**SECTION 23 83 00**

**Radiant Heating Units**

**PART 1 GENERAL**

**1.1 SUMMARY**

1. Section Includes
2. The infrared radiant heater is the model scheduled with the capacities indicated.
3. Summary of Work
4. Installation of the infrared radiant heater, gas supply, venting, miscellaneous or structural metal work (if required), field electrical wiring, cable, conduit, fuses, and disconnect switches, other than those addressed in the installation scope of work, shall be provided by others. Factory installation services are available through Big Ass Fans. Consult the appropriate installation scope of work for information on the available factory installation options, overview of customer and installer responsibilities, and details on installation site requirements.

**1.2 CODES AND STANDARDS**

1. American National Standard / CSA Standard Gas-Fired Low Intensity Infrared Heaters: Construct and certify gas-fired infrared heaters in accordance with latest edition of ANSI Z83.20/CSA 2.34 “Gas-Fired Low-Intensity Infrared Heaters,” including all current supplements.
2. Installation Compliance
3. United States: Refer to National Fuel Gas Code NFPA 54/ANSI Z223.1 - latest revision.
4. Canada: Refer to Natural Gas and Propane Installation Code CSA B149.1 - latest revision.
5. CSA Compliance: Provide CSA Seal affixed to each burner nameplate and provide CSA Certification of heater design as vented or unvented infrared heater for indoor installation.
6. National Standard Gas Piping Compliance: Install and connect gas piping to gas-fired infrared heaters in accordance with:
   1. United States: Refer to National Fuel Gas Code NFPA 54/ANSI Z223.1 - latest revision.
   2. Canada: Refer to Natural Gas and Propane Installation Code CSA B149.1 - latest revision.
7. National Electrical Code® Compliance: Install and connect electrical wiring to gas-fired infrared heaters in accordance with:
   1. United States: Refer to National Electrical Code, NFPA 70 - latest revision. Wiring must conform to the most current National Electrical Code, local ordinances, and any special diagrams furnished.
   2. Canada: Refer to Canadian Electrical Code, CSA C22.1 Part 1 - latest revision.
   3. **QUALITY ASSURANCE**
8. Approved Manufacturers
9. Infrared heating system shall be IRH as supplied by Big Ass Fans, Lexington, Kentucky.
10. Manufacturer Qualifications
    1. ISO 9001 compliant

**1.4 WARRANTY**

1. Provide written warranty, by manufacturer, agreeing to replace/repair, within warranty period, components of gas-fired infrared systems furnished by manufacturer which are defective in either material or workmanship, provided manufacturer’s instructions for handling, installing, protecting, and maintaining units have been adhered to during warranty period as follows:

Three (3) year warranty on the burner system from the date of final acceptance of the infrared heaters

**PART 2 PRODUCT**

**2.1 MANUFACTURER**

1. Delta T LLC, dba Big Ass Fans, PO Box 11307, Lexington, Kentucky 40575.   
   Phone (877) 244-3267. Fax (859) 233-0139. Website: www.bigassfans.com

**2.2 BIG ASS FANS IRH**

1. Burner Box
2. Natural gas or propane model
3. Nickel-plated steel burner cup
4. Outside air adapter
5. Direct spark ignition
6. Three-try ignition module
7. All components easily accessed
8. Durable spot-welded construction
9. Mica flame observation window
10. Balanced air rotor
11. Gas and electric controls are separated from the combustion air stream
12. Stainless steel flexible gas line and high-pressure gas cock assembly (included for U.S. models only)
13. Heater shall be equipped with permanently lubricated combustion blower with thermal overload protection.
14. Burner Controls
15. Factory Wired: All burners shall be factory wired for 120 volts AC with transformer for 24 volts AC DSI operation and supplied with a grounded three-wire pigtail located at rear of burner.
16. Fail-Safe Controls: To assure a high degree of fail-safe operation, the design shall include an air proving safety pressure switch to verify blower operation before gas valve opens. In the event of a power failure, the gas valve in the burner shall close in safe position.
17. Ignition Controls: All gas-firing burner units shall be equipped with a fully automatic Direct Spark Ignition (DSI) module. The DSI module shall have a 15-second flame response time per ignition trial before lockout occurs. In addition, the DSI module shall be capable of a minimum of three trials for ignition to provide maximum reliability.
18. Reflectors
19. High radiant reflective aluminum reflectors shall be provided for installation over all heat exchangers. Reflector joint pieces shall be provided for installation over the heat exchanger fittings so that the reflector covers the heat exchanger continuously. To maximize radiant output and reduce convective heat losses, reflectors shall extend below the bottom of the heat exchanger tube.
    1. Overall Fittings: All reflectors at termination of the heat exchanger pipe shall have end caps to prevent convective heat from escaping.
    2. Side Reflectors: The system shall have aluminum perimeter side extension reflectors in certain areas of the layout as shown on the plan where specified. Side reflectors shall permanently attach to the side of the top reflector and shall be secured to the pipe with side reflector supports and two “Z” clips for each 8 ft (2.44 m) section of side reflector. To prevent convection losses, tilting of reflectors shall not be acceptable.
20. Outside Air
21. Fresh outside air shall be provided to supply each burner for the support of combustion air.
22. Thermostats
23. Thermostats shall be provided where indicated.
24. Thermostats shall be mounted 5–6 ft (1.5–2 m) above finished floor or as otherwise noted on the drawing.
25. Radiant Piping – Heat Exchanger
26. Radiant Tube: Shall be new 4 in. (10 cm) O.D. heat treated aluminized steel tube X 16-gauge wall with an emissivity factor of 0.80 or greater. ALUMITHERM® steel (aluminized steel/titanium alloy) tubing shall be supplied on the first 10 ft (3 m) of each radiant heater.
27. Fittings: Shall be 4 in. (10 cm) O.D. aluminized steel X 16-gauge wall. Tubes shall be as described in the installation, operation, and service manual.
28. Hanging Materials: All system tubes must be supported in accordance with acceptable practices, local codes, seismic requirements, and applicable standards and as shown on plans. The heat exchanger tube shall pitch downward at least 0.5 in. per 20 ft (1.27 cm per 6.1 m) away from burner box.

**PART 3 EXECUTION**

**3.1 INSTALLATION**

1. General
2. Install gas-fired infrared heaters as indicated; in accordance with manufacturer's installation, operation, and service manual; and in compliance with applicable codes and approvals. Allow adequate space for servicing or removal of the unit without disturbing other piping or equipment.
3. Support
4. Suspend heat exchanger, burner, gas piping, conduit, and reflectors from building substrate as indicated, or if not indicated, in a manner to provide durable and safe installation and in accordance with manufacturer's installation, operation, and service manual. The mounting height shall be a minimum of ft ( m) from floor level.
5. Clearance to Combustibles
6. Always maintain clearance to combustibles as outlined and printed on burner nameplate and in manufacturer’s product data. Measure clearance distance from surface of heat exchanger or as indicated by approval agency’s listing.
7. Venting
8. Install vent piping as indicated on plans. Terminate where indicated on the drawings with a vent terminal assembly as supplied by the manufacturer. The venting must be installed in accordance with the requirements within the installation, operation, and service manual and with the following codes:
   1. United States: Refer to National Fuel Gas Code NFPA 54/ANSI Z223.1 - latest revision.
   2. Canada: Refer to Natural Gas and Propane Installation Code CSA B149.1 - latest revision.
9. Gas Piping
10. Install gas piping as indicated and in accordance/compliance with applicable codes and approval:
    1. United States: Refer to National Fuel Gas Code NFPA 54/ANSI Z223.1 - latest revision.
    2. Canada: Refer to Natural Gas and Propane Installation Code CSA B149.1 - latest revision.
11. Required Gas Supply Inlet Pressures

|  |  |  |
| --- | --- | --- |
| **Natural Gas Units** | **Required Minimum Gas Pressure** | **Maximum Gas Pressure** |
| 80,000–150,000 Btu/h | 4.6” wc | 14” wc |
| 200,000 Btu/h | 5.0” wc | 14” wc |
| **Propane Gas Units** | **Required Minimum Gas Pressure** | **Maximum Gas Pressure** |
| 80,000-200,000 Btu/h | 11” wc | 14” wc |

1. Local Codes: Gas supply piping must meet local requirements and be sized in accordance with Btu/h demand, available pressure, and total length of supply line required for the installation. Connection from supply line to burner unit must be made in accordance with the installation, operation, and service manual. The gas shut-off cock supplied with the unit and the controls in the unit must not be subjected to more than 1/2 lb or 14” wc pressure.
2. Drip Legs: Provide drip legs at all gas risers.
3. Electrical Wiring
4. Install electrical wiring as indicated. Connect power wiring to burners and control wiring between burners and thermostats in accordance with manufacturer’s wiring diagrams.
5. Thermostats
6. Mount thermostats 5–6 ft (1.5–2 m) above finished floor if not otherwise indicated.
7. Thermostat Guards
8. All thermostats shall be covered with a locking thermostat cover.

**3.2 FIELD QUALITY CONTROL**

A. Startup

1. Start up, test, and adjust gas-fired infrared heaters in accordance with the manufacturer’s startup instructions in the installation, operation, and service manual and in accordance with the utility company’s requirements.
2. Check and calibrate controls.
3. Adjust burners (if applicable) according to the manufacturer’s installation, operation, and service manual instructions for maximum efficiency.

**3.3 CLOSEOUT PROCEDURES**

A. Training

1. Provide services of manufacturer’s technical representative to instruct operating personnel in operation and maintenance of gas-fired radiant heaters.
2. Schedule instruction with operating building owner. Provide at least seven days’ notice.

**3.4 PERFORMANCE SCHEDULE**

A. Equipment

1. Provide gas-fired infrared radiant heaters to deliver the following performance capacities:

|  |  |  |  |
| --- | --- | --- | --- |
| **Manufacturer** | **Model** | **Input (Btu/h)** | **Overall Tube Length Minimum (ft, in.)** |
| Big Ass Fans | IRH 80 | 80,000 | 20 ft, 11 in. |
| Big Ass Fans | IRH 125 | 125,000 | 30 ft, 11 in. |
| Big Ass Fans | IRH 150 | 150,000 | 40 ft, 11 in. |
| Big Ass Fans | IRH 200 | 200,000 | 50 ft, 11 in. |

END OF SECTION