

**1.1. REFERENCE STANDARDS**

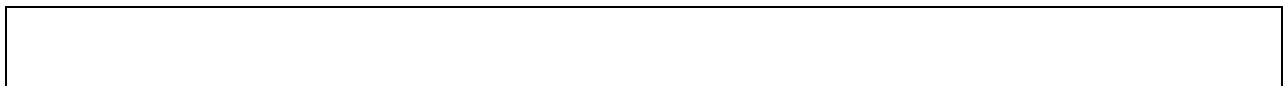
- 1.1.1. The factory assembled air handler shall conform to the requirements outlined ASHRAE 90.1.
- 1.1.2. Unit shall be designed to conform to ASHRAE 15.
- 1.1.3. Unit shall be UL and UL, Canada, tested and certified in accordance with ANSI Z21.47 Standards as a total package.
- 1.1.4. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.
- 1.1.5. Unit casing shall be capable of withstanding 500--hour salt spray exposure per ASTM B117.
- 1.1.6. Unit shall be manufactured in a facility registered to ISO 9001:2000.

**1.2. QUALITY CONTROL**

- 1.2.1. Units shall be produced by a recognized manufacturer who maintains a local service agency and parts stock.
- 1.2.2. The unit shall be the product of a North American owned firm, built in North America, with all components made in North America.
- 1.2.3. Air handling units and major components shall be products of manufacturing firms regularly engaged in production of such equipment whose products have been in satisfactory use in similar service for not less than 10 years.
- 1.2.4. Fans shall conform to AMCA bulletins regarding testing and construction.
- 1.2.5. Coils shall be ARI certified.
- 1.2.6. Filter media shall be ULC listed.
- 1.2.7. Units with factory wiring shall be factory UL/ETL/CSA approved and labelled. Failure to comply with this requirement will necessitate the manufacturer, at his expense, to have a certified UL/ETL/CSA representative inspect the equipment prior to affixing a label.

**1.3. UNIT GENERAL CONSTRUCTION**

- 1.3.1. Factory assembled rooftop packaged air conditioning units. Units shall include down flow economizer c/w barometric relied damper, solid state enthalpy, and differential enthalpy control..All specified components installed at the factory. Field fabrication of units and



their components will not be accepted. Field assembly of modules is acceptable only when performed and certified by the manufacturer's representatives.

- 1.3.2. The units will be completely factory pre-wired and tested, requiring a single point power supply at the voltage available at the location where the installation will take place.
- 1.3.3. The units shall also be equipped with a transformer to provide a separate 115V/1 phase service to ancillary factory pre-wired components such as marine lights, receptacles, controls, etc. The transformer shall be wired to a different circuit from that serving the air handler, so that shutting down the power to the unit will not affect the power supply to the 115V/1phase circuit. Preeminent labelling in this respect will be provided inside and outside the unit. .
- 1.3.4. The units shall be designed to be supported by perimeter roof curb:

#### 1.4. CASING

- 1.4.1. The unit shall be constructed out of 2" thick wall and roof panels.
- 1.4.2. The panel outer layer shall be made out of painted 16 gauge solid satin coat steel sheet in accordance with ASTM-653.
- 1.4.3. Acoustic/ thermal insulation 2" thick and 4.5 lb/cu.ft.. density fibreglass to be installed between the outer and inner layers. All insulation and accessories including adhesives and facing shall have a composite fire and smoke hazard rating tested by ASTM E84, NFPA 225, and UL 723 not exceeding; Flame Spread 25, Smoke Developed 50.
- 1.4.4. All outdoor units shall be finished with Amershield, High Solids two component Aliphatic polyurethane coatings weather resistant topcoat for extra heavy service. The exterior finish for outdoor units shall withstand the Salt Spray Test of 3,000 hrs per ASTM B117.

#### 1.5. ACCESS DOORS

- 1.5.1. Units shall be provided with access doors on one side of the unit.
- 1.5.2. Doors must be the same thickness as the unit casing to maximize thermal and acoustical resistance.. Hinges shall be continuous piano type stainless steel c/w Two (2) "Ventlok" high pressure latches operable from either side of the door shall be provided. The door opening shall be fully gasketed with continuous ½" closed cell hollow round black gasket and a metal encapsulated reinforcing backing that mechanically fastens to the door frame.



**1.6. FILTERS**

- 1.6.1. Filter sections shall be provided with adequately sized access doors to allow easy removal of filters.
- 1.6.2. 2" (50mm) Pleated Panel Disposable Filters: Non-woven cotton fabric media with a metal support grid and heavy duty beverage board enclosing frame. The filter media shall have an average efficiency of 30% and MERV 8 on ASHRAE Standard 52-76.

**1.7. INDIRECT GAS FIRED HEATING SECTION**

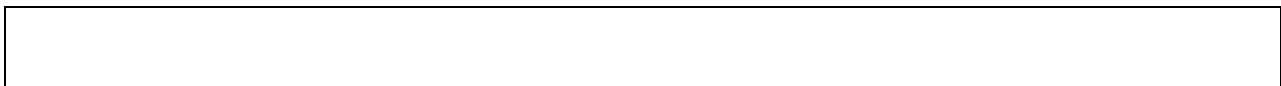
- 1.7.1. Heating units shall have an indirect natural gas heating section that is C-ETL, approved for both sea level and high altitude areas. The entire assembly shall be approved and labelled by a nationally recognized certification agency.
- 1.7.2. Efficiency: no less than 82% across the full firing spectrum.
- 1.7.3. Heat exchanger shall be a primary drum and multi-tube secondary assembly constructed of titanium stainless steel with multi-plane metal tubulators, and shall be of a floating stress relieved design.
- 1.7.4. The burner assembly shall be a blow through positive pressure type with an intermittent pilot ignition system to provide a high seasonal efficiency. Flame surveillance shall be with a solid state programmed flame relay c/w flame rod.
- 1.7.5. Unit discharge air control shall include 15:1 turndown (HT burner) turndown for all input ranges from 100MBH to 1400MBH (29.3 kW to 410 kW).

**1.8. DX COOLING COILS**

- 1.8.1. Coils shall be ARI certified and Underwriter's Laboratories listed. All coils shall be circuited in a counter flow manner with uniform circuits. Coils shall be designed and tested in accordance with American National Standards Safety Code for Mechanical Refrigeration (ANSI/ASHRAE 15). Coils shall be fully enclosed within casing and mounted on angle frames manufactured to allow coils to be individually removed.
- 1.8.2. Drain pans shall be min. 2" deep, constructed of continuously welded 304 stainless steel

**1.9. CONDENSING SECTION****1.9.1. . Refrigeration Compressors**

- 1.9.1.1. Compressors shall be fully hermetic scroll type, set on resilient neoprene mounts. Compressors are complete with crankcase heaters, internal line break motor protection and an internal pressure relief. Compressors are high efficiency and



matched with liberally sized condenser coils so that the EER ratings meet or exceed ASHRAE 90.1 recommendations. Refrigerant: choice of R-410A or R-134A.

1.9.1.2. Each compressor piping circuit shall have a liquid line filter dryer and a moisture indicating sight glass.

1.9.1.3. Compressors shall incorporate an internal or external pressure-limiting device to protect against high pressure. Compressors shall be provided with means of over-load protection. Scroll compressors shall be equipped with a device to limit noise due to scroll reversal

1.9.2. Heat Rejection Fans and Motors

1.9.2.1. Heat Rejection fans shall be direct driven propeller type arranged for vertical draw through air flow.

1.9.3. Heat Rejection Coils

1.9.3.1. Heat Rejection coils shall be copper tube type, mechanically expanded into aluminium fins. Fins density shall not exceed 14 units per inch.

1.9.4. Refrigerant Accessories

1.9.4.1. Thermal expansion valves shall be equipped with a remote sensing bulb, external equalizer line and fully adjustable superheat setting (default value: 15°F to 20°F).

1.9.4.2. Hot gas by-pass shall be provided on the lead compressor to maintain adequate suction pressure at low loads. the hot gas by-pass shall be introduced into the evaporator distributor and not directly into the suction line.

1.9.4.3. Five minute anti-short cycling timer shall be provided on the lead compressor, together with inter-stage time delay relays on subsequent stages.

1.10. FACTORY MOUNTED CONTROLS

1.10.1. The manufacturer shall furnish all material required for direct digital control of components specified. All components shall be installed in EMT conduit with liquid tight fittings.

1.10.2. Carbon Dioxide Sensor: Units supplying high occupancy rooms, such as meeting rooms shall have the outdoor damper controlled by a carbon dioxide sensor.



- 1.10.3. The manufacturer shall supply and install 1000 ohm platinum temperature sensors. The mixed air sensor shall be of the averaging type. The supply, return air and outdoor air shall be single point duct mount type..

1.11. SAFETIES

- 1.11.1. The manufacturer shall supply and install safety controls. Safety control transmitters shall be located at the sensor and output (0-10 V-DC) shall terminate on a numbered terminal strip in the main electrical panel.

