

HVAC Guideline Specifications

primoSchwank

Packaged Combined Intensity (Low and High Intensity) Luminous Infrared Radiant Gas Heater— Commercial/Industrial Applications

Size Range:

37,500 to 113,500 Btuh, Nominal (Input Heating)

<u>Schwank Model:</u>	<u>Part # Natural Gas</u>	<u>Part # Propane</u>	<u>Input (Btuh)</u>
primoSchwank 10	MO-0010-NG	MO-0010-LP	37,500
primoSchwank 15	MO-0015-NG	MO-0015-LP	56,000
primoSchwank 20	MO-0020-NG	MO-0020-LP	75,000
primoSchwank 30	MO-0030-NG	MO-0030-LP	113,500

Part 1 — General

1.01 SYSTEM DESCRIPTION

Indoor overhead mounted, electrically controlled combined intensity infrared radiant heating unit utilizing gas combustion for heating.

1.02 QUALITY ASSURANCE

- A. Heater will be tested in accordance with ANSI Z83.19A-2002 ~ CSA 2.35A - 2002 B Standards, and additionally in accordance with European Standard EN 419-1, and certified by CSA International.
- B. Heater will be designed in accordance with European EC Gas Appliances Directive or ISO 9001:2000 and manufactured in a facility registered to EC Gas Appliances Directive or ISO 9001:2000
- C. Each heater will be subjected to run testing on the assembly line.
- D. The heater will be warranted by the manufacturer for defects in material and workmanship for a period of 15 years on the ceramic tiles that comprise the burner panel, and 5 years on all other heater components.

1.03 DELIVERY, STORAGE, AND HANDLING

Heater will be stored to secure against damage and handled per manufacturer's recommendations.

Part 2 — Product

2.01 EQUIPMENT (STANDARD)

- A. General:

Factory assembled, single-piece infrared radiant heating unit for overhead mounted space or area heating application. Supplied with the heater will be all necessary factory installed wiring, piping, and controls required prior to field installation and start-up.
- B. Primary Emitting Surface:
 1. General:
 - a. The primary radiant surface will be comprised of a panel of porous ceramic burner tiles with indentation surface technology creating 372 indentations in each tile radiating surface that will increase the emitting surface area by 50%.
 - b. Ceramic tiles will have a homologous grid of approximately 3400 needled perforations that differ not more than +/- 0.001 inch (0.03 mm) in diameter to create a homogeneous radiant surface.
 - c. Ceramic tiles will have machined perimeter edges so that the burner panel assembly requires no gasket material between contiguous tiles.
 - d. The perimeter of the ceramic tile burner panel will be seated to the heater body utilizing stainless steel gasket material.
 - e. The ceramic tile burner will attain an operating surface temperature of 1740°F (950°C). The ceramic tiles will be able to withstand temperatures of 2012°F (1100°C).

- f. The ceramic tiles will have an inner porosity of 44% or more to ensure sufficient thermal insulation between radiant burner surface and mixing chamber

C. Secondary Emitting Surface

1. General:

A secondary radiant surface will be created by a reflector housing, closed in two dimensions to be in contact with the continuous stream of flue gases

- a. Heater body and reflectors will be designed and assembled to a continuous one piece unit without gaps.
- b. Exhaust gases will heat the interior reflector surfaces to a temperature of 930°F (500°C) so as to emit low intensity infrared radiant heat (dark radiator)
- c. Heater reflectors will be constructed of high grade steel clad with cold-bonded polished aluminum layer to reach reflectance of at least 90% and ensure durable corrosion protection

D. Heater Body:

1. General:

- a. Heater body and reflectors will be constructed of high grade steel clad with highly corrosion resistant cold-bonded aluminum.
- b. Heater body and reflectors will be assembled using press fit and crimp joint construction to provide flexibility during expansion and contraction that result from operation.

C. Mixing Chamber as Additional Heat Exchanger:

1. General:

Mixing Chamber will be constructed and located to be an additional exchanger of heat from flue gases to gas/air fuel mixture and will ensure a homogeneous mixture of fuel gas and air.

- a. A gas/air fuel mixing chamber will be formed by the assembly of reflectors and body.
- b. The gas/air fuel is introduced to the mixing chamber through a single venturi located at the end of the chamber.
- c. The gas/air fuel mixing chamber will ensure that the heat loss of combustion is reduced by heat exchange to preheat the gas/air mixture up to 480°F (250°C) and pressurize the gas/air mixture for consistent and balanced supply to the ceramic tile burner panel. An angle mounted heater will have the mixing chamber located in the upper position to realize the additional heat exchange.

D. Controls and Safeties:

1. General:

- a. Each individual ceramic tile burner panel will have solid state direct spark ignition and flame sensor control that is dedicated to secure the operation of that burner panel
- b. Heater gas and ignition controls will be readily accessible for servicing.

2. Ignition and Flame Control:

- a. Heater will be complete with a low voltage (25Vac), solid state direct spark ignition and ionization flame sensing control module. Electrical Rating: 25Vac, 60Hz with current rating of 0.2A at 25Vac
- b. Heater will be complete with an igniter/sensor with separate electrodes for spark ignition and flame sensing.
- c. The ionization module will sense the presence of main burner flame and discontinue spark ignition. If the burner fails to ignite within the trial-for-ignition period, the flame control will go into safety lockout. Reset of the control is manually done from the thermostat.
- d. The ionization module will check for a false flame condition (short to ground) and lock out if a false flame condition is present.
- d. The ignition module will have a 21 second trial-for-ignition period

- e. The ignition module will open the main gas valve and generate 30,000 volts at the spark igniter for direct ignition of the burner.
 - f. On a loss of burner flame the timed trial-for-ignition is repeated. Safety lockout occurs if flame is not reestablished within the trial-for-ignition period. Reset of the control is manually done from the thermostat.
 - g. To complete the direct spark ignition system the system will incorporate a gas control, 25Vac transformer, and:
 - i) For space heating application an Infrared Setback Thermostat as supplied by the manufacturer of the heater
 - ii) or for Arena spectator heating a system control panel as supplied by the manufacturer of the heater
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 measurement of gas supply and manifold pressures during servicing.
 - c. Heater will be complete with a ½" pipe nipple and ½" union with ½" female NPT for connection to the gas supply.
4. Heater Zone Temperature Control:
- a. Space Heating: Each heater zone will be controlled by a 24 Vac infrared set-back thermostat (refer Part 4A), or other 24 Vac thermostat as supplied by the manufacturer
 - b. Arena Spectator Heating: Heaters or heater zones will be controlled by an Arena Control Panel (refer Part 4B) as supplied by the manufacturer
5. Installation Requirements and Mechanical Exhaust:
- a. 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. 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 4.5 cfm for every 1,000 Btuh of propane gas system input.
- E. Electrical Requirements:
- a. Power supply wiring (25Vac, 60Hz) will connect to the heater ignition module as per the wiring diagram in the manual supplied by the manufacturer.
 - b. For each heater or zone of heaters the installer will provide a 120V/24V/60HZ transformer with a capacity of 40VA for the first heater plus 20VA for each additional heater in the zone.

Part 3 — Performance

3.01 Combustion

Heater will ensure controlled surface combustion with complete conversion of fuel and clean combustion with resultant combustion products CO₂, H₂O, O₂ and N₂ and will produce limited volumes of noxious components CO (< 100 ppm) and NO_x (<20 ppm)

3.02 Safety

- a. Clearances to combustibles in all directions will be defined individually per heater in the technical manual as certified by CSA international
- b. Clearance to combustibles as certified by CSA International will not exceed:
 - Inputs 37,500 to 113,000 Btuh: top clearance 18 inches (460 mm) horizontally mounted
 - Inputs 37,500 to 113,000 Btuh: top clearance 24 inches (760 mm) angle mounted
 - Input 150,000 Btuh: top clearance of 26 inches (660 mm) when horizontally mounted
 - Input 150,000 Btuh: top clearance of 48 inches (1200 mm) when angle mounted

3.03 Energy Efficiency - Radiant Coefficient of Appliance

Heater will produce and emit both high and low intensity radiant heat energy. The radiant coefficient of the complete appliance (radiant output in relation to heat input, corrected dry value) will not be less than 0.63 (63% radiant heat output) as tested and certified by CSA International according to ANSI Z83.19A-2002 ~ CSA 2.35A - 2002 B (formerly ANSI 83.6) or European Standard EN 419-2 (Standard test methodology). The convection heat coefficient of the appliance will not be more than 37%.

3.04 Submissions - Proof of Performance

The project submission will include written results of the radiant coefficient testing of the complete heater as produced by CSA International or other accredited certification test facility.

If the proposed radiant heater is unable to attain the minimum 63% radiant coefficient, a proposal submission will include:

- Written results from a Nationally Recognized Testing Laboratory (NRTL) for certification stipulating the radiant coefficient of the proposed heater
- The required quantity and input rating of the proposed radiant heater to attain the necessary radiant heat to the floor to satisfy the heating design condition of the specified radiant heating system
- The hourly gas consumption rate and resultant volumes of the products of combustion CO₂, CO and NO_x of the proposed radiant heater to enable comparison to the specified radiant heater

Part 4 — Accessories / Ancillaries

4.01 Temperature Control: Space Heating

A. GENERAL

Infrared Setback Thermostat will sense both infrared radiant temperature and ambient temperature to realize accurate comfort control. The setback feature will automatically reduce the set operating temperature by 9F° (5C°) when area lighting level is reduced due to an unoccupied condition.

- a. The thermostat will be comprised of a metal dome that will attach to a mounting plate using two metal screws. All control circuitry and comfort temperature selection controls will be mounted inside of the metal dome enclosure to protect the circuitry and provide resistance to tampering with temperature settings.

- i. Optionally tamper proof screws for mounting of the metal dome to the mounting plate will limit access to thermostat settings to authorized personnel with access to the special tool required to manipulate the screws
- b. The thermostat will sense both infrared and ambient temperature and average the two to maintain the comfort temperature setting within the heat zone
- c. The thermostat will incorporate automatic temperature setback of 9F° (5C°) during an unoccupied condition. A photoconductive cell will be used to sense occupancy within the heater zone by sensing illumination. Resumption of the occupied state illumination level will return thermostat temperature control to full comfort setting. A switching mechanism will allow calibration of the photoconductive cell to the base illumination level for occupied status. A switching mechanism within the thermostat will allow for disabling of the temperature setback feature.
- d. The thermostat mounting plate will attach to a standard 4" x 4" octagonal electrical box.
- e. Electrical rating: 24 Vac

4.02 Heater Control: Arena Spectator Heating Application

A. GENERAL

An Arena Control Panel will activate interlocked mechanical exhaust, provide individual On/Off control for each heater and will include a master timer so that the operator can select a predetermined time period after which power to the interlocked exhaust and all heaters will shut off.

MODELS:

ACPT-8	up to 8 Heaters	Part #: JM-0408-XX
ACPT-12	up to 12 Heaters	Part #: JM-0412-XX
ACPT-16	up to 16 Heaters	Part #: JM-0416-XX

- a. ELECTRICAL: The Arena Control Panel will provide 24 Vac power to a 24V/120V relay switch to activate any mechanical exhaust interlocked to the heaters. For each heater or zone of heaters the installer will provide a 120V/24V/60HZ transformer with a capacity of 40VA for the first heater plus 20VA for each additional heater in the zone.

4.02 Other Heater Ancillaries

A. Gas Connection

- 1. Each heater will be connected to the gas supply piping using a CSA International certified ½" x 18" stainless steel flexible gas connector (JL-0771-FF) as supplied by the manufacturer of the heater.

B. Venturi Cover: Draft Protection

When located in an area with a high rate of air infiltration such as close proximity to an overhead door, the heater will be fitted with Pressure Equalizer Venturi Cover JO-0366-XX to protect and stabilize the introduction of the gas/air fuel mixture to the heater.

C. Tile Protection Grille

When located in an area where site conditions or practices could result in foreign objects coming into contact with the ceramic tile burner the heater will be fitted with a 1" x 1" rigid protection screen as supplied by the manufacturer of the heater.

D. Reflector Extension

To prevent impingement of infrared heat on nearby surface(s) the heater will be fitted with a reflector extension as supplied by the manufacturer of the heater. The reflector extension will be installed on the heater(s) as per the manufacturer's instruction and as indicated on the drawings.

E. Clearance Reduction Above the Heater

- F. To reduce the clearance to combustibles above the heater a ceiling protection plate can be installed above the heater as per specification and instruction of local or national installation code.