



## TYPICAL *Ultra-CPA* SPECIFICATIONS

4-13-17

The *Ultra-CPA* shall be of the configuration, capacity and style as indicated on the drawings and equipment schedule and the following construction details.

### UNIT CONSTRUCTION:

#### *Casing:*

The wall/roof panels are to be a double wall construction. The panels form their own internal structure without any additional internal supports or framing. The panels shall incorporate an integral thermal break system such that there is a no through metal path.

The exterior casing of the unit shall be constructed of 16-gauge, G235 galvanized steel (optional 18-gauge or heavier stainless steel or aluminum), unpainted.

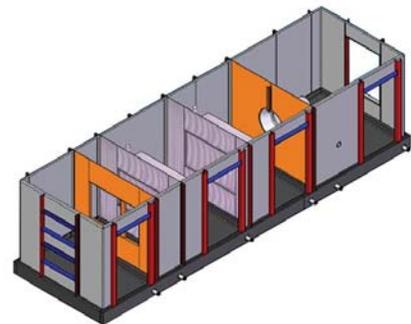
The interior of the unit shall consist of a hygienic, sanitary inner liner constructed of a minimum of 18-gauge stainless steel which shall completely enclose the insulation. The interior of the unit shall be completely watertight to allow for interior cleaning and sanitizing. The interior of the unit shall be completely sealed watertight using an FDA approved silicone sealant.

The interior of the unit shall be constructed so that all casing fasteners are either internal to the casing or on the exterior of the unit. Interior casing fasteners shall not be allowed.

All closures shall be stainless steel and shall be sealed on both sides with an FDA approved silicone sealant. Closures attachment to the unit casing shall be internal to the casing seams. NO flange type closures are permitted.

Pipe and conduit penetrations through the unit casing shall be leak free.

Optional test: Casing leakage test at no more than ½% of design volume at 1.5 times the design operating pressure.



***Insulation:***

Unit inner and outer walls are completely assembled before insulating the unit. Once assembled the walls are insulated with 2.6" (optional up to 6") of two part polyurethane pour foam insulation with a minimum R value of 17. This forms a continuous once piece case construction with no through metal type construction. The insulation is completely encapsulated within the walls. Once the walls are poured, the roof is assembled and foamed.

***Roof:***

The roof shall be a minimum of 18-gauge, G235 galvanized steel (optional stainless steel or aluminum), standing seam type construction, pitched away from the service doors for good water runoff. All exterior seams are sealed air and water tight with an FDA approved sealant.

The interior liner of the roof shall be a minimum of 18-gauge stainless steel. The interior of the unit shall be completely sealed watertight using an FDA approved silicone sealant.

***Drain Pans:***

Each section of the unit shall be complete with 100% drainable triple sloped drain pans, which shall be a minimum of 16-gauge, stainless steel. Each drain pan shall be fully welded with all seams in the "water zone" non-porous, ground and polished. All pans are individually tested to ensure they are leak free. Pans are fully welded to the unit base frame creating a one piece pan/base construction. Each pan shall have a 1.5" MPT stainless steel connection extended to the unit exterior.



The drain connection for the drain pans shall be designed so the pans drain out the bottom of the drain pan for full drain pan drainage with the drain connection then extending out the side of the unit. No standing water shall be allowed.

The underside of the pans/base of the unit shall be insulated with a minimum of 2.6" polyurethane foam insulation completely covering the frame and the bottom of the pans. This ensures a completely insulated base and an airtight construction plus forms a vapor barrier. This underside insulation is then protected by 18-gauge, G235 galvanized steel sheets (optional stainless or aluminum) welded to the bottom of the unit base frame.

### ***Frame/Base:***

The frame shall be a solid welded formed galvanized steel channel, unpainted. The base is designed to support the internal component loads without sagging, pulsating or oil canning.

Removable lifting lugs shall be provided at the base of the corners of each section of the unit.

When the return air or supply air is in the bottom of the unit, the opening shall be framed to prevent water from draining down the opening. Each opening shall have a removable FRP (optional stainless steel) safety grating.

### ***Access Doors:***

Access doors shall be of a size and quantity to permit full access to all components for maintenance, inspection and cleaning. The doors shall be sized to allow removal of all internal components with the exception of the cooling coils. Access doors shall be provided with an extruded aluminum full perimeter door frame. The frame extrusions shall be miter cut at the corners and assembled by mechanically staking the frame into concealed gussets made of extruded aluminum. All doors and door frames shall be thermally broke. Access doors shall incorporate two continuous separate replaceable gasket seals around the entire periphery of the door.

Each door shall be pressure injected with 2.5# of polyurethane foam per cubic foot of door.

The interior panels shall be constructed of 24-gauge stainless steel and the exterior panels of hot dipped galvanized steel.

The doors shall be mounted to the frame by a minimum of two (2) stainless steel hinges.

Each door shall be complete with a minimum of two (2) 90 degree handles, operable from the interior and the exterior of the unit.

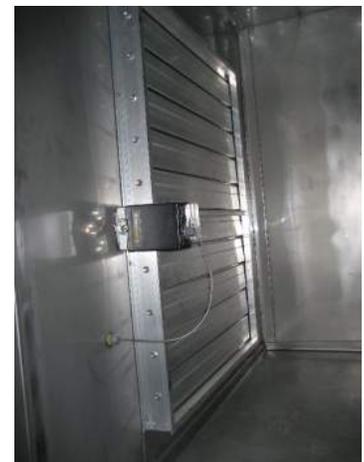
\*Option – Doors shall be complete with an 8" x 8" plastic window in each section.

\*Option – Doors shall be complete with test ports.

### ***Outside and Return Air Dampers:***

The dampers shall be single blade (optional extruded aluminum, air foil), parallel blade (optional opposed blade), with nylon bearings and stainless steel spring loaded side closures.

The construction shall be a minimum of 16-gauge stainless steel with a 12-gauge casing (optional aluminum).



The dampers shall have a low leak rating of less than 8.0 CFM per square foot at 4" of differential static pressure and rated for 2,000 FPM.

Outside air and/or exhaust air streams shall be complete with an outside air hood with bird screen (insect screen optional).

***Blowers:***

The blower wheel shall be all aluminum, non-overloading air foil type. Wheel shall be mounted directly on the motor, direct drive. Motor/blower assembly shall be mounted off the floor to provide maximum accessibility and clean-ability. Assembly shall not be mounted to the unit base/floor. Blower shall be complete with an inlet guard.

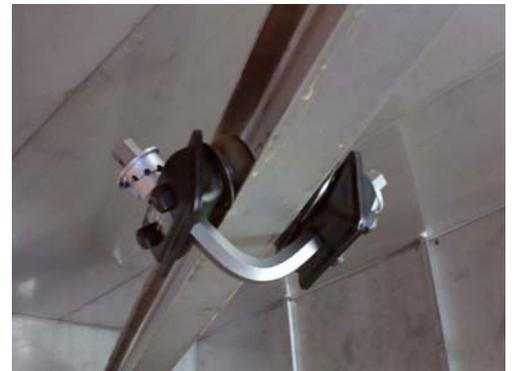


Inlet cone shall be spun aluminum construction.

The blower will be in the draw through position (optional blow through position depending on the application).

Each blower shall be test run at their operating speed prior to shipment. The blower(s) shall be balanced and records maintained of the readings. Final peak measurements shall not exceed 0.07 mm/sec.

\*Option – the fan section shall be complete with an I-beam assembly hung from the ceiling complete with a trolley to assist in the motor/blower removal. Beam shall be stainless steel (painted beams not permitted) and be mounted below the ceiling so the top of the beam can be cleaned.



\*Option – Fan wall arrangement with the direct drive motor/blower quantity determined by the size of the unit and the application.

\*Option – Air flow measurement provision and electronic transmitters to monitor and/or control the air flow volume.

***Motors:***

The motors shall be premium efficient, TEFC, VFD-ready, 1.15 service factor, NEMA design B with class F insulation.

## **HEATING OPTIONS:**

### ***Steam Coils:***

The steam coil shall have \_\_\_\_\_ rows and \_\_\_\_\_ fins per inch.

The steam coil shall be in the reheat position (optional pre-heat position).  
The steam coil shall be constructed with 0.035" wall copper tubes and 0.0095" thick aluminum fins (optional heavier copper tube and copper/aluminum fin, stainless steel tube and aluminum fin or cupro-nickel tube and aluminum fin).

The coil shall be designed for a maximum operating pressure of 25 psi (optional 100 psi steam – note operating pressures over 40 psi require cupro-nickel or stainless tubes).

The capacity of the coil shall be \_\_\_\_\_ BTUH using \_\_\_\_\_ PSIG steam at the steam coil.

The steam coil shall be designed for a \_\_\_\_\_ ° F design entering air temperature.

The coil shall be designed for a maximum face velocity of 800 feet per minute.

Coils shall be mounted off the floor for maximum clean-ability and accessibility. Coils shall not be mounted on structure fastened to the floor/base.

\*Option: Stainless steel, opposed blade, Face and bypass dampers on the steam coil. The dampers shall be the same construction as the other dampers in the unit.

### ***Hot Water or Glycol Heating Coils:***

The hot water coil (optional glycol coil) shall have \_\_\_\_\_ rows and \_\_\_\_\_ fins per inch.

The coil shall be supplied in the reheat position (optional pre-heat position).

The coil shall be constructed with 0.027" wall stainless steel tubes and 0.014" thick aluminum fins. Headers shall be stainless steel.

The coil shall have \_\_\_\_\_ BTUH capacity using \_\_\_\_\_ ° F hot water (optional glycol).

The coil shall require \_\_\_\_\_ GPM of hot water (optional glycol).

The water (optional glycol) coil pressure drop shall be \_\_\_\_\_ feet.

The coil shall be designed for a \_\_\_\_\_ ° F design entering air temperature.

The coil shall be designed for a maximum face velocity of 800 feet per minute.

The coil shall be designed for a \_\_\_\_\_ ° F design entering air temperature.

Coils shall be mounted off the floor for maximum clean-ability and accessibility. Coils shall not be mounted on structure fastened to the floor/base.

***Hot Gas Ammonia Heating Coil:***

The hot gas ammonia coil shall have \_\_\_\_\_ rows and \_\_\_\_\_ fins per inch.

The hot gas coil shall be supplied in the reheat position (optional pre-heat position).

The hot gas ammonia coil shall be constructed with stainless steel tubes and aluminum fins. Headers shall be stainless steel.

The capacity of the coil shall be \_\_\_\_\_ BTUH using \_\_\_\_\_ ° F hot gas ammonia condensing temperature.

The hot gas ammonia coil shall be designed for a \_\_\_\_\_ ° F design entering air temperature.

The coil shall be designed for a maximum face velocity of 800 feet per minute.

Coils shall be mounted off the floor for maximum clean-ability and accessibility. Coils shall not be mounted on structure fastened to the floor/base.

***Direct Fired Heating Section:***

The unit shall be designed with a direct fired burner located in the outside air section of the unit. The direct fired burner shall have a cast aluminum header with stainless steel baffle plates.

The burner shall have a \_\_\_\_\_ BTUH capacity.

The burner shall be designed for 1-5 PSI natural gas pressure (optional 8-14" or high pressure systems above 5 PSI) and be fully modulating with a 20 to 1 turndown ratio. Burner shall have adjustable profile plates.

The controls shall be full modulating and be designed in accordance with Factory Mutual (FM) insurance guidelines.

The gas train shall be complete with all safety devices and controls.

***Indirect Fired Heating Section:***

The unit shall be designed with an indirect fired heating section. The indirect fired burner shall be fully modulating. The heat exchanger, primary and secondary, shall be 400 series stainless steel and be complete with drain connection piped to the outside of the unit (Optional 304 stainless steel). **Note:** **Proper disposal of any condensate shall be by the installation contractor.**

The burner shall have a \_\_\_\_\_ BTUH input capacity and a \_\_\_\_\_ BTUH output.

The burner shall be designed for 8-14" natural gas pressure. Note: gas pressure above 14" requires a pressure reducing valve (by others).

The controls shall be fully modulating and be designed in accordance with UL.

The gas train shall be complete with all safety devices and controls. Burners are available with two-stage and fully modulating control. Turndown shall be a minimum of 8 to 1 (optional 10 to 1 and 20 to 1).

Heat exchanger shall be complete with flue stack and rain cap (shipped loose for field mounting).

## **COOLING OPTIONS:**

### ***Recirculating/ Direct Expansion/ Flooded Cooling Coils:***

The cooling coil shall have \_\_\_\_\_ rows and \_\_\_\_\_ fins per inch.

The coil shall be designed for recirculating ammonia (minimum 1.2 to 1 feed rate) (optional direct expansion or flooded coil design).

The coil shall have a \_\_\_\_ ton capacity using a \_\_\_\_ °F saturated suction temperature.

The capacity of the coil shall be based on a mixed air entering temperature of \_\_\_\_ °F dry bulb/ \_\_\_\_ °F wet bulb.



The coil(s) for ammonia use shall be constructed using 0.025" wall stainless tubes and 0.014 thick aluminum fins (maximum of 8 FPI). Coil shall meet strength requirements of ASME/ANSI B31.5. All coils shall be charged with nitrogen prior to shipment. Coil performance shall be rated in accordance with AHRI 420.

Coil(s) for R-22, R-404a, or any of the similar refrigerants shall be constructed using 0.025" wall tubes stainless tubes and 0.014" thick aluminum fins (maximum of 8 FPI). Headers shall be stainless steel. All coils shall be charged with nitrogen prior to shipment. Coil shall meet strength requirements of ASME/ANSI B31.5. Coil performance shall be rated in accordance with AHRI 420.

The coil shall be designed for a maximum face velocity of 625 feet per minute.

### ***Chilled Water or Glycol Cooling Coils:***

The cooling coil shall have \_\_\_\_\_ rows and \_\_\_\_\_ fins per inch.

The coil shall have a \_\_\_\_ ton capacity using \_\_\_\_ GPM of \_\_\_\_ °F chilled water (optional \_\_\_\_% propylene glycol).

The water (or glycol) pressure drop through the coil shall be \_\_\_\_ feet.

The coil capacities are based on a \_\_\_\_° F dry bulb / \_\_\_\_° F wet bulb mixed air entering temperature.

The coil shall be constructed with stainless tubes and aluminum fins. Coil shall meet strength requirements of ASME/ANSI B31.5. Coil performance shall be rated in accordance with AHRI 420. Coil vent and drain piping and accessories by contractor.

## **FILTRATION:**

### ***Prefilters:***

Prefilters shall have an average efficiency MERV 10, pleated filters, with synthetic media (optional aluminum or stainless steel washable filters).

The unit shall be supplied with one initial set of filters (extra sets of filters can be supplied).

The filters are held in solid welded filter frames without holes or joints. Clips and frames designed for upstream service. NO "universal" type filter frames shall be used.

\*Option – Prefilter differential pressure gauge to indicate when the filters should be changed or differential pressure transducer to provide filter pressure drop indication on the PLC.

### ***Final Filters:***

The final filters shall be a MERV 15, microfine glass wet laid paper (the same material used in HEPA, absolute filters – optional synthetic type material). The filters shall be of a cartridge type. Each filter shall have gasketing so the unit will have new gasketing with every change of final filter.

\*Option – MERV 17 absolute HEPA filter. The media on the HEPA filter shall be a microfine glass. The HEPA filter shall have a rating of 99.97% on a 0.3 micron particle size.

\*Option – An intermediate 65% filter is available upstream of the final filters.

The final filters are complete with a differential pressure gauge. Optional: filter pressure drop transducer to provide a pressure drop indication on the PLC/control system.

The unit is supplied with one set of final filters (optional - unit supplied with two or more sets of final filters).

## **ACCESSORIES:**

### ***Outside Air Inlet Hood:***

The unit includes an outside air inlet hood constructed of G235 galvanized steel.

The hood shall be complete with a bird screen (optional insect screen).

The hood shall be shipped separate from the unit.

### ***Integral Exhaust Section:***

The integral exhaust section shall be complete with (qty of fans) \_\_\_" diameter direct drive exhaust fans located within the casing of the CPA unit.

Each of the fans shall be constructed of with a cast aluminum hub and aluminum blades. Fans are direct drive.

Service for the integral exhaust fans shall be accomplished through full sized walk-in access doors (no internal hatches or confined spaces shall be allowed).

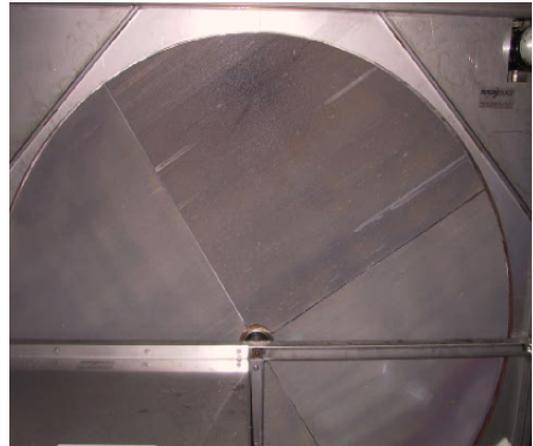
Each fan shall be driven by a \_\_\_ H.P., TEAO, direct drive motor. Motors shall be VFD ready, with grounding ring, if used for pressure or economizer control.

Each fan shall have a double, low leakage, aluminum, gravity backdraft damper.

### ***Desiccant Dehumidification Section:***

The dehumidification section shall consist of a rotor (wheel) of media impregnated with a silica gel desiccant. The wheel shall consist of a process section (where the moisture is removed from the air stream) and a regeneration section (where the moisture is removed from the air stream).

The section will include a heated regeneration section with a heat source to drive the moisture from the wheel. The heat source shall be direct fired natural gas (optional steam, electric, or indirect fired natural gas).



### ***UVC Light Systems:***

The CPA units can be supplied with a UVC light system for either just the cooling coil(s) and cooling coil pan(s) or can be supplied to provide UVC lighting/microbiological control for the whole unit. Light systems are complete with individual ballasts, mounted in a control panel on the outside of the unit. Bulbs are complete with a protective sleeve. The system includes an access door observation window and an access door safety switch so the light(s) will go off if the door is opened.



### ***Service Vestibule:***

The unit shall be provided with a full access (60" wide minimum) service vestibule the full length of the unit. Service vestibule shall be insulated double wall with a galvanized liner. Floor shall be a flat. Interior includes a 3 KW unit heater with a thermostat for winter heating and a fan and inlet louver for summer ventilation.

## **ELECTRIC CONTROLS:**

Each unit shall be supplied with an Allen Bradley PLC control system. The following are some of the many options which are available for the control systems:

- Main control panel, control transformer and terminal blocks with UL label.
- Allen Bradley Compact Logix and Micro Logix systems. Control Logix available as an option. Systems are complete with a 6" panel view (optional larger panels available) in the door of the main panel.
- Outside air and recirculated air controls which use outside air on an economizer.
- Outside air and recirculated air controls providing a fixed amount of outside air.
- Outside air damper controls for systems with 100% makeup air.
- Room thermostats or RTD's.
- Return air thermostat or RTD's
- Outside air thermostat or RTD's
- Motorized steam valve (field mounted). Trap by others.
- Magnetic motor starters mounted in the control panel.
- Disconnect switches mounted in the control panel.
- Arc flash disconnects
- Remote stainless steel control panels which can include (just a few of the possible options):
  - blower on/off switch
  - blower indicating light
  - cleanup switch
  - cleanup indicating light
  - dirty filter light
  - burner Indicator light
  - PLC panel view

- Steam coil freezestats.
- Hot water or glycol 3-way control valves (shipped loose for field mounting)
- Chilled water or glycol 3-way control valves (shipped loose for field mounting)
- Room humidity sensor located in the remote control panel (or return air).
- Natural gas heating controls – either direct or indirect fired.
- Discharge air ammonia detector.
- Smoke detectors.
- CO2 detectors
- O2 detectors
- Interior service lights (LED).
- Service receptacles.
- Room pressurization control.
- Heating coil face and bypass dampers and damper controls.
- VFD motor control
- Exhaust motor starters and or VFD drives
- Cleanup cycle system and controls.
- UVC coil/drain pan light systems.
- Complete unit UVC light systems.
- Blower door interlock switches (standard or CAT 3)
- Dirty filter lights/contacts.

**TESTING:**

1. Each unit shall be fully tested prior to shipping. This shall include a full control check to verify the control sequence of operation.
2. Air flow measurement at as close to design statics as possible.
3. Blower/motor balancing
4. Optional: Casing leakage testing
5. Optional: Sound testing.
6. Field testing and commissioning.