

**GREEN
TECHNOLOGY
FOR CLIMATE
CONTROL**



➔ Air Monitoring & Control

➔ Fire & Smoke Control

➔ HVAC & Control Damper



ABOUT US



Taking roots from design and manufacturing of HVAC products for almost three decades, Caire Consult was established in 1996 with the objective of specialisation in Air Movement and Control Products for Central Air Conditioning Systems.



As the market in India matured and concepts of fire safety, smoke control and general air quality within the HVAC systems began to get increasing attention, Caire Consult worked actively with the leading HVAC design consultants in the country to introduce newer, better and efficient systems that addressed these needs. With an uncompromising approach towards quality and unflinching commitment to perfection, the company successfully established its brand CONAIRE, in the segment.



With rapid globalisation the buildings and HVAC systems started becoming more complex and energy intensive thus raising concerns about efficiency of the systems and environment in general. We at Caire Consult were alive to these concerns and were among the first companies to develop intelligent control systems that would help monitor the HVAC and ventilation requirements in real time and thus result in optimum usage of resources and efficient environment control. Today, Conaire offers a number of products and solutions to help you meet your goals of optimal indoor air quality at reduced energy costs.



Architectural Louvers



Grilles & Diffusers



Air Treatment & Ventilation



AIR MONITORING & CONTROL

WHY SHOULD WE MONITOR AIR QUALITY AND VOLUME?

There are many significant benefits of monitoring air quality and volumes.

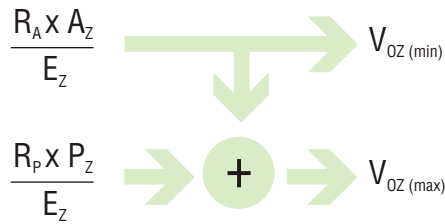
Firstly, measuring the amount of outdoor air volume coming into a building, followed by monitoring air quality inside the building, is the first step towards meeting the minimum requirements that are a prerequisite to earn LEED credits.

Studies have shown that buildings that are under ventilated suffer from reduced productivity levels. On the other hand, over ventilated buildings result in increased humidity levels, with a direct bearing on energy costs.

The second major advantage is that demand control ventilation can be strategised with measured parameters.

Demand control ventilation reduces airborne viruses and bacteria which can lead to sick building syndrome. It not only reduces the cost of operating the HVAC system, but again, also helps to earn valuable LEED credits.

→ CALCULATING OUTDOOR AIR REQUIRED FOR INDIVIDUAL SPACE



E_z is the zone distribution efficiency, which determines how effectively outdoor air distributes in the zone.

It depends upon the type of distribution system and varies from 0.5 to 1. Refer Table 6-2 in ASHRAE standard 62.1

where,

- R_A is required outdoor air cfm per square feet area, it ranges from 0.06 to 0.48, depends upon nature of occupancy
- A_z is the zone area in square feet
- R_p is required outdoor air cfm per person, it ranges from 5 to 20, depends upon nature of occupancy.
- P_z is the designed maximum population. Refer table 6-1 in ASHRAE standard 62.1

Hence we get required minimum and maximum outdoor air for a individual space. Using mass balance we can correlate these fresh air levels with CO_2 levels and demand control ventilation can be strategised.

→ CALCULATING COMBINED OUTDOOR AIR REQUIRED FOR MULTIPLE SPACE

		Zone 1	Zone 2	Zone N
V_{OZ}	Required Outdoor Airflow	V_{OZ1}	V_{OZ2}	V_{OZN}
V_{PZ}	Required Supply Airflow	V_{PZ1}	V_{PZ2}	V_{PZN}
Z	Outdoor Air Fraction	$\frac{V_{OZ1}}{V_{PZ1}}$	$\frac{V_{OZ2}}{V_{PZ2}}$	$\frac{V_{OZN}}{V_{PZN}}$
Z_D	Critical Outdoor Air Fraction	Maximum ($Z_1, Z_2, \dots Z_N$)			
V_{OZT}	Total Uncorrected Outdoor Airflow	$V_{OZ1} + V_{OZ2} + \dots V_{OZN}$			
V_{PZT}	Total Supply Airflow	$V_{PZ1} + V_{PZ2} + \dots V_{PZN}$			
X	Total Outdoor Air Fraction	$\frac{V_{OZT}}{V_{PZT}}$			
V_{OT}	Total Corrected Outdoor Airflow	$\frac{V_{OZT}}{1+X Z_D}$			

→ CALCULATING SUPPLY AIR REQUIRED FOR INDIVIDUAL SPACE

Before a selection can be made, the design airflow rate must be determined from load calculations. Caution should be taken to determine these loads accurately as VAQ station/VAV box oversizing can lead to significant energy penalties. The controllable minimum shall be determined by cross-sectional area of VAQ station/VAV Terminal, which is 120 cfm per square feet area.



AIR MONITORING & CONTROL EQUIPMENT

1 VARIABLE AIR QUALITY STATION



CONAIRE's VAQs is an air measuring control damper that utilises rapid average pitot tube for airflow measurement and low leakage volume control damper for volume control. The VAQ series combines the functionality of an accurate airflow measuring station, low leak control damper with actuator, and an advanced application specific controller into one compact assembly.

Each VAQs station is factory calibrated and programmed with an exponential flow equation, where flow is proportional to signal received from pressure transducer to regulate the control damper to achieve desired demand.

Every VAQ Station comes standard with Honey-Comb patterned airflow straightener. Thus its whole assembly is self sufficient for accurate & reliable air-flow measurement. It also has differential pressure sensor, zero calibrated and factory programmed (for non linear exponential airflow calculation routine) to provide most accurate and reliable airflow measurement in ducts.

Each VAQ station is dynamically calibrated at our-state-of-the-art facility, thus ensuring accuracy in performance and enabling fabrication to site-specific customised sizes, thereby eliminating the need for any additional transition piece for installation. This means that every Conaire VAQ Station has an ease of installation built-in.



APPLICATIONS: OUTDOOR AIR

Outdoor Air application can be further classified as Single Space and Multiple Space DCV system.

- **Single Space DCV system:** the ventilation system delivers fresh outdoor air to a single space. This is a simple system and we can easily strategise demand controlled ventilation using an indoor air quality sensor installed at space & application specific control. In addition to this, free cooling control can be provided by supplying an optional sensor and controller.
- **Multiple Space DCV system:** here the ventilation system delivers fresh outdoor air to the air handler which mixes return air from several, individual, controlled spaces. Each individual controlled space needs to have a VAQ station installed with an indoor air quality sensor & application specific supply air control. The demand controlled ventilation can be strategised by using multiple space equation and at the same time air handler drive speed can be optimised. In addition to this, free cooling control can be provided by supplying an optional sensor and controller.



APPLICATIONS: SUPPLY AIR

For Supply Air, an air measuring control damper combined with an indoor air quality sensor & application specific control which varies the flow of air to each space maintaining the desired zone temperature.

2 VARIABLE AIR VOLUME TERMINAL



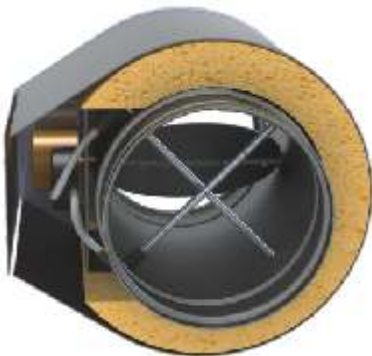
CONAIRE's VAV Terminal is an air measuring control damper, with individual space thermostat to vary the flow of air to each space, maintaining the desired set point temperature. It combines the functionality of an accurate airflow measuring rapid average pitot tube with an ultra low differential pressure sensor, a low leak control damper with actuator, and an advanced application specific controller, into one compact assembly.

Each VAV station is factory calibrated with exponential flow equation, where flow is proportional to signal received from pressure transducer to regulate the control damper to achieve desired demand. The unit modulates cold airflow from minimum to maximum setting, thereby achieving desired zone temperature. It provides cost effective temperature control.

Each VAV terminal is tested rigorously, thereby ensuring accuracy and reliability in performance even at low airflow. We offer various VAV terminals with electric reheat, hot water reheat, series and parallel fan powered terminal, thus providing efficient control for varied and larger temperature range with wide range of airflows to choose from.

Also available without thermostat as a CAV, for constant flow regulator application. Pressure dependent bypass type VAV also available for the use with the system, without air handler drive.

→ ZONE CONTROL TERMINAL



This terminal is designed to provide minimum-maximum flow control for on demand ventilation. It combines the functionality of an accurate and very low airflow measuring device with motorised control damper.

It provides cost effective treated fresh air control for hotel guest rooms.

Each terminal is tested rigorously, thereby ensuring accuracy and reliability in performance even at low airflow.

We also offer optional room controller to provide demand control ventilation based on occupancy. It can be integrated with multiple space VAQ and its controller, to optimise the blower speed of heat recovery or fresh air unit in accordance with the each room's airflow requirement.

3 WIRE-FREE SOLAR IAQ CONTROLLER



A totally wire free and portable unit that monitors indoor air quality, complete with CO₂, Temperature and Humidity sensors with set-point adjustments. It has a highly efficient indoor solar cell to harvest its own power from ambient interior lighting. It has a large display screen to facilitate reading from a distance.

It also has an advanced application specific control for with easy integration with VAQ stations.

An optional smoke detector can be connected with this controller to provide early alarm in case of fire and at the same time strategise and control VAQ stations, fire smoke damper and other smoke exhaust systems using Intelligent Damper Control and Monitoring System.

It's unique portable design and RF communication means it has zero installation hassles with no wires and conduits.



FIRE & SMOKE CONTROL

WHY FIRE AND SMOKE CONTROL IS IMPORTANT?

Fire Dampers are required by all building codes to maintain the required fire resistance ratings of walls, partitions, and floor when they are penetrated by air ducts or other ventilation openings.

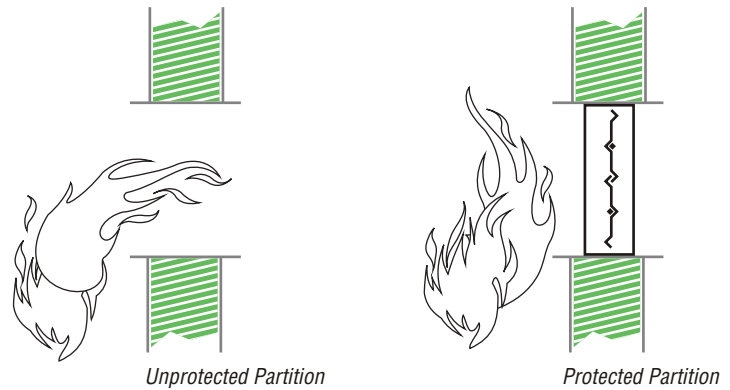
One of the basic requirements of building fire protection as required by all building codes is the compartmentation or division of buildings using fire rating walls, floors, or other partitioning methods. This compartmentation is intended to contain any fire to the compartment of the fire origin and thereby minimise damage to property and protect the lives of people living and/or working in the building.

Smoke dampers on the other hand can be effectively employed to control the spread of smoke or by simply shutting off the circulation of air and smoke through ducts or ventilation openings or more actively to be applied as part of an “Engineered Smoke Control System”

FIRE DAMPERS

A duct or ventilation opening in any of the fire rated partitions would permit a fire to spread from the compartment of origin to adjoining compartments.

Fire dampers are installed in these ducts or ventilation openings. Upon detection of heat, these dampers close (at melting of a UL Stamped fusible link or through a thermal cutoff and Solenoid) thus blocking the opening and thus prevent the spread of fire into the adjoining compartment.

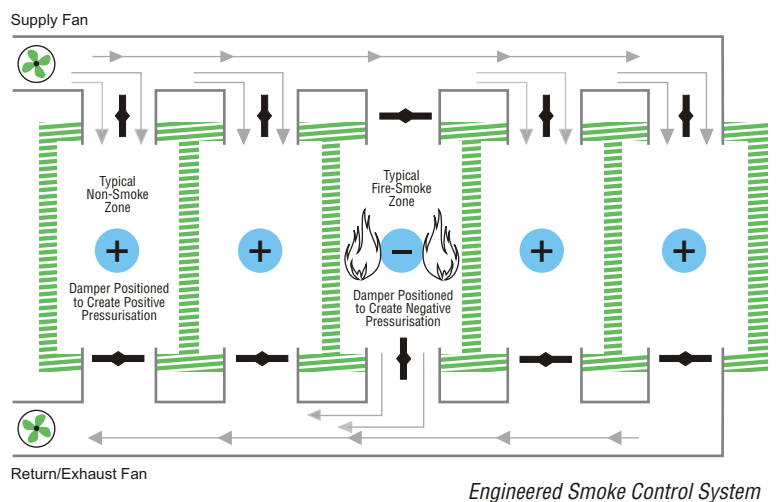


SMOKE DAMPERS

Smoke dampers applied in a “Passive Smoke Control System” simply close and prevent the circulation of air and smoke through a duct or a ventilation opening.

Or they may be applied as part of an “Engineered Smoke Control System” to control the spread of smoke by using the building’s HVAC system and/or dedicated fans to create pressure differences.

Higher pressures surround the fire area and prevent the spread of smoke from the fire zone to other areas. In this application, the smoke dampers are motorised with electric or pneumatic actuators. They can be controlled by a smoke or a heat detector signal, or in a variety of ways by the building control system to accomplish the intent of the design.



COMBINATION FIRE SMOKE DAMPERS

Combination Fire Smoke Damper performs the function of both a Fire Damper and a Smoke Damper at a same location. Combination Fire Smoke Dampers must be qualified under UL Standard 555 as a Fire Damper and under UL Standard 555S as a Smoke Dampers.



FIRE & SMOKE CONTROL EQUIPMENT

1 FIRE DAMPER

90 min. fire rating as per UL-555



These dampers are made of heavy gauge galvanised steel with multi blade construction. The blades are fitted with chrome plated shafts and self lubricated phosphorus bronze bushes.

The dampers are also provided with a jamb seal (compression type) on sides to prevent spread of smoke & fire. The blades of the damper are held in the 'open' position by a high tensile spring and a fusible link. The fusible link is UL Stamped and melts at 74° C or through a thermal cut-off and Solenoid, causing the damper to close upon heat detection, blocking the opening and thus preventing the spread of fire into the adjoining compartment.

The fire damper are available in standard depth of 150 mm with flange of 25/40 mm suitable for duct mounting.

2 FIRE SMOKE DAMPER CLASS I

90 min fire rating with Class I leakage as per UL-555/555S



These dampers are made of heavy gauge galvanised steel having multi blade construction. The blades are fitted with chrome plated shafts and self lubricated phosphorous bronze bushes. The dampers are also provided a with jamb seal (compression type) on sides and blade edge to prevent spread of smoke & fire.

These are motorised dampers with a pair of manually resettable, fixed setting, thermostats mounted in the air stream, with cut-offs at 74° C and 177° C causing the damper to close just below 74° C. Depending on demand from the smoke control system it can be opened/closed with a secondary temperature override at 177° C.

Available with UL873 listed spring return electric actuator.

These fire smoke dampers are available with a integral sleeve of length 406/535 mm suitable for 4/9 inches wall mounting.

3 FIRE SMOKE DAMPER CLASS II

90 min fire rating with class II leakage as per UL-555/555S

These dampers are made of heavy gauge galvanised steel having multi blade construction. The blades are fitted with chrome plated shafts and self lubricated phosphorous bronze bushes. The dampers are also provided with jamb seal (compression type) on sides to prevent the spread of smoke & fire.

These are motorised dampers with a UL stamped thermal cut-off mounted in the air stream, which fuses at 74° C and causes the damper to close just below 74° C, thereafter, it can be opened/closed from the smoke control system.

Available with either spring return electric or pneumatic actuator.

→ DUCT MOUNTED FIRE SMOKE DAMPER

Available in standard depth of 150 mm with flange of 25/40 mm suitable for duct mounting.

→ WALL MOUNTED FIRE SMOKE DAMPER

Available with a integral sleeve of length 406/535 mm suitable for 4/9 inches wall mounting.



4 CONTROL OPTIONS

→ SMOKE DETECTOR MODULE



Accommodates photoelectric sensor. It is easy to clean and maintain since detector heads can be removed by simply twisting-in, twisting-out of its housing. It samples air currents passing through the duct.

→ STAND ALONE CONTROL MODULE



On a signal from smoke detector module or Central Fire Alarm Panel, it sends out control signals to fans, blowers and air conditioning systems through control module and hence preventing spread of toxic smoke and fire gases through the protected areas.

→ DAMPER CONTROL AND MONITORING SYSTEM

Intelligent Damper Control and Monitoring System, provides supervisory control and monitoring for Fire Smoke Damper. With signals from an optional smoke detector installed in zone with VAQ station and its controller at supply air to provide early alarm in case of fire and at the same time strategise and control VAQ stations, fire smoke damper and other smoke exhaust systems using this system.



CONTROL DAMPERS

WHAT IS A DAMPER?

Damper is a mechanical device to stop or regulate the fluid flow in HVAC and Process Control. There are various types of dampers but they can be broadly classified in two categories based upon their industry of use.

HVAC Control Damper : The HVAC control damper may be used to cut off central air conditioning (heating or cooling) to an unused room, or to regulate it for room-by-room temperature and climate control. Its operation can be manual, or motorised.

Industrial Damper : The industrial damper may be used to divert hot exhaust from gas turbine exhaust to recovery boiler, or to shut off process for maintenance, or to regulate gas or airflow in process control. Its operation can be manual or motorised.

Various applications of Industrial dampers are as follows:

- i) Isolation dampers are used for isolation or shutoff for industrial process in extreme pressure and velocity systems.

Dampers having tight seal with minimum leakage and low pressure drop are suitable for this application.

- ii) Control dampers are used for flow control in extreme pressure and velocity system. Dampers having better flow characteristics and control options to suit your application are recommended for this application.

(contact us with your design requirement)



HVAC CONTROL

Various application of HVAC control dampers are as follows:

FRESH AIR DAMPERS

Fresh air dampers are used to regulate the amount of fresh air intake in a building. Dampers with class I leakage and automatic control are required for this application, hence extruded aluminium, motorised airfoil damper can be used.

It is even better to monitor and regulate quality and quantity of air and control fresh air intake accordingly, for which CONAIRE VAQ stations are best suited.

RETURN AIR DAMPERS

Return air dampers are used to regulate return air from air conditioned spaces to the mixing box of air handler.

It is however better to select class I leakage but not necessary in this application. Automatic or manual control can be chosen for the damper, depending on whether return air is ducted into the mixing plenum or not.

EXHAUST AIR DAMPERS

Exhaust air dampers are used to exhaust balance return air. Exhaust air could be removed either locally or through a heat recovery unit. Pressure relief damper with automatic or manual control can be used for this application.

It is even better to monitor quantity of air, when air is exhausted through heat recovery so as to regulate the heat recovery drives speed, in which case CONAIRE VAQ stations are best suited.

ZONE CONTROL DAMPERS

Zone control dampers are used to regulate the amount of primary air in various zones. Dampers with class I leakage and automatic control are required for this application to provide climate control. Hence extruded aluminium motorised airfoil dampers with thermostat could be used.

It is even better to monitor and regulate quality and quantity of air in zone and control fresh air intake accordingly in response to the demand of critical zone among all zone fed through common fresh air through a air handler. CONAIRE VAQ stations are best suited in this scenario.

VENTILATION DAMPERS

Ventilation dampers are used at fan's discharge/intake either as a backdraft damper to restrict flow in one direction or to regulate the amount of flow through fans. Dampers should be rated for velocity greater than 10 m/s at 1 kPa.



HVAC CONTROL DAMPERS

1 VOLUME CONTROL DAMPERS

→ 3-V BLADE TYPE



Standard duty flanged style frame dampers, available with various blade types and controls. Designed to be used in central air conditioning system to either cut off or regulate flow.

These dampers consist of multiple 3-V blades fabricated in C type 6 in. (150 mm) deep frame having duct suitable flange of 25/40 mm with opposed blade linkage drive. The fabricated blades are reinforced with 3-longitudinal structurally designed vee's. 3-V blades and C type frame are made out of 16(1.5), 18(1.2), or 20(1.0) ga.(mm) galvanised steel.

- **Motorised 3V Damper** : includes extended shaft for motorised assembly with wide range of electric and pneumatic actuators to choose from.

These dampers are suited for applications such as automatic control in low to medium pressure system i.e. temperature control with zone thermostat etc.

- **Manual 3V Damper** : includes manual hand quadrant consisting of a PVC knob, position lock and position indicator for manual balancing or control.

Typically used in a low to medium pressure system.

- **Face and Bypass 3V Damper** : includes face and bypass sections, assembled either horizontally or vertically. Blades in face section are interconnected with those in bypass section for simultaneous function, typically causing one section to be closed while other to be open at the same time.

Available as motorised or manual 3V blade type, these dampers are suited for application as automatic or manual control in low to medium pressure system.

→ ROUND BLADE TYPE



These dampers consists of single fabricated round blade with blade seal in round 6 in. (150 mm) deep round frame having bends at both ends for round duct connection. The round ducts present lower resistance to airflow and hence save energy.

Round blades and the casing are made out of 16(1.5), 18(1.2), or 20(1.0) ga.(mm) galvanised steel sheet.

- **Motorised Round Damper** : It includes extended shaft for motorised assembly with wide range of electric and pneumatic actuators.

Suitable for application in low to medium pressure and velocity systems with blade seals for low leakage applications. i.e. temperature control with zone thermostat, or pressure relief with pressure switch etc.

- **Manual Round Damper** : includes manual hand quadrant with PVC knob, position lock and position indicator for manual balancing or control in low to medium pressure and velocity systems with blade seals for low leakage applications.

→ AEROFOIL BLADE TYPE



These dampers consist of multiple heavy gauge extruded aluminium aerofoil blades in C 4.5 in.(115 mm) deep frame having duct suitable flange of 25 mm with exposed gear drive, EPDM blade seal. The double skin aerofoil presents lower resistance to airflow and adds strength to the blades.

C type frame is either made out of Heavy gauge extruded aluminium or 16(1.5), 18(1.2), or 20(1.0) ga.(mm) galvanised steel sheet.

- **Motorised Airfoil Damper** : includes extended shaft for motorised assembly and wide range of electric and pneumatic actuators to choose from.

Suitable for application as automatic control in high pressure and velocity systems with blade seals for low leakage applications. i.e. temperature control with zone thermostat, or pressure relief with pressure switch etc.

- **Manual Airfoil Damper** : includes manual hand quadrant with PVC knob, position lock and position indicator for manual balancing or control in high pressure and velocity systems with blade seals for low leakage applications.
- **Face and Bypass Airfoil Damper** : includes face and bypass section, assembled either horizontally or vertically. Blades in face section are interconnected with those in bypass section for simultaneous function, typically causing one section to be closed while other to be open at the same time.

These dampers are available as motorised or manual 3V blade type face and bypass damper suitable for application as automatic or manual control in low to medium pressure system.



HVAC CONTROL DAMPERS

2 BACK DRAFT DAMPERS



3-V BLADE TYPE



Used in ventilation systems to allow airflow in one direction and restrict airflow in the other direction. Standard duty flanged style frame dampers, available with various blade types to suit every backdraft application in building ventilation systems.

These dampers consist of multiple fabricated off-centre 3-V blades in C type 4 in. (100 mm) deep frame having duct suitable flange of 25/40 mm with parallel blade linkage drive. The fabricated blades are reinforced with 3 longitudinal off-centre structurally designed vee's.

3-V blades are made out of 22(0.8) ga.(mm) galvanised steel sheet while C type frame is made out of 18(1.2) ga.(mm) galvanised steel sheet.

- **3-V Backdraft Exhaust Damper:** designed to allow exhaust airflow but prevent airflow in reverse direction.

Typically used in application as exhaust backdraft damper in ventilation system even at high pressure and velocity.

- **3-V Backdraft Intake Damper:** designed to allow supply airflow but prevent airflow in reverse direction.

Typically used in application as intake backdraft damper in ventilation system even at high pressure and velocity.



EXTRUDED BLADE TYPE



These damper consists of multiple heavy gauge extruded aluminium blades in C type 4.5 in. (115 mm) deep extruded aluminium frame having duct suitable flange of 25 mm.

The extruded blades and frame are structurally reinforced to present strength.

- **Extruded Backdraft Exhaust Damper:** designed to allow exhaust airflow but prevent airflow in reverse direction.

Typically used in application as exhaust backdraft damper in ventilation system even at high pressure and velocity.

- **Extruded Backdraft Intake Damper:** designed to allow supply airflow but prevent airflow in reverse direction.

Typically used in application as intake backdraft damper in ventilation system even at high pressure and velocity.

3 PRESSURE RELIEF DAMPERS

A pressure relief damper is developed with an elevated and adjustable start open pressure while providing the backdraft function. Standard duty flanged style frame dampers, available with various actuation types to suit every application for pressure relief in building ventilation systems.

→ MANUAL



It includes backdraft dampers with balancing weight to provide necessary pressure relief function. They are suitable for medium leakage application.

→ MOTORISED



It includes motorised damper with non spring return electric actuator and adjustable differential pressure switch with necessary control and accessories to provide pressure relief function. They are suitable for low leakage applications and offer low resistance to flow.

4 ACTUATOR OPTIONS

→ MANUAL GEARED QUADRANT



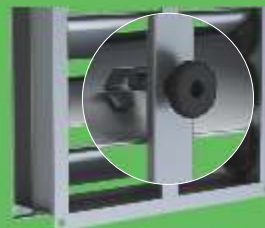
These are used for manual balancing of the airflow by lever and gear arrangement in high pressure and velocity systems. This type of actuators are mounted on the dampers externally.

→ PNEUMATIC CONTROL



These actuators are used in HVAC systems where pneumatic controls are preferred

→ INTERNAL MANUAL KNOB



For manual balancing of volume control damper from inside



ARCHITECTURAL LOUVERS

SEPARATING INDOOR AND OUTDOOR ENVIRONMENT

A louver is a ventilation product that allows air to pass through while keeping out unwanted elements such as water, dirt, and debris.

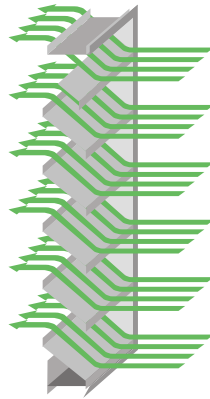
A number of fixed or operable blades mounted in a frame can provide this functionality. The basic considerations for selecting louvers are mentioned alongside.

		Construction Detail		Aesthetics		Performance		
SNo	Louver Type	Blade	Frame	Depth (inches)	Alignment	Free Area%	Water Penetration (fpm)	Features
1	Thin Line	Extruded Aluminium	Extruded Aluminium	1.86	H	53	670	For curtain wall and minimum depth
2	Wide Line	Extruded Aluminium	Extruded Aluminium	4	H	49	700	For Window/Door Walls
3	Drainable	Extruded Aluminium	Extruded Aluminium	2.25	H	48	1060	Thin and effective for rain water protection
4	Drainable	Fabricated Steel	Fabricated Steel	4	H	23	1150	Effective for rain water protection
5	Stationary	Fabricated Steel	Fabricated Steel	3	H	49	700	Stationary standard louver
6	Adjustable	Fabricated Steel	Fabricated Steel	3	H	49	700	Operable louver blades
7	Standard	Extruded PVC	Fabricated Steel	3	H	34	800	Stationary standard PVC louver offering
8	Sight Proof	Extruded PVC	Fabricated Steel	4	V	41	1250	Wind driven rain protection
9	Sand Trap	Fabricated Steel	Fabricated Steel	3.2	V	NA	NA	Sand protection
10	Acoustic	Fabricated Steel	Fabricated Steel	6	H	31	800	Sound absorption
11	Combined with backdraft damper	Extruded Aluminium	Extruded Aluminium	4.5	H	40	1060	Combination of drainable louver with backdraft damper
12	Combined with adjustable damper	Extruded Aluminium	Extruded Aluminium	4.5	H	38	1060	Combination of drainable louver with adjustable damper



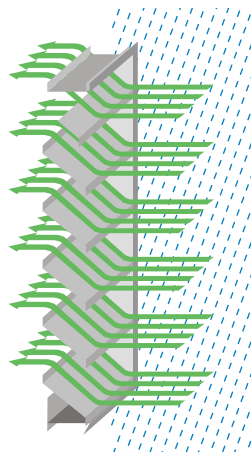
FREE AREA

It is the ratio of total open area obtained after subtracting all the obstructions and overall window opening. Generally ranges from 35% to 60%. A high percentage free area is beneficial because more air can enter into a smaller wall opening, reducing the cost of wall opening and the louver.



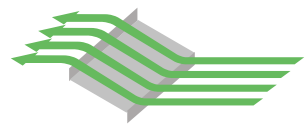
WATER PENETRATION

It is a threshold measurement of air intake velocity at which the louver will begin leaking. Generally ranges from 500 to 1300 fpm and shall be selected so as water penetration shall be higher than the air intake velocity.



RESISTANCE TO AIRFLOW

Every louver will create resistance based on the frame and blade shapes. Lower blade angles or more aerodynamic shapes create less resistance. We can calculate the pressure loss of the louver at the required free area velocity and determine its suitability. The resistance created can be detrimental to the application of fans and other air movement equipment, so we should attempt to minimise it.





ARCHITECTURAL LOUVERS

1 EXTRUDED ALUMINIUM THIN-LINE LOUVER



Commonly used to protect air intake and exhaust openings in building interior or exterior where high free area and low airflow resistance is required.

Design incorporates extruded aluminium one side flange frame for easy installation and stationary narrow profile horizontal louver which makes this product ideal for installation into curtain walls, windows, doors, or as air conditioning grilles.

2 EXTRUDED ALUMINIUM WIDE-LINE LOUVER



Commonly used to protect air intake and exhaust openings in building exterior or interior where high free area and low airflow resistance is required.

Design incorporates extruded aluminium structural member and stationary 4 inch deep horizontal louver which makes this product ideal for installation into standard walls, windows, doors, or as partition grilles.

3 EXTRUDED ALUMINIUM DRAINABLE LOUVER



Made out of specially designed weather louver to protect air intake and exhaust openings in building exterior walls where high free area and low airflow resistance is required with increased protection against water penetration.

Design incorporates extruded aluminium 2 inch deep drainable head member with one side flange and stationary horizontal louver to channel water to the jambs which guide the water through vertical down-spouts for escape at the sill.

4 STEEL FABRICATED DRAINABLE LOUVER



Made out of specially designed weather louver to protect air intake and exhaust openings in building exterior walls where high free area and low airflow resistance is required with increased protection against water penetration. Design incorporates steel fabricated 4 inch deep drainable head member with both side flange and stationary horizontal blades to channel water to the jambs which guide the water through vertical down-spouts for escape at the sill.

5 **STEEL FABRICATED ADJUSTABLE LOUVER**



Commonly used to protect air intake and exhaust openings in building exterior or interior where high free area and low airflow resistance is required with adjustable louver operation. Design incorporates steel fabricated one side flange frame for easy installation and adjustable 3 inch deep horizontal louver which makes this product ideal for installation into standard walls, air handler, windows, doors, or as partition grilles.

6 **STEEL FABRICATED STATIONARY LOUVER**



Commonly used to protect air intake and exhaust openings in building exterior or interior where high free area and low airflow resistance is required.

Design incorporates steel fabricated one side flange frame for easy installation and stationary 3 inch deep horizontal louver which makes this product ideal for installation into standard walls, air handler, windows, doors, or as partition grilles.

7 **EXTRUDED PVC STANDARD LOUVER**



Commonly used to protect air intake and exhaust openings in building exterior or interior where high free area and very low airflow resistance is required.

Design incorporates steel fabricated one side flange frame for easy installation and extruded PVC stationary airfoil 3 inch deep horizontal louver which makes this product ideal for installation into standard walls, air handler, windows, doors, or as partition grilles.

8 **EXTRUDED PVC SIGHT PROOF LOUVER**



Commonly used to protect air intake and exhaust openings in building exterior or interior where high free area and low airflow resistance is required with increased protection against water penetration.

Design incorporates steel fabricated one side flange frame for easy installation and extruded PVC sight proof 4 inch deep vertical louver which makes this product ideal for installation into standard walls, air handler, windows, doors, or as mist separator.



ARCHITECTURAL LOUVERS

9 SAND TRAP LOUVER



Commonly used as pre-filter for the protection of air conditioning plants in area exposed to extreme levels of industrial pollution.

Design incorporates steel fabricated vertically arranged sections and holes for sand drainage and self cleaning. It is designed to separate large particles at low velocities, thus avoiding excessive dust loading on conventional filters but not to serve as a substitute.

10 STANDARD ACOUSTIC LOUVER



Commonly used to protect air intake and exhaust openings where high free area and low airflow resistance is required with sound absorption from escaping noise.

Design incorporates steel fabricated C type frame for easy installation and insulated double skin stationary 6 inch deep horizontal louver which makes this product ideal for installation into standard walls, air handler, windows, or doors.

11 LOUVER & GRAVITY BACKDRAFT DAMPER COMBINED



Features a stationary front louver that provides added weather protection and secondary gravity gravity intake/exhaust backdraft damper.

Design incorporates extruded aluminium 4.5 inch deep drainable head member with both side flange, primary stationary horizontal louvers to channel water to the jambs which guides the water through vertical down-spouts for escape at the sill, and secondary gravity louver blades.

These louvers are ideal for situation where airflow is required in one direction with protection against water penetration.

12 COMBINATION OF LOUVER & ADJUSTABLE DAMPER



Features a stationary front louver that provides added weather protection and secondary operable damper.

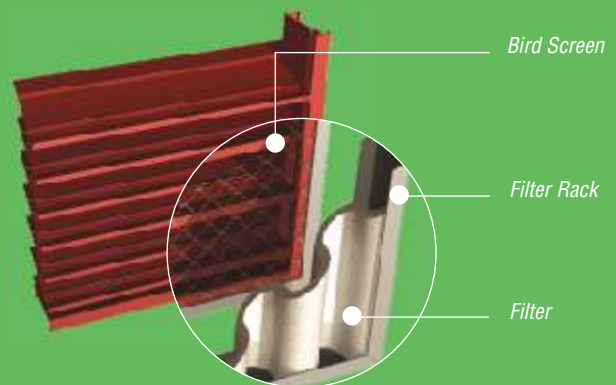
Design incorporates extruded aluminium 4.5 inch deep drainable head member with both side flange, primary stationary horizontal louvers to channel water to the jambs which guide the water through vertical down-spouts for escape at the sill, and secondary gear driven blades.

These louvers are ideal for situations where airflow is not required at all times and blade closure is desired to restrict weather infiltration. Available with electric actuator.

13 OPTIONAL ATTACHMENTS

➔ BIRD SCREEN FILTER & FILTER RACKS

Bird Screens serve to prevent unwanted access of birds & insects. Filter racks are optional for fresh air applications.



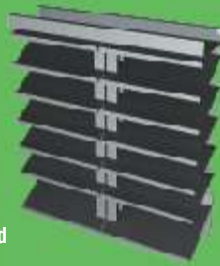
➔ MULLIONS

Required for multi width louvers. Conaire offer three different types of mullions to chose from.

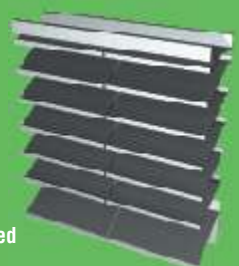
Visible Mullion



Recessed Mullion



Concealed Mullion





GRILLES & DIFFUSERS

THE BASIC UNIT OF A CENTRAL HVAC SYSTEM

Supply air outlets and diffusing equipment introduce air into a conditioned space to obtain a desired indoor atmospheric environment from the floor to 1.8 m above the floor level.

Return and exhaust air is removed from a space through return and exhaust inlets.

To obtain comfort conditions within this zone, standard limits have been established for acceptable effective draft temperature, which combines the effects of air temperature and air movement in terms of their physiological effects on a human body with humidity and radiation considered as constant. Variation from accepted standards causes occupant discomfort.

→ EFFECTIVE DRAFT TEMPERATURE

$$\theta = (t_x - t_c) - 8(V_x - 0.15) \quad \dots (1)$$

where

θ = effective draft temperature, K

t_x = local airstream dry-bulb temperature, °C

t_c = average (control) room dry-bulb temperature, °C

V_x = local airstream centreline velocity, m/s

A high percentage of people are comfortable where the effective draft temperature θ , as defined in Equation (1), is between -1.5 and +1 K and the air velocity is less than 0.35 m/s.

→ AIR DIFFUSION PERFORMANCE INDEX

If several measurements of air velocity and air temperature are made throughout the occupied zone of an office, the ADPI is the percentage of locations where measurements were taken that meet these specifications for effective draft temperature and air velocity. If the ADPI is maximum (approaching 100%), the most desirable conditions are achieved.

Terminal Device		Characteristic Length L	Load (W/m ₂)	T _{0.25/L} for Maximum ADPI	Maximum ADPI
High Sidewall Grille		Distance to wall perpendicular to jet	250	1.8	68
			190	1.8	72
			125	1.6	78
			65	1.5	85
Circular Ceiling Diffuser		Distance to closest wall or intersecting air jet	250	0.8	76
			190	0.8	83
			125	0.8	88
			65	0.8	93
Sill Grille, Straight Vanes		Length of room in direction of jet flow	250	1.7	61
			190	1.7	72
			125	1.3	86
			65	0.9	95
Sill Grille, Spread Vanes		Length of room in direction of jet flow	250	0.7	94
			190	0.7	94
			125	0.7	94
			65	0.7	94
Perforated, louvered ceiling diffusers		Distance to wall or midplane between outlets	35-160	2.0	96

■ Inlet ■ Isothermal region at 100 fpm ■ Isothermal region at 50 fpm → Natural convection current



GRILLES & DIFFUSERS

1 ADJUSTABLE GRILLES

This is the most common type of grille used as a supply outlet with adjustable vanes to provide multi directional air flow.

Made out of extruded aluminium section and available in powder coated/anodised finish.

→ SINGLE DEFLECTION GRILLE



The single-deflection grille includes a set of either vertical or horizontal adjustable vanes. Vertical vanes deflect the air stream in the horizontal plane horizontal vanes deflect the air stream in the vertical plane.

→ DOUBLE DEFLECTION GRILLE



The double-deflection grille has a second set of vanes installed behind and at right angles to the face vanes. This grille controls the airstream in both the horizontal and vertical planes.

2 FIXED BAR GRILLES

This is the most common type of grille used as a supply outlet with adjustable vanes to provide multi directional air flow.

Made out of extruded aluminium section and available in powder coated/anodised finish.

→ RECTANGULAR FIXED BAR GRILLE



With end flange

→ LINEAR FIXED BAR GRILLE



Without end flange



FLOOR GRILLE

Heavy duty flange suitable for installation in floor



4-WAY GRILLE

Suitable for installation into ceiling or floor with 4 way airflow distribution pattern.



3

FAN COIL UNIT GRILLE

This is suitable for installation at fan coil unit with front horizontal fixed bar having 0,15, or 30 degrees deflection in combination with rear vertical adjustable vanes.

Made out of extruded aluminium section and available in powder coated/anodised finish.



4

NON VISION AIR TRANSFER DOOR GRILLE

Suitable for installation in door, wall or partition for providing air transfer sight proof passage. Available with one side fixed flange or other side removable flange.

Made out of extruded aluminium section and available in powder coated/anodised finish.



5

EGG CRATE GRILLE

Return air grille with egg crate core, to handle high air volumes with limited pressure drop and noise.

Available in wide range of mounting options suitable for wall, duct or tile replacement.

12 mm egg crate core made out of aluminium sheet having 91% free area and available in powder coated/anodised finish.



6

LINEAR DIFFUSER

This fixed blade large format linear diffuser is designed for high air volume applications where low resistance is a requirement, such as VAV systems.

Delivers effective one way or two way airflow distribution patterns. Made out of extruded aluminium section and available in powder coated/anodised finish.



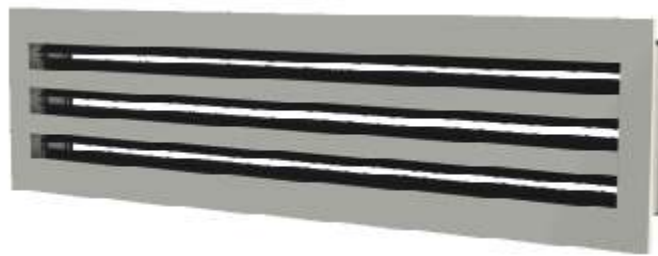


GRILLES & DIFFUSERS

7 LINEAR SLOT DIFFUSER

Offers fully adjustable air flow pattern, achieved by means of two deflecting vanes per slot. Hit & miss dampers are provided to control supply airflow rate without affecting the air pattern.

Made out of extruded aluminium section and available in powder coated/anodised finish.



8 RECT. CEILING DIFFUSERS

They are most commonly used in various ceiling systems to provide directional discharge parallel to ceiling. It consists of jointless removable core made out of aluminium sheet.

Available in powder coated/anodised finish.

→ FLUSH TYPE

Having standard flush type mitred and cleated frame constructed from aluminium extrusion.



→ ANTI SMUDGE RING TYPE

Having frame with anti smudge ring which prevents dust collection on ceiling around the diffuser.



→ GRID TYPE

Having jointless frame made out of aluminium sheet suitable for tile replacement 595 X 595 mm overall.



→ PLAQUE TYPE

Having a single plaque that forms the diffuser's face. Most often selected for its clean uniform appearance and performance which is similar to standard diffuser.



9 SWIRL DIFFUSER



Attractive lightweight design square diffuser having helical airflow discharge pattern suitable for areas where rapid mixing of supply air is required.

Available with adjustable vane to control discharge direction. Made out of aluminium sheet and available in powder coated/anodised finish.

10 FLOOR DIFFUSER



Heavy duty floor diffuser having flip-over disc for high induction discharge. Made out of die casted aluminium available in anodised finish.

11 CIRCULAR DIFFUSERS

This diffuser is a series of flaring concentric aluminium conical rings designed to produce horizontal or vertical airflow discharge pattern. Most commonly used in gypsum-board ceilings or on exposed ducts.

Available in powder coated/anodised finish.

→ SMALL FORMAT



Multi-purpose diffuser with a compact and robust build. Options available in removable core. 6 standard duct sizes up-to 450 mm dia are available.

→ LARGE FORMAT



Multi-purpose diffuser for spot cooling. Options available in removable core and step up ring. Standard duct sizes of 300 and 450 mm dia are available.

12 SPOT DIFFUSER



A versatile supply nozzle capable of delivering air to spaces where long distance penetration and low noise levels are required.

Rotatable within 40 degrees for jet setting. Made out of high grade aluminium spinning with standard single skin ring. 3 different sizes 200, 300, & 400 mm dia. are available.

13 JET NOZZLE



A versatile supply nozzle capable of delivering air to spaces where long distance penetration and low noise levels are required.

Rotatable within 30 degrees for jet setting. Made out of high grade aluminium spinning with double skin eyeball ring. 3 different sizes 280, 315, & 400 mm dia. are available.



GRILLES & DIFFUSERS

14 JET NOZZLE/DIFFUSER

A fully adjustable high capacity diffuser, featuring a reversible and rotatable core to fine-tune both pattern and deflection of the throw.

Made out of high grade aluminium spinning with "Step - Up" ring placement. Units are available with or without mounting plates in singular or multi - unit basis. 3 different sizes are available in 280, 315, & 380 mm dia.



15 EXHAUST VALVE

They are best applied to air distribution systems handling relatively low air flow rates within small circular ductwork. The valves provide high initial resistance with wide throttling capability which is necessary to offset the relatively high system resistances.

Constructed from steel spinnings protected by a polyester powder gloss white finish. Supplied with plated steel mounting subframes.



16 ACCESSORIES



OPPOSED BLADE DAMPER

Designed to suit our square/rectangular range of grilles and diffusers. They are adjustable from the front of the grille or diffuser with a screwdriver.

Manufactured with linked aluminium extruded blades, in range of sizes and are useful for fine airflow regulation and can be adjusted from fully open to closed position.



EQUALISING DAMPER

Designed to suit our square/rectangular range of grilles and diffusers. They are individually adjustable to control air direction and may be used for localised blanking.

Manufactured with aluminium extruded blades, in range of sizes and can be adjusted manually by removing the grille or diffuser core.



BUTTERFLY DAMPER

Designed to suit our range of circular diffusers. They are adjustable from the front of the grille or diffuser with a screwdriver.

Manufactured with linked aluminium extruded blades, in range of sizes and are useful for fine airflow regulation and can be adjusted from fully open to closed low-leakage position.



TURNING VANE DAMPER

Designed to suit our square/rectangular range of grilles and diffusers. They are adjustable from the front of the grille or diffuser with a screwdriver.

Manufactured with galvanised steel sheet turning vanes in a range of sizes and are useful for fine airflow regulation with uniform distribution at duct collar and can be adjusted from fully open to closed position.





GRILLES & DIFFUSERS

17 CLEAN ROOM TERMINAL PRODUCTS



LAMINAR FLOW DIFFUSER



Designed for use in clean rooms, laboratories, operating theatres, or other applications where a unidirectional or laminar discharge that is perpendicular to the mounting surface is required. Made out of aluminium frame and extrusion assembled carefully to form a robust construction with removable front perforated for easy access and cleaning.

Available in polyester powder coated finish with side/top entry and optional low leakage volume control damper.



HEPA TERMINAL



Designed for use in clean rooms, laboratories, operating theatres, or other applications where critical control of room air movement is required with HEPA filter. Made out of galvanised/stainless steel sheet and aluminium extrusion assembled carefully to form a robust construction with removable front perforated for easy access and cleaning.

Available in polyester powder coated finish with side/top entry with optional low leakage volume control damper and optional airflow monitoring station to ensure constant volume delivery at variable pressure drops of HEPA filter.



RETURN AIR RISERS



Designed to handle high return air volume for use in clean rooms, laboratories, operating theatres. Made out of galvanised/stainless steel sheet and aluminium extrusion assembled carefully to form a robust construction with removable front perforated for easy access and cleaning.

Available in polyester powder coated finish with low leakage micro volume control damper.

18 SOUND ATTENUATOR

Conaire has optimised its sound attenuator with regard to the following factors.

- The acoustic properties of the sound attenuating materials
- The thickness of acoustic baffles
- The width of spaces between baffles
- The length of acoustic baffles
- The surface covering

→ RECTANGULAR



Designed for use in rectangular duct to reduce the duct borne noise which is transmitted from the fan inlet and outlet along the duct system and breakout noise which is passing through the fan casing or duct walls.

Made out of 22 gauge galvanised steel sheet and perforated sheet metal lining.

→ ROUND



Designed for use in round duct to reduce the duct borne noise which is transmitted from the fan inlet and outlet along the duct system and breakout noise which is passing through the fan casing or duct walls.

Made out of 22 gauge galvanised steel sheet and perforated sheet metal lining.

19 MOTORISED COLLAR DAMPER

Designed to suit our square/rectangular range of grilles and diffusers for hassle free motorised regulation. They are adjustable from cordless remote or can be used with a thermostat for temperature control or occupancy sensor for on demand ventilation.

Manufactured with linked aluminium extruded airfoil blades with EPDM blade seals, in range of sizes and are useful for fine airflow regulation and can be adjusted from fully open to closed low-leakage position.



20 FLEXIBLE DUCT CONNECTOR

Metal to fabric to metal, flexible duct connectors are used to isolate vibrations produced by mechanical equipments.

Available in wide range of fabric such as Vinyl, Neoprene, and Silicon to suit various applications. The fabric is connected with 24 gauge steel using dual lock grip to ensure reliability.

Also available in insulated fabric which use a 25 mm thick fibreglass insulation of R value 4.2, sandwiched between two layers of fabric.





AIR TREATMENT & VENTILATION

MAINTAINING AIR QUALITY

Air Treatment : Air treatment in itself has two primary components a) Cleaning of air and b) Evaporative Cooling.

Different applications require different degrees of air cleaning effectiveness. In industrial applications, removing only the larger dust particles from the airstream may be necessary for cleanliness of the structure, protection of mechanical equipment and employee health and in some cases prevention of surface discoloration, in which case the smaller components of atmospheric dust are the worst offenders. Electronic air cleaners or medium to high efficiency dry filters are required to remove smaller particles, especially the respirable fraction, which often must be controlled for health reasons.

In clean room applications or when radioactive or other dangerous particles are present, high or very high efficiency filters need to be deployed.

Evaporative Cooling on the other hand is energy-efficient, environmentally benign, and cost-effective in many applications, ranging from comfort cooling in residential, agricultural, commercial and institutional buildings, to industrial applications for spot cooling in mills, foundries, power plants, and other hot environments.

Ventilation : Depending on the demand and load conditions optimal rates of ventilation need to be maintained so as to keep the toxic gas levels (typically CO, CO₂ and NO_x) within prescribed limits. Various building codes define these limits.

A good ventilation control system not only helps maintain the desired air quality but also saves energy by reducing ventilation rates during low demand,



CLASSIFICATION OF FILTERS

Table 1

Filtration	Group	Designator	Pressure Drop		Average arrestance %	Average efficiency (0.4 micron) %	DOP (0.3 micron) %
			Initial Pa	Final Pa			
Medium efficiency	Coarse	G1	50	250	50 to 65	-	-
		G2	50	250	65 to 80	-	-
		G3	50	250	80 to 90	-	-
		G4	50	250	> 90	-	-
High efficiency	Medium	M5	85	450	-	40 to 60	-
		M6	85	450	-	60 to 80	-
	Fine	F7	85	450	-	80 to 90	-
		F8	85	450	-	90 to 95	-
		F9	85	450	-	>= 95	-
Very high efficiency	HEPA ULPA	E10	165	500	-	-	>= 95
		E11	165	500	-	-	>= 99,9
		E12	165	500	-	-	>= 99,97
Electrostatic precipitator	High efficiency	I13	10	50	-	60 to 80	-
	Very high efficiency	I14	20	100	-	-	>= 95



TYPICAL FILTER APPLICATION FOR AIR TREATMENT

Table 2

Application	Note	Primary	Secondary	Final
Storage Process Equipment rooms	Reduce large particle and protect equipment from lint and dirt	NONE	G1-G3	NONE
General Office Paint Shop Electrical Shop	Average house cleaning. Reduces lint in airstream. Reduces ragweed pollen >85% at 35%. Removes all pollens at 60%, somewhat effective on particles causing smudge & stain	NONE	G3-G4	NONE
Kitchen Exhaust	Very effective on particles causing smudge and stain, smoke and fumes	G1-G4	Spray type scrubber module	NONE
Analytical Lab Electronic Shop General Office	Above average house cleaning. No settling particles of dust. Cartridge & bag-types very effective on particles causing smudge and stain, partially effective on tobacco smoke. Electronic types quite effective on smoke	NONE	M5-M6 F7-F9	NONE
		NONE	I 13	NONE
Kitchen exhaust Hospital Pharma R&D (non aseptic areas)	Excellent housecleaning. Very effective on particles causing smudge and stain, smoke and fumes. Highly effective on bacteria	G1-G4	M5-M6 F7-F9,I13	E10-E11
		G1-G4	I 14	NONE
Hospital Pharma R&D (aseptic areas)	Protects against bacteria, radioactive dusts, toxic dusts, smoke, and fumes	G1-G4	M5-M6 F7-F9,I13	E12



CAR PARK VENTILATION

As a rule, car park ventilation is based on 12ACH for normal ventilation and 30 ACH for smoke exhaust, according to NBC India, whereas as per various building codes ventilation is based on 6ACH for normal ventilation and 10ACH for smoke exhaust.

Traditionally CO is considered to be the biggest threat in car parks, followed by NO_x where there are heavy loads of diesel vehicles. CO levels should ideally be maintained within 29 (25) mg/m³ (ppm), with peak levels not to exceed 137 (115) mg/m³ (ppm), according to NBC India. Whereas NO_x levels should be maintained within 1 ppm, as per various building codes.

Since CO₂ is always the main product during combustion in presence of oxygen, it provides a good measure of accumulated exhaust and air quality. It also can also be measured more precisely and reliably than any other toxic gas.

With rapid development of environment friendly modern cars that with catalytic converters generate 100-900 times CO₂, as much CO. Therefore CO₂ itself is a greater threat to safety and health of the people present in car park.

Coverage of sensor

- Maximum distance of any corner in the car park to the nearest sensor shall be less than 25m.
- First 12m from fresh air opening are considered as natural ventilation (NV) zone.
- Sensors are grouped according to the zones by the exhaust fans. It shall be located at 0.9m ~ 1.8m above floor level. However, for practical reasons (in order to avoid vandalism), the sensors can be installed just above 1.8m.

$$N = \frac{A \times \text{SQRT}(L/W)}{1000}$$

Where,

N : no. of sensing points

A : Area of car park in square meters

L : Length of car park in meters

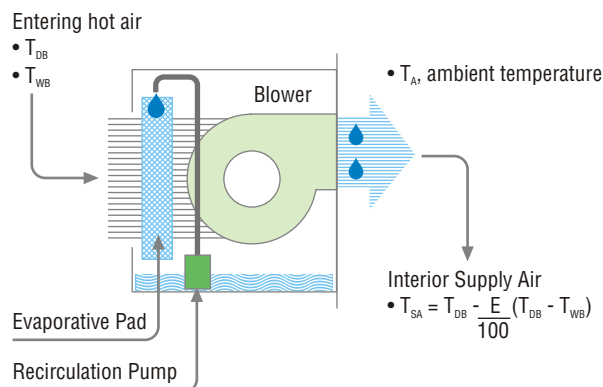
W : Width of car park in meters



DETERMINING AIR COOLER CAPACITY

The maximum reduction in dry-bulb temperature is the difference between the entering air dry- and wet-bulb temperatures. If the air is cooled to the wet-bulb temperature, it becomes saturated and the process would be 100% effective.

Evaporative coolers are available with 85-95% efficiency.



Standard heat gain calculation:

- First calculate total sensible load q_s
- Required air flow = $\frac{q_s \times 1770 \text{ cfm}}{(T_A - T_{SA})}$

Wet bulb depression method

- Air change rate = $\frac{(T_{DB} - T_{WB})}{6}$ minute (ACR)
- Required air flow = $\frac{\text{Volume}}{\text{ACR}}$ cfm



AIR TREATMENT & VENTILATION

1 AIR TREATMENT UNITS

These units are available in floor mounted and ceiling suspended variants; with combination of mixing box, primary & secondary filter, evaporative cooling module, spray type scrubber module, choice of DIDW blower & final filter depending upon their application.

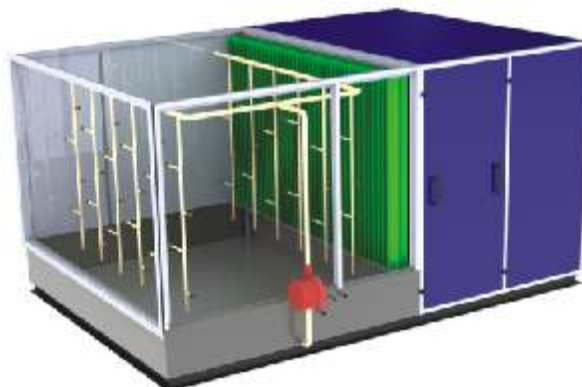
There are various unit sizes available, covering air capacities from 1,000 to 42,000 cfm for static pressure requirement up-to 6 in. W.G.

Available in double/single skin pre-coated steel sheet construction. The units can also be supplied in other materials of construction such as galvanised/stainless steel as per specific requirements.



→ SPRAY TYPE SCRUBBER

It is based on the adsorption principle of using water droplets for removal of aerosol and gaseous pollutants. It consists of a chamber containing spray nozzles, a sump for collecting spray water as it falls, water distribution and an eliminator section for removing entrained drops of water from the air. With its unique design of nozzle bank, it attains 95% scrubber efficiency.



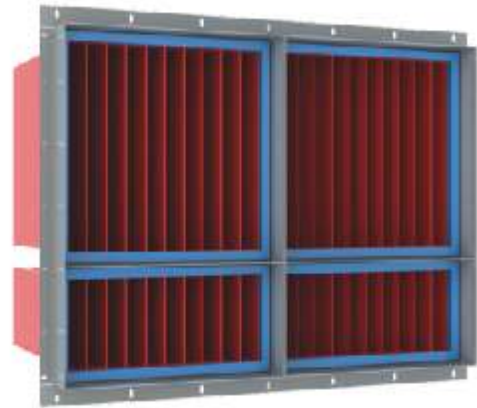


AIR TREATMENT & VENTILATION



FILTERS & ELECTROSTATIC PRECIPITATOR

Wide range of filters & electrostatic precipitators are classified in table 1 (under introduction to this section), depending upon their efficiencies to provide a comfortable and healthy indoor environment which is important to the well being of people and environmental health.

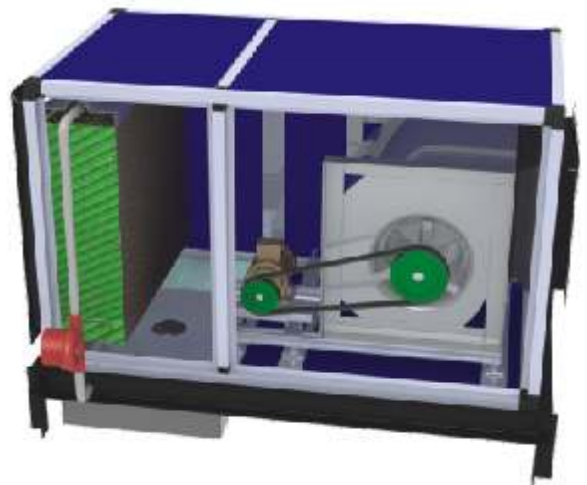


EVAPORATIVE COOLING MODULE

Based on natural principle of cooling upon evaporation. It creates a comfortable climate with the optimal combination of temperature and humidity. It has low installation, running and maintenance costs and is an environment friendly and efficient choice for climate control in hot and dry weather conditions.

It consists of a spray header and a water distribution, sump.

Available in various material and the cellulose based media which attains up-to 95% saturation efficiency.



2 VENTILATION UNITS

→ AXIAL FLOW FANS

CONAIRE Axial Flow fans are second to none. Considering workmanship, standards and performance ratings. Each fan is put through a rigorous inspection regime both after manufacturing and before despatch.

Available in wide range of air delivery from 1,000 cfm to 82,000 cfm upto 3" WG static pressure.

The cast alloy aluminium impellers are statically and dynamically balanced with high efficiency airfoil section blades. Available in direct/pulley driven propulsion with foot mounted TEFC motors suitable for 3 phase, 440 volts, 50 Hz AC supply.

The fans are available for wall mounted or duct mounted applications.



→ ON DEMAND CAR PARK VENTILATION



It includes a CO & CO₂ sensor integrated with a controller to affect energy savings by reducing ventilation rates during low movement of vehicles and at the same time taking care of local building codes by maintaining CO levels within permissible limits.

The system also provides a fail-safe smoke exhaust in case of fire and a manual override to override sensor and provide maximum ventilation.

→ INLINE CABINET/ DUCT FAN



Made out of galvanised steel complete with high efficiency forward/backward curve impeller, direct mounted single phase squirrel cage induction motor with sealed bearing.

Available with inlet and outlet connection, and mounting brackets, optional internal acoustic lining. Electronic speed regulator is also available for performance & temperature control.

Caire Consult

An ISO 9001:2000 Company



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