0.65	<15
	75	0.035	2.50	3.7 - 2.0 - 0.9	1.19	17
	100	0.047	3.36	4.3 - 2.5 - 1.3	1.95	21
	125	0.059	4.21	5.3 - 3.7 - 1.9	2.83	29
0.014	150	0.071	5.07	6.2 - 4.4 - 2.8	3.95	33
	200	0.094	6.71	7.3 - 4.9 - 3.5	6.57	41
3	100	0.047	2.24	3.5 - 1.9 - 0.8	0.96	17
	125	0.059	2.81	3.9 - 2.2 - 1.1	1.42	21
	150	0.071	3.38	4.9 - 2.8 - 1.7	2.36	25
	175	0.083	3.95	5.3 - 3.4 - 2.1	3.11	30
0.021	200	0.094	4.48	5.9 - 3.9 - 2.4	3.91	36
	250	0.118	5.62	6.9 - 5.2 - 3.3	5.38	39
4	125	0.059	2.11	3.6 - 2.0 - 0.9	0.84	17
	150	0.071	2.53	3.9 - 2.3 - 1.3	1.49	22
	175	0.083	2.96	4.4 - 3.1 - 1.9	2.0	25
	200	0.094	3.36	5.2 - 3.4 - 2.2	2.73	29
0.028	250	0.120	4.28	5.9 - 4.1 - 2.7	4.03	34
	300	0.142	5.07	6.4 - 4.9 - 3.2	5.0	38

- Data based on one meter length of the diffuser with damper fully opened.
- Face velocity is measured in m/sec.
- P_s: Static pressure loss is in mm of H_2O. Area factor in square meters.
- Throw (meters) is measured for a terminal velocities of 0.25, 0.5 and 0.75 m/sec.
- NC based on a room attenuation of 10 dB.

air master

Supply linear slot diffuser

16 mm slot opening

Model: ASLD-16

Table 7.3 (cont) Air flow data

Number of slots A_k in m^2	Air flow rate per meter length Cfm	m^3/sec	Face Velocity m/sec	Throw In meters	Ps in mm H_2O	Noise Criteria (NC)
5	150	0.071	1.97	3.7 - 2.1 - 1.0	1.16	16
	200	0.094	2.61	4.1 - 2.5 - 1.5	1.71	23
	250	0.118	3.28	5.2 - 3.4 - 2.2	2.73	29
	300	0.142	3.94	6.0 - 4.2 - 2.8	3.96	32
0.036	350	0.165	4.58	6.4 - 4.9 - 3.2	4.63	35
	400	0.189	5.25	7.3 - 5.5 - 3.7	5.38	39
6	200	0.094	2.19	3.9 - 2.4 - 1.3	1.37	18
	250	0.118	2.74	4.7 - 2.8 - 1.7	1.61	24
	300	0.142	3.30	5.6 - 3.6 - 2.5	2.46	30
	350	0.165	3.84	6.3 - 4.4 - 3.0	3.53	33
0.043	400	0.189	4.39	6.7 - 5.2 - 3.5	4.48	36
	500	0.236	5.49	7.9 - 5.6 - 4.1	5.77	41
7	250	0.118	2.41	4.2 - 2.5 - 1.4	1.61	20
	300	0.142	2.90	4.9 - 3.1 - 1.9	1.82	25
	350	0.165	3.37	5.9 - 3.8 - 2.6	2.58	29
	400	0.189	3.86	6.5 - 4.7 - 3.2	3.68	32
0.049	500	0.236	4.82	7.1 - 5.3 - 3.7	5.0	37
	600	0.283	5.77	8.3 - 5.9 - 4.3	6.06	42
8	350	0.165	2.89	5.1 - 3.2 - 2.2	2.02	24
	400	0.189	3.31	6.0 - 3.9 - 2.7	2.15	30
	450	0.213	3.74	6.6 - 4.8 - 3.3	3.02	32
	500	0.236	4.14	7.0 - 5.2 - 3.6	3.89	35
0.057	600	0.283	4.96	8.3 - 5.6 - 4.2	5.16	39
	700	0.331	5.81	8.7 - 6.1 - 4.5	6.27	42

- Data based on one meter length of the diffuser with damper fully opened.
- Face velocity is measured in m/sec.
- P_s: Static pressure loss is in mm of H_2O. Area factor in square meters.
- Throw (meters) is measured for a terminal velocities of 0.25, 0.5 and 0.75 m/sec.
- NC based on a room attenuation of 10 dB.

air master

Return linear slot diffuser

20 mm slot width

Model: ARLD

Table 7.4 Air flow data

No of slots							
1	CFM/m	100	150	200	250	300	350
	M^3/sec/m	0.047	0.071	0.094	0.118	0.142	0.165
	Neg Ps	0.61	1.37	2.41	3.81	5.46	7.37
	NC	<15	19	28	36	42	48
2	CFM/m	250	300	350	400	450	500
	M^3/sec/m	0.118	0.142	0.165	0.189	0.212	0.236
	Neg Ps	1.02	1.47	2.03	2.62	3.30	4.06
	NC	17	22	27	32	36	40
3	CFM/m	350	400	450	500	600	700
	M^3/sec/m	0.165	0.189	0.212	0.236	0.283	0.331
	Neg Ps	1.04	1.35	1.68	2.08	2.97	4.01
	NC	17	22	25	30	34	40
4	CFM/m	400	500	600	700	800	900
	M^3/sec/m	0.189	0.236	0.283	0.331	0.378	0.425
	Neg Ps	0.76	1.19	1.73	2.36	3.25	4.06
	NC	15	21	26	30	35	40
5	CFM/m	500	600	700	800	1000	1200
	M^3/sec/m	0.236	0.283	0.331	0.378	0.472	0.567
	Neg Ps	0.76	1.12	1.52	1.96	3.05	4.37
	NC	15	22	27	30	35	42
6	CFM/m	600	700	800	1000	1200	1400
	M^3/sec/m	0.283	0.331	0.378	0.472	0.567	0.66
	Neg Ps	0.83	1.08	1.78	2.18	3.53	4.75
	NC	17	24	29	31	37	43
7	CFM/m	700	800	1000	1200	1400	1600
	M^3/sec/m	0.331	0.378	0.472	0.567	0.66	0.76
	Neg Ps	0.93	1.13	1.83	2.36	3.66	4.75
	NC	18	25	30	33	38	43
8	CFM/m	800	900	1100	1300	1500	1700
	M^3/sec/m	0.378	0.425	0.52	0.61	0.71	0.8
	Neg Ps	1.02	1.13	1.96	2.45	3.87	4.93
	NC	18	25	32	35	40	45

- Data based on one meter length of the diffuser.
- NC based on a room attenuation of 10 dB.
- P_s: Static pressure loss is in mm of water.

air master

Return linear slot diffuser

25 mm slot width

Model: ARLD - 25

Table 7.5 Air flow data

No of slots							
1	CFM/m	100	150	200	250	300	350
	M^3/sec/m	0.047	0.071	0.094	0.118	0.142	0.165
	Neg Ps	0.51	1.13	1.98	3.09	4.4	5.89
	NC	<15	18	26	33	38	45
2	CFM/m	250	300	350	400	450	500
	M^3/sec/m	0.118	0.142	0.165	0.189	0.213	0.236
	Neg Ps	0.85	1.22	1.67	2.13	2.66	3.25
	NC	<15	21	25	29	33	37
3	CFM/m	350	400	450	500	600	700
	M^3/sec/m	0.165	0.189	0.213	0.236	0.283	0.331
	Neg Ps	0.87	1.11	1.37	1.69	2.39	3.21
	NC	16	21	23	28	31	37
4	CFM/m	400	500	600	700	800	900
	M^3/sec/m	0.189	0.236	0.283	0.331	0.378	0.425
	Neg Ps	0.64	0.99	1.42	1.92	2.62	3.25
	NC	<15	20	24	28	32	37
5	CFM/m	500	600	700	800	1000	1200
	M^3/sec/m	0.236	0.283	0.331	0.378	0.472	0.567
	Neg Ps	0.64	0.92	1.25	1.59	2.46	3.49
	NC	<15	21	25	27	32	39
6	CFM/m	600	700	800	1000	1200	1400
	M^3/sec/m	0.283	0.331	0.378	0.472	0.567	0.66
	Neg Ps	0.67	0.83	1.39	1.77	3.85	3.8
	NC	16	23	27	28	34	40
7	CFM/m	700	800	1000	1200	1400	1600
	M^3/sec/m	0.331	0.378	0.472	0.567	0.66	0.76
	Neg Ps	0.75	0.91	1.48	1.92	2.95	3.8
	NC	17	24	28	29	35	40
8	CFM/m	800	900	1100	1300	1500	1700
	M^3/sec/m	0.378	0.425	0.52	0.61	0.71	0.8
	Neg Ps	0.83	0.91	1.56	1.99	3.12	3.94
	NC	17	24	30	32	37	42

- Data based on one meter length of the diffuser.
- NC based on a room attenuation of 10 dB.
- P_s: Static pressure loss is in mm of water.

air master

Return linear slot diffuser

16 mm slot width

Model: ARLD - 16

Table 7.6 Air flow data

No of slots							
1	CFM/m	100	150	200	250	300	350
	M^3/sec/m	0.047	0.071	0.094	0.118	0.142	0.165
	Neg Ps	0.7	1.59	2.82	4.49	6.49	8.84
	NC	17	21	30	38	45	52
2	CFM/m	250	300	350	400	450	500
	M^3/sec/m	0.118	0.142	0.165	0.189	0.213	0.236
	Neg Ps	1.17	1.71	2.38	3.09	3.93	4.88
	NC	20	26	31	37	42	46
3	CFM/m	350	400	450	500	600	700
	M^3/sec/m	0.165	0.189	0.213	0.236	0.283	0.331
	Neg Ps	1.19	1.56	1.96	2.42	3.54	4.82
	NC	20	26	29	34	40	46
4	CFM/m	400	500	600	700	800	900
	M^3/sec/m	0.189	0.236	0.283	0.331	0.378	0.425
	Neg Ps	0.88	1.38	2.02	2.78	3.87	4.88
	NC	17	25	30	35	41	47
5	CFM/m	500	600	700	800	1000	1200
	M^3/sec/m	0.236	0.283	0.331	0.378	0.472	0.567
	Neg Ps	0.88	1.29	1.78	2.31	3.63	5.24
	NC	17	26	29	35	41	48
6	CFM/m	600	700	800	1000	1200	1400
	M^3/sec/m	0.283	0.331	0.378	0.472	0.567	0.66
	Neg Ps	0.96	1.25	2.08	2.57	4.20	5.7
	NC	19	28	34	37	40	49
7	CFM/m	700	800	1000	1200	1400	1600
	M^3/sec/m	0.331	0.378	0.472	0.567	0.66	0.76
	Neg Ps	1.07	1.38	2.14	2.78	4.36	5.7
	NC	20	28	33	39	43	50
8	CFM/m	800	900	1100	1300	1500	1700
	M^3/sec/m	0.378	0.425	0.52	0.61	0.71	0.8
	Neg Ps	1.17	1.31	2.29	2.89	4.61	5.9
	NC	22	31	37	40	45	50

- Data based on one meter length of the diffuser.
- NC based on a room attenuation of 10 dB.
- P_s: Static pressure loss is in mm of water.
- Above data is tested & certified by ETL.

air master

Linear slot diffuser

Model: ASMLD

Construction:

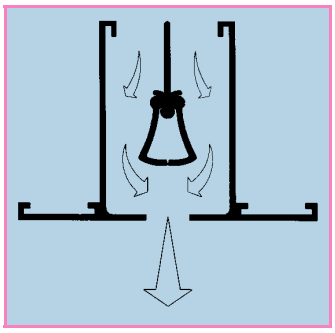
- **Frame & Blades:** High quality extruded aluminium profile.
- **Slot width:** 19mm as standard.
- **Number of slots available:** 1,2,3,4,5,6,7,8.
- **Length:** Up to 5.8m available in a single piece.
- **Optional accessories:** Plenum box either unlined, internally insulated or externally insulated.

Description:

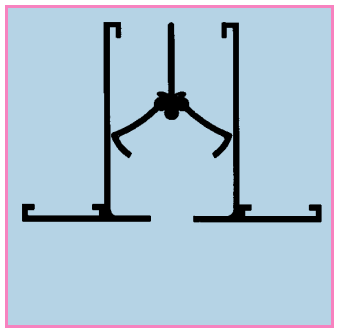
- Frame and deflection blades are made of high quality extruded aluminium profiled construction with the advantages of corrosion resistance and rigidity.
- This high capacity linear flow air diffuser is designed to achieve best possible horizontal air pattern with excellent static pressure, throw and sound characteristics.
- This totally removable pattern control device allow access for installation and balancing with option of choosing the black / white extruded aluminium pattern control device which allows 180 degree pattern adjustment and volume control in the same unit.(without using damper)
- Positive alignment of adjacent sections can be made by using alignment strips.
- Foam gasket is sealed around the back of the frame as option to avoid air leakage.

Standard finishes:

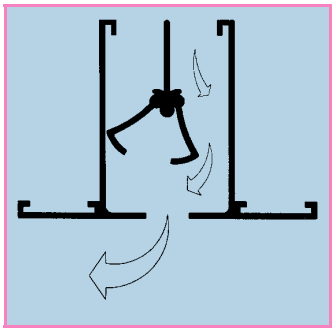
- Natural anodized aluminium finish.
- Powder coated color finish as per RAL color codes.
- Flexibility of finish available as option.



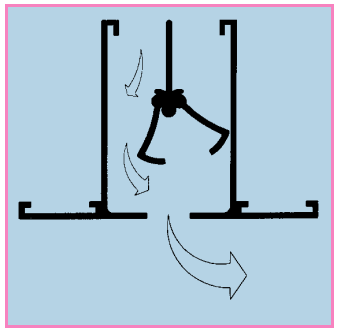
Perpendicular



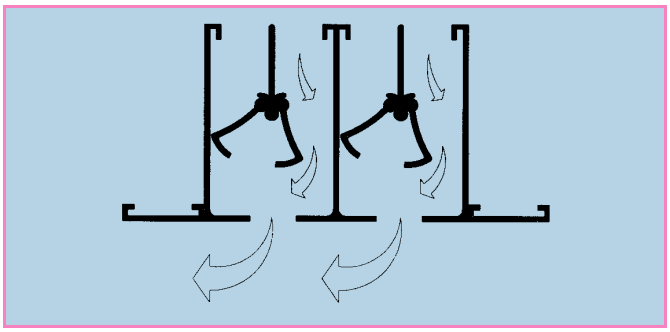
Closed



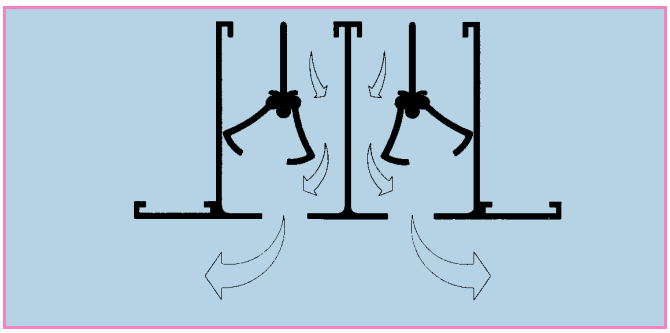
Parallel left



Parallel Right



Parallel one way multiple slot



Parallel two way opposite

air master

Linear slot diffuser

19mm slot width

Model: ASMLD

Air flow data

1 slot	Airflow Cfm M³/sec P_S in mm H_2O Throw in m NC	80 0.038 1.14 2.1-4.0-5.5 <15	88 0.042 1.40 2.4-4.3-5.8 <15	99 0.047 1.78 3.0-4.6-6.1 <15	109 0.051 2.16 3.4-4.9-6.4 17	119 0.056 2.54 3.7-5.2-6.7 20	130 0.061 3.05 4.0-5.5-7.0 22	143 0.067 3.68 4.3-5.8-7.3 25	155 0.073 4.32 4.6-5.8-7.3 29	168 0.079 5.08 4.6-6.1-7.6 32
2 slot	Airflow Cfm M³/sec P_S in mm H_2O Throw in m NC	132 0.062 1.14 1.8-3.6-5.5 <15	146 0.069 1.40 2.1-4.0-5.8 <15	166 0.078 1.78 2.7-4.6-6.4 19	182 0.085 2.16 3.0-4.9-6.7 22	196 0.092 2.54 3.5-4.9-7.0 24	215 0.101 3.05 3.7-5.2-7.0 26	237 0.112 3.68 3.7-5.2-7.3 29	256 0.121 4.32 4.0-5.5-7.3 31	278 0.131 5.08 4.0-5.8-7.6 34
3 slot	Airflow Cfm M³/sec P_S in mm H_2O Throw in m NC	178 0.084 1.14 1.2-2.7-4.3 15	196 0.092 1.40 1.5-3.0-4.6 17	223 0.105 1.78 2.1-3.7-5.2 21	244 0.115 2.16 2.4-4.3-5.8 23	266 0.125 2.54 2.7-4.6-6.4 26	290 0.137 3.05 3.0-4.9-6.7 28	320 0.151 3.68 3.3-5.2-7.0 31	345 0.163 4.32 3.7-5.5-7.3 33	375 0.177 5.08 4.0-5.8-7.6 36
4 slot	Airflow Cfm M³/sec P_S in mm H_2O Throw in m NC	232 0.109 1.14 1.2-2.4-4.0 16	257 0.121 1.40 1.5-2.7-4.3 19	290 0.137 1.78 1.8-3.3-4.9 23	320 0.151 2.16 2.1-3.7-5.5 25	346 0.163 2.54 2.4-4.0-6.1 28	380 0.179 3.05 3.0-4.6-6.7 30	418 0.197 3.68 3.3-4.9-7.0 33	452 0.213 4.32 3.7-5.2-7.0 36	490 0.231 5.08 4.0-5.5-7.6 40
5 slot	Airflow Cfm M³/sec P_S in mm H_2O Throw in m NC	306 0.144 1.14 1.2-2.1-4.0 18	338 0.159 1.40 1.5-2.4-4.3 21	382 0.180 1.78 1.8-2.7-4.9 25	422 0.199 2.16 2.1-3.0-5.2 27	456 0.215 2.54 2.7-3.6-5.8 30	500 0.236 3.05 3.0-4.3-6.4 33	550 0.259 3.68 3.3-4.9-6.7 36	595 0.281 4.32 3.7-5.2-7.0 40	645 0.304 5.08 4.0-5.5-7.3 44
6 slot	Airflow Cfm M³/sec P_S in mm H_2O Throw in m NC	380 0.179 1.14 1.2-2.1-4.0 18	420 0.198 1.40 1.5-2.4-4.6 21	473 0.223 1.78 1.8-2.7-4.9 25	522 0.246 2.16 2.1-3.4-5.5 28	565 0.267 2.54 2.7-4.0-5.8 31	620 0.293 3.05 2.7-4.6-6.4 35	680 0.321 3.68 3.0-4.6-6.7 38	740 0.349 4.32 3.3-4.9-7.0 41	800 0.377 5.08 3.7-5.2-7.0 45
7 slot	Airflow Cfm M³/sec P_S in mm H_2O Throw in m NC	460 0.217 1.14 1.2-2.1-4.3 19	510 0.241 1.40 1.5-2.4-4.6 22	570 0.269 1.78 1.8-2.7-4.9 26	630 0.297 2.16 2.1-3.4-5.2 29	685 0.323 2.54 2.7-4.0-5.8 32	750 0.354 3.05 2.7-4.3-6.1 36	825 0.389 3.68 3.0-4.6-6.4 39	890 0.420 4.32 3.3-4.9-6.7 42	970 0.458 5.08 3.7-5.2-7.0 46
8 slot	Airflow Cfm M³/sec P_S in mm H_2O Throw in m NC	540 0.255 1.14 1.2-2.1-4.3 20	595 0.281 1.40 1.5-2.4-4.6 23	675 0.318 1.78 1.8-2.7-4.9 27	740 0.349 2.16 2.1-3.4-5.2 30	805 0.380 2.54 2.4-4.0-5.8 33	880 0.415 3.05 2.7-4.3-6.1 36	970 0.458 3.68 3.0-4.6-6.4 39	1050 0.495 4.32 3.3-4.9-6.7 42	1140 0.538 5.08 3.7-5.2-7.0 47

- Neck velocity is measured in m/sec.
- P_S - Static pressure loss across the diffuser in mm of H_2O.
- Throw (meters) is measured for a terminal velocities of 0.75, 0.5 & 0.25 m/sec.
- Noice criteria (NC) is based on room attenuation of 10dB.

air master

Plenum slot diffuser

Model: ASMPD

Construction:

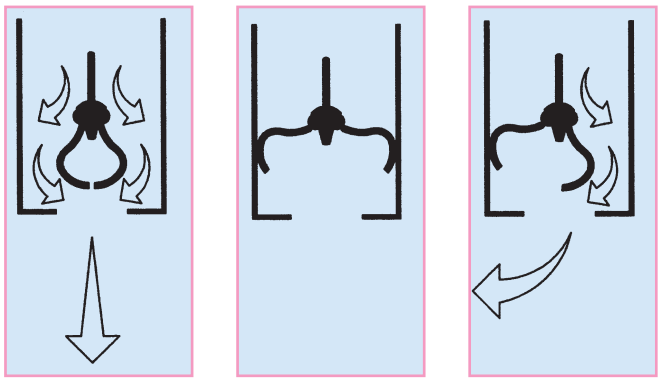
- **Frame & Blades:** 22 or 20 gauge galvanized steel sheet.
- **Blades:** High quality extruded aluminium profile.
- **Slot width:** 19mm as standard.
- **Number of slots available:** 1,2,3,4.
- **Length:** 600mm, 900mm & 1200mm Standard.
- **Spigots:** Circular spigots of 50mm length as standard.
- **Optional accessories:** Internal insulation, Volume control damper.

Description:

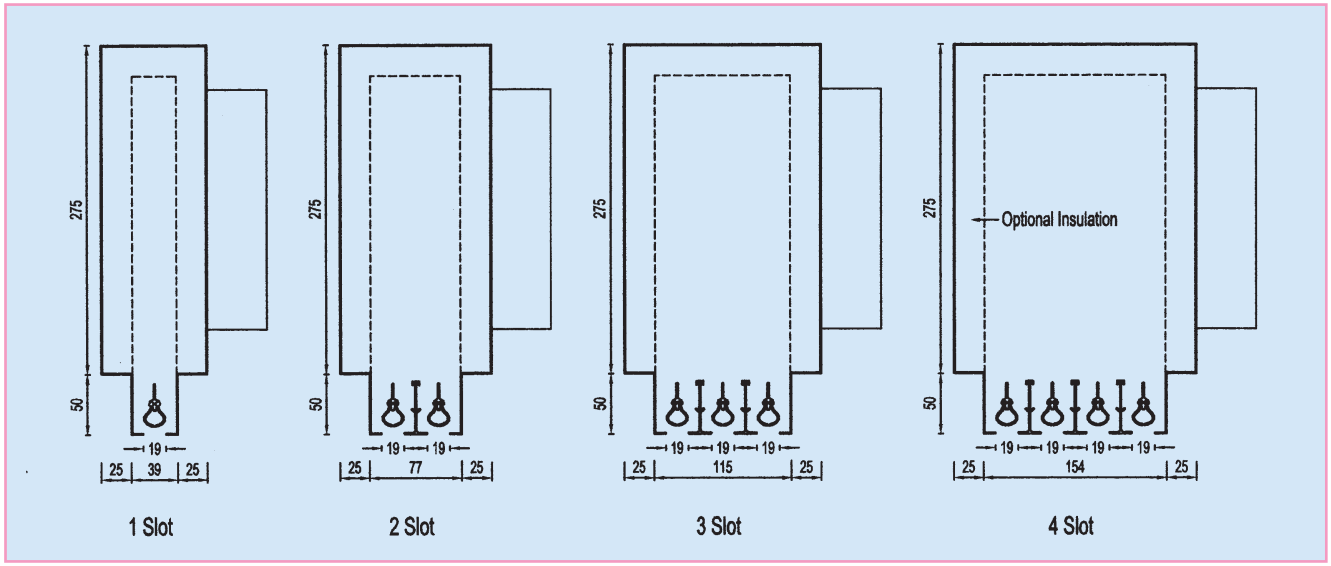
- Frame fabricated from 22 or 20 gauge gavanized steel sheet and deflection blades are made of high quality extruded aluminium profiles.
- This high capacity plenum slot diffuser is designed to achieve best possible horizontal air pattern with excellent static pressure, throw and sound characteristics.
- This totally removable pattern control device allow access for installation and balancing with option of choosing the black / white extruded aluminium pattern control device which allows 180 degree pattern adjustment and volume control in the same unit.(without using damper)
- Circular spigots of required diameter and standard length of 50mm would be fixed to the plenum box.
- Volume control dampers can be fixed to the spigots on request.

Standard finishes:

- Deflection blades can be of natural anodized aluminium finish or powder coated color finish as per RAL color codes.
- Flexibility of finish available as option.



Perpendicular | Closed | Parallel



air master

Plenum slot diffuser

19mm slot width

Model: ASMPD

Air flow data

1 slot	Airflow Cfm M³/sec P_S in mm H_2O Throw in m NC	80 0.038 1.14 2.1-4.0-5.5 <15	88 0.042 1.40 2.4-4.3-5.8 <15	99 0.047 1.78 3.0-4.6-6.1 <15	109 0.051 2.16 3.4-4.9-6.4 17	119 0.056 2.54 3.7-5.2-6.7 20	130 0.061 3.05 4.0-5.5-7.0 22	143 0.067 3.68 4.3-5.8-7.3 25	155 0.073 4.32 4.6-5.8-7.3 29	168 0.079 5.08 4.6-6.1-7.6 32
2 slot	Airflow Cfm M³/sec P_S in mm H_2O Throw in m NC	132 0.062 1.14 1.8-3.6-5.5 <15	146 0.069 1.40 2.1-4.0-5.8 <15	166 0.078 1.78 2.7-4.6-6.4 19	182 0.085 2.16 3.0-4.9-6.7 22	196 0.092 2.54 3.5-4.9-7.0 24	215 0.101 3.05 3.7-5.2-7.0 26	237 0.112 3.68 3.7-5.2-7.3 29	256 0.121 4.32 4.0-5.5-7.3 31	278 0.131 5.08 4.0-5.8-7.6 34
3 slot	Airflow Cfm M³/sec P_S in mm H_2O Throw in m NC	178 0.084 1.14 1.2-2.7-4.3 15	196 0.092 1.40 1.5-3.0-4.6 17	223 0.105 1.78 2.1-3.7-5.2 21	244 0.115 2.16 2.4-4.3-5.8 23	266 0.125 2.54 2.7-4.6-6.4 26	290 0.137 3.05 3.0-4.9-6.7 28	320 0.151 3.68 3.3-5.2-7.0 31	345 0.163 4.32 3.7-5.5-7.3 33	375 0.177 5.08 4.0-5.8-7.6 36
4 slot	Airflow Cfm M³/sec P_S in mm H_2O Throw in m NC	232 0.109 1.14 1.2-2.4-4.0 16	257 0.121 1.40 1.5-2.7-4.3 19	290 0.137 1.78 1.8-3.3-4.9 23	320 0.151 2.16 2.1-3.7-5.5 25	346 0.163 2.54 2.4-4.0-6.1 28	380 0.179 3.05 3.0-4.6-6.7 30	418 0.197 3.68 3.3-4.9-7.0 33	452 0.213 4.32 3.7-5.2-7.0 36	490 0.231 5.08 4.0-5.5-7.6 40

- Neck velocity is measured in m/sec.
- P_S - Static pressure loss across the diffuser in mm of H_2O.
- Throw (meters) is measured for a terminal velocities of 0.75, 0.5 & 0.25 m/sec.
- Noice criteria (NC) is based on room attenuation of 10dB.

Chapter 8

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air master

Perforated ceiling diffuser

- with plenum box

Model: APCD + P

Construction:

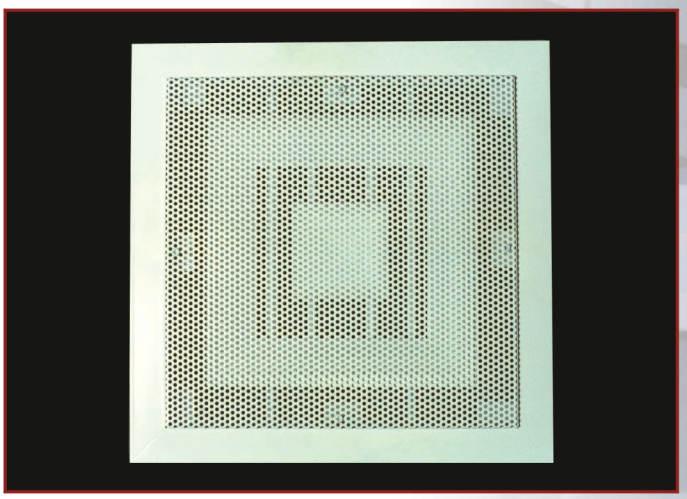
- **Frame:** High quality extruded aluminium profiles with 30 mm flange width as standard. 12, 16, 24 mm flange widths are optional.
- **Perforated panel:** 0.8 mm thick galvanized perforated steel sheet.
- **Plenum box:** Steel construction.

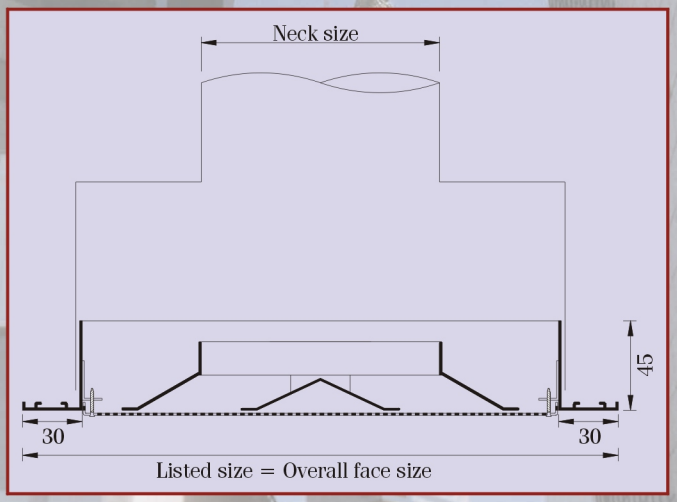
Description:

- Frame is fabricated from high quality extruded aluminium profiles with the advantages of corrosion resistance and rigidity.
- Perforated panel is fixed to the frame by screws. Panel can be removed easily by loosening the screws.
- For supply air diffusers, Perforated sheet is slightly lowered below the centre line. This arrangement provides improved horizontal airflow.
- Different types of internal cores can be fixed inside the perforated panel as option. Core is fixed to the frame with aluminium pins loaded with steel springs. Core can be easily removable and interchangeable to allow for maximum flexibility in installation and maintenance.
- Frame gasket is sealed around the back of the frame as option to avoid air leakage.
- Supply air diffusers are provided with plenum box.
- Because of high induction rates, velocity and temperature will be equalized quite rapidly above the occupied zone.

Standard finishes:

- Powder coated colour finish as per RAL colour codes.
- Flexibility of finishing is available as option.





air master

Perforated ceiling diffuser

Model: APCD

Construction:

- **Frame:** High quality extruded aluminium profiles with 30 mm flange width as standard. 12, 16, 24 mm flange widths are optional.
- **Perforated panel:** 0.8 mm thick galvanized perforated steel sheet.

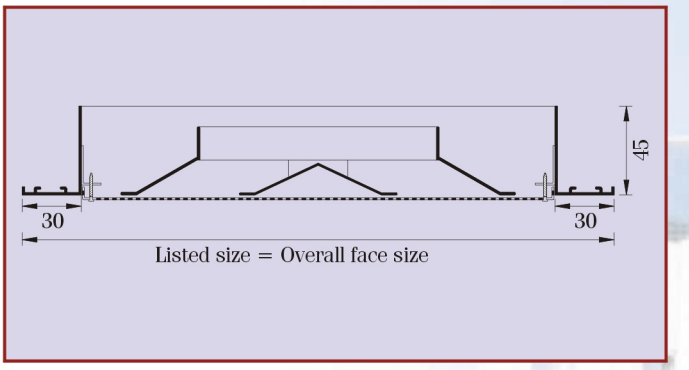
Description:

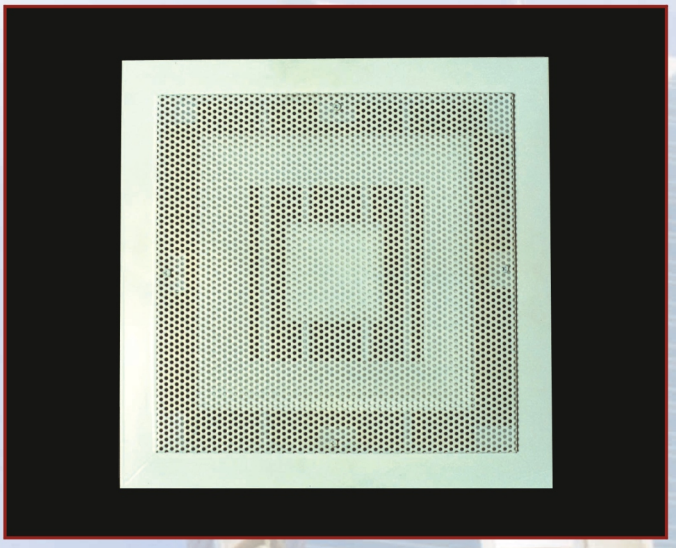
- Frame is fabricated from high quality extruded aluminium profiles with the advantages of corrosion resistance and rigidity.
- Perforated panel is fixed to the frame by screws. Panel can be removed easily by loosening the screws.
- Different types of internal cores can be fixed inside the perforated panel as option. Core is fixed to the frame with aluminium pins loaded with steel springs. Core can be easily removable and interchangeable to allow for maximum flexibility in installation and maintenance.

  Foam gasket is sealed around the back of the frame as option to avoid air leakage.

Standard finishes:

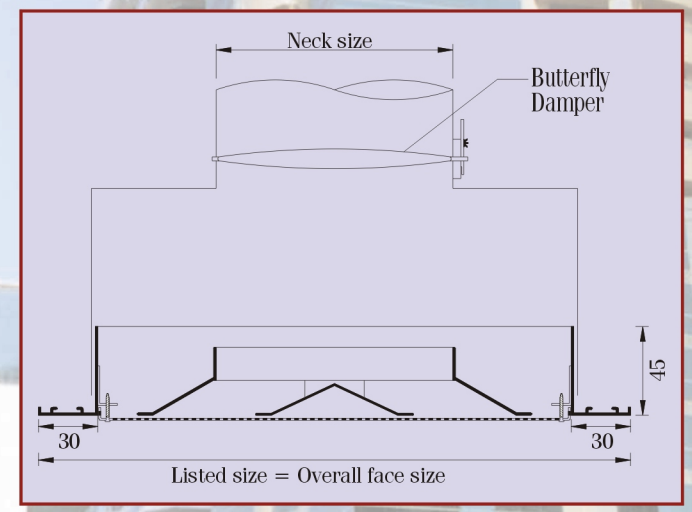
- Powder coated colour finish as per RAL colour codes.
- Flexibility of finishing is available as option.





Model : APCD+D
Type: Perforated ceiling diffuser with damper.

Construction is same as APCD+P, but with butterfly damper at the neck of the plenum.

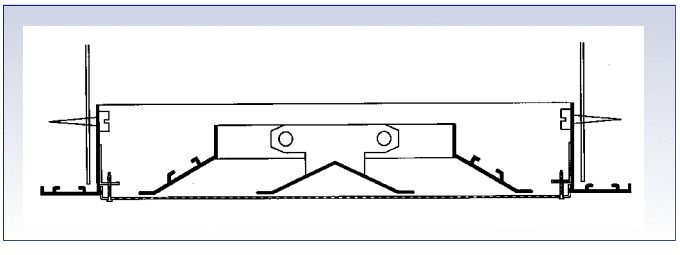


air master

Standard sizes:

- Available in square and rectangular sizes.
- Any combination of W x D.
- Non standard sizes are available.

W = width in mm	150	225	300	375	450	525	600
D = Depth in mm	150	225	300	375	450	525	600



Fixing details:

- Concealed screw fixing from neck of the diffuser to the duct.

How to order:

Model	Size	Quantity	Finish
APCD+P	Specify listed size in mm x mm	Specify in numbers	B = RAL - 9010
APCD			
APCD+D			C = Other RAL colours.

Tick the required item.

Selection example:

To select perforated ceiling diffuser with plenum of size 450 x 450. Quantity 60 nos, with RAL 9010 colour finish.

Order as : APCD+P-450 x 450 - 60 - B

air master

Perforated ceiling diffusers

Model: APCD+P

Table 8.1 Air flow data

a) Plenum Neck Size=150mm Ø, Module Size=300x300mm

Air flow in CFM Air flow in m^3/sec	75 0.0354	115 0.0543	150 0.071	200 0.0945	250 0.118	300 0.142
Neck velocity in m/sec.	2	3	4	5	6	7
P_s loss in mm H_2O	0.279	0.61	1.16	1.82	2.76	3.74
Throw in meters	0.3-0.3-0.4	0.3-0.6-1.2	0.3-0.6-1.5	0.3-0.9-1.8	0.3-1.2-2.4	0.6-1.2-2.7
NC	<15	16	24	30	38	45

b) Plenum Neck Size=200mm Ø, Module Size=400x400mm

Air flow in CFM Air flow in m^3/sec	140 0.066	210 0.099	280 0.132	350 0.165	420 0.198	490 0.231
Neck velocity in m/sec.	2	3	4	5	6	7
P_s loss in mm H_2O	0.44	1.02	1.85	2.96	4.4	5.95
Throw in meters	0.3-0.3-0.9	0.3-0.6-1.8	0.3-0.9-2.4	0.6-1.5-3.1	0.9-1.8-3.7	1.2-2.1-4.3
NC	<15	19	27	34	42	49

c) Plenum Neck Size=250mm Ø, Module Size=500x500mm

Air flow in CFM Air flow in m^3/sec	220 0.104	325 0.154	440 0.208	550 0.26	650 0.307	760 0.359
Neck velocity in m/sec.	2	3	4	5	6	7
P_s loss in mm H_2O	0.62	1.41	2.6	4.05	6.04	8.35
Throw in meters	0.3-0.3-1.5	0.3-0.9-2.4	0.6-1.5-3.4	1.2-2.1-4.3	1.5-2.4-5.2	1.8-3.1-6.1
NC	18	27	35	43	51	57

d) Plenum Neck Size=300mm Ø, Module Size=600x600mm

Air flow in CFM Air flow in m^3/sec	310 0.146	470 0.222	630 0.298	780 0.368	950 0.449	1100 0.52
Neck velocity in m/sec.	2	3	4	5	6	7
P_s loss in mm H_2O	0.8	1.83	3.34	5.23	7.76	10.72
Throw in meters	0.3-0.6-2.1	0.6-1.5-3.4	1.2-2.1-4.3	1.8-2.7-5.5	2.1-3.4-6.7	2.4-4.0-8.0
NC	24	33	43	50	58	>60

- Neck size measured in mm dia.
- P_s: Static pressure loss is in mm of H_2O.
- Throw (meters) is measured for a terminal velocities of 0.75, 0.5 & 0.25 m/sec.
- Noise criteria (NC) is based on room attenuation of 10 dB.

air master

Perforated 4 way adjustable ceiling diffuser

Model: APCS

Construction:

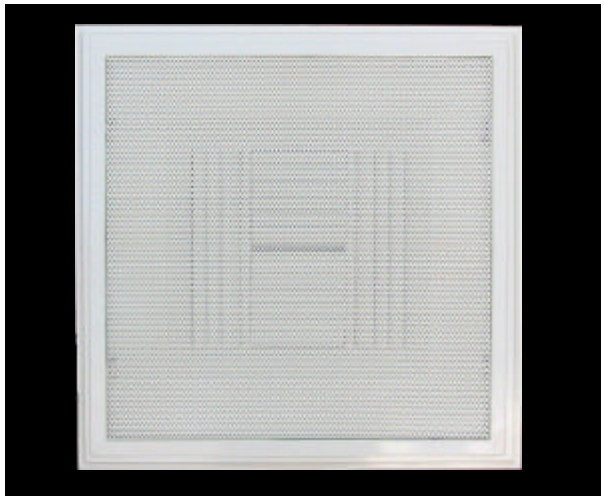
- **Frame:** High quality extruded aluminium profile.
- **Blades:** Aerofoil blades from aluminium profiles.
- **Outer frame:** High quality aluminium sheet.
- **Perforated panel:** 8mm thick galvanised perforated steel sheet.

Description:

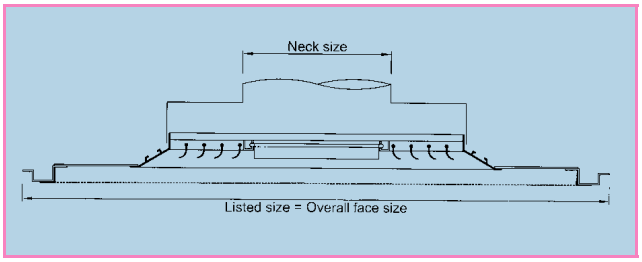
- This curved blades are specially designed so that the diffuser blades can be arranged in such a way when it is fully open deflects air equally in four directions.
- The diffuser pattern can be made as 1,2,3 way by arranging the blades.
- Perforated panel is fixed to the outer frame with adjustable slides. Panel can be removed easily by pulling it out.
- The internal core is made of curved blades which are individually adjustable. Core is fixed to the frame by screws and can be removed by loosening screws and interchangeble to allow for maximum flexibility in installation and maintenance.
- Foam gasket is sealed around the back of the frame as option to avoid air leakage.
- Supply air diffusers are provided with plenum box with round neck.

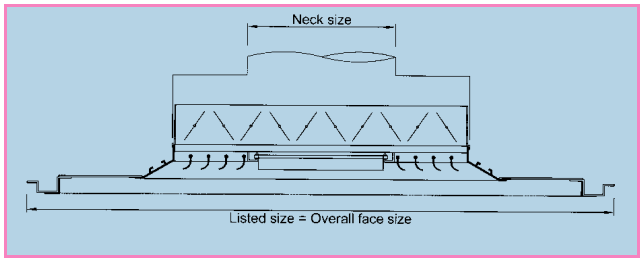
Standard finishes:

- Powder coated as per RAL color codes.
- Flexibility of finishing is available as option.



Model APCS+D:
Construction same as APCS with opposed blade damper





air master

Laminar flow panel

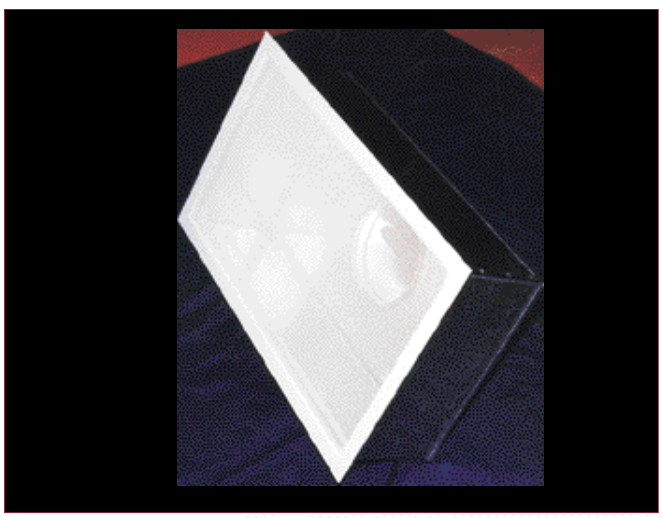
Model: ALP

Construction:

- **Frame:** High quality extruded aluminium profiles with 30 mm flange width as standard.
- **Perforated panel:** 0.8 mm thick galvanized perforated steel sheet.

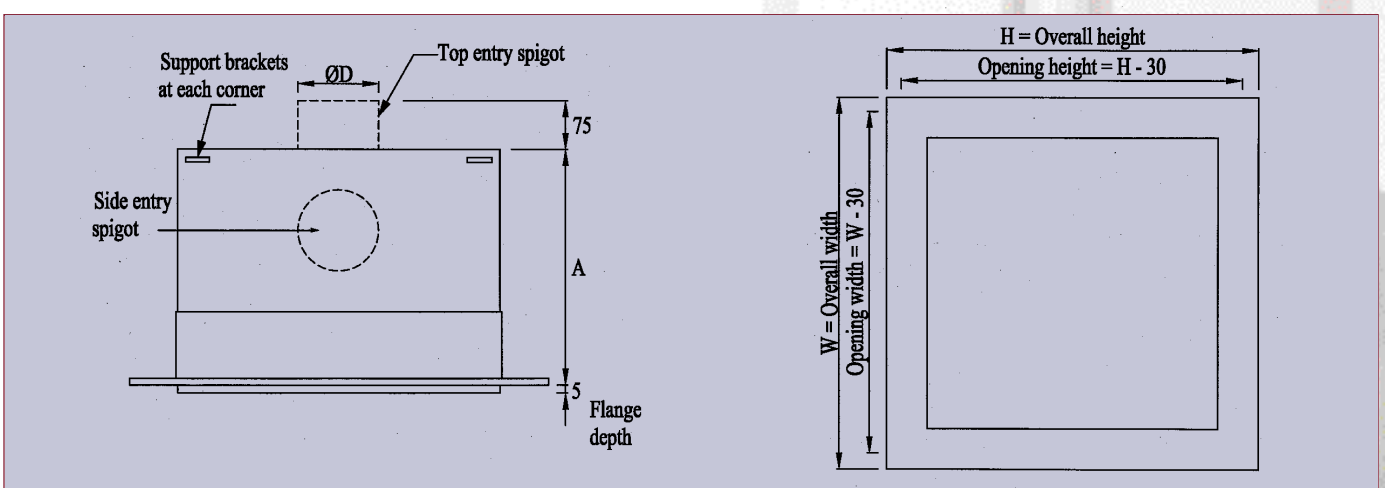
Description:

- Frame is fabricated from high quality extruded aluminium profiles with the advantages of corrosion resistance and rigidity.
- Perforated panel is fixed to the frame by screws. Panel can be removed easily by loosening the screws.
- Laminar flow panels are supplied with an inbuilt plenum box.
- Air master laminar flow panels used for a low velocity, evenly distributed, down word throw. Mostly used in operation theatres.



Standard finishes:

- Powder coated colour finish RAL 9010.
- Powder coated colour finish as per other RAL colour codes available.



How to order:

Model	Size	Quantity	Finish
ALP	Specify ceiling module size mm x mm	Specify in numbers	B = RAL - 9010
			C = Other RAL colours.

To select laminar flow panel for a size 600 x 600 mm of quantity 75 nos with RAL9010.
Order as : ALP- 600 x 600 -75 -B.

air master

Chapter 9

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air master

Disc valve

Model: ADV

Construction:

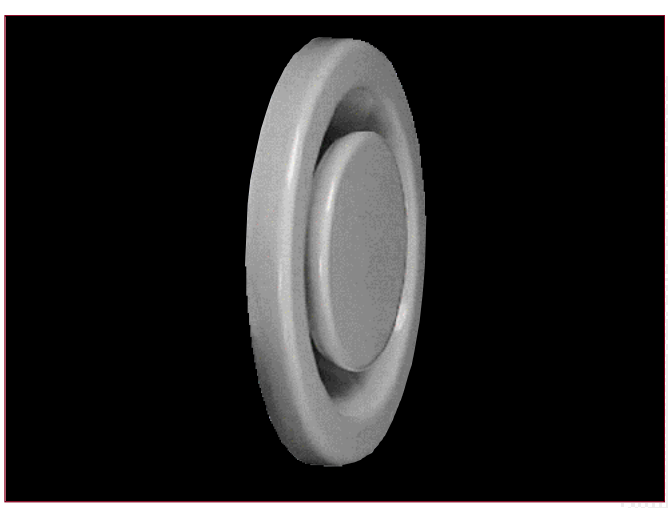
- **Frame and disc:** Steel sheet construction.
- **Mounting rings:** Galvanized sheet steel.

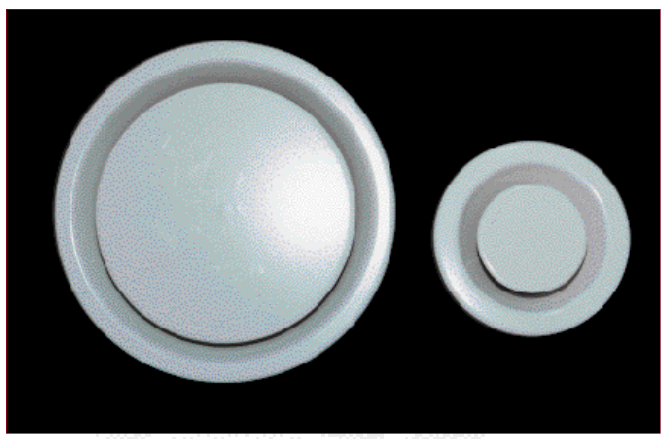
Description:

- Frame and disc is made of high quality galvanized steel sheet construction with powder coating to RAL colours.
- Disc is attached to the frame by threaded rod.
- Air flow can be adjusted by regulating the cone up or down (+A or -A)
- Foam gasket is sealed around the back of the frame to avoid air leakage.
- These valves can be used for supply, exhaust and ventilation applications.
- Air master disc valves are best suited to air distribution systems handling relatively low air flow rates within small circular duct work.
- Can be mounted in wall, ceiling or exposed air ducts with mounting rings.
- Recommended for exhaust of greasy and damp air in damp areas such as toilets, bathrooms and kitchens.

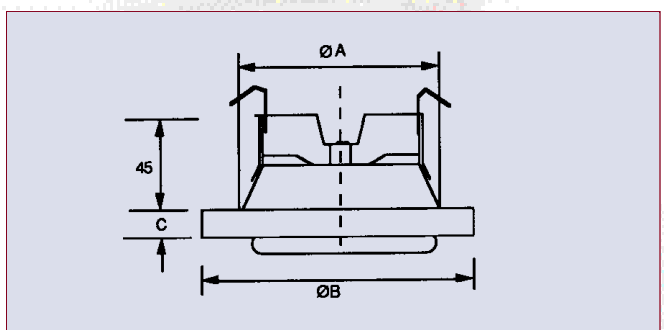
Standard finishes:

Steel sheet powder coated to RAL 9010 colour.
Flexibility of finishing is available as option.

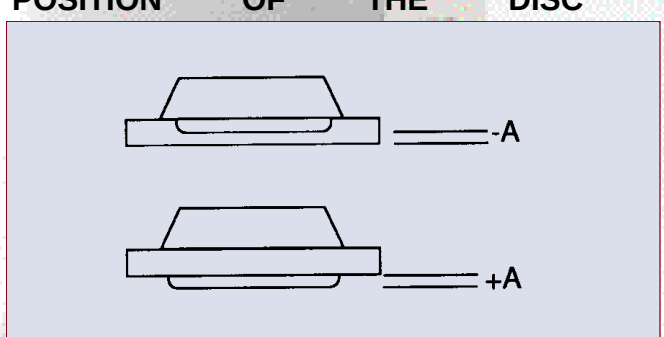




ADV



POSITION OF THE DISC



Size	ADV		
	A	B	C
80	80	106	15
100	100	135	15
125	125	160	15
160	160	194	15
200	200	238	18

air master

Standard sizes:

N = Neck size in mm dia	80	100	125	160	200

Fixing details:

Direct fixing into the duct with mounting rings.
First mounting ring has to be fixed into the duct outlet before the valve is pushed into the ring.

How to order:

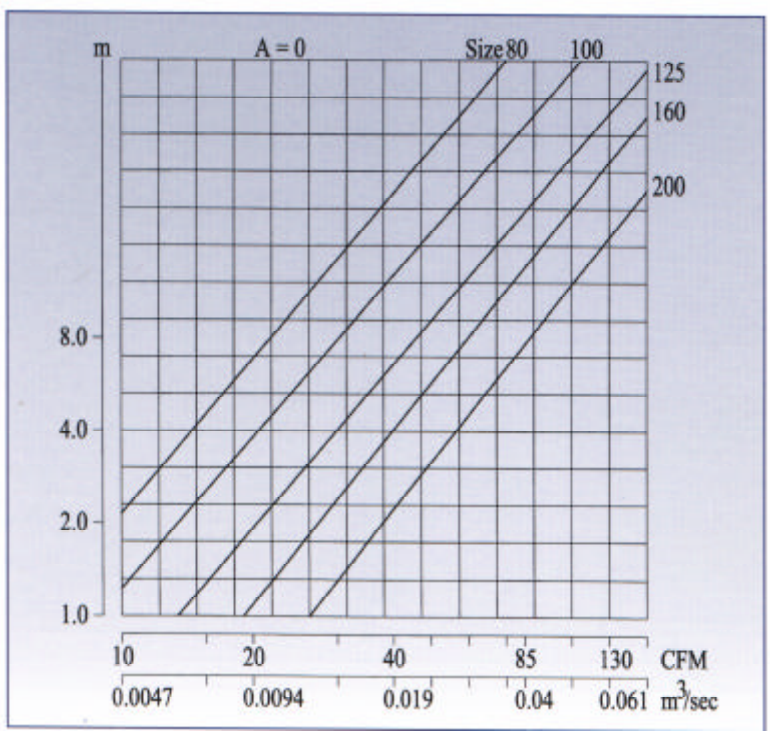
Model	Size	Quantity	Finish
ADV	Specify neck diameter of the valve in mm dia.	Specify in numbers	B = steel sheet with RAL 9010
			C = Other RAL colour

Ordering example:

To select Air master disc valves of dia 200 mm, quantity 50 nos with RAL 9010 colour.
Order as: ADV 200-50-B.

Performance data:

Table 9.1 Supply air valves Vs Throw in meters (A = 0)



Note:

- For position A = +10, reduce throw by 30%.
- For position A=-10, increase throw by 40%

air master

Disc valve

Model: ADV

Table 9.2(A) Air flow data
Supply air disc valve.

Neck size in mm dia	Position of disc	Air flow rate								
		CFM	10	20	40	60	80	100	120	140
		M^3/sec	0.0047	0.0094	0.0189	0.0283	0.0378	0.0472	0.0567	0.0661
80	A =+10	P_t in mm H_20 NC in dB	0.76 <20	1.83 22	5.6 38	----------	----------	----------	----------	----------
	A =0	P_t in mm H_20 NC in dB	1.22 <20	3.4 26	9.6 44	----------	----------	----------	----------	----------
	A =–10	P_t in mm H_20 NC in dB	2.04 <20	5.6 35	>20 >45	----------	----------	----------	----------	----------
100	A =+10	P_t in mm H_20 NC in dB	0.51 <20	1.12 <20	3.46 30	6.6 38	----------	----------	----------	----------
	A =0	P_t in mm H_20 NC in dB	0.71 <20	2.04 20	6.11 36	11.21 44	----------	----------	----------	----------
	A =–10	P_t in mm H_20 NC in dB	1.43 <20	4.08 31	12.23 45	>20 >45	----------	----------	----------	----------
125	A =+10	P_t in mm H_20 NC in dB	0.41 <20	1.12 <20	3.06 26	5.61 33	9.2 42	----------	----------	----------
	A =0	P_t in mm H_20 NC in dB	0.82 <20	1.83 <20	5.61 33	9.4 40	14.78 >45	----------	----------	----------
	A =–10	P_t in mm H_20 NC in dB	1.22 <20	3.06 26	8.87 42	16.3 >45	>20 >45	----------	----------	----------
160	A =+10	P_t in mm H_20 NC in dB	<0.4 <20	0.61 <20	1.83 20	4.3 25	5.7 31	9.2 37	12.7 40	----------
	A =0	P_t in mm H_20 NC in dB	<0.4 <20	1.22 <20	3.78 25	8.2 35	11.2 41	18.3 45	>20 >45	----------
	A =–10	P_t in mm H_20 NC in dB	1.0 <20	2.75 30	8.2 41	16.3 >45	>20 >45	>20 >45	>20 >45	----------
200	A =+10	P_t in mm H_20 NC in dB	<0.4 <20	<0.4 <20	0.82 <20	1.63 <20	3.1 22	4.1 25	5.1 33	7.9 37
	A =0	P_t in mm H_20 NC in dB	<0.4 <20	0.71 <20	1.83 <20	4.1 24	5.61 30	9.1 36	10.7 40	18.3 45
	A =–10	P_t in mm H_20 NC in dB	<0.4 <20	1.22 <20	4.3 26	7.6 35	10.7 39	18.3 45	>20 >45	>20 >45

- P_t = Total pressure loss across the disc valve in mm of H_2O.
- NC based on a room attenuation of 10 dB.
- A = +10,0 & -10 = Position of the disc 10 mm down of normal position, at normal position, and 10 mm above normal position.

air master

Disc valve

Model: ADV

Table 9.2(B) Air flow data
Return air disc valve.

Neck size in mm dia	Position of disc	Air flow rate								
		CFM	10	20	40	60	80	100	150	200
		M^3/sec	0.0047	0.0094	0.0189	0.0283	0.0378	0.0472	0.071	0.094
80	A =+10	P_t in mm H_20 NC in dB	<0.4 <20	0.91 <20	4.3 26	10.2 37	----------	----------	----------	----------
	A =0	P_t in mm H_20 NC in dB	<0.4 <20	1.43 <20	7.1 32	17.3 45	----------	----------	----------	----------
	A =–10	P_t in mm H_20 NC in dB	1.83 <20	5.1 23	18 45	>20 >45	----------	----------	----------	----------
100	A =+10	P_t in mm H_20 NC in dB	<0.4 <20	<0.4 <20	1.63 <20	3.8 23	5.8 31	9.7 37	----------	----------
	A =0	P_t in mm H_20 NC in dB	<0.4 <20	0.76 <20	2.5 <20	5.6 30	9.7 35	14.7 45	----------	----------
	A =–10	P_t in mm H_20 NC in dB	0.61 <20	2.24 <20	7.6 35	15.2 40	>20 >45	>20 >45	----------	----------
125	A =+10	P_t in mm H_20 NC in dB	<0.4 <20	<0.4 <20	0.71 <20	1.42 <20	2.9 20	4.1 25	9.7 37	----------
	A =0	P_t in mm H_20 NC in dB	<0.4 <20	<0.4 <20	1.83 <20	4.1 21	8.15 30	11.2 35	>20 >45	----------
	A =–10	P_t in mm H_20 NC in dB	<0.4 <20	2.1 <20	7.1 23	16.8 35	>20 >45	>20 >45	>20 >45	----------
160	A =+10	P_t in mm H_20 NC in dB	<0.4 <20	<0.4 <20	0.4 <20	0.81 <20	1.43 <20	2.1 <20	5.2 28	9.7 37
	A =0	P_t in mm H_20 NC in dB	<0.4 <20	<0.4 <20	0.81 <20	1.74 <20	3.4 <20	5.3 25	12.2 37	>20 45
	A =–10	P_t in mm H_20 NC in dB	<0.4 <20	0.5 <20	1.74 <20	3.8 <20	7.6 27	14.7 35	>20 >45	>20 >45
200	A =+10	P_t in mm H_20 NC in dB	<0.4 <20	<0.4 <20	<0.4 <20	<0.4 <20	0.76 <20	1.12 <20	2.6 27	4.38 34
	A =0	P_t in mm H_20 NC in dB	<0.4 <20	<0.4 <20	0.7 <20	1.4 <20	2.3 <20	3.4 20	8.4 35	12.2 42
	A =–10	P_t in mm H_20 NC in dB	<0.4 <20	0.5 <20	1.62 <20	3.4 <20	7.1 <20	11.2 34	>20 >45	>20 >45

- P_t = Total pressure loss across the disc valve in mm of H_2O.
- NC based on a room attenuation of 10 dB.
- A = +10,0 & -10 = Position of the disc 10 mm down of normal position, at normal position, and 10 mm above normal position.

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ISO 9002 certified company

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Fixed round ceiling diffuser

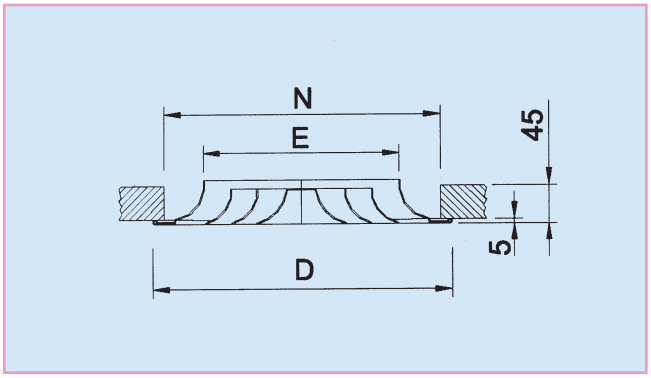
Model: ARDF

Construction:

- **Frame and inner cones:** High quality aluminium construction.
- **Damper frame and blades:** Steel sheet with black matt finish.

Description:

- Frame and inner cones are constructed from high quality aluminium sheet.
- Inner cones fixed rigidly to the frame.
- The butterfly damper in supply diffuser can be easily adjusted through the face of the unit by means of screw driver.
- The diffuser can be used for ceiling or exposed duct mounting and has a fixed horizontal air pattern.
- Foam gasket is sealed around the back of the frame as option to avoid air leakage.



Standard finishes:

- Aluminium construction with white powder coated finish (RAL 9010).
- Powder coated color finish as per other RAL color codes available as option.

	D	N	E
160	263	223	154
200	303	263	194
250	353	313	244
315	418	378	309
355	458	418	349
400	503	463	394

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Fixed round ceiling diffuser

Model: ARDF

Table 10.1 Air flow data

Neck dia in mm	Face velocity in m/sec	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0
160	Cfm M^3/sec P_s in mm H_2O Throw in m NC	51 0.0241 0.20 0.9-0.5 <15	66 0.0311 0.264 1.1-0.7 15	78 0.037 0.387 1.3-0.9 20	91 0.043 0.536 1.6-1.1 24	106 0.050 0.680 2.0-1.5 29	125 0.059 0.810 2.5-2.0 31	137 0.065 0.950 2.9-2.4 36	152 0.072 1.120 3.4-2.8 42	172 0.081 1.40 4.0-3.3 49
200	Cfm M^3/sec P_s in mm H_2O Throw in m NC	72 0.034 0.230 1.3-0.85 <15	93 0.044 0.279 1.5-1.0 15	117 0.055 0.447 1.8-1.3 20	136 0.064 0.677 2.1-1.5 23	155 0.073 0.850 2.5-1.9 28	174 0.082 1.050 2.9-2.2 31	195 0.092 1.250 3.4-2.6 35	218 0.103 1.510 4.0-3.1 42	248 0.117 2.1 4.8-3.7 50
250	Cfm M^3/sec P_s in mm H_2O Throw in m NC	116 0.055 0.301 1.6-1.1 <15	146 0.067 0.362 1.9-1.4 15	176 0.083 0.487 2.4-1.8 18	203 0.096 0.661 2.7-2.0 23	231 0.109 1.080 3.0-2.2 29	258 0.122 1.290 3.5-2.5 33	288 0.136 1.530 4.2-3.0 38	320 0.151 2.0 5.0-3.6 45	358 0.167 2.40 6.0-4.4 53
315	Cfm M^3/sec P_s in mm H_2O Throw in m NC	177 0.083 0.410 1.8-1.3 <15	222 0.105 0.480 2.2-1.6 15	267 0.126 0.653 2.5-2.0 21	314 0.148 1.020 3.1-2.5 25	354 0.167 1.260 3.6-3.0 30	392 0.185 1.820 4.2-3.2 34	437 0.206 2.20 4.9-3.8 38	487 0.230 2.60 5.8-4.6 45	542 0.257 3.20 7.0-5.6 55
355	Cfm M^3/sec P_s in mm H_2O Throw in m NC	244 0.115 0.194 2.0-1.4 <15	297 0.140 0.229 2.5-1.7 15	350 0.165 0.390 3.1-2.4 19	413 0.195 0.586 3.6-2.7 26	466 0.220 0.809 4.2-3.0 30	530 0.250 1.160 4.7-2.3 35	583 0.275 1.40 5.6-3.9 43	639 0.301 1.680 6.7-4.6 52	699 0.330 2.020 8.1-5.6 60
400	Cfm M^3/sec P_s in mm H_2O Throw in m NC	270 0.127 0.163 2.1-1.5 <15	333 0.157 0.192 2.5-1.8 15	396 0.187 0.309 3.0-2.3 20	460 0.217 0.469 3.6-2.7 25	530 0.250 0.589 4.1-3.0 29	591 0.279 0.827 4.6-3.2 34	654 0.308 1.10 5.4-3.8 41	719 0.339 1.40 6.5-4.6 50	789 0.372 1.70 7.9-5.4 61

- Neck size measured in mm dia.
- P_s - Static pressure loss is in mm of H_2O.
- Throw (meters) is measured for a terminal velocities of 0.25 & 0.5 m/sec.
- Noice criteria (NC) is based on a room attenuation of 10dB.

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Round ceiling diffuser

-adjustable pattern

Model: ARD

Construction:

- **Frame & inner cones:** High quality aluminium sheet as standard. Steel construction as option.
- **Damper frame and blade:** Steel sheet with black matt finish.

Description:

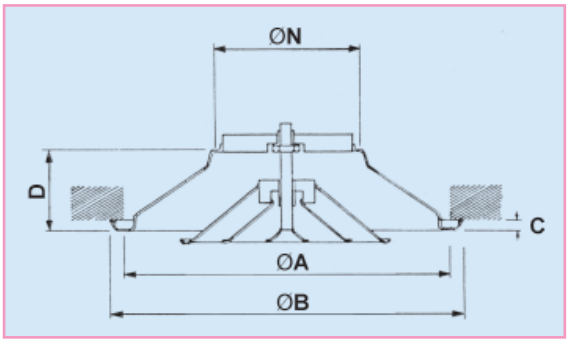
- Frame and inner cones are made of high quality aluminium sheet construction with the advantages of corrosion resistance and rigidity.
- By means of its inner adjustable cones, air pattern can be adjusted from horizontal projection to vertical projection.
- Inner cones fixed centrally to the frame. Cones can be easily removed and fixed. This provides easy installation, maintenance and access to the duct.
- The butterfly damper in supply diffuser can be easily adjusted through the face of the unit by means of screw driver after removing the inner cones.
- Discharge pattern can be adjusted for horizontal flow by extending the cones and for vertical flow by retracting the cones.
- Can be used for ceiling or exposed duct mounting especially in installation when an adjustable pattern is required.

Standard finishes:

- Aluminium construction with white powder coated finish(9010).
- Steel construction with white powder coated finish(9010).
- Powder coated color finish as per other RAL color codes available as option.

ARD	N in mm dia	A	B	C	D
160	160	295	320	9.5	46
200	200	390	428	11	60
250	250	483	536	12.7	81
315	315	573	645	15.9	95
355	355	663	746	19	114
400	400	755	863	22	130
450	450	848	978	19	147
500	500	940	4092	22	166

- Nominal size.
- All the dimension are in mm



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Round ceiling diffuser

-adjustable pattern

Model: ARD

Table 10.2 Air flow data

Neck dia in mm	Face velocity in m/sec	2.0	2.5	3.0	4.0	5.0	6.0	7.0
160	Cfm M^3/sec P_s in mm H_2O Throw in m NC	60 0.028 0.36 0.3-0.5-0.8 <15	74 0.035 0.55 0.4-0.6-1.2 16	89 0.042 0.78 0.5-0.7-1.6 22	119 0.056 1.43 0.7-1.2-1.8 30	148 0.07 2.24 0.9-1.4-2.4 35	178 0.084 3.26 1.2-1.7-2.9 40	207 0.098 4.28 1.4-2.0-3.4 45
200	Cfm M^3/sec P_s in mm H_2O Throw in m NC	110 0.052 0.36 0.5-0.7-1.3 15	138 0.065 0.55 0.6-0.9-1.7 19	165 0.078 0.78 0.7-1.2-2.0 24	220 0.104 1.43 1.0-1.6-2.5 31	275 0.13 2.24 1.3-1.9-3.3 37	330 0.156 3.26 1.6-2.4-4.0 41	385 0.182 4.28 1.9-2.8-4.8 47
250	Cfm M^3/sec P_s in mm H_2O Throw in m NC	178 0.084 0.36 0.7-0.9-1.7 15	222 0.105 0.55 0.8-1.3-2.3 21	267 0.126 0.78 1.0-1.5-2.5 26	356 0.168 1.43 1.3-2.0-3.4 32	445 0.21 2.24 1.7-2.4-4.0 38	534 0.252 3.26 2.0-3.0-5.0 43	622 0.294 4.28 2.3-3.6-6.2 48
315	Cfm M^3/sec P_s in mm H_2O Throw in m NC	263 0.124 0.36 0.8-1.2-2.0 15	328 0.155 0.55 0.9-1.4-2.2 22	394 0.186 0.78 1.2-1.7-2.8 26	525 0.248 1.43 1.4-2.2-3.8 34	656 0.31 2.24 2.0-3.0-5.0 39	788 0.372 3.26 2.2-3.5-5.7 44	920 0.434 4.28 2.8-4.4-6.8 49
355	Cfm M^3/sec P_s in mm H_2O Throw in m NC	360 0.17 0.36 0.9-1.3-2.3 16	450 0.213 0.55 1.1-1.6-2.8 23	540 0.255 0.78 1.3-2.0-3.4 27	720 0.34 1.43 1.8-2.8-4.4 35	900 0.425 2.24 2.2-3.5-5.7 41	1080 0.51 3.26 2.8-4.4-6.8 45	1260 0.595 4.28 3.4-5.0-8.6 50
400	Cfm M^3/sec P_s in mm H_2O Throw in m NC	475 0.224 0.36 1.0-1.6-2.6 17	593 0.28 0.55 1.3-2.0-3.2 23	711 0.336 0.78 1.6-2.4-4.0 27	949 0.448 1.43 2.1-3.2-5.2 36	1186 0.56 2.24 2.6-4.0-5.6 41	1423 0.672 3.26 3.1-4.8-7.6 46	1660 0.784 4.28 3.6-5.6-9.6 51
450	Cfm M^3/sec P_s in mm H_2O Throw in m NC	605 0.286 0.36 1.3-1.8-3.0 19	758 0.358 0.55 1.5-2.4-3.6 25	908 0.429 0.78 1.8-2.7-4.5 29	1210 0.572 1.43 2.4-3.6-6.0 37	1514 0.715 2.24 3.0-4.5-7.5 43	1817 0.858 3.26 3.5-5.4-8.6 48	2117 1.0 4.28 4.0-6.0-10.0 52
500	Cfm M^3/sec P_s in mm H_2O Throw in m NC	750 0.354 0.36 1.4-2.0-3.4 20	938 0.443 0.55 1.8-2.6-4.4 26	1125 0.531 0.78 2.0-3.0-5.0 31	1500 0.708 1.43 2.7-4.0-5.4 38	1874 0.885 2.24 3.5-5.2-8.4 44	2245 1.06 3.26 4.2-6.2-10 48	2623 1.239 4.28 4.8-7.6-12.0 53

- Neck size measured in mm dia.
- P_s - Static pressure loss is in mm of H_2O.
- Throw (meters) is measured for a terminal velocities of 0.25 & 0.5 m/sec.
- Noice criteria (NC) is based on a room attenuation of 10dB.

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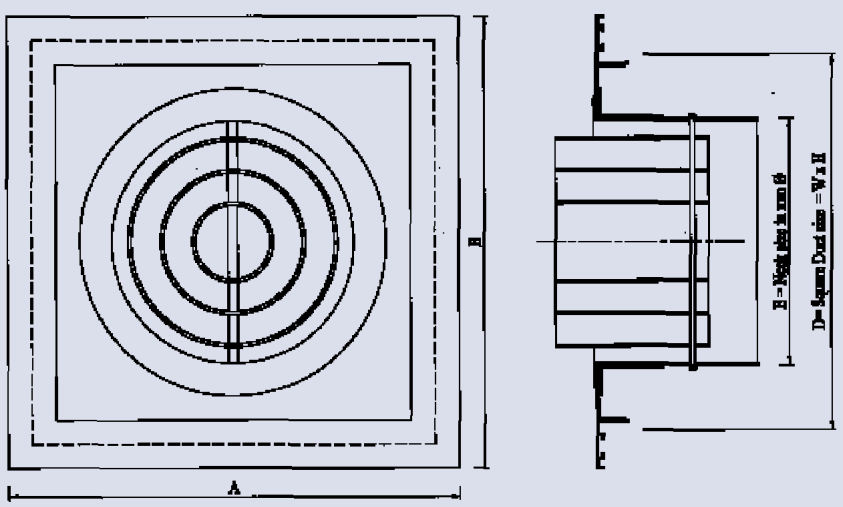
Jet diffuser
– Panel type
Model: AJD-P

Construction:
- **Frame:** High quality heavy gauge aluminium sheet.
- **Outer flange:** High quality extruded aluminium profiles.
- **Inner rings:** Aluminium spun rings.
- **Optional accessories:** Plenum box either lined or un lined as per clients choice.

Description:
- Frame and inner rings are high quality aluminium construction with the advantages of corrosion resistance.
- Jet nozzle section is mounted in aluminium square plate covered by flanged border.
- Nozzles can be adjusted 30^0 up words and down words to achieve required throw as per site condition. Nozzle jet can be rotated by 360^0 by adjusting the mounting frame.
- Generally designed for wall mounting. For ceiling mounting, drill 2 to 4 holes in the face of the flanged border.
- Air master jet diffusers are specially suitable to handle large quantity of air with long throw.
- Ideal for commercial use such as concert halls, theatres, exhibition and sport halls.
- Jet nozzles can be supplied with plenum box, which is manufactured from galvanized steel sheet as option.
- Plenum boxes can be supplied with round duct damper at the spigot as option.

Standard finishes:
- Powder coated colour finish as per RAL colour codes.
- Flexibility of finishing is available.



Standard sizes:
Available from 100 mm dia to 400 mm dia with the increments of 50 mm.

D = Dia of jet diffuser in mm	100	150	200	250	300	350	400

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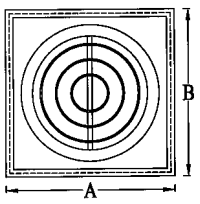
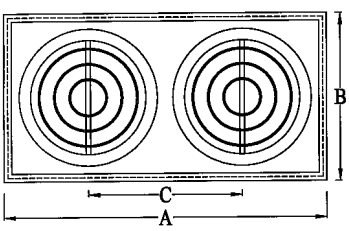
Fixing details: Screw fixing from flange to duct.

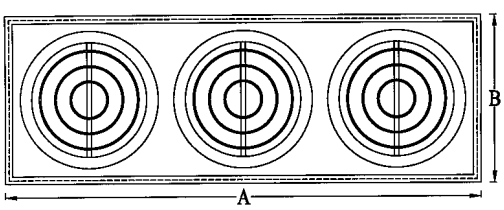
Panel arrangement:

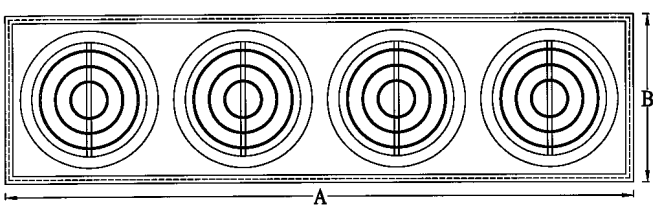
1,2,3 or 4 nos of jet diffusers will be arranged in a panel as per performance requirement.



Model	Duct size L x W in	A	B	(Ø) E
AJD 100-P	200 x 200	250	250	100
AJD 150-P	250 x 250	300	300	150
AJD 200-P	300 x 300	350	350	200
AJD 250-P	350 x 350	400	400	250
AJD 300-P	400 x 400	450	450	300
AJD 350-P	450 x 450	500	500	350
AJD 400-P	500 x 500	550	550	400







Model	Duct size L x W in	A	B	C
AJD 100-2P	390 x 200	440	250	200
AJD 100-3P	580 x 200	630	250	200
AJD 100-4P	790 x 200	840	250	200
AJD 150-2P	490 x 250	540	300	250
AJD 150-3P	730 x 250	780	300	250
AJD 150-4P	990 x 250	1040	300	250
AJD 200-2P	590 x 300	640	350	300
AJD 200-3P	880 x 300	930	350	300
AJD 200-4P	1190 x 300	1240	350	300
AJD 250-2P	690 x 350	740	400	350
AJD 250-3P	1030 x 350	1080	400	350
AJD 250-4P	1390 x 350	1440	400	350
AJD 300-2P	790 x 400	840	450	400
AJD 300-3P	1180 x 400	1230	450	400
AJD 300-4P	1590 x 400	1640	450	400
AJD 350-2P	890 x 450	940	500	450
AJD 350-3P	1330 x 450	1380	500	450
AJD 350-4P	1770 x 450	1820	500	450
AJD 400-2P	990 x 500	1040	550	500
AJD 400-3P	1480 x 500	1530	550	500
AJD 400-4P	1970 x 500	2020	550	500

- All sizes are in mm.

How to order:

Model	Size	No of diffusers / panel	Quantity	Finish	Optional accessories
AJD	Specify neck diameter of the inner round diffuser	P	Specify in numbers	B = RAL 9010	Plenum box
		2P			
		3P		C = Other RAL colours.	
		4P			

Ordering example:

To select jet diffuser of size 150 mm dia, 4 diffusers arranged in one panel, quantity = 25 nos with RAL 9010 colour.

Order as : AJD 150 - 4P - 25 - B.

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Jet diffuser
– Panel type
Model: AJD-P

Table 11.1 (A) Air flow data
Jet diffuser at 0^0 position

Size in mm dia	Neck velocity in m/sec	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0	7.0
Neck area in sq mt	P_v=vel pr loss in mm H_2O	0.15	0.25	0.41	0.56	0.79	1.016	1.57	2.29	3.1
100 0.0079	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	30 0.0141 <0.25 2.7 <15	40 0.0189 <0.25 3.1 <15	50 0.0236 0.76 3.4 15	60 0.0283 1.22 3.8 16	70 0.0331 1.65 3.9 22	80 0.378 2.37 4.2 24	90 0.0425 3.08 4.2 33	110 0.052 3.68 4.5 36	130 0.614 6.0 4.7 42
150 0.0177	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	60 0.0283 <0.25 3.0 <15	80 0.0378 <0.25 3.9 <15	100 0.0472 0.51 4.5 15	120 0.0567 0.76 4.8 16	140 0.066 1.27 4.8 24	160 0.756 1.25 5.7 26	200 0.0945 2.06 6.4 33	240 0.113 3.35 7.1 37	280 0.132 4.75 7.7 43
200 0.0314	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	110 0.052 <0.25 4.3 <15	140 0.066 0.254 5.8 <15	180 0.085 0.51 6.1 15	210 0.099 0.61 6.9 16	250 0.118 1.02 7.1 24	280 0.132 1.54 7.8 27	350 0.165 2.51 8.5 33	420 0.198 4.19 8.9 37	490 0.231 6.15 15 43
250 0.049	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	170 0.08 <0.25 6.4 <15	220 0.104 <0.25 7.7 <15	280 0.132 0.25 7.9 15	330 0.156 0.46 8.8 16	390 0.184 0.76 8.8 25	440 0.208 1.12 9.7 27	550 0.26 1.5 10.2 34	660 0.312 2.12 11.27 38	770 0.364 2.79 18 44
300 0.071	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	240 0.113 <0.25 7.6 <15	320 0.151 <0.25 8.6 <15	400 0.189 <0.25 9.2 15	480 0.227 0.9 9.7 16	550 0.26 1.02 10.0 27	630 0.298 1.4 10.6 29	790 0.373 1.4 12.3 34	950 0.449 1.67 12.53 38	1100 0.519 2.79 12.8 45
350 0.096	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	330 0.156 <0.25 8.2 <15	430 0.203 <0.25 9.6 <15	540 0.255 <0.25 10.1 15	650 0.307 0.84 11.5 17	750 0.354 0.78 11.9 27	860 0.406 0.88 12.3 29	1070 0.505 1.17 13 35	1290 0.609 1.46 15.5 39	1500 0.708 3.5 17.6 45
400 0.126	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	420 0.198 <0.25 9.1 <15	560 0.264 <0.25 10.9 <15	700 0.331 <0.25 11.5 15	840 0.397 0.62 12.8 17	980 0.463 0.92 12.7 29	1120 0.529 1.17 13.9 31	1400 0.66 1.46 16.3 36	1680 0.793 1.75 18.5 41	1960 0.926 2.04 20.8 46

- Neck velocity is measured in m/sec.
- P_s & P_v = Static and dynamic pressure losses across the diffuser in mm of H_2O.
- Throw (meters) is measured for a terminal velocities of 0.25 m/sec.
- NC based on room attenuation of 10 dB.

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Jet diffuser
– Panel type
Model: AJD-P

Table 11.1(B) Air flow data
Jet diffuser at 30^0 position

Size in mm dia	Neck velocity in m/sec	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0	7.0
Neck area in sq mt	P_v=vel pr loss in mm H_2O	0.15	0.25	0.41	0.56	0.79	1.016	1.57	2.29	3.1
100 0.0079	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	30 0.0141 <0.25 2.4 <15	40 0.0189 <0.25 2.4 <15	50 0.0236 1.67 2.7 <15	60 0.0283 1.81 2.9 19	70 0.0331 2.8 3.4 24	80 0.378 3.4 3.7 32	90 0.0425 4.3 4.0 36	110 0.052 6.2 4.3 40	130 0.614 8.7 4.6 44
150 0.0177	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	60 0.0283 0.51 2.4 <15	80 0.0378 <0.75 3.0 <15	100 0.0472 1.4 3.7 <15	120 0.0567 1.4 4.6 19	140 0.066 1.76 5.0 24	160 0.756 2.13 5.5 33	200 0.0945 3.64 6.1 36	240 0.113 5.8 6.7 40	280 0.132 8.5 7.0 45
200 0.0314	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	110 0.052 <0.25 3.7 <15	140 0.066 0.51 5.2 18	180 0.085 0.84 5.5 18	210 0.099 1.11 6.1 19	250 0.118 1.71 6.4 24	280 0.132 2.85 7.0 33	350 0.165 3.41 7.6 37	420 0.198 6.1 8.2 40	490 0.231 8.7 8.5 45
250 0.049	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	170 0.08 <0.25 5.5 <15	220 0.104 0.51 6.1 <15	280 0.132 0.84 6.4 15	330 0.156 1.11 7.3 20	390 0.184 1.42 8.3 25	440 0.208 1.76 8.5 33	550 0.26 2.6 9.5 37	660 0.312 3.8 10.1 42	770 0.364 7.0 10.7 46
300 0.071	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	240 0.113 <0.25 6.4 <15	320 0.151 <0.25 7.0 <15	400 0.189 0.7 7.9 <15	480 0.227 1.11 8.5 21	550 0.26 1.42 9.5 27	630 0.298 2.85 9.8 34	790 0.373 2.56 11.6 38	950 0.449 2.9 12.2 43	1100 0.519 5.8 12.5 47
350 0.096	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	330 0.156 <0.25 7.0 <15	430 0.203 <0.25 7.9 <15	540 0.255 0.73 9.5 <15	650 0.307 1.14 10.1 21	750 0.354 1.14 11.0 27	860 0.406 1.42 11.9 36	1070 0.505 1.71 12.5 38	1290 0.609 2.9 14.0 43	1500 0.708 7.3 15.2 47
400 0.126	Cfm M^3/sec. P_s in mm H_2O Throw in m NC	420 0.198 <0.25 8.2 15	560 0.264 <0.25 9,8 <15	700 0.331 0.84 11.0 <15	840 0.397 1.06 11.9 22	980 0.463 0.63 12.5 28	1120 0.529 0.85 13.1 36	1400 0.66 1.17 14.6 39	1680 0.793 2.05 16.4 43	1960 0.926 2.5 18.3 47

- Neck velocity is measured in m/sec.
- P_s & P_v = Static and dynamic pressure losses across the diffuser in mm of H_2O.
- Throw (meters) is measured for a terminal velocities of 0.25 m/sec.
- NC based on room attenuation of 10 dB.

air master

Jet Diffuser

-eyeball type

Model: AJD

Construction:

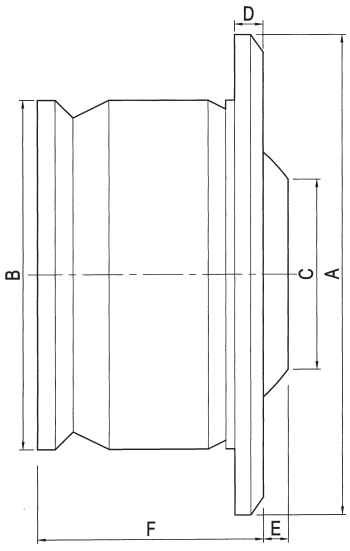
- Constructed with high quality aluminium sheets.

Description:

- Airmaster eyeball jet diffusers are highly suitable for delivering a powerful stream of air over long distances. Its ability to deliver an accurate airstream makes it ideal for spot cooling applications.
- It's angular movement allows the airstream to be delivered through a wide area of direction either in full jet position or in reduced jet position.
- This diffuser spout is fully reversible, rotating through 180deg.
- The diffuser can be fixed directly to the round duct.
- The diffuser is suitable for long throw patterns with trajectory control.
- Gasket is sealed around the back of the spout to avoid air leakage.

Finishes:

- Available standard finishes are RAL 9010, RAL 9003 & RAL 9016.
- Special finishes are available as per RAL color codes.



Dimensions of various sizes:

Size	A	B	C	D	E	F
160	216	158	82	11	10	106
200	273	198	108	16	14	127
250	318	248	136	16	23	159
315	400	313	174	23	29	189
400	483	398	230	24	47	223

air master

Jet diffuser
-eyeball type
Model: AJD

Table - Air flow data

Size in mm dia Neck area in sq.mt.	Neck velocity in m/sec	2.5	3.0	3.5	4.0	4.5	5.0	5.5
160 0.0201	L/S M^3/sec CFM P in mm H_2O Throw in m NC	12 0.012 25 0.43 3.7- 5.6 <15	15 0.015 32 0.54 4.3 - 6.5 <15	18 0.018 38 0.64 4.9 - 7.3 <15	21 0.021 44 0.87 5.7 - 8.6 16	24 0.024 51 1.13 6.6 - 9.9 17	26 0.026 55 1.295 7.1 - 10.7 18	28 0.028 59 1.472 7.7-11.5 19
200 0.0314	L/S M^3/sec CFM P in mm H_2O Throw in m NC	22 0.022 46 0.635 5.1 - 7.6 <15	25 0.025 53 0.77 5.7 - 8.6 <15	30 0.03 63 1.044 6.8 - 10.2 16	35 0.035 74 1.336 7.9 - 11.9 17	40 0.04 85 1.589 8.8 - 13.2 18	44 0.044 93 1.858 9.6 - 14.4 19	50 0.05 106 2.366 11.1 - 16.7 20
250 0.049	L/S M^3/sec CFM P in mm H_2O Throw in m NC	34 0.034 72 0.446 6.4 - 9.6 <15	41 0.041 87 0.611 7.7 - 11.5 <15	48 0.048 102 0.795 8.9 - 13.4 17	54 0.054 114 0.968 10.0 - 15.0 18	61 0.061 129 1.187 11.2 - 16.9 19	68 0.068 144 1.424 12.5 - 18.7 20	75 0.075 159 1.678 13.7 - 20.6 22
315 0.0201	L/S M^3/sec CFM P in mm H_2O Throw in m NC	57 0.057 121 0.66 6.8 - 9.8 <15	68 0.068 144 0.871 7.7 - 11.6 <15	80 0.08 169 1.126 9.0 - 13.4 18	92 0.092 195 1.403 10.3 - 15.4 19	102 0.102 216 1.651 11.3 - 17.0 20	115 0.115 243 1.994 12.7 - 19.0 21	125 0.125 265 2.274 13.7 - 20.6 22
400 0.1257	L/S M^3/sec CFM P in mm H_2O Throw in m NC	127 0.127 269 0.81 6.8 - 10.1 <15	152 0.152 322 1.1 9.2 - 12.5 <15	182 0.182 385 1.39 11.7 - 14.9 16	217 0.217 459 1.64 14.2 - 17.4 18	252 0.252 534 1.89 16.8 - 20.0 19	287 0.287 608 2.18 19.4 - 22.5 21	323 0.323 684 2.47 22.0 - 25.0 23

- Neck velocity is measured in m/sec.
- P = Pressure losses across the diffuser in mm of H_2O.
- Throw (meters) is measured for a terminal velocity of 0.5 m/sec and 0.25 m/sec.
- Noice criteria (NC) is based on a room attenuation of 10dB.

air master

Jet diffuser
-eyeball type
Model: AJD

Table - Air flow data

Size in mm dia Neck area in sq.mt.	Neck velocity in m/sec	6.0	7.0	7.5	8.0	8.5	9.0	9.5
160 0.0201	L/S M^3/sec CFM P in mm H_2O Throw in m NC	30 0.03 63 1.751 8.5 - 12.8 20	35 0.035 74 2.3 9.9 - 14.9 21	37 0.037 78 2.4 10.5 - 15.7 22	40 0.04 85 2.8 11.3 - 17.0 23	43 0.043 91 3.0 11.9 - 17.8 24	45 0.045 95 3.4 12.7 - 19.1 24	48 0.048 102 3.6 12.3 - 19.9 25
200 0.0314	L/S M^3/sec CFM P in mm H_2O Throw in m NC	55 0.055 116 2.757 12.2 - 18.3 22	60 0.06 127 3.169 13.3 - 19.9 24	64 0.064 136 3.5 14.1 - 21.1 25	69 0.069 146 3.8 14.9 - 22.4 26	73 0.073 155 4.3 16.0 - 24.0 28	78 0.078 165 4.8 17.0 - 26.0 28	82 0.082 174 5.2 18.0 - 27.0 29
250 0.049	L/S M^3/sec CFM P in mm H_2O Throw in m NC	81 0.081 171 1.908 14.8 - 22.1 24	95 0.095 201 2.5 17.2 - 25.8 26	102 0.102 216 2.807 18.4 - 27.6 27	109 0.109 231 3.136 19.6 - 29.5 28	115 0.115 244 3.431 20.7 - 31.0 29	123 0.123 261 3.787 21.9 - 32.8 29	130 0.13 276 4.212 23.3 - 34.9 30
315 0.0779	L/S M^3/sec CFM P in mm H_2O Throw in m NC	136 0.136 288 2.598 14.9 - 22.3 23	141 0.141 298 2.719 15.3 - 22.9 24	160 0.16 340 3.356 17.3 - 26.6 25	181 0.181 384 4.04 19.4 - 29.0 26	193 0.193 410 4.51 20.7 - 31.0 27	205 0.205 435 4.921 21.8 - 32.7 29	216 0.216 458 5.346 22.9 - 34.3 30
400 0.1257	L/S M^3/sec CFM P in mm H_2O Throw in m NC	363 0.363 769 2.76 24.1 - 27.4 25	405 0.405 858 3.6 25.5 - 30.0 27	447 0.447 949 3.6 26.7 - 32.2 29	482 0.482 1023 3.95 28.2 - 35.2 30	527 0.527 1119 4.35 30.1 - 37.1 31	569 0.569 1208 4.8 32.8 - 39.1 32	610 0.61 1295 5.25 33.3 - 40.1 33

- Neck velocity is measured in m/sec.
- P = Pressure losses across the diffuser in mm of H_2O.
- Throw (meters) is measured for a terminal velocity of 0.5 m/sec and 0.25 m/sec.
- Noice criteria (NC) is based on a room attenuation of 10dB.

air master

Jet diffuser
-eyeball type
Model: AJD

Table - Air flow data

Size in mm dia Neck area in sq.mt.	Neck velocity in m/sec	10.0	10.5	11.0	11.5	12.0
160 0.0201	L/S M^3/sec CFM P in mm H_2O Throw in m NC	50 0.05 106 4.0 14.1 - 21.2 26	53 0.053 112 4.3 14.7 - 22.0 27	55 0.055 117 4.7 15.5 - 23.3 28	58 0.058 123 5.0 16.1 - 25.0 29	63 0.063 134 5.3 17.0 - 25.6 30
200 0.0314	L/S M^3/sec CFM P in mm H_2O Throw in m NC	86 0.086 182 5.5 18.5 - 28.0 30	90 0.09 191 6.06 19.5 - 29.3 32	95 0.095 201 6.61 20.6 - 30.0 33	99 0.099 210 6.95 21.2 - 31.8 34	105 0.105 223 7.22 22.6 - 33.4 35
250 0.049	L/S M^3/sec CFM P in mm H_2O Throw in m NC	136 0.136 289 4.487 24.1 - 36.2 31	143 0.143 303 4.94 25.5 - 38.3 32	150 0.150 318 5.352 26.7 - 40.1 33	158 0.158 335 5.776 27.9 - 41.9 34	165 0.165 350 6.025 30.1 - 44.0 35
315 0.0779	L/S M^3/sec CFM P in mm H_2O Throw in m NC	228 0.228 484 5.783 24.0 - 36.0 31	239 0.239 507 6.316 25.3 - 37.9 33	250 0.250 531 6.78 26.4 - 39.6 34	264 0.264 560 7.388 27.8 - 41.6 35	275 0.275 584 7.654 28.4 - 42.5 37
400 0.1257	L/S M^3/sec CFM P in mm H_2O Throw in m NC	655 0.655 1390 5.75 35.2 - 42.2 34	700 0.7 1486 6.15 37.1 - 43.1 35	742 0.742 1575 6.6 39.2 - 44.9 37	787 0.787 1671 7.05 40.7 - 46.8 39	837 0.837 1777 7.60 42.1 - 48.6 40

- Neck velocity is measured in m/sec.
- P = Pressure losses across the diffuser in mm of H_2O.
- Throw (meters) is measured for a terminal velocity of 0.5 m/sec and 0.25 m/sec.
- Noice criteria (NC) is based on a room attenuation of 10dB.

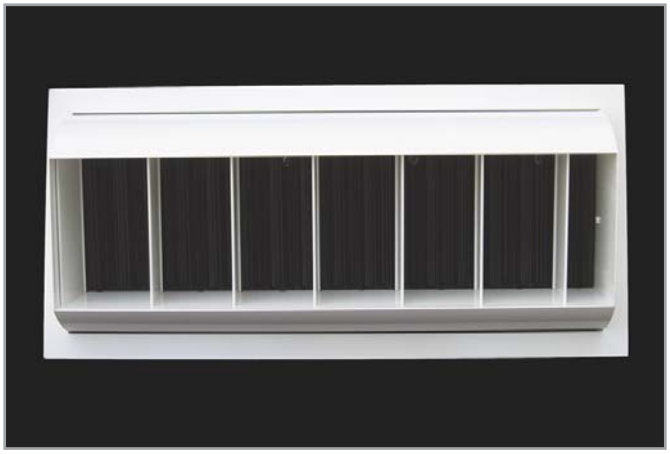
air master

Drum Louver

➤Model: ADL

Construction:

- **Frame :** Constructed with high quality extruded aluminium profiles.
- **Drum :** Aluminiium sheet and specially shaped extruded aluminium profiles.
- **Blades:** High quality extruded aluminium adjustable directional blades.
- **Damper:** Opposed blade damper made with aluminium profiles.

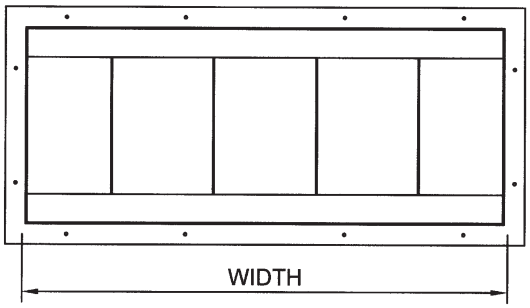


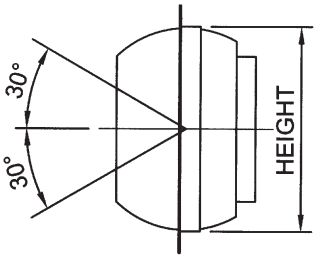
Description:

- Blades are fixed inside the drum body made with aluminium sheets and specially shaped profles and the opposed blade damper is attached to the drum body. The whole assembly is fixed to the frame by mechanical fasteners so as to enable rotation in the vertical direction.
- The opposed blade damper in supply diffuser can be easily adjusted through the face of the unit by means of screw driver.
- The louver is suitable for both long and short throw patterns with trajectory control.
- The drum can be adjusted in the vertical direction 0^o to 30^o up or down to direct the air throw in the desired direction.
- Foam gasket is sealed around the back of the frame to avoid air leakage.

Standard finishes:

- Aluminium construction with white powder coated finish (RAL 9010).
- Powder coated color finish as per other RAL color codes available as option.





air master

Drum Louver

➤ Model: ADL

Air flow data

Neck Velocity	Size	225x150 175x200	750x150 550x200	1500x150 1100x200 850x250 750x300	1600x200 1250x250 1000x300 750x375	1750x250 1500x300 1000x375	1750x300 1250x375
1	CFM NC P_S in mm of H_2O THROW in M	83 <15 0.45 1-1.2-1.5	261 <15 0.275 3.9-5.8-8.8	475 <15 0.20 4.6-6.0-10.0	651 <15 0.175 7-9.1-14.3	914 <15 0.125 7.3-9.4-15.2	1363 <15 0.1 7.0-10.4-17.9
1.5	CFM NC P_S in mm of H_2O THROW in M	124 <15 1.025 1.8-2.1-3.7	390 15 0.675 4.5-6.0-10.0	713 <15 0.375 7.0-9.1-14.3	974 <15 0.375 7.6-9.7-15.8	1373 <15 0.3 7.6-10.6-17.9	1615 <15 0.275 8.2-10.6-19.2
2	CFM NC P_S in mm of H_2O THROW in M	162 15 1.75 2.7-3.7-6.0	523 16 1.15 5.8-7.6-12.1	950 15 0.7 7.6-9.8-15.8	1297 15 0.7 9.1-11.5-18.2	1829 16 0.55 9.4-12.1-21.3	2157 17 0.525 10.0-13.1-21.9
2.5	CFM NC P_S in mm of H_2O THROW in M	204 16 2.8 3.4-4.9-7.3	651 18 1.825 7-9.1-14.3	1188 20 1.05 8.8-11.9-18.6	1625 21 1.05 10.3-13.1-21.3	2285 23 0.85 12.8-15.8-27.4	2693 25 0.8 13.1-16.7-30.4
3	CFM NC P_S in mm of H_2O THROW in M	247 18 4.125 4.0-5.8-8.8	781 23 2.7 7.9-10.9-16.7	1425 28 1.575 10.9-14.0-21	1948 30 1.575 13.4-16.1-24.9	2741 32 1.25 14.3-17.9-30.4	3230 31 1.175 17.3-21.3-37.4
3.5	CFM NC P_S in mm of H_2O THROW in M	285 24 5.475 4.9-6.4-9.8	912 30 3.625 9.4-12.4-18.8	1663 33 2.175 13.1-15.8-24.9	2275 33 2.175 14.6-17.9-27.7	3197 35 1.7 17.0-21.0-36.5	3772 35 1.6 20.1-25.9-43.0
4	CFM NC P_S in mm of H_2O THROW in M	333 27 7.475 5.4-7.0-10.7	1040 35 4.5 10.0-13.1-20.1	1900 39 2.825 14.3-17.0-27.7	2598 40 2.825 16.4-19.8-30.4	3658 40 2.2 19.8-24.0-41.1	4308 43 2.05 23.1-25.9-48.7
4.5	CFM NC P_S in mm of H_2O THROW in M	380 31 9.8 5.8-7.9-11.6	1173 39 5.975 10.7-14.0-21.0	2138 43 3.55 15.2-18.2-29.5	2921 44 3.55 18.5-21.9-33.8	4114 47 2.775 21.3-25.9-43.5	4850 48 2.6 25.9-32.3-53.3
5	CFM NC P_S in mm of H_2O THROW in M	413 36 11.55 6.0-8.2-11.9	1302 43 7.2 10.9-14.3-21	2375 47 4.425 16.4-19.2-30.4	3249 48 4.425 18.8-22.2-34.1	4570 49 3.45 22.2-24.3-45.7	5387 50 3.225 26.2-33.5-54.8

- Neck velocity is measured in m/sec.
- P_S Static pressure in mm of H_2O.
- Throw (meters) is measured for a terminal velocity of 0.75, 0.5 and 0.25 m/sec.
- NC based on a room attenuation of 10 dB.

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Chapter 12

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A. Light troffer diffuser.

air master

Single side light troffer diffuser

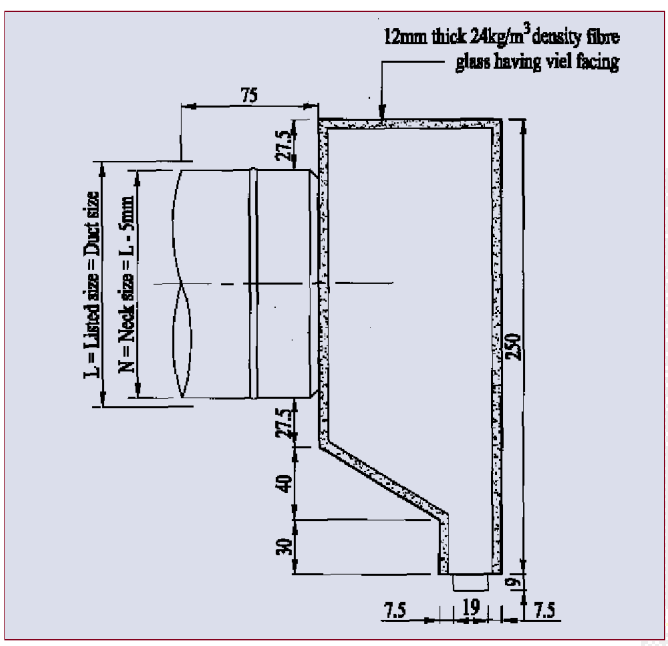
Model: ALTD

Construction:

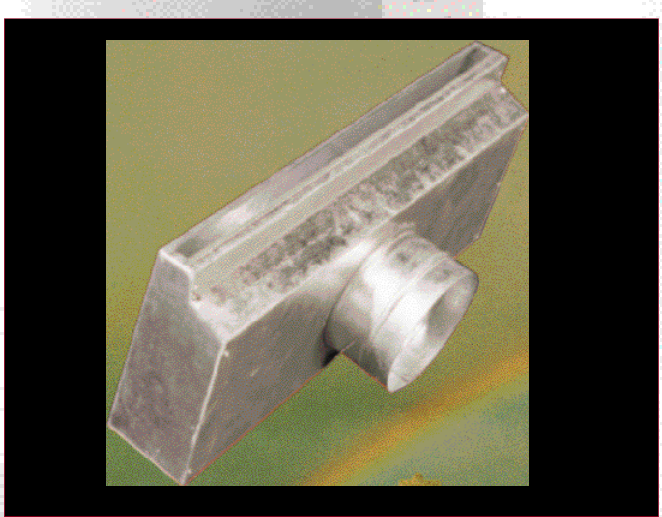
- **Frame:** 22 or 20 gauge galvanized steel sheet.
- **Spigot:** circular spigot of 125 or 150 mm dia with 75 mm length as standard. Square, rectangular and oval shaped spigots as optional.
- **Optional accessories:**
  1.Volume control dampers.
  2. With internal or external insulation.

Description:

- Constructed from 22 gauge galvanized steel sheet.
- Circular spigot of 125 or 150 mm diameter with 75 mm length fixed to the side of the diffuser. Inlets of square, rectangular or oval shapes are available on request.
- Exposed surfaces can be painted black (RAL9005) as option to minimize light reflection.
- Volume control dampers are fixed to the spigot connection as per the client's request for effective dampening and to equalize the internal flow along the full length.
- Design flexibility exits to suit different light troffers without projections and interference.



- Available with out insulation Internal or external insulation as option.
- For accuracy in fabrications as per site condition, please mention light fitting model no and manufacturer's name and details with exact dimensions.



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Double side light troffer diffuser

– Top inlet

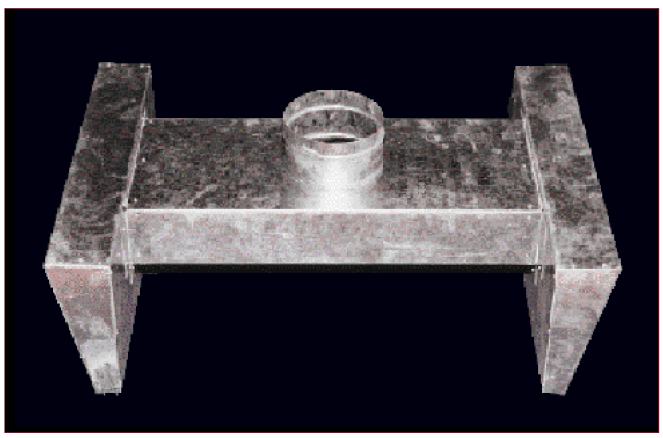
Model: ALTD-T

Construction:

- **Frame:** 22 or 20 gauge galvanized steel sheet.
- **Spigot:** circular spigot of 125 or 150 mm dia with 75 mm length as standard. Square, rectangular and oval shaped spigots as optional.
- **Optional accessories:**
  1. Volume control dampers.
  2. With internal or external insulation.

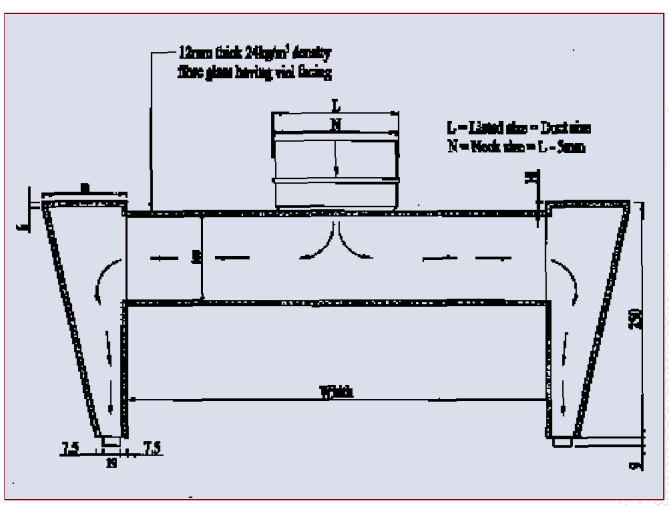
Description:

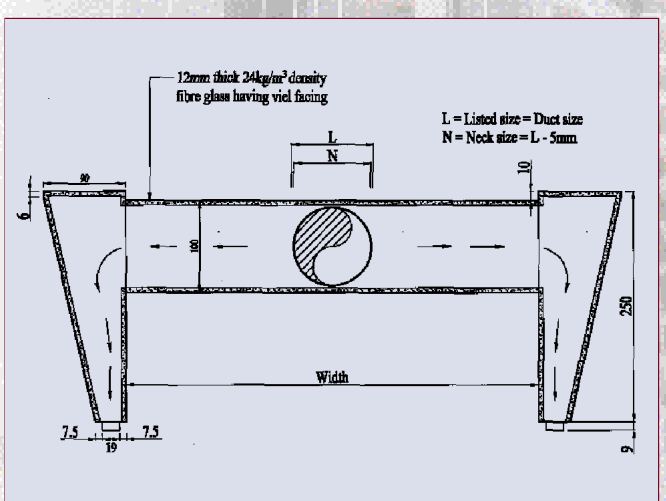
- Constructed from 22 gauge galvanized steel sheet.
- Circular spigots of 125mm or 150 mm diameter with a standard length of 75 mm are fixed at the top of the diffuser.
- Inlets of square, rectangular or oval shapes with different inlet positions as per site conditions are available on request.
- Air collected from spigot is equally discharged through slots on both sides of the diffuser.
- Exposed surfaces can be painted black (RAL9005) as an option to minimize light reflection.
- Volume control dampers are fixed to the spigot connection as per the client's request for effective dampening and to equalize the internal flow along the full length.



- Design flexibility exits to suit different light troffers without projections and interference.
- Available with out insulation Internal or external insulation as option.
- For accuracy in fabrications as per site condition, please mention light fitting model no and manufacturer's name and details with exact dimensions.

Model: ALTD-S: Construction is same as ALTD-T, with side spigot.





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Standard sizes:

Diffuser sizes corresponding to light troffer:
Model: ALTD.

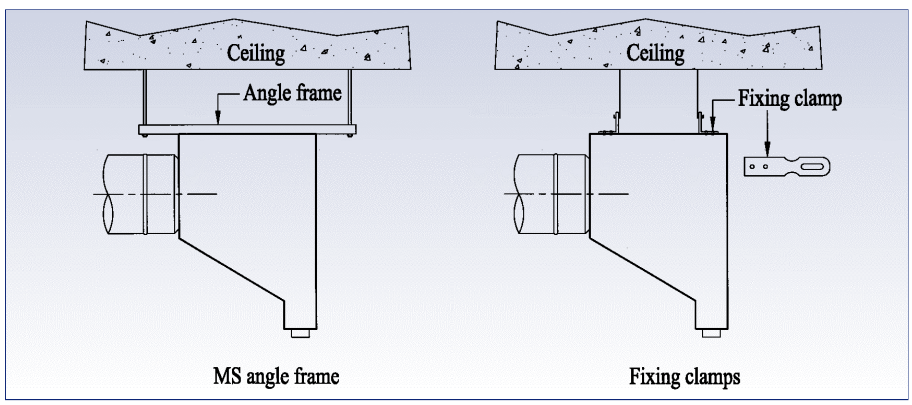
Length of troffer in mm	600	900	1200
Length of troffer diffuser in mm	560	860	1160

Model: ALTD-T & ALTD-S.

Size of the troffer L x W In mm	Light troffer diffuser	
	Length (mm)	Width (mm)
300 x 1200	230	1020
600 x 600	530	450
900 x 900	830	735
600 x 1200	530	1020
1200 x 1200	1130	1020

Fixing details:

Model: ALTD.



How to order:

Model	Size	Quantity	Optional insulation	Optional accessories
ALTD	Specify light troffer size width x depth in mm x mm	Specify in numbers	I = Internal Insulation	V= VCD
ALTD-T			E = External insulation	
ALTD-S				

Ordering example:

To order double side light troffer diffuser with top inlet for a troffer of 600 x 600 mm, quantity = 25 nos.

Intrnal insulation: 12 mm thick, 24kg/m^3 density fibre glass with black viel facing.
Order as : ALTD-T-600 x 600 -25-I.
12 mm thick, 24 kg/m^3 fibre glass- black viel facing.

air master

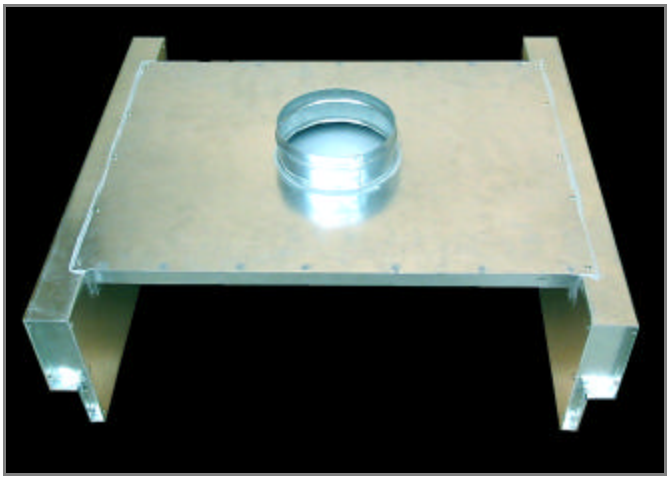
Double side light troffer diffuser

-Top Inlet

Model: ALTE-T

Construction:

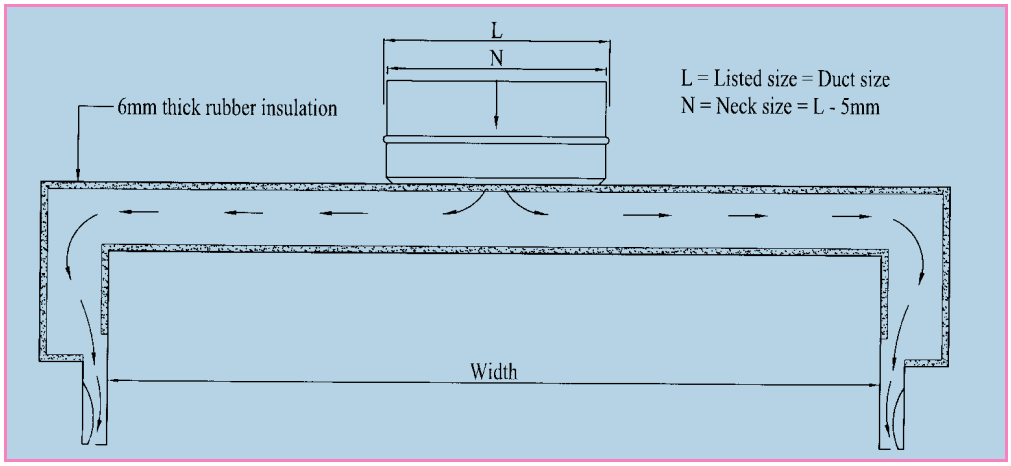
- **Frame:** 22 or 20 gauge galvanized steel sheet.
- **Spigot:** circular spigot of 125 or 150mm dia with 75mm length as standard. Square, rectangular and oval shaped spigots as optional.
- **Optional accessories:**
  1. Volume control dampers.
  2. With internal or external insulation.



Description:

- Constructed from 22 gauge galvanized steel sheet.
- Circular spigots of 125mm or 150mm diameter with a standard length of 75mm are fixed at the top of the diffuser.
- Inlets of square, rectangular or oval shapes with different inlet positions as per site conditions are available on request.
- Air collected from spigot is equally discharged through slots on both sides of the diffuser.
- Exposed surfaces can be painted black (RAL9005) as an option to minimize light reflection.
- Volume control dampers are fixed to the spigot connection as per the client's request for effective dampening and to equalize the internal flow along the full length.
- Design flexibility exists to suit different light troffers without projections and interference.
- Available with out insulation, internal or external insulation as option.
- For accuracy in fabrications as per site condition, please mention light fitting model no. and manufacturer's name and details with exact dimensions.

Model: ALTE-S: Construction same as ALTE-T, with side spigot.

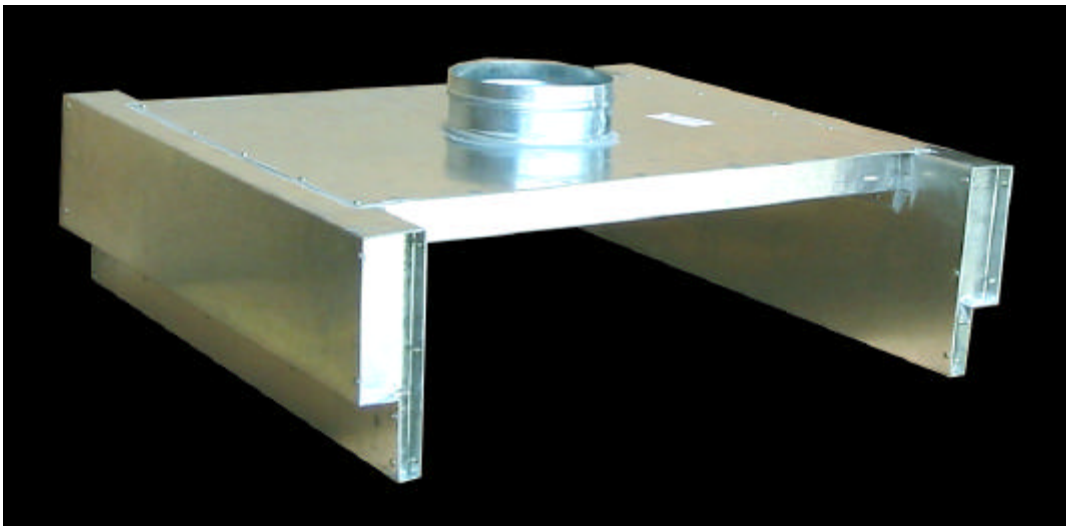


air master

Performance data

Model: ALTD-T, ALTD-S, ALTE-T, ALTE-S

Airflow CFM	Airflow L/s	Throw M	P_S mm(H_2O) 150mm inlet	NC
40	18.9	0.30 - 0.90 - 2.40	0.4	-
75	35.4	1.25 - 2.20 - 3.90	1.65	<15
100	47.2	2.10 - 3.0 - 4.80	3.5	19
125	59.0	2.70 - 3.90 - 5.50	4.6	24
150	70.8	3.20 - 4.20 - 5.90	6.7	30
200	94.4	3.60 - 4.60 - 6.40	11.9	37
225	106.2	3.90 - 4.80 - 7.0	15.0	39



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Chapter 13

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air master

Sand trap louver wih bird screen

Model: ASTL

Construction:

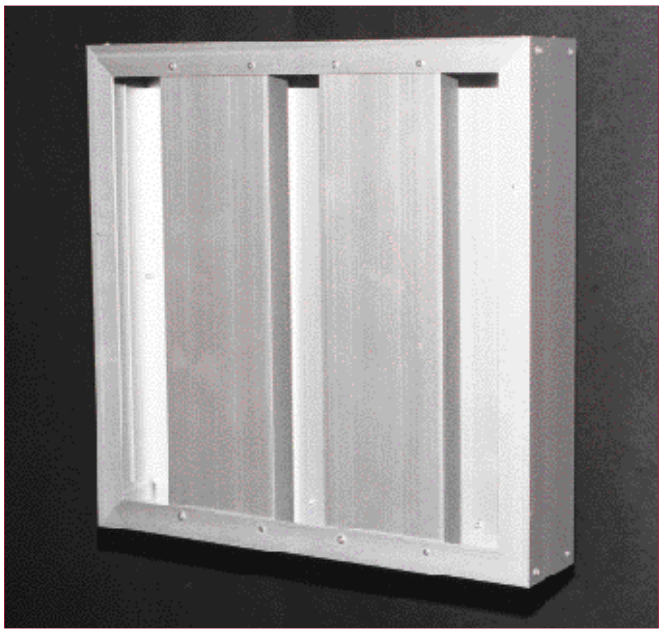
- **Frame and blades**: 1.5 mm and 1.2 mm thick high quality extruded aluminium profiles.
- **Bird screen:** 12 mm x 12 mm x 1.5 mm dia aluminium wire mesh as standard.
  12 mm x 12 mm x 1 mm dia G.I wire mesh as optional.
- **Drain:** 20 mm dia self drain holes at the bottom of the louver.

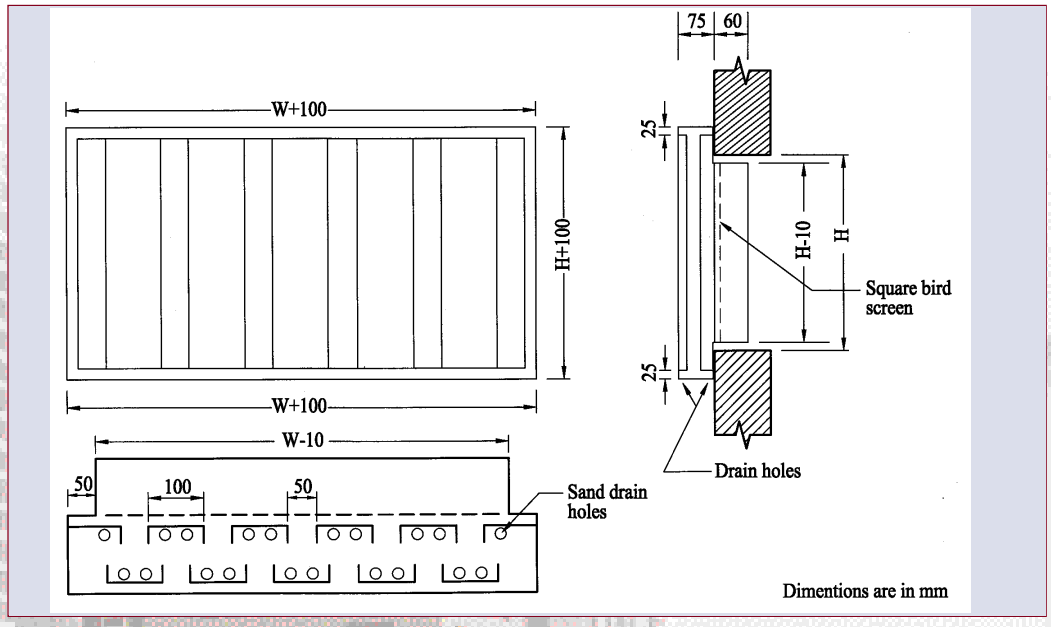
Description:

- The frame and blades are of high quality extruded aluminium profiled construction with the advantages of corrosion resistance and rigidity.
- Composed two sets of inverted U – channels mounted vertically on two opposite rows.
- Drain holes of diameter 20mm are provided in two rows at the bottom of the louver for emptying filtered sand and dust.
- Can be manufactured from galvanized steel sheets as option.
- Designed to separate sand and dust from the air stream.
- Generally used for ventilation applications and at inlet duct of air handling unit.

Standard finishes:

- Natural aluminium anodized finish.
- Finish as per RAL colour codes.
- Flexibility of finishing available on option.





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Sand trap louver with filter

Model: ASTL+F

Construction:

- **Frame and blades**: 1.5 mm and 1.2 mm thick high quality extruded aluminium profiles.
- **Bird screen:** 12 mm x 12 mm x 1.5 mm dia aluminium wire mesh as standard.
  12 mm x 12 mm x 1 mm dia G.I wire mesh as optional.
- **Drain:** 20 mm dia self drain holes at the bottom of the louver.
- **Filter frame:** 20 gauge aluminium sheet.
- **Filter media:** Expanded Aluminium media.

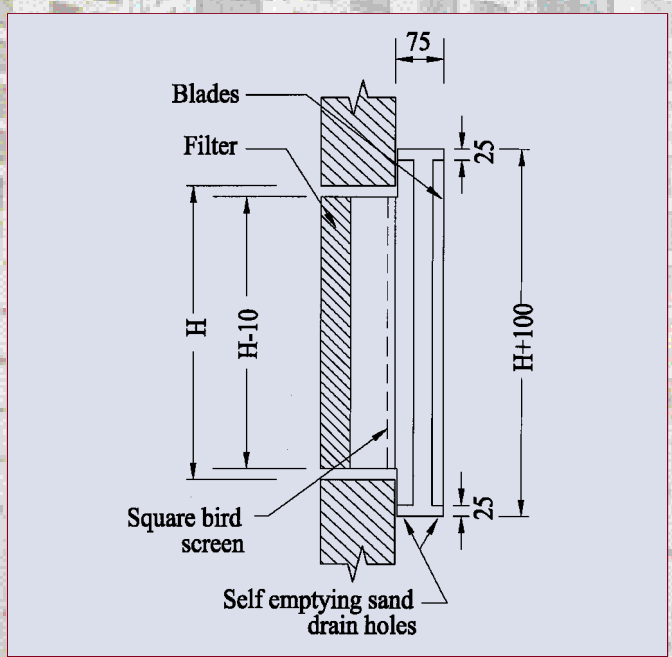
Description:

- The frame and blades are of high quality extruded aluminium profiled construction with the advantages of corrosion resistance and rigidity.
- Composed two sets of inverted U – channels mounted vertically on two opposite rows.
- Drain holes of diameter 20mm are provided in two rows at the bottom of the louver for emptying filtered sand and dust.
- Fixed with a removable washable extruded aluminium filter with aluminium mesh as the filter media.
- Filters are available at 12, 25, 40 and 50 mm thickness as required.

- Total assembly is designed to operate at medium and high velocities with high dust holding capacity at low resistance to air flow.
- Can be manufactured from galvanized steel sheets as option.
- Design to separate sand and dust from the air stream. Generally used for ventilation applications and at inlet duct of air handling unit.

Standard finishes:

- Natural aluminium anodized finish.
- Finish as per RAL colour codes.
- Flexibility of finishing available as option.



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Sand trap louver with damper

Model: ASTL+D

Construction:

- **Frame and blades**: 1.5 mm and 1.2 mm thick high quality extruded aluminium profiles.
- **Bird screen:** 12 mm x 12 mm x 1.5 mm dia aluminium wire mesh as standard.
  12 mm x 12 mm x 1 mm dia G.I wire mesh as optional.
- **Drain:** 20 mm dia self drain holes at the bottom of the louver.
- **Damper:** Galvanized steel sheet construction.
- **Damper blades:** High quality extruded aluminium profiles.

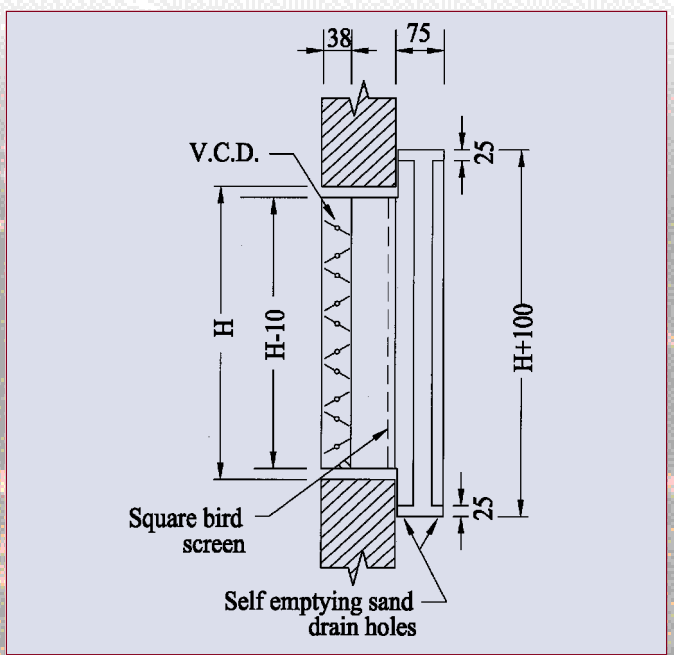
Description:

- Manufactured from high quality extruded aluminium profiles with the advantages of corrosion resistance and rigidity.
- Composed two sets of inverted U - channels mounted vertically on two opposite rows.
- Drain holes of diameter 20 mm are provided in two rows at the bottom of the louver for emptying filtered sand and dust.
- Fixed with a removable volume control damper to ensures positive control over the fresh air stream.

- Damper can be operated manually from the back of the louver or can be motor operated.
- Designed to separate sand and dust from the air stream. Generally used for ventilation applications and at inlet duct of air handling unit.

Standard finishes:

- Natural aluminium anodized finish.
- Finish as per RAL colour codes.
- Flexibility of finishing available as option.



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Sand trap louver with damper and filter

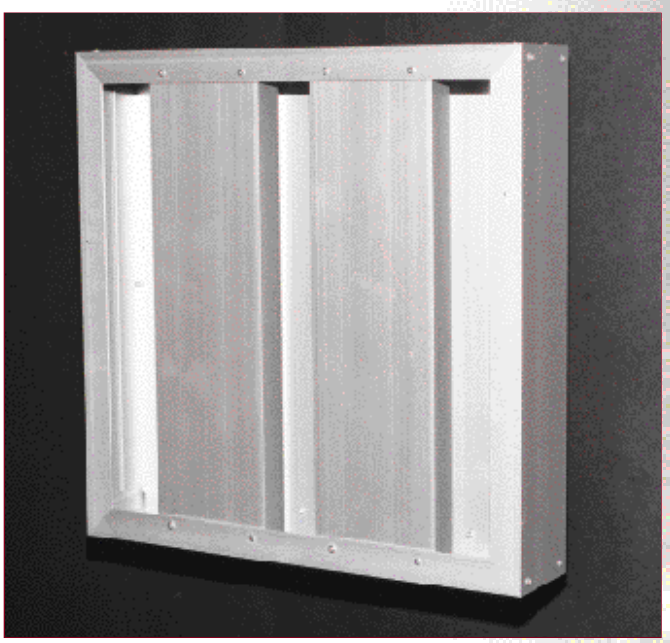
Model: ASTL+D+F

Construction:

- **Frame and blades**: 1.5 mm and 1.2 mm thick high quality extruded aluminium profiles.
- **Bird screen:** 12 mm x 12 mm x 1.5 mm dia aluminium wire mesh as standard.
  12 mm x 12 mm x 1 mm dia G.I wire mesh as optional.
- **Drain:** 20 mm dia self drain holes at the bottom of the louver.
- **Damper:** Galvanized steel sheet construction.
- **Damper blades:** High quality extruded aluminium profiles.
- **Filter frame:** 20 gauge aluminium sheet.
- **Filter media:** Aluminium mesh.

Description:

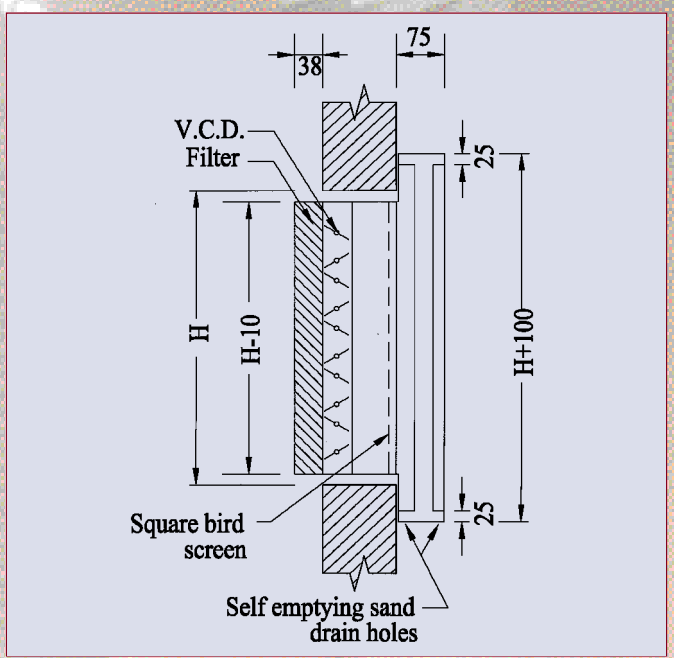
- The frame and blades are of high quality extruded aluminium profiled construction with the advantages of corrosion resistance and rigidity.
- Composed two sets of inverted U – channels mounted vertically on two opposite rows.
- Drain holes of diameter 20 mm are provided in two rows at the bottom of the louver for emptying filtered sand and dust.
- Fixed with a removable filter and volume control damper which ensures positive control over the fresh air stream.



- Dampter can be operated manually by a projected lever or can be motor operated.
- Aluminium filters with washable expanded aluminium media, as the filter media are available in 12, 25, 40 and 50 mm thickness as required.
- Designed to separate sand and dust from the air stream. Generally used for ventilation applications and at inlet duct of air handling unit.

Standard finishes:

- Natural aluminium anodized finish.
- Finish as per RAL colour codes.
- Flexibility of finishing available as option.



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High Efficiency Sand Trap Louver

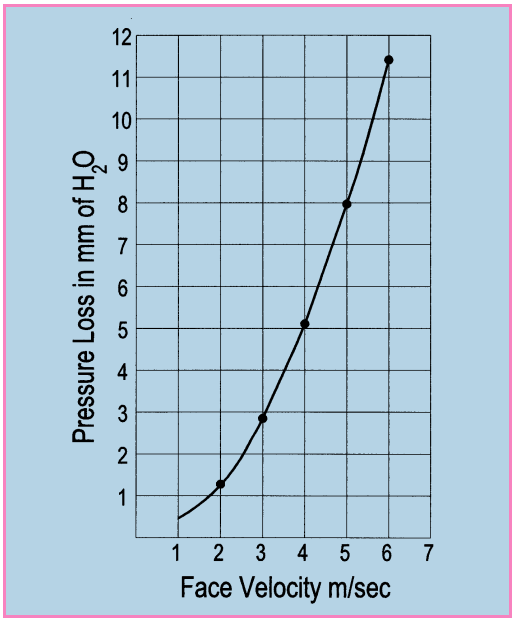
Model: ASTL-HE

Construction:

- **Frame:** 2mm thick extruded aluminium formed sheets.
- **Blades:** 6063 high grade aluminium blade 2mm thick.
- **Sand Chute:** 1.5mm thick aluminium sheet.

Description:

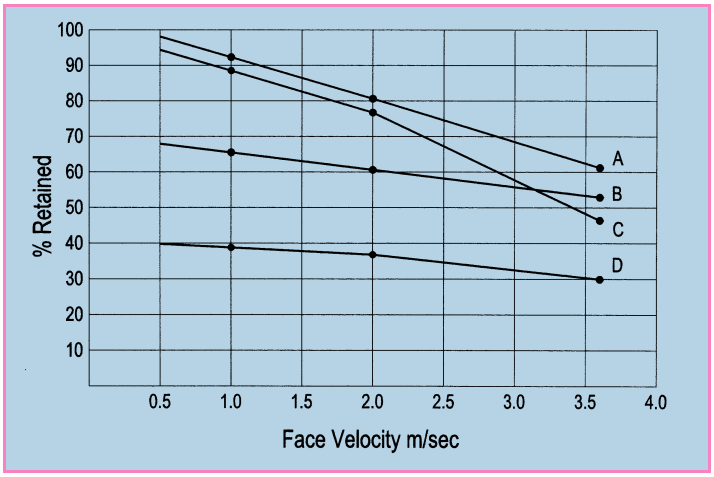
- Designed to filter sand particles at high intake velocities, as high as 4m/sec with high efficiency which is more than 90% and lesser pressure drop.
- It has the advantage of more free area so that sizes of usual sand trap louvers can be reduced to 25% of the normal sizes.
- Composed of a row of blades mountred vertically inside the frame.
- Designed to seperate sand and dust from the air stream.
- The filtered sand will be drained through a sand chute fixed at the bottom of the louver.
- Generally used for ventilation applications and at inlet duct of air handling unit.



Pressure loss vs Face velocity

Standard finishes:

- Natural anodized aluminium finish.
- Powder coated color finish as per RAL color codes.
- Flexibility of finish available as option.



% Retained vs Face velocity

A - 25mm blade spacing / 200-700 micron sand
B - 25mm blade spacing / 20-200 micron sand
C - 40mm blade spacing / 200-700 micron sand
D - 40mm blade spacing / 20-200 micron sand

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Flush mouned sand trap louver

Model: AFSTL

Construction:

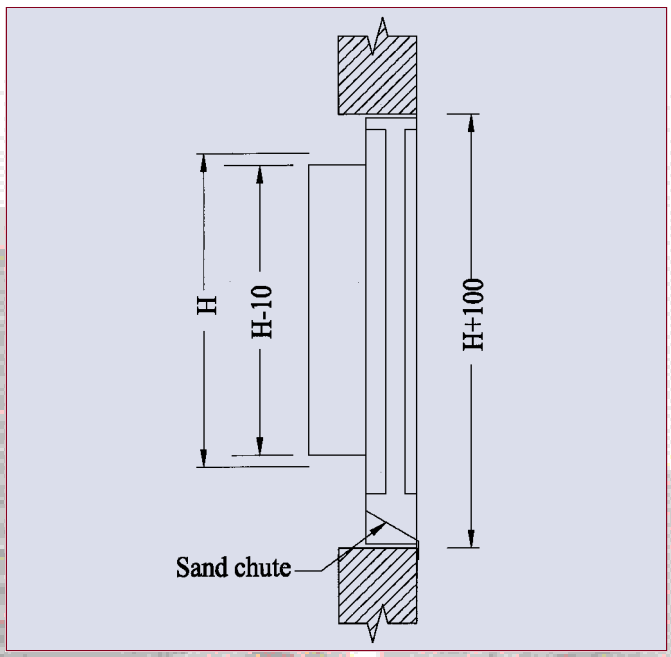
- **Frame and blades**: 1.5 mm and 1.2 mm thick high quality extruded aluminium profiles.
- **Bird screen:** 12 mm x 12 mm x 1.5 mm dia aluminium wire mesh as standard.
  12 mm x 12 mm x 1 mm dia G.I wire mesh as optional.
- **Sand chute:** Aluminium sheet tray of 1.2 mm thick.

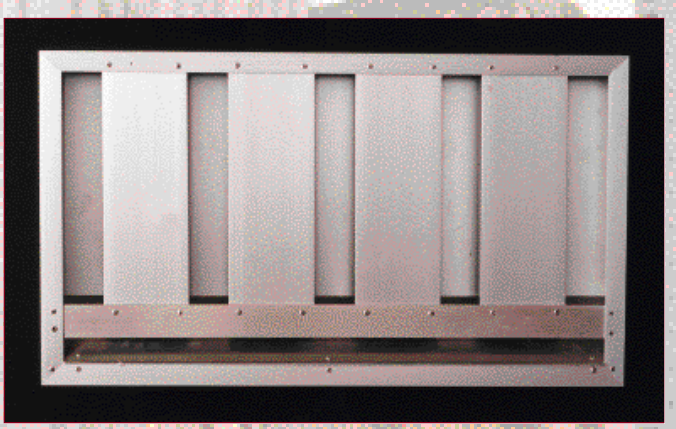
Description:

- The frame and blades are of high quality extruded aluminium profiled construction with the advantages of corrosion resistance and rigidity.
- Composed two sets of inverted U – channels mounted vertically on two opposite rows.
- Surface of the louver is fixed flush on the plane of the wall. The filtered sand will be drained through a sand chute.
- Sand chute is an inclined tray fixed at the bottom of the louver for sand drain.
- Designed to separate sand and dust from the air stream.
- Generally used for ventilation applications and at inlet duct of air handling unit.

Standard finishes:

- Natural aluminium anodized finish.
- Finish as per RAL colour codes.
- Flexibility of finishing available as option.





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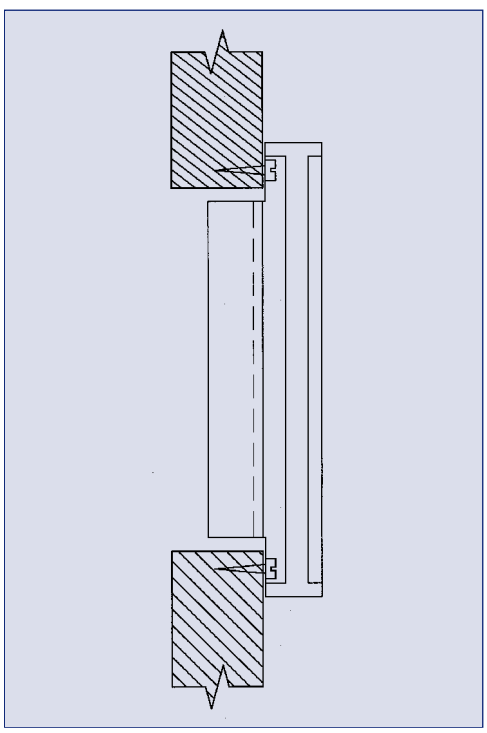
Standard Sizes:

- Available in square and rectangular sizes.
- All combinations of width x height.
- Non Standard sizes are available.

Width in mm	150	300	450	600	750	900	1050	1200	1350	1500
Height in mm	150	300	450	600	750	900	1050	1200	1350	1500



Fixing details:

- Concealed screw fixing as per the site conditions.

How to order:

Model	Accessories	Size	Quantity	Finish
ASTL	F = filter	Specify listed size Width x Height in mm x mm	Specify in numbers	A = Aluminium anodized finish.
	D = damper			B = RAL - 9010
AFSTL	D+F = damper and filter			C = Other RAL colours.

Ordering example:

To select sand trap louver, damper and filter assembly, of size 1200 x 900 mm, quantity : 75 nos, wih aluminium anodized finish..

Order as : ASTL+F+D-1200 x900 - 75 - A.

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Performance data:

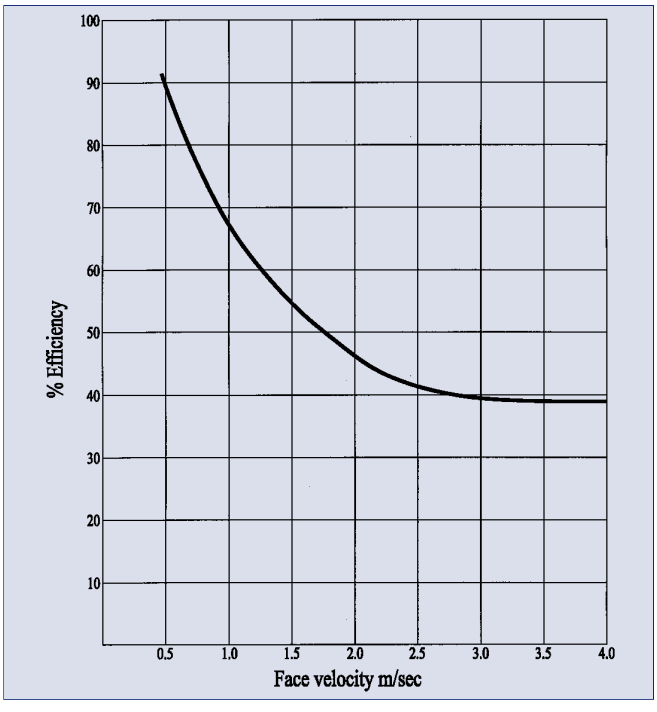
1. Sand rejection efficiency:

Tests conducted on similar equipment as Model ASTL indicate a typical efficiency of

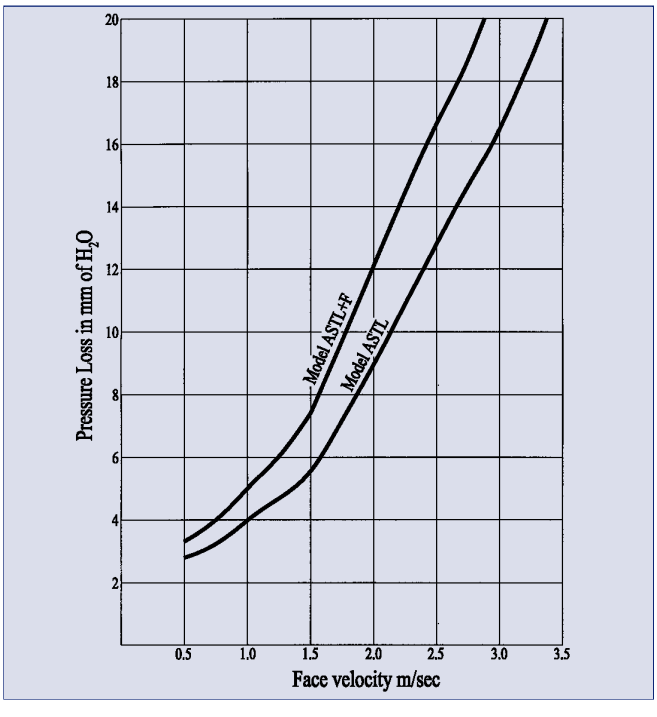
90 percent on 200 to 700 microns
80 percent on 20 to 200 microns
50 percent on 1 to 70 microns

Better efficiency can be achieved by sand trap louvers with washable aluminium filters.

% Efficiency Vs Face velocity in m/sec.
Model : ASTL



Pressure loss vs Face velocity
Model : ASTL & ASTL+F



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Chapter 14

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Exhaust air louver

Model: AL

Construction:

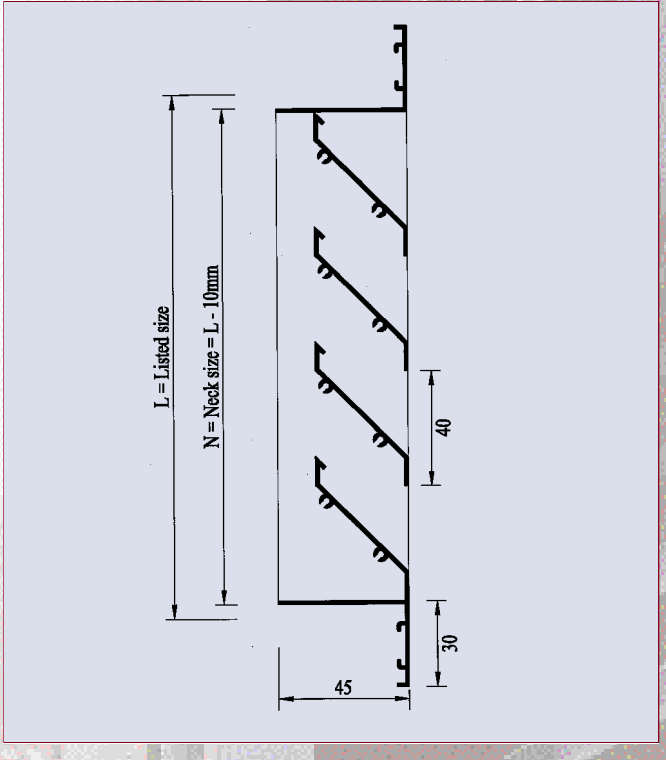
- **Frame and blades:** High quality extruded aluminium profiles with 30 mm flange width as standard. 12, 16, 24 mm flange widths are option.
- **Blade pitch:** 40 mm.
- **Optional wire mesh:** 12 x 12 x 1.5 mm dia aluminium PVC coated wire mesh.
  12 x 12 x 1 mm dia G.I wire mesh.

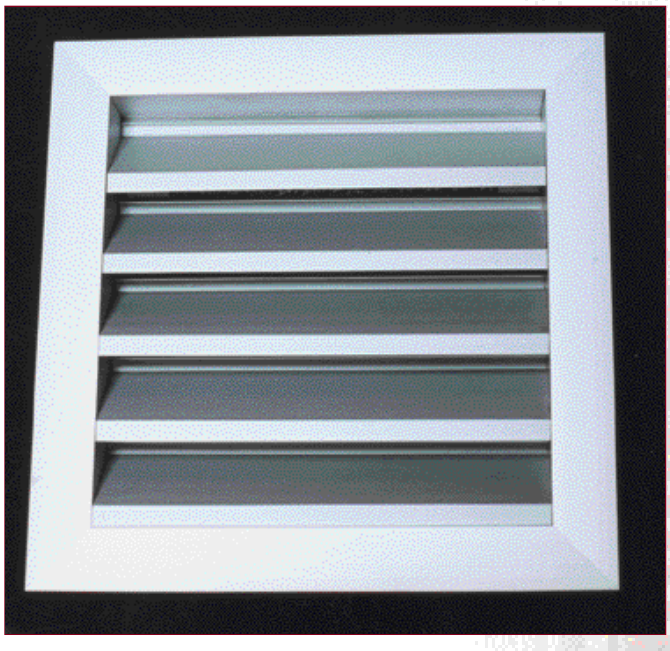
Description:

- Composed of frame and horizontal blade assembly, manufactured from high quality extruded aluminium profiles with the advantages of corrosion resistance and rigidity.
- Blades are fixed rigidly to the main frame by rivets.
- Blades are set at an angle of 45^0 to the horizontal with 40 mm spacing.
- Total structure is weather proofed and blades are inclined down wards to protect against rain water.
- Structure provides around 45% effective pressure area.

Standard finishes:

- Natural anodized aluminium finish.
- Powder coated colour finish.
- Flexibility of finish is available as option.





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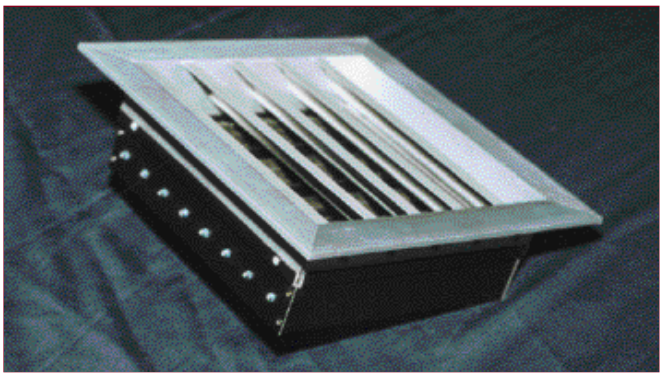
Exhaust air louver with damper

Model: ALR

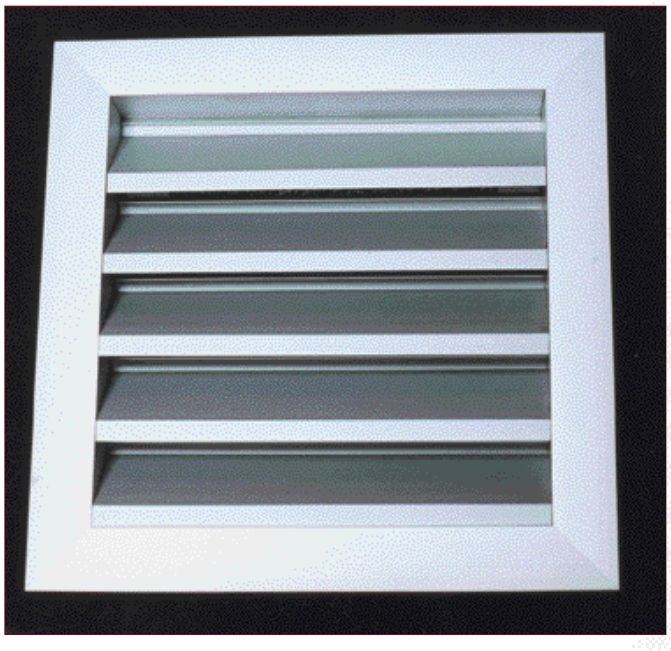


Construction:

- **Frame and blade:** High quality extruded aluminium profiles with 30 mm flange width as standard. 12, 16, 24 mm flange widths are option.
- **Blade pitch:** 40 mm.
- **Optional wire mesh:**
  12 x 12 x 1.5 mm dia aluminium wire mesh.
  12 x 12 x 1 mm dia G.I wire mesh.
- **Damper frame and blade:** High quality extruded aluminium profiles.

Description:

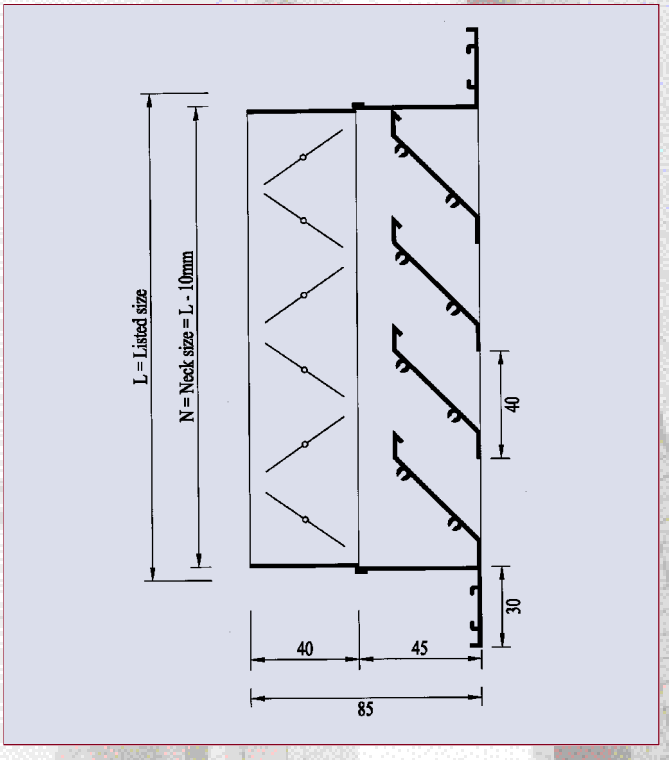
- Composed of frame and horizontal blade assembly, manufactured from high quality extruded aluminium profiles with the advantages of corrosion resistance and rigidity.
- Blades are fixed rigidly to the main frame by rivets.
- Blades are set at an angle of 45^0 to the horizontal with 40 mm spacing.
- Louver is fixed with an opposed blade damper to ensure positive control over the flow of fresh air stream. Damper blades can be operated manually by a projected lever.



- Total structure is weather proofed and blades are inclined down ward to protect against rain water.
- Structure provides around 45% effective pressure area.

Standard finishes:

- Natural anodized aluminium finish.
- Powder coated colour finish.
- Flexibility of finish is available as option.



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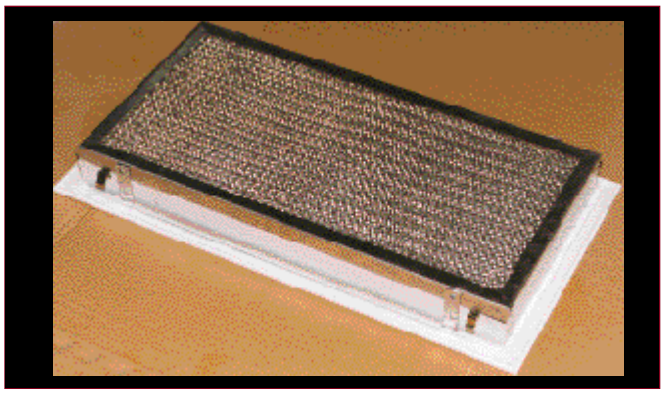
Fresh air louver

Model: AFL



Construction:

- **Frame and blade:** High quality extruded aluminium profiles with 30 mm flange width as standard. 12, 16, 24 mm flange widths are option.
- **Blade pitch:** 40 mm.
- **Optional wire mesh:**
  12 x 12 x 1.5 mm dia aluminium PVC coated wire mesh.
  12 x 12 x 1 mm dia G.I wire mesh.
- **Filter frame:** Aluminium sheet.
- **Filter media:** Expanded Aluminium media.

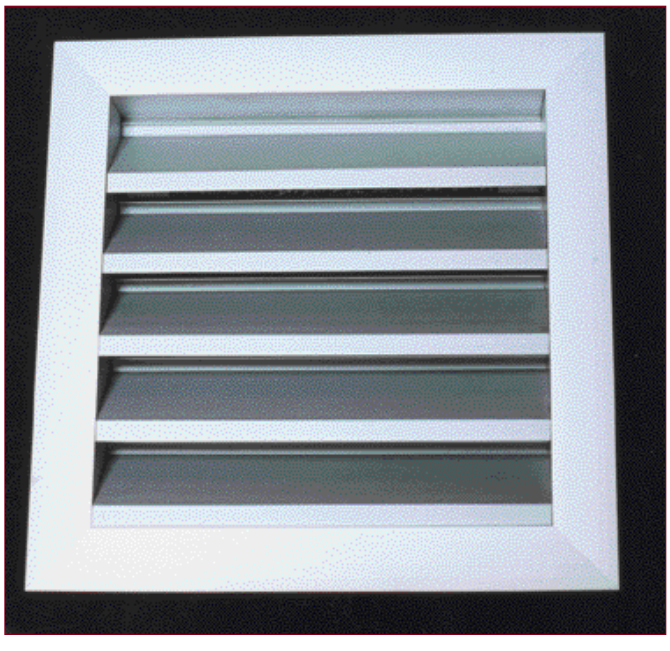
Description:

- Composed of frame and horizontal blade assembly, manufactured from high quality extruded aluminum profiles with the advantages of corrosion resistance and rigidity.

- Blades are set at an angle of 45^0 to the horizontal plane with 40 mm spacing. Fixed rigidly with the main frame by rivets.

- Louver is fixed with a removable washable extruded aluminium filter with aluminium mesh as the filter media.

- Filters are available at 12, 25, 40 and 50 mm thickness as standard. Non standard sizes available as option.

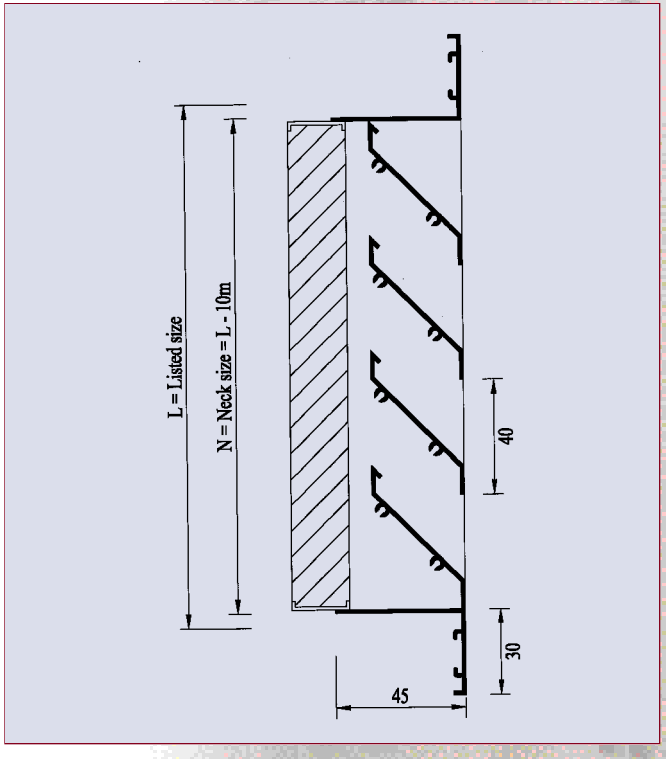


- Total structure is weather proofed and blades are inclined down ward to protect against rain water.

- Structure provides around 45% effective pressure area.

Standard finishes:

- Natural anodized aluminium finish.
- Powder coated colour finish.
- Flexibility of finish is available as option.



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Fresh air louver with damper

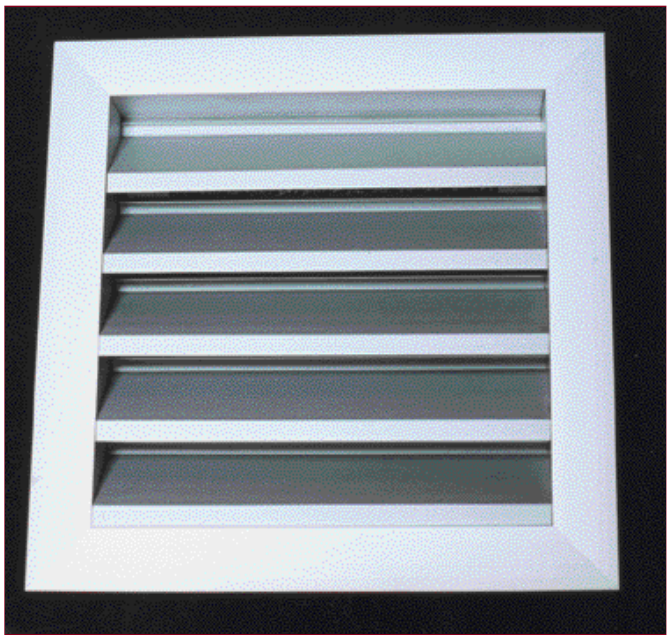
Model: AFLR

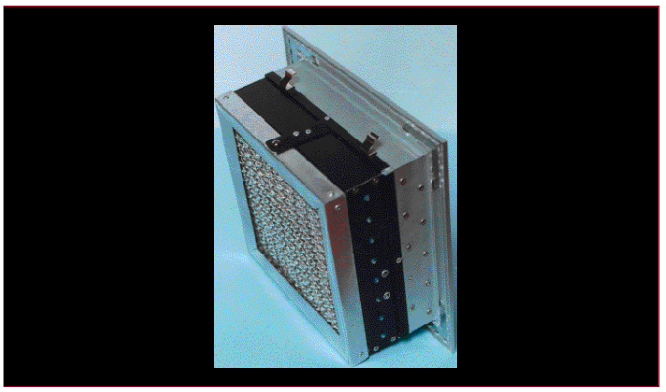
Construction:

- **Frame and blade:** High quality extruded aluminium profiles with 30 mm flange width as standard. 12, 16, 24 mm flange widths are option.
- **Blade pitch:** 40 mm.
- **Optional wire mesh:**
  12 x 12 x 1.5 mm dia aluminium wire mesh.
  12 x 12 x 1 mm dia G.I wire mesh.
- **Filter frame:** Aluminium sheet
- **Filter media:** Expanded Aluminium media.
- **Damper frame and blade:** High quality extruded aluminium profiles.

Description:

- Fresh air louvers are composed of frame and horizontal blade assembly, manufactured from high quality extruded aluminium profiles with the advantages of corrosion resistance and rigidity.
- Blades are fixed rigidly to the main frame by rivets.
- Blades are set at an angle of 45^0 to the horizontal with 40 mm spacing.
- Louver is fixed with an opposed blade damper to ensure positive control over the flow of fresh air stream.

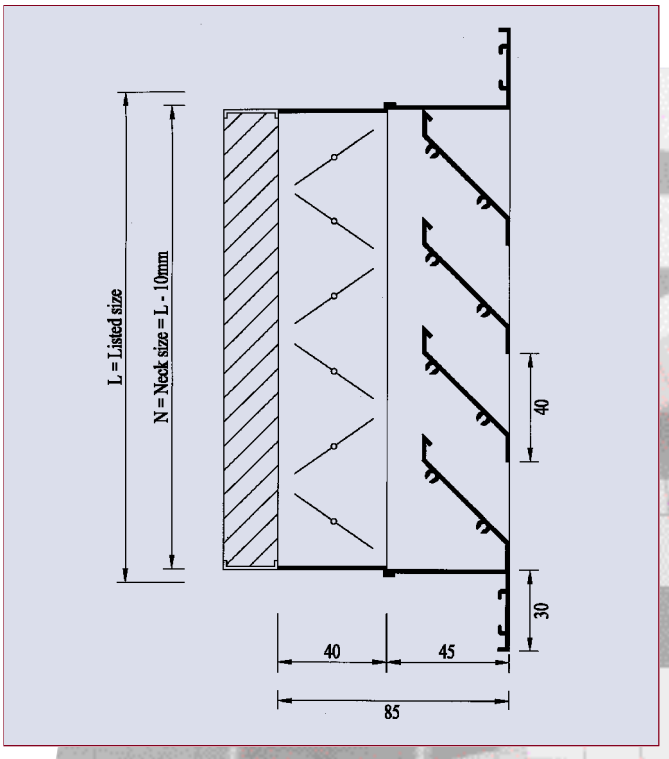




- Damper blades can be operated manually by a projected lever.
- Louver is fixed with a removable washable extruded aluminium filter with aluminium mesh as the filter media.
- Structure provides around 45% effective pressure area.

Standard finishes:

- Natural anodized aluminium finish.
- Powder coated colour finish.
- Flexibility of finish is available as option.



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Heavy duty louver

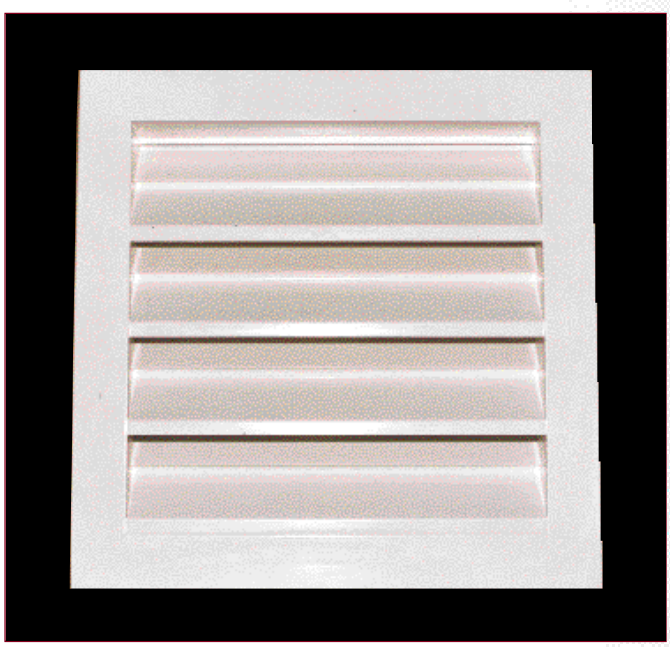
Model: AHL

Construction:

- **Frame and blade:** High quality heavy gauge extruded aluminium profiles.
- **Blade pitch:** 100 mm.
- **Optional wire mesh:**
  12 x 12 x 1.5 mm dia aluminium PVC coated wire mesh.
  12 x 12 x 1 mm dia G.I wire mesh.

Description:

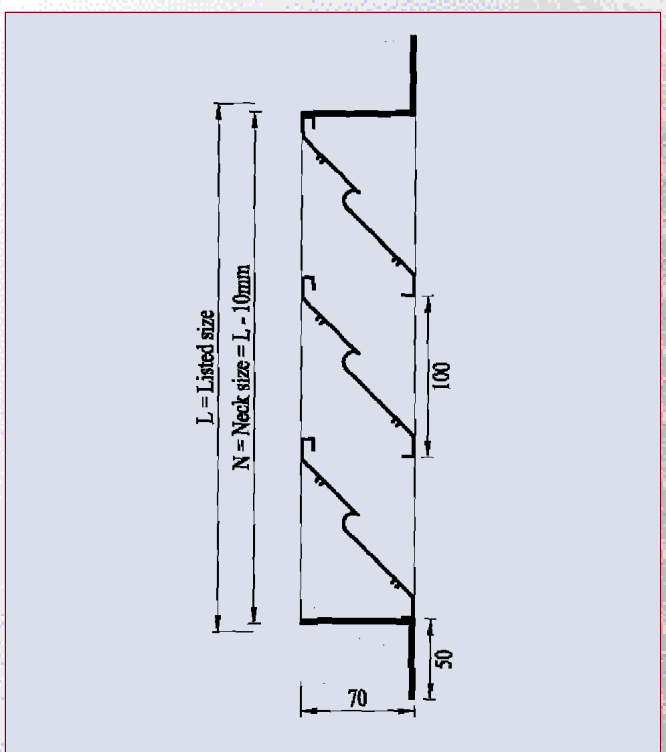
- Structure is constructed of high quality extruded aluminium profiles with the advantages corrosion resistance and rigidity.
- Blades are fixed rigidly to the main frame by rivets.
- Blades are set at an angle of 45^0 to the horizontal with 100 mm spacing.
- Total structure is weather and seepage proofed and blades are inclined down wards to protect against rain water.



- Heavy duty louver provides around 65% effective pressure area.
- These louvers are designed to provide weather protection for ventilation opening of buildings and electrical transformer rooms, etc.,

Standard finishes:

- Natural anodized aluminium finish.
- Powder coated colour finish.
- Flexibility of finish is available as option.



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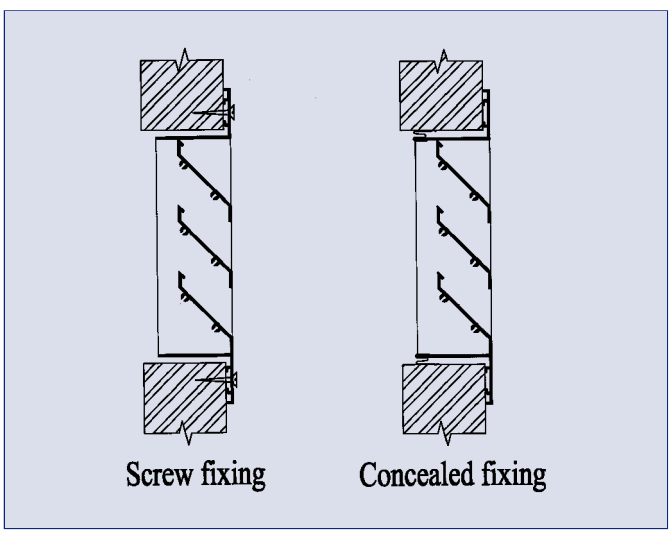
Standard Sizes:

Width in mm	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
Height in mm	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000

Fixing details:



How to order:

Model	Size	Quantity	Finish
AL	Specify listed size width x height in mm x m	Specify in numbers	A = Aluminium anodized finish.
ALR			
AFL			B = RAL - 9010
AFLR			
AHL			C = Other colours.

Tick the required item.

Ordering example:

To select fresh air louver for a size of 800 x 600 mm. Quantity 40 numbers.
Finish: aluminium anodized finish.

Order as : AFL -800 x 600 – 40-A.

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Face velocity Vs Total pressure drop across the Louver

Table 14.1

Face velocity in m/sec	1.25	1.5	2.0	2.5	3.0	3.5	3.75	4.0	4.5
Exhaust in mm of water	0.248	0.331	0.564	0.814	1.151	1.595	1.825	2.143	3.290
Intake in mm of water	-0.35	-0.57	-0.83	-1.21	-1.69	-2.35	-2.69	-3.27	-3.85

Note: Intake pressure drop includes pressure drop across filters.
Readings are taken when the damper is in fully opened conditon.

Effective pressure areas in m^2.

Model No: AL, ALR, AFL, AFLR.

Table 14.2

Height in mm	Width in mm													
	300	350	400	450	500	550	600	650	700	750	800	850	900	1000
300	0.038	0.049	0.055	0.063	0.069	0.077	0.084	0.091	0.098	0.105	0.111	0.119	0.125	0.139
350	0.049	0.057	0.065	0.073	0.082	0.089	0.097	0.106	0.1114	0.122	0.13	0.138	0.147	0.163
400	0.055	0.065	0.074	0.084	0.093	0.102	0.111	0.121	0.13	0.14	0.148	0.158	0.167	0.186
450	0.063	0.073	0.084	0.094	0.105	0.115	0.125	0.136	0.146	0.156	0.167	0.178	0.188	0.209
500	0.069	0.082	0.093	0.105	0.116	0.128	0.139	0.152	0.163	0.175	0.186	0.198	0.209	0.23
550	0.077	0.089	0.102	0.115	0.128	0.14	0.153	0.166	0.179	0.191	0.204	0.218	0.23	0.256
600	0.084	0.097	0.111	0.125	0.139	0.153	0.167	0.181	0.195	0.209	0.223	0.237	0.251	0.279
650	0.091	0.106	0.121	0.136	0.152	0.166	0.181	0.196	0.212	0.227	0.242	0.257	0.272	0.302
700	0.098	0.114	0.13	0.146	0.163	0.179	0.195	0.212	0.228	0.244	0.26	0.277	0.293	0.325
750	0.105	0.122	0.14	0.156	0.175	0.191	0.209	0.227	0.244	0.261	0.279	0.296	0.314	0.349
800	0.11	0.13	0.148	0.167	0.186	0.204	0.223	0.242	0.26	0.279	0.297	0.316	0.335	0.372
850	0.119	0.138	0.158	0.178	0.197	0.217	0.237	0.257	0.277	0.296	0.316	0.335	0.356	0.395
900	0.125	0.147	0.167	0.188	0.209	0.23	0.251	0.272	0.293	0.314	0.335	0.356	0.376	0.418
1000	0.139	0.163	0.186	0.21	0.23	0.256	0.279	0.302	0.325	0.349	0.372	0.395	0.418	0.464

Effective pressure areas for non standard sizes can be interpolated from the above data.

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A.Plenum boxes

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Plenum box - un lined

Model: APB

Construction:

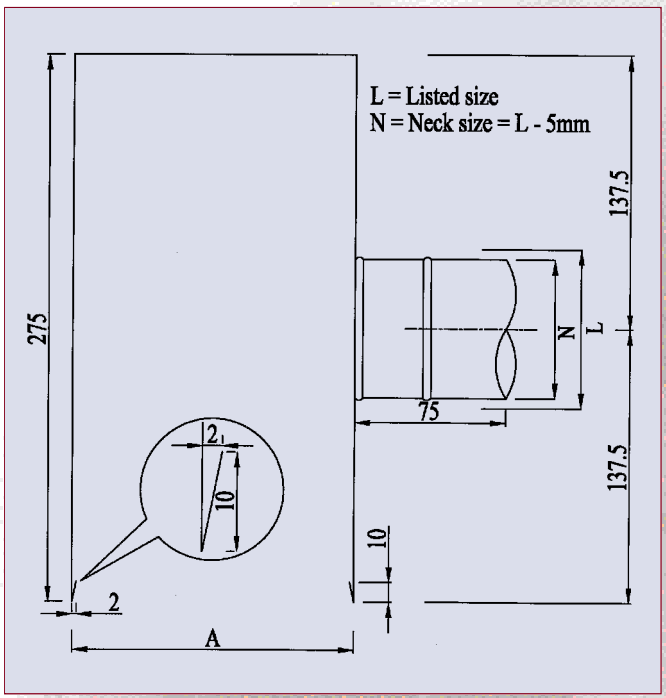
- **Frame:** 24, 22 or 20 gauge galvanized steel sheet.
- **Spigots:** Circular spigots of 75 mm length as standard. Square, rectangular and oval shaped spigots are available as option.
- **Optional accessories:** Volume control damper.

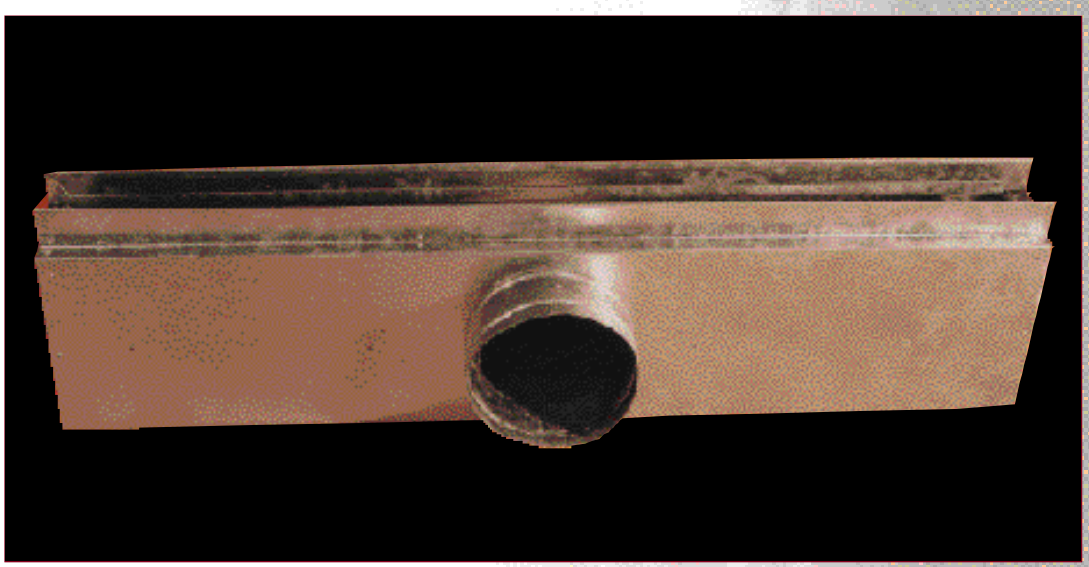
Description:

- Fabricated from 24, 22 or 20 gauge galvanized steel sheet.
- Circular spigots of required diameter and standard length of 75 mm would be fixed to the plenum box. Square, rectangular and oval shape spigots are available if required.
- Plenum boxes with side inlet are standard. Other positions are available as per the site conditions to suit client's specifications.
- Plenum boxes have hemmed edge at the opening for fixing universal mounting brackets.
- Plenum boxes of length of upto two meters can be manufactured with single spigot. For more than 2 meters plenum boxes will be arranged with multiple spigots.
- Volume control dampers can be fitted to the spigots on request.

Other model:APB-D:

- **Dummy plenum boxes:** Dummy plenum boxes are available to cover in-active linear bar grilles and diffuser.





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Insulated plenum box

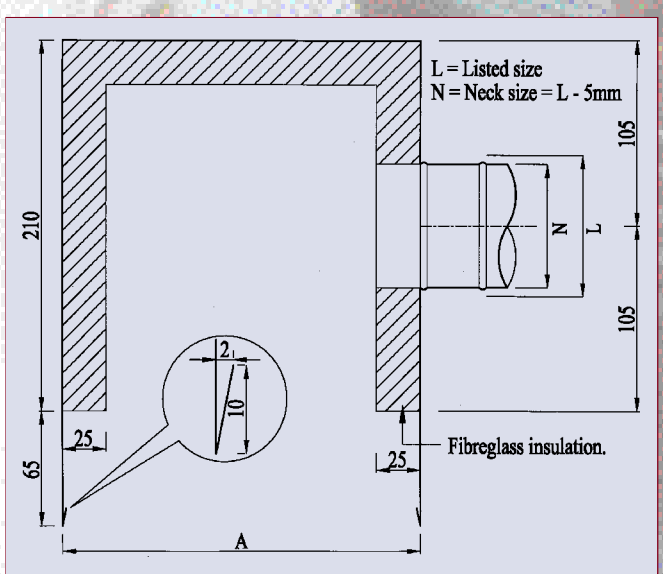
Model: APB-I

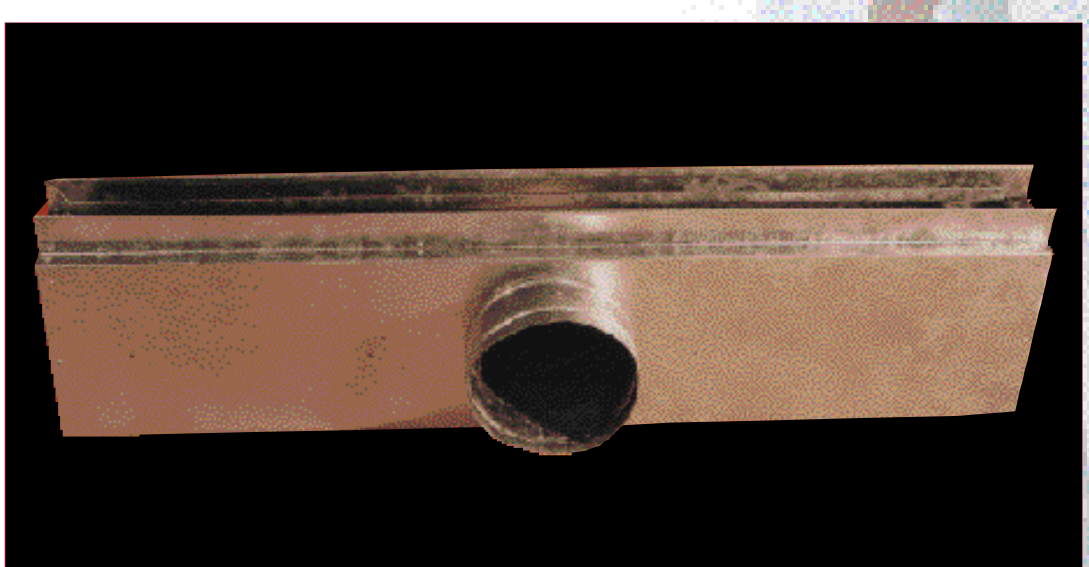
Construction:

- **Frame:** 24, 22 or 20 gauge galvanized steel sheet.
- **Spigots:** Circular spigots of 75 mm length as standard. Square, rectangular and oval shaped spigots are available as option.
- **Optional accessories:** Volume control damper.
- **Insulation:** 25 mm thick, 24 kg/m^3 density fiber glass insulation as standard. Other insulation as option.

Description:

- Fabricated from 24, 22 or 20 gauge galvanized steel sheet.
- Circular spigots of required diameter and standard length of 75 mm would be fixed to the plenum box. Square, rectangular and oval shape spigots are available if required.
- Plenum boxes with side inlet are standard. Other positions are available as per the site conditions to suit client's specifications.
- Plenum boxes have hemmed edge at the opening for fixing universal mounting brackets. These edges are un insulated.
- Internally insulated with 25 mm thick, 24 kg/m^3 density fiber glass having black viel facing as standard. Other specifications available.
- Plenum boxes of length of upto two meters can be manufactured with single spigot. For more than 2 meters plenum boxes will be arranged with multiple spigots.
- Volume control dampers can be fitted to the spigots on request.





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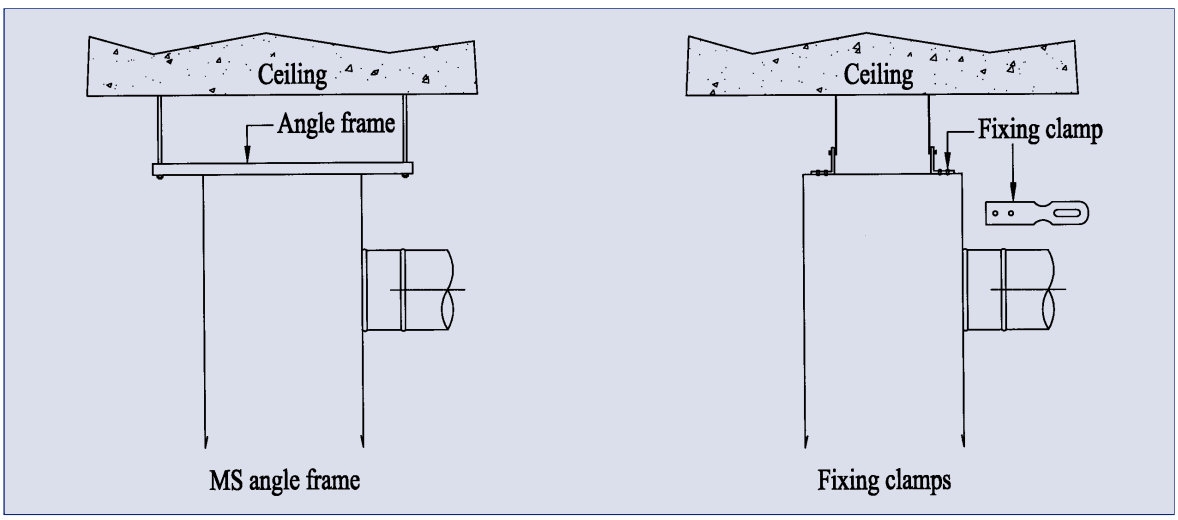
Plenum opening Vs No of slots:

No of slots.	1	2	3	4	5	6	7	8
	Plenum opening size in mm							
1. 16 mm slot opening	48	78	108	138	168	198	228	258
2. 20 mm slot opening	52	86	120	154	188	188	256	290
3. 25 mm slot opening	57	96	136	174	213	213	291	330

Fixing details:



How to order:

Model	Size	Quantity	Insulation	Optional accessories
APB	Specify length x slot opening in mm x mm.	Specify in numbers	A = 25 mm thick 24 kg/m^3 fibre glass	1 = volume control dampers
APB-I			B= 25 mm thick 48 kg/m^3 fibre glass	
APB-D			C= Other insulation.	

Ordering example:

1. To order plenum box of size 1200 x 120 mm, quantity 50 nos. lined with 25 mm thick 24 kg/m^3 density fiber glass insulation.

   Order as : APB-I-1200 x 120 – 50 – A.

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Volume control damper

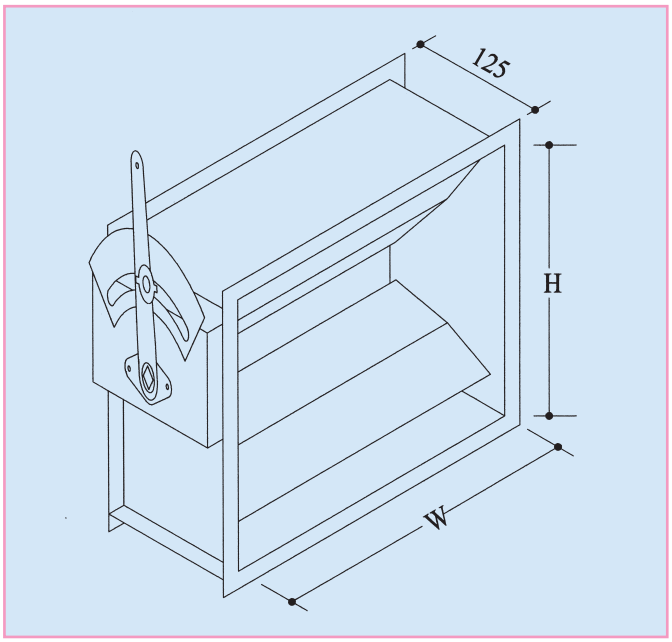
Model: AVCD

Construction:

- **Frame:** 1.2mm thick galvanized steel sheet.
- **Frame size:** 125mm depth and standard flange height of 25mm.
- **Blades:** Double skinned high quality extruded aluminium aerofoil profiles.
- **Bearing pins:** Electro plated square rod of size 12.7mmx12.7mm.
- **Bushings:** Self oiling nylon bushings of internal square size
- **Blade linkage:** nylon gear.
- **Blade stopper:** 20mmx20mm alumnium angle.

Description:

- Frame is constructed from galvanized steel sheet. Joints are welded and protected by aluminium spray coating.
- Blades are coupled by toothed nylon gears which can provide either parallel or opposed blade operation.
- Hand locking quadrant with open and close marking and frame is marked to show exact position of damper.
- Structure is available with flanged edges and are supplied un drilled as standard.
- Dampers without flanges available as option for duct insertion purpose. Flanged edges with drilled holes are also available.
- Available in square and rectangular sizes.
- Designed for use in heating, ventilating and air conditioning systems.



Accessories:

- **Motorized dampers:** Volume control dampers will be supplied with actuators of client's choice. The dampers can also be provided with an extended linkage to fix the motor at the site.

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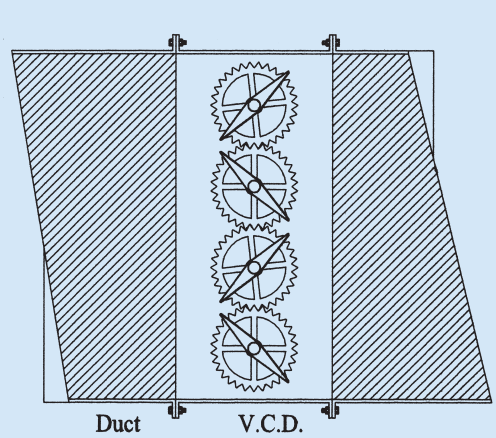
Standard sizes:

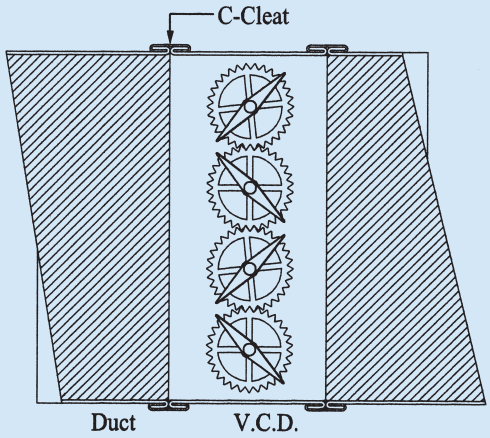
- Available in square and rectangular sizes.
- Sizes available from 100x100mm with an increment of 25mm.
- Non standard sizes available as option.

Fixing details:

Model: AVCD



Fixing by bolt



Slip and clip joint

How to order:

Model	Size	Quantity	Fixing
AVCD	Specify duct width x height in mm x mm	Specify in numbers	A = Fixing by bolts
			B = Slip and clip joint

Oredering example:

1. To select volume control damper for a duct size of 900x600, quantity 75 nos. Fixing details: Bolting.
Order as : AVCD - 900x600 - 75 - A

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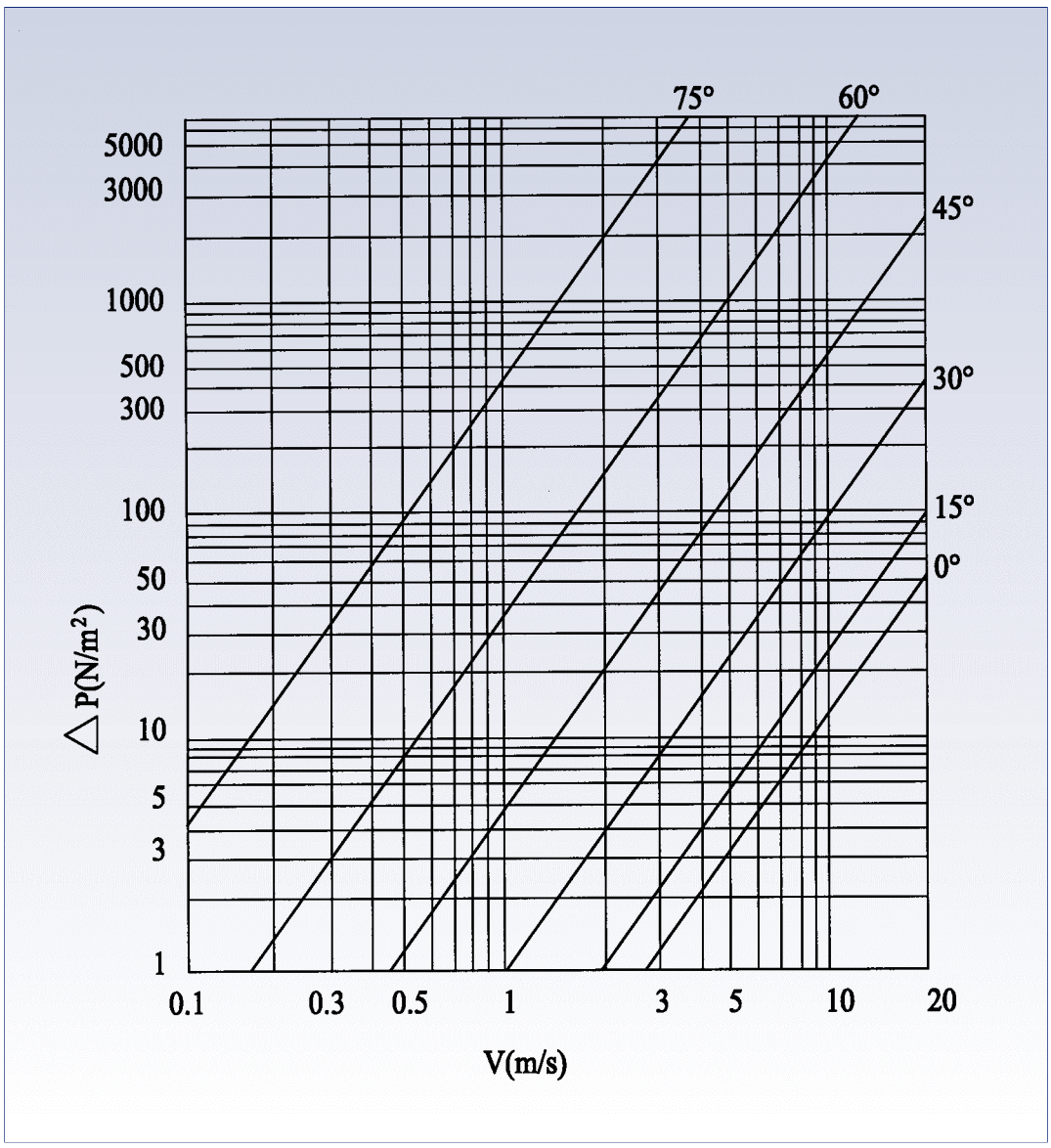
Performance chart:

Model: AVCD



Pressure drop - Rectangular VCD aerofoil type blades

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Circular volume control damper

Model: AVCD-C

Construction:

- **Frame:** 1 mm thick galvanized steel sheet.
- **Blades:** 1 mmthick galvanized steel sheet.
- **Bearing pins:** Electro plated steel rod of 10 mm diameter.
- **Bushings:** Self oiling nylon bushings of 10 mm internal square size.
- **Bearing pin connecting quadrant:** Electro plated square steel rod of size 12.7 x 12.7 mm.
- **Quadrant:** Locking quadrant with heavy gauge, electro plated steel.

Description:

- Frame is constructed from galvanized steel sheet. Joints are welded and protected by aluminium spray coating.
- Damper blade, which is fixed to the bearing pin, can be rotated in vertical plane from full open to full close.
- Bearing pin is coupled with hand locking quadrant with open and close marking. Hand locking quadrant frame is marked to show exact position of damper.
- Designed for use in heating, ventilating and air conditioning systems.

Round VCD with flange. Model AVCD-CF

Accessories:

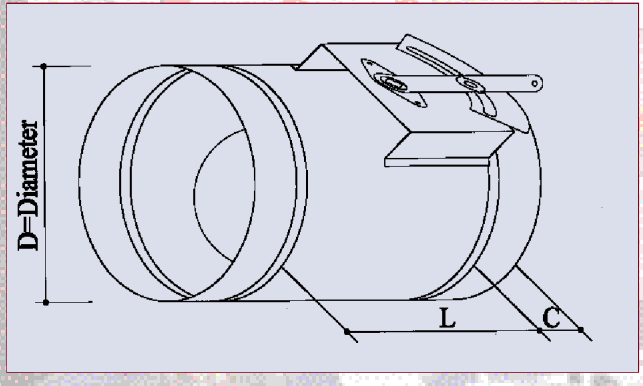
- **Motorized dampers:** Volume control dampers will be supplied with actuators of client's choice. The dampers can also be provided with an extended linkage to fix the motor at the site.

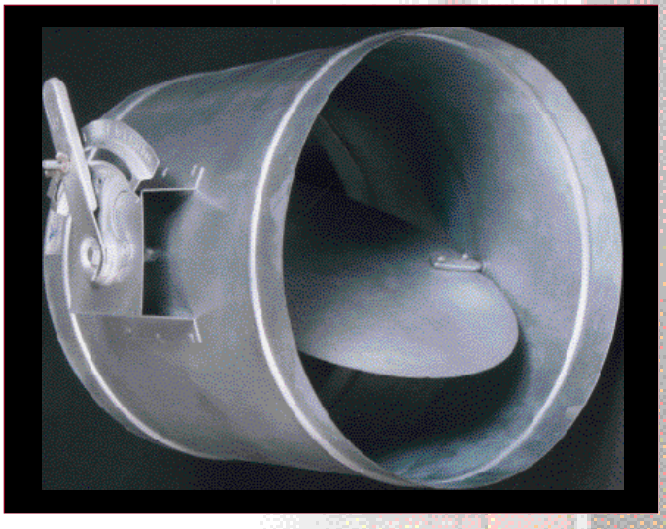
Dimensions.

D = Diameter	L = Length	C
Up to 150 mm	L = 200 mm	50 mm
Above 150 mm	L = D + 100 mm	50 mm

Standard Sizes:

D = Duct opening in mm dia					
100	200	300	400	500	600





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Fixing details:

Fixing by rivets to flexible duct.

How to order:

Model	Size	Quantity	Fixing
AVCD-C	Specify duct diameter in mm	Specify in numbers	A = Bolt fixing

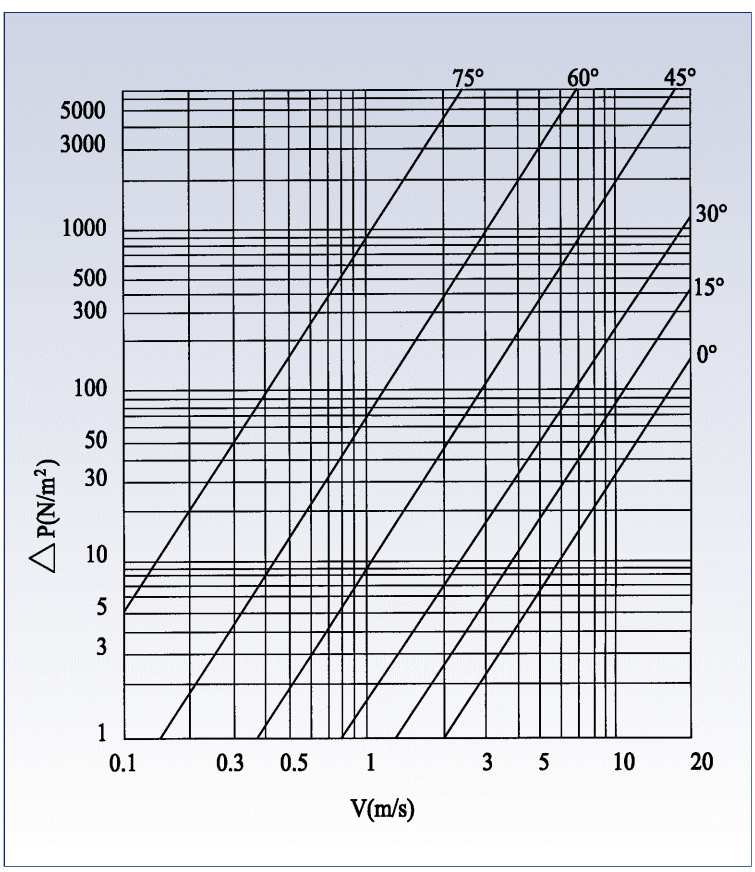
Ordering example:

1. To select round volume control damper of size 400 mm dia, quantity 25 nos. Fixing details: Bolt fixing.

   Order as : AVCD-C- 400 – 75 – A.

Performance chart:

Model: AVCD-C



Pressure drop - Circular VCD

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Access doors with removable door frame

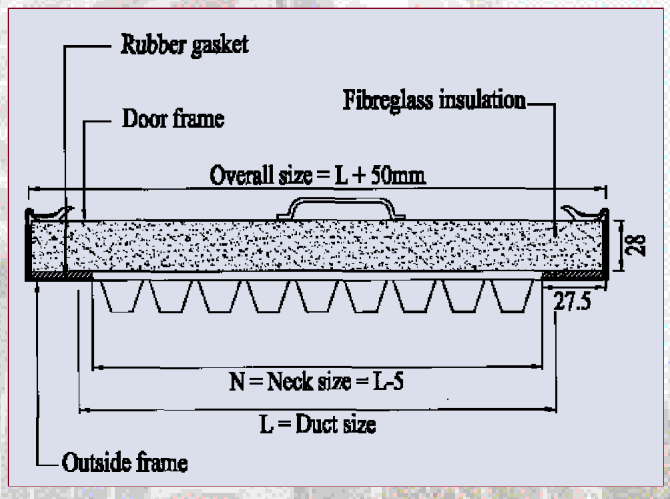
Model: AAD

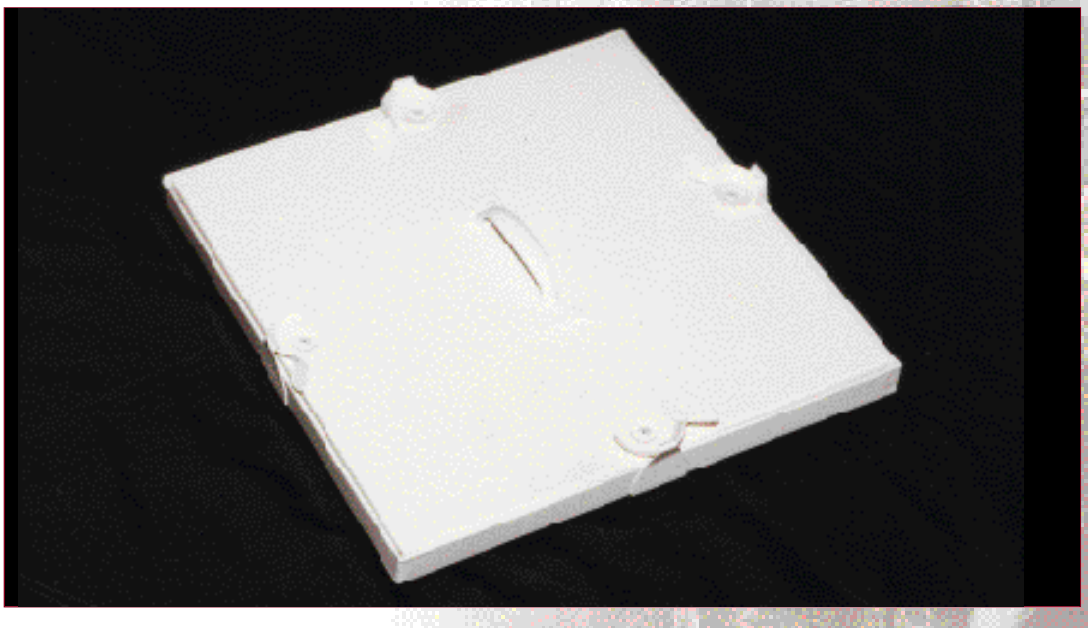
Construction:

- **Frame and door panels:** 22 gauge galvanized steel sheet.
- **Insulation of door panel:** 25 mm thick, 24 or 48 Kg/m^3 density fibre glass as standard. Other insulation specifications are optional.

Description:

- Frame and door panels are fabricated from 22 gauge galvanized steel sheet.
- Frame is provided with 3 mm thick neoprene gasket all around to avoid air leakage.
- Door panel is internally insulated with 25 mm thick, 24 or 48 kg/m^3 density fibre glass for thermal and acoustic insulation.
- For sizes up to 200 x 200 mm, door is provided with 2 no zinc plated cam locks and chromium plated handle for easy removal and fixing.
- For sizes more than 200 x 200 mm, door frame is provided with 4 no cam locks and handle.
- Structure is designed to withstand high pressure differences.
- Sizes are available from 150 x 150 mm to 600 x 600 mm with an increment of 50 mm.
- Access doors offer quick easy installation where duct access required.
- Applicable in air conditioning plant rooms, plenums, air handling units and near fire dampers.





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Access door with piano type hinged door

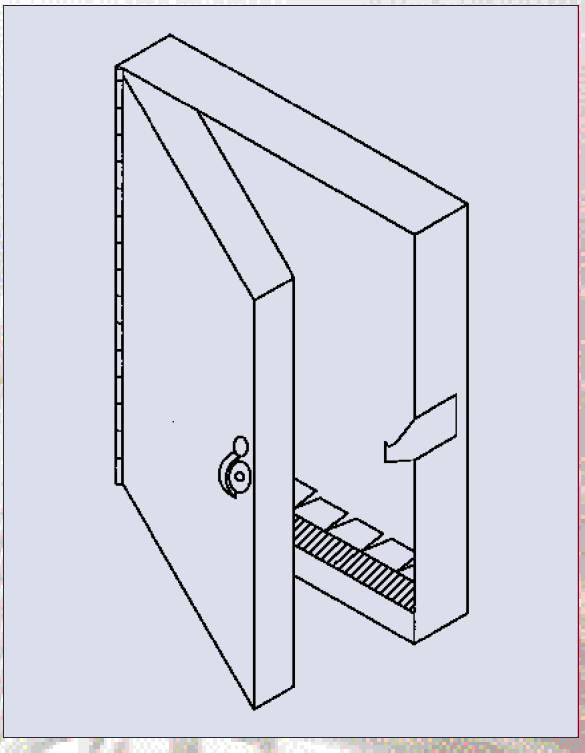
Model: AAD-P

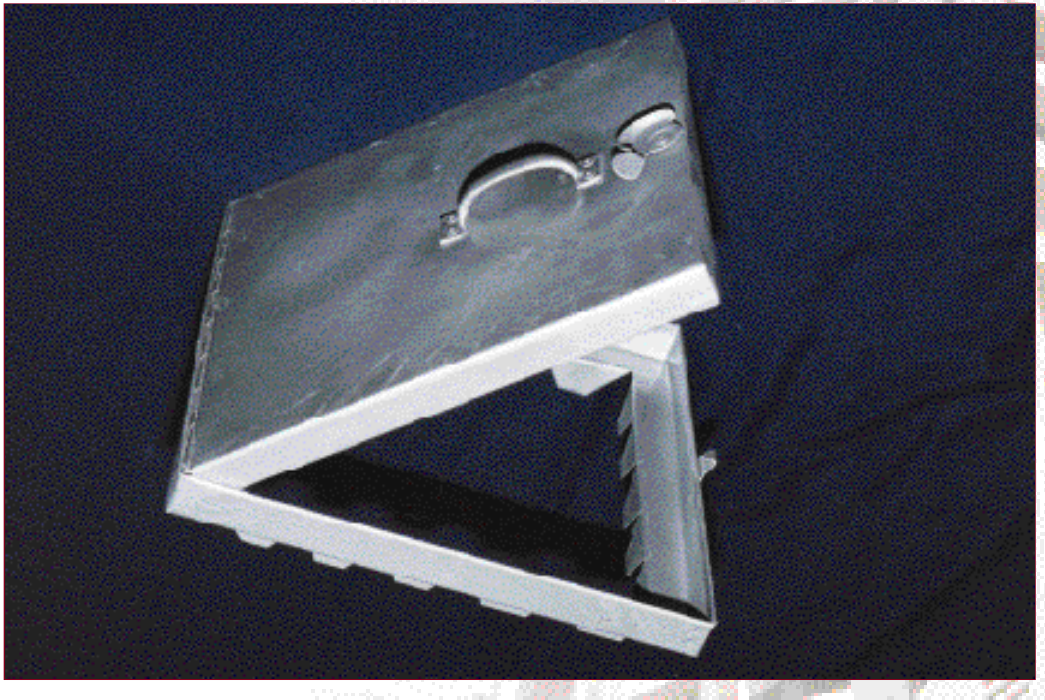
Construction:

- **Frame and door panels:** 22 gauge galvanized steel sheet.
- **Insulation of door panel:** 25 mm thick, 24 or 48 Kg/m^3 density fibre glass as standard. Other insulation specifications are optional.

Description:

- Frame and door panels are fabricated from 22 gauge galvanized steel sheet.
- Frame is provided with 3 mm thick neoprene gasket all around to avoid air leakage.
- Door panel is internally insulated with 25 mm thick, 24 or 48 kg/m^3 density fibre glass for thermal and acoustic insulation.
- Door frame is provided with single cam lock for air tight door closure.
- Structure is designed to withstand high pressure differences.
- Sizes are available from 150 x 150 mm to 600 x 600 mm with an increment of 50 mm.
- Access doors offer quick easy installation where duct access required.
- Applicable in air conditioning plant rooms, plenums, air handling units and near fire dampers.





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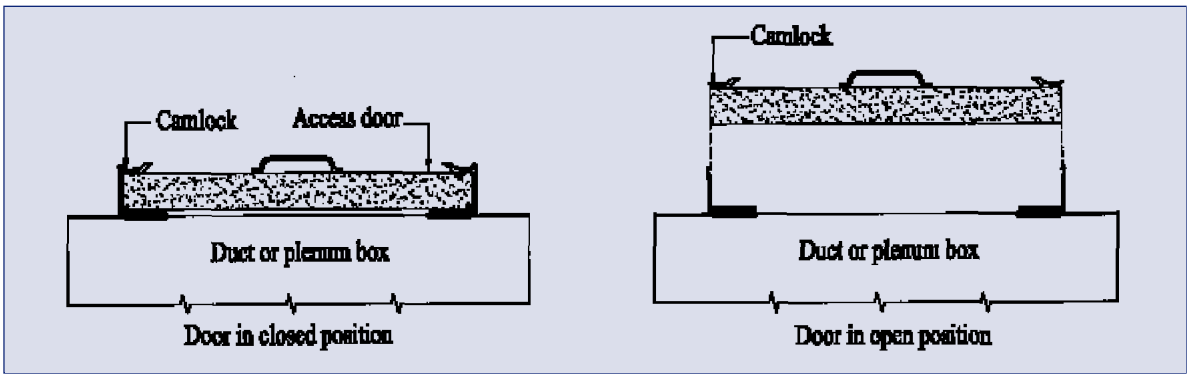
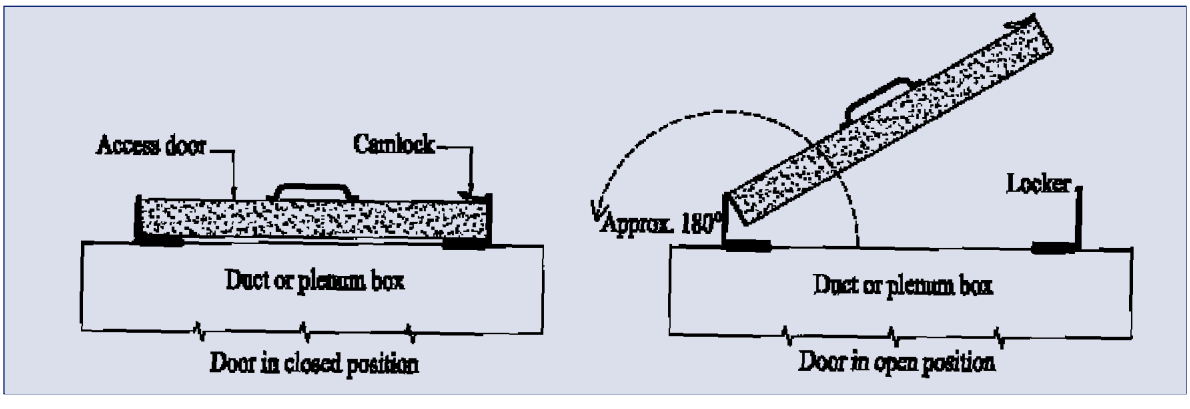
Fixing details:

Model: AAD



Model: AAD-P



How to order:

Model	Size	Quantity	Door international insulation.
AAD	Specify duct opening size in mm x mm	Specify in numbers	A = 25 mm, 24 kg/m^3 density fibre glass
			B = 25 mm, 48 kg/m^3 density fibre glass
AAD-P			C = 40 mm, 24 kg/m^3 density fibre glass
			D = Other specifications

Ordering example:

1. To select access door for a duct opening of 450 x 450 mm, Quanity 75 nos. Door frame internally insulated with 25 mm thick, 24 kg/m^3 density fibre glass insulation.

   Order as : AAD-450 x 450 – 75 – A.

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Non return dampers

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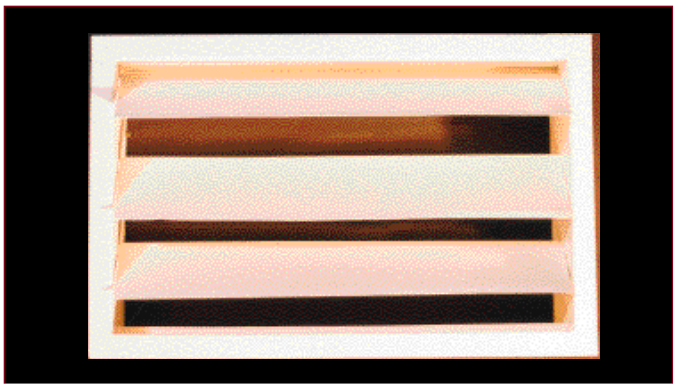
Non return damper
– Wall mounted

Model: ANRD-W



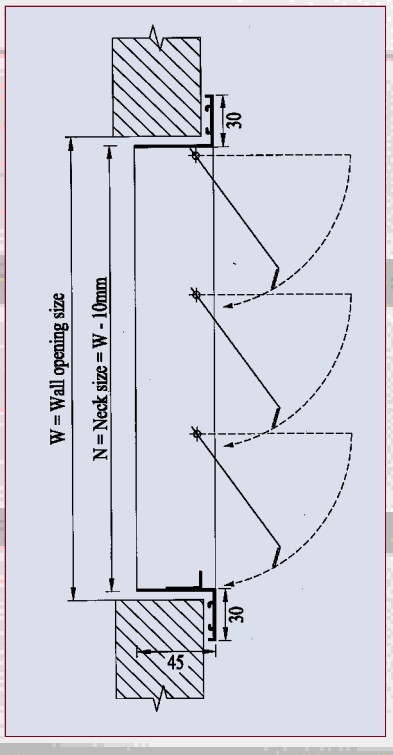
Construction:

- **Frame:** High quality extruded aluminium profile with 30 mm flange width as standard. 12, 16, 24 mm flange widths are optional.
- **Blades:** Aluminium sheet as standard. GI sheet as option.
- **Blade supports:** Self oiling nylon bushings with 8 mm diameter aluminium rods.
- **Blade seals:** Foam gasket for air tightness.
- **Blade stoper:** 20 mm x 20 mm aluminium angle.

Description:

- Frame is of high quality extruded aluminium profiled construction with the advantages of corrosion resistance and rigidity.
- Air operated damper blades are fixed to the frame by self oiling nylon bushes with 8 mm dia aluminium pipes.
- Blades are sealed with foam gasket at the bottom to avoid rattling noise and to provide air tight operation.
- Blades open fully or to any angle depending on the air velocity. Blades stay in position of opening with out fluctuating when there is constant airflow. Blades closes quietly when the air flow stops.

- Designed to maintain a constant pressure level inside pressurized rooms by relieving excess air when it exceeds the desired limit.
- Generally installed on diesel generator, plant rooms ventilation system and exhaust ducting.
- Available in square and rectangular sizes.



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Non return damper
– Duct mounted

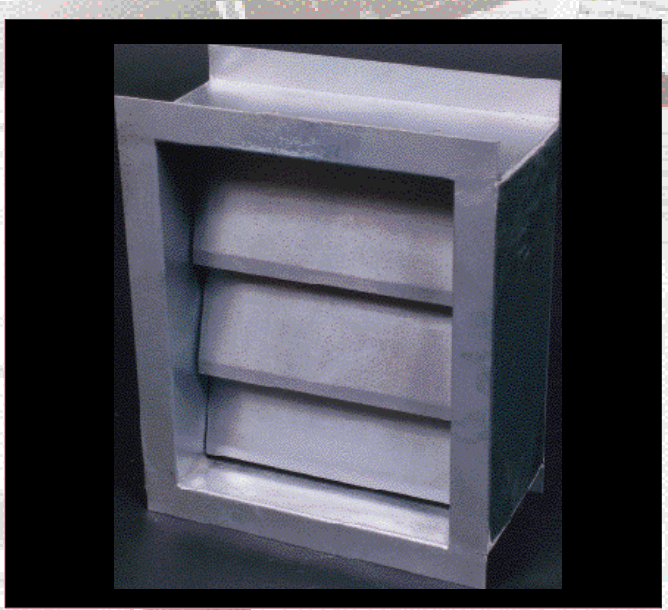
Model: ANRD-D

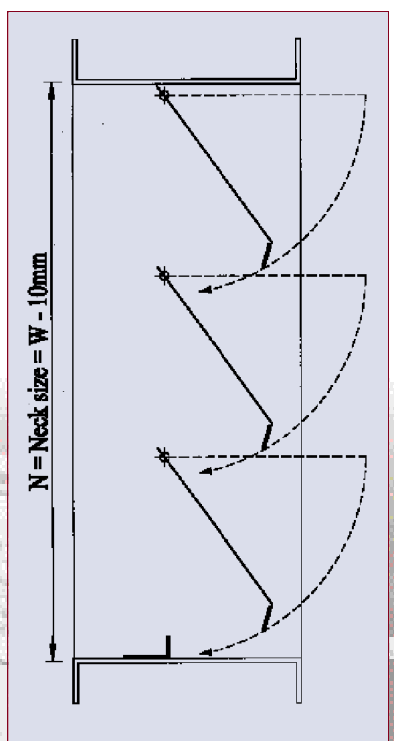
Construction:

- **Frame:** High quality galvanized steel sheet.
- **Frame size:** 125 mm depth and standard flange height of 25 mm.
- **Blades:** Aluminium sheet as standard. GI sheet as option.
- **Blae supports:** Self oiling nylon bushings with 8 mm diameter aluminium rods.
- **Blade seals:** 20 mm x 20 mm aluminium angle.

Description:

- Frame is constructed from galvanized steel sheet. Welded joints are protected by aluminium spray coating.
- Air operated damper blades are fixed to the frame by self oiling nylon bushes with 8 mm dia aluminium pipes.
- Blades are sealed with foam gasket at the bottom to avoid rattling noise and to provide air tight operation.
- Blades open fully or to any angle depending on the air velocity. Blades stay in position of opening with out fluctuating when there is constant air flow. Blades close quietly when the air flow stops.
- Designed to maintain a constant pressure level inside pressurized rooms. Used at duct outlets to prevent back draft when air moving devices are switched off.
- In a multi fan installation non return dampers prevent back draft through the operating fans.
- Structure is available with flanged edges and are supplied un drilled as standard.
- Available in square and rectangular sizes.





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Standard finishes:

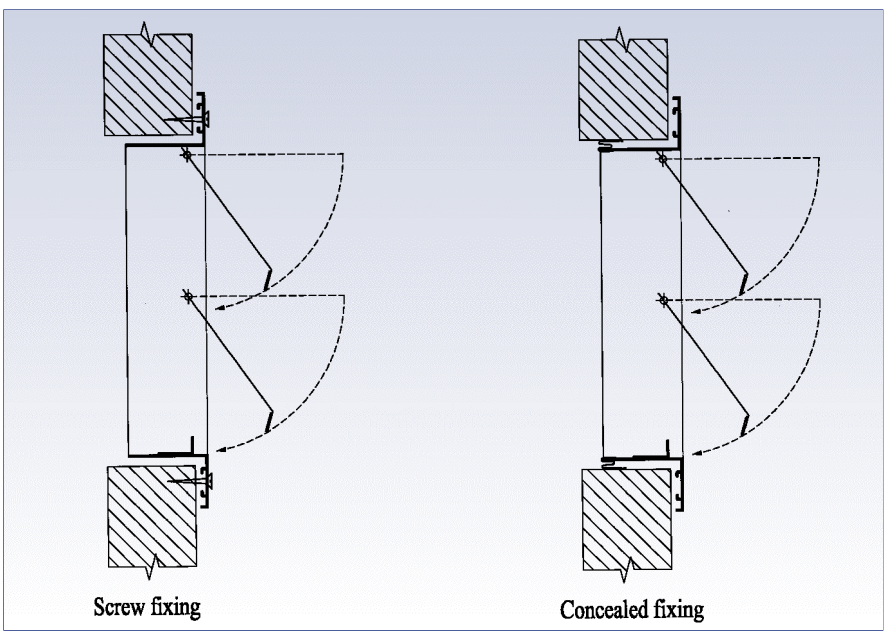
- Natural anodized aluminium finish.
- Powder coated colour finish as per RAL colour codes.
- Flexibility of finishing is available as option.

Standard sizes:

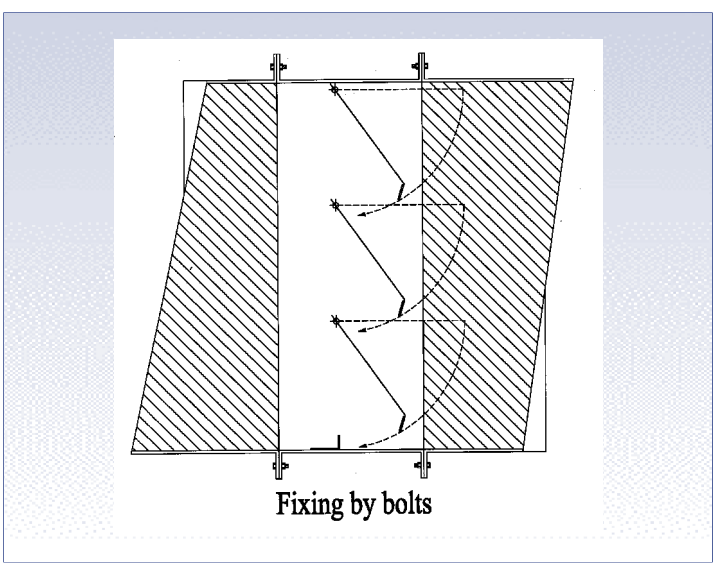
- Sizes available from 100 x 100 mm with an increment of 50 mm.
- Available in square and rectangular sizes.
- Non standard sizes available as option.

Fixing details:

Model: ANRD-W



Model: ANRD-D



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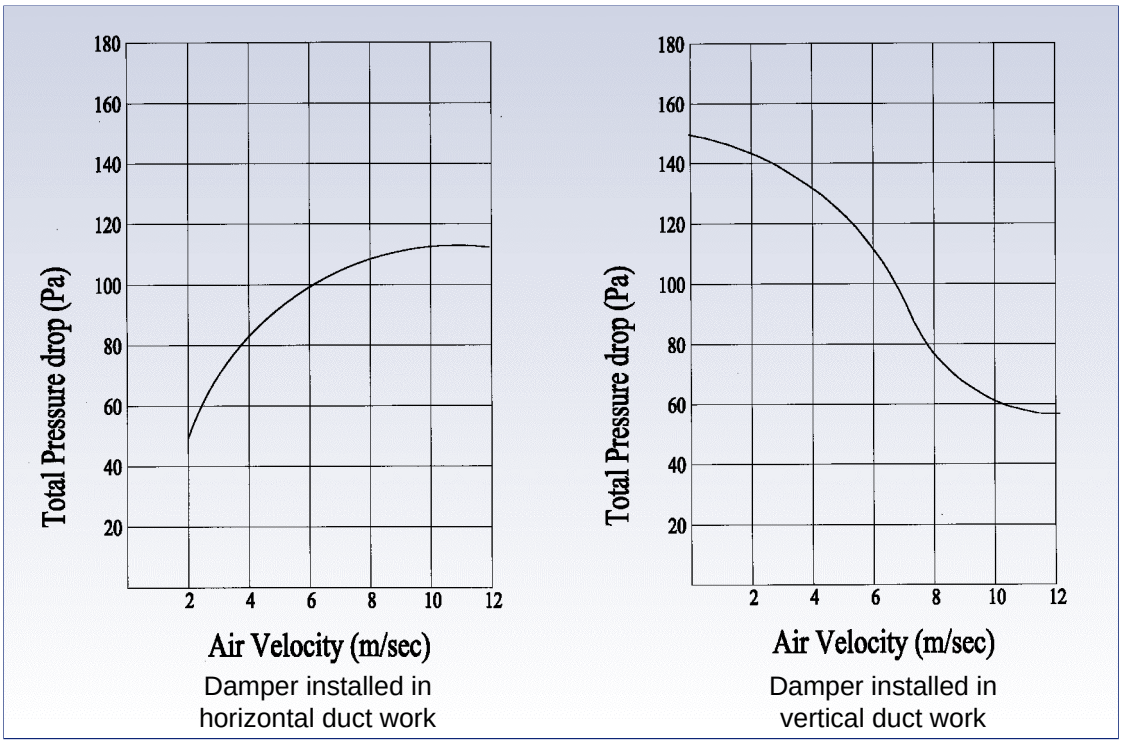
Performance data:

1. Pressure drop Vs Air velocity:



How to order:

Model	Mounting details	Size	Quantity	Fixing
ANRD	W= Wall mounted	Specify duct / wall opening size width x heigh in mm x mm	Specify in numbers	A = Fixing by bolts.
	D = Duct mounted			B = Screw fixing.
				C = Concealed fixing.

Ordering example:

1. To select non return dampers - duct mouned for a duct opening of 900 x 500 mm of quantity 50 nos. Fixing details: bolting.

   Order as : ANRD-D-900 x 500 – 50 – A.

2. To select non return dampers - wall mouned for a wall opening of 500 x 400 mm of quantity 100 nos. Fixing details: Screw fixing.

   Order as : ANRD-W-500 x 400 – 100-B.

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Pressure relief damper

Model: APRD-H-F, APRD-H-D

Construction:

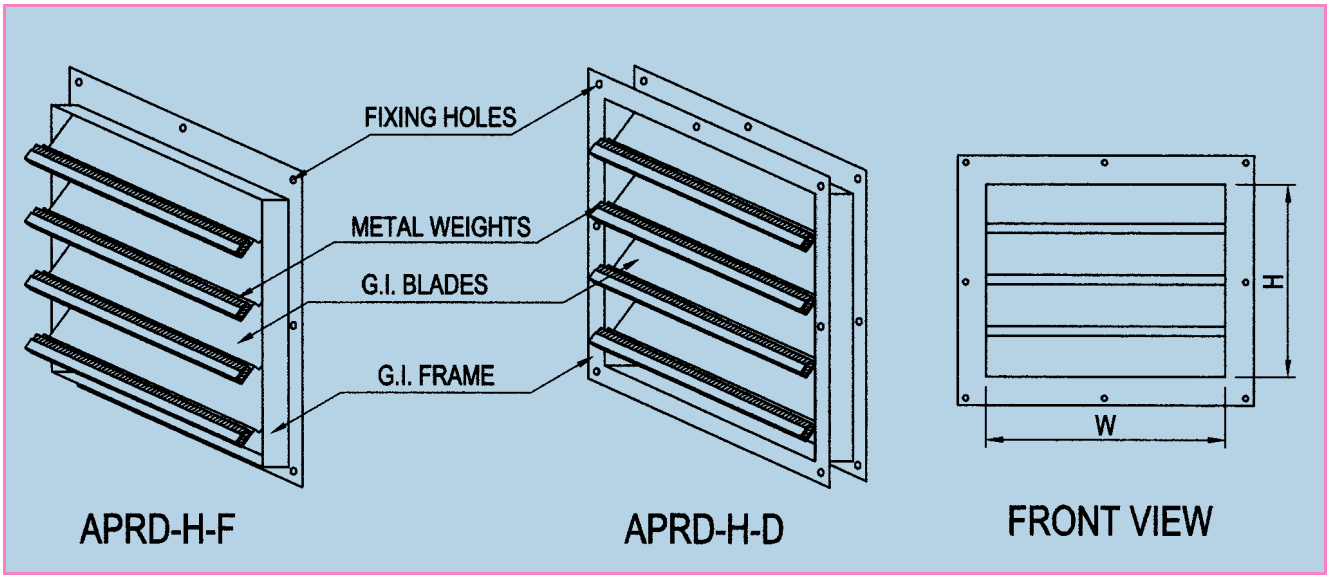
- **Frame:** Galvanized steel frame with powder coated finish.
- **Blades:** Galvanized steel blades with powder coated finish.
- **Blade supports:** Blade shafts are stainless steel and supported with brass bushes.
- **Blade seals:** Foam gasket for air tightness.

Description:

- The pressure releif dampers are provided with weighed metal strips.
- The dampers are tested after fabrication to operate at required pressure.
- The dampers are designed to maintain a constant pressure level inside pressurized rooms by relieving excess air when it exceeds the desired limit.

Standard Finishes:

Powder coated as per RAL color codes.



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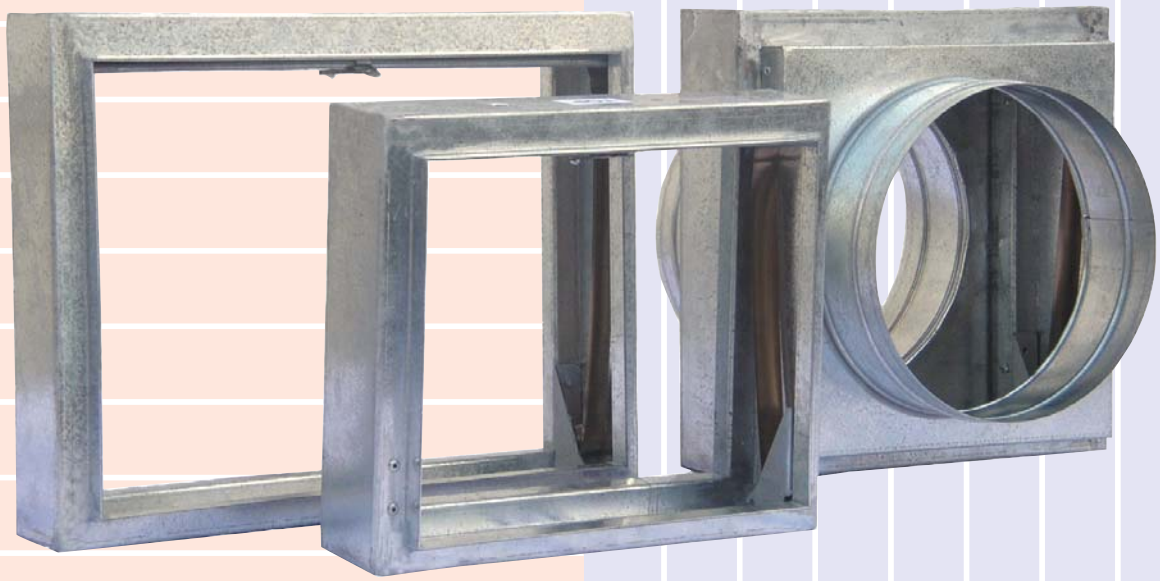
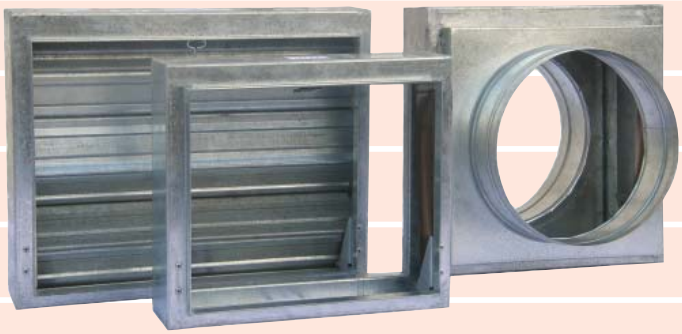
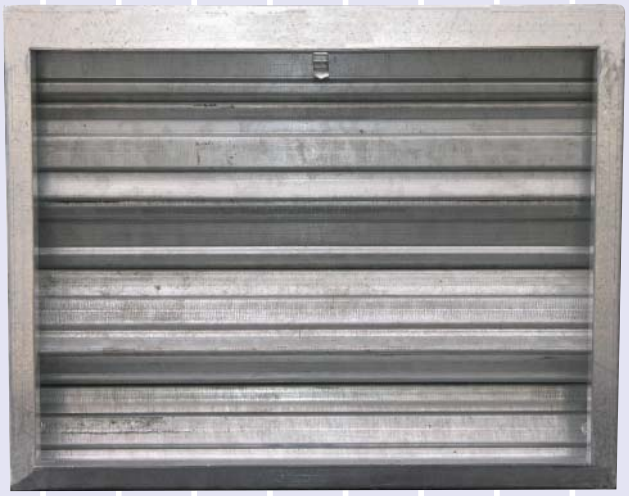
Fire Damper

Model: AFD 3







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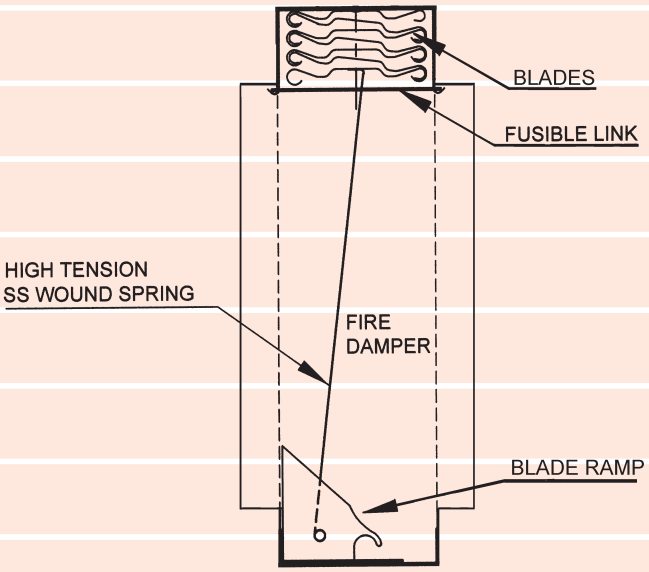
CLASSIFIED UL

The modern era buildings incorporate highly complex and sophisticated infrastructure and design and the occurrence of a fire may bring serious loss to human life, property and wastes valuable time and effort of many people involved in the successful completion of the project. Air Master Fire dampers are designed keeping in mind the safety of human life and property. This challenging demand is the most crucial of all faced by the building planners. Fire dampers protect individual rooms or zones by sealing off any supply or extract air, thus preventing the spread of fire or smoke through the central HVAC system of the building or the walls.

Air Master fire dampers are tested by UL laboratories and are manufactured in compliance with the UL 555 standards and the company's quality control procedures. AFD-3 Fire Dampers are intended for use in HVAC duct systems passing through fire resistive walls, partitions and in air transfer opening in walls.



Construction:

- **Frame:** High quality galvanized Iron Sheet of 1.6mm thickness.
- **Blades:** Interlocking type blades roll formed from 1mm thick galvanized steel.
- **Blade Ramp:** Formed from 1.6mm thick galvanized steel with a spring holder.
- **Springs:** 2nos. constant force stainless steel springs
- **Fusible Links:** UL listed fusible links which has fire rating of 165^{O} F / 212^{O} F.

Description:

- The frame is made from 1.6mm thk. high quality galvanized iron sheet. All welded joints are rust proofed by zinc paint coating. The blades are roll formed from 1mm thk. galvanized steel. The interlocking type blades are designed with hat shaped reinforcement ridges ensuring strength and stability. The blade ramp is formed from 1.6mm thk. galvanized steel with a spring holder. The ramp is frmly secured to the frame by rivets. Constant force stainless steel springs are firmly secured to the blades and held in place on the ramp. The blades are secured by UL listed fusible links which has a fire rating of 165^{O}F / 212^{O}F and thus kept out of the airstream when not in operation.

- The heat responsive links on detection of heat beyond 165^{O}F / 212^{O}F release the blades from their position. Upon release, the blades which are connected to the springs are pulled down by the springs and get automatically locked on a latch and remains so until reset. These fire dampers are rated upto 1 $^{1}/_{2}$ hours rating with low leakage. All dampers are manufactured in compliance to the UL 555 standards and the company's quality control procedures

- Upon the termination of fire condition, the damper can be re-opened (usually an access door has to be provided for inspection) by simply pulling up the curtain blades and replacing the fusible link.

Installation Instructions:

Sleeve:

Damper sleeve must be minimum 16 gauge (1.6mm) upto a maximum 10 gauge (3.5mm) steel. Sleeve thickness must be thicker than the duct connected to it. Sleeve gauge should comply with the SMACNA Duct Connection Standard Fire, Smoke and Radiation Damper Installation Guide For HVAC Systems and with NFPA90A. Sleeve must not extend more than 152mm out of the wall. Sleeves must terminate on both sides of the wall within the dimension shown in (Fig.3).

Damper must be secured inside the sleeve by 1"x1"x14gauge GI subframe, and the subframe to be fastened to sleeve by 5mm steel rivets or M5 bolts spaced at 150mm at the center and 50mm from the corners.

Duct-Sleeve Connections:

The connecting ducts shall not be continuous, and shall terminate at the sleeve.
Duct - Sleeve connections listed in UL555 STANDARD FOR FIRE DAMPERS

Fasteners may be used as follows
(a) Joints using connections shown in (Fig.1) with a maximum of two #10 sheet metal screws on each side and on the bottom located in the center of the slip pocket and penetrating both sides of the slip pocket.

(b) Joints using connectors of the type shown in (Fig.1) on the top and the bottom and using flat drive slips (Fig.2) not exceeding 508mm duct height on the sides.

Retaining Angle:

Angle must be minimum $1^1/_2$"x$1^1/_2$"x14 gauge (38x38x2mm) steel and must overlap wall opening 1" (25mm) minimum and cover corners of openings. Retaining angles must be provided on both sides of the wall. Angles are fastened to sleeve by either M5 bolts or 5mm dia 20mm long steel rivets spaced at a maximum of 150mm at the centre and 50mm from the end.
Retaining angles must not be fixed to each other or to the wall.

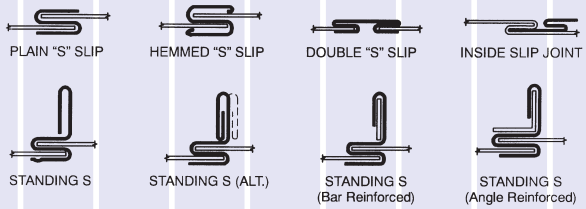


Fig. 1

Fig. 2

Damper Orientation:

Vertical.

Expansion Clearance:

Fire damper sleeve clearance within wall opening must be $^1/_4$" larger than the damper size for damper sizes upto 24" and additional $^1/_8$" per linear foot increase in the size of the damper.

Maximum rated size (Single section):

27" Width x 41" Height (672x1026mm)

Airflow:

Direction of airflow is indicated by the arrow on the damper.
The "AIR FLOW" direction arrow must be adhered to during installation.

Access Door:

An ACCESS DOOR is a NFPA requirement for damper inspection and testing.

Fusible Link:

UL Listed 165^{O}F / 212^{O}F fusible link as standard.

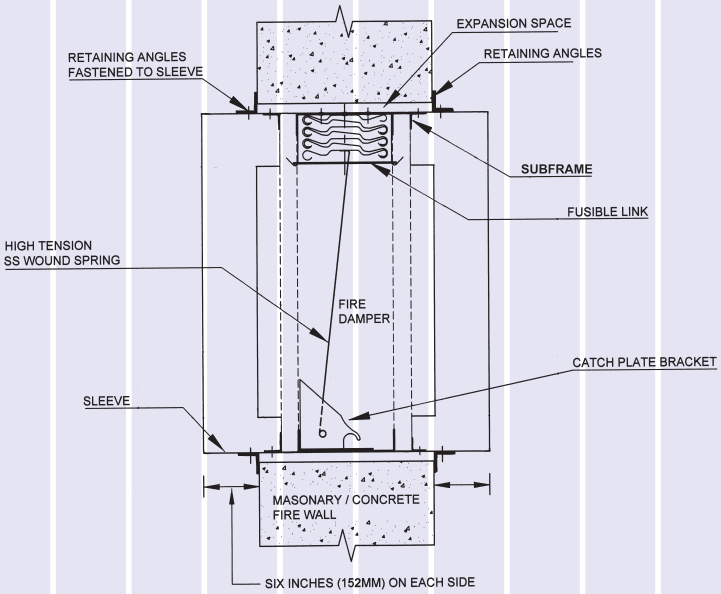
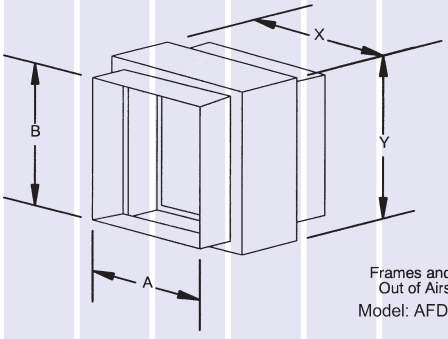


Fig.3 Vertical Installation

Model Referance:
AFD 3 - Constructed with GI blades



air master

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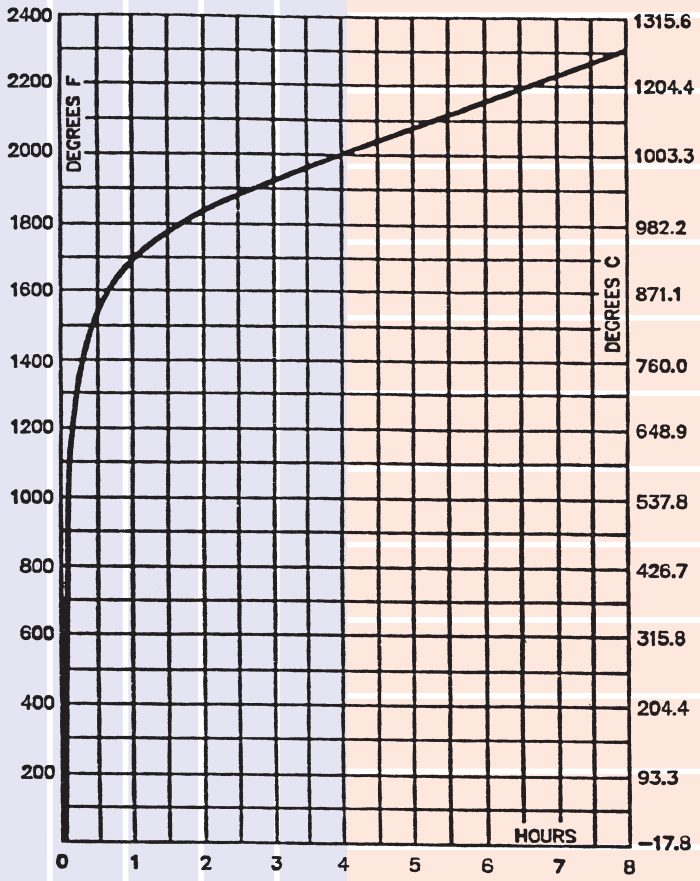

Time - Temperature Curve

The fire damper has been tested by UL Laboratories, USA. according to UL555 standard. The Time / Temperature curve required by this fire test procedure is shown above.

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