**SAMPLE SPECIFICATION**

**MODEL PDH,**

**INDOOR HEATING AND MAKEUP AIR UNITS (SEPARATED COMBUSTION)**

**General Section**

Provide packaged, indoor heating (and cooling) units with separated combustion as Reznor® brand equipment.

Provide packaged, indoor heating and makeup air, power-vented units as Reznor® brand equipment. The units

shall be the PDH series, minimum 81% efficiency, designed for ceiling suspension or slab or floor mounting. The unit shall be specifically design for make-up air and space control applications, meeting all the requirements found in AHSRAE standard 90.1 and 62.2. The base unit shall consist of blower and gas heat section. The unit shall be modular such DX cooling, DX cooling with reheat, chilled water cooling, evaporative cooling, hotwater heat, and mixing box sections can be added to the unit configuration.

**Power**

All units shall be equipped for use with (115/1) (208/1) (230/1) (208/3) (230/3) (460/3) (575/3) unit supply voltage. The unit shall have single power connection for 3 phase or 1 phase wiring with factory installed distribution blocks. The unit shall have (unit mounted, non-fusible, nema 4X, lockable disconnect switch) (factory supplied, field installed, non-fusible, lockable, nema 1) field mounted disconnect switch) (factory supplied, field installed, fusible, lockable, nema 1 disconnect switch). The control voltage wiring shall be class 2, 120Vac and/or 24Vac/dc. Unit shall have (over/under voltage or phase loss protection); (factory supplied, field powered convenience outlet ground-fault circuit interrupter).

**Blower & Air Control Section**

The base unit blower shall include an adjustable belt-driven centrifugal fan with (open dripproof) (totally enclosed) (premium efficiency) motor. The motor shall have [rubber][spring] vibration isolated with (contactor) (motor starter) (variable frequency drive). Fan shall have air proving switch inter-locked with gas controls to prevent gas heat operation when the fan is not operational. The blower shall use (solid-belt) (linked belt). The blower assemble shall be factory set to specified CFM at the given static pressure. The blower assembly shall have adjustable sheave for airflow adjustment. (The blower assembly shall be shipped with spare belts). Unit shall have [1” or 2” disposable] [1” or 2” permanent] [2” MERV 8] [4” MERV 13 pleated] filters.

**Gas Heat Section**

The gas furnace shall have a Reznor Tcore3® heat exchanger and single burner combustion system. The Heating system shall provide a minimum of 81% thermal efficiency. All units shall be equipped for use with (natural gas) (propane). The Tcore3 combustion system primary heat exchanger shall be of (aluminum steel) (409 stainless steel) (316 stainless steel) The secondary heat exchanger shall be of aluminum alloy. The furnace shall be equipped with all required safety elements including flue high temperature switch, condensate drain, condensate drain blockage shutdown switch and heat exchanger high temperature shutdown. (Unit shall have vent cap.) (Unit shall have factory installed shut off valve and union.)The gas furnace is to be arranged for ducted inlet combustion air and flue gas exhaust. The unit must have single point wall or roof penetration for entry of combustion air and exhaust of flue gases by the use of a concentric adapter. Furnace operation shall be controlled through an integrated circuit board. The circuit board shall monitor heater operation and have LED diagnostic indicator lights to identify abnormalities in control functions. The circuit board shall monitor flame failure, failed ignition, airflow and low gas pressure. Unit shall have a (two stage control) (4:1 modulating control). The unit shall use (digital controller with make-up with space temperature reset sequence.) (analog discharge air control) (Thermostat control for space temperature control applications). The unit shall have (Lon) (N2 ) (bacNet) communications capability.

**Cooling Section**

Unit shall have draw thru cooling coil section that can provide condition of air per the schedule. The coil module shall be configurable to handle DX or chilled water coil. The coil module shall have double wall construction with insulation value of (R-3.8) (R 4.4). Coil cabinet shall have sloped slide out stainless steel drain pan under all coils per ASHRAE std 62.1. The airflow shall be limited to 500 FPM to prevent water blow off from the coil. (Cooling coil cabinet to include UVC lamp for neutralization of VOCs and microorganisms for improved IAQ).

(Unit shall have custom configured DX evaporate coil to maximize thermal efficiency and system performance with the selected condenser unit. The coil shall be (single circuit) (two stage 50%-50% dual interlaced) (3 stage 33%-66% interlaced) (2 Stage unequal 40% -60% interlaced). The coils shall have (left) (right) hand connections. Coil casing shall have (galvanized) (stainless steel) material construction. The custom coil shall have 3 to 6 rows, 8 – 14 fins per inch, 200 to 500 FPM air flow, and ½” or 3/8” tube size to meet the given schedule coil performance. (Coil shall have electro-fin polymeric coating for sea coast and other corrosive environment applications.) (Unit shall be supplied with thermal expansion valve for each circuit.) (Unit shall be equipped with unit mounted reheat. Reheat system shall be self contained requiring no external piping connections. The reheat shall provide useful primary cooling of entering air meeting ASHRAE std 90.1 efficiency guidelines. The reheat coil position shall include a minimum separation of 4” from the cooling coil to eliminate re-evaporation of cooling coil condensate. Modulating capacity control not required unless necessary to maintain proper discharge air control.))

(Unit shall have custom configured chilled water evaporate coil to maximize thermal efficiency and system performance with the given GPM and fluid temperatures. The coil shall be design for ( x% Ethylene) (X % Proplylene) (No) glycol. (The coil shall have turbospiral tubes for fluids with glycol percentages above 20%.) The coils shall have (left) (right) hand connections. Coil casing shall have (galvanized) (stainless steel) material construction. The custom chilled water evaporator coil shall have quarter, half, ¾ or full circuiting to meet the schedule performance. The evaporator coil shall have 4 or 6 rows, 8 – 14 fins per inch, 200 to 500 FPM air flow, and fluid pressure drop less than 18 psi to meet the scheduled performance. Manufacture shall provide detail coil performance sheet. ½” or 3/8” tube size to meet the given schedule coil performance. (Coil shall have electro-fin polymeric coating for sea coast and other corrosive environment applications.))

**Evaporative Cooling Section**

(Provide evaporative cooling module as manufactured as Reznor® brand for makeup air application. Cabinet shall constructed of weatherized (aluminized steel) (stainless steel) for outdoor installation. A mesh screen will cover the air intake opening. Unit shall be provided with height adjustable legs. Units shall be equipped with terminal block wiring for use with 115 (208, 230) volt supply voltage. Cabinet bottom shall have overflow and drain connections and a 300 series grade stainless steel water reservoir. Module shall be equipped with pump and float control system including electrical motor with stainless steel arm, thermally protected water pump, float switch and bleed line connections (Aqua Saver® water metering system with solenoid valve and timer). Evaporative cooling media supplied to be 12 inches in size and to be made of (rigid cellulose material, rigid glass fiber material-UL rated). Equipment shall include (moisture elimination pad) and (drain and fill kit) and (water hammer arrestor).)

**CONTROLS Section**

Unit shall be equipped with factory installed contactors, relays, sensor, switches to perform (analog discharge air control) (DDC make-up air with space temperature reset control. The unit shall control blower, heating, cooling & reheat functions.) (External BMS interface control) (Space thermostat control). The unit shall have label terminal blocks and unit mounted ladder logic wiring diagram.

**Cabinet Section**

Packaged unit may have factory-attached modules:- (mixing box for inlet air with selection of outside and return entering air configurations [top, bottom, rear combinations with or without screens], outside or outside and return air dampers modulating economizer controls or MUA with direct-coupled 24VAC spring return actuators. Construction of mixing box will be (single wall, insulated)(double wall, [insulated] [high density insulated]). The (single wall, insulated) (double wall [insulated] [high density insulated]) blower section shall be supplied with (horizontal supply opening) (screened horizontal supply opening) (horizontal supply air inlet opening with duct flanges) (screened horizontal supply air inlet opening with duct flanges).

The packaged system shall have a pre-coat RAL 1001 white paint finish. Finish shall be a minimum 80 gloss on G30 galvanized steel. Cabinet shall be arranged for [floor mounting] [slab mounting] [ceiling suspension from (4) (6) (8) point base suspension]. Control, burner, and blower service compartment doors shall be hinged. Blower door hardware shall be heavy duty stainless. Control and burner door hardware shall have heavy duty external hardware. (Cabinet shall have through-the-base electrical supply knockout.)

**OPTIONAL ACCESSORIES**

The following features will be factory installed: (duct flanges); (discharge louvers [horizontal] [horizontal and vertical]); (firestat); (discharge temperature low limit), (high, low, or high and low gas pressure switches); and (relays). The following accessories will be provided: horizontal or vertical vent/combustion air kit; (downturn nozzle [25- 65° with or without vertical louvers] [50-90° with or without vertical louvers]); (gas pressure regulator); and (remote console)

**CERTIFICATION**

The packaged heating and cooling system shall be design-certified to ANSI Z83.8 and CSA 2.6 Standards. The energy usage shall be designed to meet ASHRAE Standard 90.1. See specific information for sizes and capacities. Product manufacturer must have minimum of 40 years of experience with separated combustion heating equipment. Product to be warranted to the original owner/user to be free from defects in material or workmanship. Limited warranty to be for twelve (12) months from date of installation or eighteen (18) months from date of shipment from manufacturer, whichever occurs first.