

FLEXE-H

Bespoke **Smart** Air Handling Units

Hygienic construction in accordance with
VDI 6022-1 and DIN 1946-4



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H for Hygienic construction

Designed specifically for pharmaceutical manufacturing facilities, laboratories and medical clean rooms, Flexe-H by Airef is built in accordance with hygiene requirements of VDI 6022-1 and DIN 1946-4.

These air handling units are easily cleanable. The use of hygienic materials resistant to disinfectants, and rounded inner edges ensure hygienic conditions for a longer time.

SPECIAL HYGIENE FEATURES

- Smooth inner surfaces, resistant to common disinfectants and cleaning agents
Corrosion class C4 (ISO 12944)
- Sloped Stainless Steel condensate drain pans for positive drainage in high as well as low pressure sections
- Use of UVC light of 254 Nm for complete removal of micro organisms, and for disinfection of the cooling coil surface as well as the drain pan
- Inspection window and light kit in all sections to ensure easier inspection and maintenance.
- Withdraw-able main components for easier cleaning, hassle-free replacement and quicker maintenance
- Use of multi-stage, highly efficient air filter banks for clean room supply

RANGE 500 CFM TO 40000 CFM (30 SIZES)

APPLICATIONS

Pharmaceutical Manufacturing, Food Processing, Micro Biology And Testing Labs, Operation Theatres, Isolation Rooms, Intensive Care Units etc.

Bespoke functional modules

Flexe-H modular air handling units are available in customized configurations, tailored precisely to meet the varying temperature, humidity and air-quality requirements of modern clean rooms.

A variety of functional modules can be logically clubbed to form an air handler, optimized to achieve the required indoor conditions. These units are available in 30 different sizes to fit the needs precisely.

STANDARD CASINGS (T50 / TX50)

Double skinned, sandwich type casing panels are injected with Polyurethane foam (PUF) of density 40 kg/m^3 , and fastened to cold-bridge free, anodized extruded Aluminum channels having poly-amide thermal break arrangement. E-profile or D-profile EPDM gaskets are used as standard.

OUTER & INNER SKIN MOC: Pre painted GI, mill finish GI, powder coated GI, Stainless steel, Aluminum

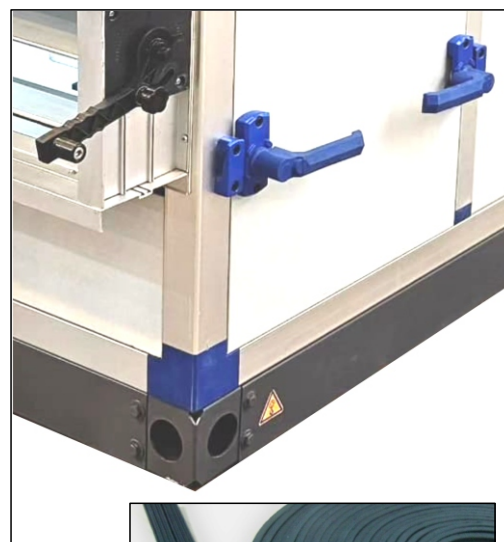
SKIN THICKNESSES: 0.6 mm - 1.5 mm

INSULATION: PUF (Optional Mineral wool)

INSULATION THICKNESS: 45-46 mm (Optional 70 mm)

SKID: 100 mm high GI channel frame in grid form, with lifting corners

STANDARD HARDWARE: Aluminum handles and hinges, Nylon joining parts, Polycarbonate view window, Caution labels, Section name labels, Safety kit



EPDM Door Gaskets

- Casing panels with thermal break construction are available as an option.
- Specially developed, frame-less type thermal break casing (TX50) is also available.

PLUG FANS (EC / AC)

Direct driven, statically and dynamically balanced plug fans of globally recognized brands are used with TEFC AC as well as EC (Electronically Commutated) motors of efficiencies up to IE05.

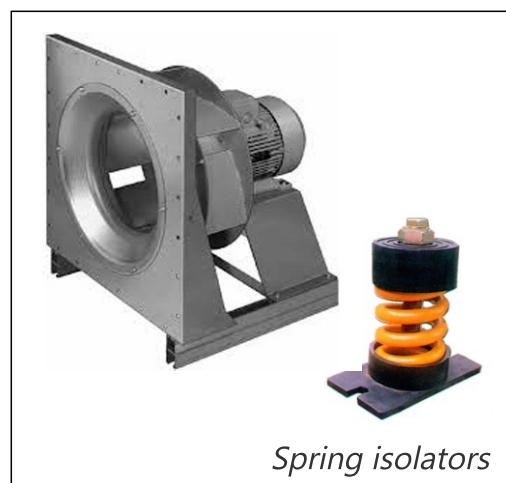
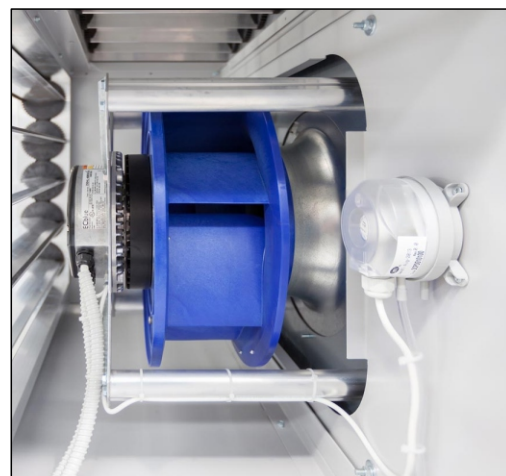
FAN MOUNTING: Spring isolation system is provided as a standard in foot-mounting type fans. Module type fans are mounted directly on the fan-blank.

VFD: Reputed brand variable frequency drives of HVAC duty are provided as standard with AC motors.

FAN WALL: For higher capacities, an array of EC fans is formed using multiple fans, controlled with one signal.

LIMIT SWITCH & LIGHT: Fan section doors are interlocked with fan using a safety limit switch and maintenance light.

- *For special applications, ATEX certified or flameproof motors are available. In such units, the limit switch and LED light are also supplied in flameproof construction.*



AIR FILTERS (G4 - H14)

Multi-stage combinations of extended surface filters are used with terminal / plenum mounted fiber glass filters to achieve the desired room class.

PANEL FILTERS: Pleated non-woven media - Grade G4

EXTENDED SURFACE BAG FILTERS: Secondary filters with non woven media - Grade M5 / F7

EXTENDED SURFACE CASSETTE FILTERS:

Pleated non woven media filters - Grade M5 / F7

Pleated non woven / fiber glass 'V' banks - Grade F8 / F9

Pleated fiber glass media filters (HEPA) - Grade H13 / H14

- *Gas phase filters and activated Carbon filters are also available*



HEAT EXCHANGERS (COILS)

High efficiency heat exchanging coils are carefully designed and selected for precise control and long life.

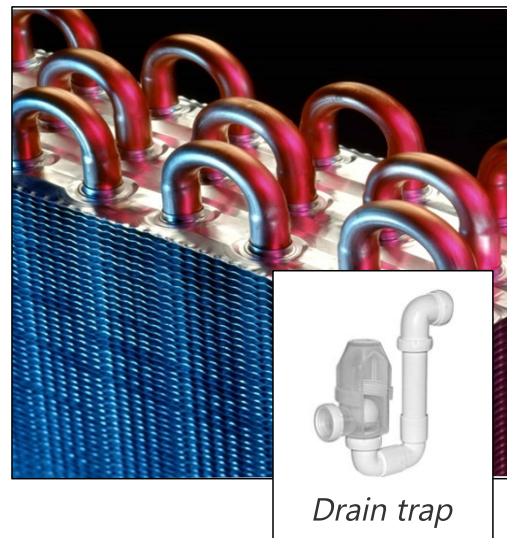
WATER TYPE: Hydronic coils use hot or chilled water, running in Copper tubes (OD 12.70 mm and minimum wall thickness 0.41 mm) mechanically bonded to Aluminum fins (11-13 FPI).

DIRECT EXPANSION (DX) TYPE: Made for high pressure refrigerants like R410A, DX coils use internally grooved Copper tubes (OD 9.52 mm and minimum wall thickness 0.5 mm), mechanically bonded to Aluminium fins (11-13 FPI).

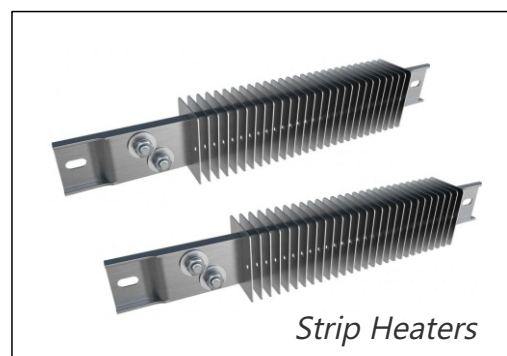
STEAM TYPE: Used with high temperature and high pressure steam, these coils have welded Stainless Steel tubes (OD 15.8 mm and minimum wall thickness 0.6 mm), mechanically bonded to Aluminium fins (11-13 FPI).

ELECTRIC HEATER BANK: Finned type electric strip heaters are provided in staged structure via electrical isolators. Both GI and Stainless steel heaters are available.

■ *Standard coil casings are made of GI sheets. Special coils with Stainless Steel casing, Hydrophilic / Hydrophobic fins and corrosion resistant coatings are also available.*



Drain trap



Strip Heaters

AIR MIXING MODULES

Air is mixed in these sections before treatment.

SINGLE MIXING BOX: This 2-damper setup is used primarily to mix return air and outside air to achieve desired room pressure or CO₂ level.

DOUBLE MIXING BOX: Uses 3-damper setup to mix partial return air with outside air, before exhausting the rest of it to the atmosphere.



INTEGRATED / ISOLATED INTELLIGENT CONTROLS (iCON)

Flexe-H is available with integrated or isolated control panels, with optional micro-processor based process controllers.

FAN STARTUP: Direct On Line (DOL), Star-Delta, VFD

TEMPERATURE CONTROL: DX ODUs & chilled-water valves

RELATIVE HUMIDITY CONTROL: Electrical heaters through thyristors & hot-water valves

AQI CONTROL: Controlling CO₂ and VOC values

FAN SPEED: Automatic control using pitot tubes and differential pressure transmitters (DPT), manual control using potentiometers or digital inputs

DATA LOGGING: Operational parameters and error log

EMS/BMS: Seamless integration with existing building management systems via Modbus TCP or BACnet/IP

MAINTENANCE: Setting up maintenance schedules, warnings and alerts



ULTRA-VIOLET GERMICIDAL IRRADIATION

In order to maintain the sterility of the supply air stream and to prevent the growth of micro organisms, like mold, on and around the face of cooling coils, UV-GI lamps are provided downstream of coils. Mounted on Aluminum or GI channels, the use of UV-C light at 254 Nm ensures highly sterile supply air, clean coil and condensate tray surfaces.

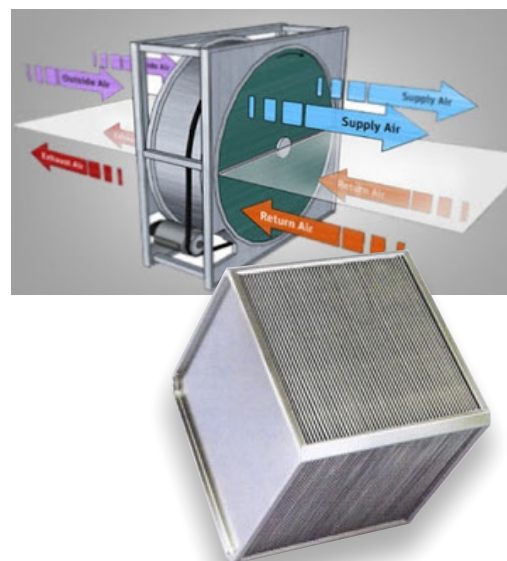


HEAT RECOVERY DEVICES

Following devices can be incorporated in these units to recover the energy from exhaust air stream and transfer it to the outside air stream for pre-cooling.

ROTARY TYPE (HEAT RECOVERY WHEELS): Used for total (latent+sensible) recovery. General efficiency of these devices goes upto 80%.

PLATE TYPE (RECUPERATORS): Static recovery devices that use alternate channels to pass exhaust and outside air, exchanging the energy without mixing. The efficiency is around 70%.



OTHER COMPONENTS

Some of the other important components of Flexe-H air handling units include:

VOLUME CONTROL DAMPERS: The dampers placed at air openings are made of heavy duty extruded Aluminum channels. The gear driven, opposite-rotation blades are gasket-sealed for very low leakages possibilities. The plastic handle can be used to adjust the opening with the help of percentage markings provided. The dampers are equipped with the provision of using motorised actuators for automatic control.

DRIFT ELIMINATORS: 2-pass and 4-pass drift eliminator baffles made of PVC can be provided downstream of cooling coils to prevent the condensate carry-over outside the coil section. These eliminators are slidable, for quick coil maintenance.



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AIREF SYSTEMS PRIVATE LIMITED

Plot No. 570, Industrial Area, Phase 9, Mohali 160062, Punjab
T: +91 90565 90909 Email: mail@airefengineers.net

airef.co/modular-air-handling-unit

