

## **Design Standard**

### **Convection Heating and Cooling Units**

#### **Purpose:**

The heating water systems are an essential element of the mechanical space heating systems. This design standard has the purpose of creating a consistent application of heating water system requirements throughout the East Side Union High School District, therefore achieving a standard of quality for maintenance, energy efficiency, and reliability throughout all renovation and new building projects.

#### **Design Standard:**

Design and specify work to include materials, installation, and testing of heating water system for a complete and operable system.

- Radiant Ceiling Panels
  - Design complete radiant heating/cooling ceiling system. The radiant panels consist of 0.040-inch aluminum faceplate, 1/2-inch ID copper serpentine coil metallurgically bonded to face plate, with a 1-1/2-inch thick, 3/4 lb. density glass fiber acoustic pad installed over panels. Panel interconnecting piping to be Type "L," soft copper, with wrought bronze or hard temper connection to valved outlets in the radiant panel circulating system. Panel finished with baked enamel finish
  - Panels to be designed as an installed system with the supplier providing interconnecting piping and the pipe between the panel system and the control valve
- Hot water heating coils:
  - Designed to be counter-flow
  - Coil construction (downstream of air handlers): copper coils, aluminum fins
  - Coil construction (inside of air handlers): copper coils, aluminum fins
- Horizontal hydronic unit heaters
  - Blow through unit with heating water coil, propeller fans with motor, three-speed switch, 18 gauge galvanized steel casing, fan guard, adjustable discharge louvers
  - Coils: 1/2-inch OD copper tubes with aluminum fins mechanically bonded to the tubes, 5/8-inch OD male sweat fittings. Coils leak tested at 350 PSIG minimum air pressure, suitable for working pressures up to 250 PSIG with air vents

- Motors: Permanent split capacitor type with built-in thermal overload protection
- Cabinet Heaters:
  - Blow-through design with direct drive motor and forward curved double inlet fans in the airstream below the coil. Internal surfaces are either painted or are constructed of galvanized steel. Baked enamel finish on cabinet
  - Heating water constructed of copper tubing mechanically expanded into aluminum fins. Joints are brazed with high temperature silver alloy
- Hot Water Convectors
  - Partially or fully recessed cabinet constructed of 16 gauge steel. Fasteners to be tamperproof Allen-Head machine screws. Access doors flush mounted with tamperproof latches. Exposed corners to have formed 1-inch radius; cabinet to be phosphatized and painted inside and out with baked on primer and baked enamel finish
  - Grilles to be die-cast formed with directional louvers
  - Heating element to consist of 1/2-inch OD copper tube and aluminum fins and 1-1/4-inch steel headers. Test heating element at 200 PSI hydrostatic pressure
- Finned Tube Radiator
  - Copper Aluminum Elements: Manufacture copper aluminum heating elements of seamless copper tube permanently bonded to aluminum fins by a mechanical process
  - Provide enclosure
- Heat Exchangers
  - Plate and Frame Exchanger: Pressure plate and frame supporting heat transfer plates to be carbon steel. Heat transfer surfaces to be corrugated Type 304 stainless steel. Piping connections to be ANSI flanges. Minimum 150 PSIG working pressure to conform to ASME rules for pressure vessels. Install as recommended by manufacturer and provide adequate clearance for cleaning

### **Approved Manufacturers:**

- Radiant Ceiling Panels
  - Airtex Corporation
  - TROX

- Hot water heating coils:
  - Temtrol
  - Titus
  - Heatcraft
  - USA Coil
  - Trane
- Horizontal hydronic unit heaters
  - Trane
  - Sterling
  - Reznor
  - Modine
- Cabinet Heaters:
  - Herman Nelson
  - Trane
  - Carrier
- Hot Water Convectors
  - American Air Filter
  - Trane
- Finned Tube Radiator
  - Trane
  - Vulcan
  - Sterling
- Heat Exchangers
  - Bell & Gossett
  - Alfa Laval
  - Taco

**Substitutes Allowed:**

Yes, if performance and quality equivalency can be evidenced.

## **Associated Design Standards and Construction Specifications**

- Division 23 HVAC Design Standards
- 23 05 53 - Identification for HVAC Piping And Equipment Design Standard
- 23 21 13 - Hydronic Piping Systems Design Standard

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