

TECHNICAL SPECIFICATIONS OF

AIR HANDLING UNIT

GENERAL DESCRIPTION

The work to be performed under this section of the contract consists of the supply, delivery, installation, painting, testing & commissioning, maintenance & servicing (for the duration of the Defects Liability Period) and handing over to the Employer in good working order, suitable for the purpose intended and ready for setting to work the air handling system of this project, comprising the following systems and equipment.

- Air handling units
- Controls and other associated accessories.

The Contractor shall supply and install all air handling equipment as shown in the drawings and in accordance with the following specifications.

This section of the specifications also sets out the requirements, methods, quality of materials and standards of workmanship concerning air handling equipment and its system.

CONTRACTOR SHOULD SUBMIT COMPLETE SPECIFICATIONS OF THE OFFERED EQUIPMENT: AHU, MOTOR, FAN, VSD ETC.

EQUIPMENT PERFORMANCE

All air conditioning equipment, when installed and operated in accordance with these specifications, shall have performance and capacities not less than the minimum requirements indicated in the Schedule of Technical Data.

AIR HANDLING UNIT

The Contractor shall supply and install, as shown in the drawings, the complete site-assembled and tested draw-through single-zone air handling units of an approved make, each complete with fan sections, fan motor, drive guard, cooling coil section, drain pan, filters section with frame, structural mountings, spring vibration isolators, valves, controls, pocket filters and accessories. All new equipment to be supplied with all necessary access doors for the mixing box, fan and cooling coil sections.

Each air handling equipment shall be installed with two (2) nos of durable marine lighting or equivalent. 1 nos of marine lighting to be installed at filter section and 1 nos at fan section.

Each component installed shall be easily dismantled for maintenance and replacement.

Casing

All air handling units shall be double skinned panel with minimum thickness of 2" and non-cold bridge type frame. The units shall be assembled from pre-fabricated galvanised steel sandwich panels of minimum 18 SWG thick with baked polyester powder coated finish fixed to sturdy galvanised steel angle structural framework. All panels shall be easily removable for inspection and service operations. The units shall be provided with full height hinged access doors and access panels with proper gasket and with non-corrosive, springs loaded, quick opening latches. In addition, the units shall also have four (4) access doors, two (2) each for the blower and motor section. Insulation shall be of rigid polyurethane or of appropriate thickness and density to prevent condensation. Where corrosion resistant casing is specified, they shall be epoxy coated to approval.

Where units are installed in non-air-conditioning areas, insulation shall be increased to ensure that no condensation occurs at the external of the whole unit casing.

Fan Section

The fan section shall be manufactured of heavy gauge steel angle members securely bolted and braced with steel panels, all galvanised. Panels shall be easily removable. Interior of panels shall be insulated with not less than 25mm thick approved insulation material, sprayed with protective vinyl coating on the inside and lined with galvanised metal sheet 24 SWG thick.

Fans shall be designed, manufactured and tested in accordance with AMCA standards. Fan wheels and housings shall be of galvanised steel. Bearings shall be of self-aligned ball type with sealed factory lubrication but with provision for re-lubrication. Vee belt drive with belt guard shall be provided. Motor speed shall not exceed 1,500 rpm. Adjustable variable pitch pulley of proprietary make shall be provided with each vee belt drive.

Fans shall be statically and dynamically balanced and fan shafts shall not pass through their first critical speed in achieving the rated rpm.

Belt drives shall be provided with at least two (2) belts with each capable of the maximum power transmission.

Coil Section

The coil section shall be of sectionalised galvanised steel sandwich panel construction with easily removable panels.

Cooling Coils

All cooling coils shall be arranged within the coil section in a vertical position with the air passing horizontally through the coil to ensure quick removal of condensate from the coil surface. Coil headers shall be completely enclosed within the insulated casing with connections only extended through the cabinet.

All coils shall be rated in accordance with the latest AHRI Standard 410. They shall be of staggered tube finned coils of sizes suitable for the various duties required. Fins shall be of rippled aluminum or copper continuous plate and shall be bonded to the tubes by expansion to ensure maximum contact with the tube for efficient heat transfer.

Fins may also be of the type fastened to the tubes by winding the fin material under tension onto the tubes. Fin design shall be suitable for operation up to 2.5m/s face velocity without moisture carry-over and fins shall have fin collar to cover the entire tube surface and without sharp edges or breaks permitting foreign matter.

The rated face velocity shall not exceed stated in selection below. Tubes shall be ½ or 5/8 inch outside diameter seamless copper spaced in a staggered pattern brazed into headers fabricated from heavy gauge copper tubing having generously sized inlet and outlet standard male pipe thread connections.

Headers shall have an air vent at the highest point and drain connections at the bottom in the same place as inlet and outlet connections.

All joints between coil tubes and headers shall be brazed with silver alloy solder. Coils shall be designed for up to 150% of system working pressure or 1,400 kPa, whichever is higher. Completed coils shall be hydraulically tested to 150% of system working pressure or 1,400 kPa, whichever is higher. The water pressure drop through the coil shall not exceed 15 feet of water but preferably be below 10 feet of water.

Drain Pan

The drain pan shall be made of stainless steel and designed to slope towards the drain outlet and with a drain connection on the side of the casing.

The drain pans for collecting the condensate shall be fabricated from corrosion resistant steel or fiberglass reinforced plastic. 25mm thickness approved type external thermal insulation shall be applied to the drain pan to prevent condensation forming on the outside and to isolate the pan from the unit casing.

The drain line shall be insulated with 38mm 60kg/m³ fiberglass and galvanised iron sheathed and painted to approval.

Adequate provisions shall be made during the installation of the AHUs to provide enough clearance for the U-bend and sufficient gradient for the drain line for proper drainage.

Provisions shall be made to prevent carry over of water from the drain pan by the air stream.

VIBRATION ISOLATORS

Vibration isolators shall be as specified under the section "Noise and Vibration Control".

SOUND POWER REQUIREMENT

The Contractor shall provide units that will conform to the sound power levels specified.

The manufacturer shall submit to the Consultant selected unit sound power ratings by octave band at design operating conditions. Neither the manufacturer nor the specific unit selection will be approved until such data has been supplied.

AIR FILTERS

General

The Contractor shall supply and install air filters in the air handling units and fresh air coils as indicated in the drawing and equipment schedule.

Performance and design data shall be as specified herein, and filters shall be selected to match the air quantity for equipment as shown on the drawings and / or equipment schedules with air velocity not more than 2.5m/s at specified air flow.

Primary Filter

Disposable filters are called for and they shall be of minimum **MERV 6** rating or as indicated in the equipment schedule when tested to ASHRAE 52-92. Arrestance shall be minimum 85%.

The filters shall have an initial resistance of 26Pa WG at rated nominal air velocity of 1.5 m/s. It shall have a dust holdings capacity of minimum 300gm/m². The filter media for air handling units, where indicated in the equipment schedule, shall be fitted to an air-seal holding frame of 50mm deep in galvanized steel construction of minimum 1.8mm thick and arranged in a V-shape configuration for low velocity operation in aside-access housing.

The filter holding frame shall be provided with a gasket on the vertical sides to prevent leakage between the frames when installed in the V-type side loading housing. The side-access housing shall be in galvanised steel of 16 gauge and shall have two gasketed access doors on both sides. It shall have a 38mm flange for insertion into the ductwork system. Approved type gaskets shall be provided in the C-channel track to prevent by-pass.

Secondary Filter

Secondary filters shall be of minimum **MERV 14** rating to reduce indoor contaminants and provide good protection for the cooling coil and reduce the frequency of duct cleaning.

CONSTRUCTION

Each filter assembly shall be arranged so that effective sealing between the filter and casing can be achieved and that filters can be easily removed without having to make any alteration to the equipment for cleaning and replacement. The air handling units shall have access doors or panels to the filter section.

All materials of each filter assembly, including filter media, frames, etc. shall be non-combustible.