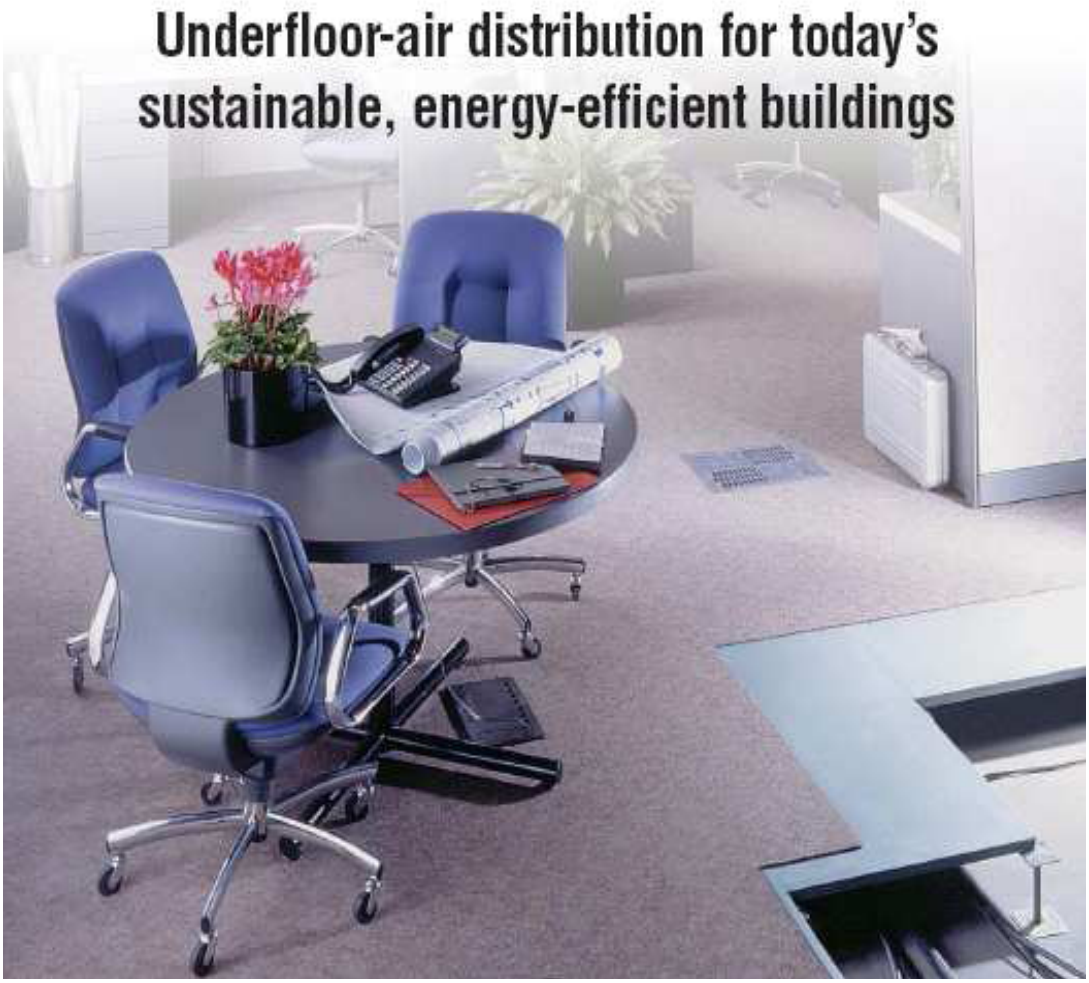
Underfloor Fan Terminal

Type UFT



Description

Underfloor Fan Terminal

Type UFT-F

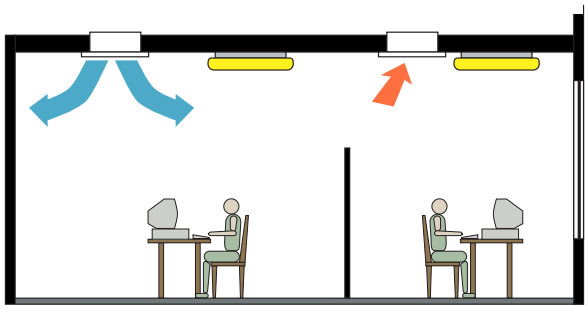
Modular raised floor systems are designed for use in offices, theaters, libraries, museums, trading floors, clean rooms and special applications. Raised floor system are popular due to demand in flexiblity in the distribution of critical services such voice, data & HVAC.

Conventional Building HVAC:

A conventional overhead air distribution system utilizes an extensive duct system to supply and return air from building spaces. A Thermostat controls the temperature of supply air to maintain a set room temperature. The Layout of the system is fixed at the time of installation. The drawback of conventional air distribution system are:

- Expensive duct system
- Limited control of thermal preferences
- Reduced flexibility in relocating building occupants
- Substantial cost to modify the ventilation system

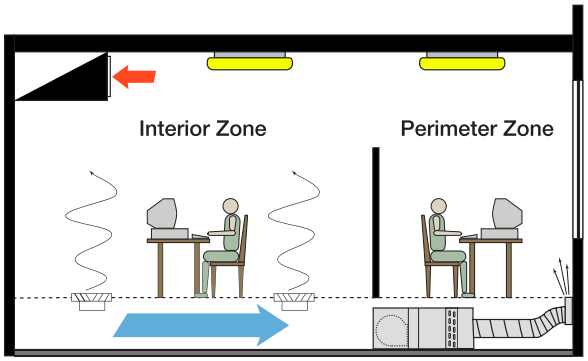
Conventional Overhead Air Distribution system



Underfloor Air Distribution:

In air distribution systems designed for underfloor applications, supply air is delivered through adjustable floor mounted swirl diffusers or grille in the floor. Typical underfloor air applications are 2 zones, interior and perimeter. The temperature in these zones are maintained through differential pressure controllers or thermostats, The advantage of underfloor air distribution are:

Underfloor Air Distribution System



- Improved Space Ventilation:

  Adjustable Swril diffusers are placed in each persons work area/cubical allowing them to have total control over the amount of air being delivered to their space. Floor to ceiling airflow results in an improved indoor air quality.

- Enhanced Space Flexibility:

  Diffusers are easily relocatable & adjustable to accommodate occupants individual preferences, changes in tenants, use of space, and to increases in space loads.

- Reduced Mechanical Equipment Cost:

  Eliminating most or all of converntional ductwork results in lower static pressure upto 375pa less than overhead system. Less ductwork results in reduced installation costs.

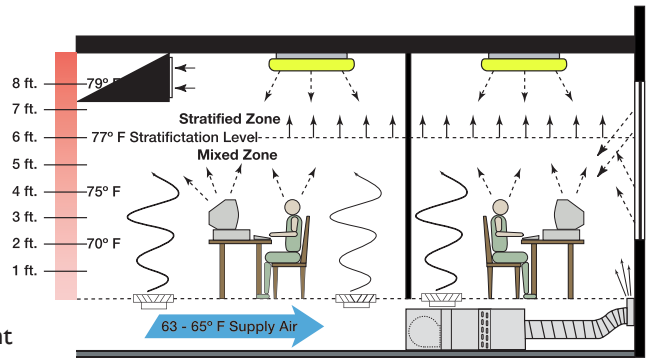
- Reduced Operational Cost:

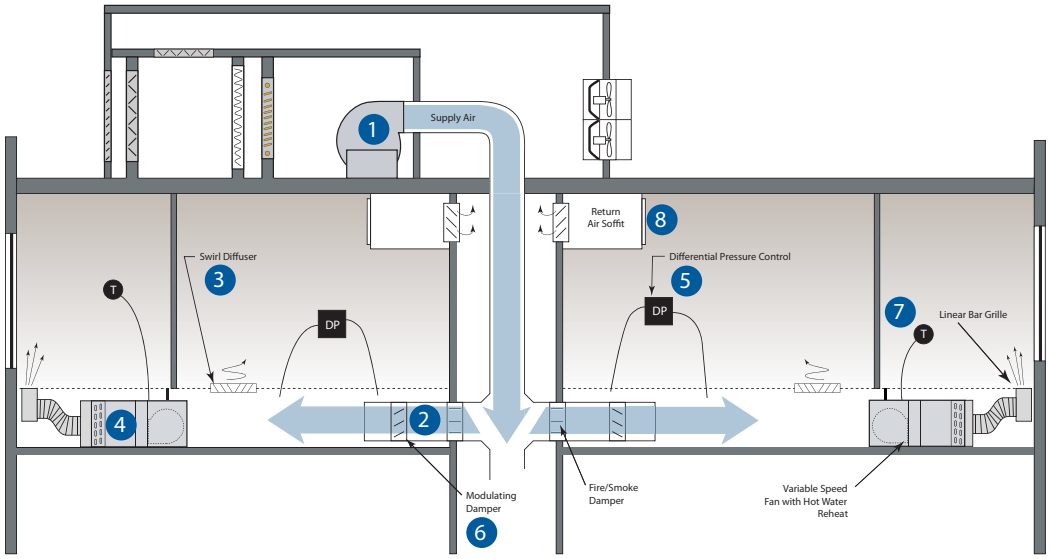
  The reduction of static pressure results in lower fan HP.

- Simplified Heat Load Calculations:

  Each room consists of 2 zones a mixing zone and a stratified zone. The zones are seperated at the stratification level. Air supplied at the floor level raises and mixes with the heat gain from room occupants & equipments in the work space. Equipment generating heat above 1.2 to 1.8 mts has less impact on heat load calculations than conventional ventilation systems. All Heat loads generated above the stratification level can be removed from the load calculations as air is exhausted at the ceiling.

Thermal Stratification





A diagram of one of many building designs utilizing the raised floor concept.

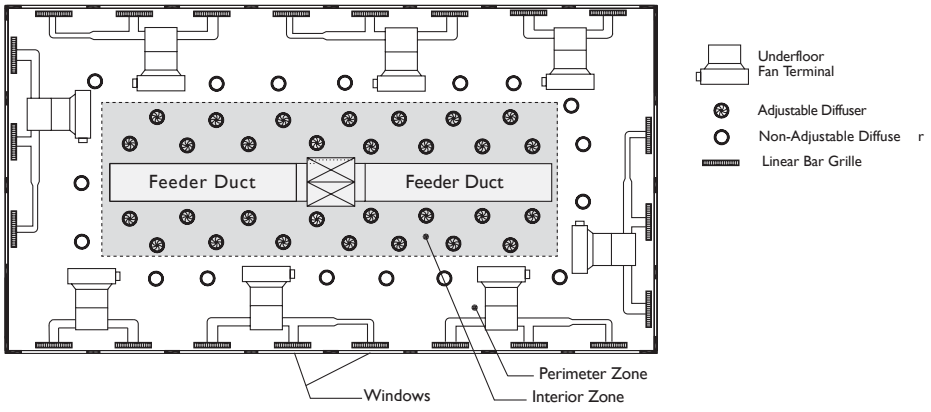
1. Air is supplied by an air handling unit that is placed on the roof. The 17.2°c to 18.3°c air is supplied through a duct shaft located near the centre of the building. Certain climates require the air to be cooled further and then the mixed air with return air to meet the required temperature 17.2°c to 18.3°c .
2. Feeder ducts distribute the air to the underfloor plenum.
3. Adjustable diffusers in the floor tiles distribute the desired amount of air to the interior work zone. By opening or closing the diffuser the occupant can change the temperature 2-3°c.
4. The UFT-F is used to supply air to the perimeter zones through linear bar grilles. The variable speed design allow the unit to satisfy the heating and cooling loads quickly.
5. A differential pressure sensor is used in conjunction with the building's electronic control system to keep the plenum at the desired constant pressure. Design underfloor are pressure ranges from 12.5 Pa to 25Pa pressure.
6. A modulating damper is used if and when the pressure needs to be adjusted. When a swirl diffuser is adjusted or a UFT-F fan changes it operation speed, the differential pressure controller will sense the change in pressure and adjust the damper accordingly.
7. Thermostats are used in conjunction with the building's electronic control system sending a signal to the UFT-F when a change in temperature is desired.
8. Return air is taken from the work space through opening or through grilles mounted in place in suspended ceiling tiles. The return air is either mixed with fresh, filtered or tempered air and is supplied back into the building or exhausted out of the tiles. The return air is either mixed with fresh, filtered or tempered air and is supplied back into the building.

Detailed view of an underfloor HVAC system.

Placement of adjustable diffusers in the interior zone gives occupants control over their environment.

Non-adjustable diffusers are placed in corridors or hallways to maintain a constant temperature.

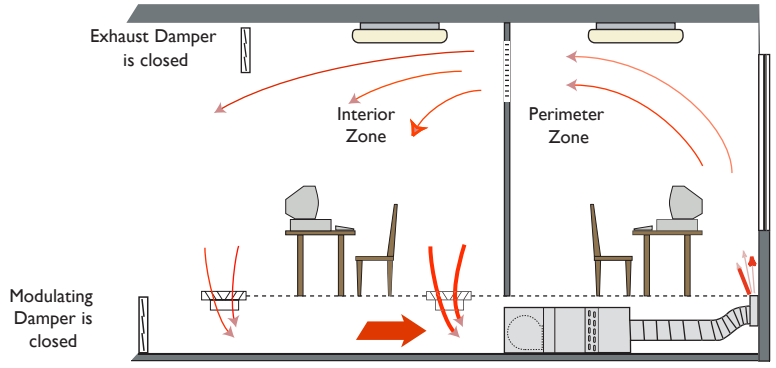
The UFT-F supplies air to the perimeter zone of the building through linear bar grilles and quickly satisfies the perimeter heating and cooling loads.



Electric reheat (Optional)

Optional electric coil heating can be used in early morning during the reheat cycle to increase the air temperature to a comfort zone after cooling overnight.

The system will return to normal operation following the temperature reaching designed comfort level.



Discharge Configurations:

The UFT is typically installed in one of two ways, ducted or non-ducted.

- Ducted System (Figure 1) : A small duct plenum attached to the outlet of the UFT-F with flexible or semi rigid sprial duct leading leading to linear bar grilles which supplies air to the perimeter zone.
- Non-Ducted System (Figure 2): The UFT-F supplies air to a plenum area enclosed by plenum walls built under the raised floor. The plenum divider can be used in the perimeter zone of a building or interior zone directly under a room where variable air flow is desired.

Figure 1

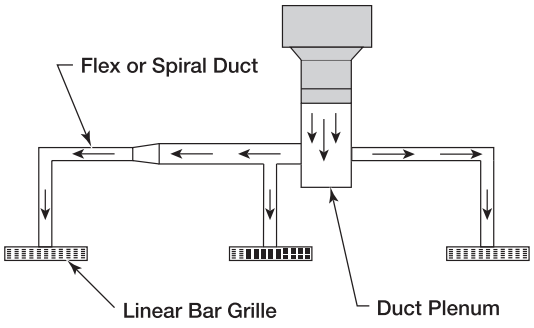
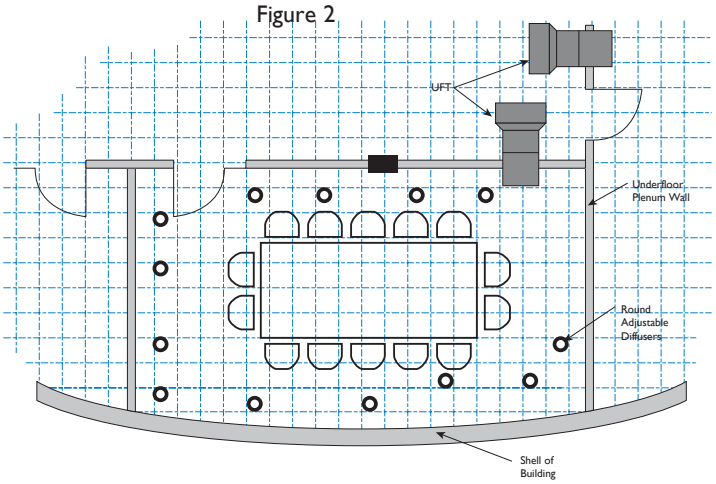
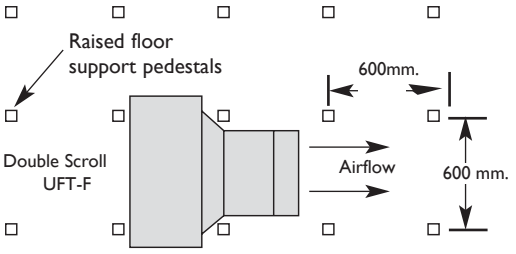


Figure 2



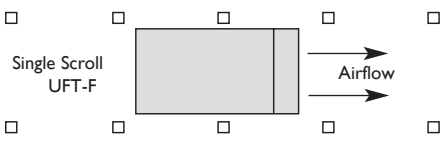
Installation - Fan Placement

Raised floor systems are designed to allow for cables and equipment to be run under the floor. To accomplish this task, the floor is supported with pedestals that are placed 24 inches apart. The UFT - F is designed specifically for the raised floor application allowing it to fit perfectly between these pedestals while allowing an outlet duct to be attached if desired.



Raised floor heights range from 300mm and above. Aurion has designed the UFT-F in two heights, UFT-F/25 and UFT-F/35 to accommodate the various floor heights.

Model	Unit Height	Floor Heights			
		300	350	400	450
UFT-F/25	260	x	x	x	x
UFT-F/35	360			x	x



The primary function of the UFT-F is to supply air to the perimeter zones of a building. The UFT-F may also be used to increase air supply to specific interior ares of a buildir Aurion UFT-F are constructed for easy service access, quiet, efficient operation.

Construction and Service

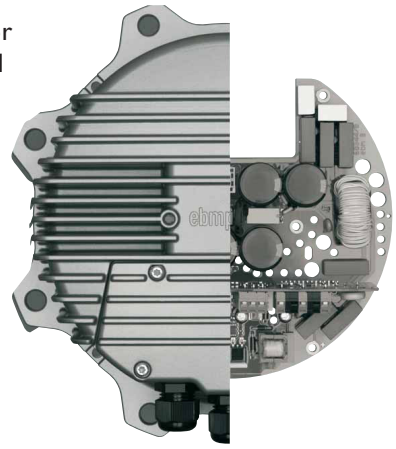
The fan housing and scroll are constructed of corrosion resistant galvanized steel. The fan housing is lined with sound absorbing insulation for quiet operation. Fan are forward curved or backward curved Galvanized steel impeller or PA plastic 6.6 fibreglass reinforced with rotor galvanized, electronic enclosure in die cast aluminum. Motor and impellers are dynamically factory balanced for vibration free operation.

The following UFT features are designed for easy installation and service:

- Easy top access to the blower assembly, reheat coil, and control center for inspection and service
- Main wiring connections are made to a single point to reduce installation time. Controls are factory mounted, calibarated and tested prior to shipment to site.

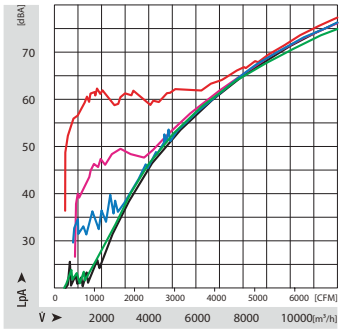
High Efficiency EC motor

Aurion uses Electronically Commutated Motors (EC). EC technology is more eco-friendly, motor are integrated commutation electronics offer high effciency across the entire speed range and optimal acoustic performance at minimal installation expenditure. Technical features include Control input 0-10VDC/PWM and output 10VDC max 1.1 mA. Locked rotor protection. Product conforms to EN 60335-1 CE. Fans are UL approved.



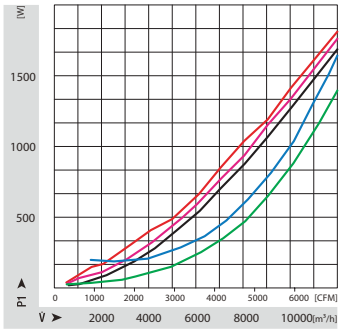
Energy efficient variable speed motor

Acoustic performance of controlled motors



Key:
- EC controls
- Frequency inverter with sine filter
- Phase-angle control without sine filter
- Phase-angle control with sine filter
- Transformer

Power input of controlled motors



Key:
- EC controls
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Control Panel

The control panel equipped with a Nema 1 can be confirgured for input voltage 240V. a 24V transformer of 25VA power for connecting other devices can be provided as optional or +10V output can be taken from the EC motor for PWM control. Fan & controls are factory mounted, wired and tested. Contol panel can be mounted left or right hand to suit site requirement. A extended control boxes are also available to accomodate field mounted DDC controller if required.

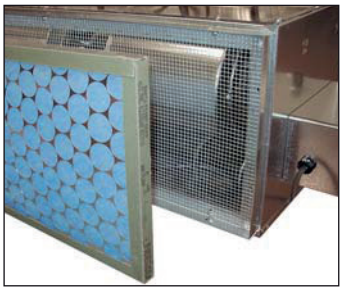
Easy access control center

Mounting and Vibration Isolation

The UFT-F comes with adjustable mounting brackets and neoprene isolators to reduce vibration. Isolators are sized to match the weight of the individual fan sizes.

Intake Filter

Heavy duty filters are provided for use during building HVAC startup operations to prevent excess dirt from accumulating on the coil, wheels, and motor which could cause a reduction in performance. Filters should be removed shortly after startup to maximize fan performance.



Inlet guard and replaceable filter

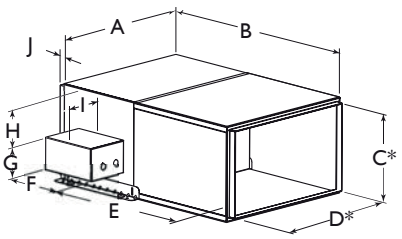
Inlet Guard

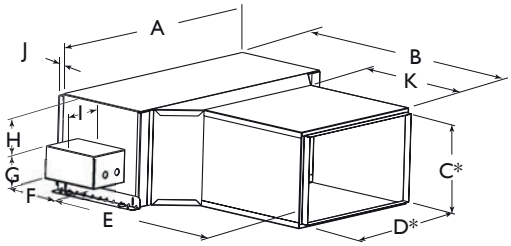
The inlet guard entirely encloses the inlet side of the fan and is constructed of galvanized steel screen, in a galvanized frame.

Insulation

The UFT-F fan housing is lined with a standard fiberglass insulation with a black tissue facing. As optional the insulation can be contained within inner perforated galvanized sheet.

Dimensions





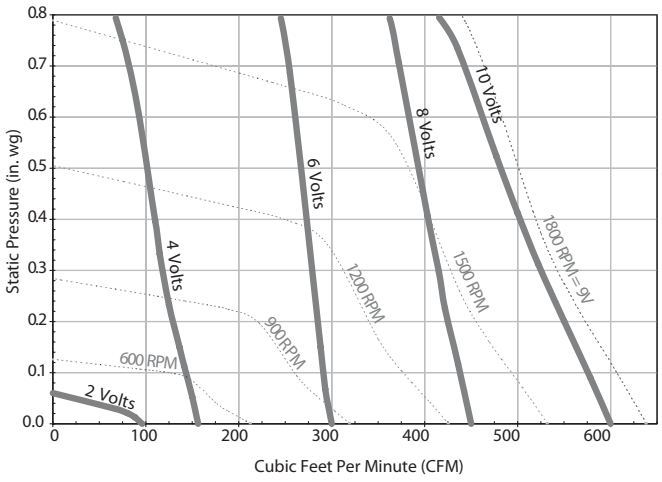
Model	A	B	C*	D*	E	F	G	H	I		J	K	WT.	Inlet Duct Connection	Outlet Duct Connection
									Standard	Extended					
UFT-F/10-1	21	29 7/8	10 3/8	21	20 3/8	12 3/4	4 1/2	3 1/4	6	10	1	-	40	9 3/8 x 20 1/4	9 1/8 x 19 7/8
UFT 10-2	35	35 1/4	10 3/8	21	20 7/8	12 3/4	4 1/2	3 1/4	6	10	1	17	75	9 3/8 x 34 5/8	9 1/8 x 19 7/8
UFT 13-1	21	29 7/8	13 1/8	21	18 7/8	12 3/4	4 1/2	5 1/2	6	10	1	-	50	12 1/8 x 20 1/4	11 7/8 x 19 7/8
UFT 13-2	35	35 3/8	13 1/8	21	24 3/8	12 3/4	4 1/2	5 1/2	6	10	1	17	90	12 1/8 x 34 5/8	11 7/8 x 19 7/8

* Dimensions C and D are the actual unit height and width. All dimensions are in inches.

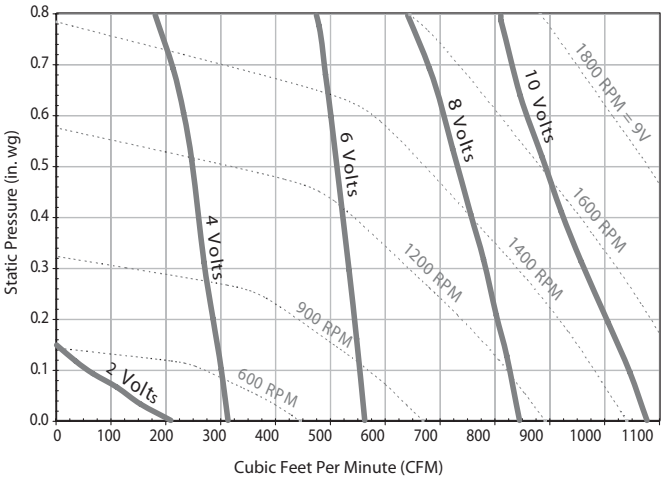
UFT-F fans can be selected and programmed to operate as Constant Volume. The Constant Volume mode is achieved using EC motor technology which functions on 0-10v signal from pressure sensor or temperature sensor. The inbuilt PCB then sets the RPM to achieve the pre-programmed temperature setting or volume.

Fan Performance at Specified Static Pressure

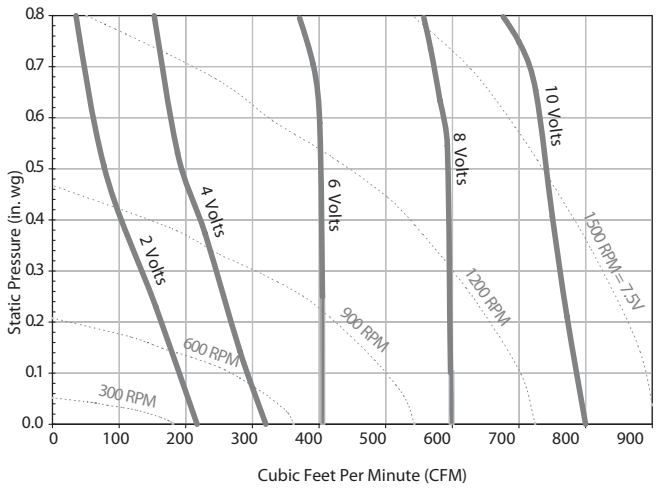
UFT-F-S/10 - Variable Volume



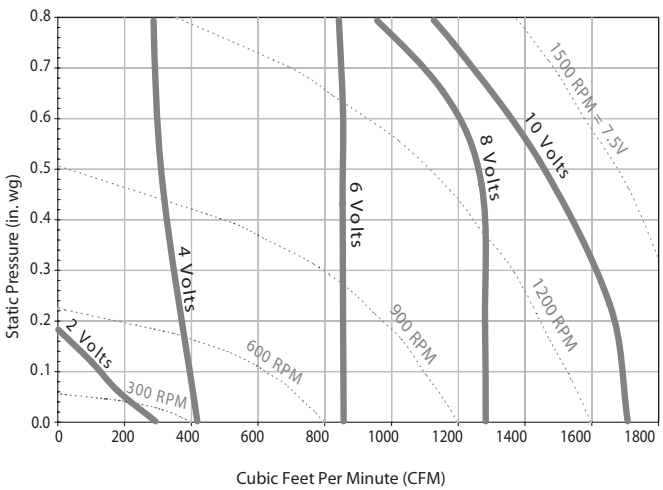
UFT-F-D/10 - Variable Volume



UFT-F-S/14 - Variable Volume



UFT-F-D/14 - Variable Volume



Acoustic data

Model	Fan Speed CFM	Sound Pressure Levels (average room) Octave Bands								NC Level
		1	2	3	4	5	6	7	8	
UFT-F-S/10	535	44	41	33	22	22	18	16	16	23
UFT-F-D/10	1161	48	46	36	29	25	19	17	17	32
UFT-F-S/14	777	47	43	36	28	27	23	18	18	28
UFT-F-D/14	1615	50	49	38	30	27	21	19	19	35

Fan tested under a 400mm raised floor at 0 Pa. in an accredited sound chamber.

Radiated sound values are dependent on RPM, inlet and outlet pressures.

Discharge Sound

Model	Sound Pressure Levels, dB Octave Bands								Max NC Level
CFM	1	2	3	4	5	6	7	8	
220	52.3	44.0	36.2	33.1	29.9	25.2	18.9	15.5	32
385	56.1	47.9	43.2	39.9	33.0	30.0	27.0	19.9	36

The sound ratings shown are five feet from the linear grille. Discharge through 1200 x 100 Linear Floor Grille.

The Results

An easy to install, comfortable office setting for employees that is cost-effective and flexible for owners.

The result of the project was a great success. The building contractors felt that the underfloor air distribution system was much easier to install then a conventional overhead air distribution system. The reason for this is because none of the work involved reaching over their head. The raised floor system also reduced the time that was needed to install the communication and electrical cables.

Occupants of the building were also impressed with the raised floor system design. They like the ability to have individual control over the amount of air being supplied to their space. Occupants also noticed a drastic improvement in air quality from their existing building.

As designed, this project will exceed energy standards mentioned in Title 24 Energy code by over 30%.

Will this design benefit you with any of your applications?

Typcial employee office setting. .