

PreciseAIR Series PPW – Packaged Water Cooled A/C Unit

1.0 GENERAL

- 1.1 This specification covers the design and manufacture of AIR's PreciseAIR Series PPW packaged, water cooled DX air conditioning unit.
- 1.2 PreciseAIR units are recommended for rooms which have temperature/humidity control requirements down to 72°F and 40% relative humidity.
- 1.3 Features described herein are AIR's standard. However, AIR offers customization of our standard designs to our Customers, upon request.
- 1.4 AIR selects each mechanical component to specifically meet the required conditions of each unit. Where deviations between this specification and AIR's detailed technical proposal offered to the Customer exist, the proposal shall take precedence.

2.0 UNIT CASING

- 2.1 Units shall be a vertical configuration with upblast supply air discharge and rear return.
- 2.2 Unit panels shall be fabricated from 18 gauge, 304 stainless steel and include fasteners that allow for easy removal and replacement without alignment issues. Panels shall not be used to support any internal equipment. Access doors shall be gasketed and easily removable for maintenance access.
- 2.3 Fan section panels shall be 1" thick single wall construction with closed cell elastomeric foam insulation, non-condensing at ambient conditions of 90°F and 80%RH.
- 2.4 Compressor section panels shall be single wall construction and uninsulated.

3.0 SUPPLY FANS

- 3.1 Units up to 15 tons shall be furnished with one fan. Units above 15 tons shall be furnished with dual fans.
- 3.2 Fan wheels shall be forward curved.
- 3.3 Fans shall be balanced per ANSI/AMCA 204-05, G6.3 level.
- 3.4 Fans shall have pillow block bearings with an L10 life of minimum 100,000 hours.
- 3.5 All fan pulleys, sheaves and belts shall have a 1.5 service factor.
- 3.6 Fans shall be constant speed, double width double inlet (DWDI). Single and dual fans shall be furnished with a single TEFC motor and motor starter.
 - 3.6.1 Upon request, motors shall be TEFC, IEEE 841 compliant.
- 3.7 Standard allowance for external duct static pressure loss is 1" w.g.

- 3.7.1 Static pressure loss through duct mounted heaters provided for field installation by AIR will be included within the internal static pressure allowance, provided the Customer provides the duct size for the heater installation at time of Request for Proposal.
- 3.7.2 Customer shall advise if external duct static pressure required exceeds 1" w.g. at time of Request for Proposal.

4.0 EVAPORATOR COILS

- 4.1 Evaporator coils shall have copper tubes and aluminum fins. Fin spacing shall not exceed 10 fins per inch. Fin thickness shall not be less than 0.008". Tube thickness shall not be less than 0.025". Coils shall be in a vertical configuration.
 - 4.1.1 Upon request, evaporator coils and all exposed copper shall be coated with ElectroFin E-Coat or Blygold PoluAl XT polyurethane coating. Application shall be by a qualified technician per manufacturer's recommendations.
- 4.2 Condensate drain pans shall be stainless steel and shall be sloped. Drain pans shall be readily accessible.

5.0 REFRIGERANT SYSTEM

- 5.1 Compressors shall be scroll design.
- 5.2 The lead compressor shall be furnished with a VFD for capacity modulation.
- 5.3 Compressors shall be furnished with high and low pressure switches.
- 5.4 System refrigerant shall be R-410a.
- 5.5 Each refrigerant circuit shall include suction and discharge service valves, liquid line filter drier with removable cores, liquid sight glass moisture indicator, and liquid line solenoid valve.
- 5.6 Thermostatic expansion valves shall be provided for each circuit.

6.0 WATER COOLED CONDENSERS

- 6.1 Condensers shall be shell and tube design per Section VIII of the ASME pressure vessel code with removable heads for cleaning.
- 6.2 Condenser shells shall be carbon steel.
- 6.3 Condenser tubes shall be minimum 0.035" thickness copper.
 - 6.3.1 Upon request, cupro-nickel tubes are available as an option.

6.3.2 Upon request, stainless steel tubes are available as an option, provided the condensers are mounted on a skid external to the unit due to the increased condenser size required.

6.4 Tube water velocity at design condition shall be 3 to 6 fpm (copper tubes) and 3 to 7 fpm (CuNi tubes).

6.5 Condenser heads shall be fully accessible for removal to facilitate tube cleaning.

6.6 Condenser water regulating valves shall be pressure actuated type with capillary tube, modulating water flow to maintain system head pressure. A separate valve shall be provided for each refrigerant circuit, shipped loose for field installation in the piping by the Customer.

7.0 FILTERS

7.1 The filter rack shall be designed to house 2" deep filters.

7.1.1 Upon request, the filter rack may be designed to house 4" deep filters.

7.2 The filter rack shall be stainless steel construction. The filter access doors shall be gasketed and hinged. Filters shall be mounted in the rear of the unit and accessible from either side of the unit.

7.3 Filters shall be 2" thick and have a MERV 8 rating. Filters shall meet the requirements of the latest version of ASHRAE Standard 52.2.

7.3.1 Upon request, a differential pressure gauge shall be furnished across the filter bank, capable of displaying the filter pressure drop locally.

7.3.2 Upon request, a differential pressure switch shall be furnished across the filter bank, capable of displaying the filter pressure drop locally and outputting a signal to the unit controller indicating high filter pressure drop.

7.4 A dirty filter pressure drop allowance of 0.5" shall be added to the clean filter pressure drop for the purpose of A/C unit fan selection.

8.0 ELECTRIC HEATERS

8.1 Upon request, electric heaters shall be provided.

8.2 Heaters shall be shipped loose for duct mounting by the Customer in the field.

8.2.1 Upon request, duct mounted heaters shall be provided with a remote control panel.

8.3 Electric heaters shall be finned tubular type with high quality alloy resistor wire centered and permanently encased within compacted refractory material, surrounded by a stainless steel sheath, furnished complete with all required safeties, including air flow

differential pressure switch, primary over temperature protection, secondary over temperature protection, and over current protection.

8.4 Heaters shall be furnished with SCR controller for fine room temperature control.

9.0 HUMIDIFIERS

9.1 Upon request, humidification shall be provided with a remote electric generated humidifier and duct mounted dispersion tube, installed by the Customer.

9.2 Piping/hoses between the humidifier and duct mounted dispersion tube shall be furnished and installed by the Customer.

9.3 The Customer shall provide the duct size for installation of the duct mounted dispersion tube.

10.0 ELECTRICAL/CONTROLS

10.1 The unit control panel shall be NEMA 12 rated and mounted remotely.

10.1.1 Upon request, an option shall be offered for power and control cables between remote control panels and the air handling unit, for field installation by the Customer.

10.1.2 Upon request, control panels shall be NEMA 4X rated for hazardous, exposed, or wet environments.

10.2 The unit shall be furnished with a Carel PLC, mounted in the control panel.

10.2.1 Upon request, the unit shall be furnished with an Allen-Bradley CompactLogix PLC.

10.3 Upon request, supply fan motor VFD's shall be provided.

10.4 Motor starter and control power transformers shall be installed within the unit control panel, such that the Customer needs only to bring a single power supply. Power supply may be 208-230v/3ph/60hz, 480v/3ph/60hz, or 575v/3ph/60hz, as requested by the Customer.

10.4.1 Upon request, a locking non-fused disconnect switch mounted on the door of the panel.

10.5 All terminals in the control compartments shall be finger safe and torqued to the terminal manufacturer's specifications utilizing the appropriate WIHA or equivalent torque screwdriver. No energized conductors or circuit parts shall be exposed when the door is opened.

10.6 Upon request, all system wiring shall be tinned copper.

10.7 The A/C unit control systems shall operate as follows:

- 10.7.1 The unit controller shall stage the compressors to maintain a constant coil leaving air temperature based on maintaining the room design absolute humidity.
- 10.7.2 If supply fan VFD's were requested, the unit controller shall control fan speed to maintain the room temperature set point.
- 10.7.3 The unit controller shall send an analog output to the electric heater SCR controllers to prevent the room temperature from dropping 2°F below set point.
- 10.7.4 The unit shall not automatically restart upon shutdown.
- 10.8 Instruments:
 - 10.8.1 A room mounted temperature/humidity sensor with digital display shall be furnished by AIR and installed within the room by the Customer.
 - 10.8.2 A unit mounted coil leaving air temperature sensor shall be installed within the unit casing.
- 10.9 Upon request, the unit shall be furnished with a smoke detector shipped loose for field mounting in the supply duct by the Customer.
 - 10.9.1 Power supply for the smoke detector shall be 120v, supplied by Customer independent of the A/C unit.
 - 10.9.2 Each smoke detector shall be provided with two (2) Form C dry contacts. One contact shall be interlocked to shutdown A/C unit upon detection of smoke.
 - 10.9.3 The A/C unit shall be furnished with at least two (2) Form C dry contacts to provide remote output of unit shut down.
- 11.0 ADDITIONAL SERVICES
 - 11.1 AIR provides startup and commissioning support for all AIR equipment by a factory certified technician.
 - 11.2 AIR offers additional services for a turnkey mechanical solution, upon request:
 - 11.2.1 Detailed engineering of the design, including mechanical, structural, and electrical.
 - 11.2.2 Demolition of existing equipment and/or ductwork (as required).
 - 11.2.3 Rental equipment for temporary cooling.
 - 11.2.4 Furnish and installation of new AIR equipment, including chillers, pump packages, air conditioning units, deep bed activated carbon filtration units, activated carbon recirculation units, etc.
 - 11.2.5 Furnish and installation of additional equipment not manufactured by AIR, required for a complete system.

- 11.2.6 Fabrication and installation of new ductwork and piping.
- 11.2.7 Architectural/structural modifications.
- 11.2.8 Remote condition monitoring analysis and engineering support via the AIRbot system.
- 11.2.9 Web based parts supplier for all AIR and other HVAC equipment.
- 11.2.10 Permanent on-site maintenance contracts offering continuous support for AIR and other HVAC equipment.

END OF SPECIFICATION