TROSTEN®

# Ecology Unit

# Mission

To meet customers' demand for environmental comfort using our knowledge, experience, dedication and adherence to the best quality standards.

# Vision

To be recognized as a market leader, in the range of centralized air conditioning and kitchen ventilation equipment manufactured by us, in our ability to offer pioneered and customized practical solutions.

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# Company Profile

Trosten Industries Company LLC., established in the year 2004, specializes in the manufacturing of centralized air conditioning and kitchen ventilation equipment, with a full fledged manufacturing facility located in Dubai Investments Park.

At Trosten, it's all about providing quality HVAC solutions for residential, industrial and ideal equipment for kitchen ventilation applications. With our strength in providing the right engineering solutions, we offer factual benefits to our customers by saving energy and ecological returns.

Modular construction of our product range offers complete flexibility in accommodating different sizes and functions, all built-in features in our computer aided selection conforming to the customer requirements.

Towards assurance to a quality management system, Trosten has acquired ISO 9001:2008 certification from TUV-SUD for the manufacturing of centralized air conditioning and kitchen ventilation equipment to ensure our commitment to continual improvement of our products and services to achieve increased customer satisfaction.

A structured Environmental Management System (EMS) has been successfully implemented to fulfill our social responsibilities towards protecting the environment and minimizing risk of pollution through ISO 14001:2004. Implementation of OHSAS 18001:2007 for Occupational Health and Safety Management System has ensured maintaining a safe and comfortable working environment.

Reliable and innovative technologies are our strength in addressing the demand for hygiene applications, energy saving recovery applications and custom-made products to suit the customer requirements.

Trosten's product range encompasses:

- Air Handling Units
- Heat Recovery Units
- Hygiene Units
- Fan Coil Units
- Condensing Units
- Ecology Units
- Electrostatic Precipitators
- Ventilation Units

TAH-TFM/TCS series Air Handling Units are Eurovent certified with the best performance of mechanical strength, casing/filter by-pass leakage and thermal efficiencies using both Polyurethane and Rockwool insulations. Internationally recognized and certified components like AMCA certified fans, UL rated filters and UL rated flexible connectors are used.

Trosten Air Handling Units have been performance tested in TUV-NORD, TUV-SUD and Intertek laboratories at various instances to reassure our product quality. Laboratory tested Fan Coil Units are of low-height type, designed for ultra-silent performance, suitable for standard and district cooling applications.

TAH-TEC series Ecology Units are Eurovent certified and are ideal kitchen ventilation product for effective filtration and odour removal. Factory supplied control panel ensures trouble-free operation by providing continuous diagnosis of the system operation. Electrostatic Precipitators are also available for sustainable and efficient removal of grease and smoke from the kitchen extract system.

Condensing Units with environment-friendly refrigerant R407C are built to deliver great performance with unmatched reliability and energy efficiency.

Due to the smooth aesthetics, contemporary looks and rust-free construction, all of our products are ideal for shopping malls, office complexes, pharmaceutical industries, clean rooms and similar applications.

# Certifications

## Eurovent

TAH-TEC series Air Handling Units

(Ecology Units for kitchen ventilation application)

## ISO 9001:2008

Quality Management System certified by TUV-SUD, UAE.

# Certifications

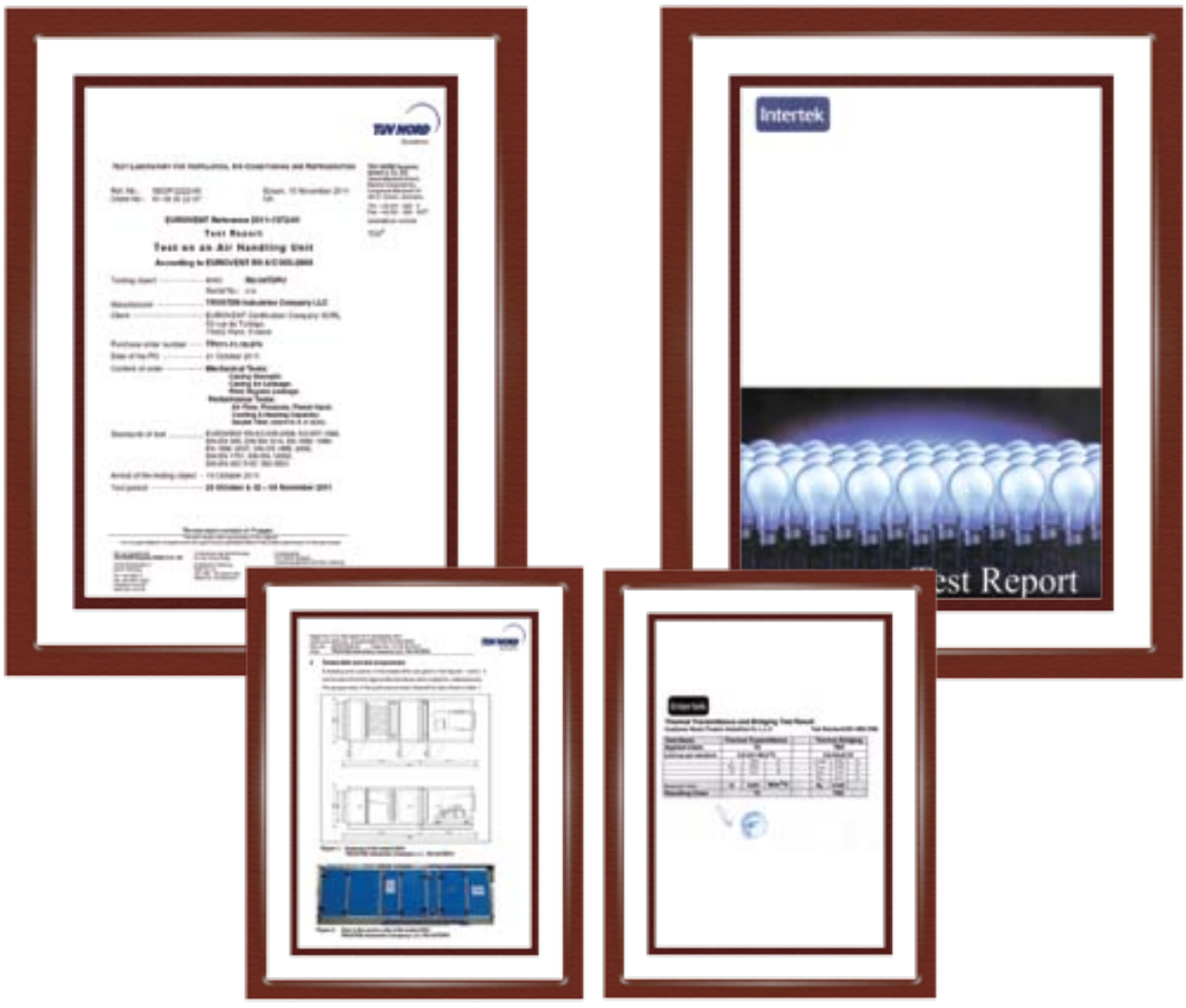
## EN 1886, EN 13053

Mechanical Characteristics and Rating / Performance

tested and certified by TUV-NORD & TUV-SUD.

## EN 1886

Mechanical Characteristics tested and certified by INTERTEK.



# Certifications

## ISO 14001:2004

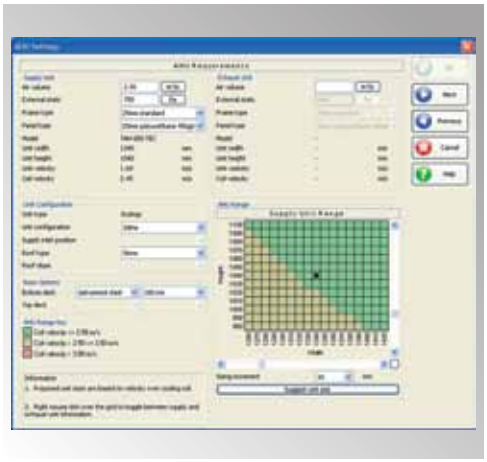
Environmental Management System certified by Quality Registrar Systems (QRS), UAE.

## OHSAS 18001:2007

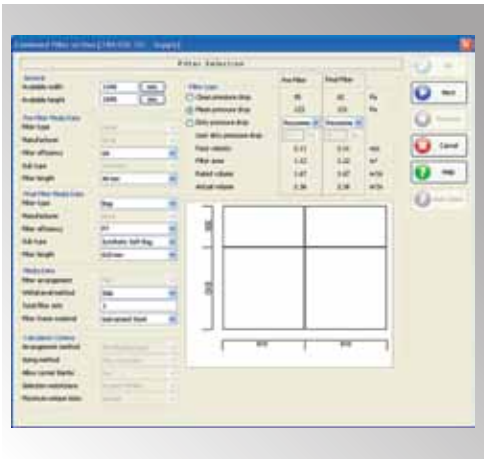
Occupational Health and Safety certified by International Industrial Certification (IIC), UAE.

# Selection Program

Trosten's WinTADS software has been custom-built to accommodate most of the possible requirements of the customer with an extremely user-friendly input panel on linear windows. The selection program has been built with standard models of TEC series Ecology Units, which simplifies the complexity of the design and selection of various components. To cater the diverse requirements of the market and match the customer requirements, the selection program has been built with various options of fans and filter components for selection.



In addition to the standard models, the selection program has an in-built option which allows selecting the unit dimensions on a grid of height vs. width, the scale of the grid being 10 mm; practically this means that we can choose any combination of sizes for our units as per the customer requirements.



The user can customize the general parameters easily to minimize the time required for multiple unit selections. Although, the selection program has been designed to produce with the SI units of measurement, the input window for each data can be toggled between the Imperial system and Metric system as per user's convenience.

Output of the selection program provides a very detailed specification, performance of each component chosen and produces a complete technical submittal comprising of all the technical information required by the customer. Constructive drawings of selected units with dimensions and all necessary details are generated by the selection program.

# EN 1886 Mechanical Characteristics

EN 1886 standard is a part of a series of standards for Air Handling Units used for ventilation and air conditioning of buildings for human occupancy. It considers the mechanical performance of an Air Handling Unit as a whole and will be supported by a standard for sections and components. This standard specifies test methods, test requirements and classification for all types of Air Handling Units. Except for the thermal and acoustic performance of the casing, the test methods and requirements are applicable to both complete units and any separate section.

Mechanical strength of the casing shall be categorized into classes in accordance with the table given below:

| Mechanical strength | Max. relative deflection mm x $m^{-1}$ |
|---|---|
| D1 | 4 |
| D2 | 10 |
| D3 | >10 |

Casing air leakage of the assembled Ecology Unit shall be tested at 400 Pa negative pressure and it shall not exceed the applicable rate given in the table below:

| Casing air leakage | Max. leakage rate ($f_{400}$) l x $s^{-1}$ x $m^{-2}$ |
|---|---|
| L1 | 0.15 |
| L2 | 0.44 |
| L3 | 1.32 |

Air bypass around filter cells will decrease the effective efficiency of the filter, especially a high efficiency one, because the bypass air is not filtered. The air tightness and area of the casing between the filter and the fan are the factors that can affect the filter bypass leakage rate. Filter bypass test is not applicable for the testing of HEPA Filters. Filter bypass leakage rate related to different filter classifications shall be in accordance with table given below:

| Filter bypass leakage | Max. filter bypass leakage rate k in % of the volume flow rate |
|---|---|
| G1 - F5 | 6 |
| F6 | 4 |
| F7 | 2 |
| F8 | 1 |
| F9 | 0.5 |

# Quality Assurance

Trosten has applied the latest technology and the years of experience in developing the Ecology Units to meet the requirements of environmental safety and pollution.

Trosten units have been tested for the highest possible mechanical characteristics of EN 1886 standards conforming to the classes given below to ensure our customers are offered with the best performance of mechanical strength, casing leakage and filter bypass leakage.

| Mechanical Characteristics | Class |
|---|---|
| Mechanical Strength | D1 |
| Casing Air Leakage @ - 400 Pa | L1 |
| Filter by-pass Leakage | F9 |

The manufacturing facility is ISO 9001:2008 certified to ensure our commitment towards quality assurance to the customers. The company is always improving and developing its products and therefore the company reserves the right to make changes to the illustrated products. Certified dimension will be provided upon request.


# Design Flexibility

Trosten's WinTADS offers an incredible flexibility to customize the unit dimensions in multiples of 10mm on the width and height meeting all the aspects of customer's requirements. The selection program provides us with tremendous options in choosing the components and their arrangement, thereby satisfying the system designer and architectural layout.

Snap-fix panels provide a contemporary look and are aesthetically pleasing. Space constraints for replacement or retrofit jobs are no longer a problem, as customization is Trosten's forte and we can offer solutions to suit any site requirements.

Wide range of unit construction materials including plain galvanized steel, pre-painted galvanized steel, aluminium and stainless steel are available. Trosten WinTADS covers a multitude of environments including the most corrosive atmosphere and offers complete range of components. Units can be designed to suit indoor and outdoor conditions.

Options are available in the design for floor mounted units and ceiling suspended units with or without base frame. Weather proof canopy is supplied with all the roof mounted units which are exposed to atmosphere. The unit is designed for easy maintenance with wide access doors for every component requiring maintenance.

# Casing Construction

TEC series Ecology Units are of modular construction type using pentapost, extruded aluminium profiles with excellent rigidity. Aluminium profiles are offered with options of anodized finish for anti-corrosion and screw-less snap fixing type for low air leakage rates. Panels are of double wall construction either injected with environment friendly polyurethane foam (PUF) insulation or with high density Rockwool insulation providing a rigid, sturdy and easily cleanable enclosure.

Panels are offered in 25mm and 50mm thickness with PUF insulation of 48kg/m3 density, CFC & HFC free foam conforms to class "O" or non-combustible rigid-slab rock wool insulation with excellent thermal and acoustic characteristics. The outer skin and inner skin of the casing have a variety of options in material (Galvanized steel pre-coated polyester/Aluminium/SS) and sheet thickness as per the requirement.

Base frames are made out of Sendzimir galvanized steel sheets with either die cast aluminium joints or heavy duty steel joints with lifting holes. Hot-dip galvanized channel frames are also provided, especially for larger size units.

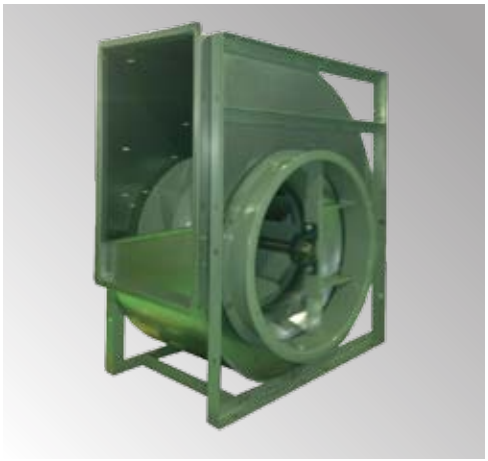
The outer surface of the panel is generally offered with pre-coated polyester, having excellent corrosion resistance, further protected with vinyl guard film for scratch protection. Panels are secured to the unit framework with fasteners, exerting pressure evenly onto the panel and the gasket attached to the frame to ensure better air tight casing construction. All the side panels are removable type to provide access to various components.

# Fans

Trosten units are equipped with centrifugal, double inlet, double width (DIDW) fans with backward curved blades. The performance of the fans have been tested and measured in accordance with AMCA standard 210. Similarly, the noise levels of the fans have been tested and measured in accordance with AMCA standard 300. Fans are designed in accordance with the specified operating class of AMCA standard 99-2408-69 performance class limits for centrifugal fans. Further, all backward inclined fans are sized in accordance with AMCA standard 99-0098-76 R20.

The backward inclined fan wheels are manufactured in cold-rolled steel sheet with polyester coated finish. Shafts are manufactured from C45 grade carbon steel and then coated for anti corrosion after assembly. All the wheels are statically and dynamically balanced according to ISO 1940 and AMCA 204 – G2.5 standards.

SISW configuration can also be offered for cases where the motor needs to be kept outside the air stream as per the application's demand. The drives are selected for 150% of the maximum motor horse power of the units. Sheaves are of fixed pitch type and dynamically balanced. Adjustable pitch pulleys are provided upon request. V-belts are of anti-static and oil resistant type.



Fan and motor assemblies are mounted on a common extruded aluminium base located inside the casing which in turn is mounted on anti-vibration mounts designed for 93% isolation. Fire retardant fabrics are used as flexible connectors between the fan outlet and the unit casing for vibration free operation.

# Motors

Trosten's WinTADS software selects the most optimum electric motor with the highest efficiency based on the selected duty condition. All ecology units have motors inside the unit casing in standard models. Motor outside the air stream arrangement is also available on request.

Electric motors are of IEC or NEMA standards in squirrel cage, totally enclosed fan cooled (TEFC) construction, foot mounted with IP 55 degree of protection and class F insulation. Motors conform to IEC34, IEC72, BS5000, BS3979, BS4999 standards and carry CE mark. Motors of explosion proof construction are also offered based on the requirment.

Motor efficiencies include EFF2 (IE1) standard efficiency, EFF1 (IE2) high efficiency and Premium Efficiency (IE3), are offered based on the requirement. On request, the motors can be offered up to 660Volts, 50/60Hz AC supply.

Motors are suitable for VFD operation, 5:1 ratio for constant torque applications. High grade and type of copper materials, lamination etc., are used and the motors have undergone vacuum-impregnated insulation treatment, to increase the insulation strength on the overhangs of the motors so that harmonic distortions are minimized.

# Filters

**Metallic Filters**

Metallic washable filters are made out of fine galvanized steel wire mesh suitable for use in heavy duty industrial and kitchen air ventilation applications. Filters having excellent dust holding capacities and ability to perform in high moisture conditions are specially made to handle the grease content exhausted out of kitchen hoods. The Metallic filters shall be with multiple layered and pleated galvanized steel wire mesh formed into a compact maze of dirt catching surfaces.

Technical specifications : Metallic Filters
Filter class: G2 as per EN 779 Standard
Initial resistance: 22 Pa
Final resistance: 130 Pa
Mean resistance: 75 Pa
Rated velocity: 2.5 m/s
Average arrestance: 75-80%
Maximum operating temp: 420 Deg C.

Technical specifications : Synthetic Panel Filters
Filter class: G4 as per EN 779 Standard
Initial resistance: 90 Pa
Final resistance: 250 Pa
Mean resistance: 170 Pa
Rated velocity: 2.5 m/s
Average arrestance: ≤90%
Maximum operating temp: 70 Deg C.

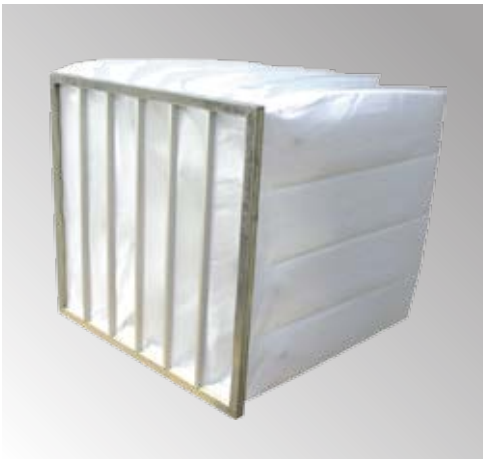
**Synthetic Panel Filters**

The 2” / 4” deep pleats shall have consistent pleat spacing and durable execution. Pleated Filters feature a self-supporting media pack in a two piece frame - pleat stabilizers on the air leaving side in combination with pleat support straps on the air entering side to ensure pleat consistency, providing excellent dust holding capacity and low pressure resistance. The pleated media shall be made from a controlled and repeatable special blend of size-specific virgin fibers. Also available, G3 class filters upon request.

# Filters

### Soft Bag Filters

Soft bag filters shall be made of ultra-fine synthetic fiber media consisting of a unique blend of coarse and fine synthetic fibers specially designed and interwoven to provide a low initial resistance and high air cleaning performance. The coarse fibers arrest larger and heavier particles in the air stream while the fine fibers remove the smaller particulate matter and give the filter its high efficiency classification. The media is color coded for identification as per filter class. Also available, F5 and F9 class filters upon request.



Technical specifications: Soft Bag Filters
Filter class: F7 as per EN 779 Standard
Initial resistance: 80 Pa
Final resistance: 250 Pa
Mean resistance: 165 Pa
Rated velocity: 2.5 m/s
Average arrestance: 98%
Efficiency: 80-85%.
Maximum operating temp: 70 Deg C.

Technical specifications: Rigid Bag Filters
Filter class: F9 as per EN 779 standard
Initial resistance: 210 Pa
Final resistance: 450 Pa
Mean resistance: 330 Pa
Rated: 2.5 m/s
Efficiency: ≥95%
Maximum operating temp: 70 Deg C.

### Rigid Bag Filters

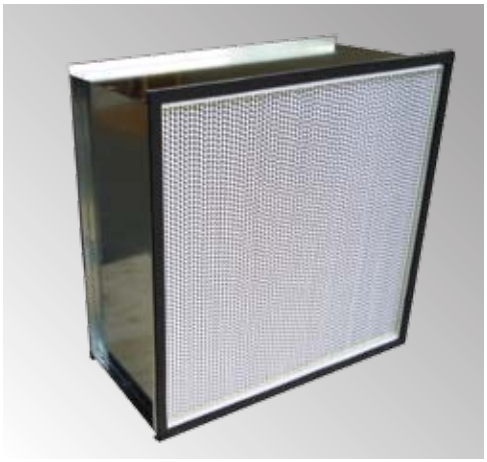
Rigid bag filters are constructed of pleated media pack with hot-melt separators which ensure that they deliver the desired air quality when used in variable air volume systems and subjected to repeated fan shutdown, high relative humidity and intermittent exposure to water. The hot-melt separators maintain uniform spacing between pleats to allow optimal flow of air into and through the filter. They also ensure large effective-media-area for low resistance and high dust holding capacity.

# Filters

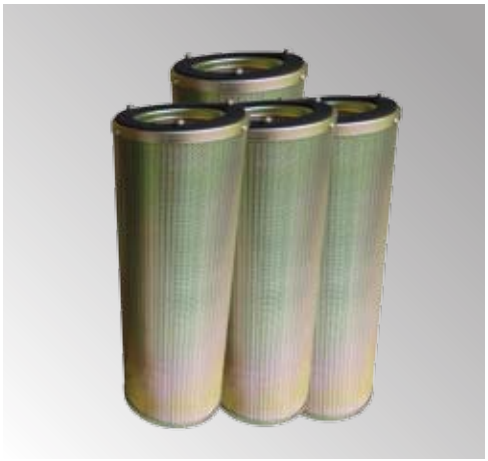
**Absolute Filters**

HEPA Filters shall be heavy duty filters designed for both constant air volume and variable air volume systems. These filters shall consist of pleated media pack enclosed in an electro-galvanized steel housing. The media shall be made of ultra-fine fiber glass formed in to a series of pleats. Corrugated Aluminum separators maintain uniform spacing between each pleat to allow unrestricted air flow. Bar braces shall be installed on both sides of the filter for extra reinforcement of the media pack. H10, H11, H13 and H14 class filters are available upon request.

Technical specifications: Absolute Filters
Filter class: H12 as per EN 1822
Efficiency: 99.5% at 0.3 micron
Initial resistance: 250 Pa
Final resistance: 750 Pa
Mean resistance: 500 Pa
Cell sides: Galvanized steel
Filter media: Ultra-fine Glass Fiber media
Separators: Aluminum
Maximum operating temp : 120 Deg C.



Technical specifications: Carbon Filters
Frame material: Galvanized steel frame
Carbon filter size: 145 dia x 600 mm long
Volume per canister: 5.9 l
Capacity per 24x24: 3200 m3/hr having 16 canisters
Carbon content: 3 kgs per canister = 48 kgs per cell
Average resistance: 150 Pa
Dwell time (contact time): 0.1 sec
Refillable type: Yes



**Carbon Filters**

Canister delivery system shall consist of multiple individual canisters in metal execution. Canisters shall be assembled in a galvanized sheet metal holding frame to fit standard dimension filter sections. The individual canister seals and holds in the frame due to its unique seal and bayonet style clamping mechanism. Canisters shall be factory pre-filled with user specific media. Each canister shall be vibration-filled in order to ensure that the media is uniformly packed.

# Filters

## MERV rating

Minimum Efficiency Reporting Value (MERV) – ASHRAE 52.2.1999 standard on "Method of Testing General Ventilation Air-Cleaning Devices for Removal by Particle Size" provides a methodology for determining filter efficiency at removing various sizes of particles as the filters become loaded. There are three ranges of particle sizes that define the MERV value. ASHRAE standard 52.2 replaces ASHRAE 52.1 method and please refer to the table of ASHRAE 52.2 showing the MERV ratings and particle size range.

The Standard only lists arrestance efficiencies for MERV values up to 16. Higher ratings of MERV 17 to MERV 20 correspond to HEPA (High Efficiency Particulate) and ULPA (Ultra-low Particulate) filters.

| MERV Rating | ASHRAE 52.2 Standards | | | ASHRAE 52.1 Standards | | EN779 / EN1822 Standards |
|---|---|---|---|---|---|---|
| | Range 1 | Range 2 | Range 3 | Arrestance % | Dustspot Efficiency % | |
| | 0.3 to 1.0 µm | 1.0 to 3.0 µm | 3.0 to 10.0 µm | | | |
| MERV 1 | | | <20% | <65% | <20% | G1 |
| MERV 2 | | | <20% | 65 - 70% | <20% | G2 |
| MERV 3 | | | <20% | 70 - 75% | <20% | G2 |
| MERV 4 | | | <20% | 75 - 80% | <20% | G2 |
| MERV 5 | | | 20 - 35% | 80 - 85% | <20% | G3 |
| MERV 6 | | | 35 - 50% | 85 - 90% | <20% | G3 |
| MERV 7 | | | 50 - 70% | >90% | 25 - 30% | G4 |
| MERV 8 | | | 70 - 85% | >90% | 30 - 35% | G4 |
| MERV 9 | | <50% | ≥85% | | 40 - 45% | F5 |
| MERV 10 | | 50 - 65% | ≥85% | | 50 - 55% | F5 |
| MERV 11 | | 65 - 80% | ≥85% | | 60 - 65% | F6 |
| MERV 12 | | 80 - 90% | ≥90% | | 70 - 75% | F6 |
| MERV 13 | <75% | ≥90% | ≥90% | | 80 - 90% | F7 |
| MERV 14 | 75 - 85% | ≥90% | ≥90% | | 90 - 95% | F8 |
| MERV 15 | 85 - 95% | ≥90% | ≥90% | | >95% | F9 |
| MERV 16 | ≥95% | ≥95% | ≥90% | | 85% DOP<br>95% DOP | H10<br>H11 |

The Standard only lists arrestance efficiencies for MERV values upto 16. Higher ratings of MERV 17 to MERV 20 correspond to HEPA (High Efficiency Particulate) and ULPA (Ultra-low Particulate) filters. These filters are suited for Clean room & Pharmaceutical manufacturing applications.

# Control System

Intelligent control system provides trouble-free performance with optimized energy consumption. The control panel consists of a Programmable Logic Controller (PLC), Variable Frequency Drive (VFD) and a filter monitoring system. The control panel helps in saving time and money by reducing the maintenance cost and providing extended equipment lifetime.

The control panel has Auto/Manual operation facility for the ecology unit along with indication of filter status. The control system has a dedicated differential pressure switch for each filter section to monitor the filter status and a differential pressure transducer to monitor the negative pressure of the fan. There are eight LED indication lamps on the front side of the panel, which indicate the state of each filter condition.

The VFD enables the fan motor to be run at optimal speed maintaining the required air flow when all the filters are clean. The pressure sensor will monitor the negative pressure within the fan section and send analog signal to the PLC. Based on the signal, the VFD shall ramp up/down the fan speed and maintain the required air flow rate. As the pressure drop across the filters increases, the fan speed will progressively increase until the upper threshold values are reached. When the upper threshold values are reached, the fan shall be switched off to prevent damage to the unit and drive motor. This reduces the maximum load on the fan motor and therefore increases the overall working life of the units. These threshold values can be adjusted by modifying the PLC program.

All controls are pre-assembled in a steel enclosure with powder coated finish as standard. Enclosure with stainless steel construction is also available on request. The panel is equipped with an electric ventilation fan and air louvers to provide better cooling for the internal components. The panel is supplied separately to enable the customer to install at a convenient location as desired.

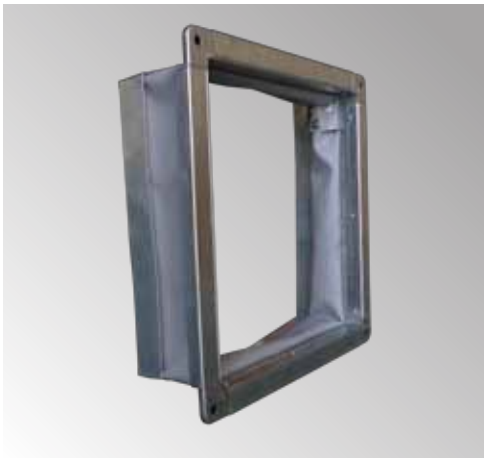
# Accessories

### Vibration Isolators

The fan and fan motor are mounted on a common base frame. To avoid the transmission of vibration from the fan motor assembly to the unit casing, the unit is provided with suitable vibration isolators underneath the base frame of the fan and motor assembly. The type and size of the isolators are selected based on the manufacturer's recommendations.

### Volume Control Dampers

Mechanical damper is provided for better control over capacity by offering resistance to flow of air. These dampers are of opposed blade type designed for low leakage. Dampers are made out of heavy gauge GI sheet metal to withstand high velocities at high temperature conditions. Suitable links are provided for either manual or motorized operation.



### Flexible Duct Connector

Flexible duct connecter is provided between the fan outlet and the unit casing to cut the transmission of fan vibration to the casing. The flexible connector is made of flame-resistant fabric coated with silicon on both sides to achieve the necessary criteria set out in BS476 Part 7 (surface spread of flame) and NFPA-9013 1999 standards. Additional duct connectors shall be provided as optional accessories at the duct connections of both inlet and outlet of the unit if required.

### Weather proof Canopy

Units are provided with weather proof canopy as an additional protection for roof mounted application from direct sunlight and rain. Canopy is supplied separately intended for site installation. This is a corrugated aluminium sheet with sheet thickness of 0.6 to 0.8 mm.

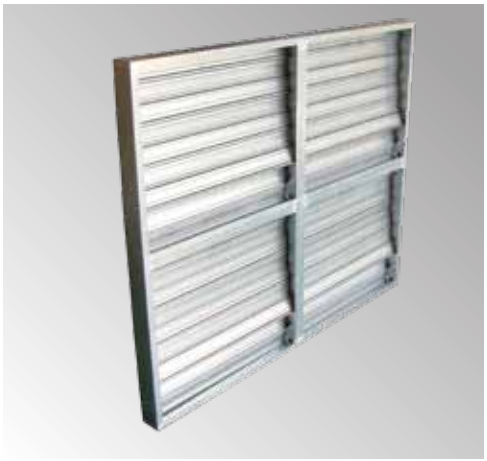
# Optional Features

**Fire Rated Fan**

There is an optimal solution for fire safety requirements for fans by any local statutory body that helps to keep your investment and the equipment in safe condition. Fans with high temperature ratings are also available in single inlet configuration which can be either direct driven or belt driven. The fans feature robust yet lightweight construction to handle elevated temperature conditions of 300°C and 400°C rated for 2 hours.

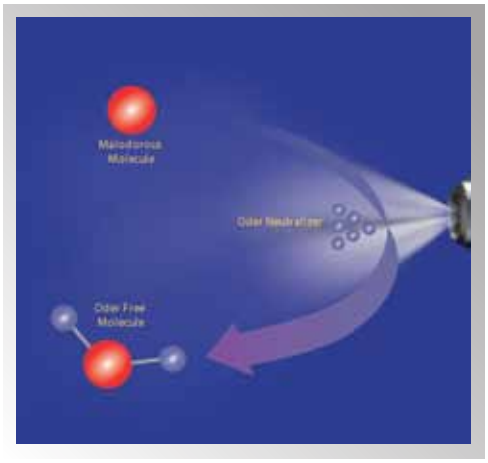
**Fire Damper**

Curtain type fire damper is available with the unit as a safety feature at air entry side to limit the spread of fire. Damper closes automatically upon detection of heat in order to protect the unit from fire. A fusible link which operates at 74°C (165°F) is installed in the fire damper to hold the blades in open condition. Damper casing and the curtain blades are made of heavy gauge galvanized steel sheet. Large size dampers come in multiple sections.



**Odour Neutralizer**

Vapour phase odour neutralizer is provided to remove unpleasant odour from the exhaust air. It is a self-contained unit which is integrated with the control system of the Ecology unit. Odour neutralizer unit contains a chemical storage tank, air compressor, spray nozzle and control system. Odour neutralizer is a low maintenance system which is easy to refill and clean.



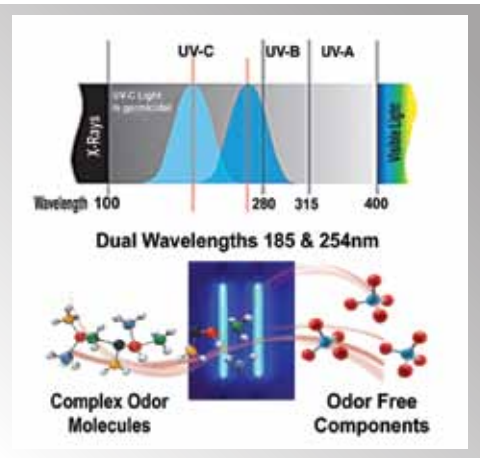
The chemical used in the neutralizer is a non-toxic, biodegradable substance, proven effective and safe. The odour neutralizing chemical's property is such that it rapidly and completely breaks down the odour molecules into harmless substances such as CO2 and water, ensuring a high level of protection for humans and safeguarding the environment.

# Optional Features

**UV Odour Control System**

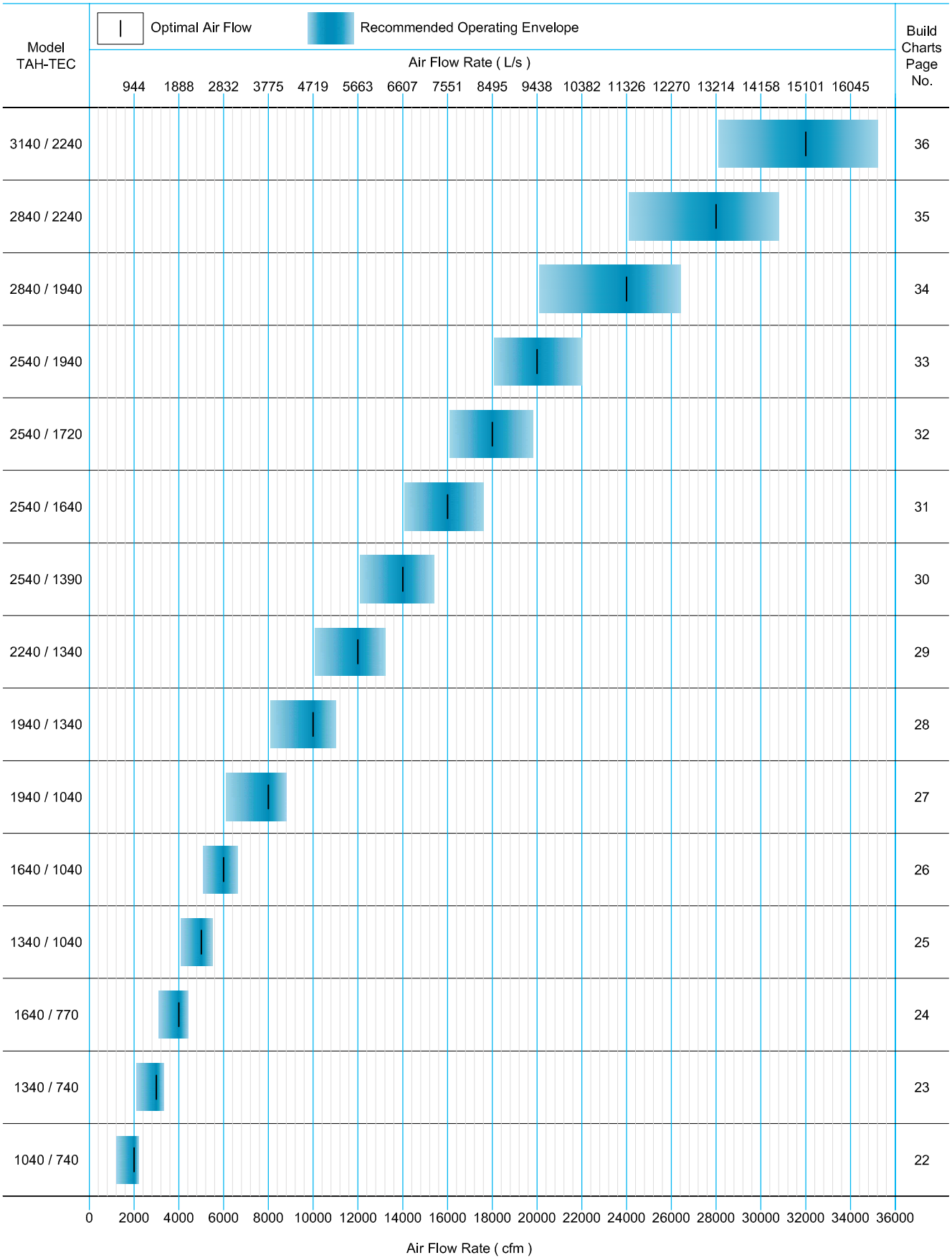
Ultraviolet (UV) based odour control system is ideal in the treatment of odours and easily adaptable for use in ecology units. It is a compact system that utilizes multi-frequency UV light which rapidly oxidizes a wide range of airborne odour producing compounds.

High intensity UV lamps are of the low-pressure mercury laden argon-neon type internally coated to reduce solarisation. The UV lamp is a pure fused quartz type 219 shell that produces both 185nm oxidizing wavelength and 254nm germicidal wavelength. It operates on a molecular scale, creating an oxidation process that quickly reduces or eliminates even the most stubborn odour.




UV Lamps are fixed in an array designed to reduce cooking odours effectively that are exhausted from the kitchen hood. Exhaust air is passed through the UV chamber to remove the airborne odour. The ultraviolet light acts as a catalyst, breaking down oxygen and water vapor molecules into O- and OH- (hydroxyl) radicals. These short-lived free radicals go on to oxidize the more complex molecules found in the contaminant, while the radicals themselves are used up in the process. The end result is a sequential and instantaneous gas breakdown with very little by-products.

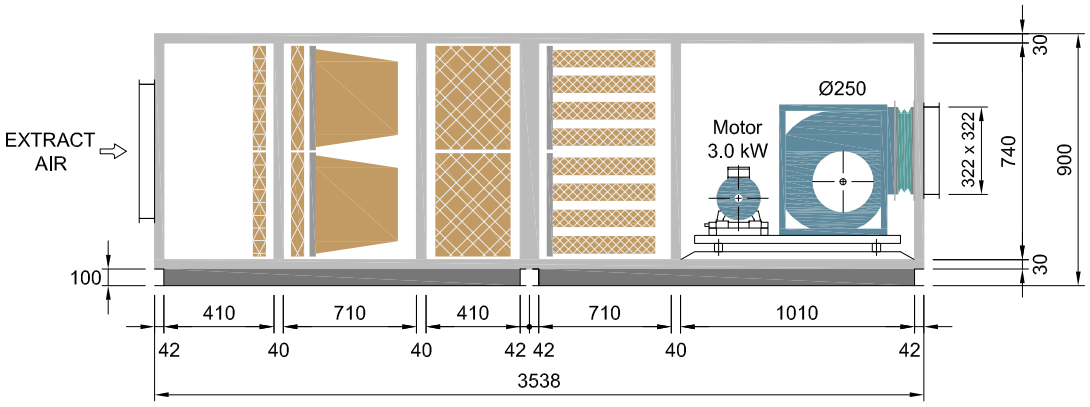
# Quick Selection Chart



# Build Charts

Model TAH-1040 / 740 TEC

**Air Flow Rate**
**2000 cfm / 944 L/s**

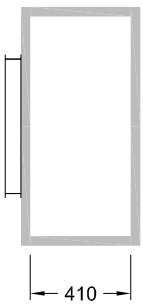



Fan Type : DIDW Backward Curve
External Static Pressure : 750 Pa
Total Static Pressure : 1650 Pa
Fan outlet velocity : 9.08 m/s

Panel Thickness : 25mm
Unit Width : 1100 mm
Internal Width : 1040 mm
Unit weight : 500 Kgs

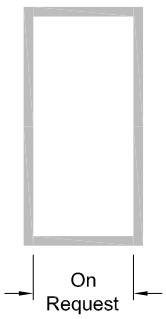
All dimensions are in mm unless otherwise specified

Inlet Section

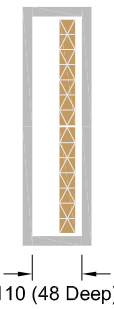



Wt : 45 Kgs

Plenum / Empty Section

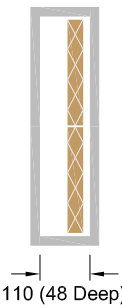



Metallic Panel Filter Section



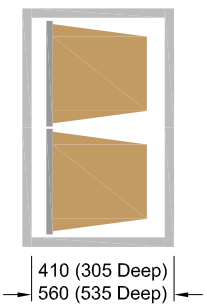

Wt : 19 / 27 Kgs

Synthetic Panel Filter Section



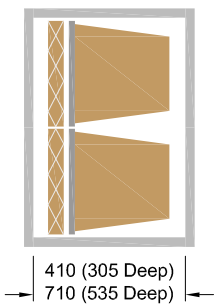

Wt : 18 / 24 Kgs

Bag Filter Section



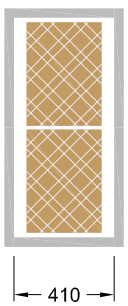

Wt : 35 / 53 / 54 Kgs

Synthetic + Bag Filter Section



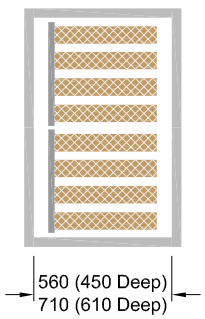

Wt : 40 / 58 / 59 Kgs

Fine / Hepa Filter Section



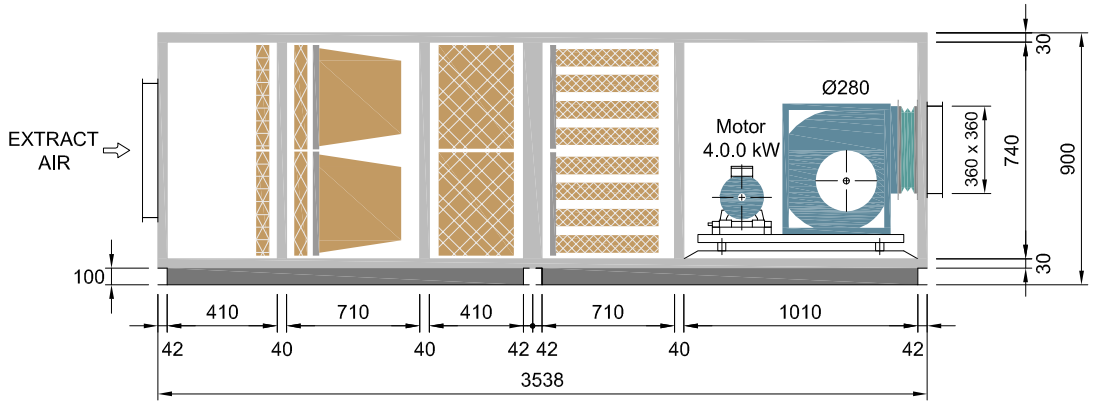

Wt : 46 Kgs

Carbon Filter Section




Wt : 143 / 173 Kgs

**Air Flow Rate**
**3000 cfm / 1416 L/s**

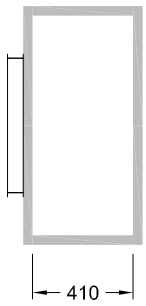



Fan Type : DIDW Backward Curve
External Static Pressure : 750 Pa
Total Static Pressure : 1650 Pa
Fan outlet velocity : 10.93 m/s

Panel Thickness : 25mm
Unit Width : 1400 mm
Internal Width : 1340 mm
Unit weight : 600 Kgs

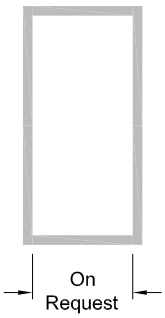
All dimensions are in mm unless otherwise specified

Inlet Section

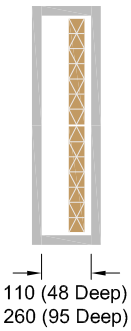



Wt : 55 Kgs

Plenum / Empty Section

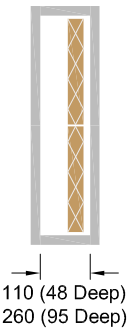



Metallic Panel Filter Section




Wt : 22 / 31 Kgs

Synthetic Panel Filter Section

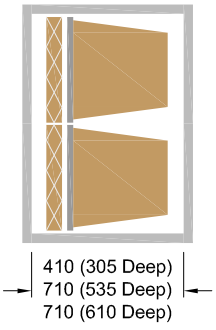



Wt : 21 / 28 Kgs

Bag Filter Section

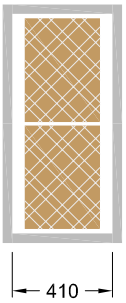

Wt : 40 / 62 / 63 Kgs

Synthetic + Bag Filter Section



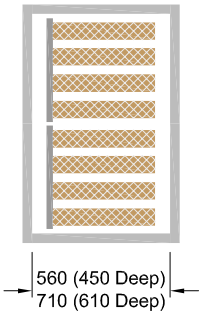

Wt : 47 / 68 / 69 Kgs

Fine / Hepa Filter Section




Wt : 56 Kgs

Carbon Filter Section

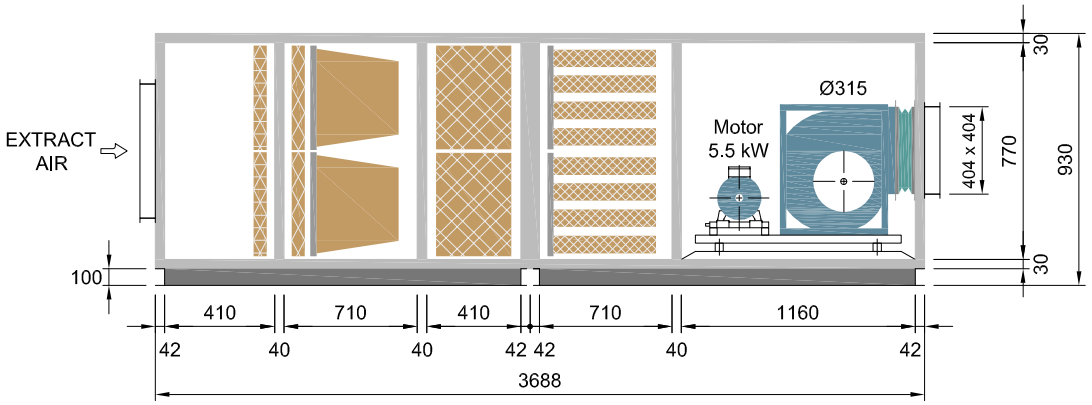



Wt : 182 / 222 Kgs

# Build Charts

Model TAH-1640 / 770 TEC

**Air Flow Rate**
**4000 cfm / 1888 L/s**

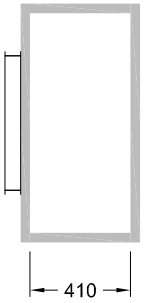



Fan Type : DIDW Backward Curve
External Static Pressure : 750 Pa
Total Static Pressure : 1650 Pa
Fan outlet velocity : 11.57 m/s

Panel Thickness : 25mm
Unit Width : 1700 mm
Internal Width : 1640 mm
Unit weight : 800 Kgs

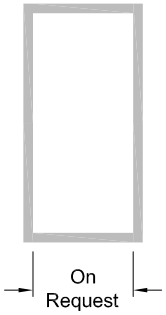
All dimensions are in mm unless otherwise specified

Inlet Section

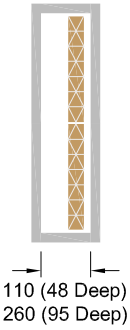



Wt : 65 Kgs

Plenum / Empty Section

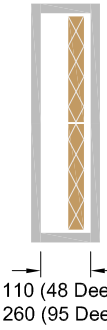



Metallic Panel Filter Section



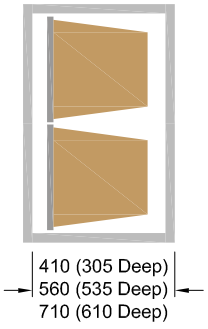

Wt : 26 / 36 Kgs

Synthetic Panel Filter Section



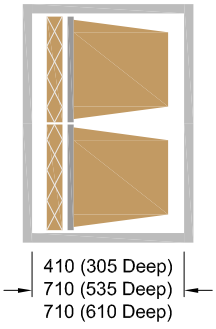

Wt : 24 / 33 Kgs

Bag Filter Section



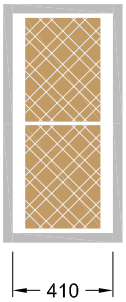

Wt : 46 / 71 / 72 Kgs

Synthetic + Bag Filter Section



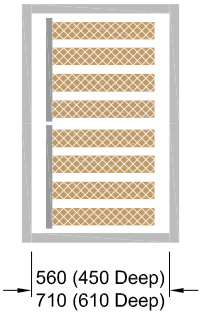

Wt : 55 / 79 / 80 Kgs

Fine / Hepa Filter Section



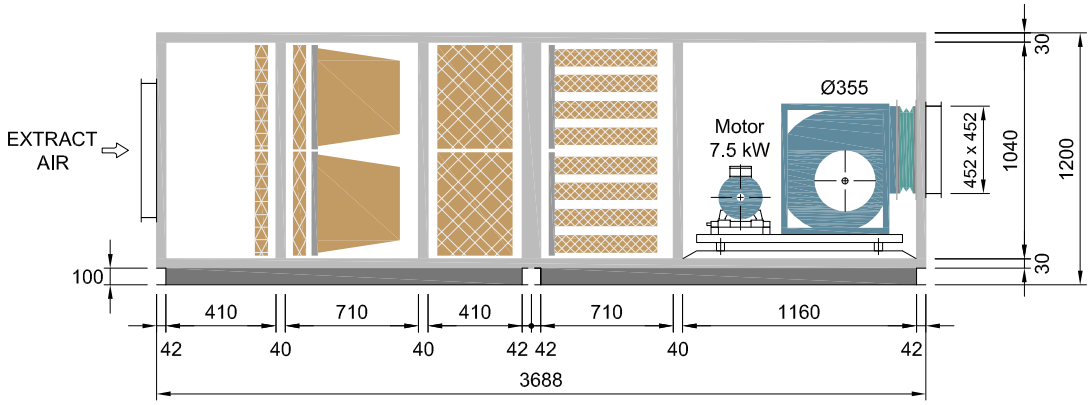

Wt : 66 Kgs

Carbon Filter Section




Wt : 223 / 271 Kgs

**Air Flow Rate**
**5000 cfm / 2360 L/s**

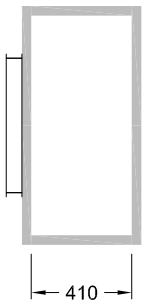



Fan Type : DIDW Backward Curve
External Static Pressure : 750 Pa
Total Static Pressure : 1650 Pa
Fan outlet velocity : 11.56 m/s

Panel Thickness : 25mm
Unit Width : 1400 mm
Internal Width : 1340 mm
Unit weight : 900 Kgs

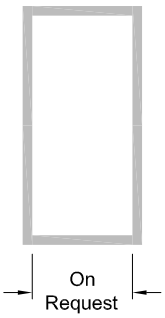
All dimensions are in mm unless otherwise specified

Inlet Section

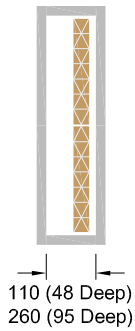



Wt : 70 Kgs

Plenum / Empty Section

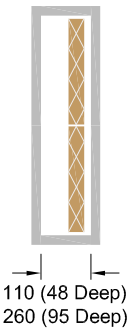



Metallic Panel Filter Section




Wt : 27 / 40 Kgs

Synthetic Panel Filter Section

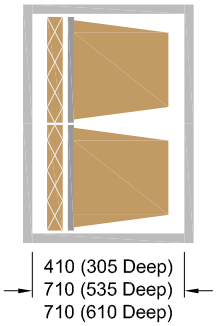



Wt : 25 / 35 Kgs

Bag Filter Section

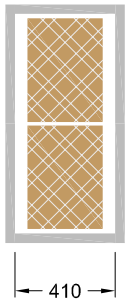

Wt : 47 / 72 / 73 Kgs

Synthetic + Bag Filter Section



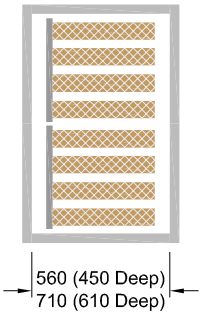

Wt : 57 / 80 / 81 Kgs

Fine / Hepa Filter Section




Wt : 70 Kgs

Carbon Filter Section

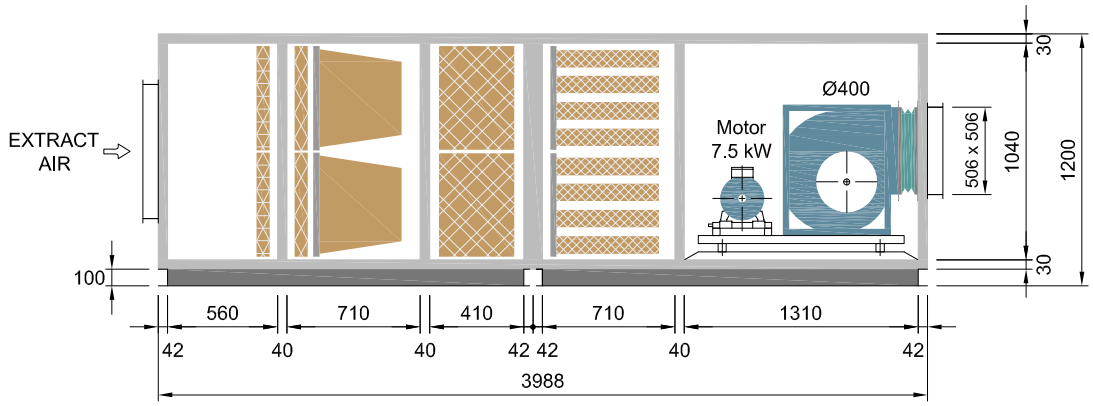



Wt : 256 / 314 Kgs

# Build Charts

Model TAH-1640 / 1040 TEC

**Air Flow Rate**
**6000 cfm / 2832 L/s**

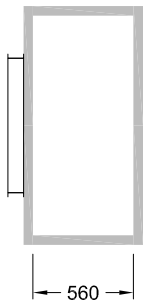



Fan Type : DIDW Backward Curve
External Static Pressure : 750 Pa
Total Static Pressure : 1650 Pa
Fan outlet velocity : 11.07 m/s

Panel Thickness : 25mm
Unit Width : 1700 mm
Internal Width : 1640 mm
Unit weight : 1050 Kgs

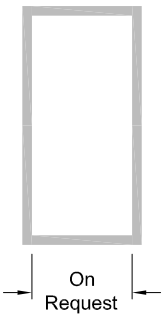
All dimensions are in mm unless otherwise specified

Inlet Section

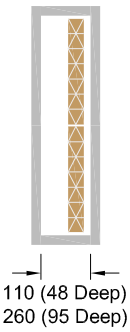



Wt : 95 Kgs

Plenum / Empty Section

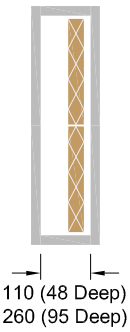



Metallic Panel Filter Section



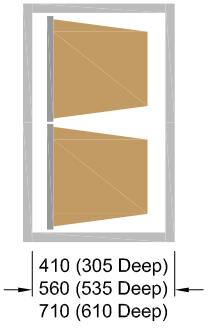

Wt : 31 / 46 Kgs

Synthetic Panel Filter Section



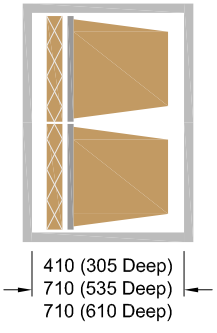

Wt : 28 / 40 Kgs

Bag Filter Section



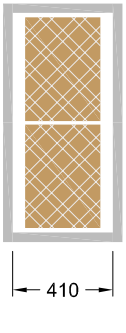

Wt : 52 / 79 / 80 Kgs

Synthetic + Bag Filter Section



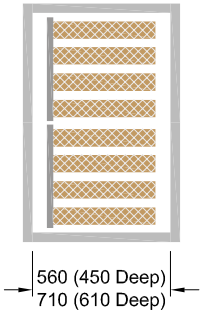

Wt : 65 / 92 / 93 Kgs

Fine / Hepa Filter Section



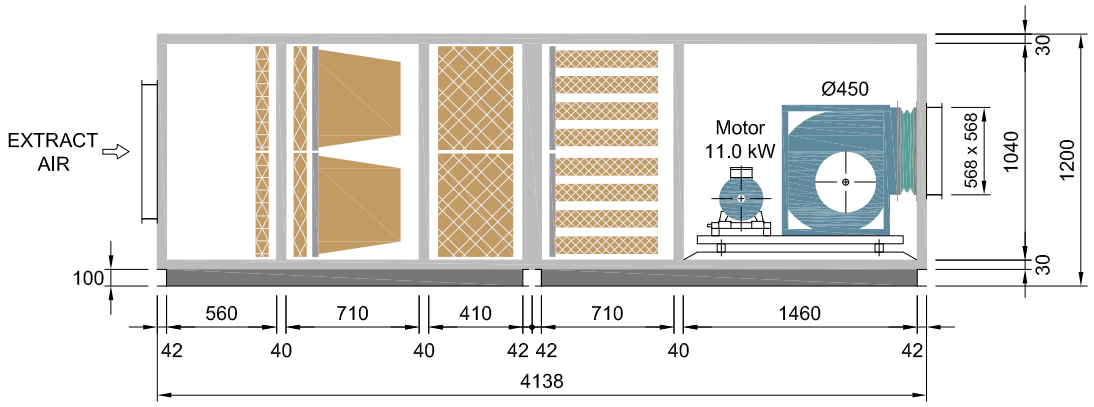

Wt : 81 Kgs

Carbon Filter Section




Wt : 312 / 384 Kgs

**Air Flow Rate**
**8000 cfm / 3775 L/s**

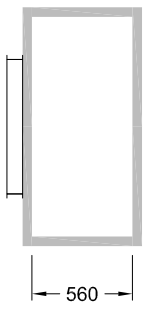



Fan Type : DIDW Backward Curve
External Static Pressure : 750 Pa
Total Static Pressure : 1650 Pa
Fan outlet velocity : 11.71 m/s

Panel Thickness : 25mm
Unit Width : 2000 mm
Internal Width : 1940 mm
Unit weight : 1250 Kgs

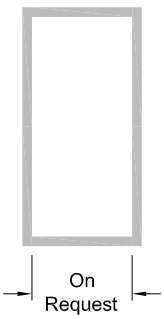
All dimensions are in mm unless otherwise specified

Inlet Section

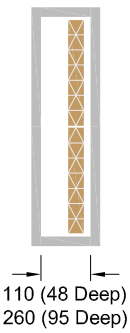



Wt : 105 Kgs

Plenum / Empty Section

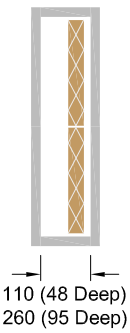



Metallic Panel Filter Section




Wt : 35 / 52 Kgs

Synthetic Panel Filter Section

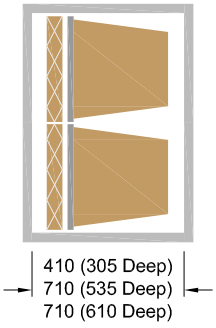



Wt : 32 / 45 Kgs

Bag Filter Section

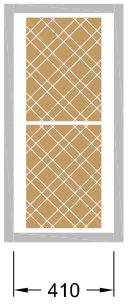

Wt : 58 / 87 / 88 Kgs

Synthetic + Bag Filter Section



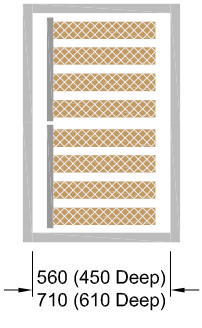

Wt : 73 / 103 / 104 Kgs

Fine / Hepa Filter Section




Wt : 93 Kgs

Carbon Filter Section

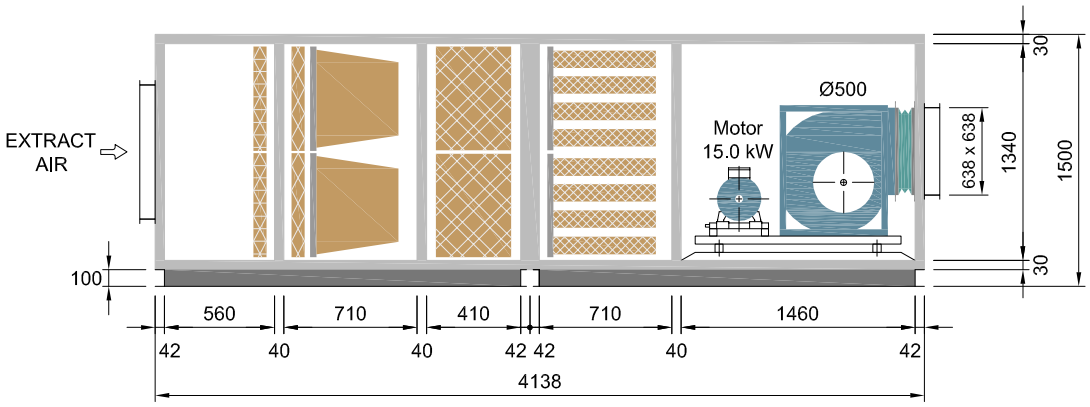



Wt : 369 / 453 Kgs

# Build Charts

Model TAH-1940 / 1340 TEC

**Air Flow Rate**
**10000 cfm / 4719 L/s**

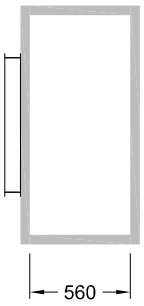



Fan Type : DIDW Backward Curve
External Static Pressure : 750 Pa
Total Static Pressure : 1650 Pa
Fan outlet velocity : 11.60 m/s

Panel Thickness : 25mm
Unit Width : 2000 mm
Internal Width : 1940 mm
Unit weight : 1550 Kgs

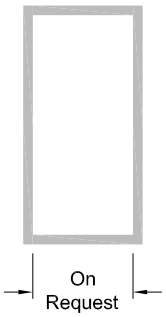
All dimensions are in mm unless otherwise specified

Inlet Section

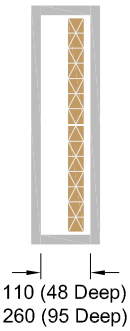



Wt : 125 Kgs

Plenum / Empty Section

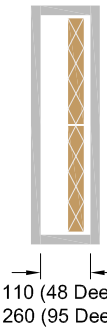



Metallic Panel Filter Section



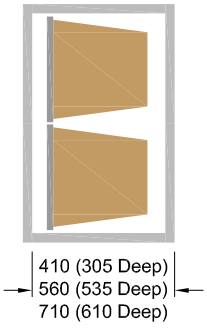

Wt : 41 / 63 Kgs

Synthetic Panel Filter Section



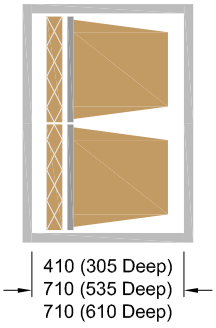

Wt : 37 / 54 Kgs

Bag Filter Section




Wt : 65 / 97 / 98 Kgs

Synthetic + Bag Filter Section

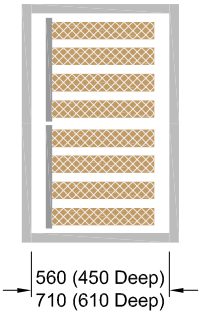



Wt : 85 / 117 / 18 Kgs

Fine / Hepa Filter Section

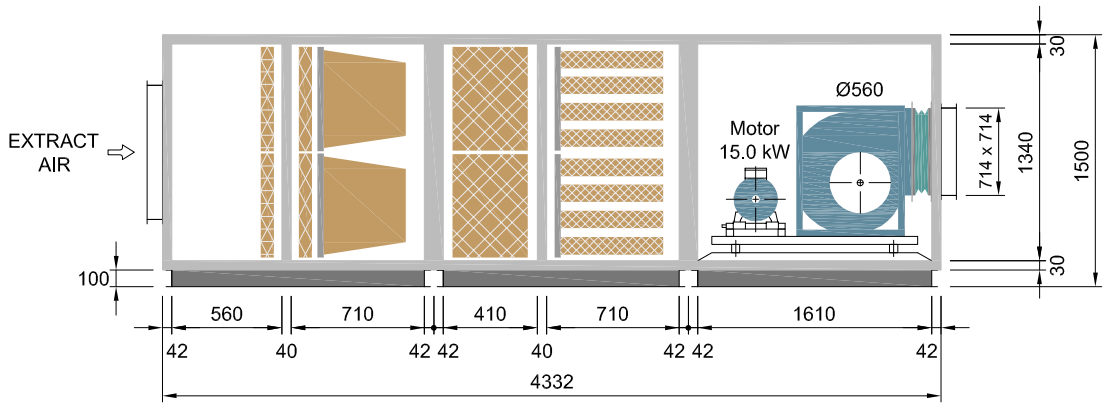

Wt : 111 Kgs

Carbon Filter Section




Wt : 475 / 588 Kgs

**Air Flow Rate**
**12000 cfm / 5663 L/s**

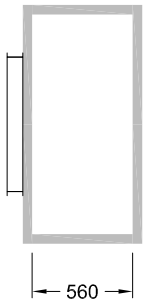



Fan Type : DIDW Backward Curve
External Static Pressure : 750 Pa
Total Static Pressure : 1650 Pa
Fan outlet velocity : 11.11 m/s

Panel Thickness : 25mm
Unit Width : 2300 mm
Internal Width : 2240 mm
Unlt welght : 1750 Kgs

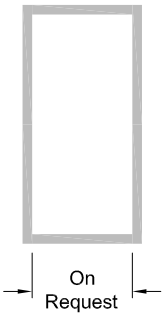
All dimensions are in mm unless otherwise specified

Inlet Sectlon

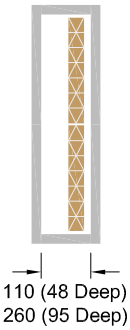



Wt : 140 Kgs

Plenum / Empty Section

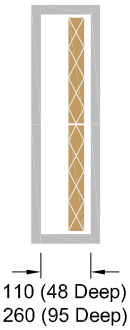



Metallic Panel Filter Section



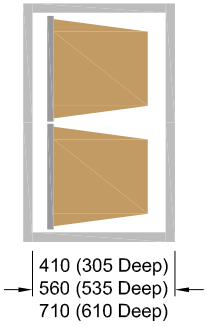

Wt : 46 / 70 Kgs

Synthetlc Panel Filter Section



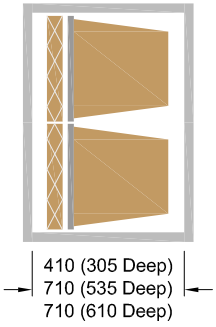

Wt : 41 / 59 Kgs

Bag Filter Section



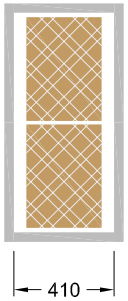

Wt : 71 / 106 / 107 Kgs

Synthetic + Bag Filter Section



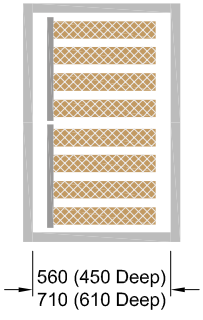

Wt : 94 / 129 / 131 Kgs

Fine / Hepa Filter Section




Wt : 125 Kgs

Carbon Filter Section

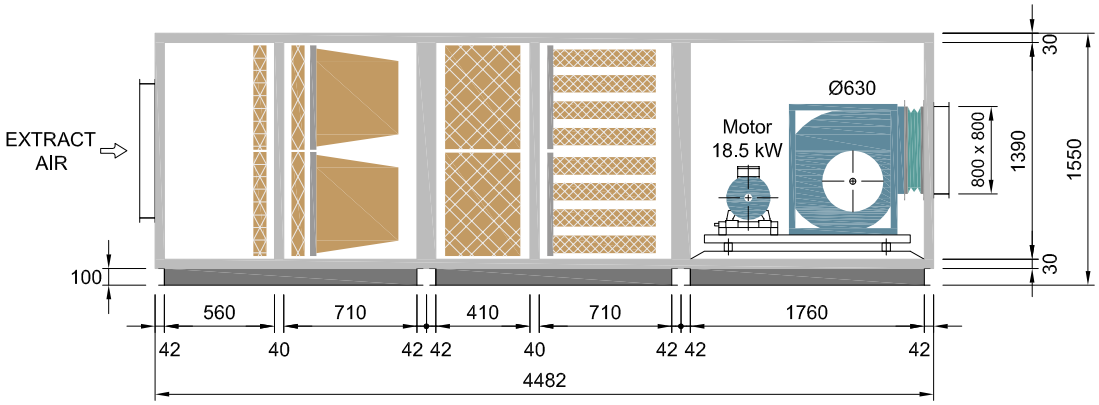



Wt : 548 / 678 Kgs

# Build Charts

Model TAH-2540 / 1390 TEC

**Air Flow Rate**
**14000 cfm / 6607 L/s**

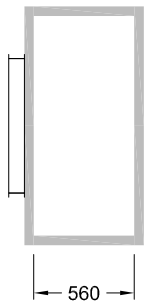



Fan Type : DIDW Backward Curve
External Static Pressure : 750 Pa
Total Static Pressure : 1650 Pa
Fan outlet velocity : 10.33 m/s

Panel Thickness : 25mm
Unit Width : 2600 mm
Internal WIdth : 2540 mm
Unit weight : 2000 Kgs

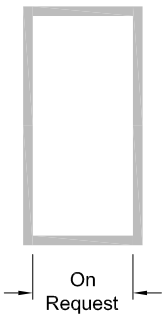
All dimensions are in mm unless otherwise specified

Inlet Section

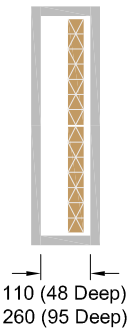



Wt : 155 Kgs

Plenum / Empty Section

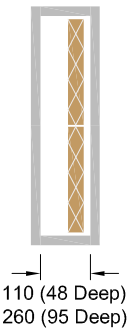



Metallic Panel Filter Section



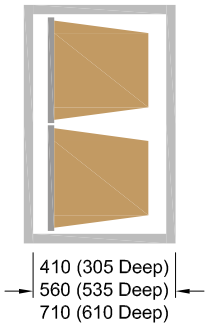

Wt : 51 / 78 Kgs

Synthetic Panel Filter Section



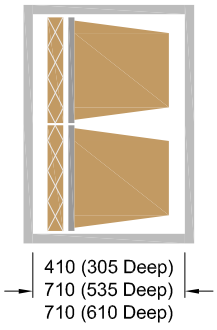

Wt : 45 / 66 Kgs

Bag Filter Section



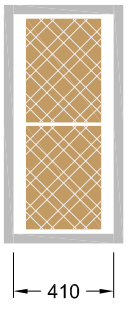

Wt : 78 / 116 / 118 Kgs

Synthetic + Bag Filter Section



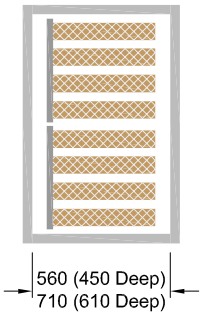

Wt : 105 / 143 / 145 Kgs

Fine / Hepa Filter Section



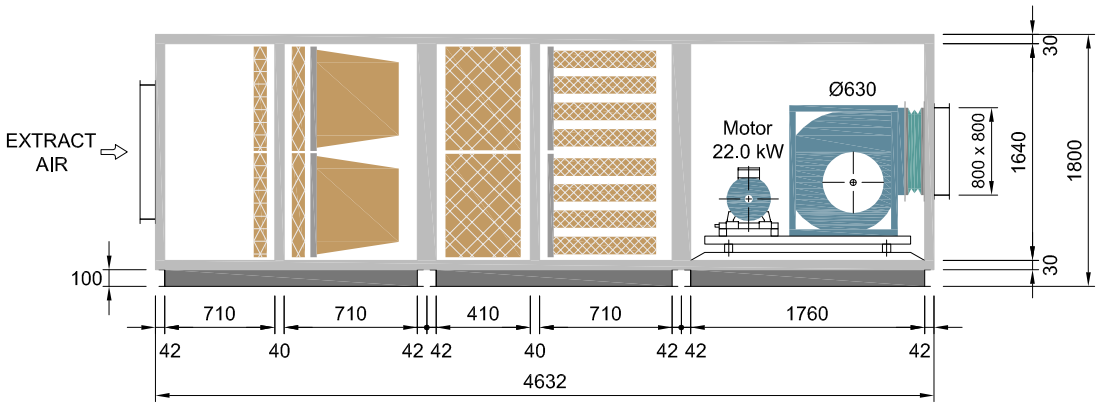

Wt : 139 Kgs

Carbon Filter Section




Wt : 623 / 770 Kgs

**Air Flow Rate**
**16000 cfm / 7551 L/s**

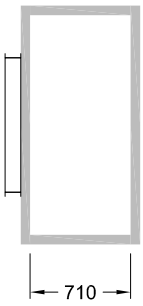



Fan Type : DIDW Backward Curve
External Static Pressure : 750 Pa
Total Static Pressure : 1650 Pa
Fan outlet velocity : 11.80 m/s

Panel Thickness : 25mm
Unit Width : 2600 mm
Internal Width : 2540 mm
Unit weight : 2350 Kgs

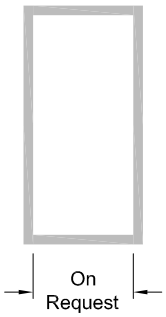
All dimensions are in mm unless otherwise specified

Inlet Section

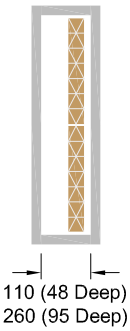



Wt : 190 Kgs

Plenum / Empty Section

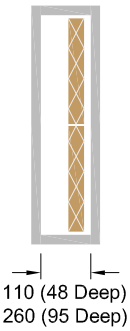



Metallic Panel Filter Section




Wt : 58 / 90 Kgs

Synthetic Panel Filter Section

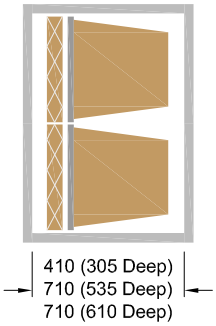



Wt : 50 / 75 Kgs

Bag Filter Section

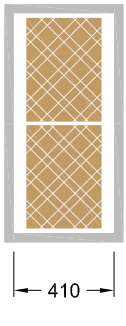

Wt : 84 / 125 / 127 Kgs

Synthetic + Bag Filter Section



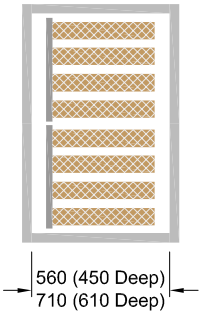

Wt : 118 / 158 / 161 Kgs

Fine / Hepa Filter Section




Wt : 161 Kgs

Carbon Filter Section

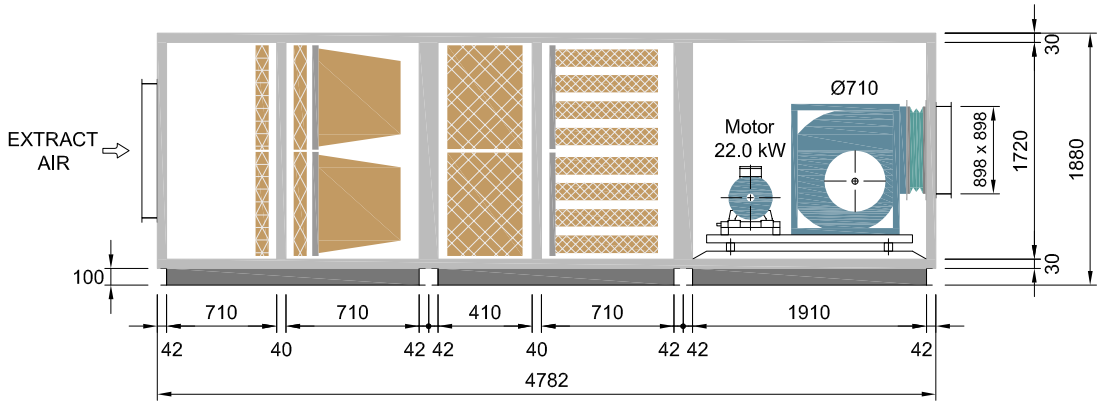



Wt : 762 / 946 Kgs

# Build Charts

Model TAH-2540 / 1720 TEC

**Air Flow Rate**
**18000 cfm / 8495 L/s**

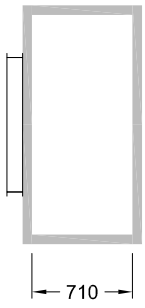



Fan Type : DIDW Backward Curve
External Static Pressure : 750 Pa
Total Static Pressure : 1650 Pa
Fan outlet velocity : 10.54 m/s

Panel Thickness : 25mm
Unit Width : 2600 mm
Internal Width : 2540 mm
Unit weight : 2450 Kgs

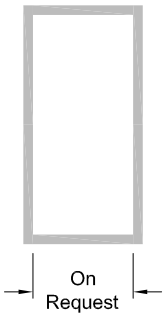
All dimensions are in mm unless otherwise specified

Inlet Section

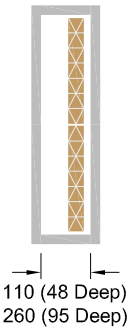



Wt : 195 Kgs

Plenum / Empty Section

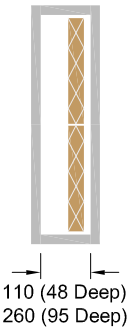



Metallic Panel Filter Section




Wt : 58 / 90 Kgs

Synthetic Panel Filter Section

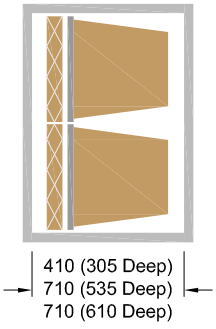



Wt : 50 / 75 Kgs

Bag Filter Section

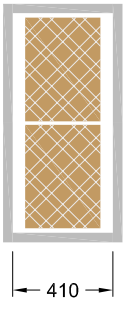

Wt : 84 / 125 / 127 Kgs

Synthetic + Bag Filter Section



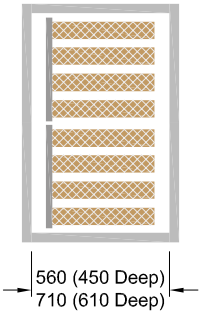

Wt : 118 / 158 / 161 Kgs

Fine / Hepa Filter Section



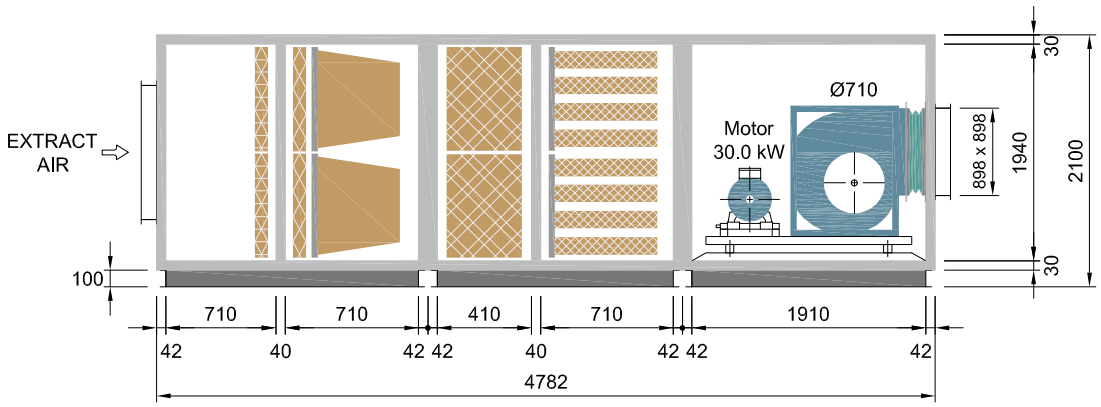

Wt : 161 Kgs

Carbon Filter Section




Wt : 762 / 946 Kgs

**Air Flow Rate**
**20000 cfm / 9438 L/s**

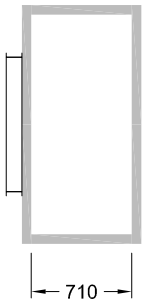



Fan Type : DIDW Backward Curve
External Static Pressure : 750 Pa
Total Static Pressure : 1650 Pa
Fan outlet velocity : 11.72 m/s

Panel Thickness : 25mm
Unit Width : 2600 mm
Internal Width : 2540 mm
Unit weight : 2800 Kgs

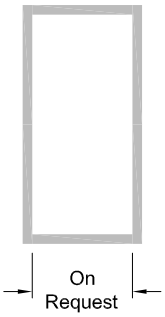
All dimensions are in mm unless otherwise specified

Inlet Section

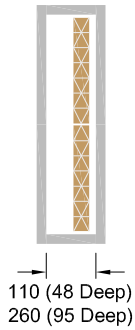



Wt : 215 Kgs

Plenum / Empty Section

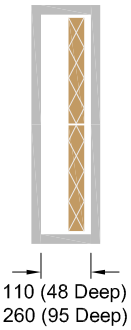



Metallic Panel Filter Section




Wt : 65 / 104 Kgs

Synthetic Panel Filter Section

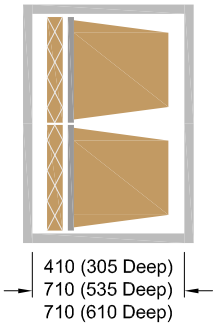



Wt : 56 / 86 Kgs

Bag Filter Section

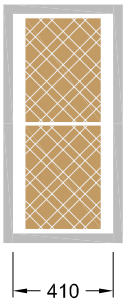

Wt : 91 / 135 / 137 Kgs

Synthetic + Bag Filter Section



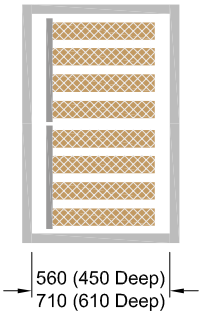

Wt : 132 / 175 / 178 Kgs

Fine / Hepa Filter Section




Wt : 184 Kgs

Carbon Filter Section

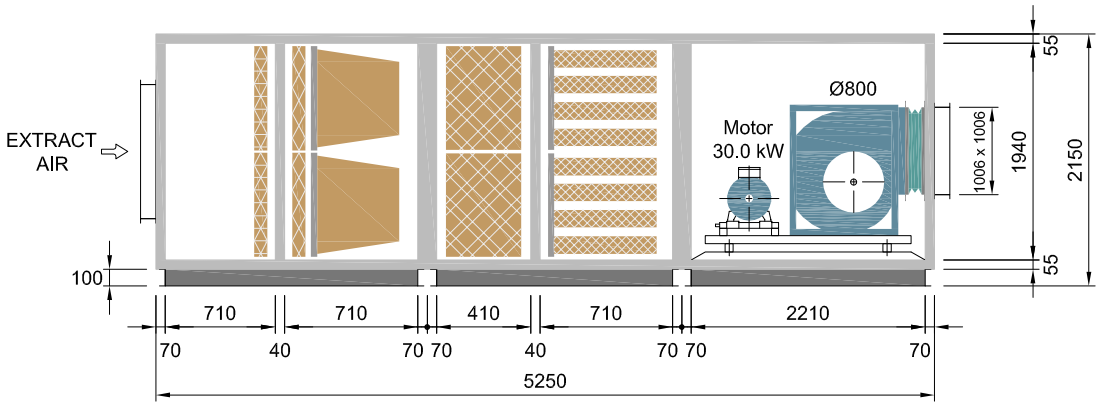



Wt : 902 / 1122 Kgs

# Build Charts

Model TAH-2840 / 1940 TEC

**Air Flow Rate**
**24000 cfm / 11326 L/s**

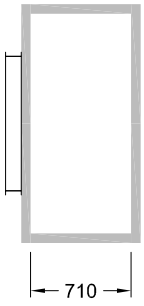



Fan Type : DIDW Backward Curve
External Static Pressure : 750 Pa
Total Static Pressure : 1650 Pa
Fan outlet velocity : 11.20 m/s

Panel Thickness : 50mm
Unit Width : 2950 mm
Internal Width : 2840 mm
Unit weight : 3200 Kgs

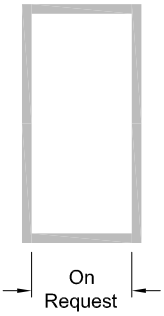
All dimensions are in mm unless otherwise specified

Inlet Section

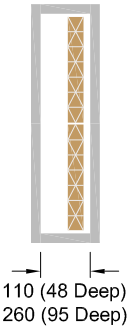



Wt : 250 Kgs

Plenum / Empty Section

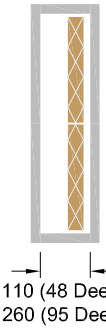



Metallic Panel Filter Section



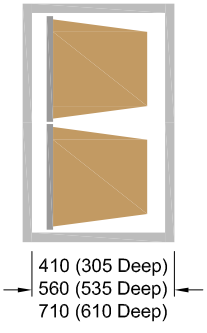

Wt : 72 / 115 Kgs

Synthetic Panel Filter Section



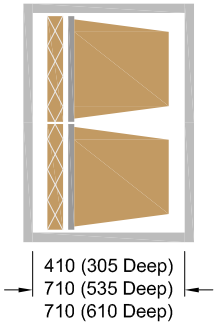

Wt : 62 / 95 Kgs

Bag Filter Section



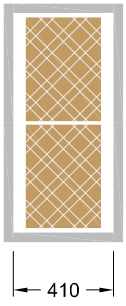

Wt : 102 / 152 / 155 Kgs

Synthetic + Bag Filter Section



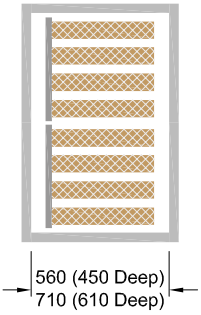

Wt : 148 / 197 / 200 Kgs

Fine / Hepa Filter Section



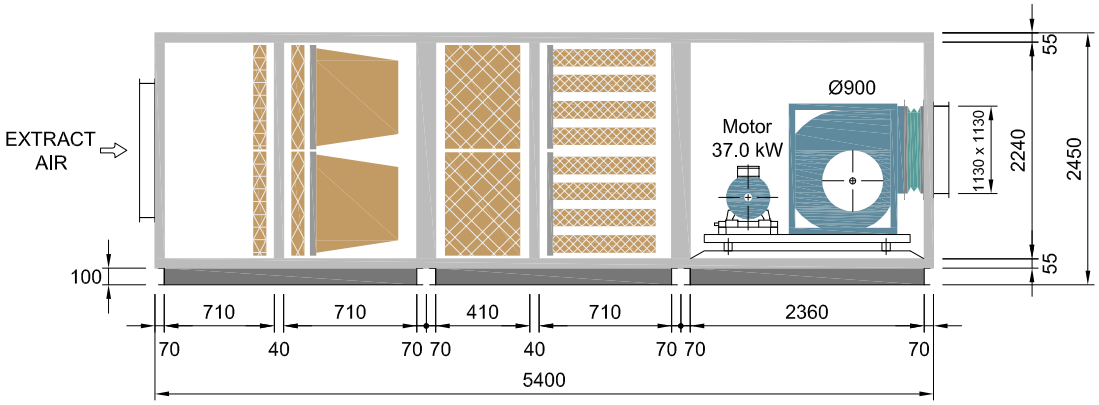

Wt : 206 Kgs

Carbon Filter Section




Wt : 1014 / 1262 Kgs

**Air Flow Rate**
**28000 cfm / 13214 L/s**

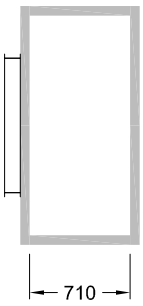



Fan Type : DIDW Backward Curve
External Static Pressure : 750 Pa
Total Static Pressure : 1650 Pa
Fan outlet velocity : 10.35 m/s

Panel Thickness : 50mm
Unit Width : 2950 mm
Internal Width : 2840 mm
Unit weight : 3700 Kgs

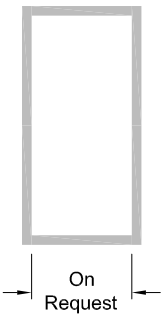
All dimensions are in mm unless otherwise specified

Inlet Section

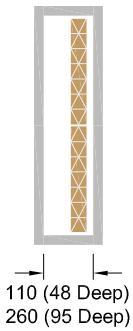



Wt : 275 Kgs

Plenum / Empty Section

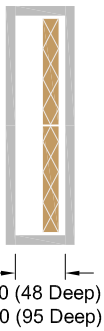



Metallic Panel Filter Section



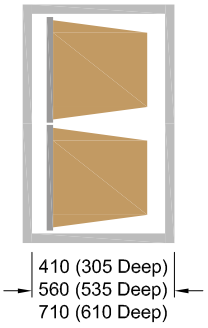

Wt : 80 / 130 Kgs

Synthetic Panel Filter Section



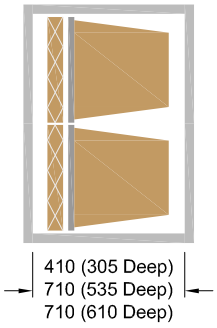

Wt : 68 / 106 Kgs

Bag Filter Section



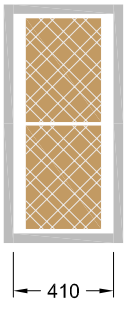

Wt : 110 / 163 / 166 Kgs

Synthetic + Bag Filter Section



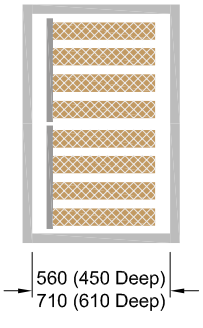

Wt : 163 / 216 / 219 Kgs

Fine / Hepa Filter Section




Wt : 231 Kgs

Carbon Filter Section

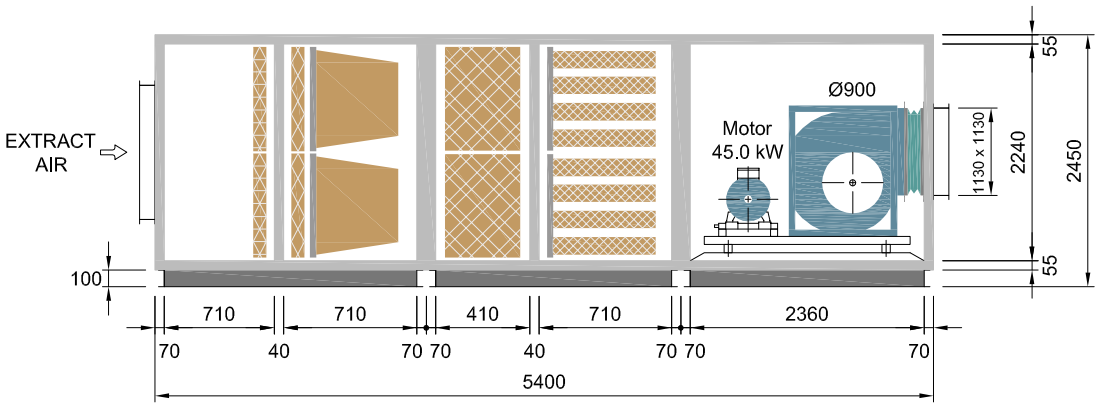



Wt : 1171 / 1460 Kgs

# Build Charts

Model TAH-3140 / 2240 TEC

**Air Flow Rate**
**32000 cfm / 15101 L/s**

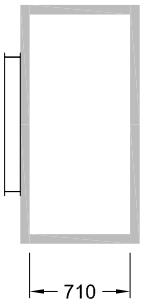



Fan Type : DIDW Backward Curve
External Static Pressure : 750 Pa
Total Static Pressure : 1650 Pa
Fan outlet velocity : 11.83 m/s

Panel Thickness : 50mm
Unit Width : 3250 mm
Internal Width : 3140 mm
Unlt welght : 3900 Kgs

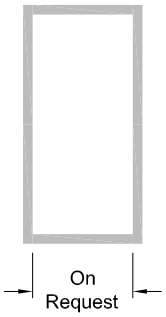
All dimensions are in mm unless otherwise specified

Inlet Section

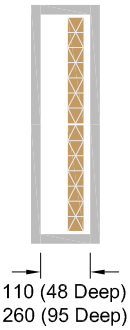



Wt : 295 Kgs

Plenum / Empty Section

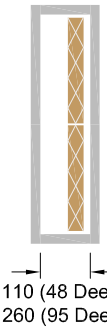



Metallic Panel Filter Section



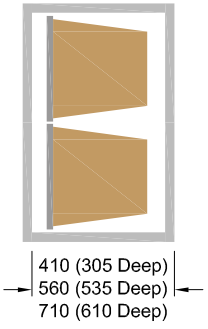

Wt : 87 / 141 Kgs

Synthetlc Panel Filter Section



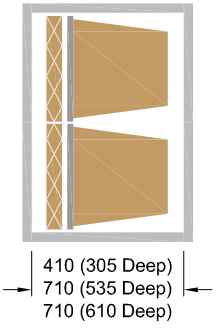

Wt : 73 / 115 Kgs

Bag Filter Section



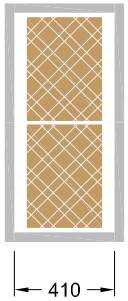

Wt : 117 / 173 / 177 Kgs

Synthetic + Bag Filter Section



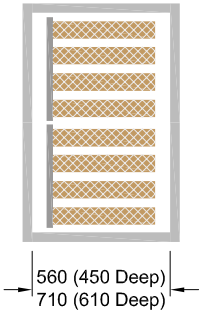

Wt : 176 / 232 / 236 Kgs

Fine / Hepa Filter Section




Wt : 252 Kgs

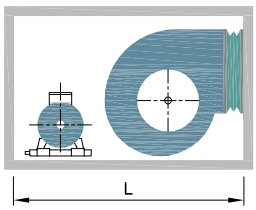
Carbon Filter Section



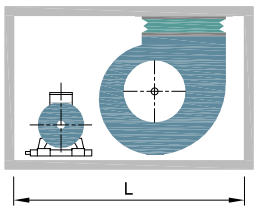

Wt : 1295 / 1615 Kgs

# Fan Orientation

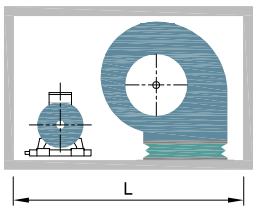
Model TAH - TEC



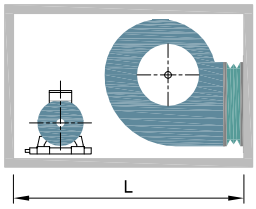
Position - A



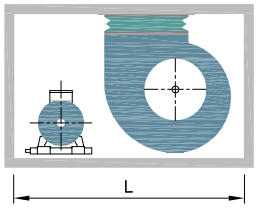
Position - B



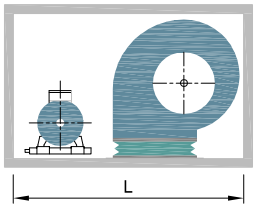
Position - C



Position - D



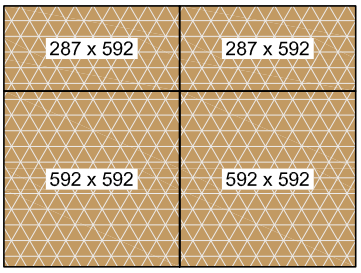
Position - E



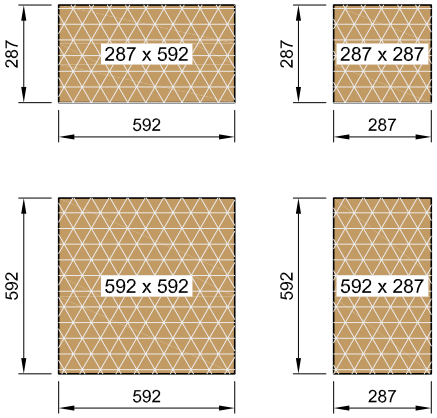
Position - F

| Fan Dia | Position | Motor Frame Sizes | | | | | Fan Outlet | |
|---|---|---|---|---|---|---|---|---|
| | | ≤112 | 132 | 160-180 | 200 | 225 | Height | Width |
| | | Section Length L (mm) | | | | | mm | mm |
| 160 | A - F | 860 | | | | | 205 | 205 |
| 180 | A - F | 860 | | | | | 229 | 229 |
| 200 | A - F | 860 | 1010 | | | | 256 | 256 |
| 225 | A - F | 1010 | 1010 | | | | 288 | 288 |
| 250 | A - F | 1010 | 1010 | | | | 322 | 322 |
| 280 | A - F | 1010 | 1010 | | | | 360 | 360 |
| 315 | A - F | 1160 | 1160 | | | | 404 | 404 |
| 355 | A - F | 1160 | 1160 | | | | 452 | 452 |
| 400 | A, D | 1160 | 1310 | | | | 506 | 506 |
| | B, C, E, F | 1310 | 1310 | | | | | |
| 450 | A, D | 1310 | 1310 | 1460 | | | 568 | 568 |
| | B, C, E, F | 1310 | 1460 | 1610 | | | | |
| 500 | A, D | 1310 | 1460 | 1460 | | | 638 | 638 |
| | B, C, E, F | 1460 | 1610 | 1760 | | | | |
| 560 | A, D | 1460 | 1460 | 1610 | | | 714 | 714 |
| | B, C, E, F | 1610 | 1610 | 1760 | | | | |
| 630 | A, D | 1610 | 1610 | 1760 | | | 800 | 800 |
| | B, C, E, F | 1760 | 1760 | 1910 | | | | |
| 710 | A, D | | 1760 | 1910 | 2060 | 2060 | 898 | 898 |
| | B, C, E, F | | 1910 | 2060 | 2207 | 2210 | | |
| 800 | A, D | | 1910 | 2060 | 2210 | 2210 | 1006 | 1006 |
| | B, C, E, F | | 2060 | 2210 | 2360 | 2360 | | |
| 900 | A, D | | 2060 | 2210 | 2360 | 2360 | 1130 | 1130 |
| | B, C, E, F | | 2210 | 2360 | 2510 | 2510 | | |
| 1000 | A, D | | 2060 | 2210 | 2360 | 2360 | 1266 | 1266 |
| | B, C, E, F | | 2360 | 2510 | 2660 | 2660 | | |
| 1120 | A, D | | 2360 | 2510 | 2660 | 2660 | 1422 | 1422 |
| | B, C, E, F | | 2810 | 2960 | 3110 | 3110 | | |

# Filter Grid




Illustrated Model : TAH-1340 / 1040 TEC




Standard Filter Sizes

| Model | Air Flow Rate | | Filter Grid | | | | Filter Face Area | |
|---|---|---|---|---|---|---|---|---|
| | | | 592 x 592 | 287 x 592 | 592 x 287 | 287 x 287 | | |
| TAH-TEC | cfm | L/s | mm | mm | mm | mm | ft² | m² |
| 1040 / 740 | 2000 | 944 | 1 | | 1 | | 5.60 | 0.52 |
| 1340 / 740 | 3000 | 1416 | 2 | | | | 7.53 | 0.70 |
| 1640 / 770 | 4000 | 1888 | 2 | | 1 | | 9.36 | 0.87 |
| 1340 / 1040 | 5000 | 2360 | 2 | 2 | | | 11.19 | 1.04 |
| 1640 / 1040 | 6000 | 2832 | 2 | 2 | 1 | 1 | 13.90 | 1.29 |
| 1940 / 1040 | 8000 | 3775 | 3 | 3 | | | 16.79 | 1.56 |
| 1940 / 1340 | 10000 | 4719 | 6 | | | | 22.60 | 2.10 |
| 2240 / 1340 | 12000 | 5663 | 6 | | 2 | | 26.25 | 2.44 |
| 2540 / 1390 | 14000 | 6607 | 8 | | | | 30.13 | 2.80 |
| 2540 / 1640 | 16000 | 7551 | 8 | 4 | | | 37.44 | 3.48 |
| 2540 / 1720 | 18000 | 8495 | 8 | 4 | | | 37.44 | 3.48 |
| 2540 / 1940 | 20000 | 9438 | 9 | | | | 33.89 | 3.15 |
| 2840 / 1940 | 24000 | 11326 | 12 | | 3 | | 50.68 | 4.71 |
| 2840 / 2240 | 28000 | 13214 | 12 | 4 | 3 | 1 | 58.88 | 5.47 |
| 3140 / 2240 | 32000 | 15101 | 15 | 5 | | | 65.64 | 6.10 |

# Motor Ratings

## EFF2 / 2 Pole

**3 Ph / 380-415 V / 50 Hz**

| Output | | Frame Size | Full Load | | | Efficiency (%) | | | Wire Size mm² x No of Wires |
|---|---|---|---|---|---|---|---|---|---|
| kW | hp | | rpm | Amps | PF | FL | 3/4 Load | 1/2 Load | |
| 0.37 | 0.5 | 71 | 2820 | 0.95 | 0.79 | 68.0 | 67.0 | 63.0 | 2.5 x 3 |
| 0.55 | 0.75 | 80 | 2820 | 1.3 | 0.81 | 73.0 | 72.0 | 68.0 | 2.5 x 3 |
| 0.75 | 1 | 80 | 2820 | 1.65 | 0.81 | 77.0 | 76.0 | 74.0 | 2.5 x 3 |
| 1.1 | 1.5 | 80 | 2820 | 2.35 | 0.82 | 79.0 | 78.0 | 76.0 | 2.5 x 3 |
| 1.5 | 2 | 90S | 2830 | 3.2 | 0.82 | 80.0 | 79.0 | 77.0 | 2.5 x 3 |
| 2.2 | 3 | 90L | 2830 | 4.6 | 0.82 | 81.0 | 80.0 | 78.0 | 4.0 x 3 |
| 3 | 4 | 100L | 2865 | 6.0 | 0.85 | 82.0 | 81.0 | 78.0 | 4.0 x 3 |
| 4 | 5.5 | 112M | 2865 | 7.5 | 0.88 | 83.0 | 82.0 | 79.0 | 4.0 x 3 |
| 5.5 | 7.5 | 112M | 2880 | 10.1 | 0.89 | 85.0 | 84.0 | 82.0 | 2.5 x 6 |
| 7.5 | 10 | 132S | 2890 | 13.8 | 0.89 | 85.0 | 84.0 | 82.0 | 4.0 x 6 |
| 11 | 15 | 160M | 2920 | 20.0 | 0.88 | 88.0 | 88.0 | 86.0 | 4.0 x 6 |
| 15 | 20 | 160M | 2920 | 26.0 | 0.88 | 89.5 | 89.5 | 87.5 | 6.0 x 6 |
| 18.5 | 25 | 160L | 2920 | 32.0 | 0.88 | 90.0 | 90.0 | 88.0 | 6.0 x 6 |
| 22 | 30 | 180M | 2930 | 41.0 | 0.83 | 91.0 | 91.0 | 89.0 | 10.0 x 6 |
| 30 | 40 | 200L | 2950 | 51.0 | 0.90 | 91.5 | 91.5 | 90.0 | 10.0 x 6 |
| 37 | 50 | 200L | 2950 | 62.0 | 0.90 | 92.0 | 92.0 | 90.0 | 10.0 x 6 |
| 45 | 60 | 225M | 2955 | 72.0 | 0.94 | 92.0 | 92.0 | 90.0 | 10.0 x 6 |
| 55 | 75 | 250M | 2955 | 88.0 | 0.94 | 92.5 | 92.5 | 90.5 | 10.0 x 6 |

## EFF2 / 4 Pole

**3 Ph / 380-415 V / 50 Hz**

| Output | | Frame Size | Full Load | | | Efficiency (%) | | | Wire Size mm² x No of Wires |
|---|---|---|---|---|---|---|---|---|---|
| kW | hp | | rpm | Amps | PF | FL | 3/4 Load | 1/2 Load | |
| 0.37 | 0.5 | 71 | 1400 | 0.9 | 0.76 | 77.0 | 76.0 | 74.0 | 2.5 x 3 |
| 0.55 | 0.75 | 80 | 1410 | 1.25 | 0.78 | 77.0 | 76.0 | 74.0 | 2.5 x 3 |
| 0.75 | 1 | 80 | 1410 | 1.75 | 0.78 | 77.0 | 76.0 | 74.0 | 2.5 x 3 |
| 1.1 | 1.5 | 90S | 1415 | 2.5 | 0.78 | 78.0 | 76.0 | 74.0 | 2.5 x 3 |
| 1.5 | 2 | 90L | 1415 | 3.2 | 0.81 | 80.0 | 79.0 | 77.0 | 2.5 x 3 |
| 2.2 | 3 | 100L | 1440 | 4.6 | 0.82 | 82.0 | 81.0 | 79.0 | 4.0 x 3 |
| 3 | 4 | 100L | 1425 | 6.4 | 0.82 | 81.0 | 80.0 | 78.0 | 4.0 x 3 |
| 4 | 5.5 | 112M | 1430 | 8.5 | 0.81 | 85.0 | 84.0 | 81.0 | 4.0 x 3 |
| 5.5 | 7.5 | 132S | 1450 | 10.1 | 0.88 | 86.0 | 85.0 | 83.0 | 2.5 x 6 |
| 7.5 | 10 | 132M | 1455 | 13.6 | 0.88 | 87.0 | 86.0 | 84.0 | 4.0 x 6 |
| 11 | 15 | 160M | 1460 | 21.0 | 0.82 | 89.0 | 89.0 | 86.0 | 4.0 x 6 |
| 15 | 20 | 160L | 1460 | 27.0 | 0.85 | 90.0 | 90.0 | 88.0 | 6.0 x 6 |
| 18.5 | 25 | 180M | 1475 | 33.0 | 0.84 | 92.0 | 92.0 | 90.0 | 6.0 x 6 |
| 22 | 30 | 180L | 1475 | 40.0 | 0.84 | 92.0 | 92.0 | 90.0 | 10.0 x 6 |
| 30 | 40 | 200L | 1475 | 51.0 | 0.89 | 92.0 | 92.0 | 90.2 | 10.0 x 6 |
| 37 | 50 | 225S | 1480 | 63.0 | 0.89 | 92.5 | 92.5 | 91.6 | 10.0 x 6 |
| 45 | 60 | 225M | 1480 | 76.0 | 0.89 | 93.0 | 93.0 | 91.5 | 10.0 x 6 |
| 55 | 75 | 250M | 1475 | 92.0 | 0.89 | 93.5 | 93.5 | 92.0 | 10.0 x 6 |

Notes : Details shall vary with different motor manufacturers
Wire sizes shall vary for lengths beyond 50 metres

# Motor Ratings

## EFF2 / 6 Pole

**3 Ph / 380-415 V / 50 Hz**

| Output | | Frame Size | Full Load | | | Efficiency (%) | | | Wire Size mm² x No of Wires |
|---|---|---|---|---|---|---|---|---|---|
| kW | hp | | rpm | Amps | PF | FL | 3/4 Load | 1/2 Load | |
| 0.37 | 0.5 | 80 | 910 | 1.05 | 0.71 | 69.0 | 68.0 | 66.0 | 2.5 x 3 |
| 0.55 | 0.75 | 80 | 910 | 1.55 | 0.71 | 69.0 | 68.0 | 66.0 | 2.5 x 3 |
| 0.75 | 1 | 90S | 935 | 2.0 | 0.72 | 73.0 | 71.0 | 69.0 | 2.5 x 3 |
| 1.1 | 1.5 | 90L | 935 | 2.85 | 0.72 | 74.0 | 73.0 | 70.0 | 2.5 x 3 |
| 1.5 | 2 | 100L | 935 | 3.8 | 0.72 | 76.0 | 75.0 | 73.0 | 2.5 x 3 |
| 2.2 | 3 | 112M | 935 | 5.3 | 0.75 | 77.0 | 76.0 | 73.0 | 4.0 x 3 |
| 3 | 4 | 132S | 940 | 6.5 | 0.79 | 84.0 | 83.0 | 80.0 | 4.0 x 3 |
| 4 | 5.5 | 132M | 945 | 8.5 | 0.79 | 84.0 | 83.0 | 80.0 | 4.0 x 3 |
| 5.5 | 7.5 | 132M | 950 | 11.3 | 0.80 | 85.0 | 84.0 | 82.0 | 2.5 x 6 |
| 7.5 | 10 | 160M | 975 | 15.0 | 0.80 | 87.5 | 87.0 | 85.0 | 4.0 x 6 |
| 11 | 15 | 160L | 975 | 22.0 | 0.80 | 88.0 | 87.5 | 86.0 | 4.0 x 6 |
| 15 | 20 | 180L | 975 | 29.0 | 0.79 | 90.0 | 90.0 | 88.0 | 6.0 x 6 |
| 18.5 | 25 | 200L | 975 | 34.0 | 0.84 | 91.1 | 91.1 | 89.9 | 6.0 x 6 |
| 22 | 30 | 200L | 975 | 40.0 | 0.84 | 91.5 | 91.5 | 90.1 | 10.0 x 6 |
| 30 | 40 | 225M | 980 | 53.0 | 0.85 | 92.0 | 92.0 | 90.5 | 10.0 x 6 |
| 37 | 50 | 250M | 980 | 66.0 | 0.84 | 93.0 | 93.0 | 92.0 | 10.0 x 6 |
| 45 | 60 | 280S | 980 | 79.0 | 0.85 | 93.0 | 93.0 | 91.9 | 10.0 x 6 |
| 55 | 75 | 280M | 980 | 95.0 | 0.86 | 93.5 | 93.5 | 92.5 | 10.0 x 6 |

## EFF2 / 8 Pole

**3 Ph / 380-415 V / 50 Hz**

| Output | | Frame Size | Full Load | | | Efficiency (%) | | | Wire Size mm² x No of Wires |
|---|---|---|---|---|---|---|---|---|---|
| kW | hp | | rpm | Amps | PF | FL | 3/4 Load | 1/2 Load | |
| 0.37 | 0.5 | 90S | 680 | 1.4 | 0.57 | 65.0 | 64.0 | 60.0 | 2.5 x 3 |
| 0.55 | 0.75 | 90L | 680 | 1.75 | 0.63 | 69.0 | 68.0 | 64.0 | 2.5 x 3 |
| 0.75 | 1 | 100L | 700 | 2.55 | 0.58 | 70.0 | 69.0 | 64.0 | 2.5 x 3 |
| 1.1 | 1.5 | 100L | 700 | 3.3 | 0.63 | 72.5 | 71.0 | 68.0 | 2.5 x 3 |
| 1.5 | 2 | 112M | 700 | 4 | 0.68 | 77.0 | 77.0 | 75.0 | 2.5 x 3 |
| 2.2 | 3 | 132S | 710 | 5.4 | 0.73 | 77.5 | 76.5 | 73.0 | 4.0 x 3 |
| 3 | 4 | 132M | 700 | 7.6 | 0.70 | 78.0 | 75.0 | 70.0 | 4.0 x 3 |
| 4 | 5.5 | 160M | 710 | 8 | 0.74 | 83.0 | 83.0 | 81.0 | 4.0 x 3 |
| 5.5 | 7.5 | 160M | 710 | 12 | 0.74 | 85.0 | 85.0 | 83.0 | 2.5 x 6 |
| 7.5 | 10 | 160L | 710 | 16 | 0.76 | 85.0 | 85.0 | 83.0 | 4.0 x 6 |
| 11 | 15 | 180L | 720 | 24 | 0.74 | 87.0 | 87.0 | 85.0 | 4.0 x 6 |
| 15 | 20 | 200L | 725 | 33 | 0.71 | 88.5 | 88.5 | 86.5 | 6.0 x 6 |
| 18.5 | 25 | 225S | 725 | 39 | 0.75 | 89.0 | 89.0 | 87.0 | 6.0 x 6 |
| 22 | 30 | 225M | 725 | 46 | 0.75 | 89.0 | 89.0 | 87.0 | 10.0 x 6 |
| 30 | 40 | 250M | 735 | 61 | 0.75 | 90.5 | 90.5 | 88.5 | 10.0 x 6 |
| 37 | 50 | 280S | 735 | 75 | 0.75 | 91.5 | 91.5 | 89.5 | 10.0 x 6 |
| 45 | 60 | 280M | 725 | 91 | 0.75 | 92.0 | 92.0 | 90.5 | 10.0 x 6 |
| 55 | 75 | 315S | 740 | 113 | 0.73 | 93.0 | 93.0 | 91.5 | 10.0 x 6 |

Notes : Details shall vary with different motor manufacturers
Wire sizes shall vary for lengths beyond 50 metres

# Motor Ratings

## EFF1 / 2 Pole

**3 Ph / 380-415 V / 50 Hz**

| Output | | Frame Size | Full Load | | | Efficiency (%) | | | Wire Size mm² x No of Wires |
|---|---|---|---|---|---|---|---|---|---|
| kW | hp | | rpm | Amps | PF | FL | 3/4 Load | 1/2 Load | |
| 0.75 | 1 | 80 | 2820 | 1.67 | 0.81 | 77.0 | 75.0 | 70.0 | 2.5 x 3 |
| 1.1 | 1.5 | 80 | 2820 | 2.28 | 0.81 | 82.8 | 81.5 | 78.0 | 2.5 x 3 |
| 1.5 | 2 | 90S | 2830 | 3.10 | 0.80 | 84.1 | 83.5 | 82.0 | 2.5 x 3 |
| 2.2 | 3 | 90L | 2860 | 4.36 | 0.82 | 85.6 | 85.0 | 83.0 | 4.0 x 3 |
| 3.7 | 5 | 100L | 2850 | 7.10 | 0.83 | 87.5 | 86.0 | 83.0 | 4.0 x 3 |
| 5.5 | 7.5 | 132S | 2865 | 10.2 | 0.85 | 88.6 | 88.0 | 86.0 | 2.5 x 6 |
| 7.5 | 10 | 132S | 2865 | 13.6 | 0.86 | 89.5 | 88.0 | 86.0 | 4.0 x 6 |
| 11 | 15 | 160M | 2925 | 19.0 | 0.90 | 90.5 | 90.5 | 88.0 | 4.0 x 6 |
| 15 | 20 | 160M | 2920 | 26.0 | 0.88 | 91.3 | 91.3 | 89.0 | 6.0 x 6 |
| 18.5 | 25 | 160L | 2920 | 32.0 | 0.88 | 91.8 | 91.8 | 89.0 | 6.0 x 6 |
| 22 | 30 | 180M | 2940 | 40.0 | 0.84 | 92.2 | 92.2 | 90.2 | 10.0 x 6 |
| 30 | 40 | 200L | 2950 | 52.0 | 0.87 | 92.9 | 92.9 | 90.9 | 10.0 x 6 |
| 37 | 50 | 200L | 2955 | 63.0 | 0.87 | 93.3 | 93.3 | 91.0 | 10.0 x 6 |
| 45 | 60 | 225M | 2960 | 73.0 | 0.92 | 93.7 | 93.7 | 91.7 | 10.0 x 6 |
| 55 | 75 | 250M | 2960 | 87.0 | 0.94 | 94.0 | 94.0 | 92.0 | 10.0 x 6 |

## EFF1 / 4 Pole

**3 Ph / 380-415 V / 50 Hz**

| Output | | Frame Size | Full Load | | | Efficiency (%) | | | Wire Size mm² x No of Wires |
|---|---|---|---|---|---|---|---|---|---|
| kW | hp | | rpm | Amps | PF | FL | 3/4 Load | 1/2 Load | |
| 0.55 | 0.75 | 80 | 1410 | 1.38 | 0.71 | 78.0 | 76.0 | 73.0 | 2.5 x 3 |
| 0.75 | 1 | 80 | 1410 | 1.69 | 0.75 | 82.5 | 81.0 | 75.0 | 2.5 x 3 |
| 1.1 | 1.5 | 90S | 1425 | 2.40 | 0.76 | 83.8 | 83.0 | 80.0 | 2.5 x 3 |
| 1.5 | 2 | 90L | 1425 | 3.23 | 0.76 | 85.0 | 84.0 | 82.0 | 2.5 x 3 |
| 2.2 | 3 | 100L | 1440 | 4.92 | 0.72 | 86.4 | 85.0 | 82.0 | 4.0 x 3 |
| 3.7 | 5 | 112M | 1440 | 7.3 | 0.80 | 88.3 | 87.0 | 86.0 | 4.0 x 3 |
| 5.5 | 7.5 | 132S | 1445 | 10.7 | 0.80 | 89.2 | 88.0 | 86.0 | 2.5 x 6 |
| 7.5 | 10 | 132M | 1445 | 14.1 | 0.82 | 90.1 | 89.0 | 87.0 | 4.0 x 6 |
| 11 | 15 | 160M | 1470 | 20.0 | 0.85 | 91.0 | 91.0 | 89.0 | 4.0 x 6 |
| 18.5 | 25 | 180M | 1475 | 33.0 | 0.85 | 92.2 | 92.2 | 90.2 | 6.0 x 6 |
| 22 | 30 | 180L | 1475 | 39.0 | 0.85 | 92.6 | 92.6 | 90.6 | 10.0 x 6 |
| 30 | 40 | 200L | 1470 | 51.0 | 0.88 | 93.2 | 93.2 | 91.2 | 10.0 x 6 |
| 37 | 50 | 225S | 1475 | 68.0 | 0.81 | 93.6 | 93.6 | 91.0 | 10.0 x 6 |
| 45 | 60 | 225M | 1475 | 81.0 | 0.82 | 93.9 | 93.9 | 92.0 | 10.0 x 6 |
| 55 | 75 | 250M | 1485 | 92.0 | 0.88 | 94.2 | 94.2 | 92.2 | 10.0 x 6 |

Notes : Details shall vary with different motor manufacturers
Wire sizes shall vary for lengths beyond 50 metres

# Motor Ratings

## EFF1 / 6 Pole

**3 Ph / 380-415 V / 50 Hz**

| Output | | Frame Size | Full Load | | | Efficiency (%) | | | Wire Size mm² x No of Wires |
|---|---|---|---|---|---|---|---|---|---|
| kW | hp | | rpm | Amps | PF | FL | 3/4 Load | 1/2 Load | |
| 0.55 | 0.75 | 80 | 910 | 1.56 | 0.68 | 72.0 | 70.0 | 65.0 | 2.5 x 3 |
| 0.75 | 1 | 90S | 935 | 2.19 | 0.64 | 74.6 | 73.0 | 70.0 | 2.5 x 3 |
| 1.1 | 1.5 | 90L | 935 | 3.19 | 0.62 | 77.3 | 76.5 | 74.0 | 2.5 x 3 |
| 1.5 | 2 | 100L | 935 | 3.75 | 0.70 | 79.6 | 78.0 | 76.0 | 2.5 x 3 |
| 2.2 | 3 | 112M | 935 | 5.48 | 0.68 | 82.2 | 81.0 | 79.0 | 4.0 x 3 |
| 3.7 | 5 | 132S | 940 | 7.9 | 0.77 | 85.1 | 84.5 | 83.0 | 4.0 x 3 |
| 7.5 | 10 | 160M | 970 | 15.0 | 0.80 | 88.1 | 88.1 | 86.1 | 4.0 x 6 |
| 11 | 15 | 160L | 975 | 21.0 | 0.80 | 89.7 | 89.7 | 86.0 | 4.0 x 6 |
| 15 | 20 | 180L | 975 | 29.0 | 0.79 | 90.5 | 90.5 | 88.5 | 6.0 x 6 |
| 18.5 | 25 | 200L | 975 | 34.0 | 0.84 | 91.3 | 91.3 | 89.3 | 6.0 x 6 |
| 22 | 30 | 200L | 975 | 40.0 | 0.84 | 91.8 | 91.8 | 89.8 | 10.0 x 6 |
| 30 | 40 | 225M | 980 | 53.0 | 0.85 | 92.6 | 92.6 | 90.6 | 10.0 x 6 |
| 37 | 50 | 250M | 980 | 66.0 | 0.84 | 93.0 | 93.0 | 91.5 | 10.0 x 6 |
| 45 | 60 | 280S | 980 | 79.0 | 0.85 | 93.4 | 93.4 | 91.4 | 10.0 x 6 |
| 55 | 75 | 280M | 980 | 101.0 | 0.81 | 93.8 | 93.8 | 91.8 | 10.0 x 6 |

## EFF1 / 8 Pole

**3 Ph / 380-415 V / 50 Hz**

| Output | | Frame Size | Full Load | | | Efficiency (%) | | | Wire Size mm² x No of Wires |
|---|---|---|---|---|---|---|---|---|---|
| kW | hp | | rpm | Amps | PF | FL | 3/4 Load | 1/2 Load | |
| 3.7 | 5 | 160M | 710 | 8.0 | 0.74 | 83.0 | 83.0 | 81.0 | 4.0 x 3 |
| 5.5 | 7.5 | 160M | 710 | 12.0 | 0.74 | 85.1 | 85.1 | 83.1 | 2.5 x 6 |
| 7.5 | 10 | 160L | 710 | 16.0 | 0.76 | 86.4 | 86.4 | 84.4 | 4.0 x 6 |
| 11 | 15 | 180L | 720 | 24.0 | 0.74 | 88.1 | 88.1 | 86.1 | 4.0 x 6 |
| 15 | 20 | 200L | 725 | 33.0 | 0.71 | 89.0 | 89.0 | 87.0 | 6.0 x 6 |
| 18.5 | 25 | 225S | 730 | 38.0 | 0.75 | 89.8 | 89.8 | 87.8 | 6.0 x 6 |
| 22 | 30 | 225M | 730 | 45.0 | 0.75 | 90.2 | 90.2 | 88.0 | 10.0 x 6 |
| 30 | 40 | 250M | 735 | 61.0 | 0.75 | 91.5 | 91.5 | 89.5 | 10.0 x 6 |
| 37 | 50 | 280S | 735 | 75.0 | 0.75 | 91.9 | 91.9 | 89.9 | 10.0 x 6 |
| 45 | 60 | 280M | 725 | 90.0 | 0.75 | 92.4 | 92.4 | 90.4 | 10.0 x 6 |
| 55 | 75 | 315S | 742 | 116.0 | 0.71 | 92.8 | 92.8 | 90.0 | 10.0 x 6 |

Notes : Details shall vary with different motor manufacturers
Wire sizes shall vary for lengths beyond 50 metres

# Motor Ratings

## EFF2 / 2 Pole

**3 Ph / 380-440 V / 60 Hz**

| Output | | Frame Size | Full Load | | | Efficiency (%) | | | Wire Size mm² x No of Wires |
|---|---|---|---|---|---|---|---|---|---|
| kW | hp | | rpm | Amps | PF | FL | 3/4 Load | 1/2 Load | |
| 0.37 | 0.5 | 63 | 3240 | 1.15 | 0.79 | 68.0 | 67.0 | 63.0 | 2.5 x 3 |
| 0.55 | 0.75 | 71 | 3380 | 1.73 | 0.79 | 67.0 | 66.0 | 62.0 | 2.5 x 3 |
| 0.75 | 1 | 71 | 3380 | 2.19 | 0.79 | 68.0 | 67.0 | 63.0 | 2.5 x 3 |
| 1.1 | 1.5 | 80 | 3385 | 3.17 | 0.82 | 79.0 | 78.0 | 76.0 | 2.5 x 3 |
| 1.5 | 2 | 80 | 3385 | 4.04 | 0.82 | 79.0 | 78.0 | 76.0 | 2.5 x 3 |
| 2.2 | 3 | 90S | 3395 | 6.06 | 0.82 | 80.0 | 79.0 | 77.0 | 4.0 x 3 |
| 3 | 4 | 90L | 3395 | 7.79 | 0.82 | 81.0 | 80.0 | 78.0 | 4.0 x 3 |
| 4.4 | 6.0 | 112M | 3450 | 8.94 | 0.89 | 84.0 | 83.0 | 81.0 | 4.0 x 3 |
| 5.5 | 7.5 | 112M | 3450 | 12.12 | 0.89 | 85.0 | 84.0 | 82.0 | 2.5 x 6 |
| 7.5 | 10 | 132S | 3470 | 16.73 | 0.89 | 85.0 | 84.0 | 82.0 | 4.0 x 6 |
| 11 | 15 | 132M | 3465 | 23.66 | 0.89 | 87.0 | 86.0 | 84.0 | 4.0 x 6 |
| 15 | 18.5 | 160M | 3520 | 32.31 | 0.88 | 89.5 | 89.5 | 87.5 | 6.0 x 6 |
| 18.5 | 25 | 160M | 3520 | 39.24 | 0.88 | 89.5 | 89.5 | 87.5 | 6.0 x 6 |
| 22 | 30 | 180L | 3510 | 43.28 | 0.88 | 90.0 | 90.0 | 88.0 | 10.0 x 6 |
| 30 | 40 | 200L | 3540 | 59.43 | 0.90 | 91.5 | 91.5 | 90.0 | 10.0 x 6 |
| 37 | 50 | 200L | 3540 | 71.55 | 0.90 | 92.5 | 92.5 | 91.6 | 10.0 x 6 |
| 45 | 60 | 225M | 3545 | 87.13 | 0.94 | 92.5 | 92.5 | 91.5 | 10.0 x 6 |
| 55 | 75 | 225M | 3545 | 106.75 | 0.94 | 92.5 | 92.0 | 90.5 | 10.0 x 6 |

## EFF2 / 4 Pole

**3 Ph / 380-440 V / 60 Hz**

| Output | | Frame Size | Full Load | | | Efficiency (%) | | | Wire Size mm² x No of Wires |
|---|---|---|---|---|---|---|---|---|---|
| kW | hp | | rpm | Amps | PF | FL | 3/4 Load | 1/2 Load | |
| 0.37 | 0.5 | 71 | 1680 | 0.98 | 0.76 | 77.0 | 76.0 | 74.0 | 2.5 x 3 |
| 0.55 | 0.75 | 71 | 1680 | 1.44 | 0.76 | 77.0 | 76.0 | 74.0 | 2.5 x 3 |
| 0.75 | 1 | 80 | 1690 | 1.90 | 0.78 | 77.0 | 76.0 | 74.0 | 2.5 x 3 |
| 1.1 | 1.5 | 80 | 1690 | 2.89 | 0.78 | 77.0 | 76.0 | 74.0 | 2.5 x 3 |
| 1.5 | 2 | 90S | 1700 | 3.46 | 0.81 | 80.0 | 79.0 | 77.0 | 2.5 x 3 |
| 2.2 | 3 | 90L | 1700 | 5.19 | 0.81 | 80.0 | 79.0 | 77.0 | 4.0 x 3 |
| 3 | 4 | 100L | 1725 | 6.92 | 0.82 | 82.0 | 81.0 | 79.0 | 4.0 x 3 |
| 4.4 | 6.0 | 112M | 1725 | 9.81 | 0.81 | 83.0 | 82.0 | 80.0 | 4.0 x 3 |
| 5.5 | 7.5 | 112M | 1725 | 12.12 | 0.81 | 84.0 | 83.0 | 81.0 | 2.5 x 6 |
| 7.5 | 10 | 132S | 1745 | 15.00 | 0.88 | 87.0 | 86.0 | 84.0 | 4.0 x 6 |
| 11 | 18.5 | 132M | 1745 | 21.93 | 0.88 | 87.0 | 86.0 | 84.0 | 4.0 x 6 |
| 15 | 20 | 160M | 1750 | 30.00 | 0.85 | 89.0 | 89.0 | 86.0 | 6.0 x 6 |
| 18.5 | 25 | 160L | 1760 | 36.35 | 0.86 | 90.0 | 90.0 | 88.0 | 6.0 x 6 |
| 22 | 30 | 180M | 1770 | 45.01 | 0.82 | 90.5 | 90.5 | 88.0 | 10.0 x 6 |
| 30 | 40 | 200M | 1770 | 55.39 | 0.89 | 92.0 | 92.0 | 90.2 | 10.0 x 6 |
| 37 | 50 | 200L | 1770 | 68.66 | 0.89 | 92.0 | 92.0 | 90.0 | 10.0 x 6 |
| 45 | 60 | 225M | 1725 | 82.51 | 0.89 | 93.0 | 93.0 | 91.5 | 10.0 x 6 |
| 55 | 75 | 225M | 1725 | 100.40 | 0.89 | 93.0 | 93.0 | 91.5 | 10.0 x 6 |

Notes : Details shall vary with different motor manufacturers
Wire sizes shall vary for lengths beyond 50 metres

# Motor Ratings

## EFF2 / 6 Pole

**3 Ph / 380-440 V / 60 Hz**

| Output | | Frame Size | Full Load | | | Efficiency (%) | | | Wire Size mm² x No of Wires |
|---|---|---|---|---|---|---|---|---|---|
| kW | hp | | rpm | Amps | PF | FL | 3/4 Load | 1/2 Load | |
| 0.37 | 0.5 | 80 | 1090 | 1.15 | 0.71 | 69.0 | 68.0 | 66.0 | 2.5 x 3 |
| 0.55 | 0.75 | 80 | 1090 | 1.73 | 0.71 | 69.0 | 68.0 | 66.0 | 2.5 x 3 |
| 0.75 | 1 | 90S | 1120 | 2.19 | 0.72 | 73.0 | 71.0 | 69.0 | 2.5 x 3 |
| 1.1 | 1.5 | 90S | 1120 | 3.17 | 0.71 | 73.0 | 72.0 | 69.0 | 2.5 x 3 |
| 1.5 | 2 | 100L | 1120 | 4.04 | 0.72 | 76.0 | 75.0 | 73.0 | 2.5 x 3 |
| 2.2 | 3 | 100L | 1120 | 6.06 | 0.72 | 76.0 | 75.0 | 73.0 | 4.0 x 3 |
| 3 | 4 | 112M | 1120 | 7.79 | 0.75 | 77.0 | 76.0 | 73.0 | 4.0 x 3 |
| 4.4 | 6.0 | 132S | 1140 | 9.81 | 0.79 | 85.0 | 84.0 | 82.0 | 4.0 x 3 |
| 5.5 | 7.5 | 132M | 1140 | 12.12 | 0.80 | 85.0 | 84.0 | 82.0 | 2.5 x 6 |
| 7.5 | 10 | 132M | 1140 | 16.73 | 0.80 | 85.0 | 84.0 | 82.0 | 4.0 x 6 |
| 11 | 15 | 160M | 1170 | 23.66 | 0.80 | 87.5 | 87.5 | 86.0 | 4.0 x 6 |
| 15 | 18.5 | 160L | 1164 | 32.31 | 0.80 | 87.5 | 87.5 | 86.0 | 6.0 x 6 |
| 18.5 | 25 | 180L | 1164 | 39.24 | 0.81 | 88.0 | 87.0 | 85.0 | 6.0 x 6 |
| 22 | 30 | 200L | 1170 | 43.28 | 0.84 | 91.5 | 91.5 | 90.1 | 10.0 x 6 |
| 30 | 40 | 200L | 1170 | 59.43 | 0.84 | 91.5 | 91.5 | 90.1 | 10.0 x 6 |
| 37 | 50 | 225M | 1176 | 71.55 | 0.85 | 82.0 | 92.0 | 90.5 | 10.0 x 6 |
| 45 | 60 | 250M | 1176 | 87.13 | 0.84 | 93.0 | 93.0 | 91.9 | 10.0 x 6 |
| 55 | 75 | 250M | 1176 | 106.75 | 0.84 | 93.0 | 93.0 | 91.9 | 10.0 x 6 |

## EFF2 / 8 Pole

**3 Ph / 380-440 V / 60 Hz**

| Output | | Frame Size | Full Load | | | Efficiency (%) | | | Wire Size mm² x No of Wires |
|---|---|---|---|---|---|---|---|---|---|
| kW | hp | | rpm | Amps | PF | FL | 3/4 Load | 1/2 Load | |
| 0.37 | 0.5 | 90S | 815 | 1.50 | 0.57 | 65.0 | 64.0 | 60.0 | 2.5 x 3 |
| 0.55 | 0.75 | 90L | 815 | 1.90 | 0.63 | 69.0 | 68.0 | 64.0 | 2.5 x 3 |
| 0.75 | 1 | 90L | 815 | 2.60 | 0.63 | 69.0 | 68.0 | 64.0 | 2.5 x 3 |
| 1.1 | 1.5 | 100L | 840 | 3.75 | 0.63 | 72.0 | 71.0 | 68.0 | 2.5 x 3 |
| 1.5 | 2 | 112M | 840 | 4.33 | 0.68 | 77.0 | 77.0 | 75.0 | 2.5 x 3 |
| 2.2 | 3 | 132S | 850 | 5.77 | 0.73 | 77.5 | 76.5 | 73.0 | 4.0 x 3 |
| 3 | 4 | 132M | 850 | 7.79 | 0.75 | 79.0 | 78.0 | 76.0 | 4.0 x 3 |
| 4.9 | 6.6 | 160M | 850 | 0.00 | 0.74 | 85.0 | 85.0 | 83.0 | 4.0 x 3 |
| 5.5 | 7.5 | 160M | 850 | 13.27 | 0.74 | 85.0 | 85.0 | 83.0 | 2.5 x 6 |
| 7.5 | 10 | 160L | 850 | 17.89 | 0.76 | 85.0 | 85.0 | 83.0 | 4.0 x 6 |
| 11 | 15 | 180L | 860 | 25.97 | 0.74 | 87.0 | 87.0 | 85.0 | 4.0 x 6 |
| 15 | 18.5 | 180L | 860 | 34.04 | 0.77 | 87.0 | 87.0 | 85.0 | 6.0 x 6 |
| 18.5 | 25 | 200L | 865 | 41.54 | 0.77 | 88.0 | 88.0 | 86.0 | 6.0 x 6 |
| 22 | 30 | 225M | 870 | 50.20 | 0.75 | 89.0 | 89.0 | 87.0 | 10.0 x 6 |
| 30 | 40 | 225M | 870 | 68.09 | 0.75 | 89.0 | 89.0 | 87.0 | 10.0 x 6 |
| 37 | 50 | 250M | 882 | 82.51 | 0.75 | 90.5 | 90.5 | 88.5 | 10.0 x 6 |
| 45 | 60 | 250M | 882 | 98.67 | 0.75 | 92.0 | 92.0 | 90.5 | 10.0 x 6 |
| 55 | 75 | 280M | 882 | 119.44 | 0.75 | 93.0 | 93.0 | 91.0 | 10.0 x 6 |

Notes : Details shall vary with different motor manufacturers
Wire sizes shall vary for lengths beyond 50 metres

# Mechanical Specification

## Ecology Units

### General

Supply and install as indicated in the schedule of equipment, Ecology Units, each capable of the duty as mentioned in the schedule of equipment. The space available for the unit to be physically verified at the site and dimensions of the units shall be selected to fit into the space available. Where necessary the units may be built on site, subject to acceptance of the finished units for warranty purposes by the original supplier and their local agent.

The units shall be double skin construction, draw-thru type comprising of various filtration components to address grease, oil, particles, smoke and odour along with fan section as per the details shown either in the drawings or specified in the schedule of equipment.

## Quality Assurance

The equipment manufacturer shall strictly comply and produce certifications to the following management systems:

**(1) ISO 9001:2008 – Certification for Quality Management Systems**

**(2) ISO 14001:2004 – Certification for Environmental Management Systems**

**(3) OHSAS 18001:2007 – Certification for Occupational Health and Safety**

## Unit Construction

The unit casing shall be of double skinned panel not less than 25mm thickness. Casing shall be assembled with extruded aluminum profiles and self-supporting modular panel elements with an integrated base frame made of zincated steel sections along the upper side of the unit.

Sheet metal thickness shall be not less than 0.6 mm for the inner skin, 0.6 mm for the outer skin and shall be made from 270 GSM zincated steel sheets. The outer skin shall be pre-painted galvanized steel sheet having 7 to 9 microns of primer coat and 20 to 25 microns of polyester coat on the outer surface. For additional protection, outer surface of the outer skin shall be provided with a vinyl guard film for scratch protection. Inside and outside of panel walls shall be completely smooth.

# Mechanical Specification

All casing panels shall be insulated with injected CFC-free polyurethane foam insulation and shall be in accordance with Class O of ISO 1182.2 standards. The insulation density shall be 48 kg/m$^3$ and having thermal conductivity (K value) of 0.02 W/m K.

The base frame of the units shall be made from sendzimir galvanized sheet metal for size with largest dimensions up to 2500 mm, and hot dip galvanized U-profile for larger units. Units installed outdoors shall be fitted with weather-proof aluminum canopy.

**Vibration Isolation**

The Ecology Unit shall have internal vibration isolation system by mounting fan, motor and drive assembly on spring isolators designed for 93% isolation. The fan discharge shall be connected to the casing of the Ecology Unit through canvas connection, to prevent vibration transfer. In addition to the above, the entire unit shall be mounted on additional vibration isolators.

**Filter Section**

Filter cells shall be of standard sizes and shall be obtained from reputed American / European manufacturers. The filters shall be sealed against the filter frame using a permanently elastic gasket to a standard compatible with the filter efficiency.

Pressure drop tappings shall be integrated into the frame to allow a manometer or filter monitor to be fitted. Filter material shall be of flame-retardant, non-odorous type and shall offer no sustenance to vermin.

The filter material shall be pleated to provide a large effective area. Filter section should be provided with an access door.

**Stage 1 Filtration**

Washable Type Metallic Filter of 4” thickness, Class G2

Metallic washable filters shall be made of fine, galvanized-steel wire mesh for use in heavy duty industrial and kitchen air ventilation applications. Filters shall have excellent dust holding capacities and ability to perform in high-moisture conditions, especially suitable for use as grease filters in kitchen hoods.

# Mechanical Specification

The Metallic filters shall be with multi-layered, pleated, galvanized steel wire mesh formed into a compact maze of dirt catching surfaces.

The multi-layered media to be held in place by metal grids on both the inlet and outlet side of the filter, thus increasing its rigidity and ensuring filter performance in heavy dust loading conditions. The filters shall be washed in a solution of detergent and warm water or cleaned with compressed air.

Technical Specifications of Panel Filters :
Filter class: G2/G3 as per EN 779 Standards
Initial resistance: 30-35 Pa
Final recommended resistance: 175-200 Pa for washing
Rated velocity: 2.5 m/s
Average Arrestance: 75-80%
Maximum operating temp: 300 Deg C.

**Stage 2 Filtration**

Disposable Type Panel Filters, Pleated of 4" thickness, Class G4
The 4" depth pleat shall have consistent pleat spacing and durable execution. Pleated Filters feature a self-supporting media pack in a two-piece frame - pleat stabilizers on the air leaving side in combination with pleat support straps on the air entering side ensure pleat consistency, providing excellent dust holding capacity and low pressure resistance. The media pack shall be housed inside a two-piece frame and bonded with a water resistant sealant to create a filter with excellent rigidity and durability.

The pleat media shall be made from a controlled and repeatable special blend of size-specific virgin fibers. The fiber technology shall give the media its self-supporting, durable, built-in memory feature which eliminates the need for wire mesh supports.

Technical Specifications of Panel Filters:
Filter class: G4 as per EN 779 Standards
Initial resistance: 45-50 Pa
Final recommended resistance: 250 Pa
Rated velocity: 2.5 m/s
Average Arrestance: ≤90%
UL Certified
Maximum operating temp: 70 Deg C.

# Mechanical Specification

**Stage 3 Filtration**

Disposable type Pocket Filters, Class F7

Pocket filters shall be made of ultra-fine, synthetic fiber media, consisting of an unique blend of coarse and fine synthetic fiber, specially designed and interwoven to provide low initial resistance and high air cleaning performance. The coarse fibers arrest the larger and heavier particles in the air stream while the fine fiber remove the smaller particulate matter and give the filter its high efficiency classification.

The fine pocket filters shall be assembled in 1.5mm thick galvanized steel frames that are mechanical robust and offering excellent performance in high relative humidity conditions. The media is color coded for identification as per the filter class.

Technical Specifications of Pocket Filters:

Filter class: F7 as per EN 779 Standards

Rated velocity: 2.5 m/s

Average Arrestance: 98%

Efficiency: 80-85%.

UL Certified

Maximum operating temp: 70 Deg C.

# Mechanical Specification

**Stage 4 Filtration**

Disposable type HEPA Filters, Class H10

HEPA filters with metal cell sides shall be of the heavy duty type, designed for both constant air volume and variable air volume systems. Filters shall consist of pleated media pack enclosed in a electro-galvanized steel housing and the media shall be made of ultra-fine fiberglass formed into a series of pleats. Corrugated Aluminum separators maintain uniform spacing between each pleat to allow unrestricted air flow. Bar braces shall be installed on both sides of the filter for extra reinforcement of the media pack.

The Filter media shall be of ultra-fine, moisture-resistant glass fiber with separators. The separators with special beads maintain uniform spacing between pleats & assure uniform air flow with minimal resistance. The consistent pleat spacing of the media allows higher dust holding capacity and full utilization of the entire media depth. The rigid metal construction improves performance under turbulent operating condition. Filters shall be fully sealed and potted on all sides and classified under class H10 as per EN 1822 standards.

Technical specifications of HEPA Filters:

Filter class: H10 Efficiency at 0.3 micron 95 % as per EN 1822 standards

Nominal capacity: 3400 m3/hr at 250 Pa

Final drop: 500 Pa

Cell sides: Galvanized steel

Filter media: Ultra-fine Glass Fiber media

Separators: Aluminum

Sealant: 5mm Rubber gasket on Clean Air side.

Maximum Temperature: 70 Deg C.

UL Certified

# Mechanical Specification

**Stage 5 Final Filtration & Odour Removal**

Activated carbon filters - Refillable type, canister type

Canister delivery system shall consist of multiple individual canisters in metal execution. The canisters shall be assembled in a galvanized sheet metal holding frame, sized to fit standard dimension filter sections. Canisters come as factory-ready for installation. No special tools are needed to replace a canister. The individual canister seals and holds in the frame due to its unique seal and bayonet style clamping mechanism.

Canisters shall be factory pre-filled with user specific media & each canister shall be vibration filled in order to ensure that the media is uniformly packed. Each canister shall then be plastic bagged and carton packed.

Technical specifications:

Frame material: Galvanized steel frame

Carbon Filter size: 145 dia x 600 mm long

Volume per canister: 5.9 l

Capacity per 24x24: 3200 m3/hr having 16 canisters

Carbon content: 3 kgs per canister= 48 kgs per cell size 24x24.

Pressure drop: 150 Pa

Dwell time (contact time): 0.1 sec

Refillable type: Yes

UL Certified.

# Mechanical Specification

**Fan & Fan Motor**

Fans shall be double inlet, double width, backward curved and centrifugal type with galvanized steel casings. Fans shall be tested in accordance with AMCA 300-85. Every individual fan shall be run before delivery to check bearing conditions and vibration. Fan shafts shall be mounted in taper sleeve bearings designed for continuous operation and a mean useful life of 200,000 hours. Backward curved impeller should be coated with 60 micron epoxy painting of high quality.

Fans shall be designed in accordance with the specified operating class of AMCA standard 99-2408-69 performance class limits for centrifugal fans. The impeller & fan shaft shall be statically and dynamically balanced to a balancing grade of G 2.5. The fan shall be connected to the outlet opening by means of an airtight flexible connection. Fans shall not exceed a maximum outlet velocity of 12 m/sec.

The fan outlet shall be connected to casing with the help of fire retardant fabric, acting as a flexible connection for anti-vibration tested to UL-214 and confirms to NFPA 90A & NFPA 90B standards.

The degree of protection shall be IP55 with mounting method B3 and Class F insulation for the electric motors. Fan drive shall be rated at 150% of the maximum motor power of the units and shall be fitted with adjustable belt tension arrangement. Belt guards or screen protection door in fan section shall be provided in accordance with CEN Standards.

The electrical characteristics of the fan motor shall meet the requirements of the local regulatory authorities. The fan motor shall be wired to the safety isolation switch or connection box. The contractor shall select power input and speed of the fan, subsequent to ascertaining system static pressure, in accordance with pressure drop calculations to the approval of the engineer.

The fan motor shall meet the safety requirements of the CE and compatible with variable frequency drives. The motor shall be mounted on a common, torsionally rigid, galvanized steel base frame.

# Mechanical Specification

**Control Panel**

VFD built-in control panel shall be provided with a selector switch for auto and manual mode. Control panels shall have four nos. of differential pressure switches to monitor the filter status including a pressure transducer and a programmable logic control (PLC).

Filter status to be indicated with lamps on the panel face. Pressure transducer will modulate the fan speed as the filters starts to clog. If all the filters are clogged, regardless of transducer status, the system needs to shut off and unit-off status indication to be displayed on the panel.

If the system shuts off due to clogged filter, the unit should be able to override the auto mode into manual mode, through the selector switch provided on the panel face.

In manual mode, the unit shall run on full speed until the filters are cleaned / replaced and then shift the selector switch to auto mode.

Control circuits to operate at 24 V AC.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