

## **SECTION 23 84 30 - GAS FIRED RADIANT TUBE HEATERS**

### **PART 1 - GENERAL**

#### **1.1 WORK INCLUDED**

- A. Provide labor, materials, equipment and services as required for the complete installation and related work as shown on the Contract Documents.

#### **1.2 QUALIFICATIONS**

- A. Two stage radiant tube heaters shall be Design Certified by the American Gas Association (AGA) and comply with current Occupational Safety and Health Act (OSHA) Requirements.

#### **1.3 SUBMITTALS**

- A. Radiant Tube Heaters and Accessories. Submittal to include copies of the engineering specification forms, showing physical dimensions, installation detail, control wiring diagrams, and spare parts list.

#### **1.4 MANUFACTURER'S WARRANTY**

- A. Warranty covering the heater's combustion and radiant entire tube assembly for a period of five (5) years, and all components utilized in the heater control assembly for a period of one (1) year.

### **PART 2 - PRODUCTS**

#### **2.1 GENERAL REQUIREMENTS**

- A. Free from expansion and contraction noises and strains.
- B. Two stage radiant tube heaters shall be designed to satisfactorily operate at a five (5) inches W.C. to a maximum inlet pressure of fourteen (14) inches W.C. without adjustments.

#### **2.2 TWO STAGE RADIANT TUBE HEATER**

- A. General:
  - 1. Ceiling suspended.
  - 2. Access for servicing the heating element, motors, and controls.
  - 3. Radiant Tube Construction:
    - a) Heater's control housing shall be totally enclosed with a corrosion resistant enameled steel exterior. The controls shall be easily serviceable by removing one (1) panel.

- b) Heater's combustion chamber shall be 4" O.D. 16 ga. titanium alloy aluminized steel finished with a high emissivity rated, corrosion resistant, black coating.
- c) Heater's radiant emitter tube shall be 4" O.D. 16 ga. aluminized steel finished with a high emissivity rated, corrosion resistant, black coating.
- d) The heater's combustion chamber and radiant emitter tube shall incorporate a 4" slip fit connection in which the upstream tube slides into the next tube and is held by a bolted clamp.
- e) Safety differential pressure switches shall incorporate atmospheric sensing termination fittings designed to eliminate blockage due to moisture or foreign matter.
- f) The silicon carbide ignitor shall be readily accessible and serviceable without the use of tools.
- g) Reflectors shall be of .025 polished aluminum with a multi-faceted design which includes reflector end caps. Reflectors shall be rotatable from 0 to 45 degrees when required. The heater's reflector hanging system shall be designed to permit expansion while preventing noise and/or rattles. Reflectors shall be assembled to the heater without the use of tools.
- h) The heaters shall utilize a downstream tabulator baffle for maximum thermal efficiency.
- i) Heaters shall be equipped with a sight glass allowing a visual inspection of ignitor and burner operation from the floor.
- j) The two stage radiant tube heaters shall be designed such that, at the customer's option, outside combustion air may be supplied without the use of additional supply fans. An air intake collar shall be supplied as part of the burner control assembly to accept a 4" O.D. supply duct.
- k) Provide double wall B-vent vent and intake. Fire caulk penetrations thru fire partitions. Provide per manufacturer's written instructions.

4. Burner Controls

- a) The two stage radiant tube heater's normal sequence of operation shall include a defined input differential. Heater must be AGA Design Certified to operate at an input differential of at least 30 % between the low-fire and high fire modes.
- b) Heaters shall be equipped with a direct silicon carbide ignition system with a one (1) time ignition trial to sensing mode and an infinite trial after sensing mode. Power supplied to each burner shall be 120 VAC, 60HZ, 1ø.

- c) The control assembly shall be Design Certified by AGA, shall provide main burner regulation, and shall be of the redundant type.
  - d) Heater controls shall include two safety differential pressure switches; one to monitor exhaust back pressure and one to monitor combustion air flow, so as to provide complete burner shut-down due to insufficient combustion air or flue blockage.
  - e) The heater's control system shall be designed to shut-off the gas flow to the main burner in the event either a gas supply or power supply interruption occurs.
  - f) The heater's air flow control system shall provide a 45 second pre-purge prior to initiating burner operation and a post-purge upon completion, effectively removing all products of combustion from heat exchanger and/or radiant tubes.
  - g) Heater control assembly shall include staging indicator lights that define the units operating input ranges.
  - h) No condensation shall form as a result of combustion in the combustion chamber or radiant tubes while at operating temperatures.
5. The thermostats shall be two stage operating on 24 volts. No external transformers shall be required.
- a) Total heater shut-down shall occur, in the event of circuit control lock-out, including burner operation and combustion air blower. An interruption of power (reset thermostat) will restart the firing sequence.
- B. Design Equipment: Detroit Radiant
- C. Acceptable Makes: Detroit Radiant, Roberts Gordon, Modine.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION - GENERAL**

- A. Provide equipment in accordance with manufacturer's printed instructions. Report untrue walls before installation. Report cases where clearance below suspended heaters is less than 7-1/2 ft. Provide clearance for piping and conduit. Support units independent of piping. Support units from building structure, with screws or bolts, no nailing allowed.

**3.2 INSTALLATION - GAS**

- A. Provide access for serving of motor, gas, valve and controls. Provide service gas shut off valve.
- B. Maintain all required clearances of flue pipe as per manufacturers instruction, and all Federal, State and Local Codes.

**END OF SECTION**