

Typical Specification

The following paragraphs are offered as an example for specifying our equipment for your project.:-

The unit shall satisfy the required performance requirements and shall satisfy the following physical requirements.

Casings

The unit casings shall be constructed from prefabricated panels manufactured by laminations of a core of 25mm or 45mm fire-retardent polystyrene sandwiched between an inner and outer layer of 0.6mm skin of Chrom-A-Dek mild steel. The panels shall be rigidly fixed together for maximum strength in anodised aluminium extrusions.

Ample access to the coil face, fans/drives and filters shall be provided through either hinged or removable, airtight, access doors manufactured from the same material as the rest of the unit casing and fastened against the air pressure with rugged reinforced nylon lever-cam door handles.

Unless requested drive guards will not be fitted on non walk-in units as warning notices are to be pasted onto the access doors. Drive guards WILL be fitted on all walk-in units.

Smaller units are to be mounted on an anodised aluminium base that forms part of the casing frame. Larger units are mounted on pre-galvanised lip channel, selected to cope with the expected load conditions.

All spigots and dampers shall be fitted with duct lock.

In applications where condensation on the unit frame is possible, special thermal breaks are fitted to the aluminium extrusions.

All traffic areas within walk-in units are fitted with checker plate.

Lighting is provided by means of circular bulk head lights employing 2x PL9 fluorescent tubes. A single light switch shall be mounted in a suitable position.

Dirty filter protection. A differential air flow switch is installed across the primary filter bank to disable cooling & heating once a 250Pa pressure drop is exceeded. At the same time a "dirty filter" fault light will be illuminated at the local switch board. Only supply air fans will continue to operate in the event of a dirty filter trip.

Industry standard Dwyer Differential Magnehelic Pressure Gauges are installed across each filter bank for spot inspections.

Fans

HPI stocks a large variety of imported Class 1 Nicotra fans, a brand name long appreciated for quality, efficiency & quiet operation. Class 2 fans can also be ordered by special arrangement. Our stock includes the popular AT & ADH family of Forward Curved Centrifugal fans (FCC) as well RDH Backward Inclined Centrifugal fans (BCC) for high pressure applications. Aforementioned fans all have double inlet, double width impellers.

Where a limited fan height, or vertical unit configuration is required, a dual or twin fan arrangement is available which share a common shaft supported by three bearings.

All fan/motor arrangements are mounted, or suspended, within HPI units on either rubber or spring type anti vibration mountings & fan discharge openings are sealed into flexible canvas collars. Suitably sized pulleys are then selected & fitted in consultation with the approved computer generated fan selection.

Nicotra PFN type impellers are direct drive, single inlet, single width, BCC wheels employed on HPI theatre units. PFN impellers are also ideal where special application requirements call for low fan/motor maintenance, zero belt debris & constant duct static pressure control by means of a Variable Speed Drive (VSD).

For detailed information on Nicotra fans please visit <http://www.nicotra-gebhardt.com>

Primary Filters

Standard washable removable 50mm primary filters are normally installed into appropriately sized galvanized holding frames on the air entering side of the cooling coil. 100mm depths are also available. Filter frames are “flashed”, using 1.6mm galvanised sheet metal, to unit casings for rigidity & air bypass prevention. Furthermore filter banks are reinforced with 5mm flat bar lengths in anticipation of strong forces when filters become dirty.

Initial Resistance – Approx. 65Pa

Final Resistance – Approx. 250Pa

Primary filters are generally selected to produce a face velocity of not more than 2.5m/s.

Secondary Filters

Where required bag or rigid cassette type secondary filters, EU9 rating, are installed into common filter frames with the primary filters. Bag filters typically vary in length from 300-600mm & manufactured with 6 to 8 “pockets” depending on filter size. A gasket will be installed between primary & secondary filters when a common frame is shared.

Stand alone dedicated secondary filter banks are also installed depending on the nature of unit design & application.

Initial Resistance – Approx. 135Pa

Final Resistance – Approx. 400Pa

Secondary filters are generally selected to produce a face velocity of not more than 2.5m/s.

Tertiary Filters

Where specified, high efficiency particle arrestor (HEPA) filters with an EU11 rating

shall be fitted down-stream of the cooling coil. HEPA filter holding frames are to be manufactured from powder coated 1.6mm tubular steel and flashed and sealed to the unit casing in such a manner that there is zero bypass of unfiltered air. The HEPA filters are to be fastened into these frames using clamps and seals but are not to be fitted into the A/C unit until the interior of the unit as well as all ducting has been blown clean. The fitting & particle count testing of these filters is carried out by others on site.

Industry standard Dwyer Differential Magnehelic Pressure Gauges are installed across each filter bank for spot inspections.

Initial Resistance – Approx. 250Pa

Final Resistance – Approx. 500Pa

HEPA filters are generally selected to produce a face velocity of not more than 2.5m/s.

HEPA filters are always supplied loose, still sealed in their original cartons, for fitting by others on site.

Coils

Coils selected in accordance with ARI standards shall be fitted and manufactured from aluminium or copper fins bonded onto copper tubes welded into copper headers, and fitted into galvanised (or 304 SS frames) which shall extend the entire width of the inside of the coil compartment, under the return and supply headers and shall also extend a minimum of 200mm beyond the coil flange.

A single coil shall not exceed 1295mm in height. Multiple coil installations shall be fitted with intermediate 304 SS drip trays, which shall run the entire length of the coil. The intermediate drip trays shall be fitted with 32mm drains piped into the tray below in such a way that water draining from the intermediate trays does not carry over into the compartment succeeding the coil bank.

The coil banks shall be mounted into SS304 drip-trays, which shall incorporate a stepped design to facilitate the flow of condensate away from the coil bottom. Drip trays are to be fitted with a 32mm drain socket protruding through the side of the unit casing.

Coils shall include a bleed screw at the top of the return header and a drain plug at the bottom of the inlet header, both of which are to be over the drip tray.

Coils are to be sized to provide a maximum face velocity of 2.5 m/s on the leaving coil face and the fin spacing shall not be less than 2mm (12 FPI).

Heater banks

The heater elements are to be manufactured from SABS approved Incaloy and rated at 3.1 Watt/cm². The elements are to be easily removable and shall be fitted into a readily accessible terminal box fitted to the air-leaving face of the cooling coil or in a flanged duct section installed onto the unit discharge flange.

Elements shall be balanced over three phases and configured to suit current valves. An auto reset overheat shall form part of the heater bank. All heater elements shall be wired with silicon insulated wire protected by Copex tubing and connected onto terminals in an enclosure mounted on the external surface of the AHU casing, unless switchboards are included as part of the AHU, where they can be wired directly to the switchboard terminals. Heater contactors must always be hard wire interlocked with the fan contactor, air flow switch & over heat stats for safe operation.

Mixing boxes and Dampers

Mixing boxes shall be manufactured from the same material as the AHUs casing and as an integral part of the AHU casing.

Dampers shall be sized at a maximum face velocity of 6 m/s and shall be fitted with duct lock on the duct-connection side. Damper blades shall be airfoil-profiled aluminium operated with gears to provide an opposed blade action. Manual dampers shall have sturdy locking quadrants and dampers to be motorised shall have suitably extended shafts.

The fresh air intake shall generally be protected from the ingress of rain and vermin through the use of a weather cowl and vermin-proof mesh. Fresh air louvres, where required, shall be fitted with OBDs and shall be sized at a maximum face velocity of 3 m/s.

If an economy cycle is to be incorporated employed, then the fresh air intake shall be sized for the full supply air volume and split into two sections - a manually adjustable section to satisfy the minimum fresh air requirements and a motorised section sized to cope with the balance. A motorised damper shall be fitted to the return air intake.

Compressors and refrigeration components

Hermetic compressors, mounted in the mixing chamber, are to be resiliently mounted and all piping to these compressors shall be so routed to allow the free movement of the compressors during starting and running and without causing metal fatigue - usually four bends will provide this requirement. The compressors shall be arranged and mounted in such a way as to facilitate access for service and replacement. Semi-hermetic compressors can also be fitted where required.

All discharge line fittings shall be silver-soldered within two linear meters from the compressors. All compressors shall be fitted with service valves and protected by high and low pressure cut-outs.

Reciprocating compressors shall be fitted with crankcase heaters. Each compressor shall have its own separate refrigeration circuit with filter/drier, shut off valve, solenoid valve, sight glass, thermostatic expansion valve with external equalizer, HP and LP gauge and charging ports.

If semi-hermetic compressors are required, an oil pressure safety cutout shall be incorporated into the compressor safety circuits. An anti-short cycling timer operating off the LP cutout and not only the temperature control shall be incorporated into the compressor safety circuits of each compressor. Reverse cycle systems can be provided on request

Evaporative condenser

When evaporative condensers are specified they are normally procured from either Evapco or Baltimore Air Coil. Typically these are forced draft condensers employing multiple FCC fans, a motorized damper for head pressure control based on water sump temperature & a dedicated coil circuit for each compressor. There are however a variety of other models on the market including induced draft condensers constructed from corrosion resistant fibre glass panels which are gaining popularity.

Provision for a water treatment device is made in the HPI switch board by way of a 220V power supply, the necessary terminals & protected by a 6A fuse. Water treatment must be fitted by specialists on site to guard against coil scaling, algae & bacteria growth.

Coastal corrosion protection for evaporative condensers is an optional extra at the tender stage.

Electrical Switchboards, wiring and certification

Sheet metal switchboards, integral with the main unit with outer doors of the same material as the unit incorporating door interlocking isolators, short circuit protection, anti-single phasing starters, heater contactors, Auto/Off/Man control switch and terminals shall be provided for each AHU. Run pilot lights, volt meters, ammeters and controls can also be provided as an optional extra and in this case an inner door of painted electro-galv will be provided. Terminals and circuitry shall be provided for remote switching and for fire interlocks. Where this panel is supplied as part of the AHU, the heaters and motors shall be wired directly to this panel, without the need for intermediate terminals and enclosures. All VAV Motors can be controlled with 380VAC 3-phase speed controllers. All control wiring within the switchboard is to be ferruled and numbered. Wiring within the switchboard is to be run in plastic cable ducts, which are to be sized so the wires do not exceed 50% of the trunking capacity. All wiring and switchboard

Optional features

The following optional features can be provided:-

- Return air temperature sensors or space or averaging temperature sensors
- Economy cycle comparing return and fresh air dry-bulb temperatures.
- Current valve heater control.
- Remote set point
- Remote on/off switch.
- Remote operator's panel with main running pilot light and a general alarm pilot light.
- 7-day time clock with 12-hour reserve.
- Phase reversal and under voltage relay.
- 15 A service electrical socket outlet mounted in the compressor chamber and fitted with E/L protection.

Commissioning and O and M Manuals

Each unit shall be supplied with Installation, Operating and Maintenance manuals.