

# Schwank

## HVAC Guideline Specifications

### phantomSchwank STP Series

#### Positive Pressure Radiant Tube Type Gas-Fired Infrared Heater—

#### Hospitality Outdoor Applications

### Part 1 — General

#### 1.01 SYSTEM DESCRIPTION

Outdoor overhead mounted, electrically controlled positive pressure radiant tube type infrared heating unit utilizing gas combustion for heating of spaces or areas.

#### 1.02 QUALITY ASSURANCE

- A. Heaters are tested in accordance with CSA/ ANSI Z83.26:20 and CSA 2.37:20 Standards and certified by UL Laboratories of Canada
- B. Each heater burner will be subjected to run testing on the assembly line.
- C. The heater will be warranted by the manufacturer for defects in material and workmanship for a period of ten (10) years on the burner cup, combustion and heat exchanger tubes, and three (3) years on all other heater components.

#### 1.03 DELIVERY, STORAGE, AND HANDLING

The heater will be stored to secure against damage and handled per the manufacturer's recommendations.

## Part 2 — Product

### 2.01 EQUIPMENT (STANDARD)

#### A. General:

Site-assembled, modular infrared radiant heating unit for overhead-mounted space or area heating application. As required for field installation and start-up, a burner with all necessary factory-installed wiring, piping, and controls and a radiant tube/ reflector system, complete with hanger plates and an end plate corresponding in length to the burner input, will be supplied with the heater.

Schwank will manufacture the radiant tube-type infrared heating unit(s).

Heater size(s) and capacity(s) are as noted on the drawing and/or schedule.

#### B. Burner:

##### 1. General:

- a. The burner will have an ECM (Electrically Commutated Motors) brushless blower to create a positive pressure system.
- b. The Two Stage Burner will have a two-stage valve output to vary the manifold pressure.
- c. The fuel conversion in the field will be done by changing the main orifice and plugging a jumper on the Controller as described in the fuel conversion instructions.
- d. The blower will provide combustion air flow directly to the burner assembly so that electronic burner components are isolated from the air flow.
- e. The blower will be fitted with a 4-inch (100 mm) diameter collar in case site conditions warrant connection of outside combustion air.
- f. The burner will operate on either natural gas or propane gas.
- g. The burner utilizes a burner cup with primary air control and creates a very long, laminar, and axially straight flame.
- h. The Combustion Chamber is 4" (100 mm) in diameter with an Access Cover to easily access the burner -cup and the orifice.
- i. The burner will be housed in marine-grade aluminum with a black powder coating.
- j. The burner cabinet will be of a 'clamshell' design that opens downward on a hinge to provide service access to all burner components.
- k. The burner will operate with the housing cabinet in the 'open' service position.

### C. Emitting Tube System:

#### 1. General:

- a. All tubes will be 4-inch (100 mm) diameter with an emitting surface area of 152 in<sup>2</sup> (982 cm<sup>2</sup>) per linear foot (305 mm).
- b. All tubes will be constructed of 16-gauge aluminized steel.
- c. Aluminized steel heat exchanger tubes will be coated with a high-temperature emissive coating.
- d. The system tubes will have a swage of approximately 4 inches (100 mm) in length to accommodate the connection of subsequent tubes and vent pipe at the heater termination.
- e. Each tube connection in the system will be secured in place with a 4-inch (100 mm) TorcTite® coupler.

### D. Reflector Shield System:

#### 1. General:

- a. Reflector shields will be constructed of 5052 marine-grade aluminum with black powder coating.
- b. The reflector system will enclose the emitting tube system on the top and two sides to entrap convection heat around the tube system, thereby increasing overall tube temperature and infrared heat emission.

### E. Tube/Reflector Suspension System:

#### 1. General:

- a. The tube/reflector system will have aluminized steel sheet metal end caps at each end of the system to act as hanging brackets that will support the system and minimize the escape of entrapped convection heat.
- b. The tube/reflector system will have two wire hangers for each tube, except for the first tube, which has one wire hanger and an end-plate hanger. It allows free passage of entrapped convection heat along the length of the system to promote more uniform heat from end to end.
- c. The tube/reflector end caps and hangers will enable suspension of the system so that the reflector shields can be oriented about the short axis of the system at a fixed angle between 0° to 45° as indicated on the drawings.

- d. The entire tube/reflector system will be suspended from the structure as indicated in the Installation and Owner's Manual or as specified in the drawings and/or schedule.

## F. Controls and Safeties:

### 1. General:

- a. Electrical Rating: The burner will operate on a 115Vac, 60Hz electrical supply with a current rating of no less than 1.5A at 115Vac.
- b. Heater gas and ignition controls will be readily accessible for servicing.
- c. The burner will have solid-state direct spark ignition and flame sensor control that is dedicated to securing the operation of the burner.

### 2. Ignition and Flame Control:

- a. To complete the direct spark ignition system, the burner will incorporate a gas control and 24Vac transformer.
- b. Burner will be complete with a low voltage (24Vac), solid-state direct spark ignition, and ionization flame sensing control module that will provide a 45-second pre-ignition purge of the system by the blower. Electrical Rating: 24Vac, 60Hz with current rating of 0.2A at 24Vac.
- c. Burner will be complete with an igniter/sensor to provide spark ignition and flame sensing.
- d. The ionization module senses the presence of the main burner flame and discontinues spark ignition. If the burner fails to ignite within the trial-for-ignition period, the ignition module will try three times with a 30-second inter-purge. After that, the flame control will go into a safety lockout. It will begin the sequence again in 60 minutes. The control reset is also manually done from the thermostat.
- e. The ionization module will check for a false flame condition (short to ground) and lock out if a false flame condition is present.
- f. The ignition module will have a 15-second trial-for-ignition period.
- g. The ignition module will open the main gas valve and generate 25,000 volts at the spark igniter for direct ignition of the burner.
- h. On a loss of burner flame, the ignition sequence goes into recycle mode. Safety lockout occurs if the flame is not re-established within the three trial-for-ignition. The reset of the control is manually done from the thermostat or electrical supply.

### 3. Gas Control:

- a. Heater will be complete with a direct ignition gas control with a manual valve, two automatic operators, and a pressure regulator.

Electrical Rating: 24Vac, 60Hz; draw 0.5A with both operators energized.

- b. The gas control will have an inlet pressure tap and an outlet pressure tap to facilitate the measurement of gas supply and manifold pressures during servicing.
- c. Heater will be complete with a ½" pipe nipple for connection to the gas supply.

### 4. Heater Temperature Control:

- a. Burner will be complete with an inducer blower relay built in the ignition module. An optional thermostat of 120VAC can be connected to the main 120VAC power line or a 24Vac thermostat to TR & TW of the terminal block of the burner.
- b. If multiple heaters are to be controlled in a zone by a single 24Vac thermostat, 24VAC relays will be installed from the 2<sup>nd</sup> burner onwards, detailed as per the wiring diagram in the manual.
- c. Space Heating: Each heater zone will be controlled by a 24 Vac infrared set-back thermostat or other 24 Vac or 120Vac thermostat as supplied by the manufacturer.

### 5. Safety Controls:

- a. Burner will be complete with a differential pressure switch in the ignition system electrical circuit that will close upon proving a sufficient supply of combustion air from the blower and will open upon pressure resulting from a blocked flue condition in the tube system or insufficient blower pressure.

### G. Exhaust Requirements:

#### a. Indirect Vented Installation in Canada:

- i. Gas-fired infrared radiant heating system installation will comply with the manufacturer's installation instructions, the current national Natural Gas and Propane Installation Code B149.1, and all applicable local codes.
- ii. The gas-fired infrared radiant heating system will be provided with mechanical ventilation at a rate of 300 cfm for each 100,000 Btuh system input or fraction thereof. The ventilation system will be interlocked so that any reduction of the ventilation rate will cause the shutdown of the interlocked heater or group of heaters.

b. Indirect Vented Installation in the USA:

- i. Gas-fired infrared radiant heating system installation will comply with the manufacturer's installation instructions, the current National Fuel Gas Code, ANSI 223.1 standards, and all applicable local codes.
- ii. Natural or mechanical exhaust will be provided for the gas-fired infrared radiant heating system at a rate of 4 cfm for every 1,000 Btuh of natural gas system input, or at a rate of 5 cfm for every 1,000 Btuh of propane gas system input.

E. Electrical Requirements:

- a. Power supply wiring (115Vac, 60Hz, with a current rating of no less than 1.5A at 115Vac) will connect to the heater as per the wiring diagram in the manufacturer's manual.

### Part 3 — Performance

#### 3.01 Combustion

Heater will ensure controlled combustion with complete conversion of fuel and clean combustion with resultant combustion products CO<sub>2</sub>, H<sub>2</sub>O, O<sub>2</sub>, and N<sub>2</sub> and will produce a limited volume of noxious components & AFCO (< 350 ppm).

#### 3.02 Safety

- a. Clearances to combustibles in all directions will be defined individually per heater model in the Installation and Owner's Manual as certified by UL Laboratories of Canada.
- b. Clearance to combustibles for horizontal or angle mounting as certified by UL Laboratories of Canada will not exceed those listed in the Installation and Owner's Manual for the Schwank model phantomSchwank STP Series.

#### 3.03 System Efficiency / Energy Consumption

System efficiency and annual energy consumption of heating systems of heaters of this type and comparison to other heating systems will be calculated acc. EN 15316 to fulfil the requirements of the EPBD (Energy Performance of Building Directive).