

SECTION 235523.13 – LOW INTENSITY GAS-FIRED RADIANT HEATERS (Multiple-Burner Engineered Vacuum System Type)

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. This Section includes gas-fired low intensity tubular radiant heaters. (Multiple-Burner Engineered Vacuum System Type).

1.3 SUBMITTALS

- A. Product Data: For each type of gas-fired radiant heater indicated. Include rated capacities, operating characteristics, and accessories.
- B. Shop Drawings: plans, elevations, sections, details, and attachments to other work.
  - 1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  - 2. Wiring diagrams: power and control wiring.
- C. Coordination drawings: plans, elevations, and other details, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
  - 1. Illustrations showing how equipment will be attached.
  - 2. Items penetrating roof.
  - 3. Vent and gas piping connections.
- D. Operation and Maintenance Data: include in emergency, operation, and maintenance manuals.
- E. Warranty: special warranty specified in Section 1.5.

1.4 QUALITY ASSURANCE

- A. Electrical components, devices, and accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

- B. Equipment shall be certified to the ANSI Z83.20 standard and bear the CSA certification label.

## 1.5 WARRANTY

- A. Warranty Period: (One year on all internal components), (five years on tube exchangers), and (ten years on burner) from date of substantial completion.

## PART 2 – PRODUCTS

### TUBULAR INFRARED HEATERS (Multiple-Burner Engineered Vacuum System Type)

- A. Basis-of-design product: Subject to compliance with requirements, provide Detroit Radiant Products Company; Re-Verber-Ray HLV Series Engineered Negative Pressure Multiple Burner Vacuum System or equal.
- B. Fuel type: burner shall be designed for [natural] [propane] gas having characteristics same as those of gas available at project site.
- C. Gas control: operation shall include a defined input differential. Heater must be CSA Design Certified to operate at an input differential of at least 20% between the low and nominal rated input modes.
- D. Combustion chamber: shall be 4 inch O.D. 16ga. Titanium stabilized aluminized steel to allow for the operating temperature to exceed the 1030F as set forth in the ANSI Z83.20 standard, finished with a high emissivity rated, corrosion resistant, black coating with an emissivity level documented at .92 or higher.
- E. Emitter tube: shall be 4 inch O.D. 16ga. aluminized steel finished with a high emissivity rated, corrosion resistant, black coating with an emissivity level documented at .92 or higher
- F. Condensate tail pipe: shall be 4 inch O.D. 16ga. 304 stainless steel. Pipe shall be able to be cut to any length without having raw carbon steel exposed at the edges. Glass lined, porcelain lined, or other material prone to chipping and cracking shall not be permitted.
- G. Burner type: units shall operate under a negative pressure with exhaust gasses pulled through the exchanger pipe to a common exhauster pump. Each burner shall receive its combustion air independently. Burners that have exhaust gases from upstream burners passing over them shall not be permitted. Burners shall operate at a minimum of 3.5" W.C. manifold pressure to achieve proper air-gas mixing. Burners that require air filters shall not be permitted.

- H. Burner: stainless-steel venturi burner. The flame anchoring screen shall have a minimum temperature rating equivalent to 304 grade stainless steel. Non stainless steel burners shall not be permitted.
- I. Tube connections: the heater's combustion chamber and radiant emitter tube shall incorporate a 4 inch slip-fit, interlocking connection in which the upstream tube slides into the next tube and is held by a bolted clamp. A butted tube connection system shall not be permitted.
- J. Exhauster Pumps:
  - 1. Systems designed for condensing shall have a cast aluminum housing for corrosion resistance. Cast iron housings shall not be permitted.
  - 2. Motors ½ hp and higher shall be TEFC type standard efficiency. Motors shall be equipped with thermal protection and capacitor starters.
- K. Ignition system: Hot surface silicon carbide composition. Igniter shall be readily accessible and serviceable without having to remove the burner. Spark ignition systems shall not be permitted.
- L. Reflectors: Shall be .025 polished aluminum with a multi-faceted design which includes reflector end caps. Reflector shall have a polished bright finish with clear visual reflection ability. (A sample will be required at time of submittal). Reflector shall have a minimum of 7 sheet metal bends in its fabrication to optimize downward radiation. Reflectors shall be rotatable from 0 to 45 degrees when required. The heater's reflector hanging system shall be designed to permit expansion while minimizing noise and/or rattles.
- M. Control box: Heater's exterior control chassis shall be constructed of corrosion resistant enameled steel.
  - 1. Air intake: An air intake collar shall be supplied as part of the burner control assembly to accept a 4 inch O.D. supply duct.
- N. Heaters shall be equipped with a sight glass allowing a visual inspection of igniter and burner operation from the floor. Sight glass visible only at a appliance level shall not be permitted.
- O. Heater shall be supplied with a stainless steel flexible gas connector.
- P. System Operation and Safety Controls:

1. Each burner assembly shall include a safety differential pressure switch to monitor combustion air flow, as to provide complete burner shutdown due to insufficient combustion air or flue blockage. A single differential pressure switch at the exhauster assembly shall not be permitted.
2. The system exhauster shall have a minimum of a 90-second post purge to aid in the removal of exhaust gases and condensate in the exchanger pipes.
3. The heater shall incorporate a self-diagnostic ignition module, and recycle the heater after an inadvertent shutdown.
4. 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.
5. Heater control assembly shall include three indicator lights that define the units operating input ranges. One indicator shall validate air flow. Two indicator lights shall indicate low and high stages.

Q. Thermostat control shall be two-stage operating on 24 volts.

R. Venting: shall be per manufacturer approval and specifications.

S. Thermostat:

1. Thermostat: 2-stage, digital programmable wall-mounting type with 50 to 90 deg F (10 to 32 deg C) operating range.
2. Control Transformer: Integrally mounted.

## PART 3 – EXECUTION

### 3.1 INSTALLATION

- A. Install and connect gas-fired radiant heaters, associated fuel and vent features and systems according to NFPA 54, applicable local codes and regulations, and manufacturer's written installation instructions.
- B. Suspended units: suspend from substrate using chain hanger kits and building attachments.
- C. Maintain manufacturers' published clearances to combustibles.
- D. Adhere to manufacturers' installation instructions.

### 3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to gas-fired radiant heaters to allow service and maintenance. Refer to manufacturers' instructions for proper gas connection details.
- C. Gas Piping: comply with NFPA 54 and manufacturer's installation instructions.
- E. Vent Connections: adhere to manufacturers' installation instructions.
- D. Electrical Connections: Comply with applicable requirements in Division 26 Sections.
- E. Install electrical devices furnished with heaters but not specified to be factory mounted.

### 3.3 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- B. Replace damaged and malfunctioning controls and equipment.

### 3.4 ADJUSTING

- A. Obtain adjustment instructions from gas-fired radiant heater manufacturer before making any adjustments to burners or other heating components.

### DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain gas-fired radiant heaters. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION 235523.13