

# Specifications for

## Reflect-O-Ray<sup>®</sup> EDS 4.0 GAS FIRED SYSTEMS

### PART 1 - GENERAL

It is the intent of this specification to identify design requirements and minimum standards for the quality, construction, delivery, installation, and operation of the low intensity, vacuum vented, gas fired infrared heating equipment. Minor variations, in accordance with standard practice, shall be indicated on the shop drawings and submitted for approval.

#### 1.1 - CODES AND STANDARD

1.1.1 The entire heating system shall be designed certified to:

- a. United States - CSA Certified to "Gas Infrared Heaters" conforming to the ANSI Z83.20 - (Current Standard).
- b. Canada - CSA Certified to "Gas Infrared Heaters" conforming to CSA 2.34 (Current Standard).

1.1.2 Installation shall conform to local codes and local gas authorities including the National Electrical Code, National Fuel Gas Code, and applicable ANSI, NFPA, B149, CAN/CGA & CSA codes.

#### 1.2 - QUALITY ASSURANCE

1.2.1 The material construction and operation of the infrared heating equipment shall conform to the performance specifications contained herein. Approved manufacturer is: Combustion Research Corporation, 2516 Leach Rd., Rochester Hills, MI, 48309; Tel. No. 248.852.3611, Fax. No. 248.852.9165.

1.2.2 Manufacturer shall warrant mechanical and electrical components for a period of three years from original invoice date.

1.2.3 Manufacturer shall warrant radiant tube for a period of ten (10) years (against internally created corrosion) from the original invoice date provided system is installed and maintained in accordance with the owner's manual.

1.2.4 System shall be furnished complete with Burner(s), Vacuum Exhauster(s), Tubular infrared emitters, Fittings, Reflector Shields, Hangers and System Controls.

#### 1.3 - MANUFACTURER AND INSTALLER QUALIFICATIONS

1.3.1 The low intensity, gas fired infrared heating system shall be a product of a manufacturer who has had at least ten years experience in design and fabrication and who is regularly engaged in the manufacture of the type of gas fired low intensity infrared heating equipment specified herein. Only manufactures who can submit evidence of actual installations of comparable designed construction, and that the products have proven practical, durable, and require a minimum of maintenance, will be qualified under this specification.

1.3.2 Installation of the gas fired low intensity infrared heating equipment shall be by supervised by an authorized representative of the heater manufacturer and shall be in accordance with approved installation drawings. Mechanics shall be skilled and experienced in the erection of the low intensity infrared heating equipment of the type specified herein.

## 1.4 - DELIVERY AND STORAGE

1.4.1 Materials shall be shipped in the manufacturers standard protective packaging to the designated site.

1.4.2 The installing contractor is responsible for receiving, unloading and storage of materials. Storage shall be in dry locations free from dust and water and available for inspection and handling. Handle equipment carefully to prevent damage. Remove damaged items that cannot be restored to like new condition and replace with new items.

## **PART 2 - PRODUCT**

### 2.1 - BURNERS

2.1.1 Burners shall be capable of firing at 40,000 BTU/hr up to 250,000 BTU/hr with 5,000 BTU/hr increments, with natural gas or LP gas.

2.1.2 Burner power requirements 24 Volt, 60 Hz AC 40VA.

2.1.3 Burners shall include the following features:

- a) Burners shall operate under a negative (vacuum) pressure.
- b) Fitted with a 4" diameter combustion air inlet with a fixed combustion air-metering orifice.
- c) Burners shall be fitted a differential air pressure switch so as to prove adequate combustion air is present before burner fires.
- d) Burners shall be fitted with solid state, (3) try, (1) hour reset electronic controls with spark ignition & 100% lockout in event of low fire or main flame failure.
- e) Burner(s) shall have a minimum 15-second pre-purge before ignition.
- f) Burner(s) shall casing to be constructed of 16 Ga. aluminized steel, powder coated.
- g) Burner(s) shall be fitted with inspection window for visual inspection of spark and flame.
- h) Burner(s) shall be fitted with 3 indicator lights - "Power On", "Air Flow On", & "Burner On".
- i) Burner controls, differential pressure switch, gas valve, electrical wiring, etc. shall be segregated from the combustion air supply.

2.1.4 Burner(s) and vacuum exhauster electrically interlocked.

### 2.2 - VACUUM EXHAUSTER

2.2.1 Dynamically balanced forward inclined fan wheel constructed of stainless steel with a cast iron hub.

2.2.3 Direct Drive.

2.2.4 Inlet cone and venturi plate engineered for maximum efficiency.

2.2.5 16 gauge aluminized steel housing and mounting bracket to be powder coated.

2.2.6 Motor to be one sixth (1/6) HP (115V, 3.0 amp), one quarter (1/4) (or one third - 1/3) HP (115V, 3.5 amp), one half (1/2) HP dual voltage (115/230V 6.2/3.1 Amps) or one (1) HP dual voltage (115/230 V 12/6 Amps) - 3450 RPM, 60 Hz capacitor start internally protected, class B insulation. Sealed ball bearings front and rear.

2.2.7 Vibration isolating rubber mounts.

2.2.8 Stainless steel bird screen on side wall venting.

2.2.9 Four inch (4.0") Stainless steel, insulated flexible vibration isolation connector.

### 2.3 - SYSTEM CONTROLS

2.3.1 Optional thermostat, 115V, 16 amp rating.

2.3.2 Each system, which includes a vacuum exhauster and burner(s), shall be wired so that they are electrically interlocked and controlled by thermostat action.

### 2.4 - RADIANT TUBE HEAT EXCHANGING NETWORK

2.4.1 Combustion tube shall be 10' long 16 gauge aluminized steel 4.0" OD swaged one end for inputs of 40,000 to 175,000 Btu/hr. For inputs of 180,000 Btu/hr up to 250,000 Btu/hr the first tube shall be 10' long 16 gauge alumatherm steel 4.0" OD and the second tube shall be 10' long 16 gauge aluminized steel 4.0" OD swaged on end.

2.4.2 Balance of radiant tubing shall be constructed of patented, spiral wound 22 gauge aluminized steel, 4.0" OD.

2.4.3 Elbows and tube coupler to be made of min. 18 gauge-aluminized steel, swaged at both ends so as to fit into 4.0" spiral tube.

2.4.4 Reflectors to be made of minimum 0.025 bright aluminum.

2.4.5 Tubing and reflector hangers to be made of 0.25" Dia. Zinc plated CRS.

2.4.6 All joints to be sealed and mechanically fastened with self drilling and tapping screws.

2.4.7 All radiant tubing to be continuously covered by the reflector, i.e. radiant tube elbows, "U" bends and fittings to be covered by reflectors -- NO GAPS BETWEEN REFLECTORS. Reflectors are to be overlapped a minimum of one-inch (1") and secured together with sheet metal screws allowing for one unsecured overlap joint for expansion on each straight run exceeding ten feet (10').

2.4.8 Minimum length of radiant tubing per 100,000 Btu/hr of input shall be 60 lineal feet.

2.4.9 The maximum firing rate shall be 2000 Btu/hr per square foot of radiant tubing surface area. The total radiant tubing surface area is the radiant tubing which is covered by reflectors and associated with one vacuum exhauster.

### 2.5 - COMBUSTION AIR

2.5.1 Outside combustion air (if used) is to be provided without the use of supplementary supply blowers or fans.

2.5.2 Outside combustion air ducting to be minimum of 4" OD (S&D PVC or galvanized stovepipe).

### 2.6 - SYSTEM PERFORMANCE

2.6.1 System shall attain a net exhaust temperature of not less than 200° F in a 15 min. run cycle and shall not exceed a maximum net temperature of 325° F.

2.6.2 System STEADY STATE EFFICIENCY shall be a minimum of 82%, maximum 87%. The system cyclic efficiency shall be a minimum of 85%, maximum 91% (this is based on a 15 min. run time).

2.6.3 System shall be a non-condensing dry tube system. i.e. - After a minimum run time of 8 minutes all condensation will cease and moisture will exit the system in a vapor state.

## **PART 3 - EXECUTION**

### **3.1 - INSTALLATION**

3.1.1 Power Requirements: It is the installers' responsibility to verify the correct power requirements for the project.

3.1.2 Fuel Supply and Distribution:

- a) A suitably designed gas distribution system shall be installed per shop drawings.
- b) Each burner assembly shall be furnished with a stainless steel gas connector with manual shut off valve.

3.1.3 Assembly: Assemble and install the heating system in accordance with the installation manual and shop drawings.

3.1.4 Cleaning: Clean reflectors as may be required and touch up painted surfaces as may be needed.

3.1.5 Testing: Upon completion of installation, including work by other trades, adjust and test the heating system in accordance to the manufacturer's owners manual. Adjust and re-test heating system until entire installation is fully operable and acceptable.

## **END OF SECTION**