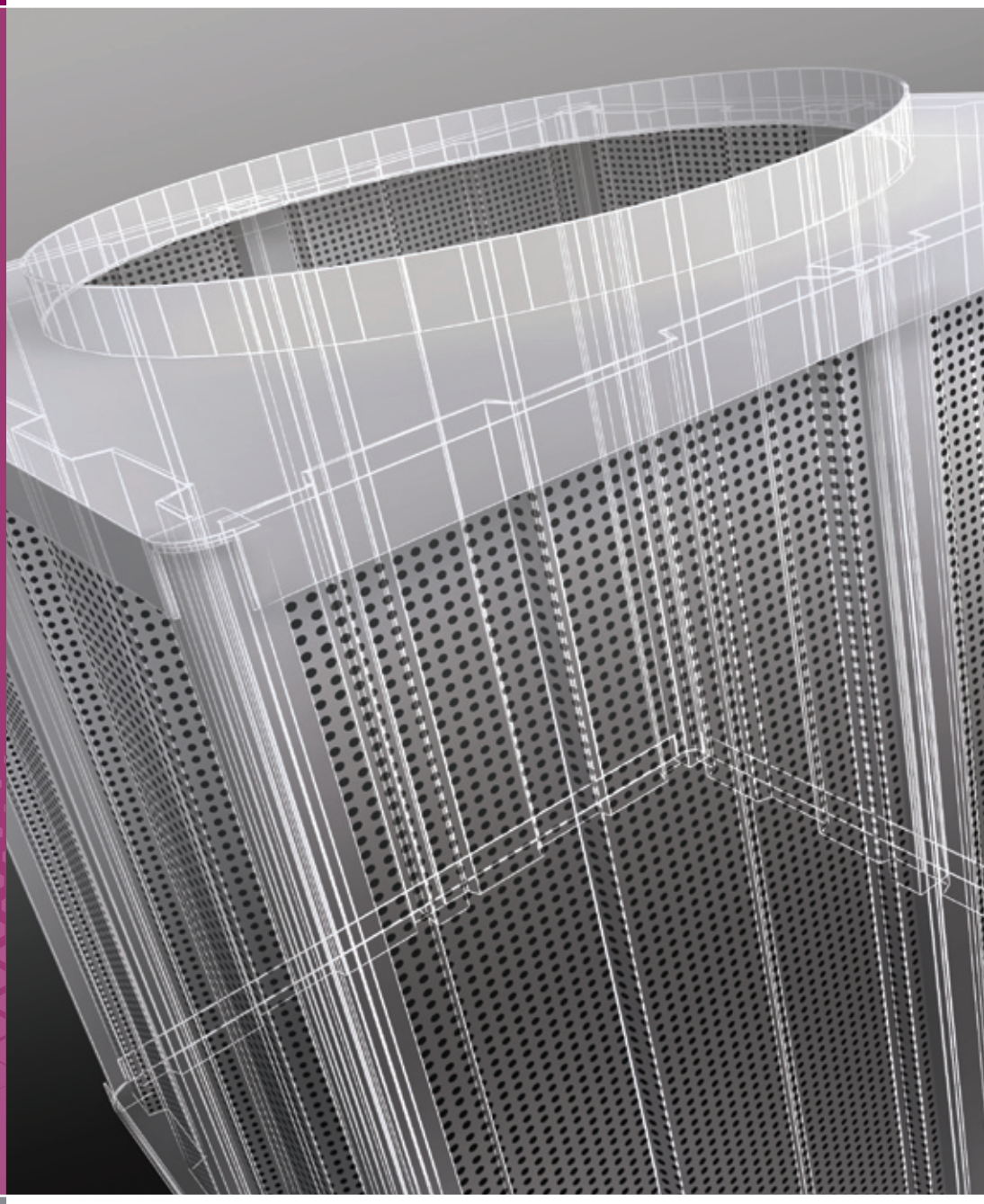
SECTION J



Engineering Guide
Displacement Ventilation

Please refer to the **Price Engineer's HVAC Handbook** for more information on Displacement Ventilation.

Introduction

Displacement ventilation is an air distribution technology that introduces cool air into a zone at low velocity, usually also at a low level. Buoyancy forces ensure that this supply air pools near the floor level, allowing it to be carried up into the thermal plumes that are formed by heat sources. This type of air distribution is effective at delivering fresh air to occupants and removing many of the contaminants associated with heat sources, while creating a comfortable environment. This chapter focuses on the main design criteria for displacement ventilation systems as well as introduces its common applications. The following pages will go further into depth on the specific requirements of schools, theaters, health care and industrial spaces.

Overview

Air flow in ventilated spaces generally can be classified by two different types: mixing (or dilution) ventilation and displacement ventilation. Mixing ventilation systems **(Figure 1)** generally supply air in a manner such that the entire room volume is fully mixed. The cool supply air exits the outlet at a high velocity, inducing room air to provide mixing and temperature equalization. Since the entire room is fully mixed, temperature variations throughout the space are small, while the contaminant concentration is uniform throughout the zone.

Displacement ventilation systems **(Figure 2)** introduce air into the space at low velocities, which causes minimal induction and mixing. Displacement outlets may be located almost anywhere within the room, but have been traditionally located at or near floor level. The system utilizes buoyancy forces in a room, generated by heat sources such as people, lighting, computers, electrical equipment, etc., to remove contaminants and heat from the occupied zone. By so doing, the air quality in the occupied zone is generally superior to that achieved with mixing ventilation.

Benefits

Flexibility - As load distribution changes within the space, a displacement system will be able to compensate. For example, if the space was designed to have a fairly even load distribution and now has the loads concentrated to one side, the system is able to compensate as the buoyant forces drive the supply system and will draw the supply air towards the loads.

IAQ - Because fresh supply air is pooling at the floor level, personal thermal plumes draw fresh air up the body. All of the warm and polluted air is extracted at the high return. When properly designed, there should always be a greater amount of fresh air in the breathing zone when compared to a conventional dilution system, leading to higher ventilation efficiency.

Green building rating systems, such as the LEED® program and Green Globes® have credits that are applicable to displacement ventilation systems. See the Green Tips for further information.

Energy Savings - Displacement systems present many potential opportunities for energy savings. The lower pressure drop associated with displacement ventilation outlets and the corresponding selection of smaller fan components may allow for a reduction in fan energy. The supply air temperature is typically higher for displacement systems than for overhead mixing systems, and can lead to free cooling from increased economizer hours. Combined with a higher return temperature than overhead systems, the warmer supply temperature of DV systems can cause an increase in chiller efficiency. Due to a high ventilation effectiveness, the amount of outdoor air that must be conditioned can also be decreased when compared with a mixing system. This is especially significant in humid climates, where dehumidification of outdoor air is a significant cost.

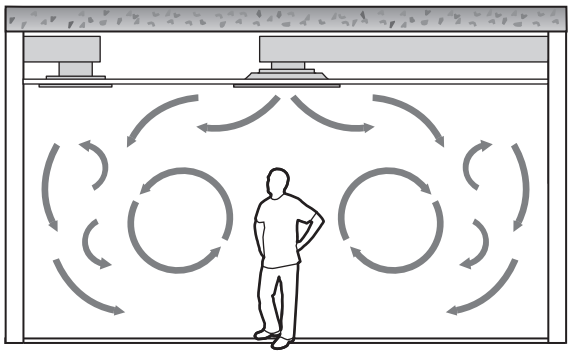


Figure 1: Mixing (Dilution) Ventilation

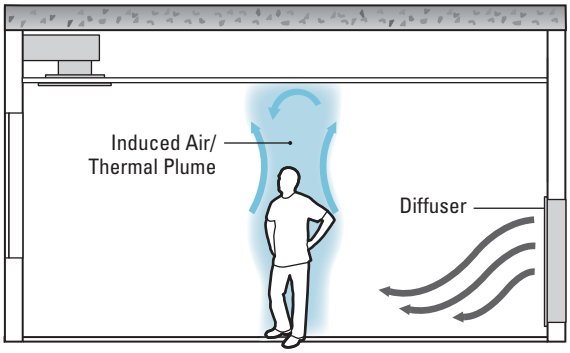


Figure 2: Displacement ventilation

Limitations

The size of displacement outlets can make selecting and locating diffusers difficult in areas where there is limited wall area. Ceiling and floor mounted diffusers may help alleviate this issue, where appropriate.

DV systems are limited in their maximum cooling capacity, primarily due to stratification limits set by ASHRAE (2004a) and ISO (2005). The Price Engineer's Handbook contains more information on how stratification affects the maximum cooling capacity of DV systems. Chen, Glicksman, Yuan, Hu, & Yang (1999) indicate a maximum cooling capacity of 38 Btu/hft2 [119 W/m2] while ensuring thermal comfort.

Typical Applications

Displacement ventilation is an effective method of obtaining good air quality and thermal comfort in the occupied space. Spaces where displacement ventilation has been successfully applied include the following.

- Schools
- Theaters
- Hospitals
- Casinos
- Restaurants
- Industrial Spaces
- Supermarkets
- Open Offices

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Concepts and Benefits

Displacement ventilation is usually a good choice if:

- The contaminants are warmer and/or lighter than the room air
- Supply air is cooler than the room air
- The room height is 9 ft [2.75 m] or more
- Low noise levels are desired

Overhead air distribution may be a better choice if:

- Ceiling heights are below 8 ft [2.4 m]
- Disturbances to room air flow are strong
- Contaminants are colder and/or denser than the ambient air
- Cooling loads are high and radiant cooling is not an option

Thermal Plume

A thermal plume is a convection current caused by buoyancy forces that causes local air to warm and rise above the heat source, entraining surrounding air and increasing in size and volume as it loses momentum, as depicted in **Figure 3**. The maximum height to which a plume will rise is dependent on the strength of the heat source, as the initial momentum of the plume will increase. Also, a room with more stratification will reduce the relative density of the plume and, as a result, limit the height to which the plume will rise.

The thermal plume generated from a point source acts differently than a thermal plume generated from large objects in the space. For example, a heated cylinder produces a boundary layer and the convective thermal plume takes a different shape than a point heat source. A point source type expansion of the thermal plume is still present, but at an altered height and with the thermal plume boundary layer included, shown in **Figure 4**. The cylinder is a better approximation of an occupant in the space than a point source.

Room Air Flow Pattern

Air flow patterns in a displacement ventilation system are quite different than in a mixing system. Because of the low discharge velocity of displacement outlets, the room air motion is largely driven by the convection flows created by heat sources such as people, equipment, and warm windows; or by heat sinks such as cold walls or windows. The convection flows within the room cause the formation of horizontal air layers. The warmest air layers are near the ceiling and the coolest air layers are near the floor.

Typical Design Parameters	IP	SI
Supply Temperature	63-68 °F	17-20 °C
Return Temperature	78-85 °F	26-29 °C
Supply Face Velocity – Mainly Sedentary Occupancy	40 fpm	0.2 m/s
Ventilation Effectiveness (ASHRAE, 2004b)	1.2	1.2

Table 1: Typical DV parameters

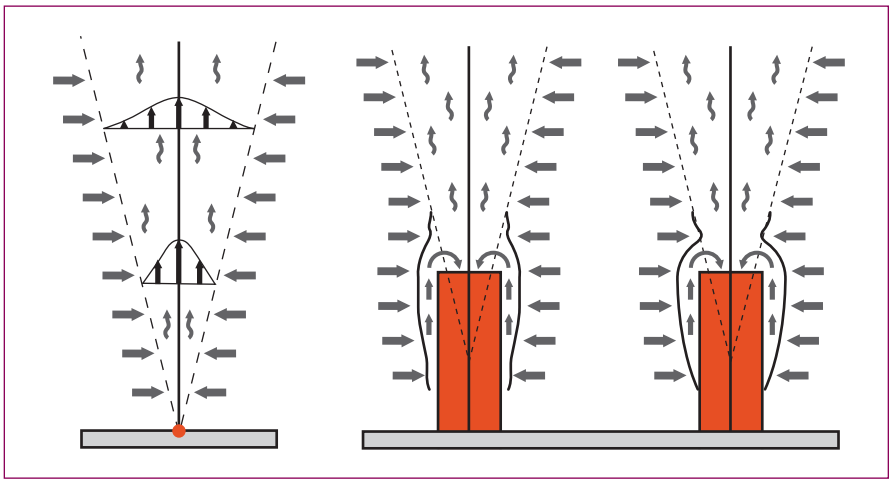

Figure 3 & 4: Thermal plume from a point heat source and of a heated cylinder

Figure 5: Air layers

Room air moves horizontally across the floor due to momentum from the supply outlet and suction from thermal plumes. It then passes vertically through the thermal plumes to a high level in the room where it is returned or exhausted.

Vertical air movement (see **Figure 5,** next page) between layers is caused by stronger convection forces associated with heat sources or cold sinks. Heat sources such as people, computers, lights, etc. create a rising convection flow known as a thermal plume. The strength of the thermal plume is dependent on the power and geometry of the heat source. The strength of the thermal plume will determine how high the convection flows can rise before the momental is fully dissipated. Cold sinks such as exterior walls or windows can generate convection flows down the wall and across the floor.

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Displacement Ventilation Characteristics

Air Flow Penetration

A displacement system supplying cool air through a diffuser will deliver air along the floor in a thin layer typically less than 8 in. [0.20 m] in height. The supply air spreads across the floor in a similar manner to water flowing out of a tap, filling the entire space. If obstructions such as furniture or partitions are encountered, the air will flow around and beyond the obstruction, as illustrated in **Figure 6**. Even rooms with irregular geometries, as illustrated in **Figure 7** can be uniformly supplied with air.

When the cool air meets a heat source such as a person or piece of equipment, a portion of the conditioned air is captured by the thermal plume of the heat source, while the remainder of air continues further into the room.

When designing the system to deal with the cooling demand of the space, the penetration depth of a displacement diffuser can be 26-30 ft [8-9 m] or more from the face of the diffuser. For rooms exceeding 30 ft [9 m] in length or width, diffusers on several walls are suggested to promote even air distribution.

Diffuser Air Flow Pattern

In order to avoid draft and minimize induction of room air, it is essential for the displacement diffuser to uniformly deliver the supply air across the entire diffuser face at low velocity. This requires an internal equalization baffle in combination with a low free area face.Yuan, Chen & Glicksman, (1999) recommended 40 fpm [0.2 m/s] in order to maintain acceptable comfort.

A displacement diffuser supplying cool air will result in an air pattern (typically 5 - 10 °F [2 - 5 °C] cooler than the room set-point), resembling **Figure 8**. Due to the density of the cool supply air, it falls towards the floor a short distance from the diffuser face and continues along the floor at a depth of approximately 4-8 in. [0.1-0.2 m].

When supply air is isothermal (supply air is the same or less than 5 °F [2.5 °C] warmer than the room set-point), the flow will be distributed horizontally into the space, as shown in **Figure 9**.

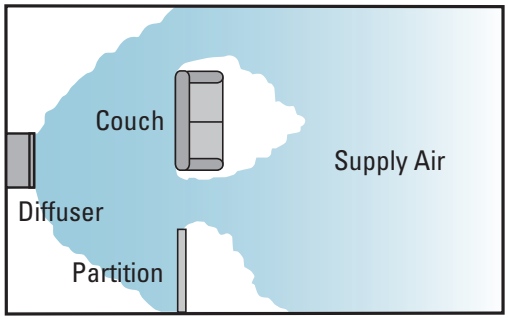

Figure 6: Obstruction

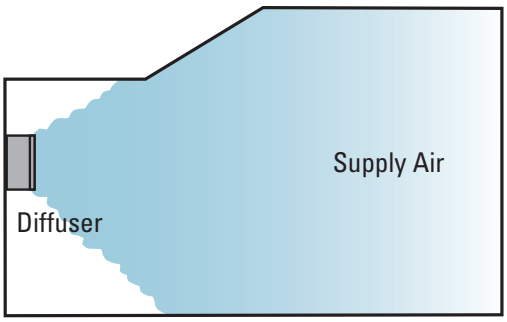

Figure 7: Irregular room geometry

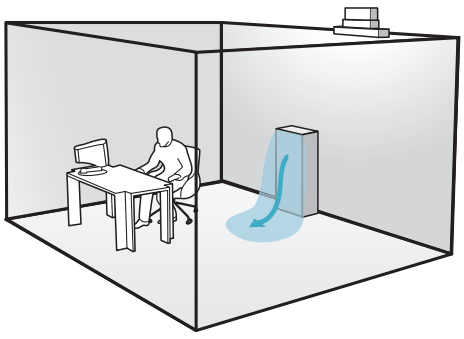

Figure 8: Cooling air flow pattern

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Displacement Ventilation Characteristics

Contaminant Distribution

Contaminant distribution is influenced by several factors such as supply air method, contaminant source type, location within the space, heat sources, and space height.

Displacement ventilation improves occupant air quality by reducing the contaminants in the lower portion of the room. The general upward motion of air causes contaminants to concentrate within the upper zone **(Figure 10).**

With mixing ventilation, contaminants are diluted with supply air and are distributed evenly throughout the space. The figure represents contamination distribution in a room supplied with mixing and displacement ventilation for a typical case where the contaminant source is warm (a person, for example).

With displacement ventilation, because the upward convection around a person brings clean air from lower level to the breathing zone, the air in the breathing zone is cleaner than the room air at the same height. Contaminants that are heavier than air need to be extracted at a lower level through a second return if they present a safety concern.

Temperature Distribution

Controlling stratification in the occupied zone is critical to maintaining occupant comfort. ASHRAE Standard 55 requires that the temperature difference between the head and foot level not to exceed 5.4 °F [3 °C] for a standing person and 3.6 °F [2 °C] for a seated person.

ASHRAE (Chen et al., 1999) has determined a method for calculating the head-to-foot temperature stratification of a displacement system based on supply air volume and load distribution. This relationship was used to develop a design procedure for displacement ventilation systems. Using this design procedure, an acceptable room temperature stratification level can be achieved.

For commercial displacement ventilation systems, supply air temperatures ranging from 63 - 68 °F [17 - 20 °C] can be expected. As well, the temperature difference between return and supply in a stratified system will generally be between 13 - 20 °F [7 - 10 °C].

CONTROL TIP

Temperature stratification above the occupied zone is not a concern as long as the ceiling is over 8 ft [2.4 m]. To ensure stratification control, returns must extract from within 1ft [0.33 m] of the maximum ceiling height.

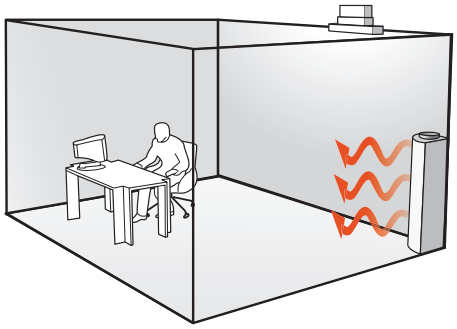

Figure 9: Isothermal air flow pattern

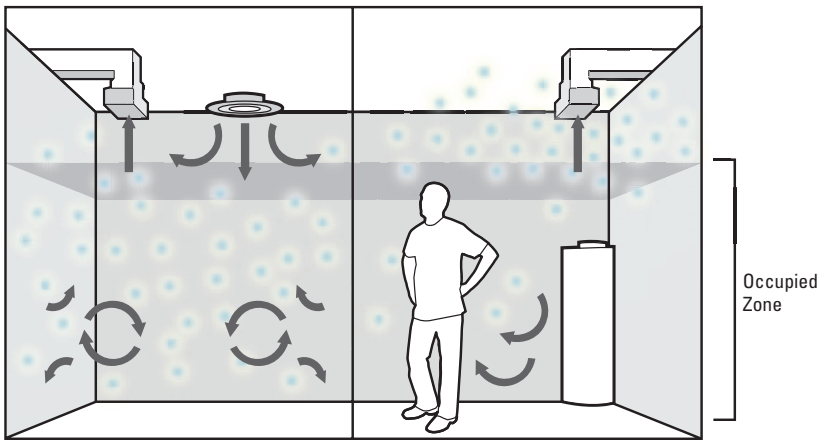

Figure 10: Contaminant distribution

Location of Returns

Returns should be located as high as possible in the space to remove as much of the stratified zone as possible, ideally at ceiling height. If the return is located below the ceiling, the air above the return may not be exhausted properly from the space. If the exhaust is located lower than 7 ft [2 m], some polluted/hot air may remain within the occupied zone. For lower ceilings it is best to place the return above the heat source in the space. In all cases, distributing the returns evenly thoughout the zone will promote even air movement in the room.

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Heating with Displacement Diffusers

As previously discussed, displacement ventilation relies on buoyancy, or more specifically, the thermal plumes that surround heat sources, to drive the air movement through the space. These plumes pull the supply air toward occupants, equipment and the façade, as well as any other heat source that requires conditioning. This is all made possible by the pooling of fresh cool supply air at the floor level, which can be used to supply the plumes with cool, fresh air.

When heating is required, the warmer (and relatively buoyant) supply air may not have enough forward momentum from the diffuser to overcome the effects of buoyancy. This may result in the warm supply air rising to the ceiling and being exhausted or returned, potentially bypassing the occupied zone. The warmer the supply air, the higher the risk of 'short circuiting,' which can result in poor thermal comfort and ventilation effectiveness, as shown in **Figures 11** and **Figure 12**.

In practice, for climates with significant heating loads, diffusers with heat-cool changeover or integrated heat should be used. Alternatively, an auxiliary heating system such a radiant panels could be used. For milder climates, it may be possible to use the DV system at slightly elevated temperatures. Experience has demonstrated that reasonable performance may be achieved using up to 5 °F [3 °C] heating air.

Diffusers with Integrated Heat

Displacement diffusers with integrated heat feature a cooling section as well as a heater. In the case of the perimeter diffuser, the bottom section is a low velocity displacement outlet, used to manage the cooling load and provide ventilation air during heating periods. The upper section includes a heater in the enclosure that is to be cycled or modulated as required. The diffuser, shown in **Figure 13**, is designed to look and function like the perimeter radiation systems common to many commercial buildings. The fintube or electric coil in the heating section manages the skin load in the same manner as a typical baseboard heater. The cooling section below continues to supply ventilation air to the building occupants, typically at isothermal or slightly cooling temperatures. This type of outlet is shown in **Figures 14**.

In this configuration, the convective forces from the heating element are not substantial enough to draw the supply air into the front intake opening for the heater, so potential short circuiting of the conditioned supply air is minimized. These diffusers are ideal for use in perimeter offices, classrooms, and commercial spaces with large windows.

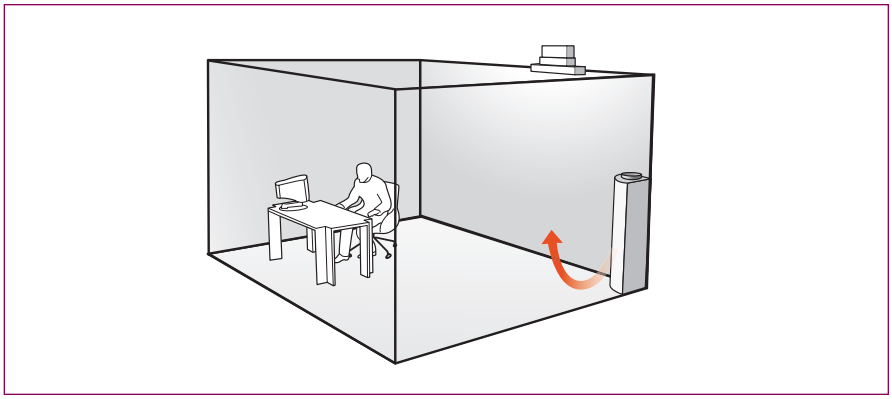

Figure 11: Heating air supply

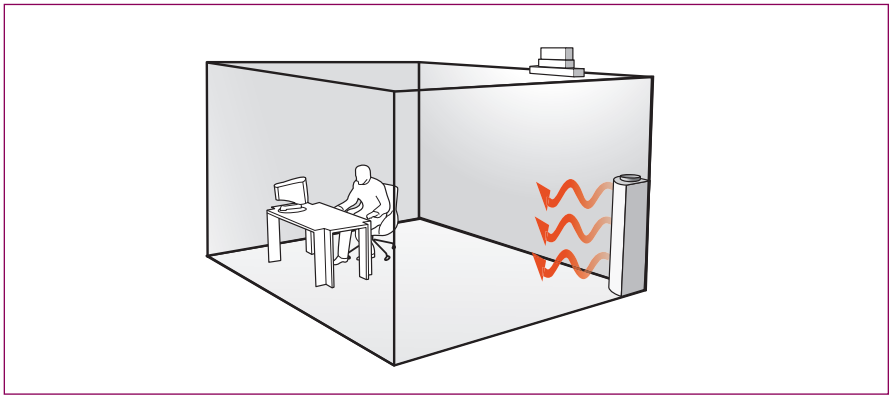

Figure 12: Isothermal air supply

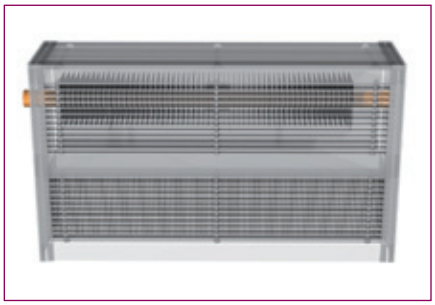

Figure 13: Perimeter diffuser with integrated heater

Figure 14: DV diffuser with integrated heat installed along the perimeter

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Heating with Displacement Diffusers

Other types of outlets with heating functions include those that can change their discharge pattern to optimize the room air flow depending on the supply air temperature. These diffusers provide a typical displacement pattern in cooling mode, but can also switch over to a mixing pattern in heating mode. These diffusers incorporate a slot diffuser or a linear bar grille section in order to increase the discharge velocity of the air when mixing is required, as shown in **Figure 17** and **Figure 18**. The changeover is actuated automatically through a signal from either the building control system or a duct temperature sensor. When the supply air is warm, it is diverted into the secondary plenum and through the heating diffuser. This allows a single duct and a single diffuser to provide both heating and cooling with no manual changeover or secondary heating systems.

Other Heating Options

There are cases where it is preferred to separate the heating and cooling functions, particularly in cold climates where the skin load can be significant. Examples of this type of system include the following:

Fan Coils

Fan coils may be incorporated into a displacement system as an alternative heating source, as long as the fan coil is located outside the occupied zone and is used to treat perimeter walls and glass without mixing the occupied zone. For more information on fan coils please refer to Chapter 13—Introduction to Fan Coils and Blower Coils of the Price Engineer's Handbook.

Hydronic Systems

Utilizing a hydronic system in conjunction with a displacement system has numerous benefits. In addition to supplying heat to the zone, hydronic systems can be used to compensate for the sensible cooling demand and provide excellent comfort conditions to a space. There are several methods for supplying hydronic heat: perimeter radiation, radiant flooring, radiant panels **(Figure 19)**, and chilled sails **(Figure 20)**. More information on this option can be found in the following section, as well as in Chapter 18—Introduction to Radiant Heating and Cooling of the Price Engineer's Handbook.

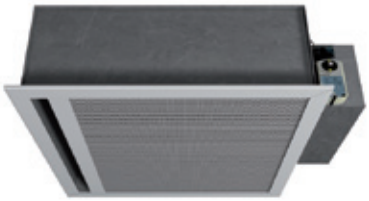

Figure 15: Ceiling mounted DV diffuser with heat-cool changeover

Figure 16: DF1W-HC, displacement diffusers with heat-cool changeover

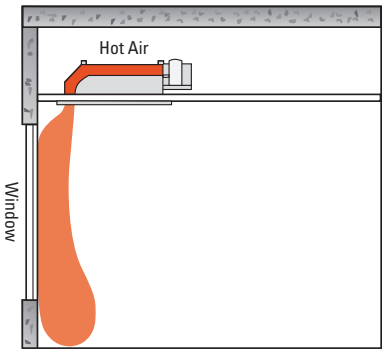

Figure 17: Air diverted through the heating plenum

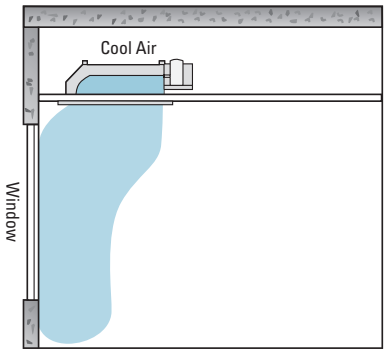

Figure 18: Air diverted through the cooling plenum

Figure 19: Radiant panel

Figure 20: Chilled sail

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Diffuser Types

Diffuser Types

A wide variety of displacement air diffuser types are available to suit the location restrictions and décor of a particular room or space. In some cases the diffusers are custom fabricated to meet an area's unique architectural design.

There are several categories of displacement diffusers:

- Free standing diffusers that mount on the floor, in most cases against a wall
- Wall diffusers that integrate into the wall or millwork
- Floor diffusers that install into the floor
- Ceiling diffusers that install in a ceiling
- Industrial diffusers which are designed to withstand harsher environments.

Free Standing Diffusers

Rectangular units are typically placed against a wall or partition or in a corner, but may also be located against pillars or, in some instances, stand in the middle of the room. They are available with rectangular or round faces in order to provide an aesthetic to compliment the room design. Depending on the design, these diffusers provide a 1 way, 3 way, or radial pattern, as shown in **Figures 21** to **Figure 24** for rectangular and round faced diffusers and various configurations.

The configuration of displacement diffusers are typically driven as much by architectural considerations as by performance characteristics. It is for this reason that there is such a large variety of displacement ventilation products in various shapes and sizes.

One common type of these diffusers are the corner outlets. These are specifically designed to fit into a 90° corner in a room and are available in flat or rounded faces, depending on the desired look. These diffusers are ideal for applications where wall space may be limited and corners are available for use.

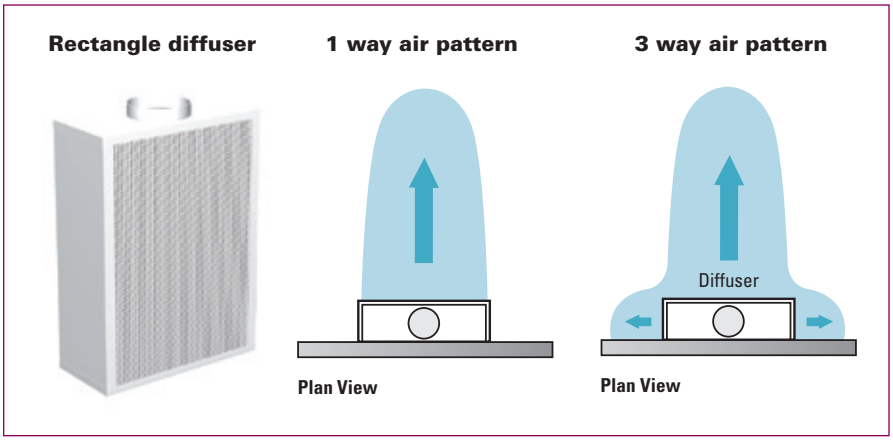

Figure 21: Rectangle diffusers

Figure 22: DF1L installed against wall

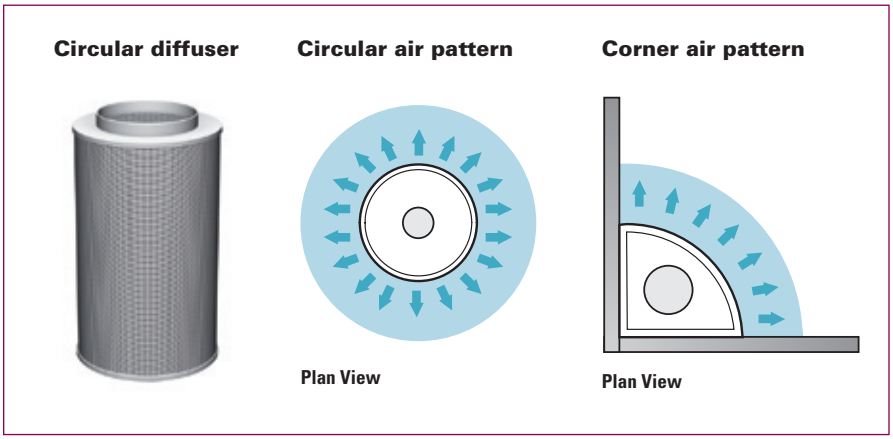

Figure 23: Circular diffusers

Figure 24: DR180 installed in free space

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Diffuser Types

Wall Mounted Diffusers

Wall mounted displacement diffusers are designed to be integrated into the wall **(Figure 25)**.The most common wall integrated diffuser features a narrow plenum and rectangular inlet to accommodate duct connection in a standard 4 in. [100 mm] studded wall. A recessed diffuser is another example of a wall mounted diffuser **(Figure 27)**. It has no plenum or inlet, and is designed for plenum fed applications, as might be found when mounted in a stair riser, wall or cabinet. Another type of wall mounted diffuser features a linear grille, as shown in **Figure 28**. These diffusers are typically installed on the perimeter and are available with an integrated heating element.

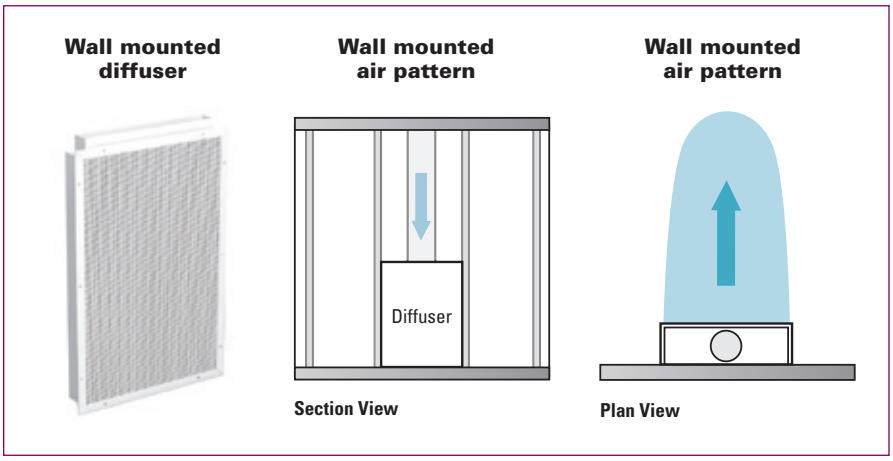

Figure 25: Wall mounted diffusers

Figure 26: DF1W installed in-wall

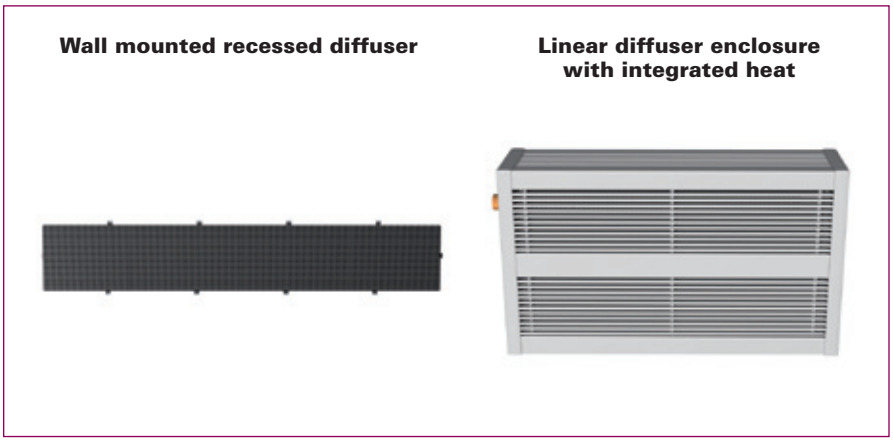

Figure 27: Wall mounted diffusers

Figure 28: DLE-H installed against wall

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Diffuser Types

Floor Diffusers

Displacement diffusers are available for integration with a raised floor air distribution system. **Figure 29** to **Figure 33** are some types of displacement floor diffusers available. These diffusers produce a low velocity radial pattern across the floor.

Displacement floor grilles can also be fan assisted **(Figure 31)** when additional air volumes are required and a fan terminal is not economical.

In some instances, such as in a highly aesthetic area or along a perimeter, a continuous grille is preferred. In these situations the linear version of the displacement floor grille is a good choice **(Figure 32)**.

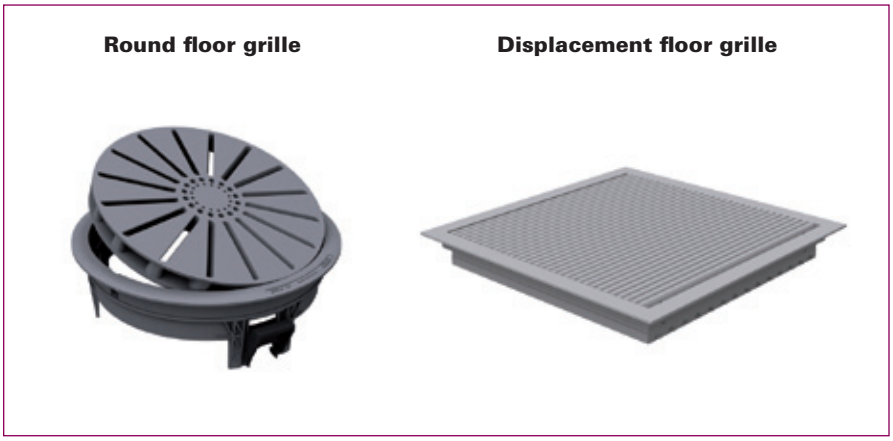

Figure 29: Floor Diffusers

Figure 30: RFDD installed in floor

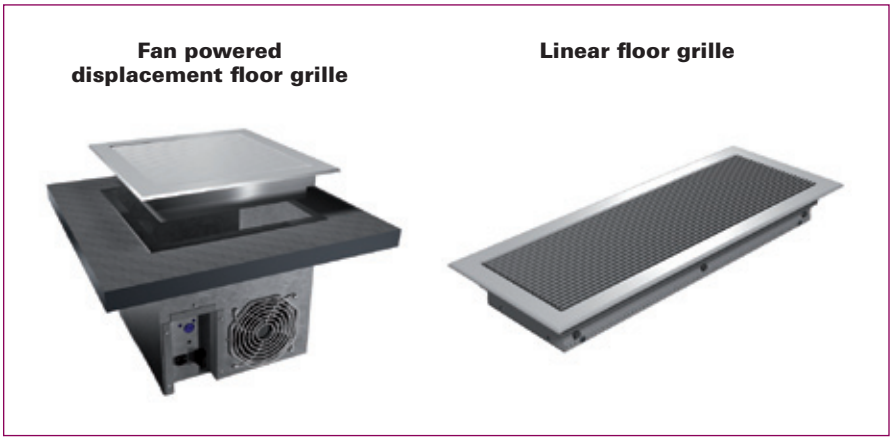

Figure 31: Floor Diffusers

Figure 32: DFGL installed continusly along a perimeter

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Diffuser Types

Ceiling Diffusers

Displacement ventilation diffusers may also be located outside of the occupied zone, which is a good location for a diffuser in a space that either does not have a lot of wall space or where space is at a premium, such as in a private office. These diffusers can either fit in to a T-bar ceiling system or can be mounted directly to ductwork. Some of these products are also available with heat-cool changeover options (**Figure 32** and **Figure 34**)

Due to the supply air falling through the warmer air above, there will be some amount of heat gain of the supply air before it reaches the floor. There is also the potential for some entrainment of pollutants that are collected in the upper zone. While the amount of heat gained and pollutants entrained is small, it is often desired to minimize this as much as possible. It is therefore common to locate the supply outlets near a wall to take advantage of the Coanda effect, wherein the supply air will travel down the wall to the occupied zone. This reduces the size of the area where the supply air interacts with the stagnant air, and thereby the heating effect.

If the face velocity of the ceiling mounted displacement diffuser is within the rage recommended for those located in the occupied zone, the velocity of the air falling past occupants should remain low. To ensure that this does not pose a risk of draft, it is good practice to place diffusers that cannot be located near a wall above corridors or office pathways (**Figure 36** and **Figure 37**)

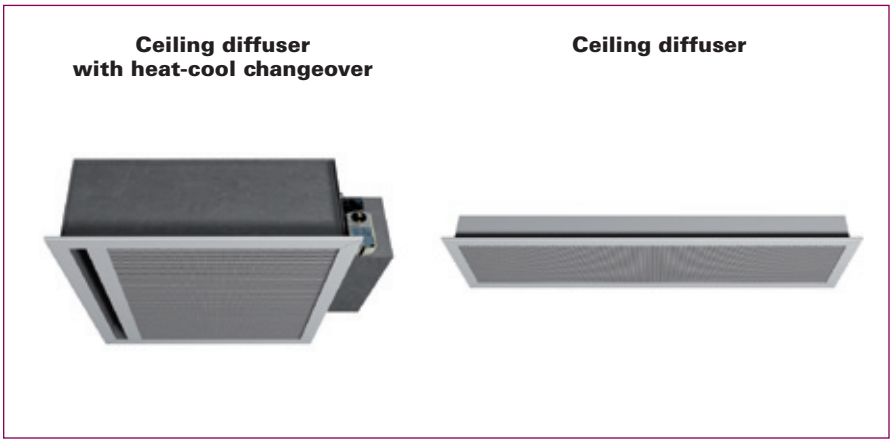

Figure 33: Ceiling Diffusers

Figure 34: DF1W-HC installed in wall

Industrial Diffusers

For the industrial environment, diffusers must be able to withstand impact from moving equipment or be mounted above the working space and designed to supply air deep into the space. Flat industrial displacement diffusers are intended to be placed on the industrial floor space and provide supply air. The robust design allows this diffuser to withstand the impact forces common to the industrial sector. Industrial diffusers are designed to be mounted above the occupied zone, and have integrated heating and cooling supply air modes (**Figure 35** and **Figure 36)**.

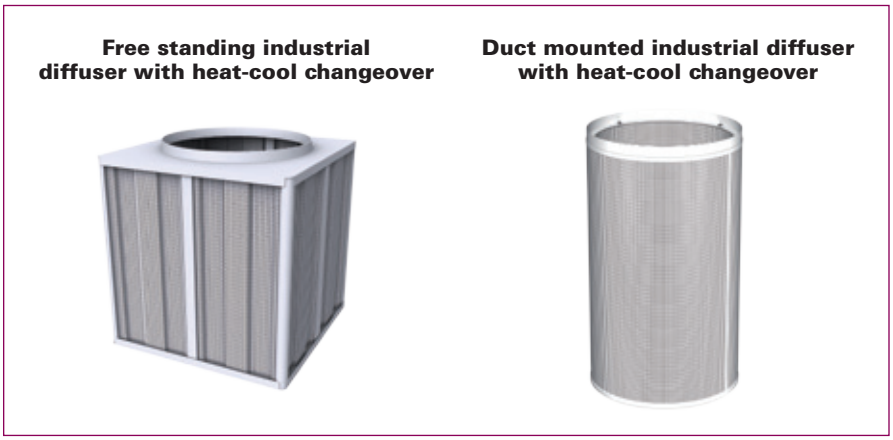

Figure 35: Industrial Diffusers

Figure 36: DFXi installed in floor

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Design Procedure - Displacement Ventilation

ASHRAE

The following step by step design procedure is offered as a simplified approach to determine the ventilation rate and supply air temperature for typical displacement ventilation applications. The procedures presented are based on the findings of ASHRAE Research Project-949 (Chen, Glicksman, Yuan, Hu, & Yang, 1999) and the procedure outlined by Chen & Glicksman (2003).

The design procedure applies to typical North American office spaces and classrooms. These procedures should be used with care when applied to large spaces such as theaters or atria; a computational fluid dynamic analysis (CFD) of large spaces is recommended to optimize the air supply volume.

Only the sensible loads should be used for the preceding calculations. These calculations are only for determining the air flow requirements to maintain the set-point in the space; the total building load remains the same as with a mixing system.

Step 1: Determine the Summer Cooling Load

Use a cooling load program or the ASHRAE manual method to determine the design cooling load of the space in the summer. If possible, assume a 1.1 °F/ft [2 °C/m] vertical temperature gradient in the space for the computer simulation as the room air temperature is not uniform with displacement ventilation. Itemize the cooling load into the following categories:

- The occupants, desk lamps and equipment, q_{oe} (Btu/h [W])
- The overhead lighting, q_l (Btu/h [W])
- The heat conduction through the room envelope and transmitted solar radiation, q_{ex} (Btu/h [W])

Step 2: Determine the Cooling Load Ventilation Flow Rate, Q_{DV}:

The flow rate required for summer cooling, using standard air, is:

IP
$$Q_{DV} = \frac{0.295\ q_{oe} + 0.132\ q_l + 0.185\ q_{ex}}{60 \rho c_p \Delta t_{hf}} \quad \text{J1}$$

SI
$$Q_{DV} = \frac{0.295\ q_{oe} + 0.132\ q_l + 0.185\ q_{ex}}{\rho c_p \Delta t_{hf}} \quad \text{J1}$$

Where:

Q_{DV} = air required to satisfy the sensible cooling load in a DV system, cfm [L/s]

ρ = air density, lb/ft³ [kg/m³]

c_p = specific heat of the air at constant pressure, Btu/lb°F [kJ/kgK]

t_{hf} = temperature difference from head to foot level, °F [°C]

Step 3: Determine Flow Rate of Fresh Air, Q_{oz}:

ASHRAE Standard 62.1-2004 Ventilation Rate Procedure includes default values for ventilation effectiveness. From ASHRAE Standard 62.1-2004: equation 6-1 is used to determine the breathing zone outdoor air flow Vbz and equation 6-2 is used to determine the zone outdoor air flow Q_{oz}.

$$Q_{oz} = \frac{R_p P_z + R_A A_z}{E_z} \quad \text{J2}$$

where:

Q_{oz} = the required volume of outdoor air, as determined from ASHRAE Standard 62.1-2004, based on room application. Note that local codes may not allow the discount for the ventilation effectiveness, or may have stricter requirements.

R_p = outdoor air flow rate required per person, as determined from Table 6-1 in ASHRAE 62.1-2004, cfm/person [L/s person]

R_A = outdoor air flow rate required per unit area, as determined from Table 6-1 in ASHRAE 62.1, cfm/ft² [L/sm²]

P_z = zone population: the largest number of people expected to occupy the zone during typical usage, persons

A_z = zone floor area, ft² [m²]

E_z = the ventilation effectiveness of the air distribution system in the zone

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Design Procedure - Displacement Ventilation

Step 4: Determine Supply Air Flow Rate, Q_s:

Choose the greater of the required flow rate for summer cooling and the required ventilation rate as the design flow rate of the supply air:

$$Q_s = \max\left[Q_{DV}, Q_{oz}\right] \quad \text{J3}$$

Step 5: Determine Supply Air Temperature, T_s:

The supply air temperature can be determined from equations and simplified to:

IP
$$t_s = t_{sp} - \Delta t_{hf} - \frac{A_z q_t}{2.456 Q_s^2 + 1.08 A Q_s} \quad \text{J4}$$

SI
$$t_s = t_{sp} - \Delta t_{hf} - \frac{A_z q_t}{0.584 Q_s^2 + 1.208 A Q_s} \quad \text{J4}$$

Step 6: Determine Exhaust Air Temperature

The exhaust air temperature can be determined by the following method:

IP
$$t_e = t_s + \frac{q_t}{1.08\left(Q_s\right)} \quad \text{J5}$$

SI
$$t_e = t_s + \frac{q_t}{1.208\left(Q_s\right)} \quad \text{J5}$$

Step 7: Evaluate Calculated Supply Temperature.

Since displacement ventilation provides the cool conditioned air along the floor level, a minimum supply air temperature of 63 °F should be observed to ensure the floor level does not become excessively cool. Occasionally the supply temperature calculated in Step 5 above will end up below 63 °F, in which case the following steps should be taken to rebalance the cooling airflow with a minimum supply temperature of 63 °F or higher.

Step 8: Rebalance Supply Air Volume (As required)

Using a derivation of equation 15.25, the supply air volume will be recalculated with the new supply air temperature, using the previous inputs and the calculated exhaust air temperature.

IP
$$Q_{DV} = \frac{q_t}{1.08\left(t_e - t_s\right)} \quad \text{J6}$$

SI
$$Q_{DV} = \frac{q_T}{1.208\left(t_e - t_{SS}\right)} \quad \text{J6}$$

Step 9: Selection of Diffusers

The goal is to maximize comfort in the space and minimize the quantity of diffusers. At a maximum, Chen & Glicksman (2003) suggest a 40 fpm face velocity, but this value may increase or decrease depending on the space and comfort requirements. A CFD simulation can validate the design and is recommended for larger spaces.

REHVA

The Federation of European Heating and Air-conditioning Associations (REHVA) presents two procedures for the air volume calculation in DV systems. The first is based on thermal comfort, and calculates the air volume required to satisfy the loads in the space. As this is the most relevant to the current discussion, it will be presented here. The second is based on air quality, and predicts the contaminant distribution in a room. For areas where AQ is critical, this method (Skistad, 2002) could be used as a check after the thermal comfort procedure is used.

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Design Procedure - Displacement Ventilation

The thermal comfort procedure offered by REHVA is based on the assumption that half of the temperature gain in the room is realized between the supply and the floor level. The REHVA procedure is not dissimilar to the ASHRAE methods, but it does have slightly different assumptions.

Step 1: Determine the Design Conditions and the Cooling Load
Determine total room load using a cooling load program or the ASHRAE manual method:

$$q_{total} = q_{oe} + q_l + q_{ex} \qquad \text{J7}$$

Step 2: Determine the Maximum Temperature Rise Through the Room
Using the design stratification, s, and the room height, h:

$$t_e - t_s = 2sh \qquad \text{J8}$$

Note: REHVA does not recommend that the maximum temperature rise exceed 18 °F [10 K] for standard commercial spaces with typical office ceiling heights (9-10 ft [2.75 – 3 m]), and recommends adjusting the value of s so that the evaluation of equation J7 is not greater than the limit.

Step 3: Calculate the Supply Air Temperature
The supply air temperature is calculated as:

$$t_s = t_{sp} - s\left(h + h_{sp}\right) \qquad \text{J9}$$

(for further explaination please refer to the Price Engineer's Handbook, Chapter 15 - Introduction to Displacement Ventilation)

Step 4: Determine Supply Air Flow Rate
Since:

IP
$$q = 60\rho c_p Q\Delta t \qquad \text{J10}$$

SI
$$q = \rho c_p Q\Delta t \qquad \text{J10}$$

and

IP
$$Q_{DV} = \frac{q_t}{60\rho c_p\left(t_e - t_s\right)} = \frac{1}{2}\frac{q_t}{60\rho c_p sh} \qquad \text{J11}$$

SI
$$Q_{DV} = \frac{q_t}{\rho c_p\left(t_e - t_s\right)} = \frac{1}{2}\frac{q_t}{\rho c_p sh} \qquad \text{J11}$$

As with the ASHRAE method, the supply air rate should satisfy both equation J7 and local code requirements:

$$Q_s = \max\left[Q_{DV}, Q_{oz}\right] \qquad \text{J3}$$

Step 5: Re-evaluate the Comfort Conditions
Calculate the temperature at the floor and ensure that the stratification limit has not been exceeded:

IP
$$t_{af} = t_s + \frac{1}{2}\frac{q_t}{60\rho c_p Q_s} \qquad \text{J12}$$

SI
$$t_{af} = t_s + \frac{1}{2}\frac{q_t}{\rho c_p Q_s} \qquad \text{J12}$$

$$s = \frac{t_e - t_s}{2h} \qquad \text{J13}$$

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Diffuser Selection, Location and Layout

Component Selection

The aim of diffuser selection is to choose an air outlet that will perform well (the function will vary by application) and not cause discomfort. These goals do not change significantly when designing a displacement ventilation system. In fact, the procedure for selecting DV outlets is often significantly easier than with mixing diffusers. The room air flow characteristics of a DV system are such that they make concepts of throw, spread and drop meaningless. As discussed, it is the heat sources in the room that drive the air diffusion, not the momentum from the air outlet. In addition, the noise generated from displacement diffusers is so low that NC is often not a factor when choosing a product.

As a result, the primary factor when selecting a displacement diffuser is thermal comfort. As discussed in the thermal comfort section, the primary factors affecting thermal comfort with a displacement ventilation system are stratification and draft. The procedure for determining the air volume already accounts for stratification, and so the primary selection criteria with displacement diffusers is draft.

A common industry metric that evaluates the performance of DV outlets is the adjacent zone (AZ). The AZ defines the region around the outlet where the velocity is 40 fpm [0.2 m/s], 1 or 2 in. [25 or 50 mm] above the floor. Unfortunately, the measurement heights and lack of temperature influence does not correspond well with North American comfort standards. It it is, therefore, difficult to get a sense on how this data translates to the thermal comfort of occupants.

A more appropriate metric is the draft ratio from ASHRAE Standard 55-2004 and ISO 7730-2005. As discussed in Chapter 4—Introduction to Indoor Environmental Quality of the Price Engineer's Hadbook, DR identifies the percentage of people dissatisfied based on a combination of temperature, velocity and turbulence intensity. Performance data presented in this form gives a real idea of how these outlets will impact the thermal comfort in the zone, which is the primary concern for DV diffuser selection and layout. In both ASHRAE Standard 55-2004 and ISO 7730-2005, the range of acceptable DR is between 0 and 20.

Figure 37 and **Figure 38** show the DR performance of a floor mounted displacement diffuser at 5 °F [2.8 °C] and 10 °F [5.5 °C] cooling.

The discomfort due to draft, DR, is highest in areas closest to the diffuser, where the lowest temperatures and often the highest velocity exist. Moving away from the outlet, the velocity decreases and the supply air temperature increases due to entrainment of room air and convective heat transfer from surrounding surfaces while the draft is decreased. Because of this, higher supply air temperatures and lower diffuser face velocities are desirable in order to minimize draft. The face velocity will have an impact on the size of the selected diffuser. For example, 200 cfm out of a diffuser with a face velocity of 40 fpm will require 5 ft^2 of diffuser face, whereas a face velocity of 50 fpm only requires 4 ft2 of diffuser face.

ASHRAE (Chen & Glicksman, 2003) recommends a maximum face velocity of 40 fpm [0.2 m/s] for regularly occupied commercial spaces. In practice this number seems to be a good compromise between draft risk and diffuser size. Depending on the application, some adjustment to the face velocity is possible. If people are seated adjacent to the outlet, such as in a theater with diffusers in risers behind the seats, a lower face velocity is preferred. In transient spaces such as lobbies or airports, the engineer may be able to select higher face velocities, perhaps as high as 50 -55 fpm [0.25 – 0.275 m/s]. In areas where draft is less of a concern, such as in a machine shop, significantly higher face velocities may be appropriate. It is not unusual to have a face velocity as high as 100 fpm [0.5 m/s] in industrial spaces.

Figure 37: DR vs. distance, 40 fpm [0.2 m/s] face velocity, supply air 5 oF [2.7 °C] below troom

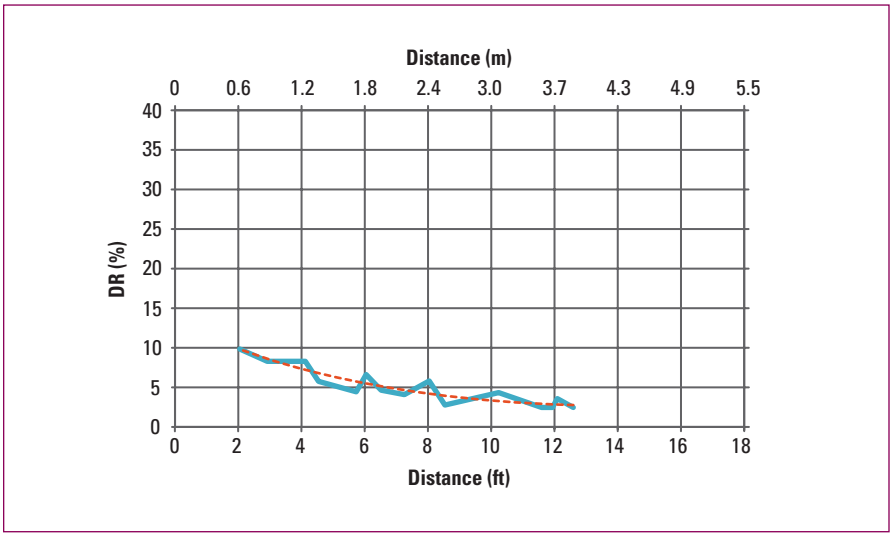

Figure 38: DR vs. distance, 40 fpm [0.2 m/s] face velocity, supply air 10 °F [2.7 °C] below troom

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Diffuser Selection, Location and Layout

These typical face velocities are general rules of thumb and have been determined to be acceptable for most spaces. A more accurate method for determining an appropriate diffuser face velocity is to evaluate the draft, or DR, around the diffuser. The diffuser face velocity directly impacts the air velocity at the floor level, thereby affecting the draft. Laboratory testing can provide relationships between the diffuser face velocity and supply air temperature to the DR in a room. Other factors that will affect comfort with a given velocity and temperature include:

- Occupant's metabolic rate
- Occupant's clothing level
- Occupant density
- Room loads

Due to these complex relationships, CFD modeling or selection software may be used to refine the diffuser size and face velocity based on a specific application.

The selection of a specific diffuser is often as much of an architectural choice as an engineering one. For the most part, various diffuser types all supply air in a similar pattern; the type of diffuser will therefore not have a large impact on the room air dynamics. The type of diffuser is selected in order suit the architectural requirements, integrate into millwork, incorporate heat, or promote an even air distribution in the space.

Once the air volume has been determined, the next step is to select the product. Some of the products feature options that are required for the application, such as a diffuser with integrated heat or a diffuser that is face adjustable for providing personal control. If the type of diffuser is already determined due to room constraints or application (floor mounted diffusers for an open office, for example), then the next step is to divide the room air volume by the face velocity:

$$A_{face} = \frac{Q_t}{V_{face}}$$

Knowing the face area, the designer can then determine either the size or number of diffusers required. Product performance pages include information about the diffuser face size to facilitate this selection, as shown in **Table 2**.

In general, selecting taller diffusers will cause a larger area with a DR of 20 or above due to the cool supply air having a longer path to the floor. This air gains momentum whenever travelling in the direction of the buoyancy forces (vertically), which will lead to higher velocity along the floor adjacent to the outlet. Diffusers that are wider do not have a significant impact on the local DR due to the constant diffuser height. As a result, it is often preferred to add face area by adding length or width to the diffuser before adding height if more diffuser capacity is required.

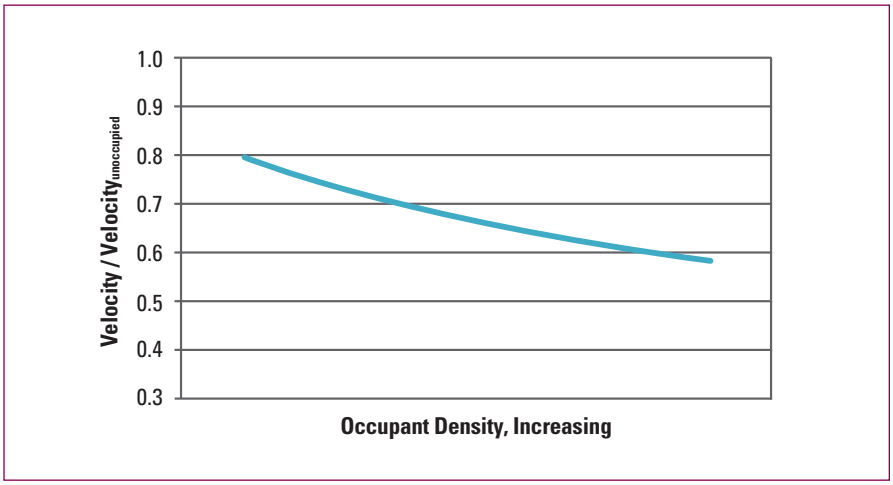

Figure 39: Reduction in air velocity due to occupant density

Unit Size, in. [Face Area. ft²] W x H x D	Inset Size in.	Face Velocity fpm	Air Flow cfm	Total Pressure in. w.g.	Static Pressure in. w.g.	Noise Criteria NC
24x24x13 [3.6]	8	20	72	---	---	---
	8	30	108	0.02	---	---
	8	40	144	0.03	---	---
	8	50	180	0.05	0.03	---
48x24x13 [7.4]	8	20	148	0.02	---	---
	8	30	222	0.04	---	---
	8	40	295	0.07	0.02	---
	8	50	369	0.11	0.04	20
60x24x13 [9.3]	8	20	186	0.02	---	---
	8	30	278	0.05	---	---
	8	40	371	0.09	---	17
	8	50	464	0.14	0.03	25
	10	30	278	0.03	---	---
	10	40	371	0.06	0.03	---
48x36x16 [11.3]	10	20	226	0.02	---	---
	10	30	338	0.04	---	---
	10	40	451	0.08	0.03	16
	10	50	564	0.12	0.05	23
	12	30	338	0.03	---	---

Table 2: DF1 Series - performance data in IP units

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Diffuser Selection, Location and Layout

Diffuser Layout

By primarily considering comfort and trusting that the heat sources will effectively distribute the air through the room, the concepts of coverage or colliding air streams are not really applicable. Instead, there are several rules of thumb that can help the designer to lay the diffusers out in the room. ASHRAE (Chen & Glicksman, 2003) recommends the following:

- There should not be large obstacles near the diffusers.
- The diffusers should be placed on the walls opposite the exterior walls/windows.
- The diffusers can be placed in the center of a room around a column, for example.
- More diffusers should be placed in the spaces with higher cooling load.

Even though the heat sources move the supply air throughout the zone, it is good practice to supply the air in such a way that promotes even air distribution. Using multiple smaller diffusers instead of a single large one can help supply the air to all corners of the room while also improving the thermal comfort.

Some rules of thumb that may be used are:

- For rooms with dimensions larger than 30 ft [9 m], consider using multiple outlets, evenly spaced or mounting the diffuser on two opposite walls or corners.
- For large open spaces, such as a casino or exhibition hall where there is limited wall space against which to locate diffusers, supply outlets should be located in the middle of the zone.
- When ducting from below a diffuser, it is important to supply the diffuser with a base for easy connection to the diffuser.
- When mounting displacement diffusers along walls, it is important to provide support in order to hold the weight of the outlets.
- In installations where the ductwork is supplied from above the diffuser and needs to be hidden, the use of a duct cover will properly conceal the ductwork. If a perforated cover is preferred, the ductwork should be painted to conceal it completely.

PRODUCT TIP

To conceal ductwork located between the ceiling and the floor mounted diffuser, a duct covering may be used. These covers are designed to match the look of the diffuser for a consistent architectural finish.

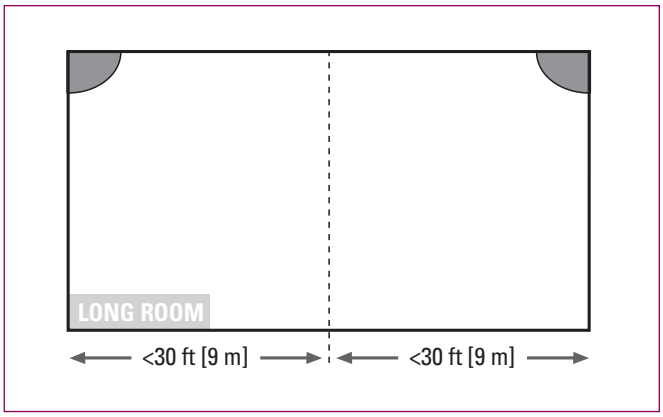

Figure 40: Long rooms

There are some additional factors to keep in mind for ceiling mounted diffusers, as well as sloped floor applications. The heavier supply air will make its way down to the lowest level in the space. For ceiling mounted diffusers, this would typically mean the floor. Care must be taken in these instances not to locate the diffuser directly above seated occupants due to the risk of draft caused by the air passing through the zone. The ideal location for ceiling mounted diffusers in an office environment is against an interior wall, which will ensure that the chances of someone being seated below the outlet is low. It will also make use of the Coanda effect (refer to Chapter 2—Introduction to Fluid Mechanics of the Price Engineer's Handbook for more information) to pull the supply air against the wall, reducing the amount of mixing that occurs between the supply air and the warm polluted air trapped at the ceiling, and thereby reducing the potential reduction in air quality from entrainment of pollutants from the return air.

In the case of a sloped floor, such as in a theater, the heavier air will make its way down to the lowest point, potentially reducing the air temperature in that zone and starving the higher elevations.

Location of Return Grilles

The only requirement for return grilles is that they are placed at the highest point in the space. If not all of the return air can be drawn from this location, placement of returns below the highest point is acceptable, as long as there is some relief at the peak to remove any trapped air or moisture. The model type does not change from mixing systems.

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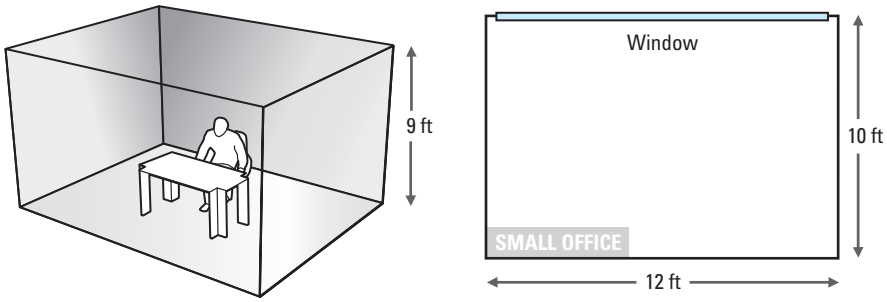
Example 1 — Office Design (IP)



Space Design

The owner of an office building is renovating and would like to consider using displacement ventilation in the office areas. This example examines a small office in this space. The office is a north facing room, used primarily during the hours from 8:00 am to 5:00 pm. The space is designed for 2 occupants, a computer with LCD monitor, T8 florescent lighting, and has a control temperature of 72 °F. The room is 10 ft wide, 12 ft long, and 9 ft from floor to ceiling. The owner expressed interest in supplying the office spaces with wall mounted displacement diffusers or corner displacement diffuser as space is limited.

Design Considerations	
Occupants	2
Set-Point	72 °F
Floor Area	120 ft²
Exterior Wall	90 ft²
Volume	1080 ft³
q_{oz}	800 Btu/h
q_l	825 Btu/h
q_{ex}	450 Btu/h
q_T	2075 Btu/h

Space Considerations

One of the primary considerations when using a DV system is comfort. As previously discussed, ASHRAE Standard 55-2010 stipulates the maximum combination of velocity and temperature in the occupied zone, PPD due to draft, as well as the stratification in the space. According to ASHRAE Standard 55-2010, the recommended stratification limit between head and foot is 5.4 °F.

The assumptions made for the space are as follows:

- Load per person is 250 Btu/h
- Lighting load in the space is 6.82 Btu/hft²
- Computer load is 308 Btu/h (CPU and LCD Monitor)
- Conduction through the window and wall is 5 Btu/hft²
- The specific heat and density of the air for this example will be 0.24 Btu/lb°F and 0.075 lb/ft³ respectively.

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Example 1 — Office Design (IP)

Using the ASHRAE Procedure (Chen & Glicksman, 2003)

The loads are broken down as follows:

q_{oz} = (2 People × 250 Btu/h) + 300 Btu/h = 800 Btu/h

q_l = 120 ft² × 6.87 Btu/hft² = 825 Btu/h

q_{ex} = 90 ft² × 5 Btu/hft² = 450 Btu/h

q_T = 2075 Btu/h

Total cooling load for this space (q_T) is 2075 Btu/h, and 17.33 Btu/hft².

ASHRAE Standard 62-2004 requires 0.06 cfm/ft² outdoor air flow rate per unit area, R_a, and 5 cfm/person outdoor air flow rate per person, R_p, be delivered to the space for moderately active office work applications. For displacement ventilation, ventilation effectiveness or zone air distribution effectiveness (E_z) is assumed to be 1.2 (Table 6-2, ASHRAE Standard 62-2004).

Step 1: Determine the air flow rate to meet the cooling load.

$$Q_{DV} = \frac{0.295 q_{oe} + 0.132 q_l + 0.185 q_{ex}}{60 \rho c_p \Delta t_{hf}}$$

$$Q_{DV} = \frac{0.295(800) + 0.132(825) + 0.185(450)}{60(.24)(.075)5.4}$$

$$Q_{DV} = 73 \text{ cfm}$$

Step 2: Determine fresh air flow rate.

$$Q_{oz} = \frac{R_p P_z + R_A A_z}{E_z}$$

$$Q_{oz} = \frac{(5)2 + (.06)120}{1.2} = 14 \text{ cfm}$$

Note: Some local codes may not allow the discount for q_{oe}, or may have stricter requirements, and they should be used instead of this calculation.

The total supply air volume for cooling is then the maximum value between Q_{DV} and Q_{oz}.

$$Q_s = \max\left[Q_{DV}, Q_{oz} \right] = 73 \text{ cfm}$$

Step 3: Calculate the supply air temperature.

$$t_s = t_{sp} - \Delta t_{hf} - \frac{A_z q_T}{2.456 Q_s^2 + 1.08 A Q_s} = 72 - 5.4 - \frac{(120)(2075)}{2.456(73)^2 + 1.08(120)(73)} = 55.6 \text{ °F}$$

Step 4: Determine the return air temperature.

$$t_e = t_s + \frac{q_T}{1.08 Q_s} = 55.6 \text{ °F} + \frac{(2075)}{1.08(73)} = 81.8 \text{ °F}$$

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Example 1 — Office Design (IP)

Step 5: Adjust for new supply temperature

The supply temperature should be 10 °F less than tsp or 63 °F, whichever is higher.

$$t_s = 63\,°\text{F}$$

$$Q_{DV} = \frac{q_t}{60\,\rho\,c_p(t_e - t_s)} = \frac{2075}{60(0.075)(0.24)(82-63)}$$

$$Q_{DV} = 101\ \text{cfm}$$

Using the REHVA Thermal Comfort Procedure (Skistad, 2002)

Step 1: Determine the design conditions and the cooling load.

$$q_t = 2075\,\text{Btu/h}$$

Step 2: Determine the maximum temperature rise through the room.

$$t_e - t_s = 2sh = 2\left(1.1\frac{°\text{F}}{\text{ft}}\right)(9) = 19.8\,°\text{F}$$

This is greater than the 18 °F maximum temperature rise recommended by REHVA, adjusting accordingly:

$$t_e - t_s = 2s'h = 18\ °\text{F}$$

$$s' = \frac{18\ °\text{F}}{2\,(9\ \text{ft})} = 1\frac{°\text{F}}{\text{ft}}$$

Step 3: Calculate the supply air temperature.

$$t_s = t_{sp} - s\,(h + h_{sp})$$

$$t_s = 72\ °\text{F} - (1)\left(9\ \text{ft} + 42\ \text{in}\frac{1\ \text{ft}}{12\ \text{in}}\right) = 59.5\ °\text{F}$$

Step 4: Determine supply air flow rate.

$$Q_{DV} = \frac{1}{2}\frac{q_t}{60\,\rho\,c_p s'h}$$

$$Q_{DV} = \frac{1}{2}\frac{2075\ \text{Btu/h}}{60\left(0.24\ \text{lb/ft}^3\right)\left(0.075\ \text{Btu/lb}_\text{m}\,°\text{F}\right)\left(1\,°\text{F/ft}\right)\left(9\ \text{ft}\right)} = 107\ \text{cfm}$$

As with the ASHRAE method, the supply air rate should satisfy both equation J10 and local code requirements:

$$Q_s = \max\left[Q_{DV}, Q_{oz}\right] = 107\,\text{cfm}$$

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Example 1 — Office Design (IP)

Step 5: Re-evaluate the comfort conditions.

Calculate the temperature at the floor and ensure that the stratification limit has not been exceeded:

$$t_{af} = 59.5\ °\text{F} + \frac{1}{2}\frac{2075\ \text{Btu/h}}{1.08\left(107\ \text{cfm}\right)} = 68.5\ °\text{F}$$

This corresponds to a 3.5 °F temperature differential between head and foot, which is acceptable according to ASHRAE Standard 55-2004.

It is important to note that the supply air temperature in this example is below what is generally recommended for DV applications. If this example was redone using a cooling differential, t_{sp}-t_s = 10 °F, the following values would be obtained:

$$t_s = 62\ °\text{F}$$

$$t_s = t_{sp} - s''\left(h + h_{sp}\right)$$

$$s'' = \frac{t_{sp} - t_s}{\left(h + h_{sp}\right)} = \frac{10\ °\text{F}}{\left(9\ \text{ft} + 42\ \text{in}\frac{1\ \text{ft}}{12\ \text{in}}\right)} = 0.8\frac{°\text{F}}{\text{ft}}$$

$$Q_{DV} = \frac{1}{2}\frac{q_t}{60\rho c_p s''h} = 133\ \text{cfm}$$

$$t_{af} = 62\ °\text{F} + \frac{1}{2}\frac{2075\ \text{Btu/h}}{1.08\left(133\ \text{cfm}\right)} = 69\ °\text{F}$$

$$t_e = t_s + 2s''h = 69\ °\text{F} + 2\left(0.8\frac{°\text{F}}{\text{ft}}\right)\left(9\ \text{ft}\right) = 83.4\ °\text{F}$$

Comparing all solutions in this example:

Value	ASHRAE	REHVA	REHVA (Adjusted Ts)
t_s	62.7 °F	59.5 °F	62 °F
Q_s	110 cfm	107 cfm	133 cfm
t_e	81.8 °F	77.5 °F	83.4 °F
θ_f	0.32	0.5	0.5
t_{hf}	3.6 °F	3.5 °F	3 °F

In the table we notice that the supply air temperature from the ASHRAE procedure is higher than that of REHVA, with the exception of the iterative procedure. This can be largely attributed to the way each method predicts the room loads' contribution to the heat gain in the occupied zone, as is also shown in the variance in the value of θ_f between the cases.

For additional REHVA sample calculations please refer to the Price Engineer's Handbook.

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Example 1 — Office Design (IP)

Selection of Diffusers

For this application we are limited to wall mounted or corner diffusers at the request of the owner. Traditional displacement diffusers are limited to 40 fpm face velocity in standard commercial applications in order to meet comfort criteria. With a supply air rate of 101 cfm and a face velocity of 40 fpm, 2.53 ft² of diffuser face area is required. For the Price DF1W, DF1R or DF1C, a 24 in. x 18 in. diffuser will provide a face area of 3 ft². A Price DR90 unit that is 30 in. tall and has an 18 in. diameter will provide a face area of 2.94 ft².

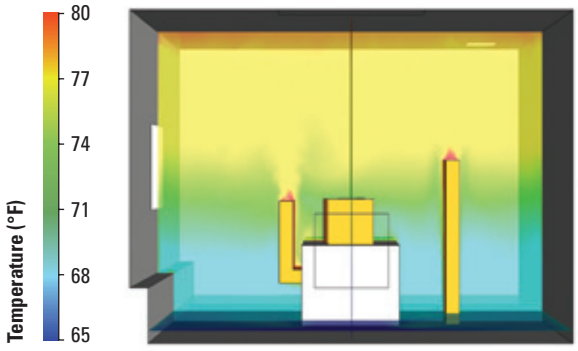
Layout of the Office

The corner diffusers could be placed in any of the corners to supply this room, as long as the occupant is comfortable. The wall diffusers can be placed on any of the walls in the room.

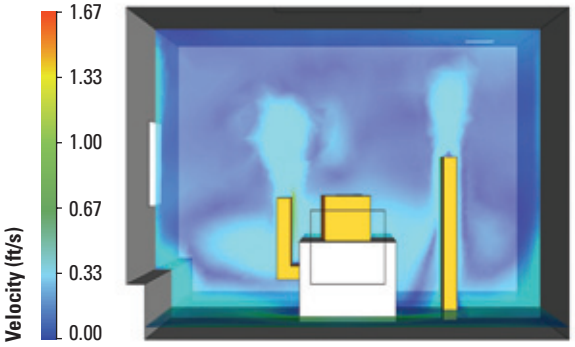
Flow Visualization

A CFD analysis was run for this example using the conditions, calculated air flow, and supply air temperature for the small office with the Price DF1W to give a visual representation of the temperature distribution, air movement, and draft temperatures.

The CFD plot of air temperature is shown below. The DF1W produces the predicted temperature stratification in the space. Also visible are the heat plumes off the occupants and computer. The seated occupant experiences ambient air temperatures from 69 °F to 72 °F, and the standing occupant 69 °F to 75 °F. Both are within the thermal stratification comfort conditions set by ASHRAE (Chen & Glicksman, 2003).



The velocity profile illustrates the slow moving air throughout the space. The images also show the plumes off the occupants and computer, as well as the general shape of the air pattern leaving the diffuser.



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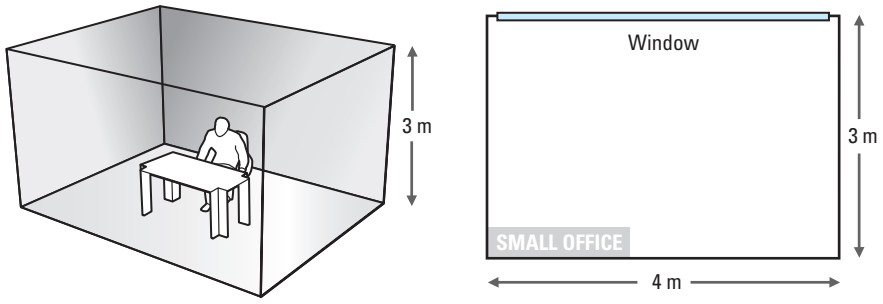
Example 1 — Office Design (SI)



Space Design

The owner of an office building is renovating and would like to consider using displacement ventilation in the office areas. This example examines a small office in this space. The office is a north facing room, used primarily during the hours from 8:00 am 5:00 pm. The space is designed for 2 occupants, a computer with LCD monitor, T8 florescent lighting, and has a control temperature of 22 °C. The room is 3 m wide, 4 m long, and 3 m from floor to ceiling. The owner expressed interest in supplying the office spaces with wall mounted displacement diffusers or corner displacement diffuser as space is limited.

Design Considerations	
Occupants	2
Set-Point	22 °C
Floor Area	12 m^2
Exterior Wall	9 m^2
Volume	36 m^3
q_{oz}	210 W
q_l	300 W
q_{ex}	135 W
q_T	645 W

Space Considerations

One of the primary considerations when using a DV system is comfort. As previously discussed, ASHRAE Standard 55-2010 stipulates the maximum combination of velocity and temperature in the occupied zone, PPD due to draft, as well as the stratification in the space. The stratification according to ASHRAE Standard 55-2010 and ASHRAE Research Project-949 (Chen et al., 1999) is 3 °C.

The assumptions made for the space are as follows:

- Load per person is 75 W
- Lighting load in the space 25 W/m^2
- Computer load is 60 W (CPU and LCD Monitor)
- Conduction through the window and wall is 15 W/m^2
- The specific heat and density of the air for this example will be 1.007 kJ/(kgK) and 1.2 kg/m^3 respectively.

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Example 1 — Office Design (SI)

Using the ASHRAE Procedure (Chen & Glicksman, 2003)

The loads are broken down as follows:

q_{oz} = (2 People × 75 W) + 60 W = 210 W

q_l = 12 m2 × 25 W/m2 = 300 W

q_{ex} = 9 m² × 15 W/m² = 135 W

q_T = 645 W

Total cooling load for this space (q_T) is 645 W, and approximately 54 W/m².

ASHRAE Standard 62-2004 requires 0.3 L/s m² outdoor air flow rate per unit area, R_a, and 2.5 L/s per person outdoor air flow rate per person, R_p, be delivered to the space for moderately active office work applications. For displacement ventilation, ventilation effectiveness or zone air distribution effectiveness (E_z) is assumed to be 1.2 (Table 6-2, ASHRAE Standard 62-2004).

Step 1: Determine the air flow rate to meet the cooling load.

$$Q_{DV} = \frac{0.295 q_{oe} + 0.132 q_l + 0.185 q_{ex}}{\rho c_p \Delta t_{hf}}$$

$$Q_{DV} = \frac{0.295(210) + 0.132(300) + 0.185(135)}{(1.2)(1.007)(3)}$$

$$Q_{DV} = 34.9 \text{ L/s}$$

Step 2: Determine fresh air flow rate.

$$Q_{oz} = \frac{R_p P_z + R_A A_z}{E_z}$$

$$Q_{oz} = \frac{(2.5)2 + (0.3)(12)}{1.2} = 7.2 \text{ L/s}$$

Note: Some local codes may not allow the discount for q_{oe}, or may have stricter requirements, and they should be used instead of this calculation.

The total supply air volume for cooling is then the maximum value between Q_{DV} and Q_{oz}.

$$Q_s = \max\left[Q_{DV}, Q_{oz} \right] = 34.9 \text{ L/s}$$

Step 3: Calculate the supply air temperature.

$$t_s = t_{sp} - \Delta t_{hf} - \frac{A_z q_T}{0.584 Q_s^2 + 1.208 A Q_s} = 22 - 3 - \frac{(12)(645)}{0.584(34.9)^2 + 1.208(12)(34.9)} = 12.6 \text{ °C}$$

Step 4: Determine the return air temperature.

$$t_e = t_s + \frac{q_T}{1.208 Q_s} = 12.6 \text{ °C} + \frac{645}{1.208(34.9)} = 27.9 \text{°C}$$

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Example 1 — Office Design (SI)

Step 5: Adjust for new supply temperature.
The supply temperature should be 5.5 °C less than tsp or 17 °C, whichever is higher.

$$t_s = 17\ ^\circ\text{C}$$

$$Q_{DV} = \frac{q_T}{\rho\, c_p\,(t_e - t_{SS})} = \frac{645}{(1.21)(1.006)(27.9 - 17)}$$

$$Q_{DV} = 48.6\ \text{L/s}$$

Using the REHVA Thermal Comfort Procedure (Skistad, 2002)
Step 1: Determine the design conditions and the cooling load.

$$q_t = 645\ \text{W}$$

Step 2: Determine the maximum temperature rise through the room.

$$t_e - t_s = 2sh = 2\left(2\,\frac{\text{K}}{\text{m}}\right)(3\,\text{m}) = 12\ \text{K} = 12\ ^\circ\text{C}$$

This is greater than the 10 °C maximum temperature rise recommended by REHVA, adjusting accordingly:

$$t_e - t_s = 2s'h = 10\ ^\circ\text{C}$$

$$s' = \frac{10\ ^\circ\text{C}}{2(3\,\text{m})} = 1.67\,\frac{^\circ\text{C}}{\text{m}}$$

Step 3: Calculate the supply air temperature.

$$t_s = t_{sp} - s\left(h + h_{sp}\right)$$

$$t_s = 22\ ^\circ\text{C} - (1.67)(3\,\text{m} + 1.1\,\text{m}) = 15.2\ ^\circ\text{C}$$

Step 4: Determine supply air flow rate.

$$Q_{DV} = \frac{1}{2}\,\frac{q_t}{\rho c_p s'h}$$

$$Q_{DV} = \frac{1}{2}\,\frac{645\ \text{W}}{(1.2\ \text{kg/m}^3)(1.007\ \text{kJ/kgK})(1.67\ ^\circ\text{C/m})(3\,\text{m})} = 53\ \text{L/s}$$

As with the ASHRAE method, the supply air rate should satisfy both equation J10 and local code requirements:

$$Q_s = \max\left[Q_{DV}, Q_{oz}\right] = 53\ \text{L/s}$$

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Example 1 — Office Design (SI)

Step 5: Re-evaluate the comfort conditions.

Calculate the temperature at the floor and ensure that the stratification limit has not been exceeded:

$$t_{af} = 15.2\ °C + \frac{1}{2}\frac{645\ W}{1.2\ (1.007)(53)} = 20.2\ °C$$

This corresponds to a 1.8 °C temperature differential between head and foot, which is acceptable according to ASHRAE Standard 55-2004.

It is important to note that the supply air temperature in this example is below what is generally recommended for DV applications. If this example was redone using a cooling differential, t_{sp}-t_s = 5.5 °C, the following values would be obtained:

$$t_s = 16.5\ °C$$

$$t_s = t_{sp} - s''(h + h_{sp})$$

$$s'' = \frac{t_{sp} - t_s}{(h + h_{sp})} = \frac{5.5\ °C}{(3\ m + 1.1\ m)} = 1.3\frac{°C}{m}$$

$$Q_{DV} = \frac{1}{2}\frac{q_t}{\rho c_p s'' h} = 68.5\ L/s$$

$$t_{af} = 16.5\ °C + \frac{1}{2}\frac{645\ W}{1.2\ (1.007)(68.5)} = 20.4\ °C$$

$$t_e = t_s + 2s''h = 16.5\ °C + 2\left(1.3\frac{°C}{m}\right)(3\ m) = 24.3\ °C$$

Comparing all solutions in this example:

Value	ASHRAE	REHVA	REHVA (Adjusted Ts)
t_s	16.7 °C	15.2 °C	16.5 °C
Q_s	52 L/s	53 L/s	68.5 L/s
t_e	25.6 °C	25.2 °C	24.3 °C
θ_f	0.32	0.5	0.5
t_{hf}	2 °C	2 °C	1.43 °C

In the table we notice that the supply air temperature from the ASHRAE procedure is higher than that of REHVA, with the exception of the iterative procedure. This can be largely attributed to the way each method predicts the room loads' contribution to the heat gain in the occupied zone, as is also shown in the variance in the value of θ_f between the cases.

For additional REHVA sample calculations please refer to the Price Engineer's Handbook.

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Example 1 — Office Design (SI)

Selection of Diffusers

For this application we are limited to wall mounted or corner diffusers at the request of the owner. Traditional displacement diffusers are limited to 0.2 m/s face velocity in standard commercial applications in order to meet comfort criteria. With a supply air rate of 49 L/s and a face velocity of 0.2 m/s, 0.245 m^2 of diffuser face area is required. For the Price DF1W, DF1R or DF1C, a 600 mm x 450 mm diffuser will provide a face area of 0.27 m^2. A Price DR90 unit with an 450 mm diameter and 750 mm tall will provide a face area of 0.265 m^2.

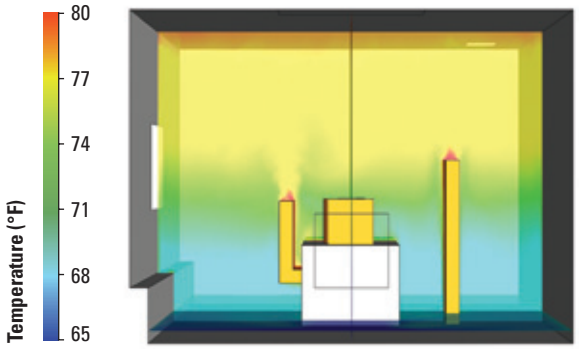
Layout of the Office

The corner diffusers could be placed in any of the corners to supply this room, as long as the occupant is comfortable. The wall diffusers can be placed on any of the walls in the room.

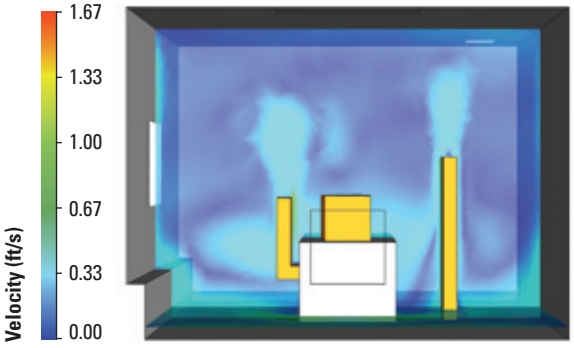
Flow Visualization

A CFD analysis was run for this example using the conditions, calculated air flow, and supply air temperature for the small office with the Price DF1W to give a visual representation of the temperature distribution, air movement, and draft temperatures in the space.

The CFD plot of air temperature is shown below. The DF1W produces the predicted temperature stratification in the space. Also visible are the heat plumes off the occupants and computer. The seated occupant experiences ambient air temperatures from 20.6 °C to 22.2 °C, and the standing occupant 20.6 °C to 23.9 °C. Both are within the thermal stratification comfort conditions set by ASHRAE (Chen & Glicksman, 2003).



The velocity profile illustrates the slow moving air throughout the space. The images also show the plumes off the occupants and computer, as well as the general shape of the air pattern leaving the diffuser.



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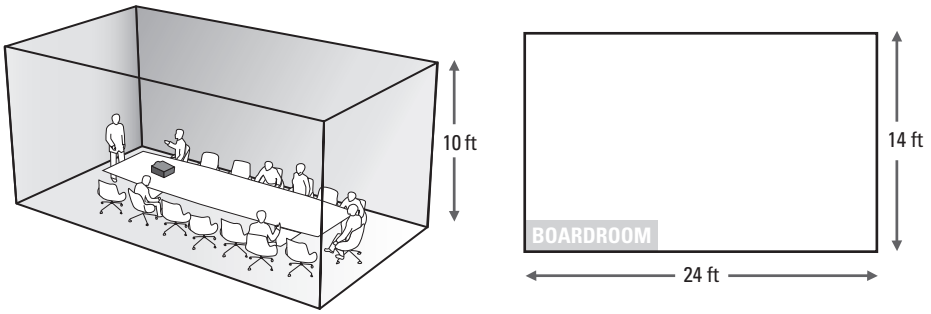
Example 2 — Boardroom Design A (IP)



Space Design

The owner of a new office building wants to use a displacement ventilation system for all occupied spaces. This example examines a private boardroom that is located in the center of the building without any exterior surfaces. The space is designed for 8 occupants, a computer with LCD monitor, a projector, T8 florescent lighting, and has a control temperature of 72 °F. The room is 24 ft wide, 14 ft long, and 10 ft from floor to ceiling. There is a large whiteboard at the west side of the room and cabinets along the south and east sides of the room. The owner and architect want the displacement diffusers in the space to fit seamlessly into the room.

Design Considerations	
Occupants	8
Set-Point	72 °F
Floor Area	336 ft²
Volume	3360 ft²
q_{oz}	2496 Btu/h
q_l	2292 Btu/h
q_{ex}	0 Btu/h
q_T	4788 Btu/h

Space Considerations

Some of the assumptions made for the space are as follows:

- The head to foot gradient recommended by ASHRAE (Chen & Glicksman, 2003) is 5.4 °F for seated occupants.
- Load per person is 250 Btu/h
- Lighting load in the space is 6.82 Btu/hft²
- Computer and LCD load is 308 Btu/h
- Projector load is 188 Btu/h
- The specific heat and density of the air for this example will be 0.24 Btu/lb °F and 0.075 lb/ft³ respectively.

The loads are broken down as follows:

$$q_{oz} = (8 \text{ People} \times 250 \text{ Btu/h}) + 308 \text{ Btu/h} + 188 \text{ Btu/h} = 2492 \text{ Btu/h}$$

$$q_l = 336 \text{ ft}^2 \times 6.82 \text{ Btu/h/ft}^2 = 2296 \text{ Btu/h}$$

$$q_{ex} = 0 \text{ Btu/h}$$

$$q_T = 4788 \text{ Btu/h}$$

Total cooling load for this space (q_T) is 4788 Btu/h, and approximately 14.5 Btu/hft².

ASHRAE Standard 62-2004 requires 0.06 cfm/ft² outdoor air flow rate per unit area, R_a, and 5 cfm/person outdoor air flow rate per person, R_p, be delivered to the space for moderately active office work applications. For displacement ventilation, ventilation effectiveness or zone air distribution effectiveness (E_z) is assumed to be 1.2 (Table 6-2, ASHRAE Standard 62-2004).

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Example 2 — Boardroom Design A (IP)

Determine the air flow rate to meet the cooling load.

$$Q_{DV} = \frac{0.295\,q_{oe} + 0.132\,q_l + 0.185\,q_{ex}}{60\,\rho\,c_p\,\Delta\,t_{hf}}$$

$$Q_{DV} = \frac{0.295(2496) + 0.132(2292) + 0.185(0)}{60\,(.24)(.075)\,5.4}$$

$$Q_{DV} = 178 \text{ cfm}$$

Determine the fresh air flow rate.

$$Q_{oz} = \frac{R_p P_z + R_A A_z}{E_z}$$

$$Q_{oz} = \frac{(5)8 + (.06)336}{1.2}$$

$$Q_{oz} = 50 \text{ cfm}$$

Note: Some local codes may not allow the discount for Q_{oz}, or may have stricter requirements, and they should be used instead of this calculation.

The total supply air volume for cooling is then the maximum value between Q_{DV} and Q_{oz}.

$$Q_s = \max\left[Q_{DV}, Q_{oe}\right] = 178 \text{ cfm}$$

Calculate the supply air temperature.

$$t_s = t_{sp} - 5.4 - \left(\frac{q_t}{1.08\,Q_s}\right)\left(\frac{A}{2.27376\,Q_s + 1.08(A)}\right)$$

$$t_s = 72 - 5.4 - \left(\frac{4788}{1.08(267)}\right)\left(\frac{336}{2.27376(178) + 1.08(336)}\right)$$

$$t_s = 59\,°\text{F}$$

Determine the return air temperature.

$$t_e = t_s + \frac{q_t}{1.08(Q_s)} = 59 + \frac{4788}{1.08(178)} = 84°\text{F}$$

Adjust for new supply temperature

The supply temperature should be 10 °F less than tsp or 63 °F, whichever is higher.

$$t_s = 63\,°\text{F}$$

$$Q_{DV} = \frac{q_t}{60\,\rho\,c_p(t_e - t_s)} = \frac{4788}{60(0.075)(0.24)(82-63)}$$

$$Q_{DV} = 211 \text{ cfm}$$

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Example 2 — Boardroom Design A (IP)

Selection of Diffusers

For this application we have three goals set by the owner:

1. Quiet operation
2. Thermal comfort to the space
3. Hidden diffusers

Inherently, displacement ventilation diffusers are quiet, but care has to be taken to limit the sound generated from the HVAC air supply. Price recommends limiting the duct velocity to 1200 fpm in order to minimize noise from ductwork. For thermal comfort, a face velocity of 40 fpm is required. At 211 cfm a diffuser face area of 5.275 ft^2 would be required.

There are two options to make these diffusers as unobtrusive as possible: mount them in the wall or as part of the furniture.

Layout of the Boardroom

For a concealed look, the Price DF1R displacement diffuser could be installed at the base of the cabinets or in the wall under the whiteboard in a pressurized plenum. Two diffusers at 48 in. x 8 in. will be able to meet the 40 fpm requirement. The diffusers can be placed on any of the walls in the room, but it is essential to ensure that sedentary occupants will be located a comfortable distance from the diffuser.

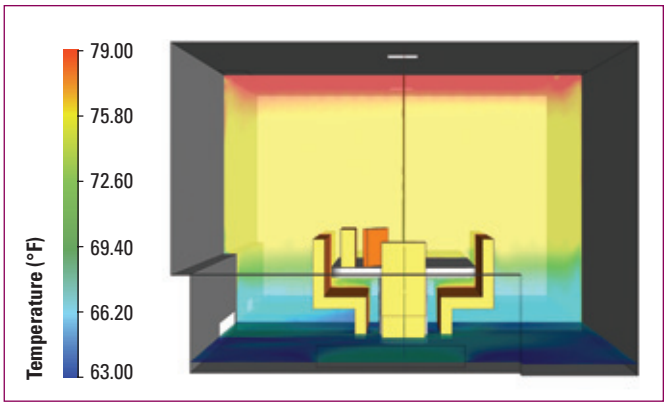
Flow Visualization

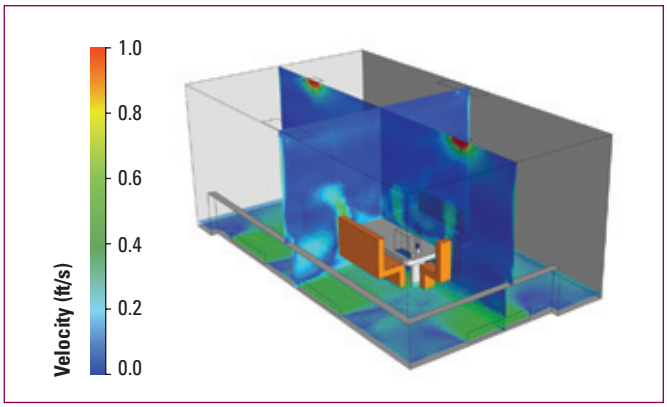
A CFD analysis was run for this example using the conditions, calculated air flow, and supply air temperature for the boardroom to give a visual representation of the temperature distribution, air movement, and draft temperatures in the space.

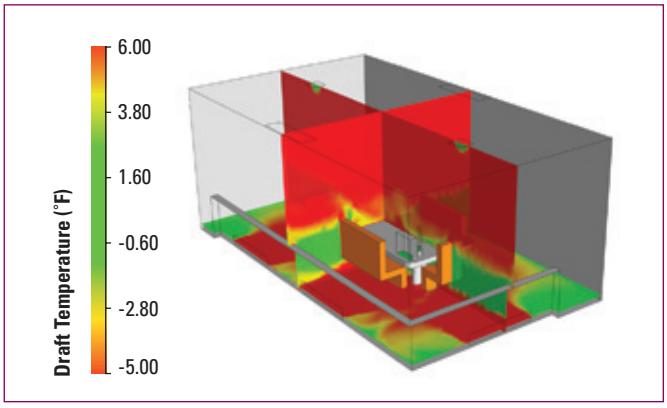
The image on the following page shows the temperature profiles across the space and a reasonable temperature stratification is predicted. Also visible are the heat plumes off the occupants and computer. The seated occupant experiences ambient air temperatures from 69 °F to 72 °F, and the standing occupant 69 °F to 75 °F. Both are within the thermal stratification comfort conditions set by ASHRAE (Chen & Glicksman, 2003).

The image below depicts the velocity profile. The images show the plumes off the occupants and computer, as well as the general shape of the air pattern leaving the diffuser and slowly entering the zone.

The image blow depicts the draft temperature for the space. The range in which people will feel the most comfortable is indicated in green. The DF1R diffusers produce a thermally comfortable space.







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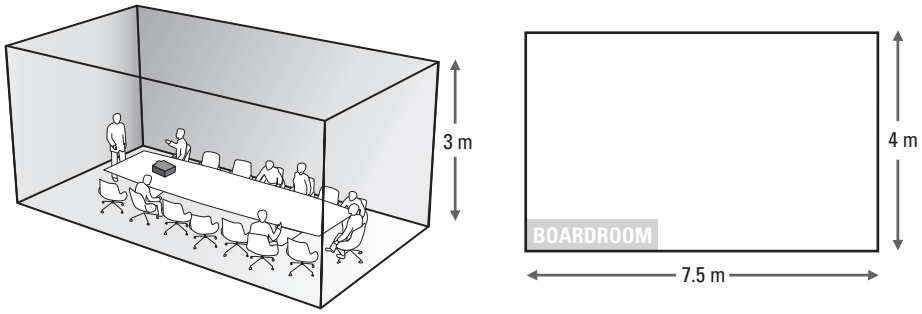
Example 2 — Boardroom Design A (SI)



Space Design

The owner of a new office building wants to use a displacement ventilation system for all occupied spaces. This example examines a private boardroom that is located in the center of the building without any exterior surfaces. The space is designed for 8 occupants, a computer with LCD monitor, a projector, T8 florescent lighting, and has a control temperature of 22 °C. The room is 7.5 m wide, 4 m long, and 3 m from floor to ceiling. There is a large whiteboard at the west side of the room and cabinets along the south and east sides of the room. The owner and architect want the displacement diffusers in the space to fit seamlessly into the room.

Design Considerations	
Occupants	8
Set-Point	22 °C
Floor Area	30 m²
Volume	90 m³
q_{oz}	700 W
q_l	750 W
q_{ex}	0 W
q_T	1450 W

Space Considerations

Some of the assumptions made for the space are as follows:

- The head to foot gradient recommended by ASHRAE (Chen & Glicksman, 2003) is 2 °C from head to foot for seated occupants.
- Load per person is 75 W
- Lighting load in the space is 25 W/m²
- Computer and LCD load is 60 W
- Projector load is 40 W
- The specific heat and density of the air for this example will be 1.007 kJ/(kgK) and 1.2 kg/m² respectively. The loads are broken down as follows:

$$q_{oz} = (8 \text{ People} \times 275 \text{ W}) + 60 \text{ W} + 640 \text{ W} = 700 \text{ W}$$

$$q_l = 30 \text{ m}^2 \times 25 \text{ W/m}^2 = 750 \text{ W}$$

$$q_{ex} = 0 \text{ W}$$

$$q_T = 1450 \text{ W}$$

Total cooling load for this space (q_T) is 1450 W, and approximately 48 W/m².

ASHRAE Standard 62-2004 requires 0.3 L/s m² outdoor air flow rate per unit area, R_a, and 2.5 L/s per person outdoor air flow rate per person, R_p, be delivered to the space for moderately active office work applications. For displacement ventilation, ventilation effectiveness or zone air distribution effectiveness (E_z) is assumed to be 1.2 (Table 6-2, ASHRAE Standard 62-2004).

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Example 2 — Boardroom Design A (SI)

Determine the air flow rate to meet the cooling load.

$$Q_{DV} = \frac{0.295\,q_{oe} + 0.132\,q_l + 0.185\,q_{ex}}{\rho\, c_p \Delta\, t_{hf}}$$

$$Q_{DV} = \frac{0.295(700) + 0.132(750) + 0.185(0)}{(1.2)(1.007)(3)}$$

$$Q_{DV} = 84.3\ \text{L/s}$$

Determine the fresh air flow rate.

$$Q_{oz} = \frac{R_p P_z + R_A A_z}{E_z}$$

$$Q_{oz} = \frac{(2.5)8 + (0.3)30}{1.2}$$

$$Q_{oz} = 24\ \text{L/s}$$

Note: Some local codes may not allow the discount for Q_{oz}, or may have stricter requirements, and they should be used instead of this calculation.

The total supply air volume for cooling is then the maximum value between Q_{DV} and Q_{oz}.

$$Q_s = \max\left[Q_{DV}, Q_{oe}\right] = 84.3\ \text{L/s}$$

Calculate the supply air temperature.

$$t_s = t_{sp} - \Delta\, t_{hf} - \frac{A q_t}{0.584 Q_s^2 + 1.208 A Q_s}$$

$$t_s = 22 - 3 - \frac{30(1450)}{0.584(84.3)^2 + 1.208(30)(84.3)} = 13.0\ ^\circ\text{C}$$

Determine the return air temperature.

$$t_e = t_s + \frac{q_t}{1.208(Q_s)}$$

$$t_e = 13 + \frac{1450}{1.208(84.3)} = 27.2\ ^\circ\text{C}$$

Adjust for new supply temperature.
The supply temperature should be 5.5 °C less than tsp or 17 °C, whichever is higher.

$$t_s = 17\ ^\circ\text{C}$$

$$Q_{DV} = \frac{q_T}{\rho\, c_p\, (t_e - t_{SS})} = \frac{1450}{(1.21)(1.006)(27.2 - 17)}$$

$$Q_{DV} = 116.8\ \text{L/s}$$

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Example 2 — Boardroom Design A (SI)

Selection of Diffusers

For this application we have three goals set by the owner:

1. Quiet operation
2. Thermal comfort to the space
3. Hidden diffusers

Inherently, displacement ventilation diffusers are quiet, but care has to be taken to limit the sound generated from the HVAC air supply. Price recommends limiting the duct velocity to 5 m/s to minimize noise from ductwork. For thermal comfort, a face velocity of 0.2 m/s fpm is required. At 117 L/s, a diffuser face area of 0.584 m2 would be required.

There are two options to make these diffusers as unobtrusive as possible: mount them in the wall or as part of the furniture.

Layout of the Boardroom

For a concealed look, the DF1R displacement diffuser could be installed at the base of the cabinets or in the wall under the whiteboard in a pressurized plenum. Two diffusers at 1.5 m x 0.2 m will be able to meet the 0.2 m/s requirement. The diffusers can be placed on any of the walls in the room, but it is essential to ensure that sedentary occupants will be located a comfortable distance from the diffuser.

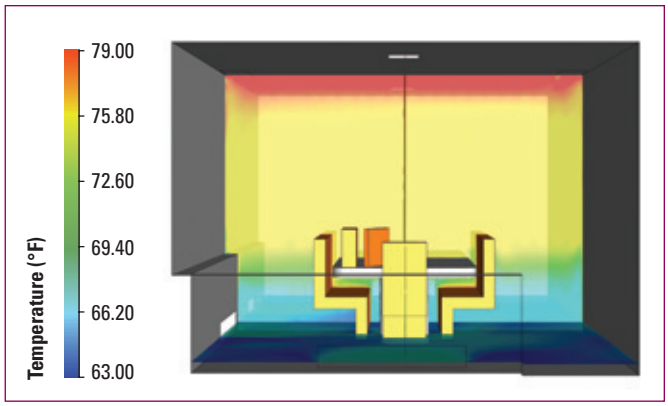
Flow Visualization

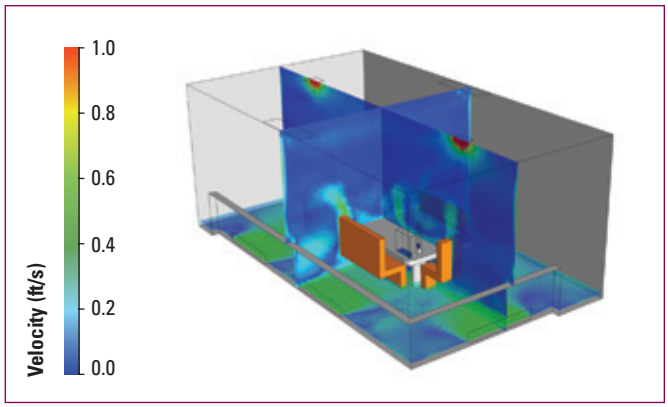
A CFD analysis was run for this example using the conditions, calculated air flow and supply air temperature for the boardroom to give a visual representation of the temperature distribution, air movement, and draft temperatures in the space.

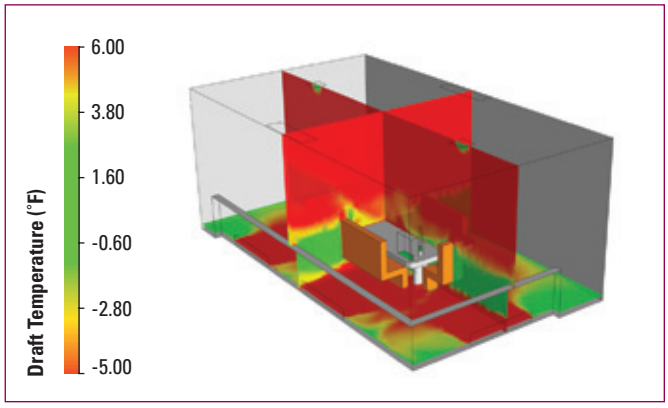
The image on the following page shows the temperature profiles across the space and a reasonable temperature stratification is predicted. Also visible are the heat plumes off the occupants and computer. The seated occupant experiences ambient air temperatures from 20.6 °C to 22.2 °C, and the standing occupant 20.6 °C to 23.9 °C. Both are within the thermal stratification comfort conditions set by ASHRAE (Chen & Glicksman, 2003).

The image below depicts the velocity profile. The images show the plumes off the occupants and computer, as well as the general shape of the air pattern leaving the diffuser and slowly entering the zone.

The image blow depicts the draft temperature for the space. The range in which people will feel the most comfortable is indicated in green. The DF1R diffusers produce a thermally comfortable space.







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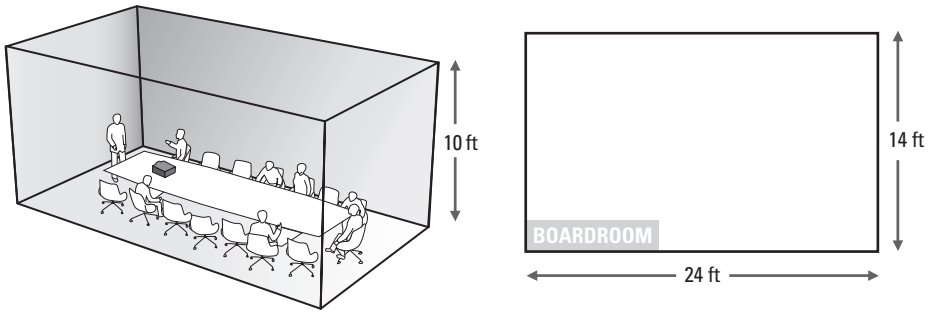
Example 3 — Boardroom Design B



Space Design

This boardroom design example is an extension to the Boardroom Design in Example 2 but adds an external load requirement for summer and winter. The exterior wall and window are located along a 14 ft long side of the room.

Design Considerations - Cooling	
Occupants	8
Set-Point	72 °F
Floor Area	336 ft²
Volume	3360 ft³
q_{oz}	2496 Btu/h
q_l	2292 Btu/h
q_{ex}	1200 Btu/h
q_T	5988 Btu/h

Design Considerations - Heating	
Occupants	8
Set-Point	72 °F
Floor Area	336 ft²
Volume	3360 ft³
q_{oz}	2496 Btu/h
q_l	2292 Btu/h
q_{ex}	-7665 Btu/h
q_T	-2877 Btu/h

Space Considerations

Some of the assumptions made for the space are as follows:

- Internal loading conditions identical to Example 2
- The head to foot gradient recommended by ASHRAE Research Project-949 (Chen et al., 1999) is 5.4 °F from head to foot for sedentary occupants

The assumptions made for the external load case are as follows:

- During summer, the external cooling load is 1200 Btu/h
- During winter, the heating load is 7665 Btu/h
- The building owners would like all ventilation, heating, and cooling to be ceiling installed

Cooling Calculations:

The loads are broken down as follows:

$$q_{oz} = (8 \text{ People} \times 250 \text{ Btu/h}) + 308 \text{ Btu/h} + 188 \text{ Btu/h} = 2496 \text{ Btu/h}$$

$$q_l = 336 \text{ ft}^2 \times 6.82 \text{ Btu/h/ft}^2 = 2292 \text{ Btu/h}$$

$$q_{ex} = 1200 \text{ Btu/h}$$

$$q_T = 5988 \text{ Btu/h}$$

Total cooling load for this space (q_T) is 5988 Btu/h, and approximately 17.8 Btu/h/ft².

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Example 3 — Boardroom Design B

ASHRAE Standard 62-2004 requires 0.06 cfm/ft² outdoor air flow rate per unit area, R_a, and 5 cfm/person outdoor air flow rate per person, R_p, be delivered to the space for moderately active office work applications. For displacement ventilation, ventilation effectiveness or zone air distribution effectiveness (E_z) is assumed to be 1.2 (Table 6-2, ASHRAE Standard 62-2004). As indicated in ASHRAE Research Project-949 (Chen et al., 1999), the design vertical temperature difference is 3.6 °F for mainly sedentary occupants.

Determine the air flow rate to meet the cooling load.

$$Q_{DV} = \frac{0.295 q_{oe} + 0.132 q_l + 0.185 q_{ex}}{60 \rho c_p \Delta t_{hf}}$$

$$Q_{DV} = \frac{0.295(2496) + 0.132(2292) + 0.185(1200)}{60(0.24)(0.075)(5.4)}$$

$$Q_{DV} = 216 \text{ cfm}$$

From example 2, the fresh air flow rate was determined to be:

$$Q_{oz} = 50 \text{ cfm}$$

The total supply air volume for cooling is then the maximum value between Q_{DV} and Q_{oz}:

$$Q_s = \max\left[Q_{DV}, Q_{oe}\right] = 216 \text{ cfm}$$

Using the procedure from Example 2:

$$t_s = 56.5 °\text{F}$$

$$t_e = 82.5 °\text{F}$$

Adjust for new supply temperature

The supply temperature should be 10 °F less than t_{sp} or 63 °F, whichever is higher:

$$t_s = 63 °\text{F}$$

$$Q_{DV} = \frac{q_t}{60 \rho c_p (t_e - t_s)} = \frac{5988}{60(0.075)(0.24)(82-63)}$$

$$Q_{DV} = 292 \text{ cfm}$$

Heating Calculations

Determine the flow rate for the heating load.

The total heating load, q_T, heating, is 2877 Btu/h, and the heating supply air for the space is set at 90 °F:

$$\Delta t = t_{s,\,heating} - t_{sp}$$

$$\Delta t = 90 °\text{F} - 72 °\text{F}$$

$$\Delta t = 18 °\text{F}$$

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Example 3 — Boardroom Design B

The air flow rate required to deliver the required heating load is determined using J9 and the table below:

IP (Btu/h)	
Air	$q = 1.08Q\Delta t$, Q in cfm
Water	$q = 500Q\Delta t$, Q in gpm

$$Q_h = \frac{q_{T,\,heating}}{1.080(\Delta t)}$$

$$Q_h = \frac{2877}{1.080(18)}$$

$$Q_h = 148 \text{ cfm}$$

Determine the fresh air flow rate.

Since displacement ventilation is not recommended for heating, the fresh air flow rate must be recalculated with a ventilation effectiveness appropriate for the ventilation method per ASHRAE Standard 62-2004, Table 6-2. For this example, the heating will be supplied and returned from the ceiling, and the value of E_z is 0.8.

$$Q_{oz} = \frac{R_p P_z + R_A A_z}{E_z}$$

$$Q_{oz} = \frac{5(8) + 0.06(336)}{0.8}$$

$$Q_{oz} = 76 \text{ cfm}$$

The total supply air volume for heating is then the maximum value between Q_{oz} and Q_h:

$$Q_s = \max\left[Q_{DV}, Q_{oz}\right] = 148 \text{ cfm}$$

Selection of Diffusers

For this application we have three goals set by the owner:

1. Heating and cooling modes available in one diffuser
2. Thermal comfort of the space
3. Diffusers must occupy minimal floor space and should be preferably mounted in the T-bar ceiling

The Price DF1L-HC is selected as the diffuser of choice. This diffuser fits into a standard T-bar ceiling and combines heating and displacement ventilation cooling into one unit. The DF1L-HC is best placed such that the slot is nearest the exterior wall so that the air pattern in heating will wash the window. When in cooling mode, the cool air will simply cascade out of the diffuser to the floor. Care should be taken to ensure that the occupants are not seated directly under the diffuser.

Price recommends limiting the duct velocity to 1200 fpm to minimize noise from the ductwork. And, to ensure thermal comfort of the occupants, the face velocity should be 40 fpm or less. At 292 cfm a diffuser face area of 7.3 ft^2 would be required for a 40 fpm face velocity.

For cooling, provide two 24 in. x 48 in. DF1L-HC diffusers providing 146 cfm of air is required. The performance data below is presented in DR%, which is the percent people dissatisfied due to draft per ASHRAE Standard 55-2010. For the 24 in. x 48 in. DF1L-HC selected, this means that at a distance of 2 ft from the diffuser, the DR% will be 20% for a ΔT = 10 °F. This performance data is useful in determining the required distance between sedentary occupants and the diffuser to maintain comfort.

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Example 3 — Boardroom Design B

Performance Data - Price DF1L-HC Cooling									
Unit Size,in. [Face Area, ft²] L x W	Face Velocity, fpm	Air flow, cfm	Total Pressure, in. w.g.	Total Static, in. w.g.	Noise Criteria (NC)	Proximity to Outlet			
						ΔT = 5 °F Radius, ft		ΔT = 10 °F Radius, ft	
						DR%		DR%	
						15	20	15	20
24 x 24 [2.6]	20	51	-	-	-	-	-	2	-
	30	77	0.02	0.02	-	1	-	3	1
	40	102	0.04	0.04	-	1	-	3	1
	50	120	0.06	0.06	-	2	-	4	2
48 x 24 [5.5]	20	110	-	-	-	1	-	3	1
	30	165	0.02	0.02	-	2	-	4	2
	40	221	0.04	0.03	-	2	-	5	2
	50	276	0.06	0.05	17	3	1	5	3

For heating mode, the diffusers must supply 148 cfm total as calculated. Each DF1L-HC will supply 74 cfm during heating mode and will be located such that the heating slot is parallel and adjacent to the window producing a horizontal heating air pattern towards the window. The diffuser is located 1 ft from the window. To ensure proper heating distribution and comfort, the supply air in heating mode should achieve a terminal velocity of 50 fpm approximately 2/3 down the window. The boardroom in this example has a 7 ft window flush to the ceiling, so the heating air must reach approximately 4 1/2 ft down the window at a terminal velocity of 50 fpm.

Using the performance data table below for the 24 in. x 48 in. DF1L-HC, the flow rate of 74 cfm in heating falls between the cataloged points of 108 cfm and 162 cfm with 12 and 18 ft throws to 50 fpm respectively. Through linear interpolation we find the throw to 50 fpm at 74 cfm is approximately 7 ft. Adjusting the isothermal throw for an 18 °F heating differential the throw becomes 7 x 0.8 = 5.5 ft with the diffuser mounted 1 ft from the window the air will project across the ceiling and down the window to the floor, meeting our requirements.

$$\frac{108-54}{12-4}=\frac{108-74}{12-x}$$

$$x=7\text{ ft}$$

Performance Data - Price DF1L-HC Heating Horizontal Pattern							
	Neck Velocity, fpm	50	100	150	200	250	300
	Velocity Pressure	0.000	0.001	0.001	0.002	0.004	0.006
24 x 24 [2.6]	Total Pressure (in. w.g.)	0.01	0.03	0.07	0.13	0.20	0.29
	Flow Rate (cfm)	27	54	81	108	136	163
	NC	-	-	18	26	32	37
	Throw 150, 100, 50	0-0-1	0-1-4	1-3-5	2-4-7	3-4-9	4-5-11
24 x 48 [5.5]	Total Pressure (in. w.g.)	0.01	0.02	0.05	0.09	0.14	0.21
	Flow Rate (cfm)	54	108	162	217	271	325
	NC	-	-	22	30	36	41
	Throw 150, 100, 50	0-1-4	2-4-12	4-9-18	8-12-21	10-15-23	12-18-25

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Typical Applications

Displacement Ventilation systems are very versatile, and can generally be used wherever traditional overhead systems can be used. Displacement applications can be divided into four key areas.

SCHOOLS

The primary market for displacement ventilation is schools. Indoor air quality, silent operation, and thermal comfort are all important design considerations for schools. As a result, many school districts are mandating the use of DV in schools.

The Collaborative for High Performance Schools (CHPS), is a national K-12 green school rating system in the United States whose goal is to improve student performance and educational experience by applying high performance building criteria to schools, as well as using the best possible building technology. CHPS recommends Displacement Ventilation as the preferred air distribution method and awards up to 4 points for the use of Displacement.

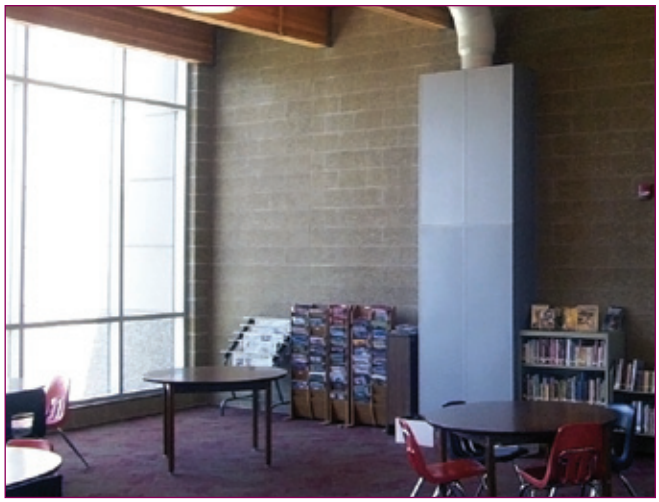
Products

Wall Mounted Diffuser Family – All diffusers from the Wall Mounted Diffuser Family are suitable for applications in schools. These diffusers feature robust construction and optional bases and duct covers which are popular with school applications. DF1C's and DR90's with bases and duct covers can be applied to the corners of classrooms, providing high quality air from a discrete location. DF1 and DF3's can be integrated into library book cases or trophy cases, and DR180's and DR180U's with bases and duct covers can be used as column like architectural features in hallways, cafeterias, change-rooms, and libraries.

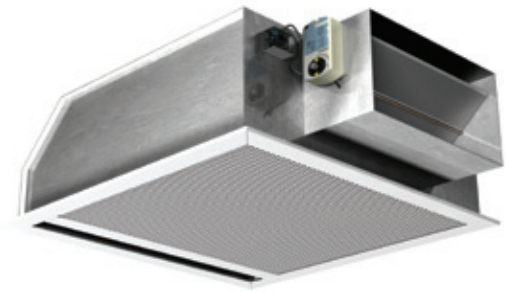
In Wall Diffuser Family - These diffusers provide high quality air and integrate into the wall space, leaving more free space in the room. The DF1R can provide perimeter cooling integrated under cabinetry or an enclosure under a bank of windows; it can also be used for an interior space such as a theatre or lecture hall. The DF1W integrates into plaster walls and is designed to fit between standard wall stud spaces; the DF1W is suitable for many areas of a school, from classrooms to offices to lecture theatres.

Linear Displacement Enclosure Family – Designed for perimeter applications, the DLE Series provides displacement ventilation with a linear bar grille appearance. The DLE can be used to provide cooling along the perimeter of classrooms or hallways. The DLE-H provides displacement ventilation cooling and either hydronic or electric heat in one unit, and is ideal for perimeter application in climates that require cooling and moderate heating.

Ceiling Mounted Diffuser Family – This diverse group provides displacement ventilation through ceiling diffusers, and includes, among the traditional benefits of displacement ventilation, a reduced amount of ductwork and minimal footprint. Both the DF1L and DF1L-HC integrate into standard suspended ceilings; the DF1L provides cooling only and is suitable for interior and perimeter use, while the DF1L-HC provides cooling and light heating from one unit for perimeter use. The DR90H is designed to be installed on plaster surfaces, and is available with duct covers for a continuous look. The DR360DH is typically applied to spaces with higher ceilings that require higher air flows, such as gymnasiums.



DF1L-HC



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Typical Applications

LARGE PUBLIC SPACES

Large public spaces often have large, open areas, high ceilings, and varying occupancy levels. Since displacement systems only condition the first six feet of a space, there is potential for large energy savings in spaces with high ceilings.

Additionally, many large public spaces – such as theatres, airports, and places of worship – can have specific architectural designs that the air distribution must accommodate. Price has the custom design capability to provide diffusers that integrate seamlessly into such architectural features.

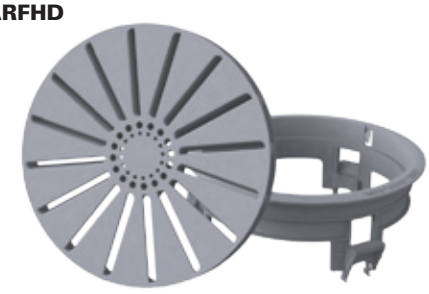
Products

In Wall Diffusers In Wall Diffuser Family - These diffusers provide high quality air and integrate into the wall space, leaving more free area in the room. The DF1R can provide perimeter cooling integrated under cabinetry or an enclosure under a bank of windows; it can also be used for an interior space such as a theatre, lecture hall, or lobby. The DF1W integrates into plaster walls and is designed to fit between standard wall stud spaces; the DF1W is suitable for many large public spaces, from lounges to airports to theatres. Both of these diffusers are highly customizable and are easily integrated into architectural features.

Free Standing Diffusers – Providing a unique architectural feature, Free Standing Diffusers, namely the DR360, is available with an optional base, can be highly customised, and can also be integrated into columns and with electrical supply. The DR360 can be applied to large public spaces such as lounges, casinos, airports, and lobbies.

Floor Mounted Diffusers - Installed in raised floors or concrete slabs, Floor Mounted Diffusers provide a subtle accent to a space. The RFDD is suitable for high churn, low wear spaces such as large offices, while the ARFDD lends itself to higher with higher foot traffic and loading, such as casinos. The DFG and DFGL offer floor supplied displacement ventilation with a linear bar grille appearance, and can be applied in areas such as lobbies, corridors, and waiting areas.

RFDD/ARFHD



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Typical Applications

HEALTH CARE

DV has become an accepted technology in hospital patient rooms and can provide a cleaner, safer, environment for patients, health care providers, and visitors while providing energy savings through a lower air-change requirement. ASHRAE has passed Addendum G to Standard 170-2008 "Ventilation of Health Care Facilities," which officially recognizes the use of displacement ventilation in health care facilities and provides guidelines for its use.

Price has been instrumental in research for applying DV in health care in North America. Visit www.priceindustries.com/sustainable/research to access our research papers.

In-Wall Diffuser Family –The Puraflo is specifically designed for use in hospital patient rooms, featuring a standard removable face and optional tamper-proof fasteners. The DF1W features an optional stainless steel face and plenum and is ideal for use in MRI Rooms.

Ceiling Mounted Diffuser Family – the DF1L and the DR90H can be used in hallways, corridors, and areas such as nursing stations. The DF1L integrates into standard suspended ceilings, while the DR90H requires plaster walls and ceiling for mounting. Both diffusers are ceiling installed and maximize available floorspace.

INDUSTRIAL FACILITIES

Displacement Ventilation was originally introduced in Europe to manage the pollutants found in industrial facilities, and is gaining acceptance in this application in North America.

Products

Displacement systems can carry harmful contaminants such as welding and adhesive fumes (when they are lighter than air) up and out of the breathing zone, leaving employees with safe, healthy breathing air.

The DFXi – With a reinforced corrugated face, the DFXi is built to withstand tough industrial environments. Installed on the floor, the DFXi is applicable for use in warehouses, factories, welding shops, and school shops classes.

DR360DH – Part of the Ceiling Mounted Diffuser Family, the DR360DH can be applied to industrial settings. The DR360DH can supply large volumes of air and takes up minimal floorspace.

DR360DH

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Typical Applications

DESCRIPTION OF OPERATION

The PIC-MB controls package is an optional feature that can be supplied with a parallel flow terminal unit (FDV8 & FDVLP8). The controls package will deliver air at a constant pressure and temperature, both of which are field adjustable. This terminal unit and controls package is best suited for a mixing box application where it draws warm return air and mixes that with cool fresh air from a rooftop or air handling unit, and then supplies the resultant tempered air to one or more zones. This controls package is intended for displacement ventilation systems.

Regardless of whether the mixing box is used to supply one or more zones, each zone must have its own form of VAV control such as Price SDV8 terminal units with PIC controllers. The mixing box should not be used to supply air directly to grilles or diffusers because the total flow rate does not adjust based on an input such as a thermostat. Instead, downstream static pressure is held constant (default 0.3" W.C.), which makes this mixing box ideal for serving VAV zones with throttling dampers connected to displacement diffusers. The zone control is independent of the mixing box.

The PIC-MB monitors and controls both downstream duct static pressure and discharge air temperature (DAT) when installed on a parallel flow fan terminal unit (FDV8 or FDVLP8). The mixing box must be equipped with a modulating ECM motor and some type of modulating reheat (electric or hot water). This system will deliver air at a constant pressure and temperature. To understand how a mixing box works, it can be broken down into two parts: pressure control and DAT control.

The PIC-MB's pressure control loop regulates static pressure in the downstream duct work using a field installed static pressure sensor. The default downstream pressure set point is 0.3" in.w.g. and is field adjustable using the LCD setup tool or Linker2 service tool. The inlet damper of the mixing box is modulated in order to regulate the downstream static pressure. If the downstream static pressure reading is higher than the set point, the damper will close to allow less air through, thereby reducing the pressure. If the downstream static pressure reading is lower than the set point, the damper will open to allow more air through, thereby increasing the pressure. This constant monitoring and regulating of pressure happens on a slower time base than the DAT control, meaning it's slower to react than the fan and heater (DAT loop).

The PIC-MB's DAT loop regulates the air temperature at the discharge of the mixing box. Typical displacement ventilation systems require the discharge air temperature to be between 62 and 68 °F. The default discharge air temperature set point of the PIC-MB is 63 °F and is field adjustable using the LCD setup tool or Linker2 service tool.

The PIC-MB utilizes two stages of analog heat in order to maintain the DAT setpoint.

Upon detection of a discharge air temperature lower than the set point, the PIC-MB ramps up the ECM motor on the mixing box in order to draw more return air into the box. The process of adding return air that is assumed to be warmer than primary air effectively increases the discharge air temperature while consuming only a small amount of energy. If the fan reaches its maximum capacity (field adjustable) and DAT is still lower than the set point, the PIC-MB will utilize the mixing box's analog reheat and increase its capacity until the DAT set point set point is reached. This constant monitoring and regulating of the DAT happens on a faster time base than the pressure control, meaning it's quicker to react than the inlet damper (pressure loop).

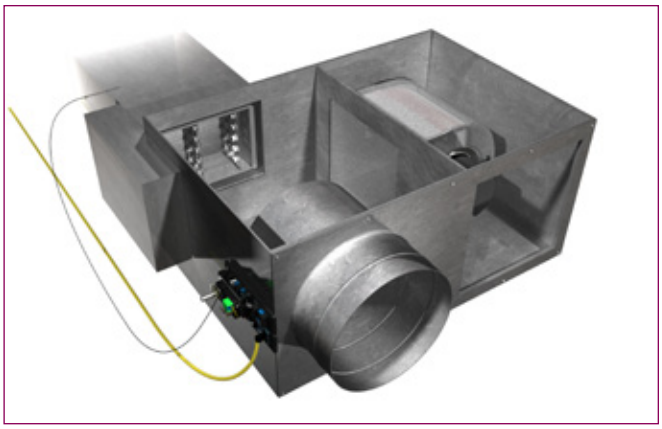

Figure 1: FDV8 Terminal Unit with PIC-MB Package

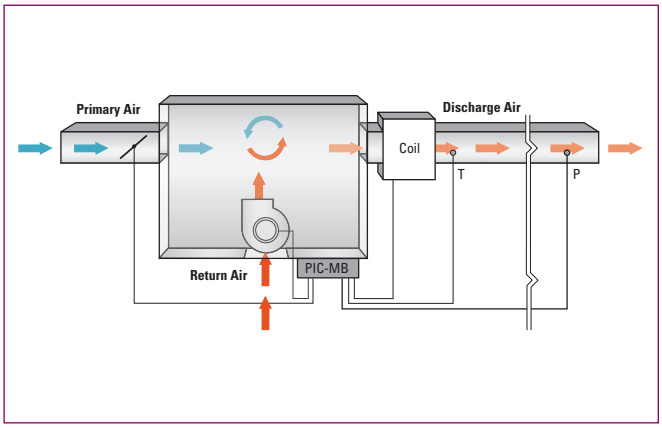

Figure 2: Mixing Box Application with Reheat Coil

Figure 3: Price Linker2 (Setup Tool) & Stand-alone LCD-SETUP

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Typical Applications

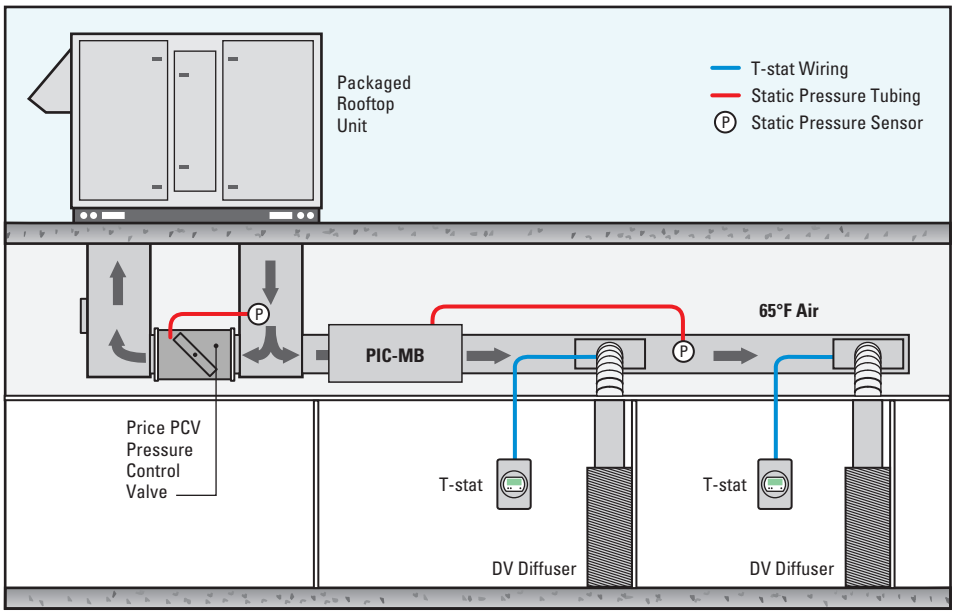
Applications

The PIC-MB is designed to be used with cool supply air and warm return air. It mixes these two air streams together to provide favourable conditions for displacement ventilation systems. The PIC-MB regulates discharge air temperature and pressure. It is typically installed in the following types of installations:

- In a building with a packaged rooftop unit and displacement ventilation diffusers. The packaged rooftop is incapable of directly delivering 65 °F air at a constant temperature and variable volume.
- In a larger building with an air handling unit that serves other zones. The other zones typically have lower air temperature requirements, for example typical VAV zones with Prodigy diffusers.

Packaged Rooftop Units with Displacement Ventilation

When using a packaged rooftop unit with a displacement ventilation (DV) system, there is a need to raise discharge air temperature to approximately 62-68°F. This can be done by mixing colder air from the rooftop unit with warmer return air from the ceiling return plenum or ductwork. The PIC-MB controls the mixing and provides a constant discharge air temperature to all the DV zones. Each zone may have its own form of VAV control to vary the amount of tempered air that goes to each diffuser, thereby controlling space temperature.



The rooftop unit will need to be equipped with either a variable speed fan or a bypass to ensure the rooftop can deliver a varying amount of conditioned air. Since most packaged rooftops are not sold with a variable speed fan, a bypass must be used in the system in order to maintain an acceptable static pressure in the ductwork. The PIC-MB will throttle the amount of incoming air from the rooftop, meaning some of the rooftop's air must be diverted elsewhere. Therefore it is paramount that some form of duct static pressure control is present in the system, upstream of the PIC-MB. Price recommends the installation of a pressure control valve (PCV) in bypass mode to maintain duct static pressure. The PCV will control static pressure in the ductwork and allow the PIC-MB to operate correctly.

To control the rooftop unit, Price recommends using the Price Rooftop Unit controller (PRTU). The rooftop unit controller can be networked to all the individual zones as well as to the pressure control valve. By polling all the zones for information about heating and cooling demands, the PRTU will activate the necessary stages of heating or cooling. Because the PIC-MB must receive cool air from the rooftop in order to function properly, the PRTU can be set up to favour cooling or even completely lock out heating stages. Furthermore, the PRTU can be calibrated to limit the off-coil temperature of the rooftop unit. Calibrating the limits of the rooftop unit discharge will ensure the PIC-MB receives cool air in the usable range and not frigid air that must be reheated significantly before it can be fed to displacement diffusers. This is advantageous by simultaneously increasing system stability and reducing overall operating costs.

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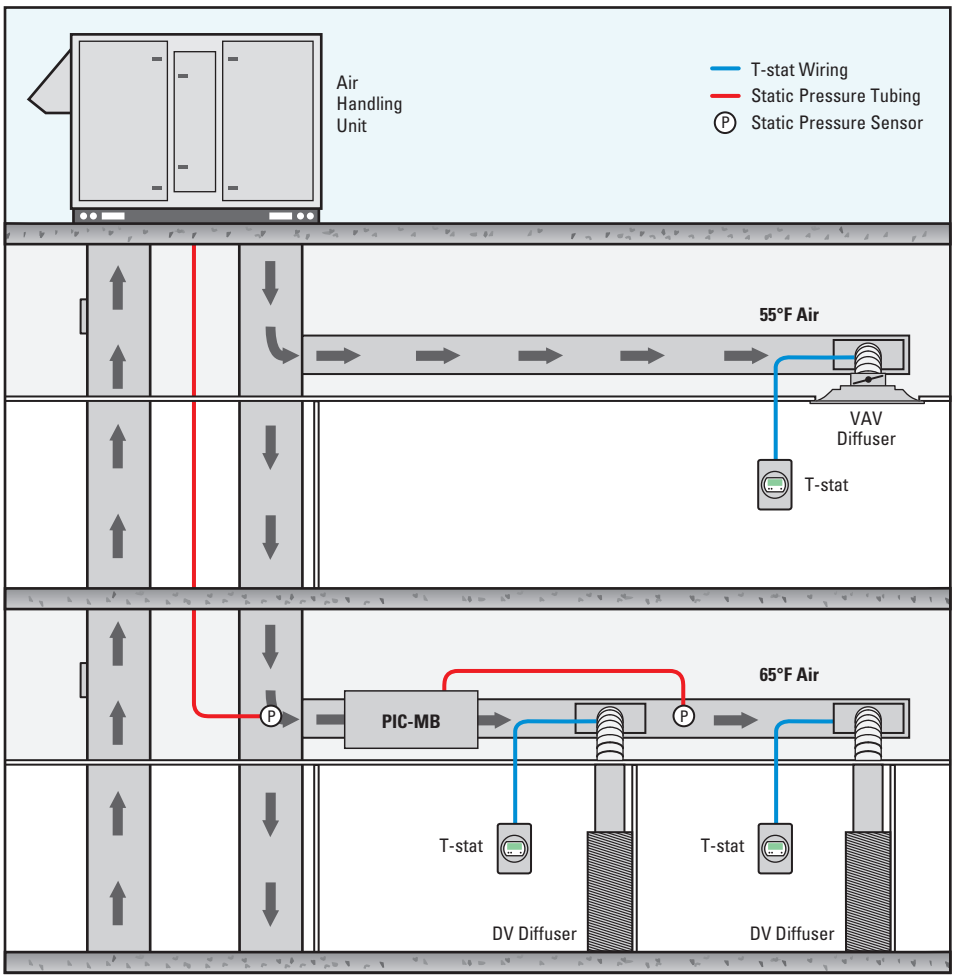
Typical Applications

Air Handling Units with Other Zones and Displacement Ventilation

Air handling units are generally versatile enough and have enough controllability to handle DV requirements without the need for the PIC-MB. An air handler with an energy recovery loop or face and bypass system can cool the incoming air enough to remove the humidity and then reheat the air back up to comfortable temperate air, around 65 °F. This is the ideal solution for larger buildings where DV is used exclusively with an air handling unit. Underfloor air distribution (UFAD) systems also use an elevated supply air temperature, so a building with separate UFAD and DV zones can generally be fed by the same air handling unit.

However, when one building has both DV and traditional overhead VAV systems supplied by the same air handling unit, a conflict of requirements occurs. The AHU is unable to supply both 55 °F air to the DV system and 65 °F air to the VAV system. The solution is to use the AHU for the VAV system and then use a PIC-MB to mix 55 °F air with local return air to deliver 65°F air to the DV zone(s). In this way, the AHU can simply run as it normally would, supplying 55°F air to all of the zones, but the DV diffusers would receive the correct higher temperature air due to the PIC-MB.



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Typical Applications

PIC-MB Requirements

Typical set points for a PIC-MB are 63-68 °F for the DAT and 0.20-0.50 in.w.g. for the static pressure. In order for the PIC-MB to function properly, it can only add heat to the incoming air stream by adding return air and/or reheating the air if required. To avoid using reheat, it is recommended that the incoming air be between 55 and 60 °F, so that the PIC-MB can raise the DAT to a satisfactory level without excessive use of the analog reheat. This will ensure that the least amount of additional energy is used by the PIC-MB so as to keep operating costs down. The primary inlet static pressure should be equal to or only slightly higher than the desired target static pressure so that the FDV8 primary damper is able to maintain downstream pressure effectively. When a Price PCV is used, the PCV target static pressure can be adjusted to supply the correct primary pressure to the PIC-MB.

PIC-MB Sequences

The following diagram describes the sequence of operation of the PIC-MB.

Pressure Control:

On an increase in duct static pressure the contoller will close the inlet damper to decrease the amount of air delivered the downstream of the box. On a decrease in duct static pressure the controller will open the inlet damper to increase the amount of air delivered downstream of the box. Duct static pressure is held constant.

Upon detection of air handler shutdown (Zone duct pressure with VAV damper fully open), the controller/actuator will place the damper at the pre-selected setback position (default: 50% open)

Discharge Air Temperature (DAT) Control:

When the DAT falls below the set point, the fan will speed up to increase the amount of return air as a first stage of heat control. If the fan is at maximum speed and DAT is still below set point, a second stage of analog reheat will slow down to draw less return air.

Note:

Primary air must be cooler than the DAT set point because the controller can only add heat to the primary air.

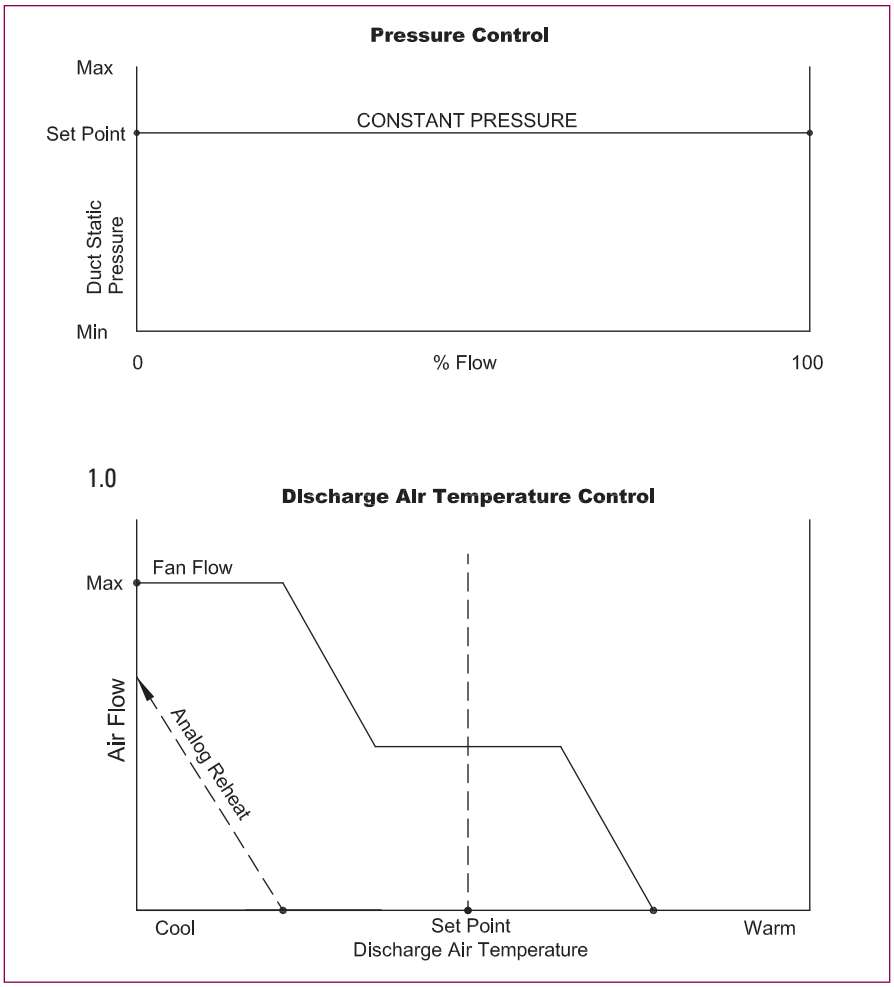

Figure 4: Pressure Control with Discharge Air Temperature Controls

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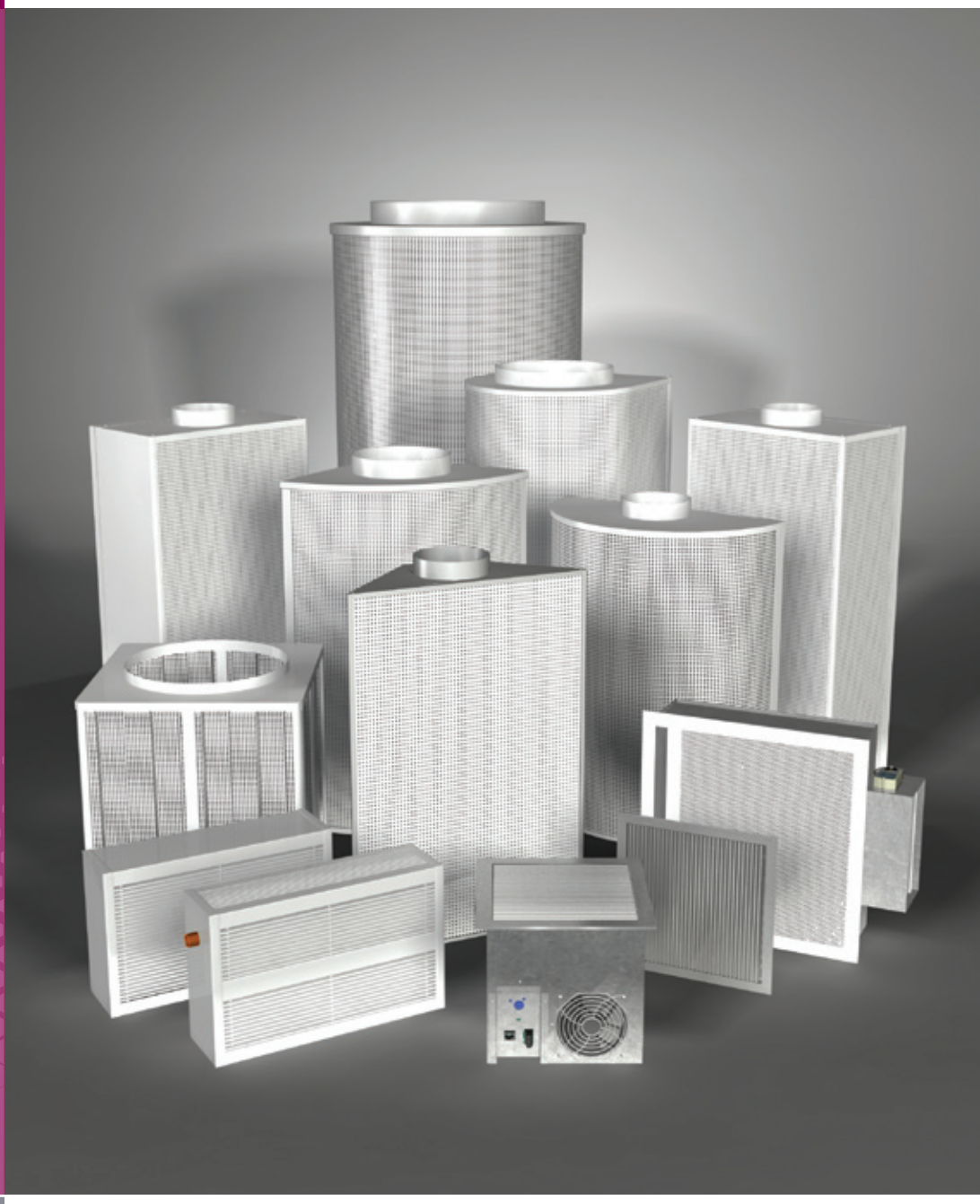
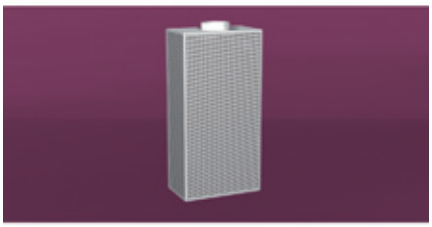


Displacement Ventilation

Wall Mounted Displacement Diffusers

DF1 Rectangular 1 Way Displacement Diffuser

The Price DF1 displacement diffuser provides low velocity supply air from a single rectangular face on the front of the diffuser..... **J59, J61**

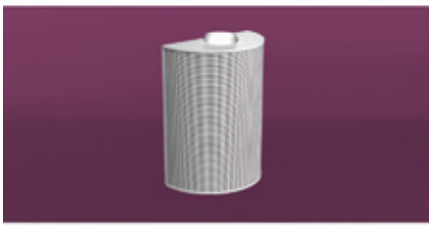


DF3 Rectangular 3 Way Displacement Diffuser

The Price DF3 is a rectangular displacement diffuser providing air flow from three (3) rectangular faces around the diffuser. The DF3 provides the same performance, but with higher capacity, as the DF1. ..... **J59, J64**

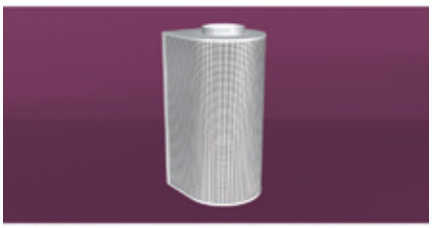
DF1C Rectangular 1 Way Corner Displacement Diffuser

The DF1C installs conveniently into room corners, maximizing room space and performance. The DF1C introduces a uniform 90° arc of conditioned air into the occupied zone via a 1 way rectangular face. **J59, J67**



DR180 Half Round 180° Displacement Diffuser

The Price DR180 provides a 180° displacement air pattern around the diffuser. The DR180 is typically placed against a wall or pillar on the floor..... **J59, J70**



DR180U Half Round U-Shaped 180° Displacement Diffuser

The Price DR180U provides a 180° displacement air pattern around the diffuser. The DR180U is typically placed against a wall or pillar on the floor **J59, J73**

DR90 Quarter Round 90° Displacement Diffuser

The DR90 provides similar performance as the DF1C while the curved face can provide higher volumes of air. The DR90 is typically installed in a corner.

..... **J59, J76**

Wall Mounted Displacement Diffuser Accessories

Price displacement accessories include duct covers for concealing ductwork, risers for architectural accents and air flow sensing devices which enable air flow adjustment. **J79**

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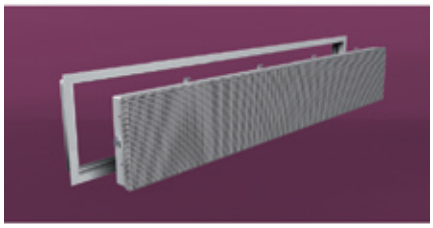
In-Wall Displacement Diffusers

DF1W 1 Way In-Wall Displacement Diffuser

The DF1W brings the high performance of the DF1 to in-wall applications, resulting in increased space for occupants **J84, J86**

Puraflo 1 Way In-Wall Diffuser for Health Care Applications

The Puraflo diffuser is designed specifically for use in health care applications, combining the high quality air of displacement ventilation with features and materials for this unique application **J84, J87**



DF1R 1 Way Displacement Diffuser for Recessed Applications

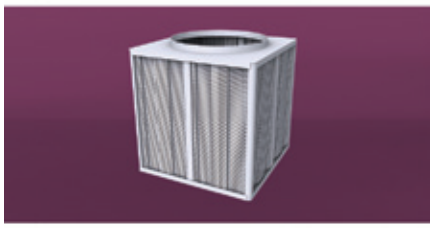
The DF1R provides displacement ventilation supply air from a flat, recessed face. The DF1R can be installed in stair risers, walls, or under cabinets, maximizing floor space and architectural appeal **J84, J90**

Free Standing Displacement Diffusers

DR360 Full Round 360° Displacement Diffuser

The Price DR360 provides a 360° displacement air pattern around the diffuser. The DR360 is typically installed as a free standing unit in the occupied zone

..... **J96, J98**



DFXi Rectangular Industrial Displacement Diffuser

The DFXi is intended for use in production and work areas where strong impacts to the diffuser face are anticipated. The rigid construction of the DFXi allows for an ideal crossover for high-wear commercial applications, such as school gymnasiums. The diffuser can be selected with 1 way, 2 way, 3 way and 4 way directional flow **J96, J101**

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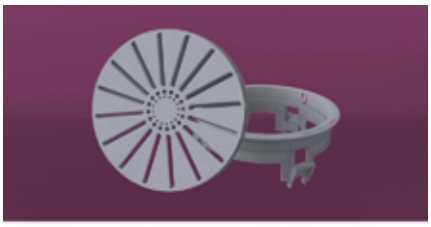
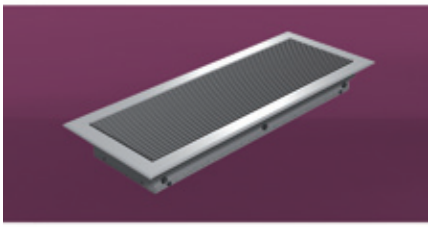
Floor Mounted Displacement Diffusers



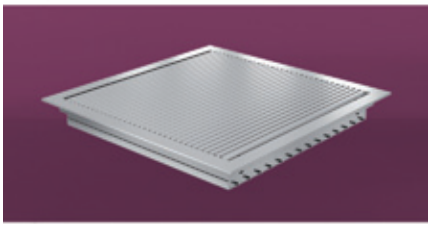
RFDD/ARFHD Round Floor Displacement Diffusers

The Price RFDD/ARFHD floor diffusers provide low velocity displacement supply air and are typically applied in spaces with raised floors or concrete slabs. **J104, J107**



DFGL Displacement Floor Grille

The DFGL is a floor grille designed to supply low velocity air to a space from a floor installation. The DFGL is similar to the DFG, but offers a wider variety of sizes and core styles **J104, J110**



DFG Displacement Floor Grille

The DFG is a 10 1/2″ x 10 1/2″ (267mm x 267mm) floor grille designed to supply low velocity air to a space from a floor installation. Typically installed into a pressurized plenum, the DFG utilizes the deflection of the core blades in conjunction with directional vanes and equalization baffles for uniform flow.

..... **J104, J112**

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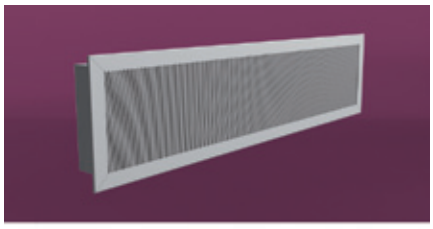
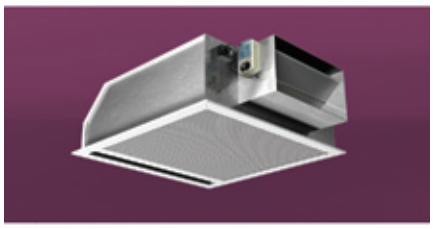
Ceiling Mounted Displacement Diffusers



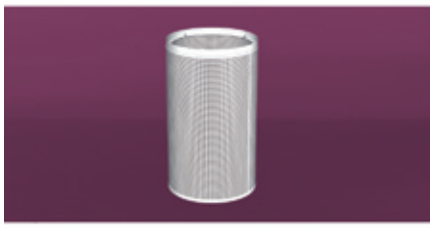
DF1L 1 Way Lay-in Displacement Diffuser

The DF1L displacement diffusers are designed to produce a 1 way low velocity air supply from a suspended ceiling application **J116, J118**



DF1L-HC 1 Way Lay-in Diffuser with Heat-Cool Changeover

The DF1L-HC displacement diffusers provide displacement ventilation cooling and linear custom flow slot heating in one unit. Like the DF1L, the DF1L-HC is designed for use in suspended ceiling applications..... **J116, J120**



DR360-DH Full Round 360° Duct Hung Displacement Diffuser

The Price DR360-DH provides a 360° displacement air pattern from a ceiling supply. The DR360-DH is typically installed directly from the ductwork above the occupied zone. The DR360-DH is ideal for large commercial spaces with high ceilings and for industrial applications..... **J116, J124**

DR90H Quarter Round Horizontal 90° Displacement Diffuser

The DR90H provides similar performance as the DF1C while the curved face can provide higher volumes of air. The DR90H is typically installed along the ceiling-wall junction in applications with drywall/hard ceilings **J116, J127**

Linear Displacement Diffusers

DLE Displacement Linear Enclosure

The DLE incorporates the architectural look of a Price Linear Enclosure with the technology of displacement ventilation. The DLE is constructed entirely of heavy gauge aluminum and is completely customizable in each dimension. This diffuser provides a supply of cool air from a perimeter location, making it ideal for a large area where the diffuser takes up minimal space and fits seamlessly into the architecture..... **J130, J132**

DLE-H Displacement Linear Enclosure with Integral Heater

The DLE-H is the standard DLE with an integrated electric or hydronic heater. The DLE-H incorporates the architectural look of a linear enclosure with the technology of displacement ventilation. From a perimeter location, this diffuser provides a supply of cool air from the lower section while it induces room air over a heating element, allowing for both cooling and perimeter heating from one diffuser **J130, J135**

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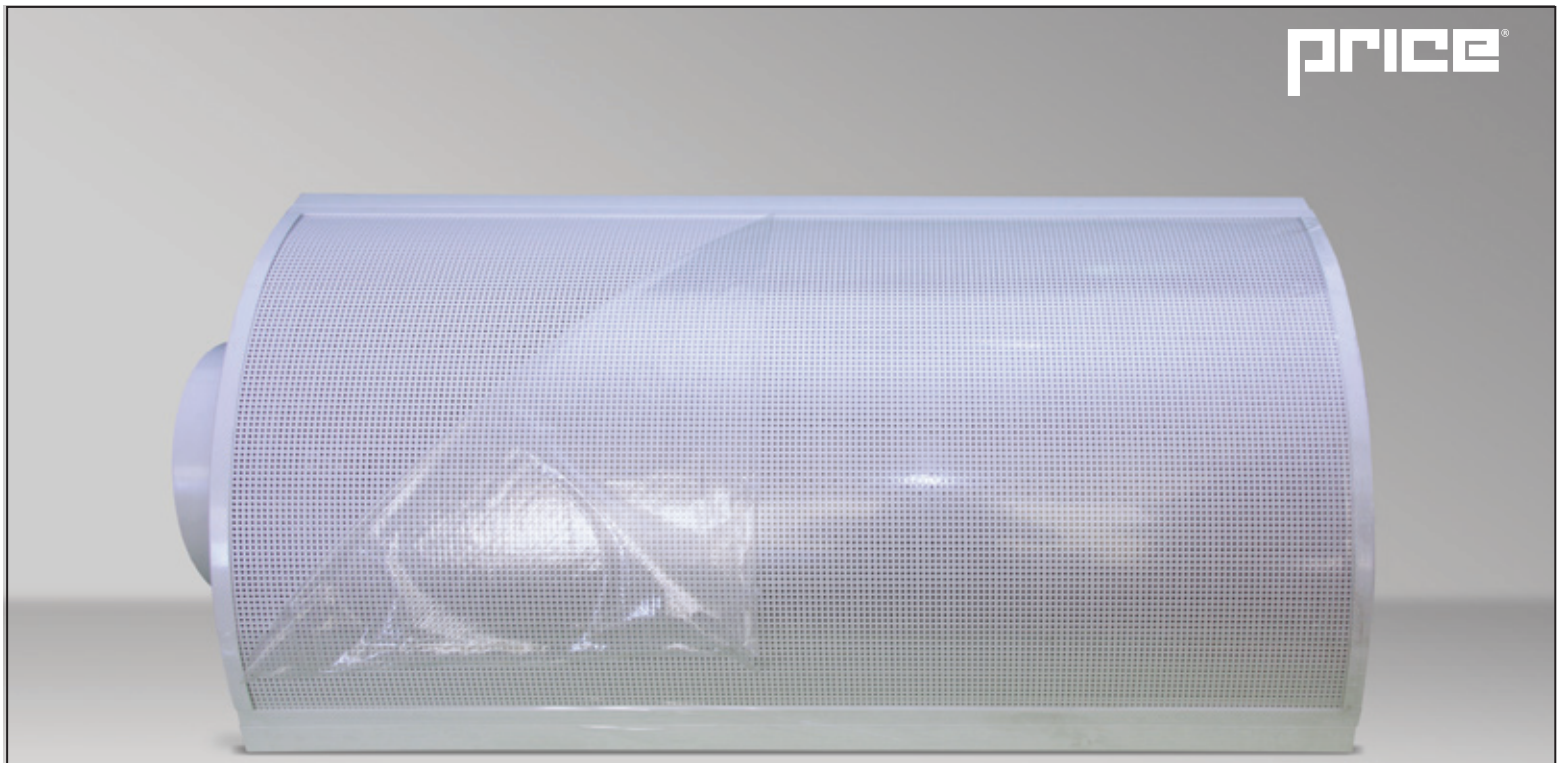
SECTION **J**

Wall Mounted Displacement Diffusers



Protective Film

Price is proud to offer a protective plastic film on the face and inlet of displacement ventilation products for protection during shipping and installation.

The protective film:

- Helps protect the diffuser face from damage during shipping and installation
- Seals the inlet and face of the diffuser of most models during installation
- Can contribute to IEQ Credit 3.1: Construction Indoor Air Quality Management Plan – During Construction, LEED for New Construction and Renovations 2009

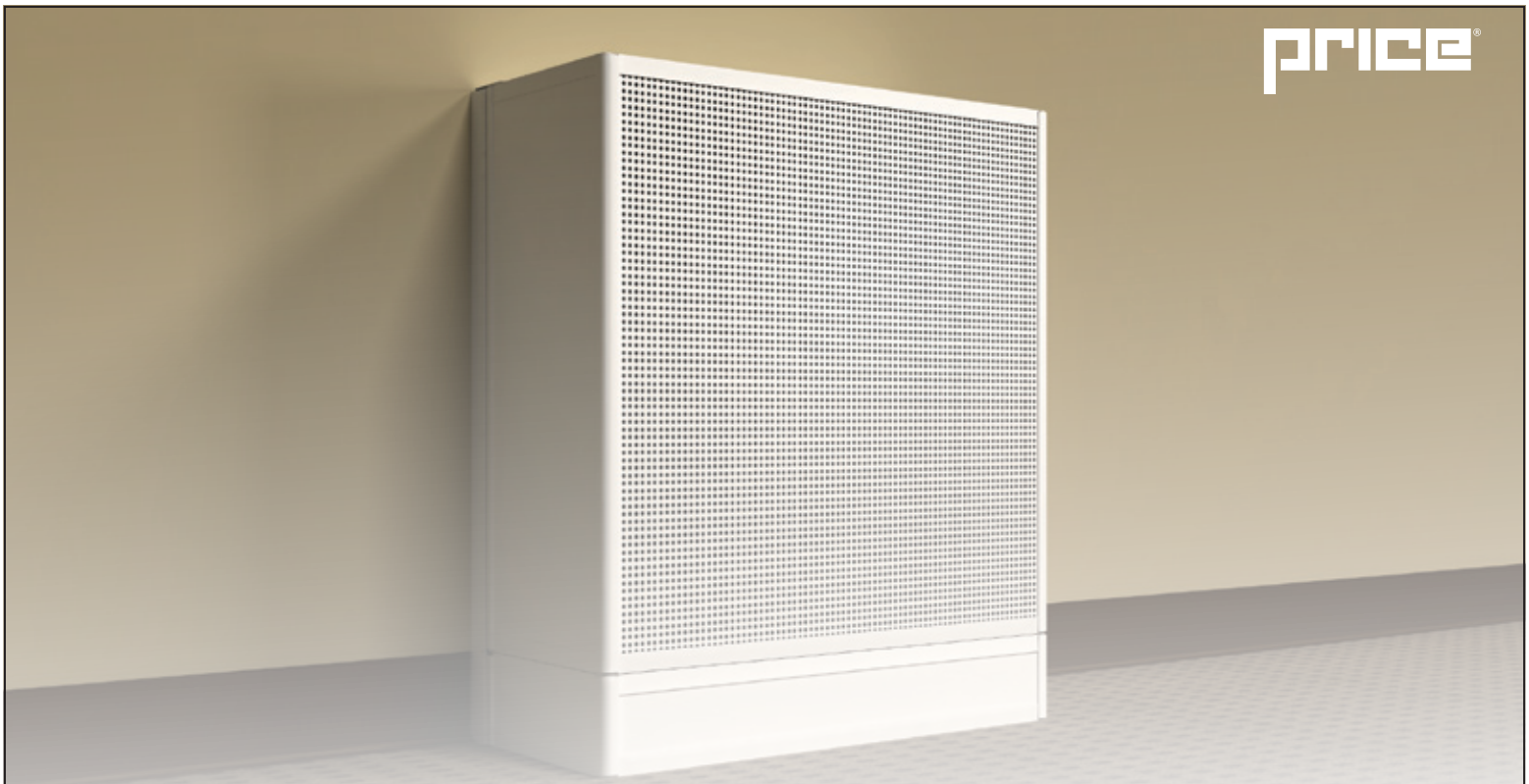
Available for Price's entire Displacement Ventilation Product Offering.

Protects the diffuser face from damage

Seals the face of the diffuser

Seals the inlet of the diffuser

priceindustries.com for additional product information, including product videos and brochures.



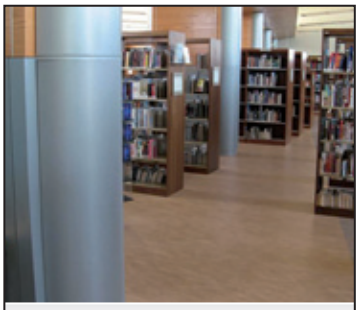
Wall Mounted Diffusers

Price Wall Mounted Displacement Diffusers supply fresh, clean air directly into the occupied zone, offer traditional displacement style, and can be easily integrated into architectural features or blended into a space. Typical applications for these diffusers include classrooms, lobbies, offices, and large public spaces such as libraries. The superior air quality achieved by displacement ventilation systems offers unique benefits for educational applications, including reduced absenteeism and higher test scores.

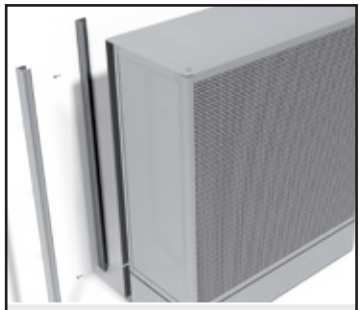
Wall Mounted Family:

- DF1
- DF3
- DF1C
- DR90
- DR180
- DR180U

Superior air quality for classrooms



Optional duct covers and bases



Rail-mounting system for easy installation

Architectural integration

priceindustries.com for additional product information, including product videos and brochures.

Wall Mounted Diffusers

Product Overview

Models

PriceWall Mounted Displacement Diffusers are designed to be integrated with the architecture in a space and provide a low velocity air pattern into a room. These diffusers are typically placed against a wall, pillar or in the corner of a room with no visible fasteners. They are most commonly used in hotels, schools, office spaces, convention centers and theaters.

Applications

PriceWall Mounted Displacement Diffusers feature high gauge steel, flat perforated faces that are held by high strength extruded aluminum frames. The perforated faces and internal baffle ensure equalized air flow across the face of the diffuser and provide low velocity air into the room. These diffusers are typically installed along a side-wall, against a pillar, or integrated onto features such as bookcases. The **DF1** can also be recessed into a wall to maintain a flush appearance. With the exception of the **DF1C**, Price Wall Mounted Displacement Diffusers use a patent-pending rail mounting system that is easy to install and has no visible fasteners.

Accessories

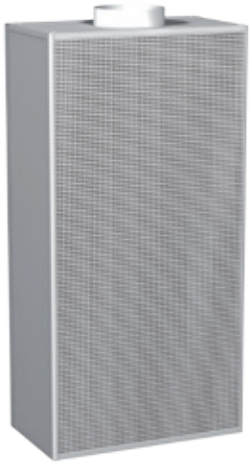
The accessories available for Price Wall Mounted Displacement Diffusers include duct covers, bases and adjustable flow sensing devices (AFSDs).

Duct covers are commonly used to hide ductwork to the diffusers and increase architectural appeal. Price duct covers are constructed of the same heavy gauge steel panels and high strength extruded aluminum frames used in their applicable diffuser. Following the same contour as its respective diffuser, duct covers are available in solid or perforated steel, and are ideal for hiding ductwork and other vertically running cables or conduit. When using a perforated duct cover, Price recommends that the duct be painted black to avoid any visible metal through the duct cover.

With the exception of the DF1C, duct covers are supplied assembled in solid or perforated steel are available in varying lengths, and use the same easy-to-install patent-pending Price rail-mounting system.

Diffuser bases offer a look that is consistent with the rest of the space, providing protection from damage or the moisture of cleaning while hiding the ductwork. The bases are designed to be inset 1" from the face of the diffuser; however, they are free to be specified to match any décor or baseboard appearance.

DF1



DF1C

The Adjustable Flow Sensing Device features both a manually adjustable damper for volume control and the Price SP300 multi-point sensor to provide accurate pressure measurement. Utilizing the gauge taps for flow measurement and the damper locking mechanism ensures quick and accurate balancing of each diffuser during the balancing process.

For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

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DF1 Series

Product Information

Price DF1 Series displacement diffusers are designed to produce a 1 way low velocity air supply, perpendicular to the diffuser face. The DF1 discharges air evenly across its perforated face with minimal turbulence or induction of room air. The cool supply air flows down to the floor level and gradually fills the occupied space. Typically installed against a wall or pillar, the diffuser can blend with a variety of surroundings. The superior air quality and low noise levels realized with the DF1 make it suitable for office spaces, restaurants, supermarkets, theaters, hotels, convention centers, schools or any application where air quality and occupant comfort demands are high.

Features

- Optional inlet locations: bottom, top, rear, or from either side.
- Field-cut inlet option.
- Ships with protective film on face and inlet.

Construction/Finish

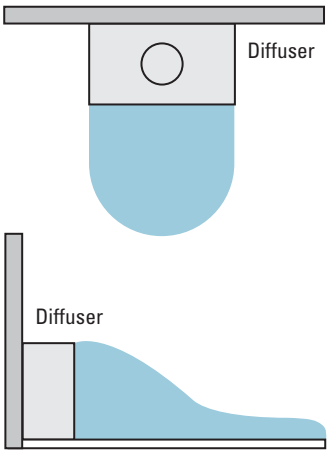
- Diffuser Frame and Equalization Baffle – Aluminum
- Side, Top and Bottom Panels – Coated Steel
- Perforated Front Panel – Coated Steel
- Finish – B12 White (Standard)

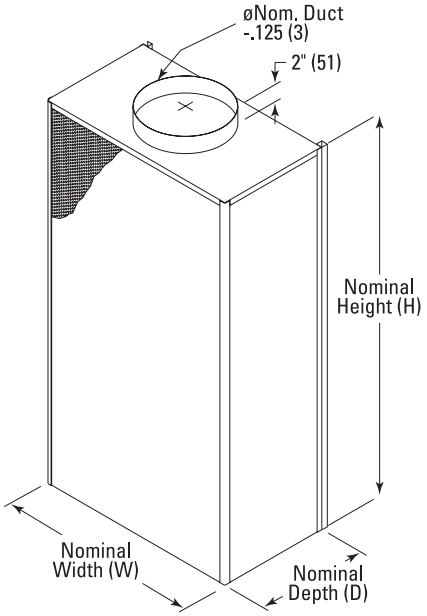
For optional and special finishes see color matrix.

Accessories

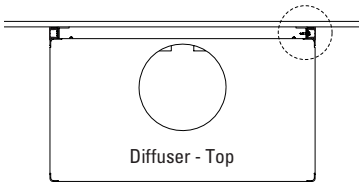
- Base
- Duct Covers
- AFSD

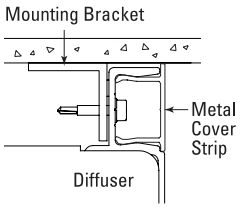
Air Pattern





Rail-Mounting System Detail





Dimensional Data - Imperial (inches)

W X H	Duct	Depth
24x24	8, 10 , 14 x 6	13
24x48	8, 10, 16 x 8	13
24x60	8, 10, 16 x 8	13
36x48	10, 12, 18 x 8	16
36x60	10, 12, 18 x 8, 24 x 8	16
48x24	8, 10, 14 x 6	13
48x36	10, 12, 16 x 8	16
60x24	8, 10, 14 x 6	13
60x36	10, 12, 16 x 8, 18 x 8	16

Dimensional Data - Metric (mm)

W X H	Duct	Depth
600 x 600	200, 250, 400 x 150	330
600 x 1200	200, 250, 400 x 200	330
600 x 1500	200, 250, 400 x 200	330
900 x 1200	250, 315, 500 x 200	410
900 x 1500	250, 315, 500 x 200, 600 x 200	410
1200 x 600	200, 250, 400 x 150	330
1200 x 900	250, 315, 400 x 200	410
1500 x 600	200, 250, 400 x 150	330
1500 x 900	250, 315, 500 x 200	410

For a complete list of standard sizes and inlets, refer to www.priceindustries.com/resources/type/literature/submittals

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Performance Data — Imperial Units

Unit Size W x H x D [in] Face Area [ft²]	Inlet Size [in]	Face Velocity [fpm]	Air Flow [cfm]	Total Pressure [in. w.g.]	Static Pressure [in. w.g.]	Noise Criteria [NC]	Proximity to Outlet [ft]			
							ΔT = 5 °F		ΔT = 10 °F	
							DR		DR	
							15%	20%	15%	20%
24 x 24 x 13 [3.6]	8	20	72	--	--	--	--	--	1	--
		30	108	0.02	--	--	3	1	5	2
		40	144	0.03	--	--	6	3	8	5
		50	180	0.05	0.03	--	8	5	10	7
24 x 48 x 13 [7.4]	8	20	148	0.02	--	--	4	1	6	3
		30	222	0.04	--	--	8	4	10	6
		40	295	0.07	0.02	--	10	7	13	9
		50	369	0.11	0.04	20	13	9	15	11
24 x 60 x 13 [9.3]	8	20	186	0.02	--	--	5	2	7	4
		30	278	0.05	--	--	9	6	11	8
		40	371	0.09	--	17	12	8	14	11
		50	464	0.14	0.03	25	14	11	17	13
	10	30	278	0.03	--	--	9	6	11	8
		40	371	0.06	0.03	--	12	8	14	11
		50	464	0.10	0.05	20	14	11	17	13
36 x 48 x 16 [11.3]	10	20	226	0.02	--	--	5	2	8	4
		30	338	0.04	--	--	9	6	12	8
		40	451	0.08	0.03	16	12	9	14	11
		50	564	0.12	0.05	23	14	11	17	13
	12	30	338	0.03	--	--	9	6	12	8
		40	451	0.06	0.04	--	12	9	14	11
		50	564	0.09	0.06	19	14	11	17	13
36 x 60 x 16 [14.2]	10	20	284	0.02	--	--	7	4	9	6
		30	425	0.06	--	--	11	7	13	9
		40	567	0.10	0.03	20	14	10	16	12
	12	30	425	0.04	0.02	--	11	7	13	9
		40	567	0.07	0.04	16	14	10	16	12
		50	709	0.11	0.06	23	16	12	18	15
48 x 24 x 13 [7.4]	10	20	148	0.01	--	--	2	--	4	1
		30	222	0.03	--	--	6	3	8	5
		40	295	0.05	0.03	--	8	5	11	7
		50	369	0.07	0.05	16	10	7	13	9
48 x 36 x 16 [11.3]	10	20	226	0.02	--	--	5	2	7	4
		30	338	0.04	--	--	8	5	11	7
		40	451	0.08	0.03	16	11	8	14	10
		50	564	0.12	0.05	23	13	10	16	12
60 x 24 x 13 [9.3]	10	20	186	0.02	--	--	3	--	5	2
		30	278	0.03	--	--	6	3	9	5
		40	371	0.06	0.03	--	9	6	11	8
		50	464	0.10	0.05	20	11	8	14	10
60 x 36 x 16 [14.2]	10	20	284	0.02	--	--	5	2	7	4
		30	425	0.06	--	--	9	6	11	8
		40	567	0.10	0.03	20	12	9	14	11
		50	709	0.15	0.05	27	14	11	17	13
	12	30	425	0.04	0.02	--	9	6	11	8
		40	567	0.07	0.04	16	12	9	14	11
		50	709	0.11	0.06	23	14	11	17	13
	18 x 8	30	425	0.03	0.02	--	9	6	11	8
		40	567	0.06	0.04	--	12	9	14	11
		50	709	0.09	0.06	21	14	11	17	13

Performance Notes:

1. Sound and pressure drop tested in accordance with ASHRAE Standard 70-2006 "Method of Testing for Rating the Performance of Air Outlets and Inlets."
2. Air flow is in cubic feet per minute, cfm.
3. Pressure is in inches of water, in. w.g.
4. The NC values, sound pressure level, are based on a room absorption of 10 dB, re 10^{-12} watts and one diffuser.
5. ΔT is the difference between the room air temperature 3 ½ ft above the floor and the temperature of the supply air.
6. Proximity to outlet is the minimum distance from an outlet to the occupant in order to achieve the listed DR value.
7. Distances closer to the diffuser have a higher DR than the cataloged value.
8. DR is the predicted percentage of people dissatisfied (PPD) due to draft. A value of less than 20 meets the requirements of ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy.
9. Blanks (--) indicate that the DR is below the specified value at all distances from the diffuser face.
10. DR catalog data is presented for an occupant density of 25 people/1000ft², which is the default occupancy density for classrooms (ages 5-8) given by ASHRAE 62.1-2004. For other occupant densities, please refer to the DV Room Designer Software.
11. Performance data for standard diffusers not listed in the catalog is available in Price AIO Software.

For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

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Performance Data — Metric Units

Unit Size W x H x D [mm] Face Area [m²]	Inlet Size [mm]	Face Velocity [m/s]	Air Flow [L/s]	Total Pressure [Pa]	Static Pressure [Pa]	Noise Criteria [NC]	Proximity to Outlet [m]			
							ΔT = 2.8 °C		ΔT = 5.6 °C	
							DR		DR	
							15%	20%	15%	20%
600 x 600 x 330 [0.33]	200	0.10	33	--	--	--	--	--	0.3	--
		0.15	49	4.2	--	--	0.9	0.3	1.5	0.6
		0.20	66	7.5	--	--	1.8	0.9	2.4	1.5
		0.25	82	11.7	7.7	--	2.4	1.5	3.0	2.1
600 x 1200 x 330 [0.69]	200	0.10	67	4.2	--	--	1.2	0.3	1.8	0.9
		0.15	101	9.5	--	--	2.4	1.2	3.0	1.8
		0.20	135	16.9	5.9	--	3.0	2.1	4.0	2.7
		0.25	168	26.5	9.1	20	4.0	2.7	4.6	3.4
600 x 1500 x 330 [0.86]	200	0.10	85	5.5	--	--	1.5	0.6	2.1	1.2
		0.15	127	12.3	--	--	2.7	1.8	3.4	2.4
		0.20	169	21.9	--	17	3.7	2.4	4.3	3.4
		0.25	212	34.2	6.9	24	4.3	3.4	5.2	4.0
	250	0.15	127	8.5	--	--	2.7	1.8	3.4	2.4
		0.20	169	15.0	7.9	--	3.7	2.4	4.3	3.4
		0.25	212	23.5	12.3	19	4.3	3.4	5.2	4.0
900 x 1200 x 410 [1.05]	250	0.10	103	4.7	--	--	1.5	0.6	2.4	1.2
		0.15	154	10.5	--	--	2.7	1.8	3.7	2.4
		0.20	206	18.7	8.1	16	3.7	2.7	4.3	3.4
		0.25	258	29.3	12.7	23	4.3	3.4	5.2	4.0
	315	0.15	154	7.1	--	--	2.7	1.8	3.7	2.4
		0.20	206	12.7	8.5	--	3.7	2.7	4.3	3.4
		0.25	258	19.8	13.3	18	4.3	3.4	5.2	4.0
900 x 1500 x 400 [1.32]	250	0.10	129	6.1	--	--	2.1	1.2	2.7	1.8
		0.15	194	13.6	--	--	3.4	2.1	4.0	2.7
		0.20	259	24.3	7.5	20	4.3	3.0	4.9	3.7
	315	0.15	194	9.2	5.5	--	3.4	2.1	4.0	2.7
		0.20	259	16.4	9.8	15	4.3	3.0	4.9	3.7
		0.25	324	25.7	15.3	22	4.9	3.7	5.5	4.6
1200 x 600 x 330 [0.69]	250	0.10	67	2.9	--	--	0.6	--	1.2	0.3
		0.15	101	6.5	--	--	1.8	0.9	2.4	1.5
		0.20	135	11.6	7.1	--	2.4	1.5	3.4	2.1
		0.25	168	18.2	11.1	15	3.0	2.1	4.0	2.7
1200 x 900 x 410 [1.05]	250	0.10	103	4.7	--	--	1.5	0.6	2.1	1.2
		0.15	154	10.5	--	--	2.4	1.5	3.4	2.1
		0.20	206	18.7	8.1	16	3.4	2.4	4.3	3.0
		0.25	258	29.3	12.7	23	4.0	3.0	4.9	3.7
1500 x 600 x 330 [0.86]	250	0.10	85	3.8	--	--	0.9	--	1.5	0.6
		0.15	127	8.5	--	--	1.8	0.9	2.7	1.5
		0.20	169	15.0	7.9	--	2.7	1.8	3.4	2.4
		0.25	212	23.5	12.3	19	3.4	2.4	4.3	3.0
1500 x 900 x 410 [1.32]	250	0.10	129	6.1	--	--	1.5	0.6	2.1	1.2
		0.15	194	13.6	--	--	2.7	1.8	3.4	2.4
		0.20	259	24.3	7.5	20	3.7	2.7	4.3	3.4
		0.25	324	37.9	11.7	27	4.3	3.4	5.2	4.0
	315	0.15	194	9.2	5.5	--	2.7	1.8	3.4	2.4
		0.20	259	16.4	9.8	15	3.7	2.7	4.3	3.4
		0.25	324	25.7	15.3	22	4.3	3.4	5.2	4.0
	500 x 200	0.15	194	7.5	5.2	--	2.7	1.8	3.4	2.4
		0.20	259	13.3	9.3	--	3.7	2.7	4.3	3.4
		0.25	324	20.8	14.5	19	4.3	3.4	5.2	4.0

Performance Notes:

1. Sound and pressure drop tested in accordance with ASHRAE Standard 70-2006 "Method of Testing for Rating the Performance of Air Outlets and Inlets."
2. Air flow is in Litres per second, L/s.
3. Pressure is in Pascals, Pa.
4. The NC values, sound pressure level, are based on a room absorption of 10 dB, re 10^{-12} watts and one diffuser.
5. ΔT is the difference between the room air temperature 1 m above the floor and the temperature of the supply air.
6. Proximity to Outlet is the minimum distance from an outlet to the occupant in order to achieve the listed DR Value.
7. Distances closer to the diffuser have a higher DR than the cataloged value.
8. DR is the predicted percentage of people dissatisfied (PPD) due to draft. A value of less than 20 meets the requirements of ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy.
9. Blanks (--) indicate that the DR is below the specified value at all distances from the diffuser face.
10. DR catalog data is presented for an occupant density of 25 people/100m², which is the default occupancy density for classrooms (ages 5-8) given by ASHRAE 62.1-2004. For other occupant densities, please refer to the DV Room Designer Software.
11. Performance data for standard diffusers not listed in the catalog is available in Price AIO Software.

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DF3 Series

Product Information

Price DF3 Series displacement diffusers are designed to produce a low turbulence horizontal air supply in three directions. Typically installed against a wall pillar or free standing, the DF3 discharges air evenly across its perforated face with minimal turbulence or induction of room air. The cool supply air flows down to the floor level and gradually fills the occupied space. The superior air quality and low noise levels realized with the DF3 make it suitable for office spaces, restaurants, supermarkets, theaters, hotels, convention centers, schools, or any application where air quality demands are high.

Features

- Optional inlet locations: bottom, top, or rear.
- Field-cut inlet option.
- Ships with protective film on face and inlet.

Construction/Finish

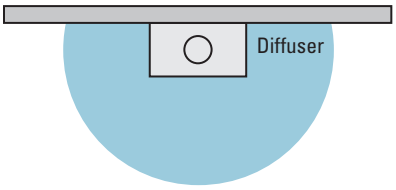
- Diffuser Frame and Equalization Baffle – Aluminum
- Side, Top and Bottom Panels – Coated Steel
- Perforated Front Panel – Coated Steel
- Finish – B12 White (Standard)

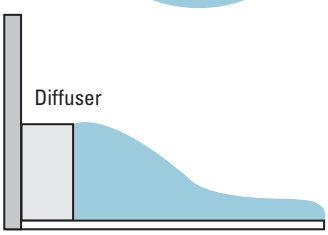
For optional and special finishes see color matrix.

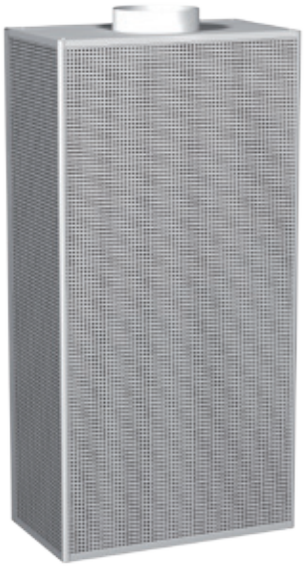
Accessories

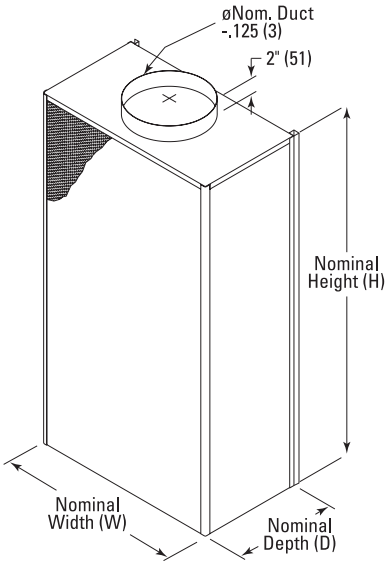
- Base
- Duct Covers
- AFSD

Air Pattern

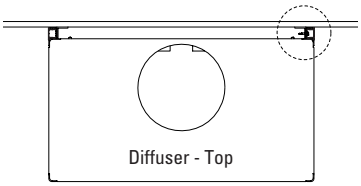


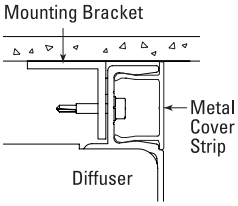






Rail-Mounting System Detail





Dimensional Data - Imperial (inches)

W X H	Duct	Depth
24x24	8, 10, 14x6	13
24x48	8, 10, 14x6, 16x8	13
24x60	8, 10, 14x6, 16x8	13
36x48	10, 12, 18x8	16
36x60	10, 12, 16x8, 18x8, 24x8	16
48x24	8, 10, 14x6	13
48x36	10, 12, 16x8, 18x8	16
60x24	8, 10, 16x8	13
60x36	10, 12, 14, 16x8, 18x8, 20x10	16
60x48	10, 12, 14, 16x8, 18x8, 20x10	16

Dimensional Data - Metric (mm)

W X H	Duct	Depth
600x600	200, 250, 400x150	330
600x1200	200, 250, 400x150, 400x200	330
600x1500	200, 250, 400x150, 400x200	330
900x1200	250, 315, 500x200, 500x300	410
900x1500	250, 315, 400x200, 500x200, 500x300, 600x200	410
1200x600	250, 315, 400x200, 500x200	330
1200x900	250, 315, 400x200, 500x200	410
1500x600	200, 250, 400x200	330
1500x900	250, 315, 400x200, 500x200, 500x300, 600x200, 600x300	410
1500x1200	250, 315, 400x200, 500x200, 500x300, 600x200, 600x300	410

For a complete list of standard sizes and inlets, refer to www.priceindustries.com/resources/type/literature/submittals

For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

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Performance Data — Imperial Units

Unit Size W x H [in] Face Area [ft²]	Inlet Size [in]	Face Velocity [fpm]	Air Flow [cfm]	Total Pressure [in. w.g.]	Static Pressure [in. w.g.]	Noise Criteria [NC]	Proximity to Outlet [ft]			
							ΔT = 5 °F		ΔT = 10 °F	
							DR		DR	
							15%	20%	15%	20%
24 x 24 x 13 [7.7]	10	20	155	--	--	--	1	--	4	1
		30	232	0.02	0.01	--	5	2	8	4
		40	310	0.04	0.02	--	8	4	11	7
		50	387	0.06	0.03	17	10	6	14	9
24 x 48 x 13 [11.6]	10	20	232	0.02	--	--	6	3	9	6
		30	347	0.04	0.01	--	11	7	14	10
		40	463	0.07	0.02	16	14	10	17	13
		50	579	0.10	0.03	23	17	12	20	16
24 x 60 x 13 [13.5]	10	20	270	0.02	--	--	8	5	12	7
		30	405	0.05	0.01	--	13	9	16	12
		40	540	0.09	0.03	20	16	12	20	15
	14 x 6	30	405	0.04	0.01	--	13	9	16	12
		40	540	0.08	0.02	18	16	12	20	15
		50	675	0.12	0.04	26	19	15	22	18
	16 x 8	30	405	0.02	--	--	13	9	16	12
		40	540	0.04	0.02	--	16	12	20	15
		50	675	0.06	0.02	16	19	15	22	18
36 x 48 x 16 [19.1]	12	20	382	0.02	--	--	7	3	9	6
		30	572	0.05	0.02	--	11	7	14	10
		40	763	0.09	0.03	21	14	10	18	13
	18 x 8	30	572	0.03	0.01	--	11	7	14	10
		40	763	0.06	0.02	16	14	10	18	13
		50	954	0.09	0.04	24	17	12	20	16
36 x 60 x 16 [22]	12	20	440	0.03	--	--	8	5	12	8
		30	660	0.07	0.02	16	13	9	16	12
		40	880	0.12	0.04	26	16	12	20	15
	18 x 8	30	660	0.04	0.02	--	13	9	16	12
		40	880	0.08	0.03	20	16	12	20	15
		50	1100	0.12	0.05	28	19	15	22	18
	24 x 8	30	660	0.03	0.01	--	13	9	16	12
		40	880	0.05	0.02	--	16	12	20	15
		50	1100	0.08	0.03	22	19	15	22	18
48 x 24 x 13 [15.8]	10	20	317	0.03	--	--	--	--	2	--
		30	475	0.06	0.02	--	4	--	6	3
		40	633	0.11	0.03	24	6	3	9	6
	16 x 8	30	475	0.06	0.02	--	4	--	6	3
		40	633	0.10	0.03	23	6	3	9	6
		50	791	0.16	0.05	30	9	5	12	8
	18 x 8	30	475	0.02	--	--	4	--	6	3
		40	633	0.04	0.02	--	6	3	9	6
		50	791	0.07	0.03	18	9	5	12	8
48 x 36 x 16 [21.7]	12	20	434	0.03	--	--	4	1	7	3
		30	651	0.06	0.02	16	8	4	11	7
		40	868	0.11	0.04	25	11	7	14	10
	18 x 8	30	651	0.04	0.02	--	8	4	11	7
		40	868	0.08	0.03	20	11	7	14	10
		50	1085	0.12	0.04	28	13	9	17	13
	24 x 8	30	651	0.03	0.01	--	8	4	11	7
		40	868	0.05	0.02	--	11	7	14	10
		50	1085	0.07	0.03	21	13	9	17	13
60 x 24 x 13 [19.9]	10	20	397	0.04	0.01	--	--	--	2	--
		30	596	0.10	0.02	21	3	--	6	2
	18 x 8	30	596	0.04	0.01	--	3	--	6	2
		40	795	0.06	0.02	17	6	2	9	5
		50	994	0.10	0.04	25	8	4	11	7
60 x 36 x 16 [27.2]	18 x 8	20	545	0.03	0.01	--	3	--	6	2
		30	817	0.07	0.02	17	7	4	10	6
		40	1090	0.12	0.04	27	10	6	14	9
	24 x 8	30	817	0.04	0.02	--	7	4	10	6
		40	1090	0.07	0.03	21	10	6	14	9
		50	1362	0.11	0.05	28	13	9	16	12

Performance Notes:

1. Sound and pressure drop tested in accordance with ASHRAE Standard 70-2006 "Method of Testing for Rating the Performance of Air Outlets and Inlets."
2. Air flow is in cubic feet per minute, cfm.
3. Pressure is in inches of water, in. w.g.
4. The NC values, sound pressure level, are based on a room absorption of 10 dB, re 10^{-12} watts and one diffuser.
5. ΔT is the difference between the room air temperature 3 ½ ft above the floor and the temperature of the supply air.
6. Proximity to outlet is the minimum distance from an outlet to the occupant in order to achieve the listed DR value.
7. Distances closer to the diffuser have a higher DR than the cataloged value.
8. DR is the predicted percentage of people dissatisfied (PPD) due to draft. A value of less than 20 meets the requirements of ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy.
9. Blanks (--) indicate that the DR is below the specified value at all distances from the diffuser face.
10. DR catalog data is presented for an occupant density of 25 people/1000ft², which is the default occupancy density for classrooms (ages 5-8) given by ASHRAE 62.1-2004. For other occupant densities, please refer to the DV Room Designer Software.
11. Performance data for standard diffusers not listed in the catalog is available in Price AIO Software.

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Performance Data — Metric Units

Unit Size W x H [mm] Face Area [m²]	Inlet Size [mm]	Face Velocity [m/s]	Air Flow [L/s]	Total Pressure [Pa]	Static Pressure [Pa]	Noise Criteria [NC]	Proximity to Outlet [m]			
							ΔT = 2.8 °C		ΔT = 5.6 °C	
							DR		DR	
							15%	20%	15%	20%
600 x 600 x 330 [0.7]	250	0.10	71	2.5	--	--	0.3	--	1.2	0.3
		0.15	107	5.6	2.8	--	1.5	0.6	2.4	1.2
		0.20	143	10.0	4.9	--	2.4	1.2	3.4	2.1
		0.25	178	15.6	7.7	17	3.0	1.8	4.3	2.7
600 x 1200 x 330 [1.05]	250	0.10	106	4.2	--	--	1.8	0.9	2.7	1.8
		0.15	160	9.5	3.1	--	3.4	2.1	4.3	3.0
		0.20	213	16.8	5.5	16	4.3	3.0	5.2	4.0
		0.25	266	26.3	8.6	24	5.2	3.7	6.1	4.9
600 x 1500 x 330 [1.22]	250	0.10	124	5.4	--	--	2.4	1.5	3.7	2.1
		0.15	186	12.1	3.5	--	4.0	2.7	4.9	3.7
		0.20	248	21.5	6.2	20	4.9	3.7	6.1	4.6
	400 x 150	0.15	186	8.7	2.9	--	4.0	2.7	4.9	3.7
		0.20	248	15.4	5.2	15	4.9	3.7	6.1	4.6
		0.25	310	24.1	8.1	23	5.8	4.6	6.7	5.5
	400 x 200	0.15	186	5.4	--	--	4.0	2.7	4.9	3.7
		0.20	248	9.6	3.8	--	4.9	3.7	6.1	4.6
		0.25	310	14.9	5.9	16	5.8	4.6	6.7	5.5
900 x 1200 x 410 [1.73]	315	0.10	176	4.7	--	--	2.1	0.9	2.7	1.8
		0.15	264	10.6	3.7	--	3.4	2.1	4.3	3.0
		0.20	352	18.9	6.6	19	4.3	3.0	5.5	4.0
	500 x 200	0.15	264	7.0	2.8	--	3.4	2.1	4.3	3.0
		0.20	352	12.5	5.0	--	4.3	3.0	5.5	4.0
		0.25	440	19.5	7.8	21	5.2	3.7	6.1	4.9
900 x 1500 x 410 [2.0]	305	0.10	203	6.9	--	--	2.4	1.5	3.7	2.4
		0.15	304	15.5	5.1	15	4.0	2.7	4.9	3.7
		0.20	405	27.6	9.0	25	4.9	3.7	6.1	4.6
	500 x 200	0.15	304	9.2	3.6	--	4.0	2.7	4.9	3.7
		0.20	405	16.3	6.4	18	4.9	3.7	6.1	4.6
		0.25	507	25.5	10.1	26	5.8	4.6	6.7	5.5
	600 x 200	0.15	304	6.8	2.9	--	4.0	2.7	4.9	3.7
		0.20	405	12.1	5.2	--	4.9	3.7	6.1	4.6
		0.25	507	18.8	8.1	21	5.8	4.6	6.7	5.5
1200 x 600 x 330 [1.44]	250	0.10	146	7.2	--	--	--	--	0.6	--
		0.15	219	16.1	4.2	--	1.2	--	1.8	0.9
		0.20	292	28.7	7.5	24	1.8	0.9	2.7	1.8
	400 x 150	0.15	219	11.6	3.6	--	1.2	--	1.8	0.9
		0.20	292	20.6	6.3	20	1.8	0.9	2.7	1.8
		0.25	364	32.1	9.9	27	2.7	1.5	3.7	2.4
	500 x 200	0.15	219	4.9	--	--	1.2	--	1.8	0.9
		0.20	292	8.8	3.7	--	1.8	0.9	2.7	1.8
		0.25	364	13.7	5.7	16	2.7	1.5	3.7	2.4
1200 x 900 x 410 [1.98]	315	0.10	201	6.1	--	--	1.2	0.3	2.1	0.9
		0.15	301	13.6	4.7	--	2.4	1.2	3.4	2.1
		0.20	402	24.3	8.3	23	3.4	2.1	4.3	3.0
	500 x 200	0.15	301	9.0	3.6	--	2.4	1.2	3.4	2.1
		0.20	402	16.0	6.3	18	3.4	2.1	4.3	3.0
		0.25	502	25.0	9.9	25	4.0	2.7	5.2	4.0
	600 x 200	0.15	301	6.6	2.9	--	2.4	1.2	3.4	2.1
		0.20	402	11.8	5.1	--	3.4	2.1	4.3	3.0
		0.25	502	18.5	8.0	21	4.0	2.7	5.2	4.0
1500 x 600 x 330 [1.8]	250	0.10	183	11.0	2.6	--	--	--	0.6	--
		0.15	275	24.7	5.9	21	0.9	--	1.8	0.6
	500 x 200	0.15	275	7.6	3.0	--	0.9	--	1.8	0.6
		0.20	366	13.4	5.4	--	1.8	0.6	2.7	1.5
		0.25	458	21.0	8.4	22	2.4	1.2	3.4	2.1
1500 x 900 x 410 [2.48]	500 x 200	0.10	252	6.2	--	--	0.9	--	1.8	0.6
		0.15	378	13.9	5.4	15	2.1	1.2	3.0	1.8
		0.20	504	24.8	9.5	25	3.0	1.8	4.3	2.7
	600 x 200	0.15	378	10.3	4.3	--	2.1	1.2	3.0	1.8
		0.20	504	18.3	7.7	21	3.0	1.8	4.3	2.7
		0.25	630	28.6	12.0	28	4.0	2.7	4.9	3.7

Performance Notes:

1. Sound and pressure drop tested in accordance with ASHRAE Standard 70-2006 "Method of Testing for Rating the Performance of Air Outlets and Inlets."
2. Air flow is in Litres per second, L/s.
3. Pressure is in Pascals, Pa.
4. The NC values, sound pressure level, are based on a room absorption of 10 dB, re 10^{-12} watts and one diffuser.
5. ΔT is the difference between the room air temperature 1 m above the floor and the temperature of the supply air.
6. Proximity to outlet is the minimum distance from an outlet to the occupant in order to achieve the listed DR value.
7. Distances closer to the diffuser have a higher DR than the cataloged value.
8. DR is the predicted percentage of people dissatisfied (PPD) due to draft. A value of less than 20 meets the requirements of ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy.
9. Blanks (--) indicate that the DR is below the specified value at all distances from the diffuser face.
10. DR catalog data is presented for an occupant density of 25 people/100m², which is the default occupancy density for classrooms (ages 5-8) given by ASHRAE 62.1-2004. For other occupant densities, please refer to the DV Room Designer Software.
11. Performance data for standard diffusers not listed in the catalog is available in Price AIO Software.

For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

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Wall Mounted Displacement Diffusers
DF1C Series

Product Information

The **Price DF1C Series** displacement diffusers are designed to produce a low velocity air supply perpendicular to the diffuser face. The DF1C discharges air evenly across its perforated face with minimal turbulence or induction of room air. The cool supply air flows down to the floor level and gradually fills the occupied space. Typically installed at the junction of two walls or in a 90° recess, this appealing diffuser meshes seamlessly into any décor. The superior air quality and low noise levels realized with the DF1C make it suitable for office space, restaurants, supermarkets, theaters, hotels, convention centers, schools, or any application where air quality and occupant comfort demands are high.

Features

Optional inlet location:

- Top inlet location for exposed ductwork or with duct cover option.
- Bottom inlet location for hidden ductwork.
- Field-cut inlet option.
- Ships with protective film on face and inlet.

Construction/Finish

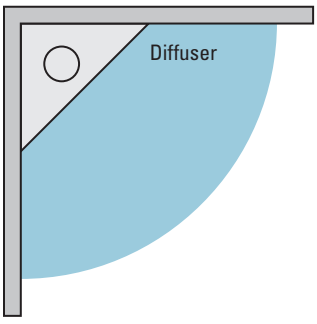
- Diffuser Frame and Equalization Baffle – Aluminum
- Side, Top and Bottom Panels – Coated Steel
- Perforated Front Panel – Coated Steel
- Finish – B12 White (Standard)

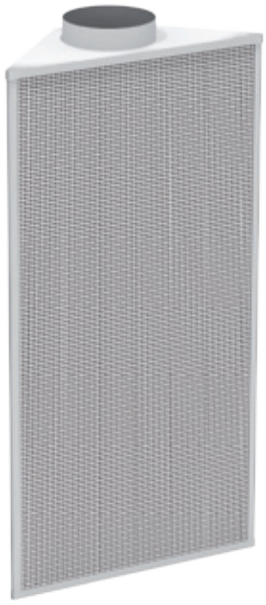
For optional and special finishes see color matrix.

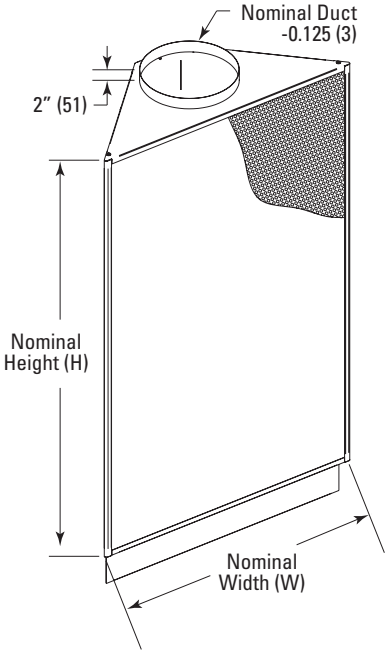
Accessories

- Base
- Duct Covers
- AFSD

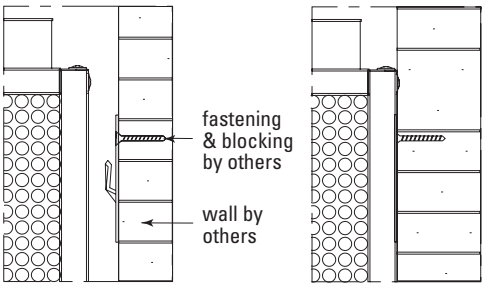
Air Pattern







Surface Mount Detail
Slide Plenum Onto Wall Mount Plate



Dimensional Data - Imperial (inches)/Metric (mm)

W X H	Duct	W X H	Duct
24x24	8	30x60	10
24x36	8	30x72	10
24x48	8	36x24	8
24x60	8	36x24	10
24x72	8	36x24	12
30x24	8	36x36	12
30x24	10	36x48	12
30x36	8	36x60	12
30x36	10	36x72	12
30x48	10		

For a complete list of standard sizes and inlets, refer to www.priceindustries.com/resources/type/literature/submittals

Dimensional Data - Metric (mm)

W X H	Duct
600 x 600	200
600 x 900	200
600 x 1200	200
600 x 1500	200
750 x 600	200, 250
750 x 900	200
750 x 1200	250
750 x 1500	250
750 x 1800	250
900 x 600	200, 250, 315
900 x 900	315
900 x 1500	315
900 x 1800	315

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Performance Data — Imperial Units

Unit Size W x H [in] Face Area [ft²]	Inlet Size [in]	Face Velocity [fpm]	Air Flow [cfm]	Total Pressure [in. w.g.]	Static Pressure [in. w.g.]	Noise Criteria [NC]	Proximity to Outlet [ft] ΔT = 5 °F DR 15%	ΔT = 5 °F DR 20%	ΔT = 10 °F DR 15%	ΔT = 10 °F DR 20%
24 x 24 [3.6]	8	20	71	--	--	--	--	--	2	--
		30	107	0.02	0.01	--	2	--	5	2
		40	142	0.03	0.02	--	4	1	7	4
		50	178	0.04	0.03	--	5	3	8	5
30 X 24 [4.5]	10	20	90	--	--	--	--	--	2	--
		30	135	0.01	--	--	2	--	4	2
		40	180	0.02	0.02	--	4	1	6	3
		50	225	0.04	0.02	--	5	2	8	5
36 x 24 [5.5]	12	20	109	--	--	--	--	--	2	--
		30	164	0.01	--	--	2	--	4	2
		40	218	0.02	0.01	--	3	1	6	3
		50	273	0.03	0.02	--	5	2	8	5
24 x 36 [5.4]	8	20	109	0.01	--	--	3	--	5	2
		30	163	0.02	0.01	--	5	2	8	5
		40	217	0.04	0.02	--	7	4	10	7
		50	272	0.07	0.03	--	9	6	10	12
30 x 36 [6.9]	10	20	138	--	--	--	2	--	5	2
		30	206	0.02	0.01	--	5	2	8	5
		40	275	0.03	0.02	--	7	4	10	7
		50	344	0.05	0.03	--	9	5	12	8
36 x 36 [8.3]	12	20	167	--	--	--	2	--	5	2
		30	250	0.02	--	--	5	2	8	5
		40	333	0.03	0.02	--	7	4	10	7
		50	417	0.04	0.03	--	9	5	12	8
24 x 48 [7.3]	8	20	146	0.01	--	--	5	2	8	5
		30	219	0.03	--	--	8	5	11	7
		40	292	0.06	0.01	--	10	7	13	10
		50	365	0.09	0.02	19	12	8	15	11
30 x 48 [9.3]	10	20	185	0.01	--	--	5	2	7	4
		30	278	0.03	--	--	7	4	10	7
		40	370	0.05	0.02	--	10	6	13	9
		50	463	0.07	0.03	16	11	8	15	11
36 x 48 [11.2]	12	20	224	--	--	--	4	2	7	4
		30	336	0.02	0.01	--	7	4	10	7
		40	448	0.04	0.02	--	9	6	13	9
		50	560	0.06	0.03	--	11	8	15	11
24 x 60 [9.2]	8	20	184	0.02	--	--	7	4	10	6
		30	276	0.04	--	--	10	6	13	9
		40	367	0.07	--	15	12	9	15	12
		50	459	0.11	--	22	14	10	17	14
30 x 60 [11.6]	10	20	233	0.01	--	--	7	3	9	6
		30	349	0.03	--	--	9	6	13	9
		40	465	0.06	0.01	--	12	8	15	12
		50	582	0.09	0.02	19	14	10	17	13
36 x 60 [14.1]	12	20	282	0.01	--	--	6	3	9	6
		30	422	0.03	--	--	9	6	13	9
		40	563	0.05	0.02	--	12	8	15	11
		50	704	0.07	0.02	17	14	10	17	13
24 x 72 [11.1]	8	20	221	0.02	--	--	8	5	12	8
		30	332	0.05	--	--	12	8	15	11
		40	442	0.08	--	18	14	10	17	13
		50	553	0.13	--	25	16	12	19	15
30 x 72 [14]	10	20	280	0.02	--	--	8	5	11	8
		30	420	0.04	--	--	11	8	14	11
		40	560	0.07	--	15	14	10	17	13
		50	700	0.11	--	22	16	12	19	15
36 x 72 [17]	12	20	339	0.01	--	--	8	5	11	8
		30	509	0.03	--	--	11	8	14	11
		40	678	0.06	0.01	--	14	10	17	13
		50	848	0.09	0.02	20	16	12	19	15

Performance Notes:

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8. DR is the predicted percentage of people dissatisfied (PPD) due to draft. A value of less than 20 meets the requirements of ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy.
9. Blanks (--) indicate that the DR is below the specified value at all distances from the diffuser face.
10. DR catalog data is presented for an occupant density of 25 people/1000ft², which is the default occupancy density for classrooms (ages 5-8) given by ASHRAE 62.1-2004. For other occupant densities, please refer to the DV Room Designer Software.
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Performance Data — Metric Units

Unit Size W x H [mm] Face Area [m²]	Inlet Size [mm]	Face Velocity [m/s]	Air Flow [L/s]	Total Pressure [Pa]	Static Pressure [Pa]	Noise Criteria [NC]	Proximity to Outlet [m] ΔT = 2.8 °C DR 15%	ΔT = 2.8 °C DR 20%	ΔT = 5.6 °C DR 15%	ΔT = 5.6 °C DR 20%
600 x 600 [0.3]	200	0.10	35	--	--	--	--	--	0.6	--
		0.15	52	4.5	2.9	--	0.6	--	1.5	0.6
		0.20	70	8.2	5.2	--	1.2	--	2.1	1.2
		0.25	88	12.9	8.2	--	1.5	0.9	2.4	1.5
750 X 600 [0.4]	200	0.10	44	2.5	--	--	--	--	0.6	--
		0.15	66	5.7	3.0	--	0.6	--	1.2	0.6
		0.20	88	10.1	5.4	--	1.2	--	1.8	0.9
		0.25	110	15.8	8.4	--	1.5	0.6	2.4	1.5
900 x 600 [0.5]	315	0.10	53	--	--	--	--	--	0.6	--
		0.15	79	2.7	--	--	0.6	--	1.2	0.6
		0.20	106	4.9	3.8	--	0.9	--	1.8	0.9
		0.25	132	7.6	5.8	--	1.5	0.6	2.4	1.5
600 x 900 [0.5]	200	0.10	53	3.0	--	--	0.9	--	1.5	0.6
		0.15	79	6.7	2.9	--	1.5	0.6	2.4	1.5
		0.20	106	12.1	5.2	--	2.1	1.2	3.0	2.1
		0.25	132	18.7	8.1	--	2.7	1.8	3.0	3.7
750 x 900 [0.6]	250	0.10	67	--	--	--	0.6	--	1.5	0.6
		0.15	100	5.4	2.9	--	1.5	0.6	2.4	1.5
		0.20	133	9.6	5.2	--	2.1	1.2	3.0	2.1
		0.25	166	14.9	8.0	--	2.7	1.5	3.7	2.4
900 x 900 [0.7]	315	0.10	80	--	--	--	0.6	--	1.5	0.6
		0.15	120	4.04	2.61	--	1.5	0.6	2.4	1.5
		0.20	160	7.18	4.6	--	2.1	1.2	3.0	2.1
		0.25	200	11.22	7.3	--	2.7	1.5	3.7	2.4
600 x 1200 [0.7]	315	0.10	71	--	--	--	1.5	0.6	2.4	1.5
		0.15	106	3.6	2.50	--	2.4	1.5	3.4	2.1
		0.20	142	6.5	4.5	--	3.0	2.1	4.0	3.0
		0.25	177	10.1	7.0	--	3.7	2.4	4.6	3.4
750 x 1200 [0.8]	250	0.10	89	3.2	--	--	1.5	0.6	2.1	1.2
		0.15	134	7.2	2.7	--	2.1	1.2	3.0	2.1
		0.20	178	12.6	4.7	--	3.0	1.8	4.0	2.7
		0.25	222	19.6	7.3	--	3.4	2.4	4.6	3.4
900 x 1200 [1.0]	315	0.10	107	--	--	--	1.2	0.6	2.1	1.2
		0.15	160	5.3	2.8	--	2.1	1.2	3.0	2.1
		0.20	214	9.5	4.9	--	2.7	1.8	4.0	2.7
		0.25	268	14.8	7.7	--	3.4	2.4	4.6	3.4
600 x 1500 [0.8]	200	0.10	89	5.0	--	--	2.1	1.2	3.0	1.8
		0.15	133	11.1	--	--	3.0	1.8	4.0	2.7
		0.20	177	19.6	--	--	3.7	2.7	4.6	3.7
		0.25	222	30.9	--	20	4.3	3.0	5.2	4.3
750 x 1500 [1]	250	0.10	111	3.9	--	--	2.1	0.9	2.7	1.8
		0.15	167	8.8	--	--	2.7	1.8	4.0	2.7
		0.20	223	15.7	3.2	--	3.7	2.4	4.6	3.7
		0.25	278	24.3	5.0	17	4.3	3.0	5.2	4.0
900 x 1500 [1.3]	315	0.10	134	2.9	--	--	1.8	0.9	2.7	1.8
		0.15	201	6.6	2.60	--	2.7	1.8	4.0	2.7
		0.20	268	11.7	4.6	--	3.7	2.4	4.6	3.4
		0.25	335	18.3	7.2	--	4.3	3.0	5.2	4.0
600 x 1800 [1.0]	200	0.10	107	5.9	--	--	2.4	1.5	3.7	2.4
		0.15	160	13.2	--	--	3.7	2.4	4.6	3.4
		0.20	213	23.5	--	16	4.3	3.0	5.2	4.0
		0.25	267	36.9	--	23	4.9	3.7	5.8	4.6
750 x 1800 [1.3]	250	0.10	134	4.7	--	--	2.4	1.5	3.4	2.4
		0.15	201	10.5	--	--	3.4	2.4	4.3	3.4
		0.20	268	18.7	--	--	4.3	3.0	5.2	4.0
		0.25	335	29.2	--	20	4.9	3.7	5.8	4.6
900 x 1800 [1.5]	315	0.10	161	3.5	--	--	2.4	1.5	3.4	2.4
		0.15	242	7.9	--	--	3.4	2.4	4.3	3.4
		0.20	322	14.0	3.7	--	4.3	3.0	5.2	4.0
		0.25	403	21.9	5.8	17	4.9	3.7	5.8	4.6

Performance Notes:

1. Sound and pressure drop tested in accordance with ASHRAE Standard 70-2006 "Method of Testing for Rating the Performance of Air Outlets and Inlets."
2. Air flow is in Litres per second, L/s.
3. Pressure is in Pascals, Pa.
4. The NC values, sound pressure level, are based on a room absorption of 10 dB, re 10^{-12} watts and one diffuser.
5. ΔT is the difference between the room air temperature 1 m above the floor and the temperature of the supply air.
6. Proximity to outlet is the minimum distance from an outlet to the occupant in order to achieve the listed DR value.
7. Distances closer to the diffuser have a higher DR than the cataloged value.
8. DR is the predicted percentage of people dissatisfied (PPD) due to draft. A value of less than 20 meets the requirements of ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy.
9. Blanks (--) indicate that the DR is below the specified value at all distances from the diffuser face.
10. DR catalog data is presented for an occupant density of 25 people/100m², which is the default occupancy density for classrooms (ages 5-8) given by ASHRAE 62.1-2004. For other occupant densities, please refer to the DV Room Designer Software.
11. Performance data for standard diffusers not listed in the catalog is available in Price AIO Software.

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DR180 Series

Product Information

Price DR180 Series displacement diffusers are designed to produce a low turbulence horizontal air supply in an 180° pattern. Typically installed against a wall or pillar, the DR180 discharges air evenly across its perforated face. The cool air then drops to the floor and gently floats into the occupied zone. This appealing diffuser meshes seamlessly into any décor, providing a curved detail to the space. The superior air quality and low noise levels realized with the DR180 make it suitable for office spaces, hotels, convention centers, schools or any application where air quality demands are high.

Features

- Optional inlet locations:
  - Top inlet available for use with duct covers.
  - Bottom and rear inlet locations also available.
- Field-cut inlet option.
- Ships with protective film on face and inlet.

Construction/Finish: DR180

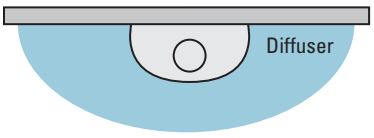
- Diffuser Frame and Equalization Baffle - Aluminum
- Plenum Caps – Rolled Steel
- Perforated Face and Plenum Back – Coated Steel
- Finish – B12 White (Standard)

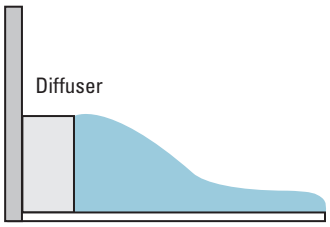
For optional and special finishes see color matrix.

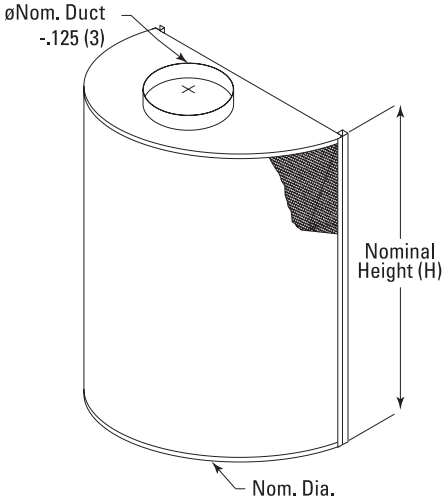
Options

- Base
- Duct Cover
- AFSD

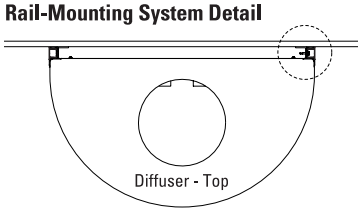
Air Pattern

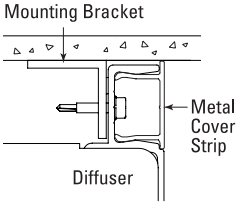






Rail-Mounting System Detail





Dimensional Data - Imperial (inches)

W X H	Duct
18x24	6,7
18x36	6, 7, 10x4
18x48	6, 7, 10x4
24x24	8, 9, 10
24x36	8, 9, 10
24x48	8, 9, 10
24x60	9, 10, 16x5
30x24	8, 10
30x36	8, 10, 12
30x48	10, 12
30x60	10, 12, 20x6
36x24	10, 12
36x36	10, 12, 14, 16
36x48	12, 14, 16
36x60	14, 16
42x36	12, 14, 16
42x48	12, 14, 16
42x60	12, 14, 16
48x36	12, 14, 16
48x48	14, 16
48x60	14, 16

Dimensional Data - Metric (mm)

W X H	Duct
457x600	150, 200
457x900	150, 200,250x100
457x1200	150, 200,250x100
610x600	200, 250
610x900	200, 250
610x1200	200, 250
610x1500	200, 250, 400x150
762x610	200, 250
762x900	200, 250, 315
762x1200	250, 315
762x1500	250, 315, 500x150
915x600	250, 315
915x900	250, 315, 400
915x1200	315, 400
915x1500	400
1067x900	315, 400
1067x1200	315, 400
1067x1500	315, 400
1219x900	315, 400
1219x1200	400
1219x1500	400

For a complete list of standard sizes and inlets, refer to www.priceindustries.com/resources/type/literature/submittals

For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

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Performance Data — Imperial Units

Unit Size W x H [in] Face Area [ft²]	Inlet Size [in]	Face Velocity [fpm]	Air Flow [cfm]	Total Pressure [in. w.g.]	Static Pressure [in. w.g.]	Noise Criteria [NC]	Proximity to Outlet [ft]			
							ΔT = 5 °F		ΔT = 10 °F	
							DR		DR	
							15%	20%	15%	20%
18 x 24 [4.3]	6	20	85	0.02	--	--	1	--	2	1
		30	128	0.05	0.02	--	2	1	5	2
		40	171	0.09	0.04	21	3	1	7	3
		50	213	0.13	0.06	28	5	2	10	5
24 x 24 [5.8]	8	20	115	0.01	--	--	1	--	2	1
		30	173	0.03	0.02	--	2	1	5	2
		40	230	0.05	0.03	--	3	1	7	3
		50	288	0.08	0.04	19	5	2	10	5
30 x 24 [7.2]	8	20	145	0.02	--	--	1	--	2	1
		30	217	0.04	0.02	--	2	1	5	2
		40	290	0.07	0.03	--	3	1	7	3
		50	362	0.12	0.05	18	5	2	10	5
18 x 36 [6.5]	6	20	130	0.04	0.01	--	2	1	4	2
		30	196	0.09	0.02	22	4	2	8	4
	10 x 4	40	261	0.09	0.04	26	6	3	12	6
		50	326	0.14	0.06	34	9	4	17	8
24 x 36 [8.8]	8	20	176	0.02	--	--	2	1	4	2
		30	264	0.05	0.02	--	4	2	8	4
		40	352	0.10	0.03	20	6	3	12	6
		50	440	0.15	0.05	27	9	4	17	8
30 x 36 [11.1]	8	20	221	0.03	--	--	2	1	4	2
	10	30	332	0.04	0.01	--	4	2	8	4
		40	443	0.07	0.03	--	6	3	12	6
		50	554	0.11	0.04	19	9	4	17	8
18 x 48 [8.8]	6	20	175	0.06	--	20	3	1	7	3
		30	263	0.13	0.02	33	6	2	12	6
	10 x 4	40	351	0.14	0.04	36	9	4	18	9
		50	439	0.21	0.06	44	12	6	25	12
24 x 48 [11.8]	8	20	237	0.04	--	--	3	1	7	3
		30	355	0.08	0.02	19	6	2	12	6
	9	40	473	0.10	0.03	25	9	4	18	9
		50	592	0.16	0.05	32	12	6	25	12
30 x 48 [14.9]	10	20	298	0.03	--	--	3	1	7	3
		30	447	0.06	0.02	--	6	2	12	6
		40	596	0.10	0.03	19	9	4	18	9
	12	50	745	0.09	0.04	21	12	6	25	12
24 x 60 [14.9]	9	20	297	0.03	--	--	4	2	9	4
		30	446	0.08	0.01	23	8	4	16	8
	16 x 5	40	595	0.10	0.03	28	12	6	24	12
		50	744	0.15	0.04	36	17	8	31	16
30 x 60 [18.7]	12	20	374	0.02	--	--	4	2	9	4
		30	561	0.04	0.01	--	8	4	16	8
		40	749	0.08	0.02	19	12	6	24	12
		50	936	0.12	0.04	27	17	8	31	16
	20 x 6	40	749	0.07	0.02	18	12	6	24	12
		50	936	0.11	0.04	26	17	8	31	16

Performance Notes:

1. Sound and pressure drop tested in accordance with ASHRAE Standard 70-2006 "Method of Testing for Rating the Performance of Air Outlets and Inlets."
2. Air flow is in cubic feet per minute, cfm.
3. Pressure is in inches of water, in. w.g.
4. The NC values, sound pressure level, are based on a room absorption of 10 dB, re 10^{-12} watts and one diffuser.
5. ΔT is the difference between the room air temperature 3 ½ ft above the floor and the temperature of the supply air.
6. Proximity to outlet is the minimum distance from an outlet to the occupant in order to achieve the listed DR value.
7. Distances closer to the diffuser have a higher DR than the cataloged value.
8. DR is the predicted percentage of people dissatisfied (PPD) due to draft. A value of less than 20 meets the requirements of ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy.
9. Blanks (--) indicate that the DR is below the specified value at all distances from the diffuser face.
10. DR catalog data is presented for an occupant density of 25 people/1000ft², which is the default occupancy density for classrooms (ages 5-8) given by ASHRAE 62.1-2004. For other occupant densities, please refer to the DV Room Designer Software.
11. Performance data for standard diffusers not listed in the catalog is available in Price AIO Software.

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Performance Data — Metric Units

Unit Size W x H [in] Face Area [m²]	Inlet Size [mm]	Face Velocity [m/s]	Air Flow [L/s]	Total Pressure [Pa]	Static Pressure [Pa]	Noise Criteria [NC]	Proximity to Outlet [m]			
							ΔT = 2.8 °C		ΔT = 5.6 °C	
							DR		DR	
							15%	20%	15%	20%
457 x 600 [0.39]	150	0.10	40	5.4	--	--	0.3	--	0.6	0.3
		0.15	59	12.3	5.5	--	0.6	0.3	1.5	0.6
		0.20	79	21.8	9.7	21	0.9	0.3	2.1	0.9
		0.25	99	34.0	15.1	28	1.5	0.6	3.0	1.5
610 x 600 [0.53]	200	0.10	53	3.5	--	--	0.3	--	0.6	0.3
		0.15	80	7.8	3.9	--	0.6	0.3	1.5	0.6
		0.20	107	13.8	6.9	--	0.9	0.3	2.1	0.9
		0.25	134	21.6	10.7	19	1.5	0.6	3.0	1.5
762 x 600 [0.66]	200	0.10	67	4.7	--	--	0.3	--	0.6	0.3
		0.15	101	10.6	4.4	--	0.6	0.3	1.5	0.6
		0.20	135	18.9	7.9	--	0.9	0.3	2.1	0.9
		0.25	168	29.5	12.3	18	1.5	0.6	3.0	1.5
457 x 900 [0.6]	150	0.10	60	9.7	2.6	--	0.6	0.3	1.2	0.6
		0.15	91	21.8	5.9	22	1.2	0.6	2.4	1.2
	250 x 100	0.20	121	23.1	9.0	26	1.8	0.9	3.7	1.8
		0.25	151	36.0	14.0	34	2.7	1.2	5.2	2.4
610 x 900 [0.8]	200	0.10	82	6.2	--	--	0.6	0.3	1.2	0.6
		0.15	123	13.8	4.7	--	1.2	0.6	2.4	1.2
		0.20	163	24.6	8.4	20	1.8	0.9	3.7	1.8
		0.25	204	38.4	13.1	28	2.7	1.2	5.2	2.4
762 x 900 [1.01]	200	0.10	103	8.4	--	--	0.6	0.3	1.2	0.6
	250	0.15	154	9.7	3.8	--	1.2	0.6	2.4	1.2
		0.20	206	17.2	6.7	--	1.8	0.9	3.7	1.8
		0.25	257	26.9	10.5	20	2.7	1.2	5.2	2.4
457 x 1200 [0.8]	150	0.10	82	14.5	--	20	0.9	0.3	2.1	0.9
		0.15	122	19.4	5.1	27	1.8	0.6	3.7	1.8
	250 x 100	0.20	163	34.5	9.0	36	2.7	1.2	5.5	2.7
		0.25	204	54.0	14.1	44	3.7	1.8	7.6	3.7
610 x12009 [1.08]	200	0.10	110	9.2	--	--	0.9	0.3	2.1	0.9
		0.15	165	20.7	4.2	19	1.8	0.6	3.7	1.8
	250	0.20	220	18.9	6.8	21	2.7	1.2	5.5	2.7
		0.25	275	29.5	10.7	29	3.7	1.8	7.6	3.7
762 x 1200 [1.36]	250	0.10	138	6.5	--	--	0.9	0.3	2.1	0.9
		0.15	208	14.5	3.8	--	1.8	0.6	3.7	1.8
		0.20	277	25.8	6.7	19	2.7	1.2	5.5	2.7
	315	0.25	346	20.2	8.3	19	3.7	1.8	7.6	3.7
610 x 1200 [1.08]	250	0.10	110	4.7	--	--	1.2	0.6	2.7	1.2
		0.15	165	10.6	3.8	--	2.4	1.2	4.9	2.4
	400 x 150	0.20	220	14.0	5.9	18	3.7	1.8	7.3	3.7
		0.25	275	21.8	9.2	26	5.2	2.4	9.4	4.9
762 x 1500 [1.71]	315	0.10	174	4.4	--	--	1.2	0.6	2.7	1.2
		0.15	261	9.9	3.2	--	2.4	1.2	4.9	2.4
		0.20	348	17.6	5.7	18	3.7	1.8	7.3	3.7
		0.25	435	27.5	8.8	25	5.2	2.4	9.4	4.9
	508 x 152	0.20	348	18.7	5.7	18	3.7	1.8	7.3	3.7
		0.25	435	29.2	9.0	26	5.2	2.4	9.4	4.9

Performance Notes:

1. Sound and pressure drop tested in accordance with ASHRAE Standard 70-2006 "Method of Testing for Rating the Performance of Air Outlets and Inlets."
2. Air flow is in Litres per second, L/s.
3. Pressure is in Pascals, Pa.
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8. DR is the predicted percentage of people dissatisfied (PPD) due to draft. A value of less than 20 meets the requirements of ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy.
9. Blanks (--) indicate that the DR is below the specified value at all distances from the diffuser face.
10. DR catalog data is presented for an occupant density of 25 people/100m², which is the default occupancy density for classrooms (ages 5-8) given by ASHRAE 62.1-2004. For other occupant densities, please refer to the DV Room Designer Software.
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For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

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DR180U Series

Product Information

Price DR180U Series displacement diffusers produce a low turbulence horizontal air supply in an 180° pattern. Due to its shape, the DR180U can accommodate large inlets and can handle higher flows than a standard DR180. Typically installed against a wall or pillar, this unit has a seamless curved front and makes an appealing addition to any decor.

The superior air quality and low noise levels realized with the DR180U make it suitable for office spaces, hotels, convention centers, schools or any application where air quality demands are high. The DR180U is constructed of a perforated steel face and with a solid steel back, top and bottom. With the option of both top and rear ducted units, as well as its optional bases or duct covers, the DR180U can adapt to be part of any interior design.

Features

- Top inlet available for use with duct covers.
- Bottom and rear inlets also available
- Ships with protective film. on face and inlet.

Construction/Finish: DR180U

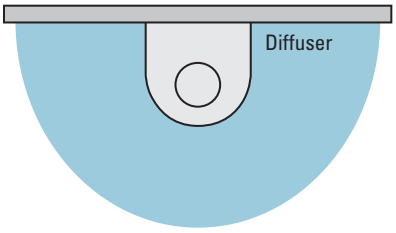
- Diffuser Frame and Equalization Baffle - Aluminium
- Plenum Caps and Perforated Face – Rolled Steel
- Plenum Back – Coated Steel
- Finish – B12 White (Standard)

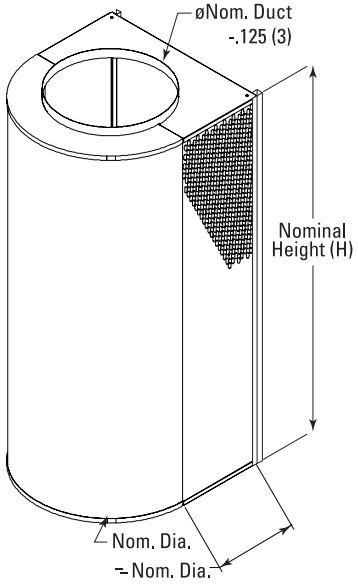
For optional and special finishes see color matrix.

Accessories

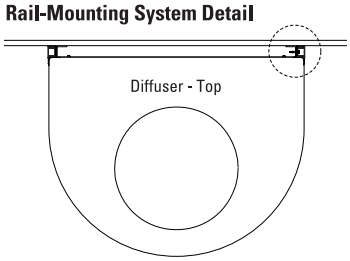
- Base
- Duct Cover
- AFSD flow sensor/damper

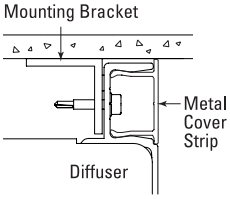
Air Pattern





Rail-Mounting System Detail





Dimensional Data - Imperial (inches)

		Height*	
Diameter	Duct	Min.	Max.
18	10, 12	24	60
24	16	24	60
30	20	24	60
36	24	24	60

*Standard heights available in 1" increments

Dimensional Data - Metric (mm)

		Height*	
Diameter	Duct	Min.	Max.
457	250, 315	600	1500
610	400	600	1500
762	500	600	1500
914	600	600	1500

*Standard heights available in 25 mm increments

For a complete list of standard sizes and inlets, refer to www.priceindustries.com/resources/type/literature/submittals

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Performance Data — Imperial Units

Unit Size W x H [in] Face Area [ft²]	Inlet Size [in]	Face Velocity [fpm]	Air Flow [cfm]	Total Pressure [in. w.g.]	Static Pressure [in. w.g.]	Noise Criteria [NC]	Proximity to Outlet [ft]			
							ΔT = 5 °F		ΔT = 10 °F	
							DR		DR	
							15%	20%	15%	20%
18 x 36 [10.86]	12	20	217	0.01	--	--	2	1	3	2
		30	326	0.02	0.01	--	3	2	4	2
		40	434	0.04	0.03	--	3	2	5	3
		50	543	0.07	0.04	21	4	2	6	4
24 x 36 [14.58]	16	20	292	0.01	--	--	2	1	3	2
		30	437	0.02	0.01	--	3	2	4	2
		40	583	0.03	0.02	--	3	2	5	3
		50	729	0.05	0.03	17	4	2	6	4
30 x 36 [22.03]	20	20	366	0.01	--	--	2	1	3	2
		30	549	0.01	--	--	3	2	4	2
		40	732	0.02	0.01	--	3	2	5	3
		50	915	0.03	0.02	--	4	2	6	4
36 x 36 [22.03]	24	20	441	0.00	--	--	2	1	3	2
		30	661	0.01	--	--	3	2	4	2
		40	881	0.02	0.01	--	3	2	5	3
		50	1101	0.03	0.02	--	4	2	6	4
18 x 48 [14.61]	12	20	292	0.01	--	--	3	2	4	2
		30	438	0.03	0.01	--	4	2	5	3
		40	585	0.06	0.02	18	5	3	7	4
		50	731	0.09	0.03	25	6	4	8	5
24 x 48 [19.62]	16	20	392	0.01	--	--	3	2	4	2
		30	589	0.02	0.01	--	4	2	5	3
		40	785	0.04	0.02	--	5	3	7	4
		50	981	0.06	0.03	20	6	4	8	5
30 x 48 [24.62]	20	20	492	0.01	--	--	3	2	4	2
		30	739	0.02	0.01	--	4	2	5	3
		40	985	0.03	0.02	--	5	3	6	4
		50	1231	0.05	0.03	--	6	4	8	5
18 x 60 [18.36]	12	20	367	0.01	--	--	3	2	4	3
		30	551	0.03	--	--	5	3	6	4
		40	735	0.06	--	20	6	4	8	5
		50	918	0.09	--	27	7	5	10	7
24 x 60 [24.65]	16	20	493	0.01	--	--	3	2	4	3
		30	740	0.03	--	--	5	3	6	4
		40	986	0.05	0.02	--	6	4	8	5
		50	1233	0.08	0.03	20	7	5	10	7

Performance Notes:

1. Sound and pressure drop tested in accordance with ASHRAE Standard 70-2006 "Method of Testing for Rating the Performance of Air Outlets and Inlets."
2. Air flow is in cubic feet per minute, cfm.
3. Pressure is in inches of water, in. w.g.
4. The NC values, sound pressure level, are based on a room absorption of 10 dB, re 10^{-12} watts and one diffuser.
5. ΔT is the difference between the room air temperature 3 ½ ft above the floor and the temperature of the supply air.
6. Proximity to outlet is the minimum distance from an outlet to the occupant in order to achieve the listed DR value.
7. Distances closer to the diffuser have a higher DR than the cataloged value.
8. DR is the predicted percentage of people dissatisfied (PPD) due to draft. A value of less than 20 meets the requirements of ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy.
9. Blanks (--) indicate that the DR is below the specified value at all distances from the diffuser face.
10. DR catalog data is presented for an occupant density of 25 people/1000ft², which is the default occupancy density for classrooms (ages 5-8) given by ASHRAE 62.1-2004. For other occupant densities, please refer to the DV Room Designer Software.
11. Performance data for standard diffusers not listed in the catalog is available in Price AIO Software.

For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

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Performance Data — Metric Units

Unit Size W x H [mm] Face Area [m²]	Inlet Size [mm]	Face Velocity [m/s]	Air Flow [L/s]	Total Pressure [Pa]	Static Pressure [Pa]	Noise Criteria [NC]	Proximity to Outlet [m]			
							ΔT = 2.8 °C		ΔT = 5.6 °C	
							DR		DR	
							15%	20%	15%	20%
457 x 900 [0.99]	315	0.10	99	--	--	--	0.6	0.3	0.9	0.6
		0.15	149	5.44	3.25	--	0.9	0.6	1.2	0.6
		0.20	199	9.68	5.77	--	0.9	0.6	1.5	0.9
		0.25	248	15.12	9.02	21	1.2	0.6	1.8	1.2
610 x 900 [1.41]	400	0.10	141	--	--	--	0.6	0.3	0.9	0.6
		0.15	212	4.45	2.75	--	0.9	0.6	1.2	0.6
		0.20	282	7.92	4.89	--	0.9	0.6	1.5	0.9
		0.25	353	12.37	7.64	17	1.2	0.6	1.8	1.2
762 x 900 [1.76]	500	0.10	176	--	--	--	0.6	0.3	0.9	0.6
		0.15	264	3.25	--	--	0.9	0.6	1.2	0.6
		0.20	353	5.78	3.84	--	0.9	0.6	1.5	0.9
		0.25	441	9.03	6.01	--	1.2	0.6	1.8	1.2
915 x 900 [2.12]	600	0.10	212	--	--	--	0.6	0.3	0.9	0.6
		0.15	317	--	--	--	0.9	0.6	1.2	0.6
		0.20	423	4.42	3.07	--	0.9	0.6	1.5	0.9
		0.25	529	6.91	4.80	--	1.2	0.6	1.8	1.2
457 x 1200 [1.41]	315	0.10	141	3.29	--	--	0.9	0.6	1.2	0.6
		0.15	212	7.39	2.97	--	1.2	0.6	1.5	0.9
		0.20	282	13.15	5.27	18	1.5	0.9	2.1	1.2
		0.25	353	20.54	8.24	25	1.8	1.2	2.4	1.5
610 x1200 [1.88]	400	0.10	188	2.63	--	--	0.9	0.6	1.2	0.6
		0.15	282	5.91	2.88	--	1.2	0.6	1.5	0.9
		0.20	376	10.50	5.12	--	1.5	0.9	2.1	1.2
		0.25	470	16.41	8.00	20	1.8	1.2	2.4	1.5
762 x 1200 [2.35]	500	0.10	235	--	--	--	0.9	0.6	1.2	0.6
		0.15	353	4.50	2.56	--	1.2	0.6	1.5	0.9
		0.20	470	7.99	4.55	--	1.5	0.9	1.8	1.2
		0.25	588	12.49	7.11	--	1.8	1.2	2.4	1.5
457 x 1500 [1.76]	315	0.10	176	3.55	--	--	0.9	0.6	1.2	0.9
		0.15	264	7.99	--	--	1.5	0.9	1.8	1.2
		0.20	353	14.20	--	20	1.8	1.2	2.4	1.5
		0.25	441	22.19	2.98	27	2.1	1.5	3.0	2.1
600 x 1500 [2.35]	400	0.10	235	3.02	--	--	0.9	0.6	1.2	0.9
		0.15	353	6.80	--	--	1.5	0.9	1.8	1.2
		0.20	470	12.08	3.67	--	1.8	1.2	2.4	1.5
		0.25	588	18.88	5.74	20	2.1	1.5	3.0	2.1

Performance Notes:

1. Sound and pressure drop tested in accordance with ASHRAE Standard 70-2006 "Method of Testing for Rating the Performance of Air Outlets and Inlets."
2. Air flow is in Litres per second, L/s.
3. Pressure is in Pascals, Pa.
4. The NC values, sound pressure level, are based on a room absorption of 10 dB, re 10^{-12} watts and one diffuser.
5. ΔT is the difference between the room air temperature 1 m above the floor and the temperature of the supply air.
6. Proximity to outlet is the minimum distance from an outlet to the occupant in order to achieve the listed DR value.
7. Distances closer to the diffuser have a higher DR than the cataloged value.
8. DR is the predicted percentage of people dissatisfied (PPD) due to draft. A value of less than 20 meets the requirements of ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy.
9. Blanks (--) indicate that the DR is below the specified value at all distances from the diffuser face.
10. DR catalog data is presented for an occupant density of 25 people/100m², which is the default occupancy density for classrooms (ages 5-8) given by ASHRAE 62.1-2004. For other occupant densities, please refer to the DV Room Designer Software.
11. Performance data for standard diffusers not listed in the catalog is available in Price AIO Software.

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DR90 Series

Product Information

Price DR90 Series displacement diffusers are designed to produce a low turbulence horizontal air supply in a 90° pattern. Typically installed at the joining of two walls or in a 90° recess, the DR90 discharges air evenly across its perforated face. The cool air then drops to the floor and gently floats into the occupied zone in a layer 2-5" thick. This appealing diffuser meshes seamlessly into any décor, providing a curved detail to the space. The superior air quality and low noise levels realized with the DR90 make it suitable for office space, hotels, convention centers, schools, or any application where air quality demands are high.

Features

- Top inlet option for use with duct covers.
- Bottom inlet option for bottom duct connection.
- Field-cut inlet option available.
- Ships with protective film on face and inlet.

Construction/Finish: DR90

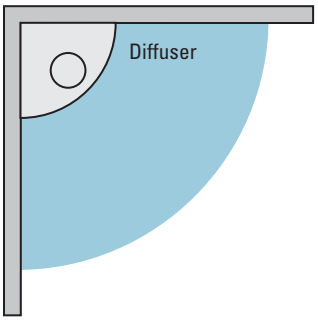
- Diffuser Frame and Equalization Baffle – Aluminum
- Plenum Caps – Rolled Steel
- Perforated Face and Plenum Back – Coated Steel
- Finish – B12 White (Standard)

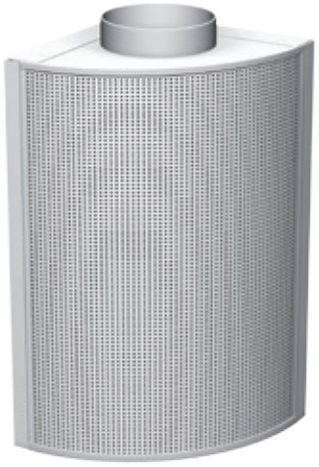
For optional and special finishes see color matrix.

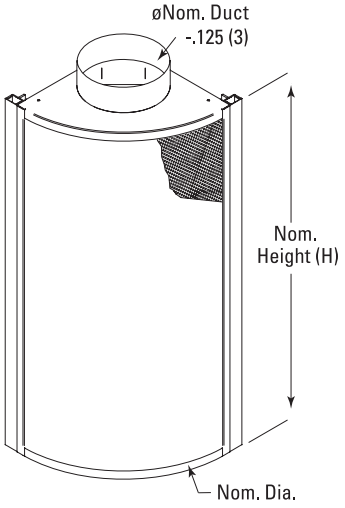
Accessories

- Base
- Duct Covers
- AFSD

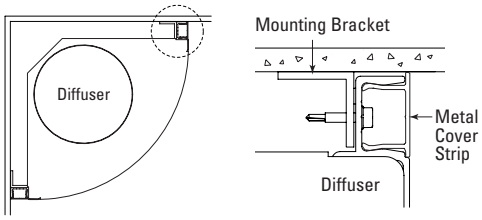
Air Pattern







Rail-Mounting System Detail



Dimensional Data - Imperial (inches)

Dia. X H	Duct
18x24	6,7
18x36	6, 7, 10x4
18x48	6, 7, 10x4
24x24	8, 9, 10
24x36	8, 9, 10
24x48	8, 9, 10
24x60	9, 10, 16x5
30x24	8, 10
30x36	8, 10, 12
30x48	10, 12
30x60	10, 12, 20x6
36x24	10, 12
36x36	10, 12, 14, 16
36x48	12, 14, 16
36x60	14, 16
42x36	12, 14, 16
42x48	12, 14, 16
42x60	12, 14, 16
48x36	12, 14, 16
48x48	14, 16
48x60	14, 16

Dimensional Data - Metric (mm)

Dia. X H	Duct
457 x 600	100
457 x 900	100
610 x 600	150
610 x 900	150
610 x 1200	150
610 x 1500	150
762 x 600	200
762 x 900	200
762 x 1200	200
762 x 1500	200
915 x 610	250, 315
915 x 900	250, 315
915 x 1200	250, 315
915 x 1500	250, 315
1067 x 1200	315
1067 x 1500	315
1219 x 1200	400
1219 x 1500	400
1219x900	315, 400
1219x1200	400
1219x1500	400

For a complete list of standard sizes and inlets, refer to www.priceindustries.com/resources/type/literature/submittals

For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

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Performance Data — Imperial Units

Unit Size Dia. x H [in] Face Area [ft²]	Inlet Size [in]	Face Velocity [fpm]	Air Flow [cfm]	Total Pressure [in. w.g.]	Static Pressure [in. w.g.]	Noise Criteria [NC]	Proximity to Outlet [ft]			
							ΔT = 5°F		ΔT = 10°F	
							DR		DR	
							15%	20%	15%	20%
18 x 24 [2]	4	20	41	0.03	0.01	--	1	--	3	2
		30	61	0.06	0.03	--	2	1	4	2
		40	81	0.10	0.05	19	2	1	6	3
		50	102	0.16	0.08	26	3	1	8	4
24 x 24 [2.8]	6	20	56	0.01	--	--	1	--	3	1
		30	83	0.03	0.02	--	2	1	5	2
		40	111	0.06	0.04	--	3	2	7	3
		50	139	0.09	0.06	17	4	2	9	4
30 x 24 [3.5]	8	20	70	0.01	--	--	1	--	3	1
		30	106	0.02	0.02	--	3	1	5	3
		40	141	0.04	0.03	--	3	2	8	4
		50	176	0.06	0.04	--	5	2	10	5
18 x 36 [3.1]	4	20	62	0.03	--	--	2	--	4	2
		30	93	0.06	--	16	3	1	6	3
		40	124	0.11	--	25	4	2	9	4
		50	155	0.18	--	33	5	2	11	6
24 x 36 [4.2]	6	20	85	0.02	0.01	--	2	1	4	2
		30	127	0.05	0.02	--	4	2	7	3
		40	170	0.09	0.04	16	5	2	10	5
		50	212	0.14	0.07	23	7	3	13	7
30 x 36 [5.4]	8	20	108	0.02	--	--	2	1	5	2
		30	162	0.04	0.02	--	4	2	8	4
		40	215	0.06	0.04	--	6	3	11	6
		50	269	0.10	0.06	17	7	4	15	8
24 x 48 [5.7]	6	20	114	0.03	--	--	2	1	6	3
		30	171	0.06	0.01	--	4	2	9	5
		40	229	0.10	0.02	20	7	3	13	7
		50	286	0.16	0.03	28	9	4	18	10
30 x 48 [7.2]	8	20	145	0.02	0.01	--	3	1	7	3
		30	217	0.05	0.02	--	5	2	11	6
		40	290	0.08	0.04	--	8	4	15	8
		50	362	0.13	0.06	21	10	5	20	11
24 x 60 [7.2]	6	20	144	0.02	--	--	3	2	7	3
		30	215	0.05	--	--	6	3	12	6
		40	287	0.09	--	24	8	4	17	9
		50	359	0.15	--	31	11	6	22	12
30 x 60 [9.1]	8	20	182	0.02	--	--	4	2	8	4
		30	273	0.05	0.02	--	7	3	14	7
		40	364	0.09	0.03	17	9	5	19	10
		50	455	0.15	0.04	24	13	7	25	14

Performance Notes:

1. Sound and pressure drop tested in accordance with ASHRAE Standard 70-2006 "Method of Testing for Rating the Performance of Air Outlets and Inlets."
2. Air flow is in cubic feet per minute, cfm.
3. Pressure is in inches of water, in. w.g.
4. The NC values, sound pressure level, are based on a room absorption of 10 dB, re 10^{-12} watts and one diffuser.
5. ΔT is the difference between the room air temperature 3 ½ ft above the floor and the temperature of the supply air.
6. Proximity to outlet is the minimum distance from an outlet to the occupant in order to achieve the listed DR value.
7. Distances closer to the diffuser have a higher DR than the cataloged value.
8. DR is the predicted percentage of people dissatisfied (PPD) due to draft. A value of less than 20 meets the requirements of ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy.
9. Blanks (--) indicate that the DR is below the specified value at all distances from the diffuser face.
10. DR catalog data is presented for an occupant density of 25 people/1000ft², which is the default occupancy density for classrooms (ages 5-8) given by ASHRAE 62.1-2004. For other occupant densities, please refer to the DV Room Designer Software.
11. Performance data for standard diffusers not listed in the catalog is available in Price AIO Software.

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Performance Data — Metric Units

Unit Size Dia. x H [mm] Face Area [m²]	Inlet Size [mm]	Face Velocity [m/s]	Air Flow [L/s]	Total Pressure [Pa]	Static Pressure [Pa]	Noise Criteria [NC]	Proximity to Outlet [m]			
							ΔT = 2.8 °C		ΔT = 5.6 °C	
							DR		DR	
							15%	20%	15%	20%
457 x 600 [0.19]	100	0.10	19	6.5	3.0	--	0.3	--	0.9	0.6
		0.15	28	14.6	6.8	--	0.6	0.3	1.2	0.6
		0.20	38	25.9	12.0	19	0.6	0.3	1.8	0.9
		0.25	47	40.5	18.8	26	0.9	0.3	2.4	1.2
610 x 600 [0.25]	150	0.10	26	3.7	--	--	0.3	--	0.9	0.3
		0.15	39	8.4	5.5	--	0.6	0.3	1.5	0.6
		0.20	51	14.9	9.7	--	0.9	0.6	2.1	0.9
		0.25	65	23.2	15.2	17	1.2	0.6	2.7	1.2
762 x 600 [0.32]	200	0.10	33	2.3	--	--	0.3	--	0.9	0.3
		0.15	49	5.3	3.8	--	0.9	0.3	1.5	0.9
		0.20	66	9.4	6.8	--	0.9	0.6	2.4	1.2
		0.25	82	14.7	10.6	--	1.5	0.6	3.0	1.5
457 x 900 [0.28]	100	0.10	29	7.0	--	--	0.6	--	1.2	0.6
		0.15	43	15.8	--	16	0.9	0.3	1.8	0.9
		0.20	58	28.1	--	25	1.2	0.6	2.7	1.2
		0.25	72	43.9	--	33	1.5	0.6	3.4	1.8
610 x 900 [0.39]	150	0.10	40	5.7	2.7	--	0.6	0.3	1.2	0.6
		0.15	59	12.8	6.1	--	1.2	0.6	2.1	0.9
		0.20	79	22.8	10.8	16	1.5	0.6	3.0	1.5
		0.25	99	35.6	16.9	23	2.1	0.9	4.0	2.1
762 x 900 [0.49]	200	0.10	50	4.0	--	--	0.6	0.3	1.5	0.6
		0.15	75	8.9	5.5	--	1.2	0.6	2.4	1.2
		0.20	100	15.8	9.7	--	1.8	0.9	3.4	1.8
		0.25	125	24.7	15.2	17	2.1	1.2	4.6	2.4
610 x 1200 [0.52]	150	0.10	53	6.5	--	--	0.6	0.3	1.8	0.9
		0.15	80	14.7	--	--	1.2	0.6	2.7	1.5
		0.20	106	26.1	4.4	20	2.1	0.9	4.0	2.1
		0.25	133	40.7	6.9	28	2.7	1.2	5.5	3.0
762 x 1200 [0.66]	200	0.10	67	5.2	--	--	0.9	0.3	2.1	0.9
		0.15	101	11.8	5.6	--	1.5	0.6	3.4	1.8
		0.20	135	21.0	9.9	--	2.4	1.2	4.6	2.4
		0.25	168	32.8	15.5	21	3.0	1.5	6.1	3.4
610 x 1500 [0.66]	150	0.10	67	5.7	--	--	0.9	0.6	2.1	0.9
		0.15	100	12.8	--	--	1.8	0.9	3.7	1.8
		0.20	134	22.8	--	24	2.4	1.2	5.2	2.7
		0.25	167	35.6	--	31	3.4	1.8	6.7	3.7
762 x 1500 [0.83]	200	0.10	84	5.9	--	--	1.2	0.6	2.4	1.2
		0.15	127	13.4	3.6	--	2.1	0.9	4.3	2.1
		0.20	169	23.4	7.1	17	2.7	1.5	5.8	3.0
		0.25	211	36.6	11.0	24	4.0	2.1	7.6	4.3

Performance Notes:

1. Sound and pressure drop tested in accordance with ASHRAE Standard 70-2006 "Method of Testing for Rating the Performance of Air Outlets and Inlets."
2. Air flow is in Litres per second, L/s.
3. Pressure is in Pascals, Pa.
4. The NC values, sound pressure level, are based on a room absorption of 10 dB, re 10^{-12} watts and one diffuser.
5. ΔT is the difference between the room air temperature 1 m above the floor and the temperature of the supply air.
6. Proximity to outlet is the minimum distance from an outlet to the occupant in order to achieve the listed DR value.
7. Distances closer to the diffuser have a higher DR than the cataloged value.
8. DR is the predicted percentage of people dissatisfied (PPD) due to draft. A value of less than 20 meets the requirements of ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy.
9. Blanks (--) indicate that the DR is below the specified value at all distances from the diffuser face.
10. DR catalog data is presented for an occupant density of 25 people/100m², which is the default occupancy density for classrooms (ages 5-8) given by ASHRAE 62.1-2004. For other occupant densities, please refer to the DV Room Designer Software.
11. Performance data for standard diffusers not listed in the catalog is available in Price AIO Software.

For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

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Duct Covers

Product Information

Price Duct Covers for displacement diffusers provide a consistent look from floor to ceiling. These products continue the appearance of the diffuser while concealing the duct work for an architecturally appealing installation. Duct covers can be supplied in solid steel or perforated material to match the diffuser face. When using a perforated duct cover, the ductwork can be painted black for a finished look. The duct cover is available in varying lengths and can be split into multiple sections to create a symmetric look with the diffuser. These units are perfect for top ducted diffusers where exposed ductwork is not desired, such as hotel lobbies, office boardrooms, schools, and restaurants. See specific product for availability.

Features

- Seamless construction.
- Matches corresponding product design.
- Variable height to match look of diffuser and fit into any room height.
- Duct covers for DF1, DF3, DR90, DR180, and DR180U:
  - Ship assembled from factory.
  - Use rail-mounting method.
- Available with protective film.

Construction/Finish

- Face – 21 Gauge steel
- Support Extrusion (where required) – Aluminum
- Finish – B12 White (Standard)

For optional and special finishes see color matrix.

Options

- Solid steel duct cover.
- Perforated steel duct cover.

Sizes

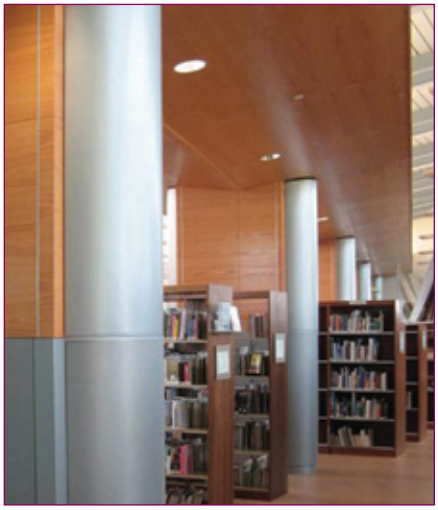
- Width, radius/diameter, depth are all based on diffuser.
- Support extrusion (where required) - Aluminum.

Duct Covers are available for:

- DF1
- DF3
- DF1C
- DR90
- DR180
- DR180U

Duct Cover for DR180

Duct Cover for DF1



For a complete list of standard sizes and inlets, refer to www.priceindustries.com/resources/type/literature/submittals

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Bases

Product Information

Price Bases for displacement diffusers allow the diffuser to be installed above floor level, creating a look that is consistent with the existing décor. These products continue the look of base board heights and provide access to bottom ducted units for easier installation. The base also provides protection from damage or moisture during cleaning. The base is available in varying lengths and is inset from the face of the diffuser by 1 inch (25 mm). The easy installation of the product allows it to be ordered with a displacement unit or as a secondary order if the look is required after the original diffuser's installation. See specific product for availablity.

Features

- Seamless construction.
- Matches corresponding product design.
- Variable height to match desired look of diffuser.
- Ships with protective film.

Construction/Finish

- Face – 21 Gauge steel
- Legs – Extruded Aluminum
- Finish – B12 White (Standard)

For optional and special finishes see color matrix.

Sizes

- Width, radius/diameter, depth are all based on diffuser ordered.
- Height ranges from 2″ to 6″ (50mm to 150mm).

Bases are available for:

- DF1
- DF3
- DF1C
- DR90
- DR180
- DR180U
- DR360

Base for DR180

Base for DF1

For a complete list of standard sizes and inlets, refer to www.priceindustries.com/resources/type/literature/submittals

For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

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AFSD Series

Product Information

The **PRICE AFSD** (Air Flow Sensing Device) is a flow measuring station combined with an adjustable damper whereby the air volume can be adjusted. The SP300 multi-point sensor ensures accurate pressure measurement, allowing the balancer to monitor the velocity pressure in the duct. The integral manually operated damper with quarter-lock allows for adjustment until the desired flow rate is obtained. A label on the side provides indication of the air flow for a given velocity pressure.The AFSD is specifically designed to operate with displacement ventilation systems to help balance downstream pressure and help in supplying optimum flow rate to the diffuser.

Features

- SP300 multi-point flow sensor designed to maintain control accuracy independent of field installation conditions.
- Gauge taps for flow measurement and balancing.
- Inlet and outlet connection bead offers a means for secure flex duct connections.

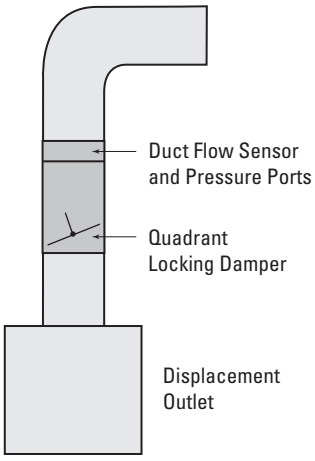
Construction/Finish

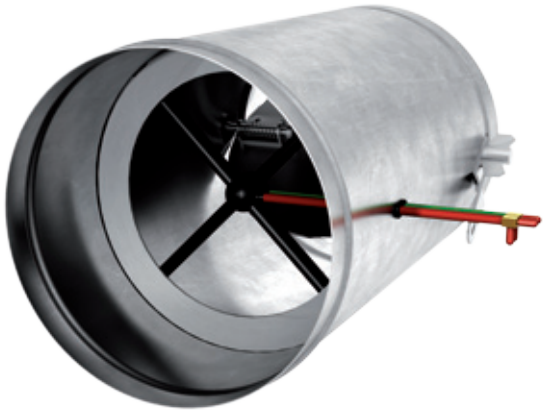
- Housing and Damper – 22 Galvanized Steel
- Air Flow Sensor – Plastic
- Galvanized Steel
- Label provides indication of air flow for a given velocity pressure

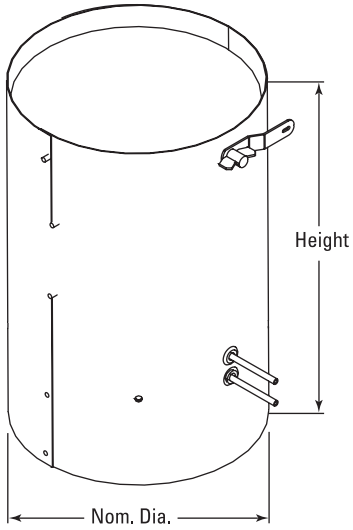
Sizes

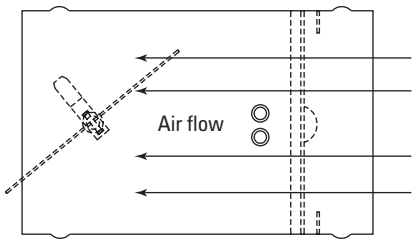
- 6" to 16" diameter (150mm to 400mm).

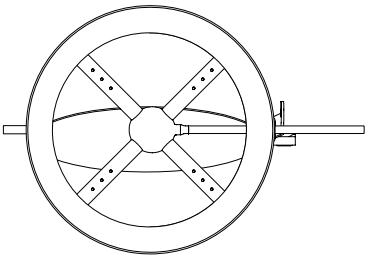
Air Flow











Dimensional Data - Imperial (inches)

Nom. Diameter X H
5 x 14
6 x14
8 x 14
10x14
14x15
16x15

Dimensional Data - Metric (mm)

Nom. Diameter X H
457 x 610
457 x 915
610 x 610
610 x 915
610 x 1524
762 x 610

For a complete list of standard sizes and inlets, refer to www.priceindustries.com/resources/type/literature/submittals

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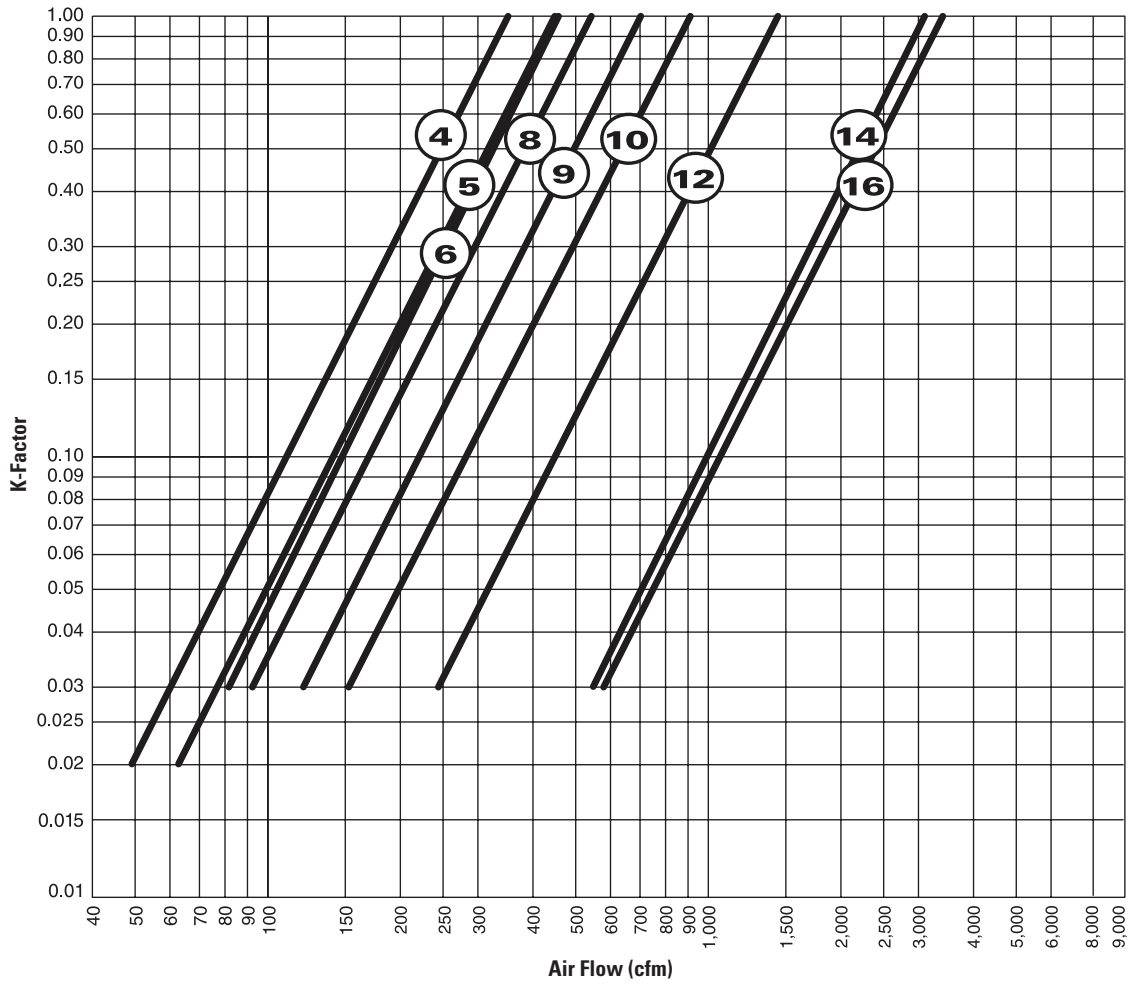
Performance Data



Performance Notes:

1. Locate appropriate K value or slope for AFSD size.
2. Use pressure taps (red line high; green line low) provided for field measurement of pressure differential (VP) with manometer.
3. Loosen wing nut on damper handle and adjust damper to vary VP.
4. When appropriate VP is obtained, tighten wing nut down on handle.

$$V_p = \frac{Q^2}{K^2}$$

where:
V_p = differential pressure at the sensor, in. w.c.
Q = air flow rate at standard conditions, cfm
K = calibration constant

For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

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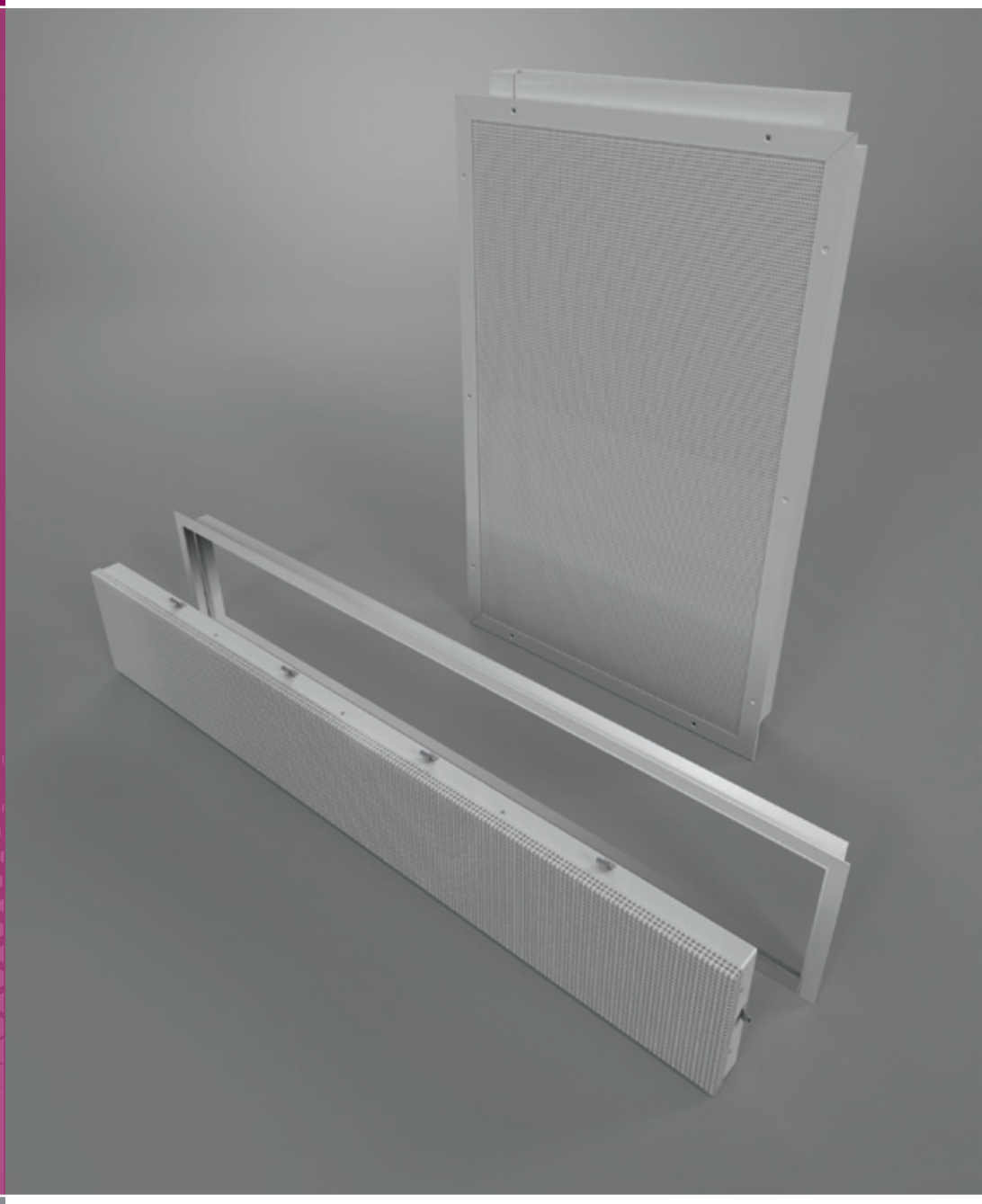
SECTION **J**



In-Wall Displacement Diffusers

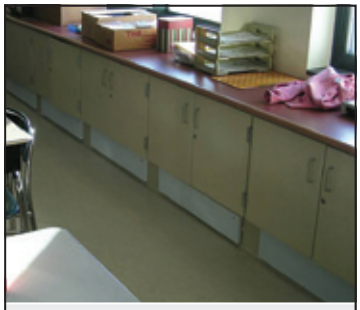
In-Wall Diffusers

Price In-Wall Displacement Diffusers can be used in a wide variety of applications, from offices and schools, to architecturally driven projects such as theaters and lobbies, and even health care facilities. Like all displacement diffusers, the Price In-Wall Series provides low velocity supply air with high thermal comfort and minimal noise.

In-Wall Diffuser Family:

- DF1R
- DF1W
- Puraflo

Provides architectural appeal



Flush mounting maximizes available floor area

Optional colors and finishes available

Puraflo series for health care

priceindustries.com for additional product information, including product videos and brochures.

In-Wall Diffusers

Product Overview

Applications

The Price In-Wall Displacement Diffusers are designed to be integrated into the wall space and to provide a low velocity horizontal air pattern into a room. Along with the traditional benefits of displacement ventilation, these diffusers have the added feature of increasing the available space in the occupied zone.

The in-wall displacement diffusers can be installed individually or together in multiple sections to achieve both air distribution function and architectural form. Since each project presents its own set of architectural and engineering limitations and requirements, the Price In-Wall Displacement Diffusers can be manufactured in custom sizes and colors.

Models and Function

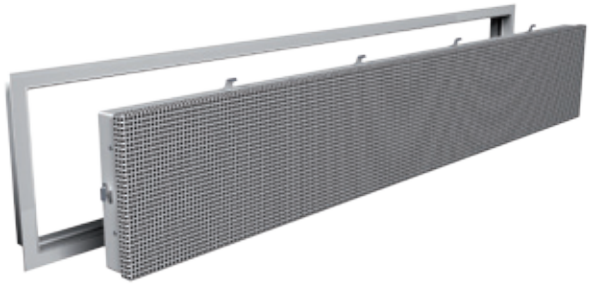
The **DF1W** features optional heavy steel and stainless steel construction. The perforated face and internal baffle ensure equalized air flow across the face of the diffuser, providing low velocity air into the room. These diffusers mount flush to the wall surface and allow for more floor space, making them ideal for high occupancy areas such as classrooms, office spaces, hotels, and convention centers. Since the DF1W is typically ducted from the top, the diffusers can also be sized to fit within nominal stud spacings to simplify building design.

The **Puraflo** diffuser, while based on DF1W, has been designed uniquely for health care applications. It can be applied in waiting rooms, nursing stations, exam rooms, patient rooms, and hallways. As high air quality and cleanliness are necessities in health care facilities, the Puraflo features all the benefits of the DF1W with a standard removable face for easy cleaning and sterilization. The Puraflo also offers an optional stainless steel face and frame, corrosion resistance, and tamper-proof fasteners for security needs.

The **DF1R** is a unique diffuser designed to deliver air into spaces from relatively hidden locations. Having no visible fasteners, the DF1R can be discreetly installed in stair risers, in a wall at floor level or in a toe kick, making it ideal for classrooms, theaters, and lobbies. The DF1R has an easy press-in face that is securely retained with mounting clips in a contractor-supplied plenum. A mud frame is available for drywall applications that require a clean appearance.

DF1W / Puraflo

DF1R



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DF1W Series

Product Information

Price DF1W Series displacement diffusers are designed to produce a 1 way low velocity air supply perpendicular to the diffuser face. The DF1W discharges air evenly across its perforated face with minimal turbulence or induction of room air. The cool supply air flows down to the floor level and gradually fills the occupied space. The DF1W is designed to be integrated into the wall space, maximizing floor space while maintaining the high level of performance seen in the DF1. This appealing diffuser meshes seamlessly into any décor by integrating into the walls. The superior air quality and low noise levels realized with the DF1W make it suitable for office space, restaurants, supermarkets, theaters, hotels, convention centers, schools, or any application where air quality demands are high.

Features

- In-wall installation maximizes available floor space.
- Ships with protective film on face.

Construction/Finish: DF1W

- Equalization Baffle - Aluminum.
- Perforated Front Panel and Diffuser Frame – Coated Steel
- Plenum – Coated Steel
- Optional Stainless Steel Machine Screws for plenum access or cleaning
- Finish - B12 White (Standard)

For optional and special finishes please see color matrix.

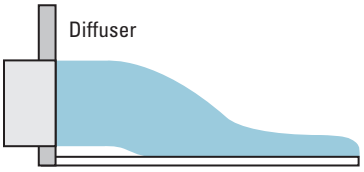
Options

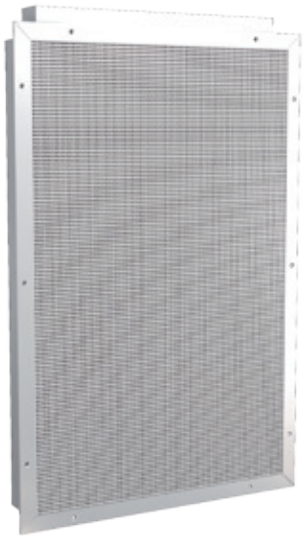
- Stainless steel (304) face and frame.
- Stainless steel (304) face, frame, baffle, and plenum.
- Removable face.

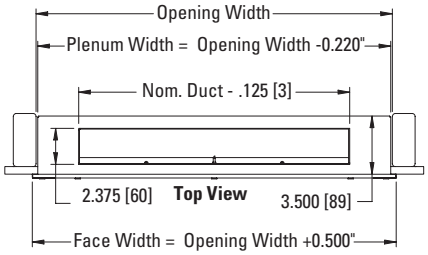
Accessories

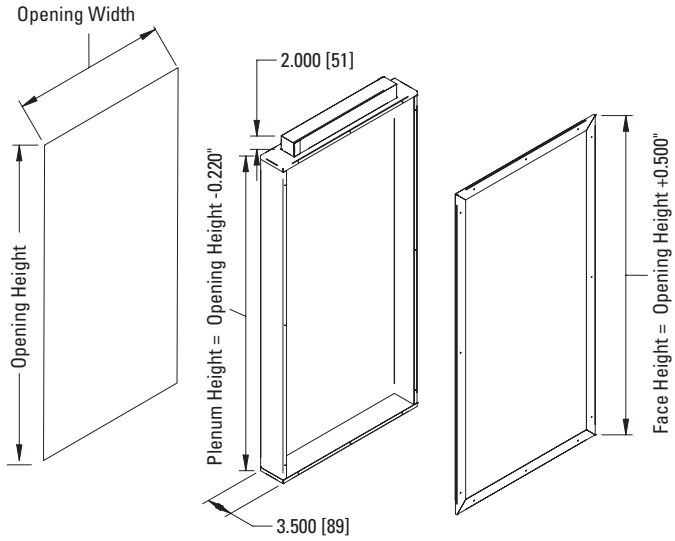
- AFSD.
- Duct damper (Flap Type with Cable Operator).

Air Pattern









Dimensional Data (Nominal) - Imperial (inches)

W X H	Duct	Nom. Studs OC
14.5 x 23.5	2.5 x 12	16
14.5 x 29.5	2.5 x 12	16
14.5 x 35.5	2.5 x 12	16
14.5 x 47.5	2.5 x 12	16
22.5 x 29.5	2.5 x 18	24
22.5 x 35.5	2.5 x 18	24
22.5 x 47.5	2.5 x 18	24
29.5 x 23.5	2.5 x 18	31
35.5 x 23.5	2.5 x 18	37
47.5 x 23.5	2.5 x 18	49

Dimensional Data (Nominal) - Metric (mm)

W X H	Duct	Nom. Studs OC
360 x 590	60 x 300	400
360 x 740	60 x 300	400
360 x 890	60 x 300	400
360 x 1190	60 x 300	400
560 x 590	60 x 500	600
560 x 740	60 x 500	600
560 x 890	60 x 500	600
560 x 1190	60 x 500	600

Additional Imperial and Metric sizes available.
Please contact your local Price Representative for more information.

For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

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Puraflo Series

Product Information

Price Puraflo displacement diffusers are in-wall diffusers designed specifically for use in health care facilities. The diffuser discharges cool supply air evenly across the perforated face at low velocity with minimal turbulence or induction of room air. The air flows down to the floor level and travels across the floor where it is carried up by thermal plumes, delivering air directly to the breathing zone.

The Puraflo displacement diffuser is designed to be integrated in the wall or casework, increasing floor area in the occupied zone and seamlessly meshing into the space for architectural appeal.

To facilitate cleaning, the Puraflo is designed with a standard removable face. Optional features include tamper-proof fasteners and a stainless steel face. The superior air quality, thermal comfort and low noise levels of the Puraflo make it an excellent choice for patient rooms, hallways, waiting rooms, exam rooms, nursing stations, and any health care application where air quality demands are high.

Features

- Standard removable face.
- Flush, in-wall integration.

Construction/Finish: Puraflo

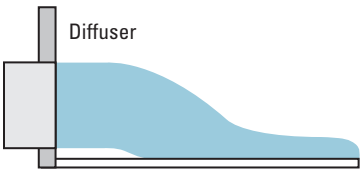
- Equalization Baffle – Aluminum
- Perforated Front Panel and Diffuser Frame – Coated Steel
- Plenum – Coated Steel
- Truss Head/Machine Screws – Stainless Steel

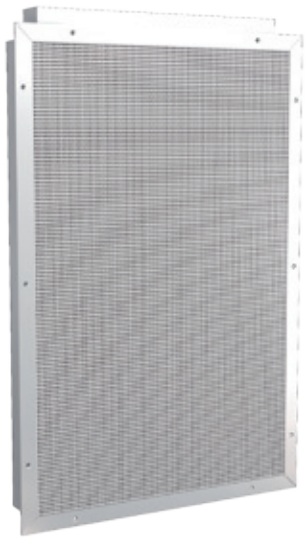
For optional and special finishes see color matrix.

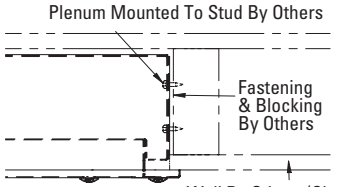
Options

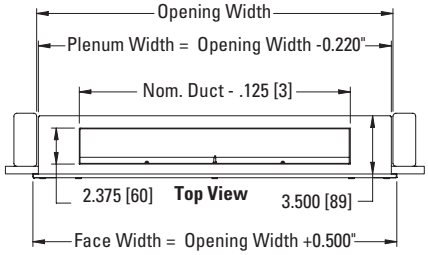
- Diffuser face and frame – 304 stainless steel.
- Tamper proof fasteners.

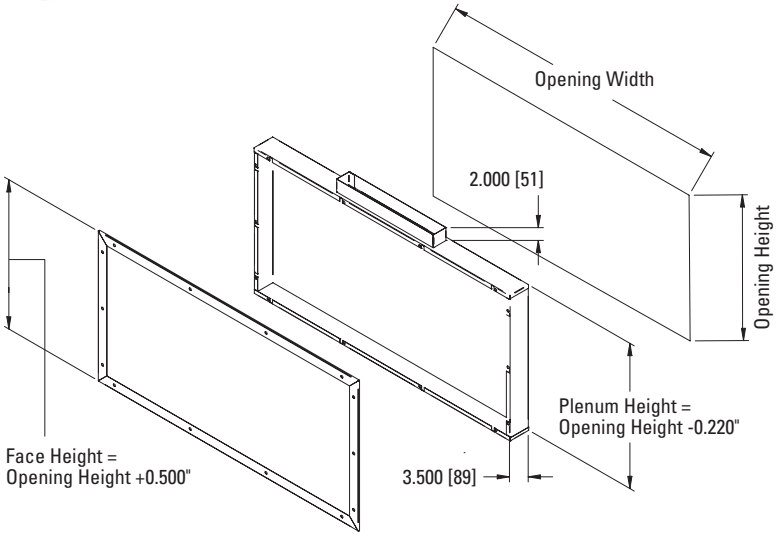
Air Pattern











Dimensional Data (Nominal) - Imperial (inches)

W X H	Duct	Nom. Studs OC
14.5 x 23.5	2.5 x 12	16
14.5 x 29.5	2.5 x 12	16
14.5 x 35.5	2.5 x 12	16
14.5 x 47.5	2.5 x 12	16
22.5 x 29.5	2.5 x 18	24
22.5 x 35.5	2.5 x 18	24
22.5 x 47.5	2.5 x 18	24
29.5 x 23.5	2.5 x 18	31
35.5 x 23.5	2.5 x 18	37
47.5 x 23.5	2.5 x 18	49

Dimensional Data (Nominal) - Metric (mm)

W X H	Duct	Nom. Studs OC
360 x 590	60 x 300	400
360 x 740	60 x 300	400
360 x 890	60 x 300	400
360 x 1190	60 x 300	400
560 x 590	60 x 500	600
560 x 740	61 x 500	600
560 x 890	62 x 500	600
560 x 1190	63 x 500	600

Additional Imperial and Metric sizes available.
Please contact your local Price representative for more information.

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Performance Data — Imperial Units

Unit Size W x H [in] Face Area [ft²]	Inlet Size [in]	Face Velocity [fpm]	Air Flow [cfm]	Total Pressure [in. w.g.]	Static Pressure [in. w.g.]	Noise Criteria [NC]	Proximity to Outlet [ft]			
							ΔT = 5°F		ΔT = 10°F	
							DR		DR	
							15%	20%	15%	20%
14.5 x 23.5 [2.2]	2.5 x 12	20	44	--	--	--	--	--	--	--
		30	66	--	--	--	1	--	2	--
		40	88	0.01	--	--	4	1	6	2
		50	109	0.02	0.01	--	7	3	9	5
14.5 x 29.5 [2.8]	2.5 x 12	20	55	--	--	--	--	--	--	--
		30	83	0.01	--	--	1	--	3	--
		40	111	0.02	0.01	--	5	1	7	3
		50	138	0.03	0.02	--	8	4	10	6
14.5 x 35.5 [3.3]	2.5 x 12	20	67	--	--	--	--	--	--	--
		30	100	0.01	--	--	2	--	4	1
		40	134	0.02	0.01	--	6	2	8	4
		50	167	0.04	0.02	--	9	5	11	7
14.5 x 47.5 [4.5]	2.5 x 12	20	90	--	--	--	--	--	1	--
		30	135	0.02	0.01	--	3	--	5	1
		40	180	0.04	0.02	--	7	3	9	5
		50	225	0.06	0.03	16	10	6	13	8
22.5 x 22.5 [3.3]	2.5 x 18	20	66	--	--	--	--	--	1	--
		30	99	0.01	--	--	4	1	6	2
		40	132	0.02	0.01	--	8	4	10	6
		50	165	0.04	0.02	--	11	7	14	9
22.5 x 29.5 [4.4]	2.5 x 18	20	87	--	--	--	1	--	2	--
		30	131	0.02	--	--	5	1	7	3
		40	175	0.04	0.02	--	9	5	12	7
		50	218	0.06	0.03	16	13	8	15	10
22.5 x 35.5 [5.3]	2.5 x 18	20	105	0.01	--	--	1	--	3	--
		30	158	0.03	0.01	--	6	2	8	4
		40	211	0.05	0.02	--	10	6	13	8
		50	264	0.08	0.03	20	14	9	16	11
22.5 x 47.5 [7.1]	2.5 x 18	20	142	0.02	--	--	2	--	4	1
		30	213	0.04	0.02	--	8	3	10	5
		40	284	0.08	0.03	21	12	7	15	10
		50	355	0.13	0.05	28	16	11	18	13
29.5 x 23.5 [4.6]	2.5 x 18	20	91	--	--	--	1	--	3	--
		30	137	0.02	0.01	--	7	2	9	4
		40	183	0.04	0.02	--	11	6	13	8
		50	228	0.06	0.03	17	14	9	17	12
35.5 x 23.5 [5.5]	2.5 x 18	20	110	0.01	--	--	3	--	5	1
		30	165	0.03	0.01	--	8	4	10	6
		40	221	0.05	0.02	--	13	8	15	10
		50	276	0.08	0.04	22	16	11	19	14
47.5 x 23.5 [7.4]	2.5 x 20	20	148	0.02	--	--	5	1	7	3
		30	223	0.04	0.01	--	11	6	14	9
		40	297	0.07	0.03	22	16	11	18	13
		50	371	0.11	0.04	29	19	14	22	17

Performance Notes:

1. Sound and pressure drop tested in accordance with ASHRAE Standard 70-2006 "Method of Testing for Rating the Performance of Air Outlets and Inlets."
2. Air flow is in cubic feet per minute, cfm.
3. Pressure is in inches of water, in. w.g.
4. The NC values, sound pressure level, are based on a room absorption of 10 dB, re 10^{-12} watts and one diffuser.
5. ΔT is the difference between the room air temperature 3 ½ ft above the floor and the temperature of the supply air.
6. Proximity to outlet is the minimum distance from an outlet to the occupant in order to achieve the listed DR value.
7. Distances closer to the diffuser have a higher DR than the cataloged value.
8. DR is the predicted percentage of people dissatisfied (PPD) due to draft. A value of less than 20 meets the requirements of ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy.
9. Blanks (--) indicate that the DR is below the specified value at all distances from the diffuser face.
10. DR catalog data is presented for an occupant density of 25 people/1000ft², which is the default occupancy density for classrooms (ages 5-8) given by ASHRAE 62.1-2004. For other occupant densities, please refer to the DV Room Designer Software.
11. Performance data for standard diffusers not listed in the catalog is available in Price AIO Software.

For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

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Performance Data — Metric Units

Unit Size W x H [mm] Face Area [m²]	Inlet Size [mm]	Face Velocity [m/s]	Air Flow [L/s]	Total Pressure [Pa]	Static Pressure [Pa]	Noise Criteria [NC]	Proximity to Outlet [m]			
							ΔT = 2.8 °C		ΔT = 5.6 °C	
							DR		DR	
							15%	20%	15%	20%
360 x 590 [0.2]	60 x 300	0.10	17	--	--	--	--	--	--	--
		0.15	29	3.34	--	--	0.3	--	0.6	--
		0.20	32	4.48	2.59	--	1.2	0.3	1.8	0.6
		0.25	35	5.73	3.47	--	2.1	0.9	2.7	1.5
360 x 740 [0.25]	60 x 300	0.10	25	--	--	--	--	--	--	--
		0.15	38	5.06	--	--	0.3	--	0.9	--
		0.20	50	9.10	4.40	--	1.5	0.3	2.1	0.9
		0.25	63	14.34	7.00	--	2.4	1.2	3.0	1.8
360 x 890 [0.3]	60 x 300	0.10	30	2.97	--	--	--	--	--	--
		0.15	46	6.79	2.94	--	0.6	--	1.2	0.3
		0.20	61	12.20	5.36	--	1.8	0.6	2.4	1.2
		0.25	76	19.23	8.53	--	2.7	1.5	3.4	2.1
360 x 1190 [0.4]	60 x 300	0.10	41	4.71	--	--	--	--	0.3	--
		0.15	61	10.76	3.80	--	0.9	--	1.5	0.3
		0.20	82	19.33	6.96	--	2.1	0.9	2.7	1.5
		0.25	102	30.45	11.13	16	3.0	1.8	4.0	2.4
560 x 590 [0.31]	60 x 500	0.10	32	--	--	--	--	--	0.3	--
		0.15	47	3.26	--	--	1.2	0.3	1.8	0.6
		0.20	63	5.85	3.19	--	2.4	1.2	3.0	1.8
		0.25	79	9.22	5.06	--	3.4	2.1	4.3	2.7
560 x 740 [0.39]	60 x 500	0.10	40	--	--	--	0.3	--	0.6	--
		0.15	60	4.68	--	--	1.5	0.3	2.1	0.9
		0.20	80	8.41	4.16	--	2.7	1.5	3.7	2.1
		0.25	100	13.24	6.62	--	4.0	2.4	4.6	3.0
560 x 890 [0.47]	60 x 500	0.10	48	2.75	--	--	0.3	--	0.9	--
		0.15	72	6.27	2.79	--	1.8	0.6	2.4	1.2
		0.20	96	11.27	5.09	--	3.0	1.8	4.0	2.4
		0.25	120	17.76	8.10	20	4.3	2.7	4.9	3.4
560 x 1190 [0.64]	60 x 500	0.10	65	4.35	--	--	0.6	--	1.2	0.3
		0.15	97	9.93	3.65	--	2.4	0.9	3.0	1.5
		0.20	129	17.85	6.69	20	3.7	2.1	4.6	3.0
		0.25	162	28.13	10.68	27	4.9	3.4	5.5	4.0

Performance Notes:

1. Sound and pressure drop tested in accordance with ASHRAE Standard 70-2006 "Method of Testing for Rating the Performance of Air Outlets and Inlets."
2. Air flow is in Litres per second, L/s.
3. Pressure is in Pascals, Pa.
4. The NC values, sound pressure level, are based on a room absorption of 10 dB, re 10^{-12} watts and one diffuser.
5. ΔT is the difference between the room air temperature 1 m above the floor and the temperature of the supply air.
6. Proximity to outlet is the minimum distance from an outlet to the occupant in order to achieve the listed DR value.
7. Distances closer to the diffuser have a higher DR than the cataloged value.
8. DR is the predicted percentage of people dissatisfied (PPD) due to draft. A value of less than 20 meets the requirements of ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy.
9. Blanks (--) indicate that the DR is below the specified value at all distances from the diffuser face.
10. DR catalog data is presented for an occupant density of 25 people/100m^2, which is the default occupancy density for classrooms (ages 5-8) given by ASHRAE 62.1-2004. For other occupant densities, please refer to the DV Room Designer Software.
11. Performance data for standard diffusers not listed in the catalog is available in Price AIO Software.

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DF1R Series

Product Information

Price DF1R Series recessed displacement diffusers are designed to produce a 1 way low velocity air supply perpendicular to the diffuser face.The DF1R discharges air evenly across its perforated face with minimal turbulence or induction of room air.The cool supply air flows across the floor, gradually filling the occupied space.

Typically installed in a stair riser, under cabinetry, or in a wall near floor level, the DF1R is ideal for applications calling for discreet or seamless air delivery. This appealing diffuser meshes seamlessly into any décor, hidden in unobtrusive room locations.

The superior air quality and low noise levels realized with the DF1R make it suitable for theaters, classrooms, or any application where air quality demands are high.

Features

- Flexible recessed installation in stair risers, walls, or under room fixtures such as cabinets.
- Ships with protective film on face.

Construction/Finish: DF1R

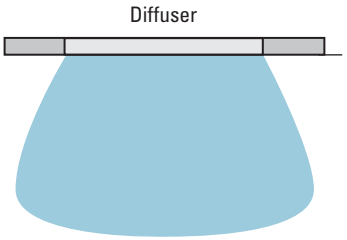
- Equalization Baffle – Aluminum
- Installation Frame – Coated Steel
- Perforated Front Panel – Coated Steel
- Finish – B12 White (Standard)

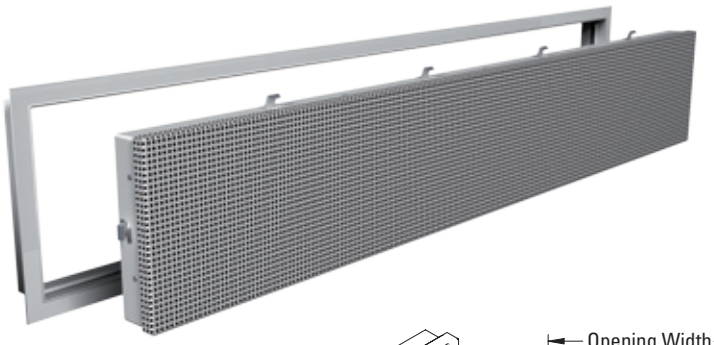
For optional and special finishes see color matrix.

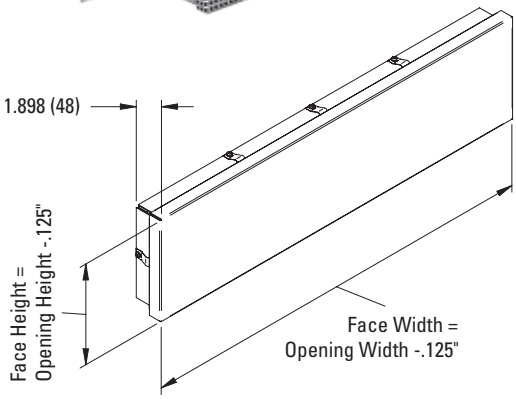
Options

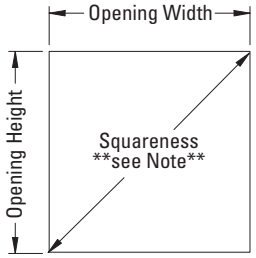
- Standard recessed frame.
- Mud frame for plaster applications.

Air Pattern



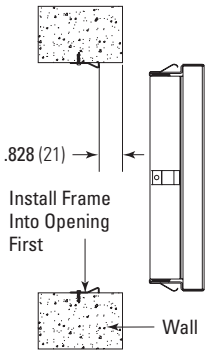




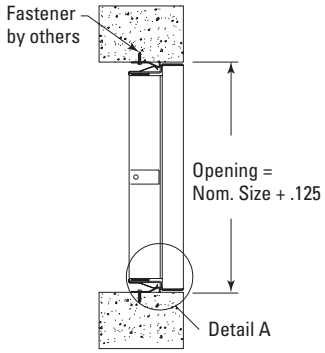


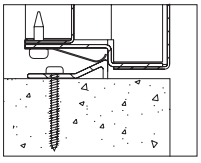
Note: Difference Between Diagonals Cannot Exceed .172"(4)

Frame Mount Detail

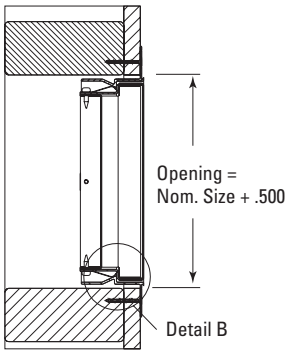


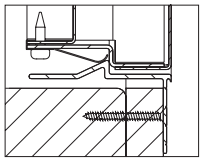
Cutout and Standard Surface Mount Detail





Optional Mud Frame (MF) Mount Detail





Available Sizes (W x H)

Minimum	Maximum
6" x 4" (150 x 100)	60" x 42" (1525 x 1050)

Additional Imperial and Metric sizes available.
Please contact your local Price Representative for more information.

For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

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Performance Data — Riser Applications - Imperial Units

Unit Size W x H [in] Face Area [ft²]	Nominal Face Velocity [fpm]	Nominal Air Flow [cfm]	Total Pressure [in. w.g.]	Static Pressure [in. w.g.]	Noise Criteria [NC]	Proximity to Outlet [ft]			
						ΔT = 5°F		ΔT = 10°F	
						DR		DR	
						15%	20%	15%	20%
24 x 4 [0.67]	20	13	--	--	--	--	--	--	--
	30	20	--	--	--	1	--	1	--
	40	27	--	--	--	3	1	4	1
	50	33	--	--	--	6	2	7	3
24 x 6 [1]	20	20	--	--	--	--	--	--	--
	30	30	--	--	--	2	--	3	--
	40	40	--	--	--	5	2	6	3
	50	50	0.01	0.01	--	7	4	8	5
24 x 8 [1.33]	20	27	--	--	--	--	--	--	--
	30	40	--	--	--	3	--	4	1
	40	53	--	--	--	6	3	7	4
	50	67	0.01	0.01	--	9	5	10	6
30 x 4 [0.83]	20	17	--	--	--	--	--	--	--
	30	25	--	--	--	2	--	3	--
	40	33	--	--	--	5	2	6	2
	50	42	--	--	--	7	4	8	5
30 x 6 [1.25]	20	25	--	--	--	--	--	--	--
	30	38	--	--	--	3	--	4	1
	40	50	--	--	--	7	3	8	4
	50	63	0.01	0.01	--	9	6	10	7
30 x 8 [1.67]	20	33	--	--	--	1	--	1	--
	30	50	--	--	--	4	1	5	2
	40	67	--	--	--	8	4	9	5
	50	83	0.01	0.01	--	10	7	12	8
36 x 4 [1]	20	20	--	--	--	--	--	--	--
	30	30	--	--	--	3	--	4	1
	40	40	--	--	--	6	3	7	4
	50	50	0.01	0.01	--	9	5	10	6
36 x 6 [1.5]	20	30	--	--	--	1	--	1	--
	30	45	--	--	--	5	1	5	2
	40	60	--	--	--	8	4	9	5
	50	75	0.01	0.01	--	11	7	12	8
48 x 12 [4]	20	80	--	--	--	5	2	6	3
	30	120	--	--	--	10	6	11	7
	40	160	0.01	0.01	--	13	10	15	11
	50	200	0.02	0.02	--	16	12	17	14

Performance Notes:

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Performance Data — Riser Applications - Metric Units

Unit Size W x H [mm] Face Area [m^2]	Nominal Face Velocity [m/s]	Nominal Air Flow [L/s]	Total Pressure [Pa]	Static Pressure [Pa]	Noise Criteria [NC]	Proximity to Outlet [m]			
						ΔT = 2.8 °C		ΔT = 5.6 °C	
						DR		DR	
						15%	20%	15%	20%
600 x 100 [0.06]	0.10	6	---	---	--	--	--	--	--
	0.15	9	---	---	--	0.3	--	0.3	--
	0.20	12	---	---	--	0.9	0.3	1.2	0.3
	0.25	15	---	---	--	1.8	0.6	2.1	0.9
600 x 150 [0.09]	0.10	9	---	---	--	--	--	--	--
	0.15	14	---	---	--	0.6	--	0.9	--
	0.20	18	---	---	--	1.5	0.6	1.8	0.9
	0.25	23	2.6	2.6	--	2.1	1.2	2.4	1.5
600 x 200 [0.12]	0.10	12	---	---	--	--	--	--	--
	0.15	18	---	---	--	0.9	--	1.2	0.3
	0.20	25	---	---	--	1.8	0.9	2.1	1.2
	0.25	31	2.8	2.8	--	2.7	1.5	3.0	1.8
750 x 100 [0.07]	0.10	8	---	---	--	--	--	--	--
	0.15	11	---	---	--	0.6	--	0.9	--
	0.20	15	---	---	--	1.5	0.6	1.8	0.6
	0.25	19	---	---	--	2.1	1.2	2.4	1.5
750 x 150 [0.11]	0.10	11	---	---	--	--	--	--	--
	0.15	17	---	---	--	0.9	--	1.2	0.3
	0.20	23	---	---	--	2.1	0.9	2.4	1.2
	0.25	29	2.8	2.7	--	2.7	1.8	3.0	2.1
750 x 200 [0.15]	0.10	15	---	---	--	0.3	--	0.3	--
	0.15	23	---	---	--	1.2	0.3	1.5	0.6
	0.20	31	---	---	--	2.4	1.2	2.7	1.5
	0.25	38	3.1	3.0	--	3.0	2.1	3.7	2.4
900 x 100 [0.09]	0.10	9	---	---	--	--	--	--	--
	0.15	14	---	---	--	0.9	--	1.2	0.3
	0.20	18	---	---	--	1.8	0.9	2.1	1.2
	0.25	23	2.6	2.6	--	2.7	1.5	3.0	1.8
900 x 150 [0.13]	0.10	14	---	---	--	0.3	--	0.3	--
	0.15	21	---	---	--	1.5	0.3	1.5	0.6
	0.20	27	---	---	--	2.4	1.2	2.7	1.5
	0.25	34	3.0	2.9	--	3.4	2.1	3.7	2.4
900 x 200 [0.18]	0.10	18	---	---	--	1.5	0.6	1.8	0.9
	0.15	27	---	---	--	3.0	1.8	3.4	2.1
	0.20	37	---	---	--	4.0	3.0	4.6	3.4
	0.25	46	3.2	3.2	--	4.9	3.7	5.2	4.3

Performance Notes:

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Performance Data — In-Wall Applications - Imperial Units

Unit Size W x H [in] Face Area [ft²]	Nominal Face Velocity [fpm]	Nominal Air Flow [cfm]	Total Pressure [in. w.g.]	Static Pressure [in. w.g.]	Noise Criteria [NC]	Proximity to Outlet [ft]			
						ΔT = 5°F		ΔT = 10°F	
						DR		DR	
						15%	20%	15%	20%
24 x 24 [4]	20	80	--	--	--	3	--	4	1
	30	120	--	--	--	8	4	9	5
	40	160	0.01	0.01	--	11	7	12	8
	50	200	0.02	0.02	--	14	10	15	11
24 x 30 [5]	20	100	--	--	--	4	1	5	2
	30	150	--	--	--	9	5	10	6
	40	200	0.01	0.01	--	12	8	13	9
	50	250	0.02	0.02	--	15	11	16	12
24 x 36 [6]	20	120	--	--	--	5	2	6	2
	30	180	--	--	--	9	6	10	7
	40	240	0.01	0.01	--	13	9	14	10
	50	300	0.02	0.02	--	16	12	17	13
24 x 48 [8]	20	160	--	--	--	6	2	7	3
	30	240	--	--	--	11	7	12	8
	40	320	0.01	0.01	--	14	10	16	12
	50	400	0.02	0.02	--	17	13	18	15
30 x 24 [5]	20	100	--	--	--	5	1	6	2
	30	150	--	--	--	9	6	10	7
	40	200	0.01	0.01	--	13	9	14	10
	50	250	0.02	0.02	--	16	12	17	13
36 x 24 [6]	20	120	--	--	--	6	3	7	4
	30	180	--	--	--	11	7	12	8
	40	240	0.01	0.01	--	14	11	16	12
	50	300	0.02	0.02	--	17	13	19	15
48 x 24 [8]	20	160	--	--	--	8	5	9	6
	30	240	--	--	--	13	9	14	10
	40	320	0.01	0.01	--	17	13	18	14
	50	400	0.02	0.02	--	20	16	21	17

Performance Notes:

1. Sound and pressure drop tested in accordance with ASHRAE Standard 70-2006 "Method of Testing for Rating the Performance of Air Outlets and Inlets."
2. Air flow is in cubic feet per minute, cfm.
3. Pressure is in inches of water, in. w.g.
4. The NC values, sound pressure level, are based on a room absorption of 10 dB, re 10^{-12} watts and one diffuser.
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Performance Data — In-Wall Applications - Metric Units

Unit Size W x H [mm] Face Area [m^2]	Nominal Face Velocity [m/s]	Nominal Air Flow [L/s]	Total Pressure [Pa]	Static Pressure [Pa]	Noise Criteria [NC]	Proximity to Outlet [m]			
						ΔT = 2.8 °C		ΔT = 5.6 °C	
						DR		DR	
						15%	20%	15%	20%
600 x 600 [0.36]	0.10	37	---	---	--	0.9	--	1.2	0.3
	0.15	55	---	---	--	2.4	1.2	2.7	1.5
	0.20	73	2.6	2.6	--	3.4	2.1	3.7	2.4
	0.25	92	4.1	4.0	--	4.3	3.0	4.6	3.4
600 x 750 [0.45]	0.10	46	---	---	--	1.2	0.3	1.5	0.6
	0.15	68	---	---	--	2.7	1.5	3.0	1.8
	0.20	92	2.8	2.8	--	3.7	2.4	4.0	2.7
	0.25	114	4.4	4.3	--	4.6	3.4	4.9	3.7
600 x 900 [0.54]	0.10	55	---	---	--	1.5	0.6	1.8	0.6
	0.15	82	---	---	--	2.7	1.8	3.0	2.1
	0.20	110	3.0	2.9	--	4.0	2.7	4.3	3.0
	0.25	137	4.6	4.6	--	4.9	3.7	5.2	4.0
600 x 1200 [0.72]	0.10	73	---	---	--	1.8	0.6	2.1	0.9
	0.15	110	---	---	--	3.4	2.1	3.7	2.4
	0.20	146	3.3	3.2	--	4.3	3.0	4.9	3.7
	0.25	183	5.1	5.1	--	5.2	4.0	5.5	4.6
750 x 600 [0.45]	0.10	46	---	---	--	1.5	0.3	1.8	0.6
	0.15	68	---	---	--	2.7	1.8	3.0	2.1
	0.20	92	2.8	2.8	--	4.0	2.7	4.3	3.0
	0.25	114	4.4	4.3	--	4.9	3.7	5.2	4.0
900 x 600 [0.54]	0.10	55	---	---	--	1.8	0.9	2.1	1.2
	0.15	82	---	---	--	3.4	2.1	3.7	2.4
	0.20	110	3.0	2.9	--	4.3	3.4	4.9	3.7
	0.25	137	4.6	4.6	--	5.2	4.0	5.8	4.6
1200 x 600 [0.72]	0.10	73	---	---	--	2.4	1.5	2.7	1.8
	0.15	110	---	---	--	4.0	2.7	4.3	3.0
	0.20	146	3.3	3.2	--	5.2	4.0	5.5	4.3
	0.25	183	5.1	5.1	--	6.1	4.9	6.4	5.2

Performance Notes:

1. Sound and pressure drop tested in accordance with ASHRAE Standard 70-2006 "Method of Testing for Rating the Performance of Air Outlets and Inlets."
2. Air flow is in Litres per second, L/s.
3. Pressure is in Pascals, Pa.
4. The NC values, sound pressure level, are based on a room absorption of 10 dB, re 10^{-12} watts and one diffuser.
5. ΔT is the difference between the room air temperature 1 m above the floor and the temperature of the supply air.
6. Proximity to outlet is the minimum distance from an outlet to the occupant in order to achieve the listed DR value.
7. Distances closer to the diffuser have a higher DR than the cataloged value.
8. DR is the predicted percentage of people dissatisfied (PPD) due to draft. A value of less than 20 meets the requirements of ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy.
9. Blanks (--) indicate that the DR is below the specified value at all distances from the diffuser face.
10. DR catalog data is presented for an occupant density of 25 people/100m^2, which is the default occupancy density for classrooms (ages 5-8) given by ASHRAE 62.1-2004. For other occupant densities, please refer to the DV Room Designer Software.
11. Performance data for standard diffusers not listed in the catalog is available in Price AIO Software.

For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

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SECTION **J**

Free Standing Diffusers

Free Standing Diffusers

Price Free Standing Displacement Diffusers, models DR360 and DFXi, are unique choices for standalone applications. The DR360 can easily be integrated into architectural features or designed as focal points, while the tough construction of the DFXi makes it ideal for spaces where diffusers are exposed to daily wear and tear, such as school gymnasiums or industrial areas. The DFXi is available with 1, 2, 3, and 4 way air supply, making it a versatile diffuser that can be placed in the center of a space or along a wall.

Free Standing Family:

- DR360
- DFXi

Easily integrates into architectural features

Custom colors and perforations available

Tough construction for active areas - DFXi

Industrial applications

priceindustries.com for additional product information, including product videos and brochures.

Free Standing Diffusers

Product Overview

Applications

The Price Free Standing Displacement Diffusers are designed to be installed away from the wall and provide low velocity supply air to the space. These diffusers provide an excellent means for architectural integration, as either standalone features or blended accents to columns or vertical structures. Free standing displacement diffusers provide an interesting architectural feature in lobbies, atriums, and corridors as standalone units, and can be integrated into columns for use in large open areas. As custom options, these diffusers can be used as table bases and even planters.

Models and Function

The **DR360** discharges air in a radial 360 degree pattern. The perforated face and internal baffle ensure equalized airflow across the face of the diffuser, providing low velocity air into the room. The cool supply air flows across the room seeking out heat sources, and gradually rises to the high level returns as it gains heat.

The DR360 diffuser can be ducted from the top or the bottom, and is available with an optional base for either ducting configuration.

The **DFXi** is a free standing industrial displacement diffuser that has up to four active faces. Featuring a reinforced, corrugated face for increased rigidity, the DFXi is built for delivering air to tough industrial environments. The perforated face and internal baffle ensure equalized airflow across the face of the diffuser, providing low velocity air into the room. The cool supply air flows across the room seeking out heat sources rises to the high level returns as it gains heat, carrying up pollutants that are lighter than air. The DFXi is best suited for areas that have high specific heat loads, typically greater than 40 Btu/hft$_2$ (120 W/m$_2$) or where pollutants are lighter than air.

DR360

DFXi

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For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

DR360 Series

Product Information

Price DR360 Series displacement diffusers are designed to produce a low turbulence horizontal air supply in a 360° pattern. Typically installed free standing away from the wall, the DR360 discharges air evenly across its perforated face. The cool air then drops to the floor and gently floats outward along the floor. This appealing diffuser meshes seamlessly into any décor and can be installed where units are conventionally not possible, due to architectural reasons or room size. The superior air quality and low noise levels realized with the DR360 make it suitable for office space, hotels, convention centers, schools or any application where air quality demands are high.

Features

- Top or bottom inlet options.
- Ships with protective film on face and inlet.

Construction/Finish: DR360

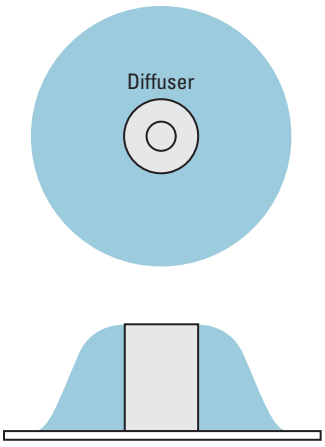
- Diffuser Frame and Equalization Baffle – Aluminum
- Plenum Caps – Rolled Steel
- Perforated Face – Coated Steel
- Finish – B12 White (Standard)

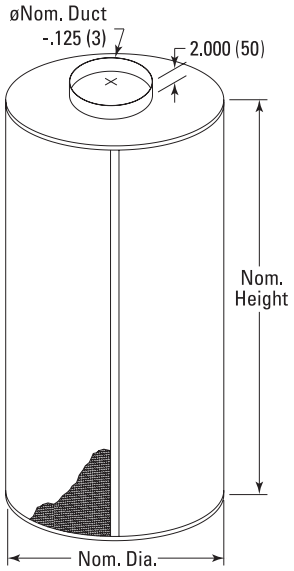
For optional and special finishes see color matrix.

Options

- Base
- AFSD

Air Pattern





Dimensional Data - Imperial (inches)

Diameter	Min. Height	Max. Height	Duct Size Range**	Inlet Location
12	12	48	8	Top / Bottom
18	12	48	10 - 14	Top / Bottom
24	12	60	10 - 18	Top / Bottom
30	24	60	10 - 18	Top / Bottom
36	24	48	12 - 22	Top / Bottom
42	24	48	16 - 22	Top / Bottom
48	24	48	16 - 22	Top / Bottom

**Inlets available in 2" increments for Imperial Duct Sizes

Dimensional Data - Metric (mm)

Diameter	Min. Height	Max. Height	Duct Size	Inlet Location
305	300	1200	200	Top / Bottom
457	300	1200	250, 315	Top / Bottom
610	300	1500	250, 315, 400, 500, 630	Top / Bottom
762	600	1500	250, 315, 400, 500, 630	Top / Bottom
915	600	1200	315, 400, 500, 630, 800	Top / Bottom
1067	600	1200	400, 500, 630, 800	Top / Bottom
1219	600	1200	400, 500, 630, 800, 1000	Top / Bottom

For a complete list of standard sizes and inlets, refer to www.priceindustries.com/resources/type/literature/submittals

For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

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Performance Data — Floor Mounted — Imperial Units

Unit Size Dia. x H [in] Face Area [ft²]	Inlet Size [in]	Face Velocity [fpm]	Air Flow [cfm]	Total Pressure [in. w.g.]	Static Pressure [in. w.g.]	Noise Criteria [NC]	Proximity to Outlet [ft]			
							ΔT = 5 °F		ΔT = 10 °F	
							DR		DR	
							15%	20%	15%	20%
18 x 36 [13.5]	14	20	270	--	--	--	3	2	4	3
		30	405	0.02	0.01	--	4	3	6	4
		40	540	0.04	0.02	--	5	3	7	5
		50	675	0.06	0.03	--	6	4	9	6
24 x 36 [18.04]	14	20	361	0.01	--	--	3	2	4	3
		30	541	0.03	0.01	--	4	3	6	4
		40	722	0.05	0.02	--	5	3	7	5
		50	902	0.08	0.04	17	6	4	9	6
30 x 36 [22.59]	14	20	452	0.02	--	--	3	2	4	3
		30	678	0.04	0.01	--	4	3	6	4
		40	904	0.07	0.02	16	5	3	7	5
		50	1130	0.11	0.04	23	6	4	9	6
18 x 48 [18.16]	14	20	363	0.01	--	--	4	3	6	4
		30	545	0.03	0.01	--	5	4	8	6
		40	726	0.05	0.02	--	7	5	10	7
		50	908	0.08	0.04	--	8	6	12	8
24 x 48 [24.28]	14	20	486	0.02	--	--	4	3	6	4
		30	728	0.04	0.01	--	5	4	8	6
		40	971	0.07	0.02	16	7	5	10	7
		50	1214	0.11	0.03	24	8	6	12	8
30 x 48 [30.39]	16	20	608	0.02	--	--	4	3	6	4
		30	912	0.04	0.01	--	5	4	8	6
		40	1216	0.07	0.02	16	7	5	10	7
		50	1520	0.10	0.03	23	8	6	12	8
24 x 60 [30.51]	16	20	610	0.02	--	--	5	3	7	5
		30	915	0.04	0.01	--	7	5	10	7
		40	1220	0.07	0.02	--	9	6	13	9
		50	1525	0.10	0.03	22	11	7	16	11
30 x 60 [38.2]	18	20	764	0.02	--	--	5	3	7	5
		30	1146	0.03	--	--	7	5	10	7
		40	1528	0.06	0.01	--	9	6	13	9
		50	1910	0.10	0.02	23	11	7	16	11
36 x 36 [27.14]	18	20	543	0.01	--	--	3	2	4	3
		30	814	0.02	0.01	--	4	3	6	4
		40	1086	0.04	0.02	--	5	4	8	5
		50	1357	0.07	0.03	--	7	5	10	7
36 x 48 [36.51]	20	20	730	0.01	--	--	4	3	6	4
		30	1095	0.03	0.01	--	5	4	8	6
		40	1461	0.05	0.02	--	7	5	10	7
		50	1826	0.07	0.03	16	8	6	12	8
48 x 42 [42.5]	20	20	850	0.01	--	--	4	3	6	4
		30	1275	0.03	--	--	5	4	8	6
		40	1700	0.05	0.02	--	7	5	10	7
		50	2125	0.08	0.03	21	8	6	12	8
48 x 48 [48.75]	20	20	975	0.01	--	--	4	3	6	4
		30	1463	0.03	--	--	5	4	8	6
		40	1950	0.06	0.01	18	7	5	10	7
	22	30	1463	0.03	--	--	5	4	8	6
		40	1950	0.05	0.02	--	7	5	10	7
		50	2438	0.08	0.02	20	8	6	12	8

Performance Notes:

1. Sound and pressure drop tested in accordance with ASHRAE Standard 70-2006 "Method of Testing for Rating the Performance of Air Outlets and Inlets."
2. Air flow is in cubic feet per minute, cfm.
3. Pressure is in inches of water, in. w.g.
4. The NC values, sound pressure level, are based on a room absorption of 10 dB, re 10^{-12} watts and one diffuser.
5. ΔT is the difference between the room air temperature 3 ½ ft above the floor and the temperature of the supply air.
6. Proximity to outlet is the minimum distance from an outlet to the occupant in order to achieve the listed DR value.
7. Distances closer to the diffuser have a higher DR than the cataloged value.
8. DR is the predicted percentage of people dissatisfied (PPD) due to draft. A value of less than 20 meets the requirements of ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy.
9. Blanks (--) indicate that the DR is below the specified value at all distances from the diffuser face.
10. DR catalog data is presented for an occupant density of 25 people/1000ft², which is the default occupancy density for classrooms (ages 5-8) given by ASHRAE 62.1-2004. For other occupant densities, please refer to the DV Room Designer Software.
11. Performance data for standard diffusers not listed in the catalog is available in Price AIO Software.

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Performance Data — Floor Mounted — Metric Units

Unit Size Dia. x H [in] Face Area [m²]	Inlet Size [mm]	Face Velocity [m/s]	Air Flow [L/s]	Total Pressure [Pa]	Static Pressure [Pa]	Noise Criteria [NC]	Proximity to Outlet [m]			
							ΔT = 2.8 °C		ΔT = 5.6 °C	
							DR		DR	
							15%	20%	15%	20%
457 x 900 [1.23]	315	0.10	125	3.2	--	--	0.9	0.6	1.2	0.9
		0.15	188	7.2	3.7	--	1.2	0.9	1.8	1.2
		0.20	251	12.8	6.6	--	1.5	0.9	2.1	1.5
		0.25	313	20.0	10.2	--	1.8	1.2	2.7	1.8
610 x 900 [1.65]	400	0.10	168	--	--	--	0.9	0.6	1.2	0.9
		0.15	251	5.3	2.9	--	1.2	0.9	1.8	1.2
		0.20	335	9.4	5.2	--	1.5	0.9	2.1	1.5
		0.25	419	14.8	8.1	--	1.8	1.2	2.7	1.8
762 x 900 [2.06]	400	0.10	210	3.1	--	--	0.9	0.6	1.2	0.9
		0.15	315	7.0	3.2	--	1.2	0.9	1.8	1.2
		0.20	420	12.4	5.7	--	1.5	0.9	2.1	1.5
		0.25	524	19.3	8.9	16	1.8	1.2	2.7	1.8
457 x 1200 [1.66]	400	0.10	168	--	--	--	1.2	0.9	1.8	1.2
		0.15	253	5.4	2.9	--	1.5	1.2	2.4	1.8
		0.20	337	9.5	5.2	--	2.1	1.5	3.0	2.1
		0.25	421	14.9	8.1	--	2.4	1.8	3.7	2.4
610 x 1200 [2.22]	400	0.10	226	3.3	--	--	1.2	0.9	1.8	1.2
		0.15	338	7.5	3.2	--	1.5	1.2	2.4	1.8
		0.20	451	13.4	5.6	--	2.1	1.5	3.0	2.1
		0.25	564	20.9	8.8	17	2.4	1.8	3.7	2.4
762 x 1200 [2.78]	400	0.10	282	4.1	--	--	1.2	0.9	1.8	1.2
		0.15	423	9.3	2.5	--	1.5	1.2	2.4	1.8
		0.20	564	16.6	4.5	16	2.1	1.5	3.0	2.1
		0.25	706	25.9	7.0	24	2.4	1.8	3.7	2.4
610 x 1500 [2.79]	400	0.10	284	4.2	--	--	1.5	0.9	2.1	1.5
		0.15	425	9.4	--	--	2.1	1.5	3.0	2.1
		0.20	567	16.7	4.4	--	2.7	1.8	4.0	2.7
		0.25	709	26.0	6.9	22	3.4	2.1	4.9	3.4
762 x 1500 [3.49]	500	0.10	355	3.1	--	--	1.5	0.9	2.1	1.5
		0.15	532	7.0	2.6	--	2.1	1.5	3.0	2.1
		0.20	709	12.4	4.6	--	2.7	1.8	4.0	2.7
		0.25	887	19.4	7.1	17	3.4	2.1	4.9	3.4
915 x 900 [2.48]	500	0.10	252	--	--	--	0.9	0.6	1.2	0.9
		0.15	378	4.8	2.5	--	1.2	0.9	1.8	1.2
		0.20	505	8.5	4.5	--	1.5	1.2	2.4	1.5
		0.25	631	13.2	7.0	--	2.1	1.5	3.0	2.1
915 x 1200 [3.34]	500	0.10	339	3.0	--	--	1.2	0.9	1.8	1.2
		0.15	509	6.7	2.6	--	1.5	1.2	2.4	1.8
		0.20	679	11.9	4.7	--	2.1	1.5	3.0	2.1
		0.25	848	18.5	7.3	17	2.4	1.8	3.7	2.4
1219 x 1050 [3.88]	500	0.10	395	3.4	--	--	1.2	0.9	1.8	1.2
		0.15	592	7.7	--	--	1.5	1.2	2.4	1.8
		0.20	789	13.7	4.0	--	2.1	1.5	3.0	2.1
		0.25	986	21.4	6.2	22	2.4	1.8	3.7	2.4
1219 x 1200 [4.46]	630	0.10	453	--	--	--	1.2	0.9	1.8	1.2
		0.15	679	5.1	--	--	1.5	1.2	2.4	1.8
		0.20	905	9.1	4.0	--	2.1	1.5	3.0	2.1
	630	0.15	679	5.1	--	--	1.5	1.2	2.4	1.8
		0.20	905	9.1	4.0	--	2.1	1.5	3.0	2.1
		0.25	1132	14.2	6.3	--	2.4	1.8	3.7	2.4

Performance Notes:

1. Sound and pressure drop tested in accordance with ASHRAE Standard 70-2006 "Method of Testing for Rating the Performance of Air Outlets and Inlets."
2. Air flow is in Litres per second, L/s.
3. Pressure is in Pascals, Pa.
4. The NC values, sound pressure level, are based on a room absorption of 10 dB, re 10^{-12} watts and one diffuser.
5. ΔT is the difference between the room air temperature 1 m above the floor and the temperature of the supply air.
6. Proximity to outlet is the minimum distance from an outlet to the occupant in order to achieve the listed DR value.
7. Distances closer to the diffuser have a higher DR than the cataloged value.
8. DR is the predicted percentage of people dissatisfied (PPD) due to draft. A value of less than 20 meets the requirements of ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy.
9. Blanks (--) indicate that the DR is below the specified value at all distances from the diffuser face.
10. DR catalog data is presented for an occupant density of 25 people/100m², which is the default occupancy density for classrooms (ages 5-8) given by ASHRAE 62.1-2004. For other occupant densities, please refer to the DV Room Designer Software.
11. Performance data for standard diffusers not listed in the catalog is available in Price AIO Software.

For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

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DFXi Series

Product Information

Price DFXi displacement diffusers are designed to supply fresh air directly to the occupants and equipment within an industrial or high traffic space. The DFXi diffuser is constructed with support mullions on 12" increments and utilizes a corrugated face for increased rigidity.

The DFXi is suitable for high traffic and high user areas such as gymnasiums or any industrial environment where large air volumes may be required and air quality is a concern. Due to the strength and rigidity of this diffuser it is also a good choice for gymnasiums and other public spaces. The DFXi is available in 1, 2, 3, or 4 way discharge patterns.

Features

- Floor mounted.
- Corrugated face for added rigidity.
- Mullions at every 12" (305 mm) for increased strength.
- Large air volumes.
- Variable height to meet airflow. requirements: 12" (305 mm) to 96" (2438mm) in 1" (25 mm) increments.
- Can be used in non-industrial applications such as school gymnasiums.
- Ships with protective film on face and inlet.

Construction/Finish: DFXi

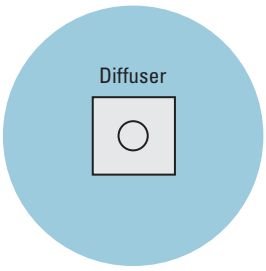
- Diffuser Frame and Equalization Baffle – Aluminum
- Side, Top, and Bottom Panels – Steel
- Perforated Panels – Corrugated Steel
- Finish – B12 White (Standard)

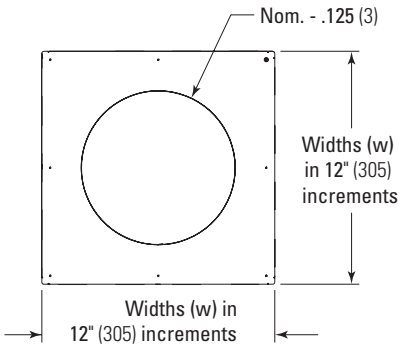
For optional and special finishes see color matrix.

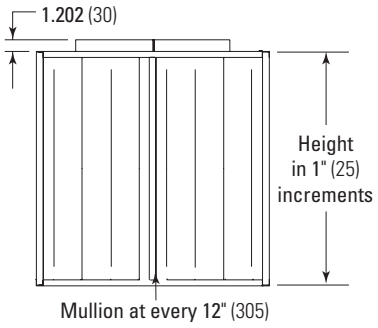
Options

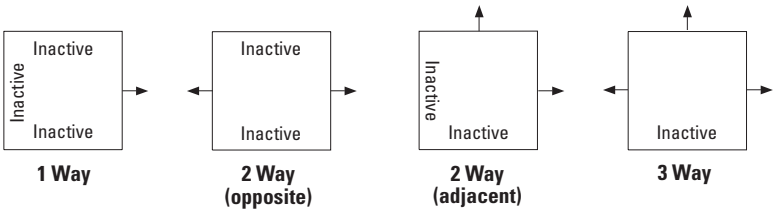
- 1, 2, 3, or 4 active sides.
- Forklift arm supports.

Air Pattern





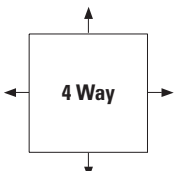




Standard Size Range: W x W x H*
Imperial (inches)/Metric (mm)

Minimum
12 x 12 x 12 (305 x 305 x 305)
Maximum
12 x 12 x 12 (1219 x 1219 x 2438)

*Note: Square units only



Sample Sizes - Imperial (inches)

W x H	Inlet
24 x 36	10, 12, 14, 16, 18, 20
36 x 60	16, 18, 20, 22, 24, 26, 28, 30, 32
48 x 60	24, 26, 28, 30, 32, 34, 36, 38, 40, 42
48 x 72	24, 26, 28, 30, 32, 34, 36, 38, 40, 42

Sample Sizes - Metric (mm)

W x H	Inlet
(610 x 914)	250, 315, 400, 500
(914 x 1524)	400, 500, 630, 800
(1219 x 1524)	630, 800, 1000
(1219 x 1829)	630, 800, 1000

For a complete list of standard sizes and inlets, refer to www.priceindustries.com/resources/type/literature/submittals

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For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

Performance Data — Imperial Units

Unit Size (W x H) [in]	Face Area [ft²]	Inlet Size [in]	Face Velocity [fpm]	Airflow [cfm]	Total Pressure [in. w.g.]	Static Pressure [in. w.g.]	Noise Criteria
24 x 36	23.17	16	40	927	0.04	0.01	--
			70	1622	0.12	0.03	32
			100	2317	0.24	0.06	44
36 x 60	58.75	22	40	2350	0.08	0.03	24
			70	4113	0.23	0.08	43
			100	5875	0.48	0.17	55
48 x 60	78.33	28	40	3133	0.05	0.01	28
			70	5483	0.15	0.04	47
			100	7833	0.30	0.09	59
48 x 72	94.33	32	40	3773	0.04	0.01	30
			70	6603	0.12	0.03	49
			100	9433	0.25	0.07	61

Performance Notes:

1. Sound and Pressure Drop tested in accordance with ASHRAE Standard 70-2006 (RA 2011) "Method of Testing for Rating the Performance of Air Outlets and Inlets."
2. Airflow is in cubic feet per minute, CFM.
3. Pressure is in inches of water, in.wg.
4. The NC values, sound pressure level, are based on a room absorption of 10 dB, re 10^{-12} watts and one diffuser.
5. Blanks (--) indicate an NC below 15 or a Pressure below 0.01 in.wg.
6. Data for the DFXi is presented for 4-way air flow only. For 1, 2, or 3 way airflow, pressure drop and NC will be less than the cataloged value at the same face velocity.
7. Please refer to www.priceindustries.com for more information on this product.
8. Performance data for diffusers not listed above is available by contacting stratified@priceindustries.com.

For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

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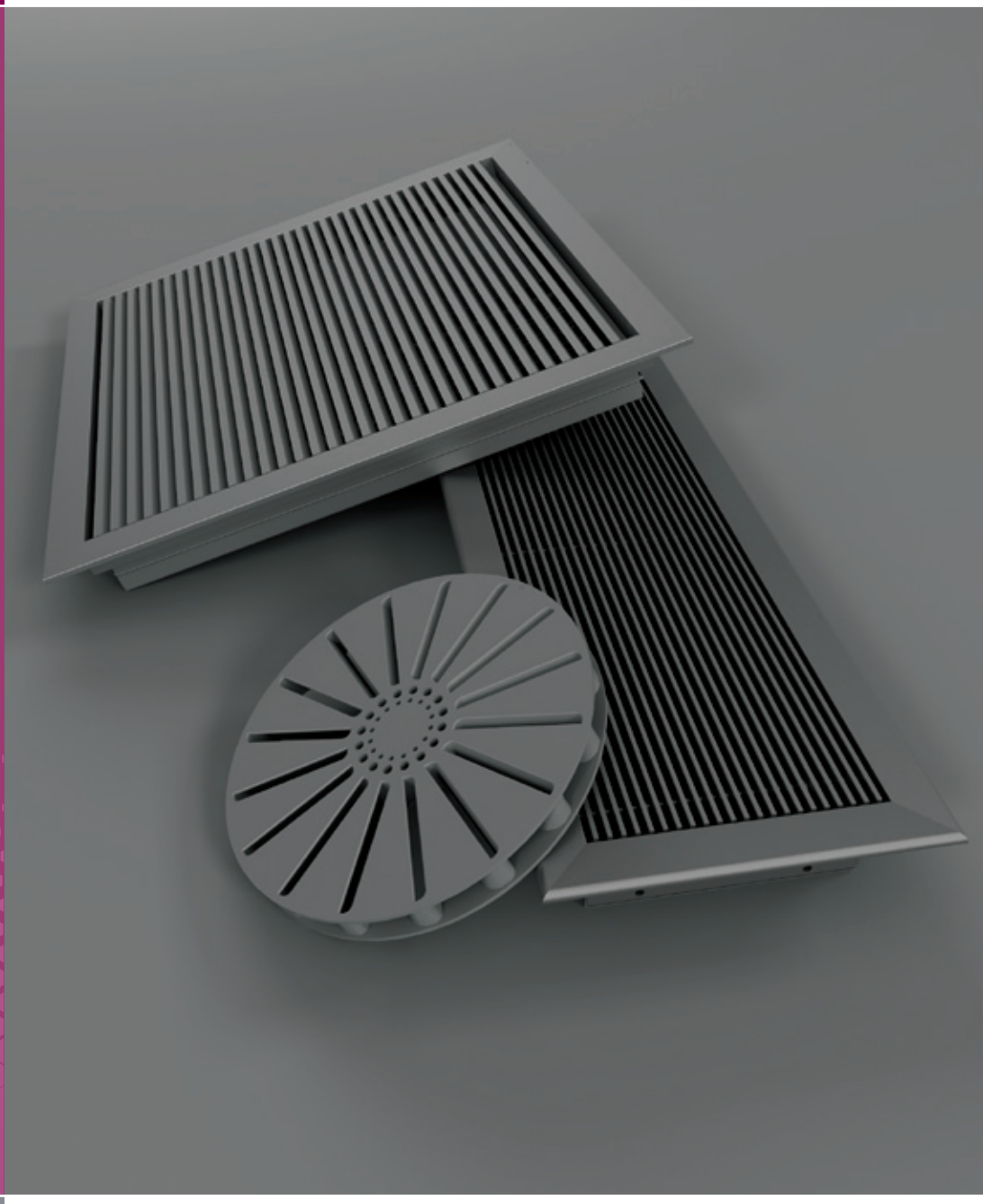
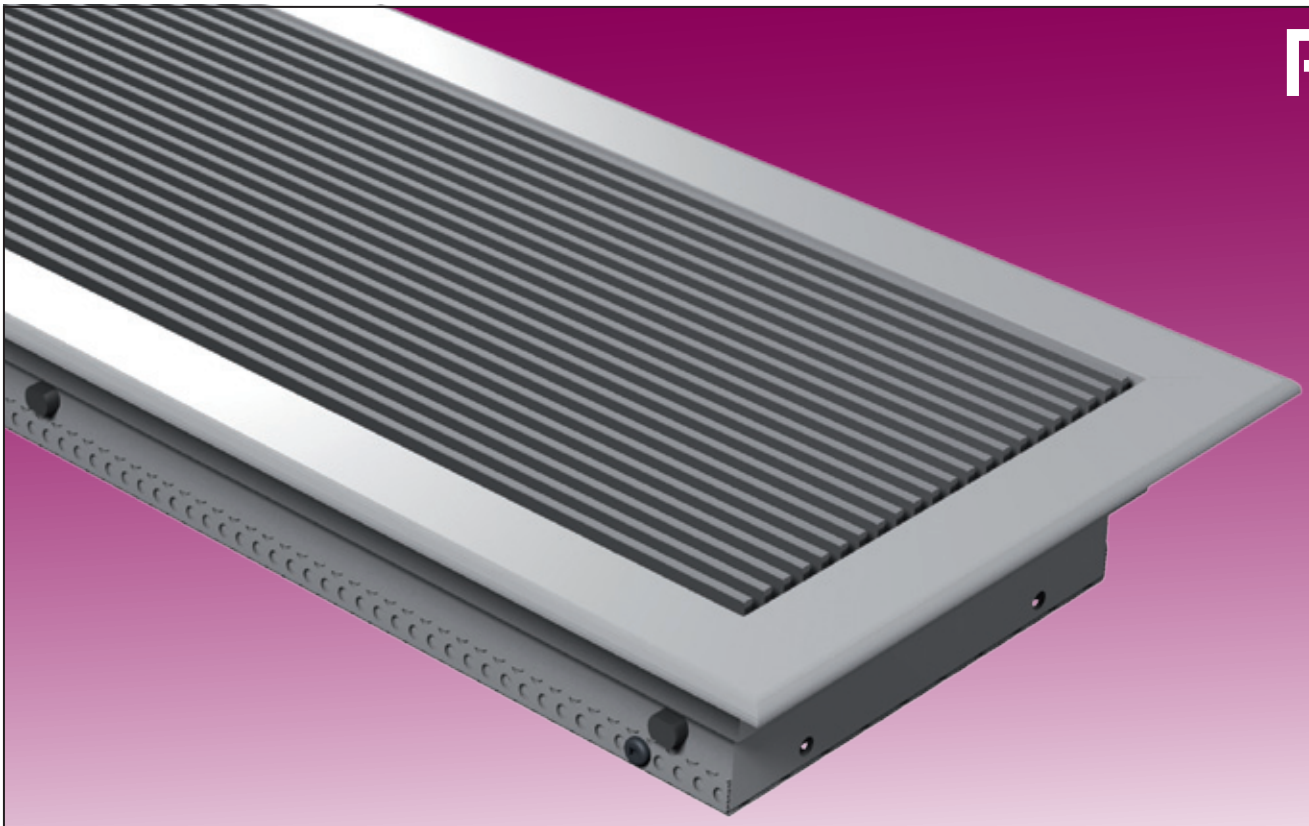
SECTION **J**



Floor Mounted Displacement Diffusers



Floor Mounted Diffusers

Price Floor Mounted Displacement Diffusers create a horizontal, low turbulence displacement flow that achieves a high comfort level for the occupants. Price Floor Mounted Displacement Diffusers can be installed in raised floors or concrete slabs, and are ideally suited for high 'churn' spaces such as offices, theaters, churches, lobbies, and other large public spaces such as casinos and libraries, which see a continual movement of people.

Floor Mounted Family:

- RFDD/ARFHD
- DFG
- DFGL

Easy to install

Integrates into architectual design

Permits individual flow control (model RFDD)

priceindustries.com for additional product information, including product videos and brochures.

Product Overview

Application

The Price Floor Mounted Displacement Diffusers have been designed for use in displacement systems utilizing a raised floor design, and, for some products, recessed installation in concrete floors. The Price line of Displacement Floor Mounted Diffusers provide an excellent means for the efficient, attractive, and safe supply of air through underfloor systems. Displacement systems offer superior indoor air quality when compared to traditional mixing systems, and provide potential for large energy savings. A number of different accessories and mounting options are available to suit a wide range of applications.

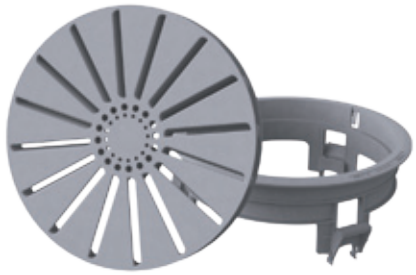
Models and Function

The **RFDD/ARFHD** is a round floor displacement diffuser that is designed for use where non-turbulent horizontal flow is required. The face is designed to provide this displacement-like flow by using narrow slots arranged in a star pattern with a central perforated section. Instead of mixing the room air, the low velocity supply air moves along the floor towards heat sources where it is drawn up by thermal plumes, providing a constant supply of clean, conditioned air to the occupant. Due to this low velocity, non-mixing supply air, diffusers can be placed within 12" (300mm) of occupants with little to no discomfort.

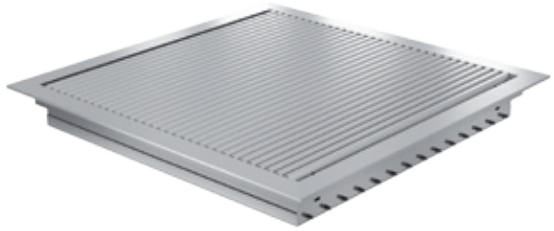
Two material choices are available for these round floor diffusers; one is a fire rated polymer (RFDD), the other is an aluminum core with a galvanized basket (ARFHD). The polymer diffusers are UL2043 certified, meeting NFPA90A code requirements.

The Price **DFG** displacement floor diffusers create a horizontal flow, discharging air evenly across the face of the grille while providing minimal induction of room air. This air pattern is achieved by the fixed, 30-degree deflection face blades and rear mounted adjustable directional vanes. Fixed blades can be set for 1 or 2 way discharge patterns to suit the specific application. Typically, the DFG is placed in the center of a raised floor or floor tiles, but can also be positioned in floor cavities or sills. A nominal size of 10 ½" x 10 ½" (267mm x 267mm) fits perfectly between floor pedestals and ties in seamlessly in other applications due to its small dimensions.

RFDD/ARFHD



DFG



DFGL

In applications where more flexibility in a grille is required, the **DFGL** linear displacement floor grille can provide a good solution. Where the DFG only has one size and one core style available, multiple core styles as well as lengths from 12"-72" (300mm-1829mm) and widths from 6"-12" (150mm - 300mm) can be ordered with the DFGL. All core styles feature fixed blades and have adjustable directional rear vanes. The cool supply air leaves the diffuser evenly at a low velocity to move slowly across the floor, searching for heat sources before being exhausted through high level returns.

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Product Overview

Accessories and Options – Round Floor Diffusers

There are a variety of baskets available for the round floor diffusers. The purpose of these baskets is to provide even distribution of supply air through the diffuser while preventing a sight line through to the building floor. The basket also catches debris that may fall through the diffuser. This decreases housekeeping; the core is simply removed to allow vacuuming and cleaning of the basket. All baskets are constructed of UL 2043 certified black engineered polymer. Other functions are incorporated depending on the basket chosen.

Some applications require that underfloor diffusers be duct mounted, typically to fan power terminal units, for use in spaces with variable occupancy. The **RFB**, round floor boot allows for direct ducting of the Price round floor diffusers for supply of constant volume heating and VAV cooling, or constant volume supply. The RFB is mounted underneath the floor tile holding the round floor diffuser and contains a 6" or 8" connection inlet.

Mounting

The **Zip Clip** is a simple patented method for installing Price Round Floor Diffusers. The advantage of this mounting method is that everything can be done from the room side and installation only takes a few seconds. Some other installation methods, such as spring retainers and threaded nuts, take considerably longer. For installing with the zip clips, place the diffuser ring into the floor. The rings are then slid into their channels. This sandwiches the floor between the top of the ring and the clip. The core can now be locked into place in the ring, effectively securing the entire assembly.

Price rectangular and square floor diffusers have the option of 'A' mounting with countersunk screw fastening or 'B' mounting for spring clip installation. 'A' mounting secures the grille to the floor so that the grille will not move around, even when being stepped on by occupants. 'B' mounting provides a clean look from the room side as there are no visible fasteners.

RFB

Zip Clip

For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

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Floor Mounted Displacement Diffusers
RFDD/ARFHD Series

Product Information

Price RFDD floor displacement diffusers are ideal for use where low induction floor level flow is required. The diffuser slots discharge air in a displacement manner, horizontally across the floor, where it is drawn to heat loads and transports heat and contaminants up to the return grilles in the ceiling.

Price ARFHD floor displacement diffusers, are used where low mixing, horizontal flow is required.The diffuser slots discharge air in a displacement manner, horizontally across the floor, where it can absorb the heat load and rise to the return grilles in the ceiling.

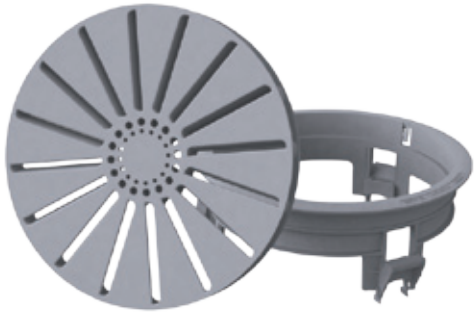
These diffusers create a horizontal flow using narrow slots arranged in a star pattern with a perforated section in the center to resist induction of room air. This generates a low turbulence flow with low velocities to minimize draft when located near seated occupants. This low level discharge is ideal for supplying cool air across the floor of the room and allowing it to rise as the heat load from people and electrical equipment is absorbed. The 8" (200 mm) diameter diffusers can be placed within 24" (610 mm) of a seated occupant while maintaining a draft rate of less than 10% according to ASHRAE 55-2013.

Features

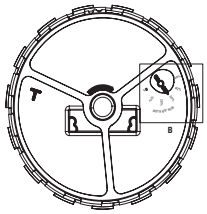
- Fire rated engineered polymer (RFDD) meets NFPA90A requirements.
- Aluminum core and ring (ARFHD).
- Optional variable air volume basket (DBV) for non-ducted VAV applications.
- Core is ready for installation in stepped bore installation. Optional ring press fit and ring law allow for insertion in through-bore floor tiles.
- Complete range of accessory baskets, dampers, fasteners, etc.
- Discharge air volume is adjustable at the diffuser face without removing diffuser from the floor. Minimum air flow is adjustable from 0% to 50% of maximum air flow.
- Diffuser face has positive interlock, reducing the potential for accidental adjustment of diffusers.

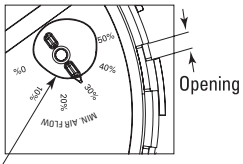
Finish

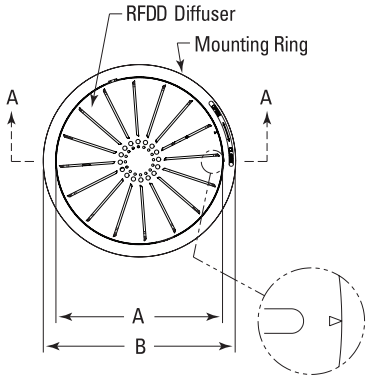
- RFDD - Dusty Gray or Black
- ARFDD - Aluminum

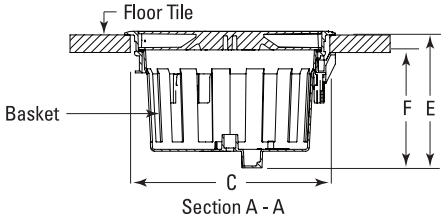


Internal Adjustable Air Flow Limiting Device Detail









Available Sizes - Imperial (inches) Metric (mm)

RFDD	ARFDD
8 (200)	8 (200)

Basket Height - Imperial (inches)

Type	E	F
B	5.75"	5.00"
DB	5.75"	5.00"
DBA	5.75"	5.00"
BS	2.75"	2.00"
DBS	2.75"	2.00"
DBAS	2.75"	2.00"
DBV	7.27"	6.45"

Basket Height - Metric (mm)

Type	E	F
B	146	127
DB	146	127
DBA	146	127
BS	70	51
DBS	70	51
DBAS	70	51
DBV	185	164

Standard Basket:

- DBA = Distributor basket with face adjustable damper

Optional Baskets:

- B = Distributor basket no damper (5" high)
- DB = Distributor basket with damper.
- BS = Short distributor basket with no damper (2" high).
- DBS = Short basket with damper (2" high).
- DBAS = Short basket with face adjustable damper (2" high).
- DBV = Variable volume basket see Page I61.

Diffuser & Mounting Ring - Imperial (inches)

Size (in)	A	B*	C
8	7.810"	9 1/16"	8 7/16"

*RFDD only.

Diffuser & Mounting Ring - Metric (mm)

Size (mm)	A	B*	C
8	198	230	214

*RFDD only.

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Performance Data - Imperial Units

	Pressure (in. w.g.)	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12
No basket	Air Flow (cfm)	27	32	37	41	45	49	53	57	60	64
	Sound (NC)	-	-	-	-	-	-	-	-	-	16
DB Basket Damper Full Open	Air Flow (cfm)	27	33	37	41	45	49	53	56	59	62
	Sound (NC)	-	-	-	-	-	-	-	-	16	18
DBV 100% open	Air Flow (cfm)	26	31	35	39	43	47	50	54	57	60
	Sound (NC)	-	-	-	-	-	-	-	-	16	17
DBS Basket No Damper	Air Flow (cfm)	27	31	36	40	44	47	51	54	57	60
	Sound (NC)	-	-	-	-	-	-	-	-	15	16
6" RBC Collar No Damper (ducted)	Air Flow (cfm)	28	33	37	42	45	49	52	56	59	62
	Sound (NC)	-	-	-	-	-	-	-	-	-	16
RFB 8" Inlet Damper Full Open (ducted)	Air Flow (cfm)	28	33	37	41	45	49	52	56	59	62
	Sound (NC)	-	-	-	-	-	-	-	16	18	19

Performance Notes:

1. Units are tested in accordance with ASHRAE Standard 70-2006 (RA 2011).
2. Air flow is in cubic feet per minute, cfm.
3. SP - Static pressure is in inches of water, in. w.g.
4. NC levels are based on a room absorption of 10 dB, re10^{-12} watts and one diffuser.
5. Blanks (--) signifies individual diffusers have been lab tested and verified to achieve noise levels below NC-15 in accordance with ASHRAE-70.
6. Ducted indicates the Basket is direct ducted to a supply source.
7. Plenum indicates the Basket is sourced from a pressurized plenum.
8. All RFB data tested with damper fully open where applicable.
9. DB applies to B, DB, and DBA baskets.

RFDD - Insertion Loss

Octave Band	2	3	4	5	6	7
Center Frequency (Hz)	125	250	500	1000	2000	4000
Loss (dB)	1	0	2	3	5	6

Performance Data - Metric Units

	Pressure (Pa)	7	10	12	15	17	20	22	25	27	30
No basket	Air Flow (L/s)	13	15	17	19	21	23	25	27	28	30
	Sound (NC)	-	-	-	-	-	-	-	-	-	16
DB Basket Damper Full Open	Air Flow (L/s)	13	15	18	20	21	23	25	26	28	29
	Sound (NC)	-	-	-	-	-	-	-	-	16	18
DBV 100% open	Air Flow (L/s)	12	14	17	19	20	22	24	25	27	28
	Sound (NC)	-	-	-	-	-	-	-	-	16	17
DBS Basket No Damper	Air Flow (L/s)	13	15	17	19	21	22	24	26	27	28
	Sound (NC)	-	-	-	-	-	-	-	-	15	16
6" RBC Collar No Damper (ducted)	Air Flow (L/s)	13	16	18	20	21	23	25	26	28	29
	Sound (NC)	-	-	-	-	-	-	-	-	-	16
RFB 8" Inlet Damper Full Open (ducted)	Air Flow (L/s)	13	15	18	19	21	23	25	26	28	29
	Sound (NC)	-	-	-	-	-	-	-	16	18	19

Performance Notes:

1. Units are tested in accordance with ASHRAE Standard 70-2006 (RA 2011).
2. Air flow is in liters per second, L/s.
3. SP - Static pressure is in Pascals, Pa.
4. NC levels are based on a room absorption of 10 dB, re10^{-12} watts and one diffuser.
5. Blanks (--) signifies individual diffusers have been lab tested and verified to achieve noise levels below NC-15 in accordance with ASHRAE-70.
6. Ducted indicates the Basket is direct ducted to a supply source.
7. Plenum indicates the Basket is sourced from a pressurized plenum.
8. All RFB data tested with damper fully open where applicable.
9. DB applies to B, DB, and DBA baskets.

RFDD - Insertion Loss

Octave Band	2	3	4	5	6	7
Center Frequency (Hz)	125	250	500	1000	2000	4000
Loss (dB)	1	0	2	3	5	6

For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

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Performance Data - Imperial Units

Unit Size Dia. [in]	Air Flow [cfm]	Proximity to Outlet [ft]			
		ΔT = 5 °F		ΔT = 10 °F	
		DR		DR	
		15%	20%	15%	20%
8" RFDD/ARFHD	20	--	--	--	--
	30	--	--	--	--
	40	--	--	--	--
	50	--	--	--	--

Performance Notes:

1. ΔT is the under-temperature which is the difference between the room air temperature 3 1/2 ft above the floor and the temperature of the supply air.
2. Proximity to outlet is the minimum distance from an outlet to occupant in order to achieve the listed DR value.
3. DR is the predicted percentage of people dissatisfied (PPD) due to draft. A value of less than 20 meets the requirements of ASHRAE Standard 55-2013, Thermal Environmental Conditions for Human Occupancy.
4. DR catalog data is presented for an occupant density of 25 people/1000 ft^2, which is the default occupancy density for classrooms (ages 5-8) given by ASHRAE 62.1-2013. For other occupant densities, please refer to the DV Room Designer Software.

Performance Data - Metric Units

Unit Size Dia. [mm]	Air Flow [L/s]	Proximity to Outlet [m]			
		ΔT = 2.8 °C		ΔT = 5.6 °C	
		DR		DR	
		15%	20%	15%	20%
200 mm RFDD/ARFHD	9	--	--	--	--
	14	--	--	--	--
	19	--	--	--	--
	24	--	--	--	--

Performance Notes:

1. ΔT is the under-temperature which is the difference between the room air temperature 1 meter above the floor and the temperature of the supply air.
2. Proximity to outlet is the minimum distance from an outlet to occupant in order to achieve the listed DR value.
3. DR is the predicted percentage of people dissatisfied (PPD) due to draft. A value of less than 20 meets the requirements of ASHRAE Standard 55-2013, Thermal Environmental Conditions for Human Occupancy.
4. DR catalog data is presented for an occupant density of 25 people/100 m^2, which is the default occupancy density for classrooms (ages 5-8) given by ASHRAE 62.1-2013. For other occupant densities, please refer to the DV Room Designer Software.

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DFGL Series

Product Information

Price DFGL displacement floor grilles provide a uniform low velocity flow into a space, with minimal turbulence or induction of room air. Best suited for linear perimeter applications, the DFGL may be installed with a continuous or segmented look and is typically used in raised floors, floor cavities, or on the top of sills. The cool supply air flows across the floor and gradually fills the occupied space. The superior air quality and low noise levels associated with the DFGL make it suitable for office spaces, places of worship, galleries, museums, schools, or any application that demands a comfortable, quiet space.

Features

- Extruded aluminum frame with reinforcing support bars.
- 1 or 2 way discharge patterns.
- Variety of core styles and fasteners.
- Integrated equalization baffle.
- Ships with protective film on face.
- Pencil proofs models available: examples 25C, 26C, 27C.

Options

- 3 flanged frames available: Type 750, 1000, 1250.
- Fastening options:
  - "A" Fastening: countersunk screws (Frames 1000 and 1250).
  - "B" Fastening - spring clips.
  - "0" Fastening - no holes.
  - "H" Fastening - straight holes (Frame 750).
- Multiple core styles available.
- Optional black perforated baffle.

Construction/Finish

- Extruded Frame with Reinforcing Support Bars – Aluminum
- Extruded Core – Aluminum
- Pressed Core Construction
- Perforated Baffle – Aluminum
- Finish – B12 White (Standard)

For optional and special finishes please see color matrix.

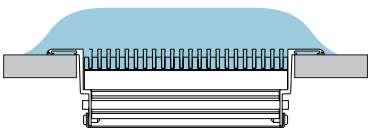
Available Sizes

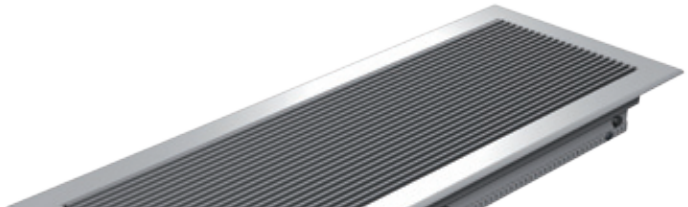
Length: Minimum 12" (300 mm). Maximum 72" (1829 mm) per section.

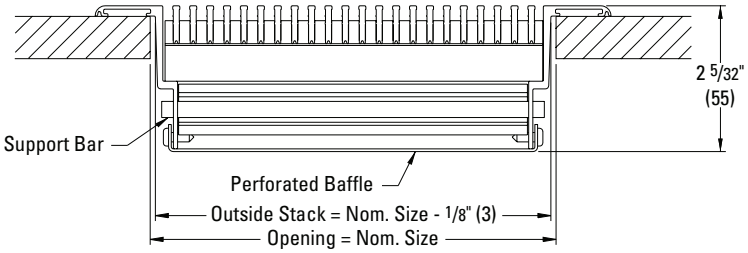
Width: Minimum 6" (150 mm). Maximum 12" (305 mm).

Multiple section lengths are provided with alignment splice plates.

Air Pattern

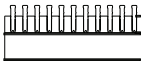




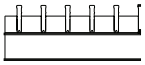


Available Core Styles

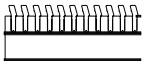
15A — 0° Deflection, 1/4" (6) Spacing



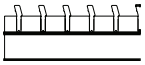
15B — 0° Deflection, 1/2" (13) Spacing



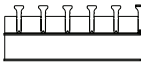
16A — 15° Deflection, 1/4" (6) Spacing



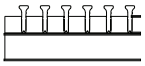
16B — 15° Deflection, 1/2" (13) Spacing



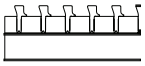
25B — 0° Deflection, 1/2" (13) Spacing



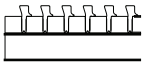
25C — 0° Deflection, 7/16" (11) Spacing



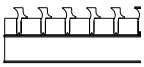
26B — 15° Deflection, 1/2" (13) Spacing



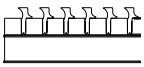
26C — 15° Deflection, 7/16" (11) Spacing

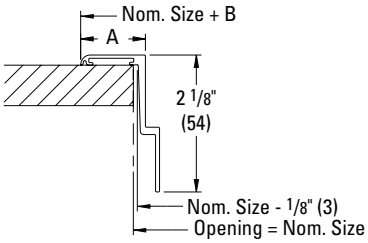


27B — 30° Deflection, 1/2" (13) Spacing



27C — 30° Deflection, 7/16" (11) Spacing





Flanged Mount Detail - Imperial (inches)/Metric (mm)

Frame	Dimension A	Dimension B
750	3 1/4(19)	1 1/8 (29)
1000	1 (25)	1 5/8 (41)
1250	1 1/4(32)	2 1/8(54)

DISPLACEMENT VENTILATION

For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

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Performance Data — Imperial Units

Unit Size L x W (in.) [Face Area (ft^2)]	Face Velocity (fpm)	Air Flow (cfm)	Total Pressure (in. w.g.)	Static Pressure (in. w.g.)	Noise Criteria (NC)	Proximity to Outlet (ft)			
						ΔT = 5 °F		ΔT = 10 °F	
						DR		DR	
						15%	20%	15%	20%
24 x 12 [1.9]	20	38	--	--	--	--	--	--	--
	30	57	--	---	--	--	--	--	--
	40	76	0.01	0.01	--	--	--	--	--
	50	95	0.02	0.02	--	--	--	1	--
48 x 12 [3.8]	20	77	--	--	--	--	--	--	--
	30	115	--	--	--	--	--	1	--
	40	154	0.01	0.01	--	--	--	3	--
	50	192	0.02	0.02	--	--	--	4	1
72 x 12 [5.8]	20	116	--	--	--	--	--	1	--
	30	173	--	--	--	--	--	4	1
	40	231	--	--	--	2	--	5	2
	50	289	0.01	0.01	--	3	--	8	4

Performance Notes:

1. Sound and pressure drop tested in accordance with ASHRAE Standard 70-2006 (RA 2011) "Method of Testing for Rating the Performance of Air Outlets and Inlets."
2. Air flow is in cubic feet per minute, cfm.
3. Pressure is in inches of water, in. w.g.
4. The NC values, sound pressure level, are based on a room absorption of 10 dB, re 10^{-12} watts and one diffuser.
5. ΔT is the difference between the room air temperature 3 ½ ft above the floor and the temperature of the supply air.
6. Proximity to outlet is the minimum distance from an outlet to the occupant in order to achieve the listed DR value.
7. Distances closer to the diffuser have a higher DR than the cataloged value.
8. DR is the predicted percentage of people dissatisfied (PPD) due to draft. A value of less than 20 meets the requirements of ASHRAE Standard 55-2013, Thermal Environmental Conditions for Human Occupancy.
9. Blanks (--) indicate that the DR is below the specified value at all distances from the diffuser face.
10. DR catalog data is presented for an occupant density of 25 people/1000 ft^2, which is the default occupancy density for classrooms (ages 5-8) given by ASHRAE 62.1-2013. For other occupant densities, please refer to the DV Room Designer Software.
11. Performance data for standard diffusers not listed in the catalog is available in Price AIO Software.

Performance Data — Metric Units

Unit Size L. x W (mm) [Face Area (m^2)]	Face Velocity (m/s)	Air Flow (L/s)	Total Pressure (Pa)	Static Pressure (Pa)	Noise Criteria (NC)	Proximity to Outlet (m)			
						ΔT = 2.8 °C		ΔT = 5.6 °C	
						DR		DR	
						15%	20%	15%	20%
600 x 300 [0.19]	0.10	19	-	-	-	--	--	--	--
	0.15	28	-	-	-	--	--	--	--
	0.20	38	2	2	-	--	--	--	--
	0.25	47	5	5	-	--	--	0.3	--
1200 x 300 [0.37]	0.10	38	-	-	-	--	--	--	--
	0.15	57	-	-	-	--	--	0.3	--
	0.20	76	2	2	-	--	--	0.9	--
	0.25	94	5	5	-	--	--	1.2	0.3
1825 x 300 [0.56]	0.10	57	-	-	-	--	--	0.3	--
	0.15	85	-	-	-	--	--	1.2	0.3
	0.20	113	-	-	-	0.6	--	1.5	0.6
	0.25	142	2	2	-	0.9	--	2.4	1.2

Performance Notes:

1. Sound and pressure drop tested in accordance with ASHRAE Standard 70-2006 (RA 2011) "Method of Testing for Rating the Performance of Air Outlets and Inlets."
2. Air flow is in Litres per second, L/s.
3. Pressure is in Pascals, Pa.
4. The NC values, sound pressure level, are based on a room absorption of 10 dB, re 10^{-12} watts and one diffuser
5. ΔT is the difference between the room air temperature 1 m above the floor and the temperature of the supply air.
6. Proximity to outlet is the minimum distance from an outlet to the occupant in order to achieve the listed DR value.
7. Distances closer to the diffuser have a higher DR than the cataloged value.
8. DR is the predicted percentage of people dissatisfied (PPD) due to draft. A value of less than 20 meets the requirements of ASHRAE Standard 55-2013, Thermal Environmental Conditions for Human Occupancy.
9. Blanks (--) indicate that the DR is below the specified value at all distances from the diffuser face.
10. DR catalog data is presented for an occupant density of 25 people/100 m^2, which is the default occupancy density for classrooms (ages 5-8) given by ASHRAE 62.1-2013. For other occupant densities, please refer to the DV Room Designer Software.
11. Performance data for standard diffusers not listed in the catalog is available in Price AIO Software.

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DFG Series

Product Information

The **Price DFG** floor diffusers create a horizontal flow using fixed extruded face blades and adjustable directional rear vanes. The DFG can be used anywhere round floor diffusers are applied, such as raised floors or floor cavities. The DFG discharges air to the space evenly across the face of the grille with minimal turbulence or induction of room air. The cool supply air flows across the floor and gradually fills the occupied space. The superior air quality and low noise levels realized with the DFG make it suitable for office spaces, churches, galleries and museums, schools, or any application where air quality demands are high.

Features

- Grille face: 30-degree deflection pencil proof, 7/16" blade spacing in 1 or 2 way discharge patterns: (27C-1W and 27C-2W cores).
- Standard directional vanes to spread air from diffuser face.
- Integrated equalization baffle.
- Removable core with core clips.
- Ships with protective film on face.

Options

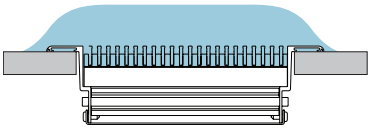
- Three flanged frames availableP: Type 750, 1000, 1250.
- Fastening options:
  - "A" Fastening: countersunk screws (frames 1000 and 1250).
  - "B" Fastening - spring clips.
  - "0" Fastening - no holes.
  - "H" Fastening - straight holes (frame 750).
- 2 Standard core options: 27C-1W, 27C-2W.

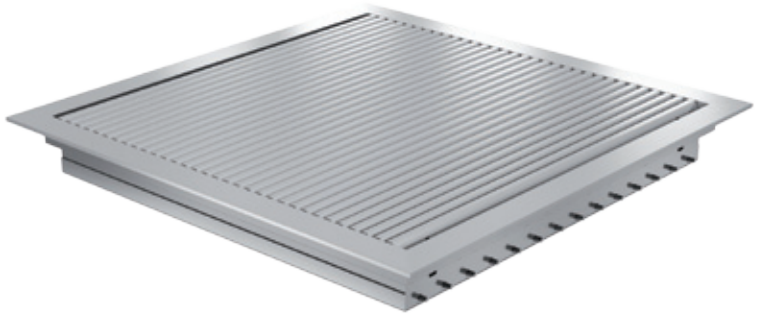
Construction/Finish

- Grille Frames, Core, Supports, and Directional Vanes – Extruded Aluminum
- Equalization Baffle – Aluminum
- Finish - B12 White (Standard)

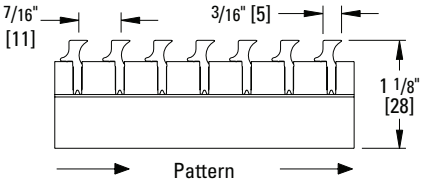
For optional and special finishes please see color matrix.

Air Pattern

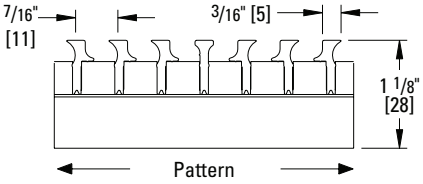


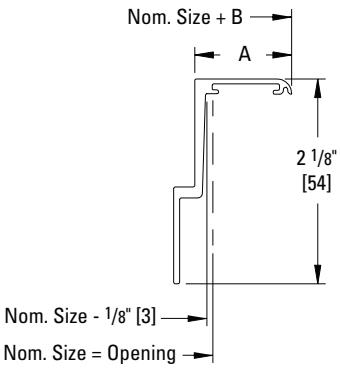


1 Way Core (27C-1W)



2 Way Core (27C-2W)





Nominal Size - (inches)/Metric (mm)

10 1/2 x 10 1/2 (267 x 267)

Flanged Mount Detail - Imperial (inches)/Metric (mm)

Frame	Dimension A	Dimension B
750	3 1/4 (19)	1 1/8 (29)
1000	1 (25)	1 5/8 (41)
1250	1 1/4 (32)	2 1/8 (54)

For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

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Performance Data — Imperial Units

Unit Size L x W [in] Face Area [ft²]	Face Velocity [fpm]	Air Flow [cfm]	Total Pressure [in. w.g.]	Static Pressure [in. w.g.]	Noise Criteria [NC]	Proximity to Outlet [ft]			
						ΔT = 5 °F		ΔT = 10 °F	
						DR		DR	
						15%	20%	15%	20%
10 1/2 x 10 1/2 [0.71]	20	14	--	--	--	1	--	2	1
	30	21	--	--	--	2	1	2	1
	40	28	--	--	--	2	1	3	2
	50	36	--	--	--	2	1	3	2

Performance Notes:

1. Sound and pressure drop tested in accordance with ASHRAE Standard 70-2006 (RA 2011) "Method of Testing for Rating the Performance of Air Outlets and Inlets."
2. Air flow is in cubic feet per minute, cfm.
3. Pressure is in inches of water, in. w.g.
4. The NC values, sound pressure level, are based on a room absorption of 10 dB, re 10^{-12} watts and one diffuser.
5. ΔT is the difference between the room air temperature 3 ½ ft above the floor and the temperature of the supply air.
6. Proximity to outlet is the minimum distance from an outlet to the occupant in order to achieve the listed DR value.
7. Distances closer to the diffuser have a higher DR than the cataloged value.
8. DR is the predicted percentage of people dissatisfied (PPD) due to draft. A value of less than 20 meets the requirements of ASHRAE Standard 55-2013, Thermal Environmental Conditions for Human Occupancy.
9. Blanks (--) indicate that the DR is below the specified value at all distances from the diffuser face.
10. DR catalog data is presented for an occupant density of 25 people/1000ft², which is the default occupancy density for classrooms (ages 5-8) given by ASHRAE 62.1-2013. For other occupant densities, please refer to the DV Room Designer Software.
11. Performance data for standard diffusers not listed in the catalog is available in Price AIO Software.

Performance Data — Metric Units

Unit Size L x W [mm] Face Area [m²]	Face Velocity [m/s]	Air Flow [L/s]	Total Pressure [Pa]	Static Pressure [Pa]	Noise Criteria [NC]	Proximity to Outlet [m]			
						ΔT = 2.8 °C		ΔT = 5.6 °C	
						DR		DR	
						15%	20%	15%	20%
267 x 267 [0.066]	0.10	7	--	--	--	0.3	--	0.6	0.3
	0.15	10	--	--	--	0.6	0.3	0.6	0.3
	0.20	13	--	--	--	0.6	0.3	0.9	0.6
	0.25	17	--	--	--	0.6	0.3	0.9	0.6

Performance Notes:

1. Sound and pressure drop tested in accordance with ASHRAE Standard 70-2006 (RA 2011) "Method of Testing for Rating the Performance of Air Outlets and Inlets."
2. Air flow is in Litres per second, L/s.
3. Pressure is in Pascals, Pa.
4. The NC values, sound pressure level, are based on a room absorption of 10 dB, re 10^{-12} watts and one diffuser.
5. ΔT is the difference between the room air temperature 1 m above the floor and the temperature of the supply air.
6. Proximity to outlet is the minimum distance from an outlet to the occupant in order to achieve the listed DR value.
7. Distances closer to the diffuser have a higher DR than the cataloged value.
8. DR is the predicted percentage of people dissatisfied (PPD) due to draft. A value of less than 20 meets the requirements of ASHRAE Standard 55-2013, Thermal Environmental Conditions for Human Occupancy.
9. Blanks (--) indicate that the DR is below the specified value at all distances from the diffuser face.
10. DR catalog data is presented for an occupant density of 25 people/100m², which is the default occupancy density for classrooms (ages 5-8) given by ASHRAE 62.1-2013. For other occupant densities, please refer to the DV Room Designer Software.
11. Performance data for standard diffusers not listed in the catalog is available in Price AIO Software.

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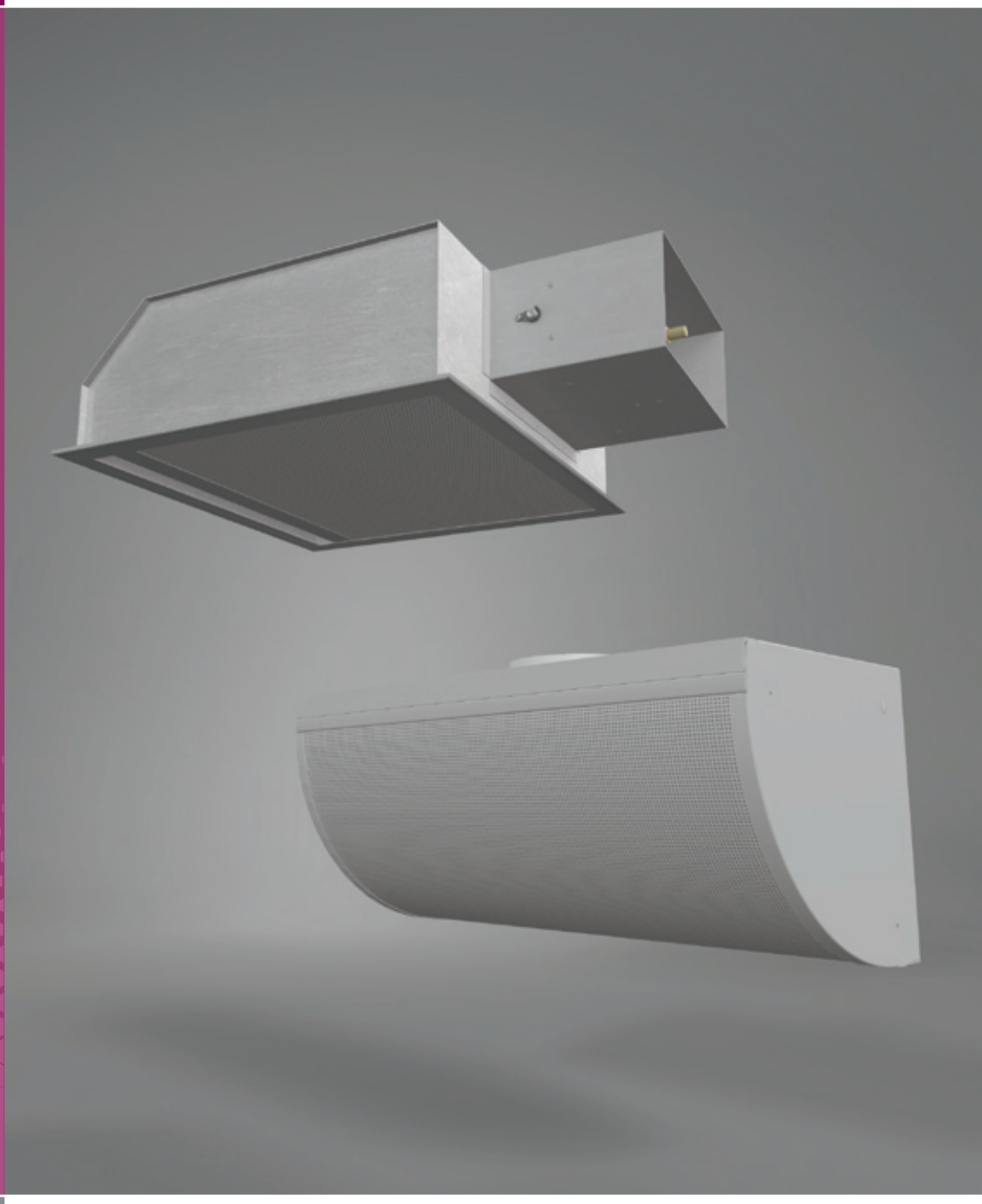
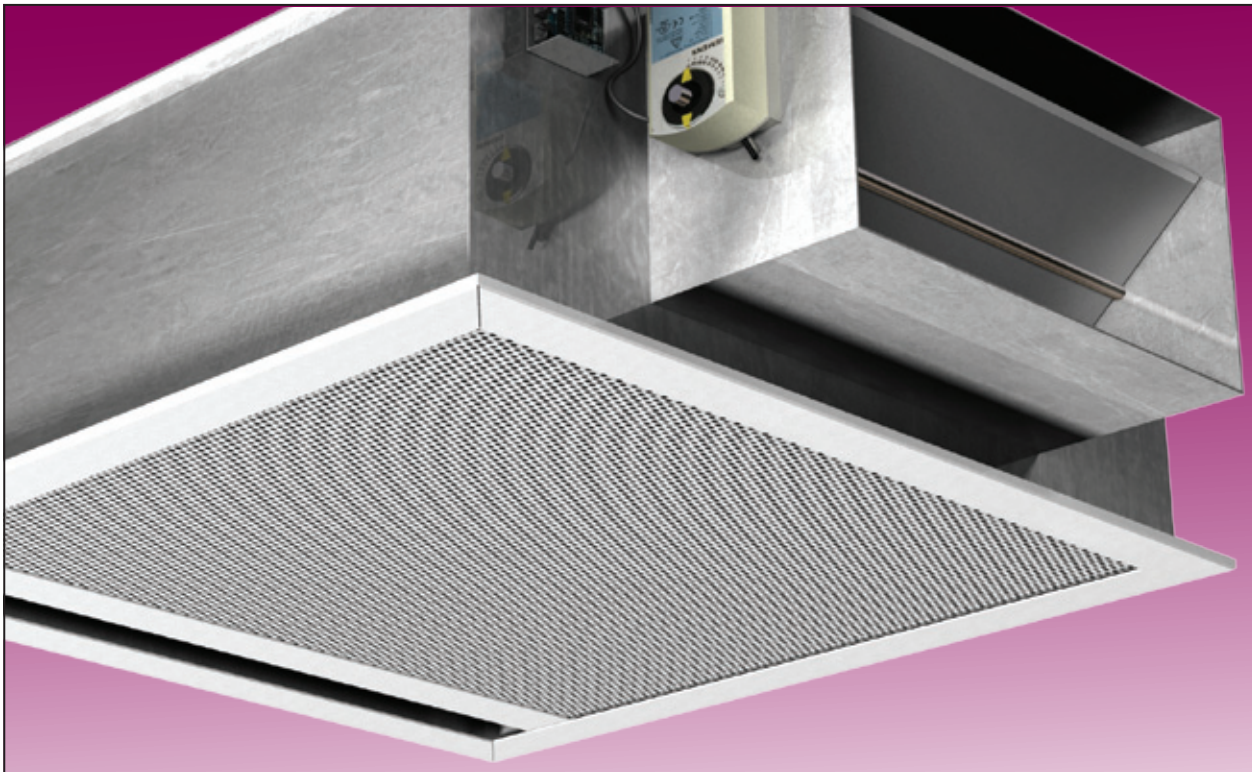
SECTION **J**



Ceiling Mounted Displacement Diffusers

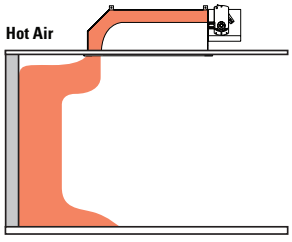


Ceiling Mounted Diffusers

Price Ceiling Mounted Displacement Diffusers provide high quality air to the occupied zone with superior thermal comfort while maximizing available floor space. These diffusers discharge low velocity air across a perforated face. The cool supply air naturally falls to the floor where it slowly spreads across a room, seeking out heat sources. Price Ceiling Mounted displacement diffusers are suitable for varied applications such as offices, classrooms, corridors, and even industrial applications.

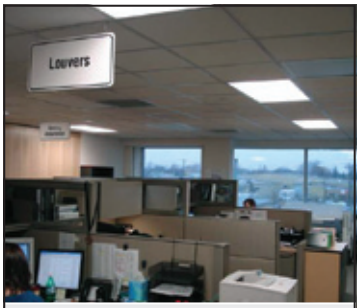
Ceiling Mounted Family:

- DF1L
- DF1L-HC
- DR90H
- DR360-DH



Linear slot for heating – DF1L-HC

Industrial crossover – DR360-DH



Maximizes floor space

Easy integration into standard ceilings – DF1L & DF1L-HC

priceindustries.com for additional product information, including product videos and brochures.

Ceiling Mounted Diffusers

Product Overview

Application

The Price Ceiling Mounted Displacement Diffusers have been designed for easy integration with standard ceilings. The Price line of Ceiling Mounted Diffusers provide an excellent means for the efficient, attractive, and safe supply of air in a number of different applications. Displacement systems offer superior indoor air quality when compared to traditional mixing systems and provide potential for large energy savings.

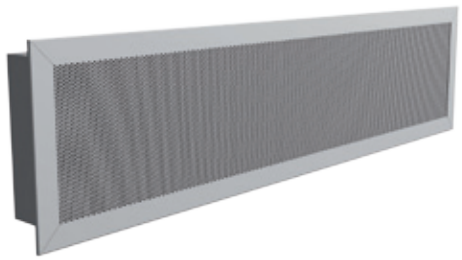
Models/Function

The **DF1L** integrates seamlessly into a standard suspended ceiling system. These diffusers are ideal for displacement retrofits where there is no room for floor or wall mounted displacement diffusers and the associated ductwork. The DF1L simply lays in to the T-bar grid as a conventional ceiling diffuser would. Due to its design, the air is discharged at a low velocity in a cool column of air with little to no entrainment of room air. This supply air pools on the floor, gradually filling the space and seeking out heat sources. Due to the ease of installation and integration with typical construction, the Price model DF1L lends itself to a wide array of applications, including offices, classrooms, conference rooms, corridors, or any application where air quality demands are high and floor space is limited.

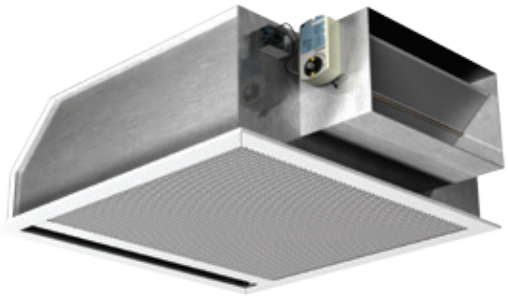
For applications requiring moderate heat as well as cooling capabilities, the **DF1L–HC** is the ideal choice. The DF1L–HC provides the unique flexibility to change the diffuser discharge pattern depending on the supply temperature. During cooling, the air is discharged at a low velocity across the perforated face, slowly falling to the floor. In heating mode, the DF1L-HC discharges high velocity air through a linear slot. This slot is positioned to blow horizontally towards the perimeter, conditioning the exterior walls/windows. This diffuser is ideal for use in perimeter applications where conditioning of exterior glass is required.

The **DR90H** is a 90-degree rounded diffuser designed for use along ceiling corners. These diffusers use the patent pending Rail-Mounting System, and are designed for installation on plaster or drywall. The DR90H is available with solid or perforated duct covers for a continuous look, and can also be used in series connections. The DR90H is suitable for use in areas such as kitchens, corridors, offices, and classrooms.

DF1L



DF1L-HC



DR90H

DR360-DH

The **DR360-DH** provides a full 360-degree radial pattern, discharging air evenly across the entire face. These diffusers have been adapted such that they install directly to ducts, freeing up floor space. Due to the large surface area, these diffusers are well suited to industrial applications where large volumes of air are required, but occupant comfort and high indoor air quality are also considerations. The DR360DH can also be used effectively in large commercial spaces with relatively high ceilings, such as casinos and stages.

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DF1L Series

Product Information

Price DF1L Series displacement diffusers are designed to produce a 1 way low velocity air supply from a suspended ceiling installation. The DF1L discharges air evenly across the perforated face with minimal turbulence or induction of room air. The cool supply air flows from the ceiling down to the floor level and gradually fills the space. The DF1L is designed to be installed in a standard suspended ceiling, freeing up valuable floor space and reducing ducting. The superior air quality and low noise levels make the DF1L suitable for offices, classrooms, theaters, hotels, or any application where air quality demands are high and there is limited floor space.

Features

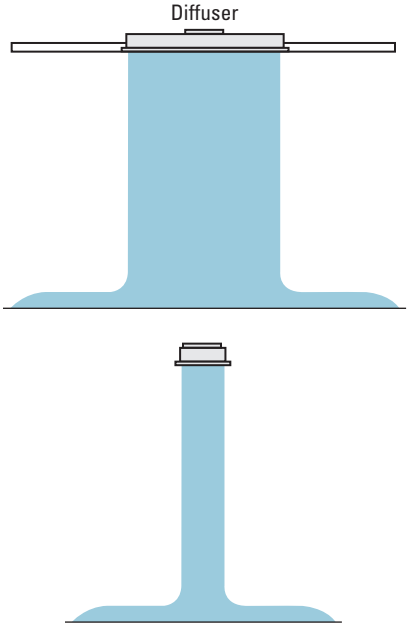
- Suspended ceiling installation.
- Ships with protective film on face and inlet.

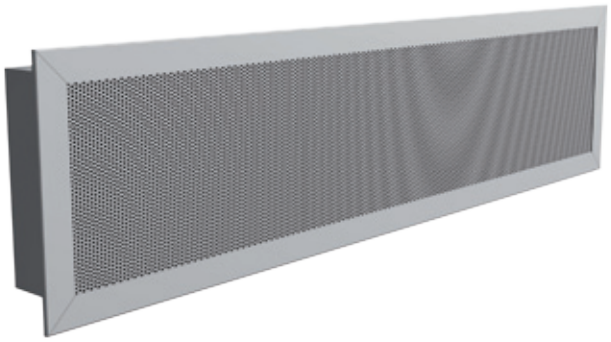
Construction/Finish: DF1L

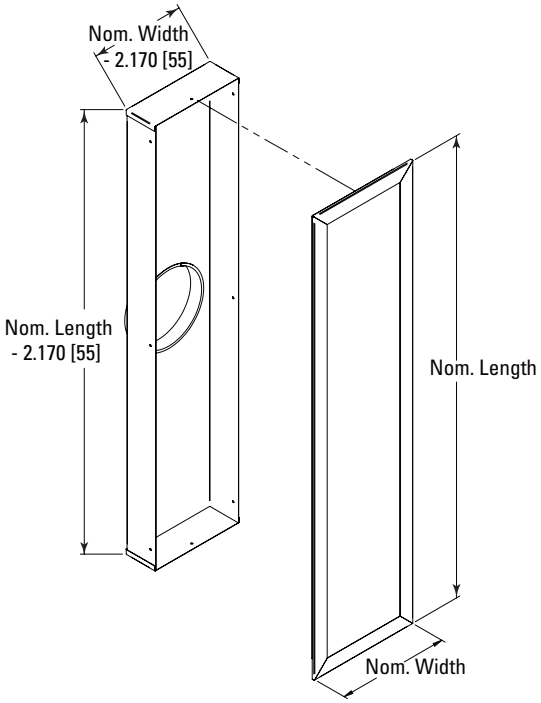
- Equalization Baffle – Aluminum
- Perforated Front Panel and Diffuser Frame – Coated Steel
- Plenum – Coated Steel
- Finish – B12 White (Standard)

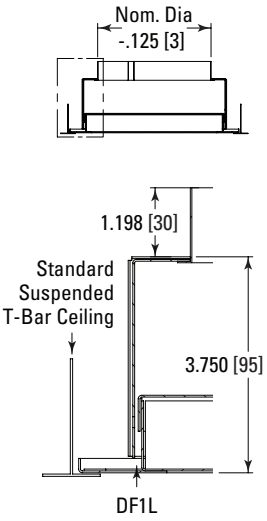
For optional and special finishes see color matrix.

Air Pattern









Dimensional Data - Imperial (inches)

W X L	Duct
12 x 24	6, 8
24 x 24	8, 10, 12
12 x 48	6, 8
24 x 48	8, 10, 12
24 x 72	8, 10, 12, 14

Dimensional Data - Metric (mm)

W X L	Duct
300 x 600	160, 200
600 x 600	200, 250, 315
300 x 1200	160, 200
600 x 1200	200, 250, 315
600 x 1800	200, 250, 315, 400

For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

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Performance Data — Imperial Units

Unit Size W x L [in] Face Area [ft²]	Inlet Size [in]	Face Velocity [fpm]	Air Flow [cfm]	Total Pressure [in. w.g.]	Static Pressure [in. w.g.]	Noise Criteria [NC]	Proximity to Outlet [ft]			
							ΔT = 5 °F		ΔT = 10 °F	
							DR		DR	
							15%	20%	15%	20%
12 x 24 [1.26]	6	20	25	--	--	--	--	--	--	--
		30	38	0.01	0.01	--	--	--	1	--
		40	50	0.02	0.02	--	1	--	2	1
		50	63	0.04	0.03	--	2	--	3	1
24 x 24 [2.99]	8	20	60	--	--	--	0	--	--	--
		30	90	0.02	0.02	--	1	--	2	--
		40	120	0.03	0.03	--	2	--	3	1
		50	150	0.05	0.04	15	3	1	4	2
24 x 48 [6.45]	10	20	129	0.01	0.01	--	1	--	3	1
		30	193	0.03	0.03	--	3	1	5	2
		40	258	0.06	0.05	21	5	2	6	4
		50	322	0.09	0.07	27	6	4	7	5

Performance Notes:

1. Sound and pressure drop tested in accordance with ASHRAE Standard 70-2006 "Method of Testing for Rating the Performance of Air Outlets and Inlets."
2. Air flow is in cubic feet per minute, cfm.
3. Pressure is in inches of water, in. w.g.
4. The NC values, sound pressure level, are based on a room absorption of 10 dB, re 10^{-12} watts and one diffuser.
5. ΔT is the difference between the room air temperature 3 ½ ft above the floor and the temperature of the supply air.
6. Proximity to outlet is the minimum distance from an outlet to the occupant in order to achieve the listed DR value.
7. Distances closer to the diffuser have a higher DR than the cataloged value.
8. DR is the predicted percentage of people dissatisfied (PPD) due to draft. A value of less than 20 meets the requirements of ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy.
9. Blanks (--) indicate that the DR is below the specified value at all distances from the diffuser face.
10. DR catalog data is presented for an occupant density of 25 people/1000ft², which is the default occupancy density for classrooms (ages 5-8) given by ASHRAE 62.1-2004. For other occupant densities, please refer to the DV Room Designer Software.
11. Performance data for standard diffusers not listed in the catalog is available in Price AIO Software.

Performance Data — Metric Units

Unit Size W x L [in] Face Area [m²]	Inlet Size [mm]	Face Velocity [m/s]	Air Flow [L/s]	Total Pressure [Pa]	Static Pressure [Pa]	Noise Criteria [NC]	Proximity to Outlet [m]			
							ΔT = 2.8 °C		ΔT = 5.6 °C	
							DR		DR	
							15%	20%	15%	20%
300 x 600 [0.11]	160	0.10	12	--	--	--	--	--	--	--
		0.15	18	2.60	--	--	--	--	0.3	--
		0.20	24	4.62	3.78	--	0.3	--	0.6	0.3
		0.25	30	7.22	5.90	--	0.6	--	0.9	0.3
600 x 600 [0.27]	200	0.10	28	--	--	--	0.0	--	--	--
		0.15	42	5.23	4.14	--	0.3	--	0.6	--
		0.20	56	9.30	7.36	--	0.6	--	0.9	0.3
		0.25	71	14.53	11.50	16	0.9	0.3	1.2	0.6
600 x 1200 [0.58]	250	0.10	61	3.93	3.00	--	0.3	--	0.9	0.3
		0.15	91	8.84	6.76	--	0.9	0.3	1.5	0.6
		0.20	122	15.71	12.02	21	1.5	0.6	1.8	1.2
		0.25	152	24.55	18.78	28	1.8	1.2	2.1	1.5

Performance Notes:

1. Sound and pressure drop tested in accordance with ASHRAE Standard 70-2006 "Method of Testing for Rating the Performance of Air Outlets and Inlets."
2. Air flow is in Litres per second, L/s.
3. Pressure is in Pascals, Pa.
4. The NC values, sound pressure level, are based on a room absorption of 10 dB, re 10^{-12} watts and one diffuser.
5. ΔT is the difference between the room air temperature 1 m above the floor and the temperature of the supply air.
6. Proximity to outlet is the minimum distance from an outlet to the occupant in order to achieve the listed DR value.
7. Distances closer to the diffuser have a higher DR than the cataloged value.
8. DR is the predicted percentage of people dissatisfied (PPD) due to draft. A value of less than 20 meets the requirements of ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy.
9. Blanks (--) indicate that the DR is below the specified value at all distances from the diffuser face.
10. DR catalog data is presented for an occupant density of 25 people/100m², which is the default occupancy density for classrooms (ages 5-8) given by ASHRAE 62.1-2004. For other occupant densities, please refer to the DV Room Designer Software.
11. Performance data for standard diffusers not listed in the catalog is available in Price AIO Software.

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DF1L-HC Series

Product Information

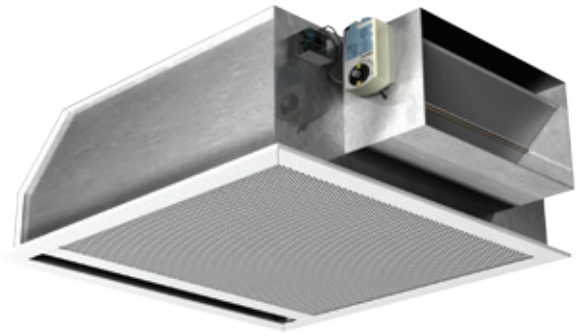
Price DF1L-HC displacement diffusers are intended for mounting in a suspended ceiling installation for applications requiring both cooling and heating. The diffuser is designed to produce a vertical low velocity displacement air pattern when supplying cool air or an adjustable high velocity pattern when supplying heated air. The diffuser switches from cooling to heating mode or vice versa with an electric or thermal actuator. When the DF1L-HC is in cooling mode it discharges air evenly across the perforated face with minimal turbulence or induction of room air. The cool air falls slowly to the floor and gradually fills the space. When the DF1L-HC is in heating mode, it discharges air parallel to the face towards the perimeter with a high velocity jet. The superior air quality and low noise levels make the DF1L-HC suitable for offices, classrooms or any application where air quality demands are high, but there is minimal floor space and a requirement for both cooling and overhead heating.

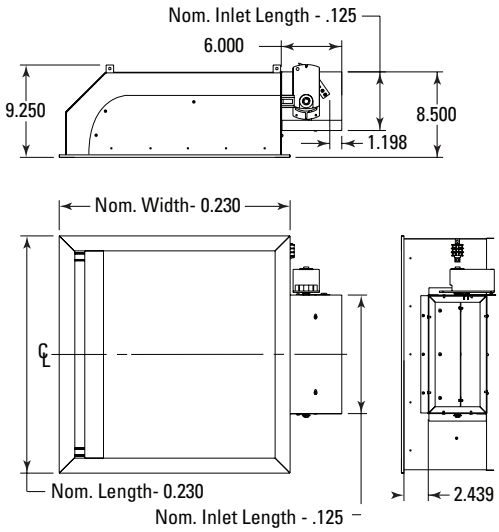
Features

- Suspended ceiling installation.
- Dual plenum facilitates heat-cool changeover.
- Heating provided by standard 1" (25 mm) custom flow (AS) slot diffuser with adjustable pattern controls.
- Ships with protective film on face and inlet.

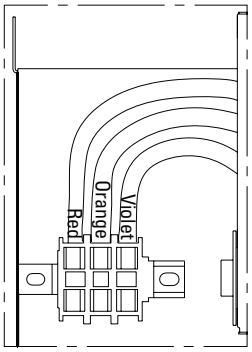
Construction/Finish

- Equalization Baffle – Aluminum
- Perforated Front Panel and Diffuser Frame – Coated Steel
- Plenum – Coated Steel
- Pattern Controllers – Steel
- Finish – B12 White (Standard)





Electric Actuator Wiring Connection



Violet = Clockwise Cooling Mode

Orange = Counterclockwise Heating Mode

Red = Ground

Dimensional Data - Imperial (inches)/Metric (mm)

Nom. L x W	Nom. Inlet L x W
24 x 24 (600 x 600)	12 x 6 (300 x 150)
48 x 24 (1200 x 600)	24 x 6 (600 x 150)

For a complete list of standard sizes and inlets, refer to www.priceindustries.com/resources/type/literature/submittals

For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

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Product Information

For optional and special finishes see color matrix.

Options

- Aluminum foil insulation (1½", 25mm thick).
- Air flow sensing damper (AFSD).
- Actuator options available:
  - Electric actuator (EA), 24V floating point. The electric actuator switches the diffuser from cooling to heating mode or vice versa when it is activated by a duct temperature sensor or signal from the HVAC system.
  - Thermal actuator (TA). For full cooling mode, the thermal actuator requires a cooling supply temperature less than 70°F (21°C). For full heating mode, the thermal actuator requires a heating supply temperature greater than 80°F (27°C). Changeover time between full cooling and heating modes is approximately 10 minutes.

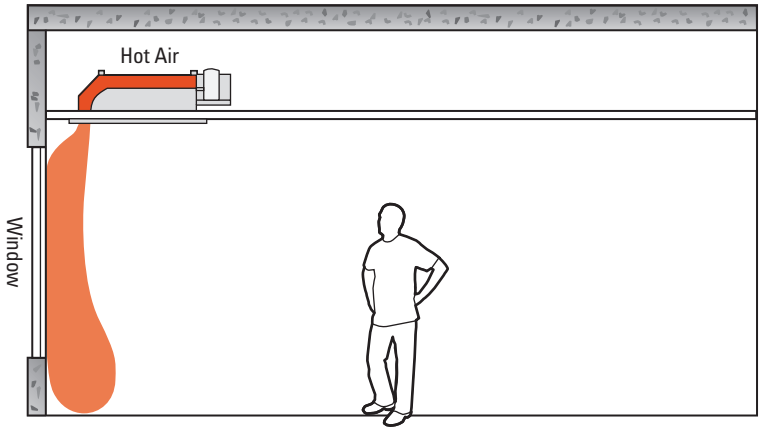
Electric Actuator

The DF1L-HC diffuser is designed to produce an adjustable high or low velocity air pattern when supplying cool or heated air. A 24VAC actuator is provided the on the DF1L-HC, which operates a damper in the neck of the diffuser. In cooling mode this dual-position damper will open a cooling inlet and direct cool air through the larger perforated face; in heating mode it will direct air through the heating inlet to the slot diffuser. Discharging warm air through the slot diffuser will increase velocity and increase the effectiveness of the warm air in the room.The actuator must be provided 24V from the building controls on the clockwise or counterclockwise terminal when the changeover is desired. This can be triggered by a duct temperature sensor, the zone or building controls.

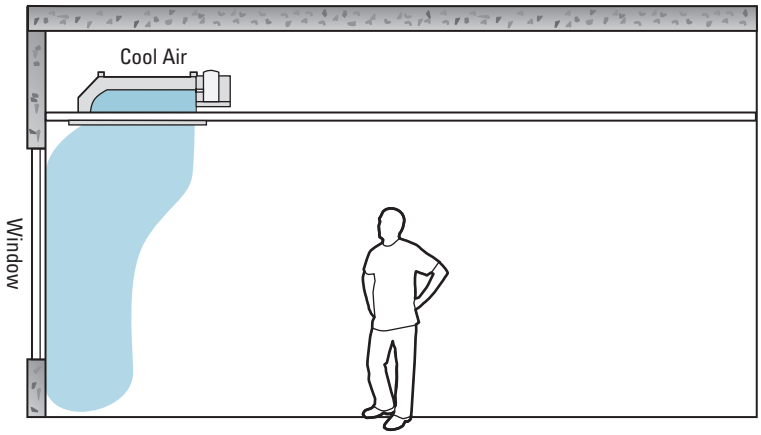
Thermal Actuator (TA).

The DF1L-HC diffuser is designed to automatically provide a low velocity displacement pattern during cooling and a high velocity discharge during heating. An internal thermal actuator mechanism senses supply air temperature and adjusts the air pattern to suit heating or cooling applications. Supply air temperatures of less than 69°F (21° C) will result in the air being directed through the larger perforated face, while supply air temperatures greater than 81°F (27°C) will result in a high velocity discharge through the slot diffuser suitable for heating applications. Changeover time between full cooling and heating modes is approximately 10 minutes.

Air Pattern - Heating



Air Pattern - Cooling



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Performance Data — Cooling Displacement Pattern — Imperial Units

Unit Size L x W [in] Face Area [ft²]	Face Velocity [fpm]	Air Flow [cfm]	Total Pressure [in. w.g.]	Static Pressure [in. w.g.]	Noise Criteria [NC]	Proximity to Outlet [ft]			
						ΔT = 5 °F		ΔT = 10 °F	
						DR		DR	
						15%	20%	15%	20%
24 x 24 [2.6]	20	51	--	--	--	--	--	2	--
	30	77	0.02	0.02	--	1	--	3	1
	40	102	0.04	0.04	--	1	--	3	1
	50	128	0.06	0.06	--	2	--	4	2
48 x 24 [5.5]	20	110	--	--	--	1	--	3	1
	30	165	0.02	0.02	--	2	--	4	2
	40	221	0.04	0.03	--	2	--	5	2
	50	276	0.06	0.05	17	3	1	5	3

Performance Data — Heating Vertical Pattern — Imperial Units

	Neck Velocity, fpm	50	100	150	200	250	300
	Velocity Pressure, in. w.g.	0.000	0.001	0.001	0.002	0.004	0.006
24 x 24 [2.6]	**Total Pressure, in. w.g.**	0.001	0.03	0.07	0.13	0.20	0.29
	Flow Rate, cfm	27	54	81	108	136	163
	NC	--	--	18	26	32	37
	Throw 150, 100, 50	0-1-4	2-4-9	4-7-11	6-9-13	8-10-14	9-11-16
24 x 48 [5.5]	**Total Pressure, in. w.g.**	0.01	0.03	0.06	0.11	0.17	0.25
	Flow Rate, cfm	54	108	162	217	271	325
	NC	--	--	22	30	36	41
	Throw 150, 100, 50	1-1-2	2-2-5	2-4-7	3-5-9	4-6-10	5-7-10

Performance Data — Heating Horizontal Pattern — Imperial Units

	Neck Velocity, fpm	50	100	150	200	250	300
	Velocity Pressure, in. w.g.	0.000	0.001	0.001	0.002	0.004	0.006
24 x 24 [2.6]	**Total Pressure, in. w.g.**	0.001	0.03	0.07	0.13	0.20	0.29
	Flow Rate, cfm	27	54	81	108	136	163
	NC	--	--	18	26	32	37
	Throw 150, 100, 50	0-0-1	0-1-4	1-3-5	2-4-7	3-4-9	4-5-11
24 x 48 [5.5]	**Total Pressure, in. w.g.**	0.01	0.02	0.05	0.09	0.14	0.21
	Flow Rate, cfm	54	108	162	217	271	325
	NC	--	--	22	30	36	41
	Throw 150, 100, 50	0-1-4	2-4-12	4-9-18	8-12-21	10-15-23	12-18-25

Performance Notes:

1. Sound and pressure drop tested in accordance with ASHRAE Standard 70-2006 "Method of Testing for Rating the Performance of Air Outlets and Inlets."
2. Air flow is in cubic feet per minute, cfm.
3. Pressure is in inches of water, in. w.g.
4. The NC values, sound pressure level, are based on a room absorption of 10 dB, re 10^{-12} watts and one diffuser.
5. Blanks (--) indicate that the DR is below the specified value at all distances from the diffuser face.
6. ΔT is the difference between the room air temperature 3 ½ ft above the floor and the temperature of the supply air.
7. Proximity to outlet is the minimum distance from an outlet to the occupant in order to achieve the listed DR value.
8. DR is the predicted percentage of people dissatisfied (PPD) due to draft. A value of less than 20 meets the requirements of ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy.
9. Throw values are given for terminal velocities of 150, 100, 50 fpm.
10. Throw data is based on supply air and room air at isothermal conditions.

For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

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Performance Data — Cooling Displacement Pattern — Metric Units

Unit Size L x W [mm] Face Area [m²]	Face Velocity [m/s]	Air Flow [L/s]	Total Pressure [Pa]	Static Pressure [Pa]	Noise Criteria [NC]	Proximity to Outlet [m]			
						ΔT = 2.8 °C		ΔT = 5.6 °C	
						DR		DR	
						15%	20%	15%	20%
600 x 600 [0.23]	0.10	24	--	--	--	--	--	0.6	--
	0.15	36	--	--	--	0.30	--	0.9	0.30
	0.20	48	--	--	--	0.30	--	0.9	0.30
	0.25	60	3.75	3.32	--	0.61	--	1.2	0.61
1200 x 600 [0.50]	0.10	52	--	--	--	0.30	--	0.9	0.30
	0.15	78	5.02	4.29	--	0.61	--	1.2	0.61
	0.20	104	8.92	7.63	--	0.61	--	1.5	0.61
	0.25	130	13.94	11.92	18	0.91	0.30	1.5	0.91

Performance Data — Heating Vertical Pattern — Metric Units

	Neck Velocity, m/s	0.25	0.51	0.76	1.0	1.3	1.5
	Velocity Pressure, Pa	0.039	0.155	0.349	0.621	0.970	01.396
600 x 600 [0.24]	**Total Pressure, Pa**	2.00	8.01	18.02	32.03	50.04	72.06
	Flow Rate, L/s	13	26	38	51	64	77
	NC	--	--	18	26	32	37
	Throw 0.76, 0.51, 0.25	0-0.30-1.2	0.61-1.2-2.7	1.2-2.1-3.4	1.8-2.7-4.0	2.4-3.0-4.3	2.7-3.4-4.9
600 x 1200 [0.51]	**Total Pressure, Pa**	1.73	6.92	15.58	27.70	43.27	62.32
	Flow Rate, L/s	26	51	77	102	128	153
	NC	--	--	22	30	36	41
	Throw 0.76, 0.51, 0.25	0.30-0.30-0.31	0.60-0.61-1.5	0.61-0.61-1.5	0.91-1.5-2.7	1.2-1.8-3.0	1.5-2.1-3.0

Performance Data — Heating Horizontal Pattern — Metric Units

	Neck Velocity, m/s	0.25	0.51	0.76	1.0	1.3	1.5
	Velocity Pressure, Pa	0.039	0.155	0.349	0.621	0.970	01.396
600 x 600 [0.24]	**Total Pressure, Pa**	2.01	8.05	18.10	32.18	50.28	72.41
	Flow Rate, L/s	13	26	38	51	64	77
	NC	--	--	18	26	32	37
	Throw 0.76, 0.51, 0.25	0-0-0	0-0-1	0-1-2	0-1-3	1-2-4	1-2-5
600 x 1200 [0.51]	**Total Pressure, Pa**	1.44	5.77	12.98	23.08	36.06	51.93
	Flow Rate, L/s	26	51	77	102	128	153
	NC	--	--	22	30	36	41
	Throw 0.76, 0.51, 0.25	0-0-1	0-1-4	1-2-8	2-4-11	3-6-14	4-8-17

Performance Notes:

1. Sound and pressure drop tested in accordance with ASHRAE Standard 70-2006 "Method of Testing for Rating the Performance of Air Outlets and Inlets."
2. Air flow is in Litres per second, L/s.
3. Pressure is Pascals, Pa.
4. The NC values, sound pressure level, are based on a room absorption of 10 dB, re 10^{-12} watts and one diffuser.
5. Blanks (--) indicate that the DR is below the specified value at all distances from the diffuser face.
6. ΔT is the difference between the room air temperature 1 meter above the floor and the temperature of the supply air.
7. Proximity to outlet is the minimum distance from an outlet to the occupant in order to achieve the listed DR value.
8. DR is the predicted percentage of people dissatisfied (PPD) due to draft. A value of less than 20 meets the requirements of ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy.
9. Throw values are given for terminal velocities of 0.76, 0.51, 0.25 m/s.
10. Throw data is based on supply air and room air at isothermal conditions.

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DR360-DH Series

Product Information

The **DR360-DH** is a duct hanging displacement diffuser with a 360° air pattern. It is ideal for duct mounted installations in large atriums, theaters or industrial settings. Designed to look like an extension of the duct, the DR360-DH offers an appealing architectural detail. A unique double opening option is available for mounting as an active section of ductwork.

Features:

- Ships with protective film on face and inlet.

Construction/Finish: DR360-DH

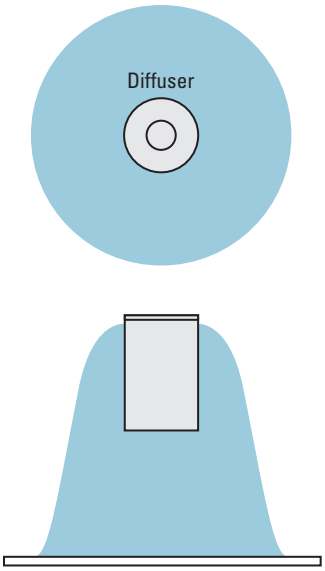
- Diffuser Frame and Equalization Baffle – Aluminum
- Diffuser Caps – Rolled Steel
- Perforated Face – Coated Steel
- Finish – B12 White (Standard)

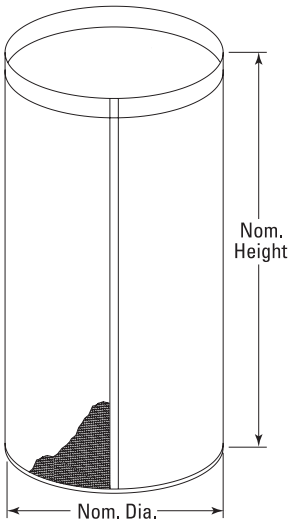
For optional and special finishes see color matrix.

Options

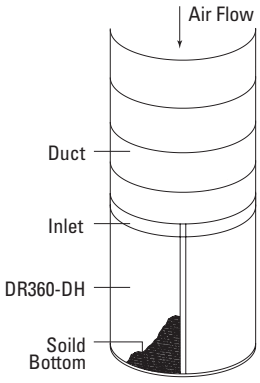
- S - Single opening
- D - Dual opening

Air Pattern

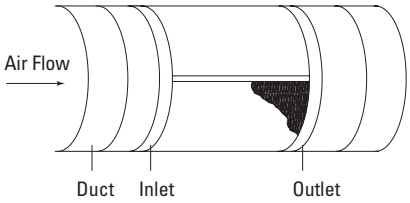




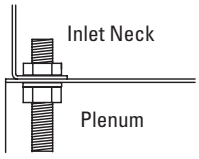
S - Single Opening



D - Dual Opening



Installation Detail



Dimensional Data - Imperial (inches)

Diameter x H	Duct Size
18 x 24	18
18 x 36	18
18 x 48	18
24 x 24	24
24 x 36	24
24 x 48	24
24 x 60	24
30 x 24	30
30 x 36	30
30 x 48	30
30 x 60	30

Dimensional Data - Metric (mm)

Diameter x H	Duct Size
457 x 600	457
457 x 900	457
457 x 1200	457
610 x 600	610
610 x 900	610
610 x 1200	610
610 x 1500	610
762 x 600	762
762 x 900	762
762 x 1200	762
762 x 1500	762

For a complete list of standard sizes and inlets, refer to www.priceindustries.com/resources/type/literature/submittals

For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

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Performance Data — Duct Hanging — Imperial Units

Unit Size Dia. x H [in] Face Area [ft²]	Inlet Size [in]	Face Velocity [fpm]	Air Flow [cfm]	Total Pressure [in. w.g.]	Static Pressure [in. w.g.]	Noise Criteria [NC]	Proximity to Outlet [ft]			
							ΔT = 5 °F		ΔT = 10 °F	
							DR		DR	
							15%	20%	15%	20%
18 x 24 [8.8]	18	20	177	--	--	--	3	2	4	3
		30	265	0.01	--	--	4	3	5	4
		40	353	0.02	0.02	--	5	3	6	4
		50	442	0.03	0.03	--	6	4	7	5
24 x 24 [11.8]	24	20	236	--	--	--	3	2	5	3
		30	354	--	--	--	5	3	6	4
		40	473	0.01	0.01	--	6	4	7	5
		50	591	0.02	0.02	--	7	5	9	6
30 x 24 [14.8]	30	20	296	--	--	--	4	3	5	4
		30	444	--	--	--	5	4	7	5
		40	592	--	--	--	7	4	8	6
		50	740	0.01	0.01	--	8	5	10	7
18 x 36 [13.5]	18	20	270	--	--	--	4	3	5	4
		30	405	0.01	0.01	--	5	4	7	5
		40	540	0.02	0.02	--	6	4	8	6
		50	675	0.04	0.03	--	7	5	10	7
24 x 36 [18]	24	20	361	--	--	--	5	3	6	4
		30	541	0.01	--	--	6	4	8	6
		40	722	0.02	0.02	--	8	5	10	7
		50	902	0.03	0.03	--	9	6	11	8
30 x 36 [22.6]	30	20	452	--	--	--	5	4	7	5
		30	678	--	--	--	7	5	9	6
		40	904	0.01	0.01	--	9	6	11	8
		50	1130	0.02	0.02	--	10	7	13	9
18 x 48 [18.2]	18	20	363	--	--	--	5	3	6	4
		30	545	--	--	--	6	4	8	6
		40	726	--	--	--	8	5	10	7
		50	908	0.01	--	--	9	6	12	8
24 x 48 [24.3]	24	20	486	--	--	--	6	4	7	5
		30	728	0.01	--	--	8	5	10	7
		40	971	0.02	0.01	--	9	7	12	8
		50	1214	0.03	0.02	--	11	8	14	10
30 x 48 [30.4]	30	20	608	--	--	--	7	5	9	6
		30	912	0.01	--	--	9	6	11	8
		40	1216	0.02	0.01	--	11	8	14	10
		50	1520	0.03	0.02	--	13	9	16	11
24 x 60 [30.5]	24	20	610	--	--	--	7	5	9	6
		30	915	--	--	--	9	6	12	8
		40	1220	--	--	--	11	8	14	10
		50	1525	0.01	--	--	13	9	16	12
30 x 60 [38.2]	30	20	764	--	--	--	8	5	10	7
		30	1146	--	--	--	10	7	13	9
		40	1528	0.02	0.01	--	13	9	16	12
		50	1910	0.03	0.02	--	15	11	19	14

Performance Notes:

1. Sound and pressure drop tested in accordance with ASHRAE Standard 70-2006 "Method of Testing for Rating the Performance of Air Outlets and Inlets."
2. Air flow is in cubic feet per minute, cfm.
3. Pressure is in inches of water, in. w.g.
4. The NC values, sound pressure level, are based on a room absorption of 10 dB, re 10^{-12} watts and one diffuser.
5. ΔT is the difference between the room air temperature 3 ½ ft above the floor and the temperature of the supply air.
6. Proximity to outlet is the minimum distance from an outlet to the occupant in order to achieve the listed DR value.
7. Distances closer to the diffuser have a higher DR than the cataloged value.
8. DR is the predicted percentage of people dissatisfied (PPD) due to draft. A value of less than 20 meets the requirements of ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy.
9. Blanks (--) indicate that the DR is below the specified value at all distances from the diffuser face.
10. DR catalog data is presented for an occupant density of 25 people/1000ft², which is the default occupancy density for classrooms (ages 5-8) given by ASHRAE 62.1-2004. For other occupant densities, please refer to the DV Room Designer Software.
11. Performance data for standard diffusers not listed in the catalog is available in Price AIO Software.

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Performance Data — Duct Hanging — Metric Units

Unit Size Dia. x H [in] Face Area [m²]	Inlet Size [mm]	Face Velocity [m/s]	Air Flow [L/s]	Total Pressure [Pa]	Static Pressure [Pa]	Noise Criteria [NC]	Proximity to Outlet [m]			
							ΔT = 2.8 °C		ΔT = 5.6 °C	
							DR		DR	
							15%	20%	15%	20%
457 x 600 [0.81]	457	0.10	82	--	--	--	0.9	0.6	1.2	0.9
		0.15	123	2.7	--	--	1.2	0.9	1.5	1.2
		0.20	164	4.7	4.1	--	1.5	0.9	1.8	1.2
		0.25	205	7.4	6.4	--	1.8	1.2	2.1	1.5
610 x 600 [1.08]	610	0.10	109	--	--	--	0.9	0.6	1.5	0.9
		0.15	165	--	--	--	1.5	0.9	1.8	1.2
		0.20	219	3.0	2.7	--	1.8	1.2	2.1	1.5
		0.25	274	4.7	4.2	--	2.1	1.5	2.7	1.8
762 x 600 [1.35]	762	0.10	137	--	--	--	1.2	0.9	1.5	1.2
		0.15	206	--	--	--	1.5	1.2	2.1	1.5
		0.20	275	--	--	--	2.1	1.2	2.4	1.8
		0.25	343	3.2	2.9	--	2.4	1.5	3.0	2.1
457 x 900 [1.23]	457	0.10	126	--	--	--	1.2	0.9	1.5	1.2
		0.15	188	3.4	2.7	--	1.5	1.2	2.1	1.5
		0.20	251	6.1	4.7	--	1.8	1.2	2.4	1.8
		0.25	313	9.6	7.4	--	2.1	1.5	3.0	2.1
610 x 900 [1.65]	610	0.10	168	--	--	--	1.5	0.9	1.8	1.2
		0.15	251	2.7	--	--	1.8	1.2	2.4	1.8
		0.20	335	4.8	4.1	--	2.4	1.5	3.0	2.1
		0.25	419	7.6	6.3	--	2.7	1.8	3.4	2.4
762 x 900 [2.06]	762	0.10	210	--	--	--	1.5	1.2	2.1	1.5
		0.15	315	--	--	--	2.1	1.5	2.7	1.8
		0.20	420	3.6	3.1	--	2.7	1.8	3.4	2.4
		0.25	524	5.6	4.8	--	3.0	2.1	4.0	2.7
457 x 1200 [1.66]	457	0.10	168	--	--	--	1.5	0.9	1.8	1.2
		0.15	253	--	--	--	1.8	1.2	2.4	1.8
		0.20	337	2.7	--	--	2.4	1.5	3.0	2.1
		0.25	421	4.3	--	--	2.7	1.8	3.7	2.4
610 x 1200 [2.22]	610	0.10	226	--	--	--	1.8	1.2	2.1	1.5
		0.15	338	2.8	--	--	2.4	1.5	3.0	2.1
		0.20	451	5.1	3.6	--	2.7	2.1	3.7	2.4
		0.25	564	7.9	5.7	--	3.4	2.4	4.3	3.0
762 x 1200 [2.78]	762	0.10	282	--	--	--	2.1	1.5	2.7	1.8
		0.15	423	2.6	--	--	2.7	1.8	3.4	2.4
		0.20	564	4.5	3.6	--	3.4	2.4	4.3	3.0
		0.25	706	7.1	5.7	--	4.0	2.7	4.9	3.4
610 x 1500 [2.79]	610	0.10	283	--	--	--	2.1	1.5	2.7	1.8
		0.15	425	--	--	--	2.7	1.8	3.7	2.4
		0.20	567	--	--	--	3.4	2.4	4.3	3.0
		0.25	708	3.7	--	--	4.0	2.7	4.9	3.7
762 x 1500 [3.49]	762	0.10	355	--	--	--	2.4	1.5	3.0	2.1
		0.15	532	--	--	--	3.0	2.1	4.0	2.7
		0.20	709	4.2	2.7	--	4.0	2.7	4.9	3.7
		0.25	887	6.6	4.3	--	4.6	3.4	5.8	4.3

Performance Notes:

1. Sound and pressure drop tested in accordance with ASHRAE Standard 70-2006 "Method of Testing for Rating the Performance of Air Outlets and Inlets."
2. Air flow is in Litres per second, L/s.
3. Pressure is in Pascals, Pa.
4. The NC values, sound pressure level, are based on a room absorption of 10 dB, re 10^{-12} watts and one diffuser.
5. ΔT is the difference between the room air temperature 1 m above the floor and the temperature of the supply air.
6. Proximity to outlet is the minimum distance from an outlet to the occupant in order to achieve the listed DR value.
7. Distances closer to the diffuser have a higher DR than the cataloged value.
8. DR is the predicted percentage of people dissatisfied (PPD) due to draft. A value of less than 20 meets the requirements of ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy.
9. Blanks (--) indicate that the DR is below the specified value at all distances from the diffuser face.
10. DR catalog data is presented for an occupant density of 25 people/100m², which is the default occupancy density for classrooms (ages 5-8) given by ASHRAE 62.1-2004. For other occupant densities, please refer to the DV Room Designer Software.
11. Performance data for standard diffusers not listed in the catalog is available in Price AIO Software.

For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

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DR90H Series

Product Information

DR90H Horizontal Series displacement diffusers are designed to produce a low turbulence, low velocity air supply from a high level supply. Designed for ceiling installation, the DR90H discharges air evenly across its perforated face with minimal induction of room air. The cool supply air flows down from the ceiling to the floor level and gradually fills the space. As a ceiling mounted diffuser, the DR90H offers the traditional air quality and comfort benefits of displacement ventilation while freeing up valuable floor space and reducing ducting. The DR90H is suitable for offices, classrooms, changerooms, kitchens, hallways, or any application with limited floor space where air quality demands are high.

Features

- Rail-mounting system with no visible fasteners.
- Factory inlet locations available on top, rear, and sides of unit.
- Optional end connections for linear installations of units.
- Optional field cut inlets.
- Ships with protective film on face and inlet.

Construction/Finish: DR90H

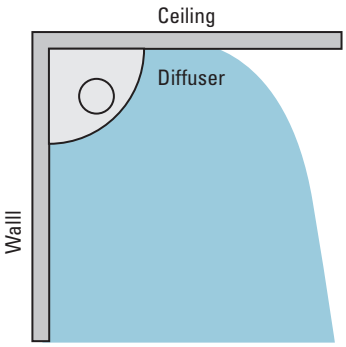
- Diffuser Frame and Equalization Baffle – Aluminum
- Plenum Caps – Rolled Steel
- Perforated Face and Plenum Back – Coated Steel
- Finish – B12 White (Standard)

For optional and special finishes see color matrix.

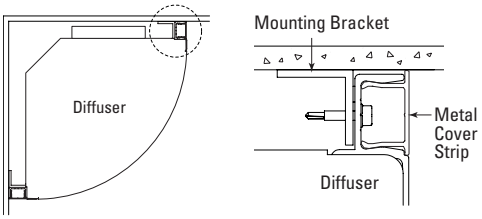
Accessories

- Duct Covers
- AFSD

Air Pattern



Rail-Mounting System Detail



Dimensional Data - Imperial (inches)

Dia. X L	Duct
18 x 24	6,7
18 x 36	6, 7, 10x4
18 x 48	6, 7, 10x4
24 x 24	8, 9, 10
24 x 36	8, 9, 10
24 x 48	8, 9, 10
24 x 60	9, 10, 16x5
30 x 24	8, 10
30 x 36	8, 10, 12
30 x 48	10, 12
30 x 60	10, 12, 20x6
36 x 24	10, 12
36 x 36	10, 12, 14, 16
36 x 48	12, 14, 16
36 x 60	14, 16

Dimensional Data - Metric (mm)

Dia. X L	Duct
457 x 600	100
457 x 900	100
610 x 600	150
610 x 900	150
610 x 1200	150
610 x 1500	150
762 x 600	200
762 x 900	200
762 x 1200	200
762 x 1500	200
915 x 600	250, 315
915 x 900	250, 315
915 x 1200	250, 315
915 x 1500	250, 315

For a complete list of standard sizes and inlets, refer to www.priceindustries.com/resources/type/literature/submittals

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SECTION **J**

Linear Enclosure Displacement Diffusers

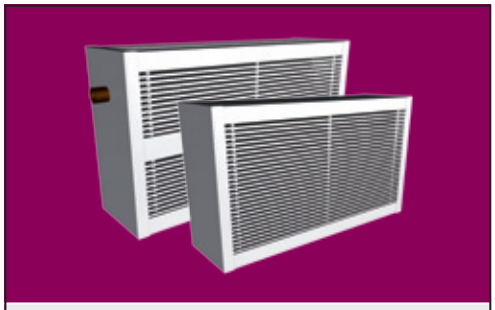
Linear Enclosure Diffusers

Price Linear Displacement Enclosures, models DLE and DLE-H, provide a low velocity horizontal displacement air pattern for cooling and the DLE-H includes heat via a hydronic heating element or electric heater. The DLE and DLE-H are designed for perimeter applications, and can be installed both as standalone units or connected together. Price Linear Displacement Enclosures are designed as the ideal perimeter displacement solution in areas such as offices, schools and cafeterias.

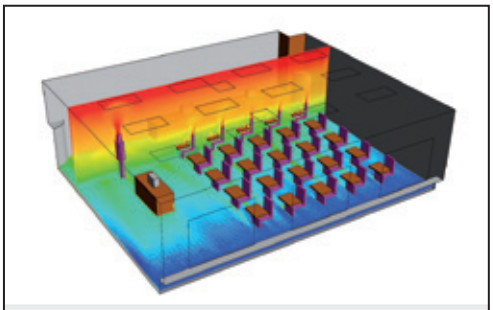
Linear Enclosure Displacement Family:

- DLE
- DLE-H

Aesthetically pleasing in a variety of designs



Hydronic or electric heating in DLE-H



Provides high comfort levels for occupants

priceindustries.com for additional product information, including product videos and brochures.

Linear Enclosure Diffusers

Product Overview

Application

The Price DLE Series displacement diffusers are designed to produce a low velocity horizontal air pattern from a perimeter installation. Unlike most displacement diffusers, the DLE Series had an extruded bar face and can be connected in series for unique architectural appeal. These diffusers are well suited to schools and offices or other commercial buildings with long lengths of exterior windows.

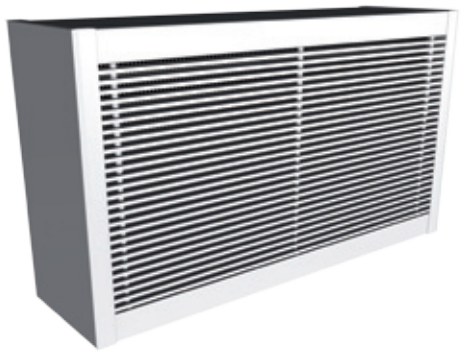
Models and Function

The **DLE** is a linear displacement enclosure that provides low velocity supply air for cooling evenly across an extruded bar face with minimal turbulence into the room.The cool supply air flows down to the floor and spreads across the room, drawn to heat sources. The supply air rises via thermal plumes, providing a constant supply of clean, conditioned air to the occupant. The DLE accepts primary air from a ducted connection and through the use of a perforated baffle assembly, spreads the air along the diffuser section for a uniform face velocity. These diffusers can be installed in a continuous length along the perimeter or as a single standalone unit.

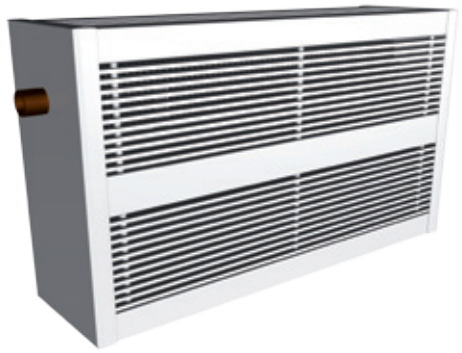
The **DLE-H** is a linear displacement enclosure that provides cooling and heating from one unit. Cool supply air is discharged through the lower portion of the unit in a manner similar to the DLE, while the top portion of the diffuser provides a choice of electric or hydronic heat. The DLE-H with the electric heater option is ETL certified and is available in 120V, 208V, and 240V.

The addition of the fin tube or electric heater allow the DLE-H to pull cool room air, warm it and discharge upwards along a cool window similar to a baseboard heater. This helps to eliminate draft and frosting of a cool exterior window. The DLE-H can also provide ventilation air through the lower portion with the heater on without significant short circuiting.

DLE



DLE-H



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DLE Series

Product Information

Price DLE Series displacement diffusers are designed to distribute low velocity air from a perimeter installation. Supply air is supplied from either side or from the bottom of the diffuser, and is discharged into the room across the extruded bar face of the DLE. The cool supply air flows down to the floor and spreads throughout the room with minimal turbulence. The superior air quality and low noise levels realized with the DLE make it suitable for office spaces, schools, hotels, lobbies, or any perimeter application where air quality and occupant comfort demands are high.

Features

- Architecturally appealing face.
- Heavy duty construction.
- Can be integrated into perimeter LE installation.
- Multiple units may be connected together (Y end condition), or end caps may be used for standalone (Z end condition).
- Optional blank-off section to cover junctions.
- Ships with protective film on face.

Construction/Finish: DLE Plenum

- Outer Shell and End Caps – Steel
- Optional Construction – Stainless Steel or Aluminum
- Inner Baffle – Aluminum

Grille

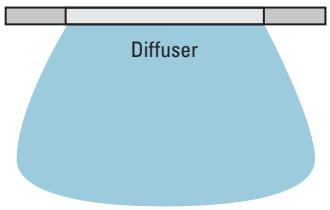
- Bars – Heavy Duty Aluminum Bars
- Mandrel Tubes – Aluminum
- 'Pencil-Proof' Core Spacing

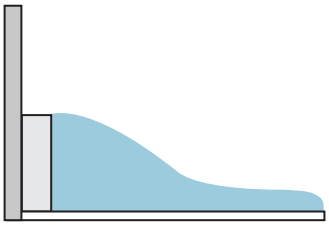
Finish

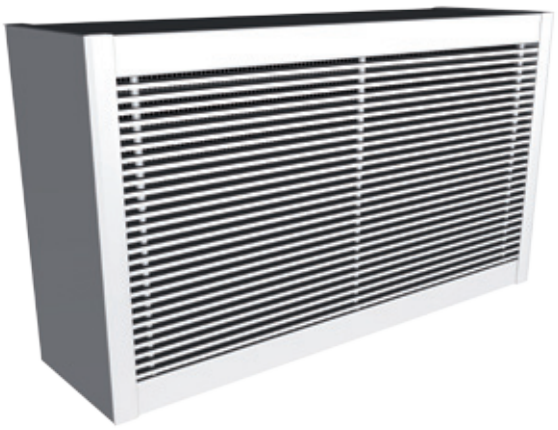
- Finish – B12 White (Standard)

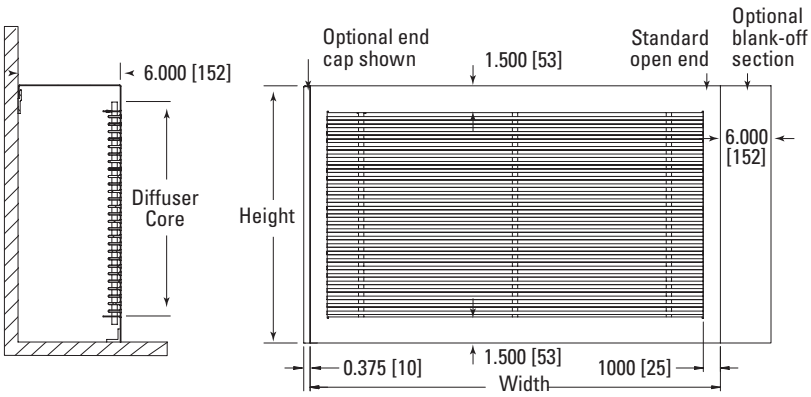
For optional and special finishes see color matrix.

Air Pattern









Dimensional Data - Imperial (inches)/Metric (mm)

Standard Sizes Available	
Length	Height
24 (600), 30 (750), 36 (900), 42 (1075), 48 (1200), 54 (1375), 60 (1500)	6 (152), 9 (229), 12 (305), 15 (381), 18 (457)

*Other lengths available. Please contact your local Price Representative for more information.

For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

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Performance Data - Imperial Units

Unit Size L x H [in] Face Area [ft²]	Face Velocity [fpm]	Air Flow [cfm]	Total Pressure [in. w.g.]	Static Pressure [in. w.g.]	Noise Criteria [NC]	Proximity to Outlet [ft]			
						ΔT = 5 °F		ΔT = 10 °F	
						DR		DR	
						15%	20%	15%	20%
24 x 6 [0.46]	20	9	--	--	--	--	--	1	--
	30	14	--	--	--	--	--	2	--
	40	18	--	--	--	1	--	4	1
	50	23	--	--	--	1	--	5	2
24 x 12 [1.38]	20	28	--	--	--	1	--	6	3
	30	41	--	--	--	4	1	8	4
	40	55	--	--	--	5	2	9	6
	50	69	0.01	0.01	--	6	3	10	7
24 x 18 [2.29]	20	46	--	--	--	5	1	9	5
	30	69	--	--	--	7	3	11	7
	40	92	--	--	--	8	4	12	8
	50	115	0.01	0.01	--	9	5	14	9
30 x 6 [0.58]	20	12	--	--	--	--	--	1	--
	30	18	--	--	--	--	--	3	--
	40	23	--	--	--	1	--	4	1
	50	29	--	--	--	1	--	5	2
30 x 12 [1.75]	20	35	--	--	--	2	--	6	3
	30	53	--	--	--	4	1	8	4
	40	70	--	--	--	5	2	9	6
	50	88	0.01	0.01	--	6	3	11	7
30 x 18 [2.92]	20	58	--	--	--	5	1	9	5
	30	88	--	--	--	7	3	11	7
	40	117	--	--	--	8	4	12	8
	50	146	0.01	0.01	--	9	5	14	9
30 x 6 [0.71]	20	14	--	--	--	--	--	1	--
	30	21	--	--	--	--	--	2	--
	40	28	--	--	--	1	--	4	1
	50	35	--	--	--	1	--	5	2
36 x 12 [2.13]	20	43	--	--	--	2	--	6	3
	30	64	--	--	--	4	1	8	4
	40	85	--	--	--	5	2	9	6
	50	106	0.01	0.01	--	6	3	11	7
36 x 18 [3.54]	20	71	--	--	--	5	1	9	5
	30	106	--	--	--	7	3	11	7
	40	142	0.01	0.01	--	8	4	12	8
	50	177	0.02	0.02	--	9	5	14	9
40 x 6 [0.96]	20	19	--	--	--	--	--	1	--
	30	29	--	--	--	--	--	3	--
	40	38	--	--	--	1	--	4	1
	50	48	0.01	0.01	--	1	--	5	2
48 x 12 [2.88]	20	58	--	--	--	2	--	6	3
	30	86	--	--	--	4	1	8	4
	40	115	--	--	--	5	2	9	6
	50	144	0.01	0.01	--	6	3	11	7
48 x 18 [4.79]	20	96	--	--	--	5	1	9	5
	30	144	--	--	--	7	3	11	7
	40	192	0.01	0.01	--	8	4	12	8
	50	240	0.02	0.02	--	9	6	14	10
60 x 6 [1.21]	20	24	--	--	--	--	--	1	--
	30	36	--	--	--	--	--	2	--
	40	48	--	--	--	1	--	4	1
	50	60	0.01	0.01	--	1	--	5	2
60 x 12 [3.63]	20	73	--	--	--	--	--	6	3
	30	109	--	--	--	4	1	8	4
	40	145	0.01	0.01	--	5	2	9	6
	50	181	0.02	0.02	--	7	3	11	7
60 x 18 [6.04]	20	121	--	--	--	5	1	9	5
	30	181	--	--	--	7	3	11	7
	40	242	0.01	0.01	--	8	4	12	8
	50	302	0.02	0.02	--	9	6	14	10

Performance Notes:

1. Sound and pressure drop tested in accordance with ASHRAE Standard 70-2006 "Method of Testing for Rating the Performance of Air Outlets and Inlets."
2. Air flow is in cubic feet per minute, cfm.
3. Pressure is in inches of water, in. w.g.
4. The NC values, sound pressure level, are based on a room absorption of 10 dB, re 10^{-12} watts and one diffuser.
5. ΔT is the difference between the room air temperature 3 ½ ft above the floor and the temperature of the supply air.
6. Proximity to outlet is the minimum distance from an outlet to the occupant in order to achieve the listed DR value.
7. Distances closer to the diffuser have a higher DR than the cataloged value.
8. DR is the predicted percentage of people dissatisfied (PPD) due to draft. A value of less than 20 meets the requirements of ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy.
9. Blanks (--) indicate that the DR is below the specified value at all distances from the diffuser face.
10. DR catalog data is presented for an occupant density of 25 people/1000ft², which is the default occupancy density for classrooms (ages 5-8) given by ASHRAE 62.1-2004. For other occupant densities, please refer to the DV Room Designer Software.
11. Performance data for standard diffusers not listed in the catalog is available in Price AIO Software.

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Performance Data - Metric Units

Unit Size L x H [in] Face Area [m²]	Face Velocity [m/s]	Air Flow [L/s]	Total Pressure [Pa]	Static Pressure [Pa]	Noise Criteria [NC]	Proximity to Outlet [m]			
						ΔT = 2.8 °C		ΔT = 5.6 °C	
						DR		DR	
						15%	20%	15%	20%
600 x 152 [0.04]	0.10	4	--	--	--	--	--	0.3	--
	0.15	7	--	--	--	--	--	0.6	--
	0.20	8	--	--	--	0.3	--	1.2	0.3
	0.25	11	--	--	--	0.3	--	1.5	0.6
600 x 305 [0.13]	0.10	13	--	--	--	0.3	--	1.8	0.9
	0.15	19	--	--	--	1.2	0.3	2.4	1.2
	0.20	25	--	--	--	1.5	0.6	2.7	1.8
	0.25	32	2.9	2.9	--	1.8	0.9	3.0	2.1
600 x 457 [0.21]	0.10	21	--	--	--	1.5	0.3	2.7	1.5
	0.15	32	--	--	--	2.1	0.9	3.4	2.1
	0.20	42	--	--	--	2.4	1.2	3.7	2.4
	0.25	53	3.4	3.4	--	2.7	1.5	4.3	2.7
750 x 152 [0.05]	0.10	5	--	--	--	--	--	0.3	--
	0.15	8	--	--	--	--	--	0.9	--
	0.20	11	--	--	--	0.3	--	1.2	0.3
	0.25	14	--	--	--	0.3	--	1.5	0.6
750 x 305 [0.16]	0.10	16	--	--	--	0.6	--	1.8	0.9
	0.15	25	--	--	--	1.2	0.3	2.4	1.2
	0.20	33	--	--	--	1.5	0.6	2.7	1.8
	0.25	41	3.1	3.1	--	1.8	0.9	3.4	2.1
750 x 457 [0.27]	0.10	27	--	--	--	1.5	0.3	2.7	1.5
	0.15	41	--	--	--	2.1	0.9	3.4	2.1
	0.20	54	--	--	--	2.4	1.2	3.7	2.4
	0.25	67	3.7	3.7	--	2.7	1.5	4.3	2.7
900 x 152 [0.06]	0.10	7	--	--	--	--	--	0.3	--
	0.15	10	--	--	--	--	--	0.6	--
	0.20	13	--	--	--	0.3	--	1.2	0.3
	0.25	17	--	--	--	0.3	--	1.5	0.6
900 x 305 [0.19]	0.10	20	--	--	--	0.6	--	1.8	0.9
	0.15	30	--	--	--	1.2	0.3	2.4	1.2
	0.20	40	--	--	--	1.5	0.6	2.7	1.8
	0.25	49	3.3	3.3	--	1.8	0.9	3.4	2.1
900 x 457 [0.32]	0.10	33	--	--	--	1.5	0.3	2.7	1.5
	0.15	49	--	--	--	2.1	0.9	3.4	2.1
	0.20	66	2.5	2.5	--	2.4	1.2	3.7	2.4
	0.25	82	3.9	3.9	--	2.7	1.5	4.3	2.7
1200 x 152 [0.09]	0.10	9	--	--	--	--	--	0.3	--
	0.15	13	--	--	--	--	--	0.9	--
	0.20	18	--	--	--	0.3	--	1.2	0.3
	0.25	22	2.6	2.5	--	0.3	--	1.5	0.6
1200 x 305 [0.26]	0.10	27	--	--	--	0.6	--	1.8	0.9
	0.15	40	--	--	--	1.2	0.3	2.4	1.2
	0.20	53	--	--	--	1.5	0.6	2.7	1.8
	0.25	67	3.7	3.6	--	1.8	0.9	3.4	2.1
1200 x 457 [0.44]	0.10	44	--	--	--	1.5	0.3	2.7	1.5
	0.15	67	--	--	--	2.1	0.9	3.4	2.1
	0.20	89	2.8	2.7	--	2.4	1.2	3.7	2.4
	0.25	111	4.3	4.3	--	2.7	1.8	4.3	3.0
1500 x 152 [0.11]	0.10	11	--	--	--	--	--	0.3	--
	0.15	17	--	--	--	--	--	0.6	--
	0.20	23	--	--	--	0.3	--	1.2	0.3
	0.25	28	2.8	2.7	--	0.3	--	1.5	0.6
1500 x 305 [0.33]	0.10	34	--	--	--	--	--	1.8	0.9
	0.15	50	--	--	--	1.2	0.3	2.4	1.2
	0.20	67	2.5	2.5	--	1.5	0.6	2.7	1.8
	0.25	84	4.0	3.9	--	2.1	0.9	3.4	2.1
1500 x 457 [0.55]	0.10	56	--	--	--	1.5	0.3	2.7	1.5
	0.15	84	--	--	--	2.1	0.9	3.4	2.1
	0.20	112	3.0	3.0	--	2.4	1.2	3.7	2.4
	0.25	140	4.7	4.6	--	2.7	1.8	4.3	3.0

Performance Notes:

1. Sound and pressure drop tested in accordance with ASHRAE Standard 70-2006 "Method of Testing for Rating the Performance of Air Outlets and Inlets."
2. Air flow is in Litres per second, L/s.
3. Pressure is in Pascals, Pa.
4. The NC values, sound pressure level, are based on a room absorption of 10 dB, re 10^{-12} watts and one diffuser.
5. ΔT is the difference between the room air temperature 1 m above the floor and the temperature of the supply air.
6. Proximity to outlet is the minimum distance from an outlet to the occupant in order to achieve the listed DR value.
7. Distances closer to the diffuser have a higher DR than the cataloged value.
8. DR is the predicted percentage of people dissatisfied (PPD) due to draft. A value of less than 20 meets the requirements of ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy.
9. Blanks (--) indicate that the DR is below the specified value at all distances from the diffuser face.
10. DR catalog data is presented for an occupant density of 25 people/100m², which is the default occupancy density for classrooms (ages 5-8) given by ASHRAE 62.1-2004. For other occupant densities, please refer to the DV Room Designer Software.
11. Performance data for standard diffusers not listed in the catalog is available in Price AIO Software.

For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

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Linear Enclosure Displacement Diffusers
DLE-H Series

Product Information

Price DLE-H Series displacement diffusers are designed to produce a low velocity horizontal air pattern as well as provide heat in a perimeter installation. The DLE-H discharges conditioned supply air evenly from the lower section across an extruded bar face with minimal turbulence into the room, while the upper section provides convective heat from a heating element. The cool supply air flows down to the floor and spreads across the room, gradually filling the space. When the heater is energized it induces room air over the heating element. The hot air rises above the unit and up a wall or window. Multiple sections may be spliced together for a continuous look, or individual standalone units can be used. Supply air can be introduced from either the side or the bottom. The superior air quality and low noise levels associated with the DLE-H make it suitable for office spaces, schools, hotels, lobbies, or any application where occupant comfort demands are high.

Features

- Multiple units may be connected together (Y end condition), or end caps may be used for standalone (Z end condition).
- Available in three different heights and various lengths.
- Back plate/liner for clean inner surface, easy installation.
- Ships with protective film on face.

Construction

- Extruded aluminum core bars.
- Mandrel tube core construction.
- Steel face frames.
- Perforated aluminum baffles.
- Coated steel liner.

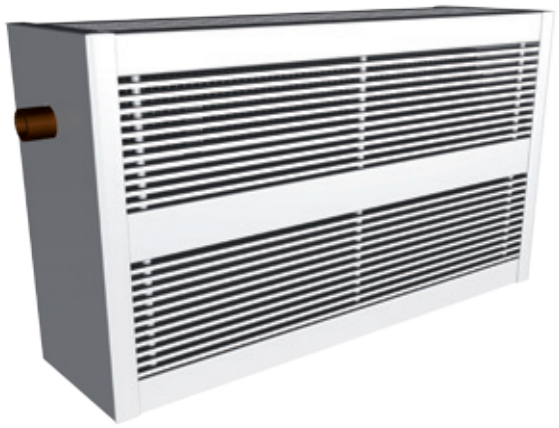
Heater Options

- Hydronic heating element – accepts hot water heating element.
- Electric heater – available in 120V, 208V, or 240V with either SCR or 24 VAC binary control signal. SCR can control one additional drone unit (120 V) or up to three drone units (208 / 240 V).
- Optional PTC thermostat for master units.

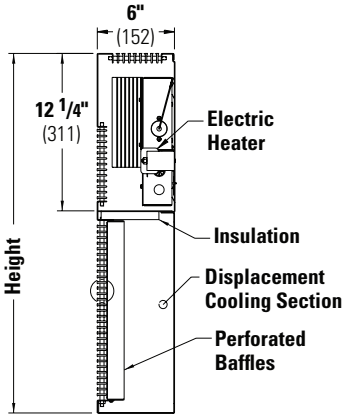
Finish

- Finish – B12 White (Standard)

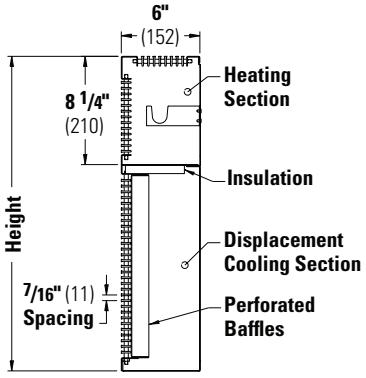
For optional and special finishes see color matrix.



Electric Heating Option



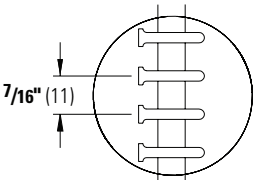
Hydronic Heating Option



Electric Heater Output - Imperial (inches)/Metric (mm)

Nominal Length, in (mm)	Heater Output		
	120V	208V	240V
30 (750)	500W	375W	500W
36 (900)	500W	375W	500W
48 (1200)	1000W	750W	1000W
60 (1500)	1000W	750W	1000W

Core 25C Detail



Electric Heater Dimensional Data -
Imperial (inches)/Metric (mm)

Standard Sizes Available	
Length	Height
24 (600)	16 (406)
36 (900)	20 (508)
48 (1200)	24 (610)
60 (1500)	-

Hydronic Heating Dimensional Data -
Imperial (inches)/Metric (mm)

Standard Sizes Available	
Length	Height
30 (750)	20 (508)
36 (900)	24 (610)
48 (1200)	28 (711)
60 (1500)	-

For a complete list of standard sizes and inlets, refer to www.priceindustries.com/resources/type/literature/submittals

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Product Information

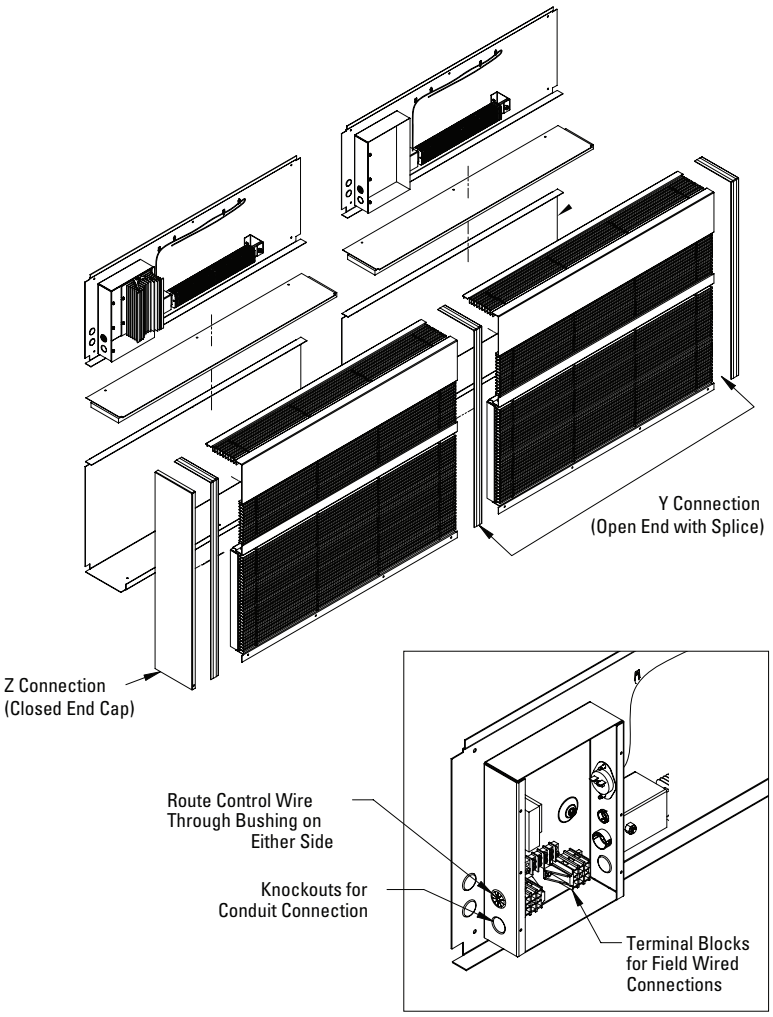
Connecting Multiple Units

Multiple units of the DLE-H with electric heat can be connected to meet room design requirements. As with single units, the multiple units can also be controlled using the SCR controller via master and drone units. The controller is located on the master unit and can power additional drone units. For a 120V unit, a maximum of 1 drone unit may be connected to the master unit with the SCR or relay controller. For 208V or 240V units, a maximum of three drone units may be connected to the master unit with the SCR or relay controller.

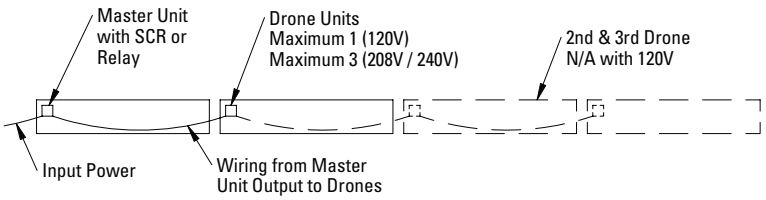
ETL Certified

The DLE-H with electric heater is ETL Certified for electric performance by the standards of Canada and the United States. The ETL Certification indicates that this product meets the requirements of UL 1995 and CSA C22.2 NO. 236.

DLE-H with Electric Heat – Multiple Unit Connection Schematic



DLE-H with Electric Heat – Multiple Unit Connection Wiring Schematic



For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

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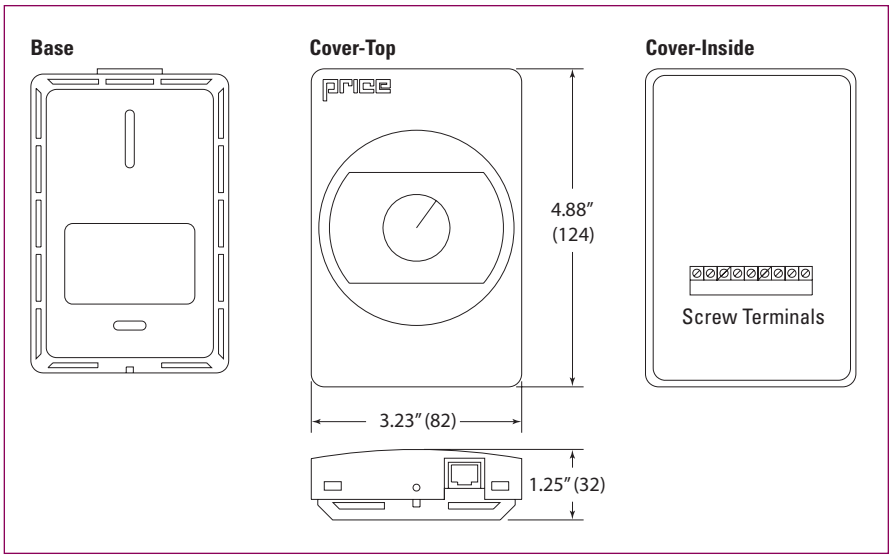
Product Information

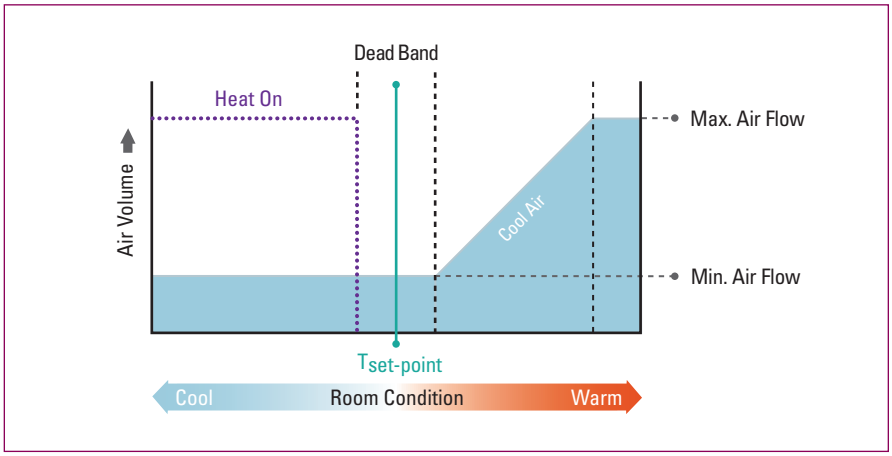
PTC Thermostat Option

Fahrenheit and Celcius scales are available for horizontal and vertical mounting. The thermostat and terminals are an integral part of the cover. The cover hooks on to the base for easy service and is locked in place using a security screw. Specifications and equipment are subject to change without prior notice.



Reheat Option

On a decrease in space temperature into the heating proportional band, the first stage binary 24 VAC reheat ouput will energize.



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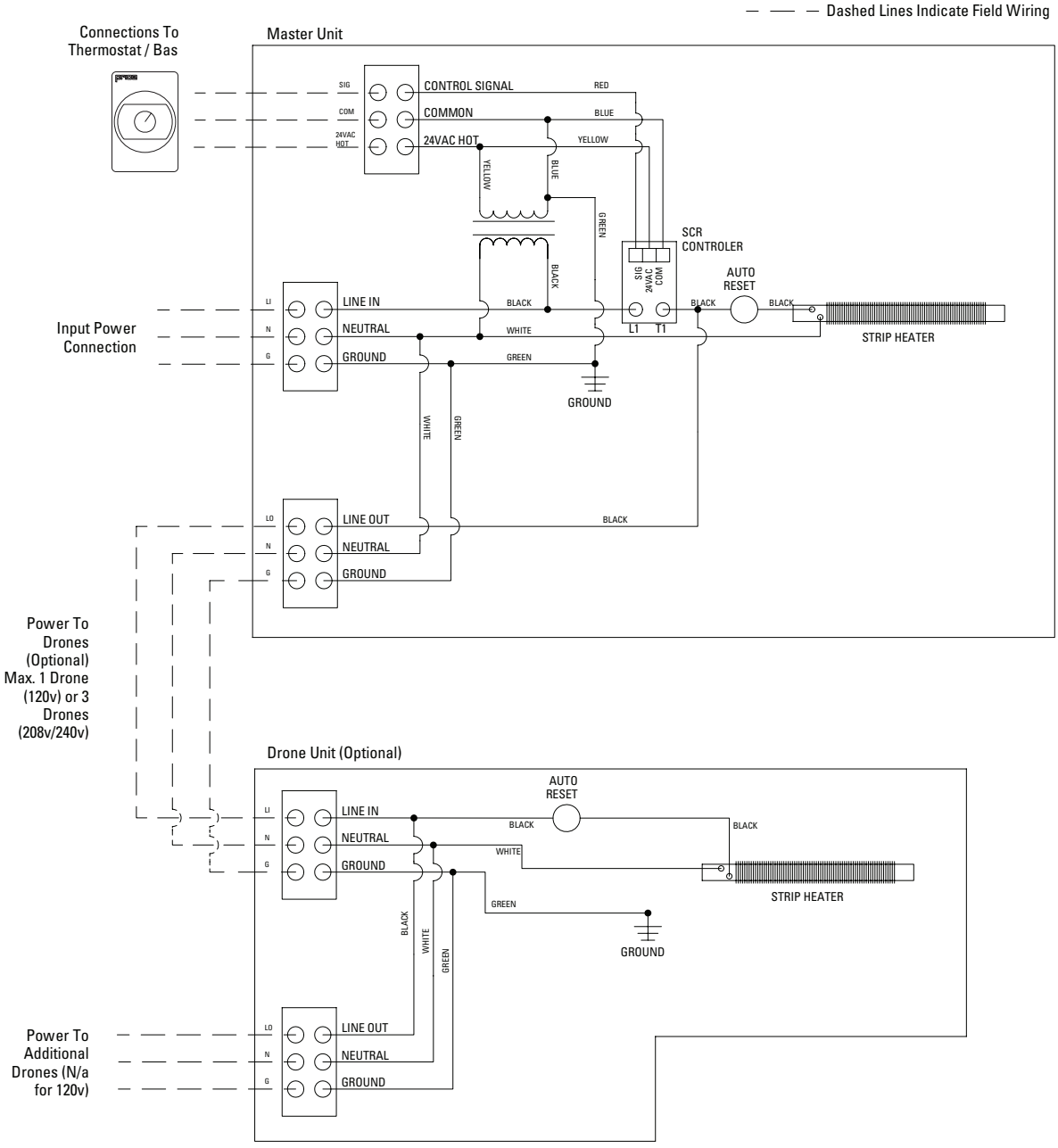
Product Information

DLE-H with Electric Heat - Wiring Diagram (SCR)



For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

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Selection Guidelines

Select size based on both air flow requirements and heating requirements. Note that the electric heater section is only available in standard increments, depending on unit size and voltage. See chart at right. Hydronic performance will vary depending on entering water temperature (EWT) and water flow rate (gpm). Contact Application Engineering for more detailed information regarding finned tube performance.

To select a unit size based on air flow requirements, you can use the chart at right. If you plan to attach multiple sections together or use a custom size, follow these steps:

1. Calculate the minimum required face area by dividing total air flow by the recommended face velocity of 40 fpm (0.20 m/s).

$$Area\,(\text{ft}^2) = \frac{Air\ Flow\ (\text{cfm})}{Air\ Speed\ (40\ \text{fpm})}$$

2. Calculate required length by dividing face area by the height of the active section. Active section heights are as follows: nominal height – 10" (254 mm) for hydronic; nominal height – 14"(356 mm) for electric.

Note: Although multiple units can be joined together for a continuous look, the inlet air velocity will limit the maximum section length. If joining multiple units that exceed 72" (1800mm) in length, you must use more than one inlet. Bottom inlet sections are optional.

Note: Maximum side inlet size is 3.5" (90 mm) deep. Maximum side inlet height is nominal – 11" (280 mm).

Electric units can be ganged together in master / drone formation. Each 120 V unit can be ordered with up to one additional drone unit. Each 208 / 240V unit can be ordered with up to three additional drone units. Drone units do not ship with controls.

Electric Heater Output

Nom. Length	Heater Output		
	120V	208V	240V
30" (750)	500W	375W	500W
36" (900)	500W	375W	500W
48" (1200)	1000W	750W	1000W
60" (1500)	1000W	750W	1000W

Electric Unit Air Flow Specifications

Nominal Size L x H in. (mm)	Active Height in. (mm)	Active Height in. (mm)	Face Area ft² (m²)	Flow at 40 fpm/0.20 m/s cfm (L/s)
30 x 20 (750 x 508)	30 (750)	6 (152)	1.25 (0.11)	50 (23)
30 x 24 (750 x 610)	30 (750)	10 (254)	2.08 (0.19)	83 (38)
30 x 28 (750 x 711)	30 (750)	14 (356)	2.92 (0.27)	117 (53)
36 x 20 (900 x 508)	36 (900)	6 (152)	1.50 (0.14)	60 (27)
36 x 24 (900 x 610)	36 (900)	10 (254)	2.50 (0.23)	100 (46)
36 x 28 (900 x 711)	36 (900)	14 (356)	3.50 (0.32)	140 (64)
48 x 20 (1200 x 508)	48 (1200)	6 (152)	2.00 (0.18)	80 (36)
48 x 24 (1200 x 610)	48 (1200)	10 (254)	3.33 (0.30)	133 (61)
48 x 28 (1200 x 711)	48 (1200)	14 (356)	4.67 (0.43)	187 (85)
60 x 20 (1500 x 508)	60 (1500)	6 (152)	2.50 (0.23)	100 (46)
60 x 24 (1500 x 610)	60 (1500)	10 (254)	4.17 (0.38)	167 (76)
60 x 28 (1500 x 711)	60 (1500)	14 (356)	5.83 (0.53)	233 (107)

Hydronic Unit Air Flow Specifications

Nominal Size L x H in. (mm)	Active Height in. (mm)	Active Height in. (mm)	Face Area ft² (m²)	Flow at 40 fpm/0.20 m/s cfm (L/s)
24 x 16 (600 x 416)	24 (600)	6 (152)	1.00 (0.091)	40 (18)
24 x 20 (600 x 508)	24 (600)	10 (254)	1.67 (0.15)	67 (30)
24 x 24 (600 x 610)	24 (600)	14 (356)	2.33 (0.21)	93 (43)
36 x 16 (900 x 416)	36 (900)	6 (152)	1.50 (0.14)	60 (27)
36 x 20 (900 x 508)	36 (900)	10 (254)	2.50 (0.23)	100 (46)
36 x 24 (900 x 610)	36 (900)	14 (356)	3.50 (0.32)	140 (64)
48 x 16 (1200 x 416)	48 (900)	6 (152)	2.00 (0.18)	80 (36)
48 x 20 (1200 x 508)	48 (1200)	10 (254)	3.33 (0.30)	133 (61)
48 x 24 (1200 x 610)	48 (1200)	14 (356)	4.67 (0.43)	187 (85)
60 x 16 (1500 x 416)	60 (1200)	6 (152)	2.50 (0.23)	100 (46)
60 x 20 (1500 x 508)	60 (1500)	10 (254)	4.17 (0.38)	167 (76)
60 x 24 (1500 x 610)	60 (1500)	14 (356)	5.83 (0.53)	233 (107)

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Performance Data — Cooling (Electric Heat Option) — Imperial

Unit Size L x H [in] Face Area [ft²]	Face Velocity [fpm]	Air Flow [cfm]	Total Pressure [in. w.g.]	Static Pressure [in. w.g.]	Noise Criteria [NC]	Proximity to Outlet [ft]			
						ΔT = 5 °F		ΔT = 10 °F	
						DR		DR	
30 x 20 [1.25]	20	25	--	--	--	1	--	5	1
	30	38	--	--	--	3	--	7	3
	40	50	--	--	--	4	1	8	4
	50	63	0.01	0.01	--	5	2	9	5
30 x 24 [2.08]	20	42	--	--	--	3	--	7	4
	30	63	--	--	--	5	2	9	5
	40	83	--	--	--	7	3	11	7
	50	104	0.01	0.01	--	8	4	12	8
30 x 28 [2.92]	20	58	--	--	--	5	2	9	5
	30	88	--	--	--	7	3	11	7
	40	117	--	--	--	8	5	13	9
	50	146	0.01	0.01	--	9	6	14	10
36 x 20 [1.5]	20	30	--	--	--	1	--	5	1
	30	45	--	--	--	3	--	6	3
	40	60	--	--	--	4	1	8	4
	50	75	0.01	0.01	--	5	2	9	5
36 x 24 [2.5]	20	50	--	--	--	3	--	7	4
	30	75	--	--	--	5	2	9	5
	40	100	--	--	--	6	3	11	7
	50	125	0.01	0.01	--	8	4	12	8
36 x 28 [3.5]	20	70	--	--	--	5	2	9	5
	30	105	--	--	--	7	3	11	7
	40	140	0.01	0.01	--	8	5	13	9
	50	175	0.02	0.02	--	9	6	14	10
48 x 20 [2.0]	20	40	--	--	--	1	--	4	1
	30	60	--	--	--	3	--	6	3
	40	80	--	--	--	4	1	8	4
	50	100	0.01	0.01	--	5	2	9	5
48 x 24 [3.33]	20	67	--	--	--	3	--	7	3
	30	100	--	--	--	5	2	9	5
	40	133	--	--	--	6	3	10	7
	50	167	0.02	0.02	--	7	4	12	8
48 x 28 [4.67]	20	93	--	--	--	5	1	9	5
	30	140	--	--	--	7	3	11	7
	40	187	0.01	0.01	--	8	4	12	8
	50	233	0.02	0.02	--	9	6	14	10
60 x 20 [2.5]	20	50	--	--	--	1	--	4	1
	30	75	--	--	--	3	--	6	3
	40	100	--	--	--	4	1	8	4
	50	125	0.01	0.01	--	5	2	9	5
60 x 24 [4.17]	20	83	--	--	--	3	--	7	3
	30	125	--	--	--	5	2	9	5
	40	167	0.01	0.01	--	6	3	10	7
	50	208	0.02	0.02	--	7	4	12	8
60 x 28 [5.83]	20	117	--	--	--	5	1	9	5
	30	175	--	--	--	7	3	11	7
	40	233	0.01	0.01	--	8	4	12	8
	50	292	0.02	0.02	--	9	6	14	10

Performance Notes:

1. Sound and pressure drop tested in accordance with ASHRAE Standard 70-2006 "Method of Testing for Rating the Performance of Air Outlets and Inlets."
2. Air flow is in cubic feet per minute, cfm.
3. Pressure is in inches of water, in. w.g.
4. The NC values, sound pressure level, are based on a room absorption of 10 dB, re 10^{-12} watts and one diffuser.
5. ΔT is the difference between the room air temperature 3 ½ ft above the floor and the temperature of the supply air.
6. Proximity to outlet is the minimum distance from an outlet to the occupant in order to achieve the listed DR value.
7. Distances closer to the diffuser have a higher DR than the cataloged value.
8. DR is the predicted percentage of people dissatisfied (PPD) due to draft. A value of less than 20 meets the requirements of ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy.
9. Blanks (--) indicate that the DR is below the specified value at all distances from the diffuser face.
10. DR catalog data is presented for an occupant density of 25 people/1000ft², which is the default occupancy density for classrooms (ages 5-8) given by ASHRAE 62.1-2004. For other occupant densities, please refer to the DV Room Designer Software.
11. Performance data for standard diffusers not listed in the catalog is available in Price AIO Software.

For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

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Performance Data — Cooling (Electric Heat Option) — Metric

Unit Size L x H [in] Face Area [m²]	Face Velocity [m/s]	Air Flow [L/s]	Total Pressure [Pa]	Static Pressure [Pa]	Noise Criteria [NC]	Proximity to Outlet [m]			
						ΔT = 2.8 °C		ΔT = 5.6 °C	
						DR		DR	
750 x 508 [0.11]	0.10	12	--	--	--	0.3	--	1.5	0.3
	0.15	17	--	--	--	0.9	--	2.1	0.9
	0.20	23	--	--	--	1.2	0.3	2.4	1.2
	0.25	29	2.8	2.8	--	1.5	0.6	2.7	1.5
750 x 610 [0.19]	0.10	19	--	--	--	0.9	--	2.1	1.2
	0.15	29	--	--	--	1.5	0.6	2.7	1.5
	0.20	39	--	--	--	2.1	0.9	3.4	2.1
	0.25	49	3.3	3.3	--	2.4	1.2	3.7	2.4
750 x 711 [0.27]	0.10	27	--	--	--	1.5	0.6	2.7	1.5
	0.15	41	--	--	--	2.1	0.9	3.4	2.1
	0.20	54	--	--	--	2.4	1.5	4.0	2.7
	0.25	68	3.7	3.7	--	2.7	1.8	4.3	3.0
900 x 508 [0.14]	0.10	14	--	--	--	0.3	--	1.5	0.3
	0.15	21	--	--	--	0.9	--	1.8	0.9
	0.20	28	--	--	--	1.2	0.3	2.4	1.2
	0.25	35	3.0	2.9	--	1.5	0.6	2.7	1.5
900 x 610 [0.23]	0.10	23	--	--	--	0.9	--	2.1	1.2
	0.15	35	--	--	--	1.5	0.6	2.7	1.5
	0.20	46	--	--	--	1.8	0.9	3.4	2.1
	0.25	58	3.5	3.5	--	2.4	1.2	3.7	2.4
900 x 711 [0.32]	0.10	33	--	--	--	1.5	0.6	2.7	1.5
	0.15	49	--	--	--	2.1	0.9	3.4	2.1
	0.20	65	2.5	--	--	2.4	1.5	4.0	2.7
	0.25	81	3.9	3.9	--	2.7	1.8	4.3	3.0
1200 x 508 [0.18]	0.10	18	--	--	--	0.3	--	1.2	0.3
	0.15	28	--	--	--	0.9	--	1.8	0.9
	0.20	37	--	--	--	1.2	0.3	2.4	1.2
	0.25	46	3.3	3.2	--	1.5	0.6	2.7	1.5
1200 x 610 [0.3]	0.10	31	--	--	--	0.9	--	2.1	0.9
	0.15	46	--	--	--	1.5	0.6	2.7	1.5
	0.20	62	--	--	--	1.8	0.9	3.0	2.1
	0.25	77	3.9	3.8	--	2.1	1.2	3.7	2.4
1200 x 711 [0.43]	0.10	43	--	--	--	1.5	0.3	2.7	1.5
	0.15	65	--	--	--	2.1	0.9	3.4	2.1
	0.20	87	2.8	2.7	--	2.4	1.2	3.7	2.4
	0.25	109	4.3	4.3	--	2.7	1.8	4.3	3.0
1500 x 508 [0.23]	0.10	23	--	--	--	0.3	--	1.2	0.3
	0.15	35	--	--	--	0.9	--	1.8	0.9
	0.20	46	--	--	--	1.2	0.3	2.4	1.2
	0.25	58	3.5	3.5	--	1.5	0.6	2.7	1.5
1500 x 610 [0.38]	0.10	39	--	--	--	0.9	--	2.1	0.9
	0.15	58	--	--	--	1.5	0.6	2.7	1.5
	0.20	77	2.7	2.6	--	1.8	0.9	3.0	2.1
	0.25	97	4.1	4.1	--	2.1	1.2	3.7	2.4
1500 x 711 [0.53]	0.10	54	--	--	--	1.5	0.3	2.7	1.5
	0.15	81	--	--	--	2.1	0.9	3.4	2.1
	0.20	109	3.0	2.9	--	2.4	1.2	3.7	2.4
	0.25	135	4.6	4.6	--	2.7	1.8	4.3	3.0

Performance Notes:

1. Sound and pressure drop tested in accordance with ASHRAE Standard 70-2006 "Method of Testing for Rating the Performance of Air Outlets and Inlets."
2. Air flow is in Litres per second, L/s.
3. Pressure is in Pascals, Pa.
4. The NC values, sound pressure level, are based on a room absorption of 10 dB, re 10^{-12} watts and one diffuser.
5. ΔT is the difference between the room air temperature 1 m above the floor and the temperature of the supply air.
6. Proximity to outlet is the minimum distance from an outlet to the occupant in order to achieve the listed DR value.
7. Distances closer to the diffuser have a higher DR than the cataloged value.
8. DR is the predicted percentage of people dissatisfied (PPD) due to draft. A value of less than 20 meets the requirements of ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy.
9. Blanks (--) indicate that the DR is below the specified value at all distances from the diffuser face.
10. DR catalog data is presented for an occupant density of 25 people/100m², which is the default occupancy density for classrooms (ages 5-8) given by ASHRAE 62.1-2004. For other occupant densities, please refer to the DV Room Designer Software.
11. Performance data for standard diffusers not listed in the catalog is available in Price AIO Software.

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Performance Data — Cooling (Hydronic Heating Option) — Imperial

Unit Size L x H [in] Face Area [ft²]	Face Velocity [fpm]	Air Flow [cfm]	Total Pressure [in. w.g.]	Static Pressure [in. w.g.]	Noise Criteria [NC]	Proximity to Outlet [ft]			
						ΔT = 5 °F		ΔT = 10 °F	
						DR		DR	
						15%	20%	15%	20%
24 x 16 [1.0]	20	20	--	--	--	1	--	5	1
	30	30	--	--	--	3	--	7	3
	40	40	--	--	--	4	1	8	4
	50	50	0.01	0.01	--	5	2	9	5
24 x 20 [1.67]	20	33	--	--	--	3	--	7	4
	30	50	--	--	--	5	2	9	5
	40	67	--	--	--	7	3	11	7
	50	83	0.01	0.01	--	8	4	12	8
24 x 24 [2.33]	20	47	--	--	--	5	2	9	5
	30	70	--	--	--	7	3	11	7
	40	93	--	--	--	8	5	13	9
	50	117	0.01	0.01	--	9	6	14	10
36 x 16 [1.5]	20	30	--	--	--	1	--	4	1
	30	45	--	--	--	3	--	6	3
	40	60	--	--	--	4	1	8	4
	50	75	0.01	0.01	--	5	2	9	5
36 x 20 [2.5]	20	50	--	--	--	3	--	7	3
	30	75	--	--	--	5	2	9	5
	40	100	--	--	--	6	3	10	7
	50	125	0.01	0.01	--	7	4	12	8
36 x 24 [3.5]	20	70	--	--	--	5	1	9	5
	30	105	--	--	--	7	3	11	7
	40	140	0.01	0.01	--	8	4	12	8
	50	175	0.02	0.02	--	9	6	14	10
48 x 16 [2.0]	20	40	--	--	--	1	--	4	1
	30	60	--	--	--	3	--	6	3
	40	80	--	--	--	4	1	8	4
	50	100	0.01	0.01	--	5	2	9	5
48 x 20 [3.33]	20	67	--	--	--	3	--	7	3
	30	100	--	--	--	5	2	9	5
	40	133	--	--	--	6	3	10	7
	50	167	0.02	0.02	--	7	4	12	8
48 x 24 [4.67]	20	93	--	--	--	5	1	9	5
	30	140	--	--	--	7	3	11	7
	40	187	0.01	0.01	--	8	4	12	8
	50	233	0.02	0.02	--	9	6	14	10
60 x 16 [2.5]	20	50	--	--	--	1	--	4	1
	30	75	--	--	--	2	--	6	3
	40	100	--	--	--	4	1	8	4
	50	125	0.01	0.01	--	5	1	9	5
60 x 20 [4.17]	20	83	--	--	--	3	--	7	3
	30	125	--	--	--	5	2	9	5
	40	167	0.01	0.01	--	6	3	10	7
	50	208	0.02	0.02	--	7	4	12	8
60 x 24 [5.83]	20	117	--	--	--	5	1	9	5
	30	175	--	--	--	7	3	11	7
	40	233	0.01	0.01	--	8	4	12	8
	50	292	0.02	0.02	--	9	6	14	10

Performance Notes:

1. Sound and pressure drop tested in accordance with ASHRAE Standard 70-2006 "Method of Testing for Rating the Performance of Air Outlets and Inlets."
2. Air flow is in cubic feet per minute, cfm.
3. Pressure is in inches of water, in. w.g.
4. The NC values, sound pressure level, are based on a room absorption of 10 dB, re 10^{-12} watts and one diffuser.
5. ΔT is the difference between the room air temperature 3 ½ ft above the floor and the temperature of the supply air.
6. Proximity to outlet is the minimum distance from an outlet to the occupant in order to achieve the listed DR value.
7. Distances closer to the diffuser have a higher DR than the cataloged value.
8. DR is the predicted percentage of people dissatisfied (PPD) due to draft. A value of less than 20 meets the requirements of ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy.
9. Blanks (--) indicate that the DR is below the specified value at all distances from the diffuser face.
10. DR catalog data is presented for an occupant density of 25 people/1000ft², which is the default occupancy density for classrooms (ages 5-8) given by ASHRAE 62.1-2004. For other occupant densities, please refer to the DV Room Designer Software.
11. Performance data for standard diffusers not listed in the catalog is available in Price AIO Software.

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Performance Data — Cooling (Hydronic Heating Option) — Metric

Unit Size L x H [mm] Face Area [m²]	Face Velocity [m/s]	Air Flow [L/s]	Total Pressure [Pa]	Static Pressure [Pa]	Noise Criteria [NC]	Proximity to Outlet [m]			
						ΔT = 2.8 °C		ΔT = 5.6 °C	
						DR		DR	
						15%	20%	15%	20%
600 x 406 [0.09]	0.10	9	---	---	--	0.3	--	1.5	0.3
	0.15	14	---	---	--	0.9	--	2.1	0.9
	0.20	18	---	---	--	1.2	0.3	2.4	1.2
	0.25	23	2.6	2.6	--	1.5	0.6	2.7	1.5
600 x 508 [0.15]	0.10	16	---	---	--	0.9	--	2.1	1.2
	0.15	23	---	---	--	1.5	0.6	2.7	1.5
	0.20	31	---	---	--	2.1	0.9	3.4	2.1
	0.25	39	3.1	3.0	--	2.4	1.2	3.7	2.4
600 x 610 [0.21]	0.10	22	---	---	--	1.5	0.6	2.7	1.5
	0.15	33	---	---	--	2.1	0.9	3.4	2.1
	0.20	43	---	---	--	2.4	1.5	4.0	2.7
	0.25	54	3.4	3.4	--	2.7	1.8	4.3	3.0
900 x 406 [0.14]	0.10	14	---	---	--	0.3	--	1.2	0.3
	0.15	21	---	---	--	0.9	--	1.8	0.9
	0.20	28	---	---	--	1.2	0.3	2.4	1.2
	0.25	35	3.0	2.9	--	1.5	0.6	2.7	1.5
900 x 508 [0.23]	0.10	23	---	---	--	0.9	--	2.1	0.9
	0.15	35	---	---	--	1.5	0.6	2.7	1.5
	0.20	46	---	---	--	1.8	0.9	3.0	2.1
	0.25	58	3.5	3.5	--	2.1	1.2	3.7	2.4
900 x 610 [0.32]	0.10	33	---	---	--	1.5	0.3	2.7	1.5
	0.15	49	---	---	--	2.1	0.9	3.4	2.1
	0.20	65	2.5	---	--	2.4	1.2	3.7	2.4
	0.25	81	3.9	3.9	--	2.7	1.8	4.3	3.0
1200 x 406 [0.18]	0.10	18	---	---	--	0.3	--	1.2	0.3
	0.15	28	---	---	--	0.9	--	1.8	0.9
	0.20	37	---	---	--	1.2	0.3	2.4	1.2
	0.25	46	3.3	3.2	--	1.5	0.6	2.7	1.5
1200 x 508 [0.3]	0.10	31	---	---	--	0.9	--	2.1	0.9
	0.15	46	---	---	--	1.5	0.6	2.7	1.5
	0.20	62	---	---	--	1.8	0.9	3.0	2.1
	0.25	77	3.9	3.8	--	2.1	1.2	3.7	2.4
1200 x 610 [0.43]	0.10	43	---	---	--	1.5	0.3	2.7	1.5
	0.15	65	---	---	--	2.1	0.9	3.4	2.1
	0.20	87	2.8	2.7	--	2.4	1.2	3.7	2.4
	0.25	109	4.3	4.3	--	2.7	1.8	4.3	3.0
1500 x 406 [0.23]	0.10	23	---	---	--	0.3	--	1.2	0.3
	0.15	35	---	---	--	0.6	--	1.8	0.9
	0.20	46	---	---	--	1.2	0.3	2.4	1.2
	0.25	58	3.5	3.5	--	1.5	0.3	2.7	1.5
1500 x 508 [0.38]	0.10	39	---	---	--	0.9	--	2.1	0.9
	0.15	58	---	---	--	1.5	0.6	2.7	1.5
	0.20	77	2.7	2.6	--	1.8	0.9	3.0	2.1
	0.25	97	4.1	4.1	--	2.1	1.2	3.7	2.4
1500 x 610 [0.53]	0.10	54	---	---	--	1.5	0.3	2.7	1.5
	0.15	81	---	---	--	2.1	0.9	3.4	2.1
	0.20	109	3.0	2.9	--	2.4	1.2	3.7	2.4
	0.25	135	4.6	4.6	--	2.7	1.8	4.3	3.0

Performance Notes:

1. Sound and pressure drop tested in accordance with ASHRAE Standard 70-2006 "Method of Testing for Rating the Performance of Air Outlets and Inlets."
2. Air flow is in Litres per second, L/s.
3. Pressure is in Pascals, Pa.
4. The NC values, sound pressure level, are based on a room absorption of 10 dB, re 10^{-12} watts and one diffuser.
5. ΔT is the difference between the room air temperature 1 m above the floor and the temperature of the supply air.
6. Proximity to outlet is the minimum distance from an outlet to the occupant in order to achieve the listed DR value.
7. Distances closer to the diffuser have a higher DR than the cataloged value.
8. DR is the predicted percentage of people dissatisfied (PPD) due to draft. A value of less than 20 meets the requirements of ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy.
9. Blanks (--) indicate that the DR is below the specified value at all distances from the diffuser face.
10. DR catalog data is presented for an occupant density of 25 people/100m^2, which is the default occupancy density for classrooms (ages 5-8) given by ASHRAE 62.1-2004. For other occupant densities, please refer to the DV Room Designer Software.
11. Performance data for standard diffusers not listed in the catalog is available in Price AIO Software.

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Product Overview

Model

Rectangular Industrial Diffuser **DFXi**

PRICE Industrial displacement diffusers present a unique and effective method of air distribution where air quality requirements for and industrial application are high. The industrial diffusers are designed to supply low velocity air to an industrial space at a higher rate than a commercial application, as the comfort conditions are much different between the two applications.

For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

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Rectangular Industrial Displacement Diffuser
DFXi Series

Product Information

Model:

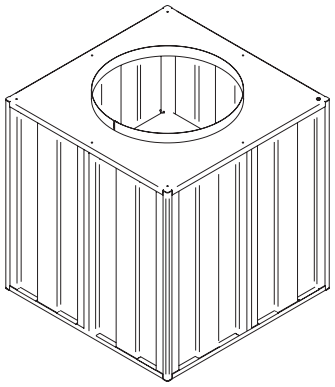
Industrial Floor Mounted Displacement Diffuser **DFXi**

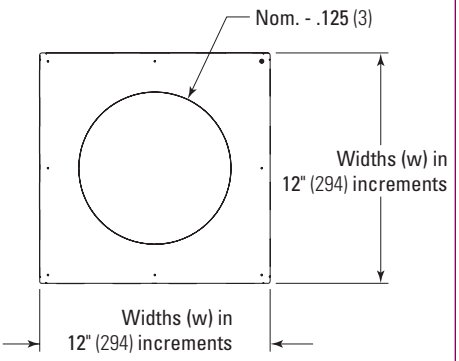
PRICE DFXi displacement diffusers are designed to supply fresh air directly to the occupants and equipment within an industrial or high traffic space. The DFXi diffuser is constructed with support mullions on 12″ increments and utilizes a corrugated face for increased rigidity. The DFXi is suited for any industrial environment where large air volumes may be required and air quality is a concern. Due to the strength and rigidity of this diffuser it is also a good choice for gymnasiums and other public spaces. The DFXi is available in 1-way, 2-way, 3-way, or 4-way discharge patterns.

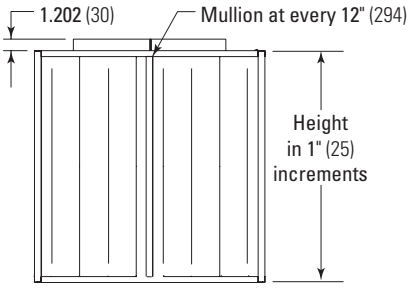
Features:
- Floor mounted
- Corrugated face for added rigidity
- Mullions at every 12″ for increased strength
- Large air volumes
- Variable height to meet air flow requirements: 12″ to 96″ in 1″ increments

Construction:
- Diffuser frame and equalization baffle - aluminum
- Side, top, and bottom panels – steel
- Perforated panels – corrugated steel

Finish: **B12**
- For optional and special finishes see color matrix

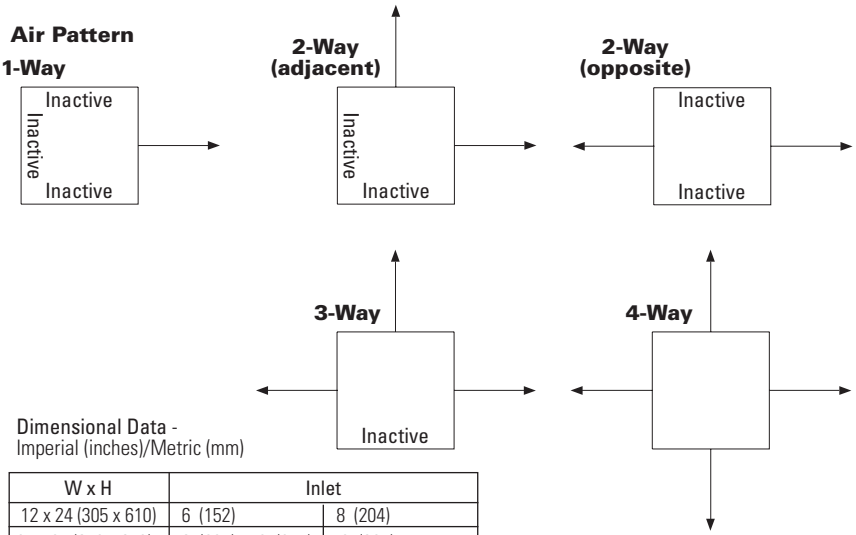






DFXi

Active Sides
- 1 — One-way pattern
- 2 — Two-way pattern
- 3 — Three-way pattern
- 4 — Four-way pattern



Dimensional Data - Imperial (inches)/Metric (mm)

W x H	Inlet		
12 x 24 (305 x 610)	6 (152)		8 (204)
24 x 24 (610 x 610)	8 (204)	10 (254)	12 (305)
12 x 48 (305 x 1219)	6 (152)		8 (204)
24 x 48 (610 x 1219)	8 (204)	10 (254)	12 (305)
24 x 72 (610 x 1829)	8 (204)	10 (254)	12 (305) 14 (356)

✓ Product Selection Checklist

1] Select diffuser Size based on desired performance characteristics.
2] Select inlet location and size.
3] Select Options and Accessories if required.
4] Select Finish.

Example: DF4i/36 x 48/Top/16/B12

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SECTION **J**

Suggested Specifications

Suggested Specifications

Index

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Wall Mounted Displacement Diffusers

SECTION 23 06 30 – PRODUCT

PART 1 - GENERAL

1.1 Summary

A. This section includes the following:
   1. Floor mounted displacement diffusers

1.2 Related Documents

A. 23 01 00 – Operation and Maintenance of HVAC Systems
B. 23 05 00 – Common Work Results for HVAC
C. 23 09 00 – Instrumentation of Control for HVAC
D. 23 20 00 – HVAC Piping and Pumps
E. 23 30 00 – HVAC Air Distribution

1.3 Submittals

A. Product Data: For each type of product indicated, include rated capacities, furnished specialties and accessories.
B. Shop Drawings: For each type of product indicated, include the following:
   1. Detail equipment assemblies and indicated dimensions.
   2. Required clearances.
   3. Method of field assembly.
   4. Revit models
C. Coordination Drawings: Include floor plans, and other details, drawn to scale, one which the following items are shown and coordinated with each other, based on input from installers of the items involved:
   1. Ceiling-mounted items including;
      a. Fixtures
      b. Lightning fixtures
      c. Speakers
      d. Sprinklers
      e. Access panels
      f. Diffusers
      g. Grilles
      h. Air inlets
      i. Perimeter molding for exposed or partially exposed cabinets.
D. Operation and Maintenance Data: To include in emergency, operation and maintenance manuals, maintenance schedules and repair part lists for all parts.

1.4 Quality Assurance

A. Product Options: Include drawings indicating size, profiles and dimensional requirements of the displacement ventilation diffusers that are based on the specific system indicated.
B. Electrical Components, Devices and Accessories: Listed and labeled as defined in NFPA 70, Article 100 by a testing agency acceptable to authorities having jurisdiction and marked for intended use.

1.5 Coordination

A. Coordinate layout and installation of diffusers with other construction that penetrates ceilings, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.
B. Specific configuration of the supply and return ductwork and at each unit has been indicated on the drawings. If the configuration of the units furnished on the project differs from that indicated on the drawings (whether or not the units furnished are the specific units or an acceptable substitute), it shall be the contractor's responsibility to modify ductwork, etc., as required to accommodate the actual configuration of units furnished on the project.

PART 2 – PRODUCTS

2.1 General

A. Manufacturer shall be responsible for examining applications of each type of unit to assure that each will operate properly in the intended application.
B. Unit sizes are shown as selected in accordance with the principles set forth in the ASHRAE Guide and Manufacturer's literature.
C. All items of a given type shall be the products of the same manufacturer.

2.2 Manufactureres

A. In Part 2 articles where titles below introduce lists, the following requirements apply to selection:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

      Manufacturers shall demonstrate that they have successfully supplied and installed displacement ventilation products, as well as the computer modeling thereof for a minimum of 10 years. Manufacturers must be pre-qualified to bid based on the completion of a minimum of xx jobs in similar climates.

      Manufacturers shall provide a list of completed jobs and references.

2.3 DF1 Displacement Diffusers

A. Approved Manufacturers:
   1. Price
B. Description: Furnish and install Price model series DF1 (WxHxD) with the sizes and capacities indicated on the plans and air outlet schedule.
C. Performance: Air shall be delivered to the space at low noise levels and low velocities that are even across the diffuser face, in all ducting configurations and without the use of nozzles.

   Diffuser Manufacturer shall provide sound and pressure drop data derived from tests in accordance with ASHRAE Standard 70-2006. Performance data for Draft Rate (%DR) shall be provided based on tests in accordance with ASHRAE Standard 55-2004. A manufacturer software program that allows room comfort evaluation for specific operating conditions and diffuser locations shall be available to aid in performance assessment. If such a computer program is not available from the manufacturer, the manufacturer shall supply, free of charge, a CFD model of the representative spaces completed by a modeling contractor who has demonstrable qualifications to model such spaces. These shall include no less than 10 years of experience in the modeling of displacement ventilation systems, thorough validation of the code through comparison to empirical data as well as a list of references.

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Wall Mounted Displacement Diffusers

D. Construction: The 1 way flat faced Displacement diffuser, model DF1 shall be constructed with an equalization baffle behind the operative diffuser face for uniform, low velocity, distribution of supply air. Both the equalization baffle and face shall be securely retained in the diffuser frames. Plastic nozzle arrays or any plastic components are unacceptable. The diffuser frames shall be constructed of high strength aluminum extrusion for rigidity and protection of the operative face and side panels. There shall be no visible fasteners on the front or side panels. The operative face shall be constructed of painted 16 gauge perforated steel, rear side and end panels shall beprovided in painted 20 gauge steel. The frame andinternal baffling elements shall be constructed ofAluminum. The diffuser shall be available for ductconnection at the top, bottom, side or rear of the diffuser with a factory or field cut inlet. The paint shallbe powder coat polyester. Epoxies and their derivatives are unacceptable. Visible non-metallic componentsare unacceptable. The diffuser shall be supplied with a rail mounting system that does not requirepuncturing the diffuser to install.

Mounting/Fastening: The diffuser shall fasten to the wall via a rail mounting system. The rail mounting system with metal cover strips to conceal all visible fasteners.

2.4 DF3 Displacement Diffusers

A. Approved Manufacturers:

1. Price

B. Description: Furnish and install Price model series DF3 (WxHxD) with the sizes and capacities indicated on the plans and air outlet schedule.

C. Performance: Air shall be delivered to the space at low noise levels and low velocities that are even across the diffuser face, in all ducting configurations and withoutthe use of nozzles. Diffuser Manufacturer shall providesound and pressure drop data derived from tests inaccordance with ASHRAE Standard 70-2006. Performancedata for Draft Rate (%DR) shall be provided based ontests in accordance with ASHRAE Standard 55-2004. Asoftware program that allows room comfort evaluationfor specific operating conditions and diffuser locationsshall be available to aid in performance assessment.If such a computer program is not available from themanufacturer, the manufacturer shall supply, freeof charge, a CFD model of the representative spaces completed by a modeling contractor who has demonstrable qualifications to model such spaces. These shall include no less than 10 years of experience in the modeling of displacement ventilation systems, thorough validation of the code through comparison to empirical data as well as a list of references.

D. Construction: The 3 way flat faced Displacement diffuser, model DF3 shall be constructed with an equalization baffle behind the operative diffuser faces for uniform,low velocity, distribution of supply air. Both theequalization baffle and faces shall be securely retainedin the diffuser frames. Plastic nozzle arrays or anyplastic components are unacceptable. The diffuserframes shall be constructed of high strength aluminum extrusion for rigidity and protection of the operative face and side panels. There shall be no visible fasteners on the front or side panels. The operativefaces shall be constructed of painted 16 gaugeperforated steel, rear and end panels shall be provided inpainted 20 gauge steel. The frame andinternal baffling elements shall be constructed of Aluminum. The diffuser shall be available for duct connection at the top, bottom, or rear of the diffuser with a factory or field cut inlet.The paint shall be powder coat polyester. Epoxies and their derivatives are unacceptable. Visible non-metallic components are unacceptable. The diffuser shall be supplied with a rail mounting system that does not require puncturing the diffuser to install.

E. Mounting/Fastening: The diffuser shall fasten to the wall via a rail mounting system. The rail mounting system with metal cover strips to conceal all visible fasteners.

2.5 DF1C Displacement Diffusers

A. Approved Manufacturers:

1. Price

B. Description: Furnish and install Price model series DF1C (WxH) with the sizes and capacities indicated on the plans and air outlet schedule.

C. Performance: Air shall be delivered to the space at low noise levels and low velocities that are even across the diffuser face, in all ducting configurations and withoutthe use of nozzles. Diffuser Manufacturer shallprovide sound and pressure drop data derived fromtests in accordance with ASHRAE Standard 70-2006.Performance data for Draft Rate (%DR) shall beprovided based on tests in accordance with ASHRAEStandard 55-2004. A software program that allowsroom comfort evaluation for specific operating conditions and diffuser locations shall be available to aid in performance assessment. If such a computer program is not available from the manufacturer, the manufacturer shall supply, free of charge, a CFD model of therepresentative spaces completed by a modelingcontractor who has demonstrable qualifications to modelsuch spaces. These shall include no less than 10 yearsof experience in the modeling of displacementventilation systems, thorough validation of the codethrough comparison to empirical data as well as a list of references.

D. Construction: The 1 Way Flat Faced Corner Displacement diffuser, model DF1C, shall be constructed with an equalization baffle behind the operative diffuser face for uniform, low velocity, distribution of supply air. Both the equalization baffle and face shall be securely retained in the diffuser frames. Plastic nozzle arrays or any plastic components are unacceptable. The diffuser frames shall be constructed of high strength aluminum extrusionfor rigidity and protection of the operative faceand side panels. There shall be no visible fastenerson the front or side panels. The operative face shallbe constructed of painted 16 gauge perforated steel, sideand end panels shall be provided in painted 20gauge steel. The frame and internal baffling elementsshall be constructed of Aluminum. The diffuser shallbe available for duct connection at the top, bottom, or rear of the diffuser with a factory or field cut inlet. The paint shall be powder coat polyester. Epoxies and their derivatives are unacceptable Visiblenon-metallic components are unacceptable. The diffusershall be supplied with concealed mounting bracketsthat do not require puncturing the diffuser to install.

E. Mounting/Fastening: The diffuser shall be supplied with concealed mounting bracket that do not require puncturing the diffuser to install.

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Wall Mounted Displacement Diffusers

2.6 DR90 Displacement Diffusers

A. Approved Manufacturers:

1. Price

B. Description: Furnish and install Price model series DR90 (DiaxH) with the configurations and mounting typesindicated on the plans and air outlet schedule.

C. Performance: Air shall be delivered to the space at low noise levels and low velocities that are even across the diffuser face, in all ducting configurations andwithout the use of nozzles. Diffuser Manufacturer shallprovide sound and pressure drop data derivedfrom tests in accordance with ASHRAE Standard 70-2006. Performance data for Draft Rate (%DR) shall beprovided based on tests in accordance with ASHRAE Standard 55-2004. A software program that allowsroom comfort evaluation for specific operating conditions and diffuser locations shall be available to aid in performance assessment. If such a computer program is not available from the manufacturer, the manufacturer shall supply, free of charge, a CFD model of therepresentative spaces completed by a modelingcontractor who has demonstrable qualifications tomodel such spaces. These shall include no less than 10years of experience in the modeling of displacementventilation systems, thorough validation of the codethrough comparison to empirical data as well as a list of references.

D. Construction: The 90 Degree Supply Radial Displacement diffuser, model DR90 shall be constructed with an equalization baffle behind the operative diffuser face for uniform, low velocity, distribution of supply air. Both the equalization baffle and face shall be securely retained in the diffuser frames. Plastic nozzle arrays or any plastic components are unacceptable. The diffuser frames shall be constructed of high strength aluminum extrusion for rigidity and protection of the operative face and side panels. There shall be no visible fasteners on the front or side panels. The operative face shall be constructed of painted 18 gauge perforated steel, top and bottom panels shall be provided in painted 20 gauge steel. The frame and internal baffling elements shall be constructed of Aluminum. The diffuser shall be available for duct connection at the top, bottom, or rear of the diffuser with a factory or field cut inlet. The paint shall be powder coat polyester. Epoxies and their derivatives are unacceptable. Visible non-metallic components are unacceptable. The diffuser shallbe supplied with a rail mounting system that doesnot require puncturing the diffuser to install.

E. Mounting/Fastening: The diffuser shall fasten to the wall via a rail mounting system. The rail mounting system with metal cover strips to conceal all visible fasteners.

2.7 DR180 Displacement Diffusers

A. Approved Manufacturers:

1. Price

B. Description: Furnish and install Price model series DR180 (DiaxH) with the configurations and mounting typesindicated on the plans and air outlet schedule.

C. Performance: Air shall be delivered to the space at low noise levels and low velocities that are even across the diffuser face, in all ducting configurations and without the use of nozzles. Diffuser Manufacturer shall provide sound and pressure dropdata derived from tests in accordance with ASHRAE standard 70-2006. Performance data for Draft Rate (%DR) shall be provided based on tests in accordance with ASHRAE Standard 55-2004. A manufacturer software program that allows room comfort evaluation for specific operating conditions and diffuser locations shall beavailable to aid in performance assessment. If sucha computer program is not available from themanufacturer, the manufacturer shall supply, free ofcharge, a CFD model of the representative spacescompleted by a modeling contractor who has demonstrable qualifications to model such spaces. These shall include no less than 10 years of experience in the modeling of displacement ventilation systems, thorough validation of the code through comparison to empirical data as well as a list of references.

C. Construction: The 180 Degree Supply Radial Displacement diffuser, model DR180 shall be constructed with an equalization baffle behind the operative diffuser face for uniform, low velocity, distribution of supply air. Both the equalization baffle and face shall be securely retained in the diffuser frames. Plastic nozzle arrays or any plastic components are unacceptable. The diffuser frames shall be constructed of high strength aluminum extrusion for rigidity and protection of the operative face and side panels. There shall be no visible fasteners on the front or side panels. The operative face shall be constructed of painted 18 gauge perforated steel, top and bottom panels shall be provided in painted 20 gauge steel. The frame and internal baffling elements shall be constructed of aluminum. The diffuser shall be available for duct connection at the top, bottom, or rear of the diffuser with a factory or field cut inlet. The paint shall be powder coat polyester. Epoxies and their derivatives are unacceptable. Visible non-metallic components are unacceptable. The diffuser shall besupplied with a rail mounting system that does notrequire puncturing the diffuser to install.

D. Mounting/Fastening: The diffuser shall fasten to the wall via a rail mounting system. The rail mounting system with metal cover strips to conceal all visible fasteners.

2.8 DR180U Displacement Diffusers

A. Approved Manufacturers:

1. Price

B. Description: Furnish and install Price model series DR180U (DiaxH) with the configurations and mounting typesindicated on the plans and air outlet schedule.

C. Performance: Air shall be delivered to the space at low noise levels and low velocities that are even across the diffuser face, in all ducting configurations and without the use of nozzles. Diffuser Manufacturer shall providesound and pressure drop data derived from testsin accordance with ASHRAE Standard 70-2006.Performance data for Draft Rate (%DR) shall beprovided based on tests in accordance with ASHRAEStandard 55-2004. A manufacturer software programthat allows room comfort evaluation for specific operating conditions and diffuser locations shallbe available to aid in performance assessment. Ifsuch a computer program is not available from themanufacturer, the manufacturer shall supply, free ofcharge, a CFD model of the representative spacescompleted by a modeling contractor who hasdemonstrable qualifications to model such spaces. Theseshall include no less than 10 years of experiencein the modeling of displacement ventilation systems,thorough validation of the code through comparisonto empirical data as well as a list of references.

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Wall Mounted Displacement Diffusers

D. Construction:The 180U Degree Supply RadialDisplacement diffuser, model DR180U shall beconstructed with an equalization baffle behind theoperative diffuser face for uniform, low velocity, distribution of supply air. Both the equalization baffleand face shall be securely retained in the diffuserframes. Plastic nozzle arrays or any plastic componentsare unacceptable. The diffuser frames shall be constructedof high strength aluminum extrusion for rigidity andprotection of the operative face and side panels. Thereshall be no visible fasteners on the front or side panels.The operative face shall be constructed of painted 18 gauge perforated steel, top and bottom panels shall be provided in painted 20 gauge steel.The frame and internal baffling elements shall be constructed of Aluminum. The diffuser shall be available for duct connection at the top, bottom, or rear of the diffuser with a factory or field cut inlet. The paint shall be powder coat polyester. Epoxies and their derivatives are unacceptable. Visible non-metallic components are unacceptable. The diffuser shall besupplied with a rail mounting system that does notrequire puncturing the diffuser to install.

E. Mounting/Fastening: The diffuser shall fasten to the wall via a rail mounting system. The rail mounting system with metal cover strips to conceal all visible fasteners.

2.9 Diffuser Accessories

A. Bases for displacement diffuser models: DF1, DF3, DF1C, DR90, DR180, DR180U

Diffuser manufacturer shall provide bases under each displacement diffuser. The base shall allow for removal from the space for access to the inlet of the diffuser if ducted from below. The base shall have an extruded aluminum frame and 20 gauge solid steel face. Base heights shall be as indicated on the drawings. Finish shall be B12 – white, or as indicated.

B. Duct Covers for displacement diffuser models: DF1, DF3, DR90, DR180, DR180U

Diffuser manufacturer shall provide duct covers available for all inlet locations. The duct covers shall be manufactured by the diffuser manufacturer. The duct cover face shall be constructed of painted 18 gauge (solid/perforated) steel. The duct cover frames shall be constructed of high strength aluminum extrusion for rigidity and protection of the face and side panels. The duct cover shall be supplied with a rail mounting system with metal cover strips to conceal all fasteners. All duct covers shall be factory assembled and shipped complete with the associated diffuser. There shall be no visible fasteners on the duct cover panels. The paint shall be powder coat polyester to match the diffuser or as selected by the architect. Epoxies and their derivatives are unacceptable. Visible non-metallic components are unacceptable. The paint shall be powder coat polyester to match the diffuser or as selected by the architect.

C. Duct Covers for displacement diffuser models: DF1C

Diffuser manufacturer shall provide duct covers available for all inlet locations. The duct cover face shall be securely retained in the mounting frames. The duct cover face shall be constructed of painted 18 gauge (solid/perforated) steel. The duct cover frames shall be constructed of high strength aluminum extrusion for rigidity and protection of the face. There shall be no visible fasteners on the duct cover panels. The paint shall be powder coat polyester to match the diffuser or as selected by the architect. Epoxies and their derivatives are unacceptable. Visible non-metallic components are unacceptable. All duct covers shall ship complete with the associated diffuser.

D. AFSD's for displacement diffuser models: DF1, DF3, DF1C, DR90, DR180, DR180U

1. Approved Manufacturers:
   a. Price

B. Description: Furnish and install Price model series Adjustable Flow Station for Displacement Diffusers, AFSD, (DiaxH) as indicated on the plans and air outlet schedule.

C. Performance: The manufacturer shall supply pressure loss data and air flow ranges for the various sensing device sizes.

D. Construction: The air flow sensor shall be of a cross configuration. The sensor shall have twelve total pressure sensing ports and a center averaging chamber designed to accurately average the flow across the inlet of the assembly. Sensor shall meet accuracy within 5% with a 90° sheet metal elbow directly at the inlet of the assembly. The air flow sensor shall amplify the sensed air flow signal. Two flexible tubes, one connected to the high pressure port and the other connected to the low pressure port of the air flow sensor, shall extend through the assemble housing to allow for easy monitoring of the air flow.

The unit shall be constructed of 22 gauge zinc coated steel. The damper shall incorporat a lever for manual adjustment and a wing-nut for locking the damper in position.

PART 3 – EXECUTION

3.1 Installation – General

A. Install displacement diffusers level and plumb. Maintain sufficient clearance for normal services, maintenance, or in accordance with construction drawings.

B. Complete installation and startup checks according to manufacturer's instructions and perform the following.

1. Verify that inlet duct connections are asrecommended by manufacture to achieve properperformance.
2. Verify that any identification tags are visible.
3. Verify locations of thermostats, humidistats, and other exposed control sensors with Drawings and room details before installation.

For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

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In-Wall Displacement Diffusers

SECTION 23 06 30 – PRODUCT

PART 1 - GENERAL

1.1 Summary

A. This section includes the following:
   1. Floor mounted displacement diffusers

1.2 Related Documents

A. 23 01 00 – Operation and Maintenance of HVAC Systems
B. 23 05 00 – Common Work Results for HVAC
C. 23 09 00 – Instrumentation of Control for HVAC
D. 23 20 00 – HVAC Piping and Pumps
E. 23 30 00 – HVAC Air Distribution

1.3 Submittals

A. Product Data: For each type of product indicated, include rated capacities, furnished specialties and accessories.
B. Shop Drawings: For each type of product indicated, include the following:
   1. Detail equipment assemblies and indicated dimensions.
   2. Required clearances.
   3. Method of field assembly.
   4. Revit models
C. Coordination Drawings: Include floor plans, and other details, drawn to scale, one which the following items are shown and coordinated with each other, based on input from installers of the items involved:
   1. Ceiling-mounted items including;
      a. Fixtures
      b. Lightning fixtures
      c. Speakers
      d. Sprinklers
      e. Access panels
      f. Diffusers
      g. Grilles
      h. Air inlets
      i. Perimeter molding for exposed or partially exposed cabinets.
D. Operation and Maintenance Data: To include in emergency, operation and maintenance manuals, maintenance schedules and repair part lists for all parts.

1.4 Quality Assurance

A. Product Options: Include drawings indicating size, profiles and dimensional requirements of the displacement ventilation diffusers that are based on the specific system indicated.
B. Electrical Components, Devices and Accessories: Listed and labeled as defined in NFPA 70, Article 100 by a testing agency acceptable to authorities having jurisdiction and marked for intended use.

1.5 Coordination

A. Coordinate layout and installation of diffusers with other construction that penetrates ceilings, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.
B. Specific configuration of the supply and return ductwork and at each unit has been indicated on the drawings. If the configuration of the units furnished on the project differs from that indicated on the drawings (whether or not the units furnished are the specific units or an acceptable substitute), it shall be the contractor's responsibility to modify ductwork, etc., as required to accommodate the actual configuration of units furnished on the project.

PART 2 – PRODUCTS

2.1 General

A. Manufacturer shall be responsible for examining applications of each type of unit to assure that each will operate properly in the intended application.
B. Unit sizes are shown as selected in accordance with the principles set forth in the ASHRAE Guide and Manufacturer's literature.
C. All items of a given type shall be the products of the same manufacturer.

2.2 Manufactureres

A. In Part 2 articles where titles below introduce lists, the following requirements apply to selection:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

      Manufacturers shall demonstrate that they have successfully supplied and installed displacement ventilation products, as well as the computer modeling thereof for a minimum of 10 years. Manufacturers must be pre-qualified to bid based on the completion of a minimum of xx jobs in similar climates. Manufacturers shall provide a list of completed jobs and references.

2.3 DF1W Displacement Diffusers

A. Approved Manufacturers:
   1. Price
B. Description: Furnish and install Price model series DF1W (WxH) with the sizes and capacities indicated on the plans and air outlet schedule.
C. Performance: Air shall be delivered to the space at low noise levels and low velocities that are even across the diffuser face, in all ducting configurations and without the use of nozzles.

   Diffuser Manufacturer shall provide sound and pressure drop data derived from tests in accordance with ASHRAE Standard 70-2006. Performance data for Draft Rate (%DR) shall be provided based on tests in accordance with ASHRAE Standard 55-2004. A manufacturer software program that allows room comfort evaluation for specific operating conditions and diffuser locations shall be available to aid in performance assessment If such a computer program is not available from the manufacturer, the manufacturer shall supply, free of charge, a CFD model of the representative spaces completed by a modeling contractor who has demonstrable qualifications to model such spaces. These shall include no less than 10 years of experience in the modeling of displacement ventilation systems, thorough validation of the code through comparison to empirical data as well as a list of references.

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In-Wall Displacement Diffusers

D. Construction: The 1 way flat faced in-wall displacement diffuser, model DF1W, shall be constructed with an equalization baffle behind the operative diffuser face for uniform, low velocity, distribution of supply air. Both the equalization baffle and face shall be securely retained in the diffuser frames. Plastic nozzle arrays or any plastic components are unacceptable.The diffuser frames shall be constructed of 20 gauge steel for rigidity and protection of the operative face.The operative face shall beconstructed of painted 18 gauge perforated steel,and the frame shall be provided in painted 20 gaugesteel. The plenum shall be 24 gauge steel. The internalbaffling elements shall be constructed of aluminum.The diffuser shall be available for duct connection atthe top. The paint shall be powder coat polyester. Epoxies and their derivatives are unacceptable. Visible non-metallic components are unacceptable.

E. Mounting/Fastening:The diffuser front panel shall bebolted to the plenum through the wall with factory provided fasteners.

2.4 Puraflo Displacement Diffusers

A. Approved Manufacturers:

1. Price

B. Description: Furnish and install Price model series Puraflo (WxH) with the sizes and capacities indicated on the plans and air outlet schedule.

C. Performance: Air shall be delivered to the space at low noise levels and low velocities that are even across the diffuser face, in all ducting configurations and withoutthe use of nozzles. Diffuser Manufacturer shall providesound and pressure drop data derived from testsin accordance with ASHRAE Standard 70-2006.Performance data for Draft Rate (%DR) shall be providedbased on tests in accordance with ASHRAE Standard55-2004. A software program that allows room comfortevaluation for specific operating conditions and diffuserlocations shall be available to aid in performance assessment. If such a computer program is not available from the manufacturer, the manufacturer shall supply, free of charge, a CFD model of therepresentative spaces completed by a modelingcontractor who has demonstrable qualifications to modelsuch spaces. These shall include no less than 10years of experience in the modeling of displacementventilation systems, thorough validation of the codethrough comparison to empirical data as well as a list of references.

D. Construction: The 1 way flat faced in-wall displacement diffuser, model Puraflo, shall be constructed with an equalization baffle behind the operative diffuser face for uniform, low velocity, distribution of supply air. Both the equalization baffle and face shall be securely retained in the diffuser frames. Plastic nozzle arrays or any plastic components are unacceptable.The diffuser frames shall be constructed of 20 gauge steel for rigidity and protection of the operative face.The operative face shall beconstructed of painted 18 gauge perforated steel, andthe frame shall be provided in painted 20 gauge steel.The plenum shall be 24 gauge steel. The internal bafflingelements shall be constructed of aluminum. The diffuserface shall be field-removable for cleaning. The diffusershall be available for duct connection at the top.The paint shall be powder coat polyester. Epoxies andtheir derivatives are unacceptable. Visible non-metallic components are unacceptable.

E. Mounting/Fastening:The diffuser front panel shallbe bolted to the plenum through the wall withfactory provided fasteners. The front panel shall be field-removable for cleaning.

2.5 DF1R Displacement Diffusers

A. Approved Manufacturers:

1. Price

B. Description: Furnish and install Price model series DF1R (WxH) with the configurations and mounting typesindicated on the plans and air outlet schedule.

C. Performance: Air shall be delivered to the space at low noise levels and low velocities that are even across the diffuser face, in all ducting configurations and withoutthe use of nozzles. Diffuser Manufacturer shall providesound and pressure drop data derived from testsin accordance with ASHRAE Standard 70-2006.Performance data for Draft Rate (%DR) shall be provided based on tests in accordance with ASHRAE Standard 55-2004. A software program that allows room comfortevaluation for specific operating conditions and diffuserlocations shall be available to aid in performance assessment. If such a computer program is not available from the manufacturer, the manufacturer shall supply, free of charge, a CFD model ofthe representative spaces completed by a modelingcontractor who has demonstrable qualifications to modelsuch spaces. These shall include no less than 10 yearsof experience in the modeling of displacement ventilationsystems, thorough validation of the code throughcomparison to empirical data as well as a list of references.

D. Construction: The 1 way flat faced recessed displacement diffuser, model DF1R, shall be constructed with an equalization baffle behind the operative diffuser face for uniform, low velocity, distribution of supply air. Both the equalization baffle and face shall be securely retained in the diffuser frames. Plastic nozzle arrays or any plastic components are unacceptable. There shall be no visible fasteners on the front panel. The operative face shall be constructed of painted 18 gauge perforated steel. The installation frame shall be constructed of 24 gage steel. The internal baffling elements shall be constructed of aluminum. The paint shall be powder coat polyester. Epoxies and their derivatives are unacceptable. Visible non-metallic components are unacceptable. The diffuser shall be supplied with an installation frame for recessed installation that is not visible from the room. (The diffuser shall be supplied with an installation frame for recessed installation which allows the diffuser to be installed in areas where plaster is required).

E. Mounting/Fastening: The diffuser shall be installed within the supplied installation frame. The diffuser shall have no visible fasteners or framing, and shall be held within the supplied installation frame via secure mounting clips.

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In-Wall Displacement Diffusers

2.6 Diffuser Accessories

A. AFSDs for displacement diffuser models: DF1W, DF1WSS, Puraflo

1. Approved Manufacturers:

a. Price

B. Description: Furnish and install Price model series Adjustable Flow Station for Displacement Diffusers, AFSD, (DiaxH) as indicated on the plans and air outlet schedule.

C. Performance: The manufacturer shall supply pressure loss data and air flow ranges for the various sensing device sizes.

D. Construction: The air flow sensor shall be of a cross configuration. The sensor shall have twelve total pressure sensing ports and a center averaging chamber designed to accurately average the flow across the inlet of the assembly. Sensor shall meet accuracy within 5% with a 90° sheet metal elbow directly at the inlet of the assembly. The air flow sensor shall amplify the sensed air flow signal. Two flexible tubes, one connected to the high pressure port and the other connected to the low pressure port of the air flow sensor, shall extend through the assemble housing to allow for easy monitoring of the air flow.

The unit shall be constructed of 22 gauge zinc coated steel. The damper shall incorporate a lever for manual adjustment and a wing-nut for locking the damper in position.

PART 3 – EXECUTION

3.1 Installation – General

A. Install displacement diffusers level and plumb. Maintain sufficient clearance for normal services, maintenance, or in accordance with construction drawings.

B. Complete installation and startup checks according to manufacturer's instructions and perform the following.

1. Verify that inlet duct connections are as recommended by manufacture to achieve proper performance.
2. Verify that any identification tags are visible.
3. Verify locations of thermostats, humidistats, and other exposed control sensors with Drawings and room details before installation.

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Free Standing Displacement Diffusers

SECTION 23 06 30 – PRODUCT

PART 1 - GENERAL

1.1 Summary

A. This section includes the following:
   1. Free standing displacement diffusers

1.2 Related Documents

A. 23 01 00 – Operation and Maintenance of HVAC Systems
B. 23 05 00 – Common Work Results for HVAC
C. 23 09 00 – Instrumentation of Control for HVAC
D. 23 20 00 – HVAC Piping and Pumps
E. 23 30 00 – HVAC Air Distribution

1.3 Submittals

A. Product Data: For each type of product indicated, include rated capacities, furnished specialties and accessories.
B. Shop Drawings: For each type of product indicated, include the following:
   1. Detail equipment assemblies and indicated dimensions.
   2. Required clearances.
   3. Method of field assembly.
   4. Revit models
C. Coordination Drawings: Include floor plans, and other details, drawn to scale, one which the following items are shown and coordinated with each other, based on input from installers of the items involved:
   1. Ceiling-mounted items including;
      a. Fixtures
      b. Lightning fixtures
      c. Speakers
      d. Sprinklers
      e. Access panels
      f. Diffusers
      g. Grilles
      h. Air inlets
      i. Perimeter molding for exposed or partiallyexposed cabinets.
D. Operation and Maintenance Data: To includein emergency, operation and maintenance manuals,maintenance schedules and repair part lists for all parts.

1.4 Quality Assurance

A. Product Options: Include drawings indicating size, profiles and dimensional requirements of DR90 the displacement ventilation diffusers that are based on the specific system indicated.
B. Electrical Components, Devices and Accessories: Listed and labeled as defined in NFPA 70, Article 100 by a testing agency acceptable to authorities having jurisdiction and marked for intended use.

1.5 Coordination

A. Coordinate layout and installation of diffusers with other construction that penetrates ceilings, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.
B. Specific configuration of the supply and return ductwork and piping at each unit has been indicated on the drawings. If the configuration of the units furnished on the project differs from that indicated on the drawings (whether or not the units furnished are the specific units or an acceptable substitute), it shall be the contractor's responsibility to modify ductwork, piping, etc., as required to accommodate the actual configuration of units furnished on the project.

PART 2 – PRODUCTS

2.1 General

A. Manufacturer shall be responsible for examining applications of each type of unit to assure that each willoperate properly in the intended application.
B. Unit sizes are shown as selected in accordance with the principles set forth in the ASHRAE Guide and Manufacturer's literature.
C. All items of a given type shall be the products of the same manufacturer.

2.2 Manufactureres

A. In Part 2 articles where titles below introduce lists, the following requirements apply to selection:
   1. Manufacturers: Subject to compliance withrequirements, provide products by one of themanufacturers specified. Manufacturers shalldemonstrate that they have successfully suppliedand installed displacement ventilation products,as well as the computer modeling thereof for aminimum of 10 years. Manufacturers must be pre-qualified to bid based on the completion of a minimum of xx jobs in similar climates.Manufacturers shall provide a list of completed jobs and references.

2.3 DR360 Displacement Diffusers

A. Approved Manufacturers:
   1. Price
B. Description: Furnish and install Price model series DR360 (W/HDia x Height/D) with the configurations and mounting types) sizes and capacities indicated on the plans and air outlet schedule.
C. Performance: Air shall be delivered to the space at low noise levels and low velocities that are even across the diffuser face, in all ducting configurations and without the use of nozzles. Diffuser Manufacturer shall providesound and pressure drop data derived from testsin accordance with ASHRAE Standard 70-2006.Performance data for Draft Rate (%DR) shall be providedbased on tests in accordance with ASHRAE Standard55-2004. A manufacturer software program that allowsroom comfort evaluation for specific operating conditions and diffuser locations shall be available to aid in performance assessment. If such a computer program is not available from the manufacturer, the manufacturer shall supply, free of charge, a CFD model of the representative spaces completed by a modeling contractor who has demonstrable qualifications to model such spaces. These shall include no less than 10 years of experience in the modeling of displacement ventilation systems, thorough validation of the code through comparison to empirical data as well as a list of references.D.Construction: The 360 degree Radial Supply Displacement Diffuser, model DR 360, shall b e constructed with an equalization baffle behind the operative diffuser face for uniform, low velocity distribution of supply air.

For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

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Free Standing Displacement Diffusers

Both the equalization baffle and the face shall be securely retained in the diffuser frame. Plastic nozzle arrays or any plastic components are unacceptable. The diffuser frame shall be constructed of high strength aluminum extrusion for rigidity and protection of the operative face panel. There shall be no visible fasteners on the front panel. The operative face shall be constructed of painted high 18 gauge perforated steel, and the top and bottom panels may shall be provided in painted 20 gauge steel. The frame and internal baffling elements shall be constructed of aluminum. The diffuser shall be available for duct connection at the top or bottom of the diffuser with a factory cut inlet. The paint shall be powder coat polyester. Epoxies and their derivatives are unacceptable. Visible non-metallic components are unacceptable. The diffusers hall be supplied with a rail mounting system that does not require puncturing the diffuser to install.

2.4 DFXi Displacement Diffusers

A. Approved Manufacturers:

1. Price

B. Description: Furnish and install Price model series DFXi (W x Height) with the sizes and capacities indicated on the plans and air outlet schedule.

C. Performance: Air shall be delivered to the space at low noise levels and low velocities that are even across the diffuser face in all ducting configurations and without the use of nozzles. Diffuser Manufacturer shall provide sound and pressure drop data derived from tests in accordance with ASHRAE standard 70-2006. Performance data for velocity depth shall be provided by manufacturer.

D. Construction: and install Price DFXi Industrial Floor Mounted Displacement Diffuser of sizes and capacities indicated on the drawings or diffuser schedule.

The Industrial Floor Mounted Displacement Diffuser, model DFXi, shall be constructed with a perforated operative face for uniform, low velocity distribution of supply air. The diffuser face shall be strengthened with breaking in a corrugated fashion and shall be securely retained in the diffuser frames. The diffuser frames shall be constructed of high strength aluminum extrusion for rigidity and protection of the operative face and side panels. A maximum of 12" is permitted between the support frames. These shall be no visible fasteners on the front or side panels. The operative face shall be constructed of painted 18 gauge steel, side and end panels may be provided in painted steel. The perforated baffle shall be constructed of aluminum. The paint shall be powder coat polyester; epoxies and their derivatives are unacceptable. Visible, non-metallic components are unacceptable. The diffuser shall be available for duct connection into the top or bottom. Air shall be delivered to the space at low noise levels and low velocities that are even across the diffuser face, in all ducting configurations. (The diffuser shall be supplied with forklift arm supports).

2.5 Diffuser Accessories

A. Bases for displacement diffuser models: DR360

Diffuser manufacturer shall provide bases under each displacement diffuser. The base shall allow for removal from the space for access to the inlet of the diffuser if ducted from below. The base shall have an extruded aluminum frame and 20 gauge solid steel face. Base heights shall be as indicated on the drawings. Finish shall be B12 – white, or as indicated.

B. AFSD's for displacement diffuser models: DR360

1. Approved Manufacturers:
   a. Price
   b. Description: Furnish and install Price model series Adjustable Flow Station for Displacement Diffusers, AFSD, (DiaxH) as indicated on the plans and air outlet schedule.
   c. Performance: The manufacturer shall supply pressure loss data and air flow ranges for the various sensing device sizes.
   d. Construction: The air flow sensor shall be of a cross configuration. The sensor shall have twelve total pressure sensing ports and a center averaging chamber designed to accurately average the flow across the inlet of the assembly. Sensor shall meet accuracy within 5% with a 90° sheet metal elbow directly at the inlet of the assembly. The air flow sensor shall amplify the sensed air flow signal. Two flexible tubes, one connected to the high pressure port and the other connected to the low pressure port of the air flow sensor, shall extend through the assemble housing to allow for easy monitoring of the air flow.

   The unit shall be constructed of 22 gauge zinc coated steel. The damper shall incorporate a lever for manual adjustment and a wing-nut for locking the damper in position.

Part 3 – EXECUTION

3.1 Installation – General

A. Install displacement diffusers level and plumb. Maintain sufficient clearance for normal services, maintenance, or in accordance with construction drawings.

B. Complete installation and startup checks according to manufacturer's instructions and perform the following.

1. Verify that inlet duct connections are as recommended by manufacture to achieve proper performance.
2. Verify that any identification tags are visible.
3. Verify locations of thermostats, humidistats, and other exposed control sensors with Drawings and room details before installation.

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Floor Mounted Displacement Diffusers

SECTION 23 06 30 – PRODUCT

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes the following:
   1. Floor mounted displacement diffusers

1.2 Related Documents

A. 23 01 00 – Operation and Maintenance of HVAC Systems
B. 23 05 00 – Common Work Results for HVAC
C. 23 09 00 – Instrumentation of Control for HVAC
D. 23 20 00 – HVAC Piping and Pumps
E. 23 30 00 – HVAC Air Distribution

1.3 Submittals

A. Product Data: For each type of product indicated, include rated capacities, furnished specialties and accessories.
B. Shop Drawings: For each type of product indicated, include the following:
   1. Detail equipment assemblies and indicated dimensions.
   2. Required clearances.
   3. Method of field assembly.
   4. Revit models
C. Coordination Drawings: Include floor plans, and other details, drawn to scale, one which the following items are shown and coordinated with each other, based on input from installers of the items involved:
   1. Floor or underfloor-mounted items including;
      a. Floor structure (floor tiles, concrete, etc.)
      b. Floor finishing (carpet, tile, etc.)
      c. Access panels
      d. Electrical components
      e. Plumbing
      f. Networking components
      g. Terminal Units and other HVAC components
D. Operation and Maintenance Data: To include in emergency, operation and maintenance manuals, maintenance schedules and repair part lists for all parts.

1.4 Quality Assurance

A. Product Options: Include drawings indicating size, profiles and dimensional requirements of the floor mounted displacement diffusers that are based on the specificsystem indicated.
B. Electrical Components, Devices and Accessories: Listed and labeled as defined in NFPA 70, Article 100 by a testing agency acceptable to authorities having jurisdiction and marked for intended use.

1.5 Coordination

A. Coordinate layout and installation of diffusers with other construction that penetrates flooring, including but not limited to: electrical fixtures, network equipment, HVAC equipment, and partition assemblies.
B. Specific configuration of the supply and return ductwork, electrical work, and piping at each unit has been indicated on the drawings. If the configuration of the units furnished on the project differs from that indicated on the drawings (whether or not the units furnished are the specific units or an acceptable substitute), it shall be the contractor's responsibility to modify ductwork, piping, etc., as required to accommodate the actual configuration of units furnished on the project.

Part 2 – PRODUCTS

2.1 General

A. Manufacturer shall be responsible for examining applications of each type of unit to assure that each will operate properly in the intended application.
B. Unit sizes are shown as selected in accordance with the principles set forth in the ASHRAE Guide and manufacturer's literature.
C. All items of a given type shall be the products of the same manufacturer.

2.2 Manufacturers

A. In Part 2 articles where titles below introduce lists, the following requirements apply to selection:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of themanufacturers specified. Manufacturers shalldemonstrate that they have successfully suppliedand installed underfloor displacement HVACproducts, as well as the computer modelingthereof for a minimum of 10 years. Manufacturersmust be pre-qualified to bid based on thecompletion of a minimum of xx jobs in similar climates. Manufacturers shall provide a listof completed jobs and references.

2.3 RFDD Underfloor Displacement Diffusers

A. Approved Manufacturers:
   1. Price
B. Description: Furnish and install Price model RFDD with the sizes, configurations and capacities indicated on the plans and air outlet schedule.
C. Performance: Air shall be deliv ered to the space at low noise levels and low velocities that result in lowinduction horizontal flow resulting in a stratifiedzone temperature distribution within the occupied zonewithout the use of nozzles. Diffuser manufacturershall provide sound and pressure drop data derived fromtests in accordance with ASHRAE Standard 70-2006.Performance data for Draft Rate (%DR) shall be provided based on tests in accordance with ASHRAE Standard 55-2004. A manufacturer software program that allows room comfort evaluation for specific operating conditions and diffuser locations shall be available to aid in performance assessment. If such a computer program is not available from the manufacturer, the manufacturer shall supply, free of charge, a CFD model of therepresentative spaces completed by a modelingcontractor who has demonstrable qualifications to modelsuch spaces. These shall include no less than 10 yearsof experience in the modeling of displacementventilation systems, thorough validation of the codethrough comparison to empirical data as well as a list of references.

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Floor Mounted Displacement Diffusers

D. Construction:The round floor displacement diffuser, model RFDD, shall be adjustable from the face of the diffuser. Minimum flow limit shall be adjustable from 0% to 50% of the maximum flow using a mechanical stop. The adjustable diffuser face shall have a positive interlock with themounting hardware to reduce the chance of accidentaladjustment due to foot traffic. The 8" core shall beconstructed of UL2043 fire rated polyamide withpermeating color able to withstand maximum mechanical loading of 1300 lbs (589 kg). Assembly shall include black or gray polycarbonate standarddistributor basket with damper device.

E. Mounting/Fastening: The RFDD shall be installed withzip clip or ring press fit fastening.

2.4 ARFHD Displacement Diffusers

A. Approved Manufacturers:

1. Price

B. Description: Furnish and install Price model ARFHDwith the sizes, configurations and capacities indicatedon the plans and air outlet schedule.

C. Performance: Air shall be delivered to the space at low noise levels and low velocities that result in low inductionhorizontal flow resulting in a stratified zone temperaturedistribution within the occupied zone without the useof nozzles. Diffuser manufacturer shall provide sound andpressure drop data derived from tests in accordancewith ASHRAE Standard 70-2006. Performance data forDraft Rate (%DR) shall be provided based on tests inaccordance with ASHRAE Standard 55-2004. Amanufacturer software program that allows roomcomfort evaluation for specific operating conditionsand diffuser locations shall be available to aid in performance assessment. If such a computer program is not available from the manufacturer, the manufacturer shall supply, free of charge, a CFD model of therepresentative spaces completed by a modelingcontractor who has demonstrable qualifications to modelsuch spaces. These shall include no less than 10years of experience in the modeling of displacementventilation systems, thorough validation of the codethrough comparison to empirical data as well as a list of references.

D. Construction:The aluminum round floor horizontaldiffuser, model ARFHD shall be adjustable from the faceof the diffuser. Minimum flow limit shall be adjustablefrom 0% to 50% of the maximum flow using a mechanicalstop. The adjustable diffuser face shall have a positiveinterlock with the mounting hardware to reduce thechance of accidental adjustment due to foot traffic.The 8" core shall be constructed of aluminum able to withstand maximum mechanical loading of 3000 lbs (1360 kg). Assembly shall include black polycarbonate standard distributor basket with damper device.

E. Mounting/Fastening: The ARFHD shall be installed with zip clip or ring press fit fastening.

2.5 DFG Displacement Floor Grilles

A. Approved Manufacturers:

1. Price

B. Description: Furnish and install Price model DFG (10-1/2"x10-1/2") with (27C-1W, 27C-2W) core in the sizes, configurations and capacities indicated on the plans and air outlet schedule.

C. Performance: Air shall be delivered to the space at low noise levels and low velocities that are even result in low induction horizontal flow resulting in a stratified zone temperature distribution within the occupied zone without the use of nozzles. Diffuser manufacturer shall provide sound and pressure drop data derived from tests in accordance with ASHRAE Standard 70-2006 (RA 2011). Performance data for Draft Rate (%DR) shall be provided based on tests in accordance with ASHRAE Standard 55-2013. A manufacturer software program that allows room comfort evaluation for specific operating conditions and diffuser locations shall be available to aid in performance assessment. If such a computer program is not available from the manufacturer, the manufacturer shall supply, free of charge, a CFD model of the representative spaces completed by a modeling contractor who has demonstrable qualifications to model such spaces. These shall include no less than 10 years of experience in the modeling of displacement ventilation systems, thorough validation of the code through comparison to empirical data as well as a list of references.

D. Construction: The displacement floor grille model (DFG) shall be constructed with an equalization baffle and individually adjustable extruded 1" directional vanes behind the diffuser face for uniform, low velocity distribution of supply air. The equalization baffle and directional vanes shall be securely retained in the diffuser frame. The baffle shall be constructed of perforated aluminum. The diffusers shall have a removable core section with bars spaced 7/16" on center and a fixed deflection of 30 degrees. The outlet core shall have extruded aluminum bars mechanically locked into extruded aluminum receiving bars. The (3/4", 1", 1-1/4") wide diffuser border shall be heavy duty extruded aluminum construction with precise factory mitered corners and reinforcing support bars for additional support. The core shall be held in the border with removable core clips allowing the removal of the core without special tools. The grille shall be finished in (B11 - PURE WHITE, B12 - WHITE - POWDER COAT, B13 - OFF-WHITE - POWDER COAT, B15 - ALUMINUM - POWDER COAT, B17 - BLACK - POWDER COAT, B25 - COLOR TO MATCH, PC12 - PRIME COAT - POWDER COAT, 66 - BRUSHED AND POWDER COAT CLEAR, MILL - RAW ALUMINUM, PA - PREPARED ALUMINUM - MILL FINISH FACTORY CLEANED, AB - ANODIZED BLACK, AC - ANODIZED CLEAR, ALB - ANODIZED LIGHT BRONZE, AMB - ANODIZED MEDIUM BRONZE, ADB - ANODIZED DARK BRONZE, ACH - Champagne Anodized, ASPL - ANODIZED COLOR OTHER THAN LISTED, SPL - SPECIAL FINISHES). Paint finish shall pass 500 hours of salt spray exposure with no measurable creep in accordance with ASTM D1654 and 1000 hours with no rusting or blistering as per ASTM D610 and ASTM D714.

E. Mounting/Fastening: The frame shall be attached to the floor (with countersunk screws (for 1", 1-1/4" borders only)/ straight screws (for ¾" borders only)/spring clips/without any holes).

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Floor Mounted Displacement Diffusers

2.6 DFGL Linear Displacement Floor Grilles

A. Approved Manufacturers:

1. Price

B. Description: Furnish and install Price model DFGL (L (min. 12") x W (6"-12") with (15A, 16A, 25C, 26C, 27C) core in the sizes, configurations and capacities indicated on the plans and air outlet schedule.

C. Performance: Air shall be delivered to the space at low noise levels and low velocities that are even result in low induction horizontal flow resulting in a stratified zone temperature distribution within the occupied zone without the use of nozzles. Diffuser manufacturer shall provide sound and pressure drop data derived from tests in accordance with ASHRAE Standard 70-2006 (RA 2011). Performance data for Draft Rate (%DR) shall be provided based on tests in accordance with ASHRAE Standard 55-2013. A manufacturer software program that allows room comfort evaluation for specific operating conditions and diffuser locations shall be available to aid in performance assessment. If such a computer program is not available from the manufacturer, the manufacturer shall supply, free of charge, a CFD model of the representative spaces completed by a modeling contractor who has demonstrable qualifications to model such spaces. These shall include no less than 10 years of experience in the modeling of displacement ventilation systems, thorough validation of the code through comparison to empirical data as well as a list of references.

D. Construction: The displacement floor grille model (DFG) shall be constructed with an equalization baffle and individually adjustable extruded 1" directional vanes behind the diffuser face for uniform, low velocity distribution of supply air. The equalization baffle and directional vanes shall be securely retained in the diffuser frame. The baffle shall be constructed of perforated aluminum and shall be available in (black finish, finish matching grille face). The diffusers shall have a removable core section with bars spaced (1/4", 7/16") on center and a fixed deflection of (0, 15, 30 degrees). The outlet core shall have extruded aluminum bars mechanically locked into extruded aluminum receiving bars.The (3/4", 1", 1-1/4") wide diffuser border shall be heavy duty extruded aluminum construction with precise factory mitered corners and reinforcing support bars for additional support.The core shall be held in the border with removable core clips allowing the removal of the core without special tools.The grille shall be finished in (B11 - PURE WHITE, B12 - WHITE - POWDER COAT, B13 - OFF-WHITE - POWDER COAT, B15 - ALUMINUM - POWDER COAT, B17 - BLACK - POWDER COAT, B25 - COLOR TO MATCH, PC12 - PRIME COAT - POWDER COAT, 66 - BRUSHED AND POWDER COAT CLEAR, MILL - RAW ALUMINUM, PA - PREPARED ALUMINUM - MILL FINISH FACTORY CLEANED, AB - ANODIZED BLACK, AC - ANODIZED CLEAR, ALB - ANODIZED LIGHT BRONZE, AMB - ANODIZED MEDIUM BRONZE, ADB - ANODIZED DARK BRONZE, ACH - Champagne Anodized, ASPL - ANODIZED COLOR OTHER THAN LISTED, SPL - SPECIAL FINISHES). Paint finish shall pass 500 hours of salt spray exposure with no measurable creep in accordance with ASTM D1654 and 1000 hours with no rusting or blistering as per ASTM D610 and ASTM D714.

E. Mounting/Fastening: The frame shall be attached to the floor (with countersunk screws (for 1", 1-1/4" borders only)/ straight screws (for ¾" borders only)/spring clips/without any holes).

2.7 Diffuser Accessories

A. DBV Baskets for displacement diffuser models: RFDD/ ARFHD

Round Floor VAV Distributor Basket

Supply and install Price DBV baskets, black distributorbasket with integral VAV Damper. The DBV shall besupplied with a floating point actuator furnished with twomodular jacks (RJ12) for system connections and one 25 ft(7.6 m) plenum rated modular plug-in control cable. Theelectric actuator shall be 24VAC bidirectional, directlycoupled to the damper screw. The damper shall movefrom a fully open position to a fully closed position in 90seconds. The actuator must be capable of operating in thestalled position without overheating or mechanicaldamage. The basket shall be constructed out of blackcolored polycarbonate.

B. B / BS baskets for displacement diffuser models: RFDD ARFHD Round Floor Diffuser Basket / Round Floor Diffuser Basket, Short Supply and install the Price B / BS baskets,(round floor diffuser basket / round floor diffuser basket,short). The basket shall be constructed out of blackcolored polycarbonate and provide air flow equalizationacross the diffuser face. The basket shall minimize sightlines through the diffuser.

C. DB / DBS baskets for displacement diffuser models: RFDD/ ARFHD

Round Floor Diffuser Basket with Damper / Round Floor Diffuser Basket with Damper, Short

Supply and install the Price DB / DBS baskets, (round floor diffuser basket with damper / round floor diffuserbasket with damper, short). The discharge air flow shallbe controlled by the basket. The basket shall beconstructed out of black colored polycarbonate andprovide air flow equalization across the diffuser face.Thebasket shall minimize sightlines through the diffuser.

D. DBA / DBAS baskets for displacement diffuser models: RFDD/ARFHD

Round Floor Adjustable Diffuser Basket / AdjustableDiffuser Basket Short

Supply and install the Price DBA / DBAS baskets,(round floor adjustable diffuser basket / round flooradjustable diffuser basket, short). The discharge air flowshall be controlled by the basket and shall beadjustable from the face of the diffuser. Minimum flowlimit shall be adjustable from 0% to 50% of maximumflow using a mechanical stop. The adjustable diffuser faceshall have a positive interlock with the mounting ringto reduce the chance of accidental adjustment dueto foot traffic.The basket shall be constructed out of black colored polycarbonate and provide air flow equalization across the diffuser face. The basket shall minimize sightlines through the diffuser.

E. RFB-F diffuser boot for displacement diffuser models:RFDD/ ARFHD

Round Floor Diffuser Boot, Fan Sourced

Supply and install the Price RFB round floor diffuser boot. The boot shall be constructed of 22 gauge galvanized steel with a 6"/8" (152mm/203mm) inlet. The boot shall mount under a standard floor tile. An optional mounting flange can be supplied to blank off structural depressions which may exist on the bottom surface of the floor tile thereby ensuring proper sealing to the diffuser.

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Floor Mounted Displacement Diffusers

F. RFB-VC diffuser boot for displacement diffuser models: RFDD/ARFHD

Round Floor Diffuser Boot, Variable Cooling

Supply and install the Price RFB-VC round floor diffuser boot for variable cooling. The boot shall be constructed of 22 gauge galvanized steel with a 6"/8" (152mm/203mm) inlet. The boot shall mount under a standard floor tile. An optional mounting flange can be supplied to blank off structural depressions which may exist on the bottomsurface of the floor tile thereby ensuring proper sealing to the diffuser.

The RFB-VC shall be supplied with a floating point actuator furnished with two modular jacks (RJ12) for system connections and one 25 foot plenum rated modular plug-in control cable. The electric actuator shall be 24 VAC bi-directional, directly coupled to the damper shaft. The actuator must be capable of operating in the stalled position without overheating or mechanical damage. The supplied actuator shall have a fully adjustablehardware stop allowing field adjustment and balancing.Peripheral gasket shall be provided on the control damper.The RFB-VC shall have a modulated opening on theunderside of the boot, eliminating varying performancedue to flow direction.The RFB-VC shall have an integralbaffle for flow equalization and debris collection.

G. RFB-HC diffuser boot for displacement diffuser models: RFDD/ARFHD

Round Floor Diffuser Boot, Heating and Cooling

Supply and install the Price RFB-HC round floor diffuser boot for heating and cooling. The boot shall be constructed of 22 gauge galvanized steel with a 6" / 8" (152mm / 203mm) heating air inlet and 6"/ 8" (152 mm / 203 mm) cooling air inlet complete with control damper. The boot shall mount under a standard floor tile. An optional mounting flange can be supplied to blank off structural depressions which may exist on the bottom surface of the floor tile thereby ensuring proper sealing to the diffuser.

The RFB-HC shall be supplied with a floating point actuator furnished with two modular jacks (RJ12) for system connections and one 25 foot plenum rated modular plug-in control cable. The electric actuator shall be 24 VAC bi-directional, directly coupled to the cooling air controldamper shaft. The actuator must be capable of operatingin the stalled position without overheating or mechanicaldamage. The supplied actuator shall have a fullyadjustable hardware stop allowing field adjustment andbalancing. Peripheral gasket shall be provided on the control damper.

Optional internal fiberglass insulation can be provided.

Part 3 – EXECUTION

3.1 Installation – General

A. Install displacement diffusers level and plumb. Maintain sufficient clearance for normal services, maintenance, or in accordance with construction drawings.

B. Complete installation and startup checks according to manufacturer's instructions and perform the following.

1. Verify that inlet duct connections are asrecommended by manufacture to achieve proper performance.
2. Verify that any identification tags are visible.
3. Verify locations of thermostats, humidistats, andother exposed control sensors with Drawingsand room details before installation.

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Ceiling Mounted Diffusers

SECTION 23 06 30 – PRODUCT

PART 1 - GENERAL

1.1 Summary

A. This section includes the following:
   1. Ceiling mounted displacement diffusers

1.2 Related Documents

A. 23 01 00 – Operation and Maintenance of HVAC Systems
B. 23 05 00 – Common Work Results for HVAC
C. 23 09 00 – Instrumentation of Control for HVAC
D. 23 20 00 – HVAC Piping and Pumps
E. 23 30 00 – HVAC Air Distribution

1.3 Submittals

A. Product Data: For each type of product indicated, include rated capacities, furnished specialties and accessories.
B. Shop Drawings: For each type of product indicated, include the following:
   1. Detail equipment assemblies and indicated dimensions.
   2. Required clearances.
   3. Method of field assembly.
   4. Revit models
C. Coordination Drawings: Include floor plans, and other details, drawn to scale, one which the following items are shown and coordinated with each other, based on input from installers of the items involved:
   1. Ceiling-mounted items including;
      a. Fixtures
      b. Lightning fixtures
      c. Speakers
      d. Sprinklers
      e. Access panels
      f. Diffusers
      g. Grilles
      h. Air inlets
      i. Perimeter molding for exposed or partiallyexposed cabinets.
D. Operation and Maintenance Data: To include in emergency, operation and maintenance manuals, maintenance schedules and repair part lists for all parts.

1.4 Quality Assurance

A. Product Options: Include drawings indicating size, profiles and dimensional requirements of the displacement ventilation diffusers that are based on the specific system indicated.
B. Electrical Components, Devices and Accessories: Listed and labeled as defined in NFPA 70, Article 100 by a testing agency acceptable to authorities having jurisdiction and marked for intended use.

1.5 Coordination

A. Coordinate layout and installation of diffusers with other construction that penetrates ceilings, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.
B. Specific configuration of the supply and return ductwork and at each unit has been indicated on the drawings. If the configuration of the units furnished on the project differs from that indicated on the drawings (whether or not the units furnished are the specific units or an acceptable substitute), it shall be the contractor's responsibility to modify ductwork, etc., as required to accommodate the actual configuration of units furnished on the project.

Part 2 – PRODUCTS

2.1 General

A. Manufacturer shall be responsible for examining applications of each type of unit to assure thateach will operate properly in the intended application.
B. Unit sizes are shown as selected in accordance with the principles set forth in the ASHRAE Guide and Manufacturer's literature.
C. All items of a given type shall be the products of the same manufacturer.

2.2 Manufactureres

A. In Part 2 articles where titles below introduce lists, the following requirements apply to selection:
   1. Manufacturers: Subject to compliance withrequirements, provide products by one of themanufacturers specified Manufacturers shalldemonstrate that they have successfully suppliedand installed displacement ventilation products,as well as the computer modeling thereof fora minimum of 10 years. Manufacturers must be pre-qualified to bid based on the completion of a minimum of xx jobs in similar climates.Manufacturers shall provide a list of completed jobs and references.

2.3 DF1L Displacement Diffusers

A. Approved Manufacturers:
   1. Price

B.Description: Furnish and install Price model seriesDF1 (LxW) with the (sizes and capacities indicatedon the plans and air outlet schedule.

C.Performance: Air shall be delivered to the space at low noise levels and low velocities that are even across the diffuser face in all ducting configurations and without the use of nozzles. Diffuser Manufacturer shall provide sound and pressure drop data derived from tests in accordance with ASHRAE Standard 70-2006. Performance data for Draft Rate (%DR) shall be provided based on tests in accordance with ASHRAE Standard 55-2004. A manufacturer software program that allows room comfort evaluation for specific operating conditions and diffuser locations shall be available to aid in performance assessment. If such a computer program is not available from the manufacturer, the manufacturer shall supply, free of charge, a CFD model of the representative spaces completed by a modeling contractor who has demonstrable qualifications to model such spaces. These shall include no less than 10 years of experience in the modeling of displacement ventilation systems, thorough validation of the code through comparison to empirical data as well as a list of references.

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Ceiling Mounted Diffusers

D. Construction: The 1 way flat faced lay-in Displacement diffuser, model DF1L shall be constructed withan equalization baffle behind the operative diffuser facefor uniform, low velocity, distribution of supply air. Boththe equalization baffle and face shall be securelyretained in the diffuser frames. Plastic nozzle arraysor any plastic components are unacceptable. The diffuser frames shall be constructed of high strengthaluminum extrusion for rigidity and protection ofthe operative face and side panels. There shall be novisible fasteners on the front or side panels. The operative face shall be constructed of painted 18 gauge perforated steel, and the frame shall be provided in painted 20 gauge steel. The internal baffling elements shall be constructed of Aluminum. The diffuser shall be available for duct connection at the top, bottom, side or rear of the diffuser with a factory inlet. The paint shall be powder coat polyester. Epoxies and their derivatives are unacceptable. Visible non-metallic components are unacceptable.

Mounting/Fastening: The diffuser shall integrate into standardT-Bar ceilings and shall have no visible fasteners.

2.4 DF1L-HC Displacement Diffusers

A. Approved Manufacturers:

1. Price

B. Description: Furnish and install Price model series DF1L-HC (LxW) with the sizes and capacities indicated on the plans and air outlet schedule.

C. Performance-Cooling Mode: Air shall be delivered to the space at low noise levels and low velocities that are even across the diffuser face, in all ducting configurations and without the use of nozzles. Diffuser Manufacturer shall provide sound and pressure drop data derived from tests in accordance with ASHRAE Standard 70-2006. Performance data for Draft Rate (%DR) shall be provided based on tests in accordance with ASHRAE Standard 55-2004. A software program that allows room comfort evaluation for specific operating conditions and diffuser locationsshall be available to aid in performance assessment.If such a computer program is not available from themanufacturer, the manufacturer shall supply, free ofcharge, a CFD model of the representative spacescompleted by a modeling contractor who hasdemonstrable qualifications to model such spaces. These shall include no less than 10 years of experience in the modeling of displacement ventilation systems,thorough validation of the code through comparisonto empirical data as well as a list of references.

Performance-Heating Mode: The diffuser shall becapable of delivering air to the space in either avertical or horizontal heating pattern. Performance data forThrow at 150 fpm, 100 fpm, 50 fpm (0.76 m/s, 0.51 m/s,0.25m/s) shall be provided by manufacturer.

C. Construction: The diffuser shall be constructed with two separate plenums, one for the heating operation and one for the cooling operation. The cooling section of the heat-cool lay-in Displacement diffuser, model DF1L-HC shall be constructed with an equalization baffle behind theoperative diffuser faces for uniform, low velocity,distribution of supply air. Both the equalization baffleand faces shall be securely retained in the diffuser frames.Plastic nozzle arrays or any plastic components areunacceptable. The diffuser frames shall be constructedof steel and shall be welded to ensure rigidity andpositioning of the baffle.There shall be no visible fasteners on the front or side panels. The operative face shall be constructed of painted 18 gauge perforated steel, and the frame shall be constructed of 20 gauge steel. The internal baffling elements shall be constructed ofAluminum. The plenum may be satin coat steel. Thepaint shall be powder coat polyester. Epoxies and theirderivatives are unacceptable. Visible non-metallic components are unacceptable.

The linear slot diffuser for the heating section shall utilize heavy wall extruded aluminum air deflector frames. The steel air pattern controllers shall be fullyadjustable allowing movement from side to side to createvarious air pattern configurations and shall be fullyadjustable to allow shut-off without adding any blank-off devices.

E. Mounting/Fastening: The diffuser shall integrate into standardT-Bar ceilings and shall have no visible fasteners.

F. Actuator: Electric Actuator: The diffuser shall use a 24 VACmodulating actuator controlling a damper allowingtwo separate air flow paths. The actuator shallclose the heating section when in cooling mode andclose the cooling section while in heating mode.The actuator shall remain accessible from the outside of the diffuser for servicing.

Thermal Actuator: The diffuser shall use a wax actuator controlling a damper allowing two separate air flow paths. The actuator shall close the heating section when in cooling mode and the supply temperature lowers below 70°F(21°C). The actuator shall close the cooling sectionwhen in heating mode and the supply temperaturerises above 80°F (27°C). The actuator shall remainaccessible from the outside of the diffuser for servicing.

2.5 DR360DH Displacement Diffusers

A. Approved Manufacturers:

1. Price

B. Description: Furnish and install Price model seriesDR360DH (DiaxH) with the sizes and capacities indicatedon the plans and air outlet schedule.

C. Performance: Air shall be delivered to the space at low noise levels and low velocities that are even across the diffuser face, in all ducting configurations and withoutthe use of nozzles. Diffuser Manufacturer shall providesound and pressure drop data derived from testsin accordance with ASHRAE Standard 70-2006.Performance data for Draft Rate (%DR) shall beprovided based on tests in accordance with ASHRAEStandard 55-2004. A software program that allowsroom comfort evaluation for specific operating conditionsand diffuser locations shall be available to aid in performance assessment. If such a computer program is not available from the manufacturer, the manufacturer shall supply, free of charge, a CFD model of therepresentative spaces completed by a modelingcontractor who has demonstrable qualifications tomodel such spaces. These shall include no less than 10 yearsof experience in the modeling of displacement ventilationsystems, thorough validation of the code throughcomparison to empirical data as well as a list of references.

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Ceiling Mounted Diffusers

D. Construction: The 360 Degree Duct Hung Displacement diffuser, model DR360DH, shall be constructed with an equalization baffle behind the operative diffuser face for uniform, low velocity, distribution of supply air. Both the equalization baffle and face shall be securely retained in the diffuser frames. Plastic nozzle arrays or any plastic components are unacceptable. The diffuser frames shall be constructed of high strength aluminum extrusion for rigidity and protection of the operative face. Thereshall be no visible fasteners on the face of thediffuser. The operative face shall be constructed of painted18 gauge perforated steel, and end panels shall beprovided in painted 20 gauge steel. The frame andinternal baffling elements shall be constructed ofAluminum. The diffuser shall be available for inlet or inlet and outlet configurations. The paint shall be powder coat polyester. Epoxies and their derivatives are unacceptable. Non-metallic components are unacceptable.

E. Mounting/Fastening: The diffuser shall be supplied with concealed mounting using safety-bolts for seamless integration.

2.6. DR90H

A. Approved Manufacturers:

1. Price

B. Description: Furnish and install Price model series DR90H (Dia x L) with the sizes and capacities indicated on the plans and air outlet schedule.

C. Performance: Air shall be delivered to the space at low noise levels and low velocities that are even across the diffuser face in all ducting configurations and without the use of nozzles. Diffuser Manufacturer shall providesound and pressure drop data derived from tests inaccordance with ASHRAE Standard 70-2006. Performancedata for Draft Rate (%DR) shall be provided based ontests in accordance with ASHRAE Standard 55-2004. Amanufacturer software program that allows room comfortevaluation for specific operating conditions and diffuserlocations shall be available to aid in performanceassessment. If such a computer program is not availablefrom the manufacturer, the manufacturer shall supply,free of charge, a CFD model of the representativespaces completed by a modeling contractor who hasdemonstrable qualifications to model such spaces.These shall include no less than 10 years of experience in the modeling of displacement ventilation systems, thorough validation of the code through comparison to empirical data as well as a list of references.

D. Construction: The 90 Degree Horizontal Supply Ceiling Mounted Radial Displacement Diffuser, model DR90H, shall be constructed with an equalization baffle behind the operative diffuser face for uniform, low velocity,distribution of supply air. Both the equalization baffleand face shall be securely retained in the diffuser frames.Plastic nozzle arrays or any plastic components areunacceptable. The diffuser frames shall be constructed ofhigh strength aluminum extrusion for rigidity andprotection of the operative face and side panels. Thereshall be no visible fasteners on the front or sidepanels. The operative face shall be constructedof painted 18 gauge perforated steel, and the frame shall be provided in painted 20 gauge steel. The internal baffling elements shall be constructed ofAluminum. The diffuser shall be available for ductconnection at the top, bottom, or either side of thediffuser. The paint shall be powder coat polyester. Epoxiesand their derivatives are unacceptable. Visible non-metalliccomponents are unacceptable.

Mounting/Fastening: The diffuser shall attach to the wall and ceiling using a rail system with metal cover strips.

2.7 Accessories

A. AFSD's for displacement diffuser models: DF1L, DF1L-HC, DR360DH and DR90H

1. Approved Manufacturers:
   a. Price
2. Description: Furnish and install Price model series Adjustable Flow Station for Displacement Diffusers, AFSD, (DiaxH) as indicated on the plans and air outlet schedule.
3. Performance: The manufacturer shall supply pressure loss data and air flow ranges for the various sensing device sizes.
4. Construction: The air flow sensor shall be of a cross configuration. The sensor shall have twelve total pressure sensing ports and a center averaging chamber designed to accurately average the flow across the inlet of the assembly. Sensor shall meet accuracy within 5% with a 90° sheet metal elbow directly at the inlet of the assembly. The air flow sensor shall amplify the sensed air flow signal. Two flexible tubes, one connected to the high pressure port and the other connected to the low pressure port of the air flow sensor, shall extend through the assemble housing to allow for easy monitoring of the air flow.

   The unit shall be constructed of 22 gauge zinc coated steel. The damper shall incorporate a lever for manualadjustment and a wing-nut for locking the damper in position.

B. Duct Covers for model: DR90H

Diffuser manufacturer shall provide duct covers available for all inlet locations. The duct covers shall be manufactured by the diffuser manufacturer. The duct cover face shall be constructed of painted 18 gauge (solid/perforated) steel. The duct cover frames shall be constructed of high strength aluminum extrusion for rigidity and protection of the face and side panels. The duct cover shall be supplied with a rail mounting system with metal cover strips to conceal all fasteners. All duct covers shall be factory assembled and shipped complete with the associated diffuser. There shall be no visible fasteners on the duct cover panels. The paint shall be powder coat polyester to match the diffuser or as selected by the architect. Epoxies and their derivatives are unacceptable. Visible non-metallic components are unacceptable. The paint shall be powder coat polyester to match the diffuser or as selected by the architect.

PART 3 – EXECUTION

3.1 Installation – General

A. Install displacement diffusers level and plumb. Maintain sufficient clearance for normal services, maintenance, or in accordance with construction drawings.

B. Complete installation and startup checks according to manufacturer's instructions and perform the following.

1. Verify that inlet duct connections are asrecommended by manufacture to achieve proper performance.
2. Verify that any identification tags are visible.
3. Verify locations of thermostats, humidistats, andother exposed control sensors with Drawingsand room details before installation.

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Linear Enclosure Displacement Diffusers

SECTION 23 06 30 – PRODUCT

PART 1 - GENERAL

1.1 Summary

A. This section includes the following:

1. Floor Linear enclosure perimeter mounted displacement diffusers

1.2 Related Documents

A. 23 01 00 – Operation and Maintenance of HVAC Systems

B. 23 05 00 – Common Work Results for HVAC

C. 23 09 00 – Instrumentation of Control for HVAC

D. 23 20 00 – HVAC Piping and Pumps

E. 23 30 00 – HVAC Air Distribution

1.3 Submittals

A. Product Data: For each type of product indicated, include rated capacities, furnished specialties and accessories.

B. Shop Drawings: For each type of product indicated, include the following:

1. Detail equipment assemblies and indicated dimensions.
2. Required clearances.
3. Method of field assembly.

1.4 Revit models

A. Coordination Drawings: Include floor plans, and other details, drawn to scale, one which the following items are shown and coordinated with each other, based on input from installers of the items involved:

1. Ceiling-mounted items including;
   a. Fixtures
   b. Lightning fixtures
   c. Speakers
   d. Sprinklers
   e. Access panels
   f. Diffusers
   g. Grilles
   h. Air inlets
   i. Perimeter molding for exposed or partiallyexposed cabinets.

B. Operation and Maintenance Data: To include in emergency, operation and maintenance manuals, maintenance schedules and repair part lists for all parts.

1.5 Quality Assurance

A. Product Options: Include drawings indicating size, profiles and dimensional requirements of DR90 the displacement ventilation diffusers that are based on the specific system indicated.

B. Electrical Components, Devices and Accessories: Listed and labeled as defined in NFPA 70, Article 100 by a testing agency acceptable to authorities having jurisdiction and marked for intended use.

1.6 Coordination

A. Coordinate layout and installation of diffusers with other construction that penetrates ceilings, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

B. Specific configuration of the supply and return ductwork and piping at each unit has been indicated on the drawings. If the configuration of the units furnished on the project differs from that indicated on the drawings (whether or not the units furnished are the specific units or an acceptable substitute), it shall be the contractor's responsibility to modify ductwork, piping, etc., as required to accommodate the actual configuration of units furnished on the project.

PART 2 – PRODUCTS

2.1 General

A. Manufacturer shall be responsible for examining applications of each type of unit to assure that each willoperate properly in the intended application.

B. Unit sizes are shown as selected in accordance with the principles set forth in the ASHRAE Guide andManufacturer's literature.

C. All items of a given type shall be the products of the same manufacturer.

2.2 Manufacturers

A. In Part 2 articles where titles below introduce lists, the following requirements apply to selection:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified. Manufacturers shall demonstrate that they have successfully supplied and installed displacement ventilation products, as well as the computer modeling thereof for a minimum of 10 years. Manufacturers must be pre-qualified to bid based on the completion of a minimum of xx jobs in similar climates. Manufacturers shall provide a list of completed jobs and references.

2.3 DLE Displacement Diffusers

A. Approved Manufacturers:

1. Price

B. Description: Furnish and install Price model series DLE (LxH) with the configurations and mounting types) sizes and capacities indicated on the plans and air outlet schedule.

C. Performance: Air shall be delivered to the space at low noise levels and low velocities that are even across the diffuser face, in all ducting configurations and without the use of nozzles. Diffuser Manufacturer shall providesound and pressure drop data derived from tests inaccordance with ASHRAE Standard 70-2006. Performancedata for Draft Rate (%DR) shall be provided based ontests in accordance with ASHRAE Standard 55-2004. Amanufacturer software program that allows room comfortevaluation for specific operating conditions and diffuserlocations shall be available to aid in performanceassessment. If such a computer program is not availablefrom the manufacturer, the manufacturer shall supply,free of charge, a CFD model of the representativespaces completed by a modeling contractor who hasdemonstrable qualifications to model such spaces. Theseshall include no less than 10 years of experiencein the modeling of displacement ventilation systems,thorough validation of the code through comparison to empirical data as well as a list of references.

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Linear Enclosure Displacement Diffusers

D. Construction: The Linear Enclosure Displacement diffuser, model DLE, shall be constructed with an equalization baffle behind the operative diffuser face for uniform, low velocity distribution of supply air. There shall be no visible fasteners on the front, top, or side panels. Grille sections shall have fixed 0 degree blades spaced 7/16" (11mm) on center. The outlet core shall be ¾" (19mm) deep extruded aluminum blades mechanically locked to a 5/16"(8mm) O.D. aluminum mandrel tube with 0.35" (0.9mm)thick walls. Blades shall run parallel to the longdimension of the diffuser. The core shall bemechanically fixed to the heavy duty aluminum framewith a 0.250" (6mm) rod or a bolt through the mandreltube. The joining flanges shall be constructed of extruded aluminum and capture and conceal the joints of two connecting units or end caps. The panels and internal baffling shall be constructed of aluminum. Plastic nozzle arrays or any plastic components are unacceptable.The paint shall be powder coat polyester. Epoxies andtheir derivatives are unacceptable. Visible non-metalliccomponents are unacceptable.

E. Mounting/Fastening: The diffuser shall be supplied with concealed mounting brackets that do not requirepuncturing the diffuser to install.

2.4 DLE-H Displacement Diffusers

A. Approved Manufacturers:

1. Price

B. Description: Furnish and install Price model series DLE-H (LxH) (Electric/Hydronic) with the sizes and capacities indicated on the plans and air outlet schedule.

C. Performance-Cooling Mode: Air shall be delivered to the space at low noise levels and low velocities that are even across the diffuser face, in all ducting configurations and without the use of nozzles. Diffuser Manufacturer shall provide sound and pressure drop data derived from tests in accordance with ASHRAE Standard 70-2006. Performance data for Draft Rate (%DR) shall be provided based on tests in accordance with ASHRAE Standard 55-2004. A software program that allows room comfort evaluation for specific operating conditions and diffuser locationsshall be available to aid in performance assessment.If such a computer program is not available fromthe manufacturer, the manufacturer shall supply, freeof charge, a CFD model of the representative spacescompleted by a modeling contractor who hasdemonstrable qualifications to model such spaces. Theseshall include no less than 10 years of experiencein the modeling of displacement ventilation systems,thorough validation of the code through comparison to empirical data as well as a list of references.

Performance-Heating Mode: The diffuser shall be capable of providing heating via an (electric/hydronic) heater. Performance data for the electric heater option shall be provided by manufacturer.

D. Construction: The Linear Enclosure Displacement diffuser, model DLE, shall be constructed with an equalization baffle behind the operative diffuser face for uniform, low velocity distribution of supply air. There shall be no visible fasteners on the front, top, or side panels. Grille sections shall have fixed 0 degree blades spaced 7/16" (11mm) on center. The outlet core shall be ¾" (19mm) deep extruded aluminum blades mechanically locked to a 5/16"(8mm) O.D. aluminum mandrel tube with 0.35" (0.9mm)thick walls. Blades shall run parallel to the longdimension of the diffuser. The core shall be mechanicallyfixed to the heavy duty aluminum frame with a 0.250"(6mm) rod or a bolt through the mandrel tube.The joining flanges shall be constructed of extruded aluminum and capture and conceal the joints of two connecting units or end caps. The panels and internal baffling shall be constructed of aluminum. Plastic nozzle arrays or any plastic components are unacceptable.The paint shall be powder coat polyester. Epoxies and their derivatives are unacceptable. Visible non-metallic components are unacceptable.

Hydronic Heating Option

The heating section shall accommodate a hydronic heating element. The hydronic heating element shall be supplied by Price and shall be installed into the DLE-H unit during site installation.

Electric Heating Option

The heating section shall include an electric heater with either a 120V, 208V, or 240V supply voltage. Control over heater shall be provided by SCR or 24VAC relay. The entire unit shall be tested and listed with ETL.

Mounting/Fastening: The diffuser shall be supplied with concealed mounting brackets that do not requirepuncturing the diffuser to install.

PART 3 – EXECUTION

3.1 INSTALLATION – GENERAL

A. Install displacement diffusers level and plumb. Maintain sufficient clearance for normal services, maintenance, or in accordance with construction drawings.

B. Complete installation and startup checks according to manufacturer's instructions and perform the following.

1. Verify that inlet duct connections are as recommended by manufacture to achieve proper performance.
2. Verify that any identification tags are visible.
3. Verify locations of thermostats, humidistats, and other exposed control sensors with Drawings and room details before installation.

For more information on additional imperial and metric sizes please visit priceindustries.com or contact your local Price representative.

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Industrial Displacement Diffusers

DFXi

Industrial Floor Mounted Displacement Diffuser

Supply and install Price DFXi Industrial Floor Mounted Displacement Diffuser of sizes and capacities indicated on the drawings or diffuser schedule.

The Industrial Floor Mounted Displacement Diffuser, model DFXi, shall be constructed with a perforated operative face for uniform, low velocity distribution of supply air. The diffuser face shall be strengthened with breaking in a corrugated fashion and shall be securely retained in the diffuser frames. The diffuser frames shall be constructed of high strength aluminum extrusion for rigidity and protection of the operative face and side panels. A maximum of 12" is permitted between the support frames. These shall be no visible fasteners on the front or side panels.

The operative face shall be constructed of painted high-gauge steel, side and end panels may be provided in painted steel. The frame shall be constructed of aluminum. The paint shall be powder coat polyester; epoxies and their derivatives are unacceptable. Visible, non-metallic components are unacceptable. The diffuser shall be available for duct connection into the top or bottom. Air shall be delivered to the space at low noise levels and low velocities that are even across the diffuser face, in all ducting configurations.

Diffuser Manufacturer shall provide sound and pressure drop data derived from tests in accordance with ASHRAE standard 70-1991. Performance data for Percent People Dissatisfied based on Draft (DR) shall be provided based on tests completed in accordance with ASHRAE Standard 55.

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