

WRITTEN SPECIFICATIONS

SECTION 23 55 23 – FUEL-FIRED RADIANT HEATERS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, and Division 01 Specification Sections apply to this Section.

1.2 SUMMARY

- A. Section includes:
- Gas-Fired Infra-Red Tube Heaters
- B. Related Sections:
- Division 23, Section 23 10 00 "Facility Fuel Systems"
 - Division 23, Section 23 51 00 "Breechings, Chimneys, and Stacks"

1.3 QUALITY ASSURANCE

- A. Building Codes and Standards
- Gas-fired radiant tube heaters shall be Design Certified by CSA (American Gas Association and Canadian Gas Association) and comply with current ANSI, CAN/CSA and Occupational Safety and Health (OSHA) Requirements. The supplier shall provide the CSA Certification Number and the heaters shall bear the CSA Seal of Certification.
 - Gas-fired radiant tube heaters shall be furnished and installed in accordance with local codes, building drawings and manufacturer's recommendations.

1.4 SUBMITTALS

- A. The supplier shall furnish the owner/contractor with _____ copies of the engineering specification forms, showing physical dimensions, installation detail, recommendations, and field wiring.

1.5 WARRANTY

- A. The supplier shall provide a manufacturer's published warranty covering the heater's burner core for a period of ten (10) years, heat exchanger and combustion chamber tubes for a period of ten (10) years, and all components utilized in the heater control assembly and hardware for a period of two (2) years.

PART 2 – PRODUCTS

2.1 MANUFACTURER

- A. Gas-fired radiant tube heaters shall be SOLARONICS SUNTUBE IV VERSAMOUNT SERIES of the model numbers and inputs in MBTUH as manufactured by Solaronics, Inc. Rochester, Michigan 48307.

2.2 DESCRIPTION

- A. Gas-fired radiant tube heaters shall be designed to satisfactorily operate at a minimum inlet pressure of: 6 inches W.C. for 40-125 MBTUH units, and 7 inches W.C. for 130-200 MBTUH units, when specified for natural gas; or 11 inches W.C. when specified for LP/propane gas; and at a maximum inlet pressure of 14 inches W.C.
- B. Gas-fired radiant tube heaters shall be designed to operate without adjustments when burning natural gas having a heat value of 1000 BTU per cubic foot with a specific gravity of .65, or when burning LP/propane gas having a heat value of 2500 BTU per cubic foot with a specific gravity of 1.53.

2.3 CONSTRUCTION

- A. The heater's controls shall be totally enclosed with a corrosion resistant housing. The controls shall be easily accessible from three sides by removing the cover. The burner core assembly shall be constructed of durable materials specially designed for high efficiency, maximum heat transfer, extremely quiet operation and extended life.
- B. The heater's combustion chamber shall be 4" O.D. Aluma Therm (aluminized titanium alloy steel) or Aluma Therm finished with a high emissivity rated, corrosion resistant, black coating. Aluma Therm provides excellent mechanical properties at elevated temperatures and for corrosion / oxidation resistance is coated with 8% silicon/aluminum alloy, and shall meet MIL 500 hour salt spray test.
- C. The heater's heat exchanger tube shall be heavy-duty 12 ga. (.109") wall thickness 4" O.D. black steel.
- D. The heaters are CSA Design Certified for alternate construction utilizing radiant tubes of all Aluma Therm finished with a high emissivity rated, corrosion resistant, black coating.
- E. The 4" O.D. tubes shall be joined by two layers of 18 ga. (.052") wall thickness aluminized steel tube clamp assembly and shall be a minimum of 8" in length for maximum support. Clamp shall be of a compression coupling design for uniform draw and pressure, and four (4) 5/8"-11x2" zinc plated carriage bolts and nuts to draw up (tighten to a minimum of 65 foot-pounds of torque).

- F. The direct spark ignitor shall be durable to resist breakage.
- G. Reflectors shall be .025" thick - #3003H25 aluminum brite finish with a geometrically designed configuration not having less than 91.7% reflectional efficiency, shall be held by a .229" diameter aluminized steel wire hanger. Hanger shall incorporate the geometric ability to rotate the reflector up to 45 degrees, in either direction from horizontal using the center of the combustion chamber or heat exchanger as the axis of rotation.
- H. Each 5 or 10-foot reflector section shall have the ability to be independently rotated from all other 5 or 10-foot sections, or overlapped between 5 or 10-foot sections, or a combination of both over the entire length of the system. The heater's reflector hanging system shall be designed to permit expansion while minimizing noise and/or rattles. Reflectors shall be assembled to the heater without the use of tools.
- I. Heaters shall utilize a downstream turbulator that shall be factory installed in the last ten (10) feet of heat exchanger, wave formed for optimal turbulence, acceleration and impingement of the products of combustion resulting in appropriate velocity pressure and momentum for maximum thermal efficiency.
- J. Heaters shall be equipped with a sight glass permitting a visual inspection of the spark ignitor and burner operation from the floor.
- K. 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.
- L. Heaters shall be either directly vented outdoors with insulated flue pipe, or indirectly vented by positive air displacement of 4 CFM and one square inch of net free area per 1,000 BTUH input.

2.4 CONTROLS

- A. Heater controls shall be isolated from combustion air to prevent corrosion from wet or dirty air.
- B. Heaters shall be equipped with a direct spark ignition system with three (3) trials-for-ignition and upon loss of flame sensing three (3) re-trials-for-ignition. Flame sensing shall be via an independent sensing rod and circuit.
- C. Power supplied to each burner shall be 120 VAC, 60 Hz. (Optional 50 Hz units available.) Maximum heater electrical current draw shall not exceed 3 amps.
- D. The heater controls shall have a three (3) copper conductor electrical power cord extending a minimum of thirty-six (36) inches from the control box with a three (3) prong plug.
- E. Heater controls shall include a safety differential pressure switch, factory set (non-field adjustable), to monitor combustion airflow, so as to provide complete burner shutdown due to insufficient combustion air or flue blockage.
- F. The heater's control system shall be designed to shut off the gas flow to the burner in the event either a gas supply or power supply interruption occurs.
- G. Combination gas control shall have a step open feature for softer ignition. Gas valve shut-off shall be of the redundant type. 100% safety shut-off.
- H. The heater shall have an 1/8" – 27 FPT externally accessible inlet gas pressure test point.
- I. The heater shall automatically recycle itself after an inadvertent shutdown.
- J. The heater shall have three (3) system validation lights easily visible on the bottom of the burner housing. Lights shall validate "Power On," "Air Pressure Normal," and "Operation Normal."
- K. The heater's blower motor shall be thermally protected, permanently lubricated and the blower motor's impeller shall be both statically and dynamically balanced.
- L. The heater's airflow control system shall provide a pre-purge prior to initiating burner operation.
- M. No condensation shall form as a result of combustion in the combustion chamber or heat exchanger tubes while at operating temperatures.
- N. Total heater shutdown shall occur in the event of circuit control lockout, including burner operation and combustion air blower. An interruption of power (reset thermostat) will restart the firing sequence.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Installation shall be in accordance with the requirements of the manufacturer.
- B. An Installation, Operation, and Maintenance Manual shall be supplied with each heater.