

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Not used.

1.2 REFERENCES

- .1 Definitions:
 - .1 Catalogued or published ratings: ratings obtained from tests carried out by manufacturer or manufacturer's designated independent testing agency which signify adherence to codes and standards in force.
- .2 Reference Standards:
 - .1 American Society of Heating, Refrigeration and Air Condition Engineers (ASHRAE)
 - .1 ANSI/ASHRAE 52.2-2007, Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size.
 - .2 Air Conditioning and Refrigeration Institute (ARI)
 - .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB 1.181-99, Ready-Mixed Organic Zinc-Rich Coating.
 - .4 Sheet Metal and Air-Conditioning Contractors' National Association (SMACNA)

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Provide manufacturer's printed product literature and datasheets for refrigerant, insulation, filters, and paints, and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Alberta, Canada.
 - .2 Drawings to indicate project layout and dimensions; indicate:
 - .1 Equipment, piping, and connections, together with valves, control assemblies, auxiliaries and hardware, and recommended ancillaries which are mounted, wired and piped ready for final connection to building system, its size and recommended bypass connections.
 - .2 Piping, valves, fitting shipped loose showing final location in assembly.
 - .3 Control equipment shipped loose, showing final location in assembly.

- .4 Dimensions, internal and external construction details, recommended method of installation with proposed structural steel support, mounting curb details, sizes and location of mounting bolt holes; include mass distribution drawings showing point loads.
- .5 Detailed composite wiring diagrams for control systems showing factory installed wiring and equipment on packaged equipment or required for controlling devices of ancillaries, accessories, controllers.
- .6 Fan performance curves and sound data.
- .7 Details of vibration isolation.
- .8 Estimate of sound levels to be expected across individual octave bands in dB referred to A rating.
- .9 Type of refrigerant used.
- .10 Air pressure drop across each internal component.

1.4 CLOSEOUT SUBMITTALS

- .1 Provide maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Furnish list of individual manufacturer's recommended spare parts for equipment such as bearings and seals, and addresses of suppliers, together with list of specialized tools necessary for adjusting, repairing or replacing, for placement into operating manual.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
- .3 Packaging Waste Management: remove for reuse and return by manufacturer of pallets crates, padding, and packaging materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 GENERAL

- .1 Factory assembled components to form units supplying air at design conditions as indicated.

2.2 FANS

- .1 In accordance with Section 23 34 00 - HVAC Fans.

- .2 Non-fused disconnect switches to be provided and installed by manufacturer.

2.3 CASING

.1 General:

- .1 Factory manufactured unit casing of minimum 18 gauge (1.3mm) satin coat galvanized sheet metal. Surfaces shall be cleaned with a degreasing solvent to remove oil and metal oxides and primed with a two-part acid based etching primer. Finish coat shall be electrostatically applied enamel, to all exposed surfaces. All unprotected metal and welds shall be factory coated.
- .2 All walls, roofs and floors shall be of formed construction, with at least two breaks at each joint. Joints shall be secured by sheet metal screws or pop rivets. Wall and floor joints shall be broken in; roof joints on outdoor units shall be broken out (exposed) for rigidity, min 50mm. Wall joints shall extend min 6mm below floor panel. All joints shall be caulked with a water resistant sealant.
- .3 Unit casing floors shall be provided with structural reinforcing channels under floor to minimize deflection. Units mounted on roof curbs shall incorporate welded floor to base construction, with welded corners. Unit underside joints shall be caulked.
- .4 Provide inspection doors to allow access to internal parts and component removal; provide doors at for access to all fans and motors, filters, dampers and operators, access plenums, electrical control panels, burner compressor compartments.
 - .1 Inspection doors: thermally insulated (min 50mm thick, 24 kg/m³ density neoprene coated fibreglass thermal) factory manufactured complete with latches, two handles and extruded neoprene gaskets of sizes as indicated. Hinge doors to open against air pressure complete with hold open devices and lockable “Leverlok” type handles.
- .5 Internally insulate casing with 50mm thick, 24 kg/m³ density, neoprene coated rigid fibreglass insulation with metal nosings at longitudinal edges and butt joints, pinned at no more than 400mm spacing and cemented in place using fire retardant adhesive. Drain pans and all floor areas shall be insulated on the underside.
- .6 Weatherproof sheet metal casings:
 - .1 All units shall be weatherproofed and equipped for installation outdoors, complete with louvers and/or hoods on air intakes and exhaust openings; louvers and exhaust hoods shall be c/w 25mm galvanized screens; rain gutters or diverters shall be installed over all access doors; caulk all joints with water resistant sealant.
- .7 Openings and bolted sections gasketed.
- .8 22 Gauge Solid Liner throughout unit & 24 Gauge Perforated Liner in AHU Fan Sections.

- .9 Provide duplex receptacle and vapour tight marine lights complete with gaskets and cast aluminum guards in each section in accordance with Division 26.

2.4 ROOF CURBS

- .1 Provide full perimeter roof mounting curb of heavy gauge sheet metal, minimum of 450mm high, and complete with wood nailer, neoprene sealing strip, and fully welded "Z" bar with 25mm upturn on inner perimeter, to provide a complete seal against the elements. External insulation of the roof-mounting curb shall be provided by the Roofing Subcontractor.

2.5 MIXING BOX SECTION

- .1 Provide as indicated.
- .2 Material: to match casing.
- .3 Design: provide internal baffles and other devices, as required, to produce mixed air temperature to within plus or minus 3 degrees C of design across face of outlet.
- .4 Factory manufactured assembly to include frame, dampers, operating linkages, drive shafts of minimum 12 mm diameter carbon steel and access door on each side.
- .5 Damper operators suitable for operation at -40°C ambient conditions.
- .6 Dampers for mixing boxes: Section 23 33 15 - Dampers - Operating.

2.6 FILTER BOX

- .1 Filters: in accordance with Section 23 44 00 - HVAC Air Filtration.
- .2 Filters shall be 50mm pleated panel disposable type filters c/w rust resistant support grid and high-wet strength beverage board enclosing frame with diagonal support members bonded to the air entering and air exiting side of each pleat. Provide for each filter a permanent re-usable metal enclosing frame. The filter media shall have a minimum efficiency of 30-35% on ASHRAE Standard 52.1-92, and a minimum of MERV 8 per ASHRAE 52.2. Rated U.L. Class 2
- .3 Provide 1 set of spare filters.
- .4 Provide blank off plates around filters.

2.7 VIBRATION ISOLATION

- .1 Flexible connections in accordance with Section 23 33 00 - Air Duct Accessories.
- .2 Provide 50mm spring isolation on air handling unit fans and 25mm rubber & shear isolation on makeup air unit fans.
- .3 Vibration isolators on each fan section in accordance with Section 23 05 48 - Vibration and Seismic Controls for HVAC Piping and Equipment.

Part 3 Execution**3.1 APPLICATION**

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 FANS

- .1 Provide sheaves and belts required for final air balance.
- .2 Suspension for hung units: install four part hanger type, ceiling flange, top hanger, bottom hanger and vibration isolator with takeup for levelling.
- .3 Install flexible connections at fan inlets and outlets as indicated.
 - .1 Ensure metal bands of connectors are parallel and not touching.
 - .2 Ensure that fan outlet and duct are aligned when fan is running.
- .4 For units with variable frequency drives (including MUA-7), provide vented enclosure complete with manual bypass. Outdoor variable frequency drives shall be suitable for operation to -40°C ambient.

3.3 DRIP PAN

- .1 Install deep deal P trap on drain lines.
 - .1 Depth of water seal to be 1.5 minimum times static pressure at this point.

3.4 CONDENSING HEATING SECTION

- .1 For condensing units (including MUA-4), provide acid neutralization tank and pipe condensate to neutralizer using stainless steel tubing; discharge neutralized condensate to nearest hub / funnel / floor drain.
- .2 Provide category II stainless steel venting.

3.5 CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
- .2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

END OF SECTION
