HVAC Guideline Specifications
Schwank STS-JZ SERIES
Positive Pressure Radiant Tube Type Gas-Fired Infrared Heater—
Commercial/Industrial Applications

Technical Summary

Input Range: 45,000 Btuh (13 kWh) to 200,000 Btuh (58.5 kWh) Nominal (Input Heating)

Model	Input Btuh (kWh)	Nominal Length* ft. (mm)	System Length** ft.-in. (mm)	Weight lb. (kg)	Turbulator ft. (mm)
STS-JZ-45-10	45,000 (13)	10' (3050)	11'-8" (3550)	68 (31)	5' (1525)
STS-JZ-45-20	45,000 (13)	20' (6100)	21'-4" (6500)	111 (50)	14' (4270)
STS-JZ-60-20	60,000 (17.5)	20' (6100)	21'-4" (6500)	111 (50)	14' (4270)
STS-JZ-60-30	60,000 (17.5)	30' (9150)	31'-0" (9450)	154 (70)	14' (4270)
STS-JZ-80-20	80,000 (23)	20' (6100)	21'-4" (6500)	111 (50)	14' (4270)
STS-JZ-80-30	80,000 (23)	30' (9150)	31'-0" (9450)	154 (70)	14' (4270)
STS-JZ-80-40	80,000 (23)	40' (12100)	40'-8" (12400)	197 (89)	10' (3050)
STS-JZ-100-20	100,000 (29)	20' (6100)	21'-4" (6500)	113 (50)	10' (3050)
STS-JZ-110-30	110,000 (32)	30' (9150)	31'-0" (9450)	154 (70)	14' (4270)
STS-JZ-110-40	110,000 (32)	40' (12100)	40'-8" (12400)	197 (89)	10' (3050)
STS-JZ-110-50	110,000 (32)	50' (15150)	50'-4" (15350)	239 (108)	None
STS-JZ-130-30	130,000 (38)	30' (9150)	31'-0" (9450)	154 (70)	14' (4270)
STS-JZ-130-40	130,000 (38)	40' (12100)	40'-8" (12400)	197 (89)	10' (3050)
STS-JZ-130-50	130,000 (38)	50' (15150)	50'-4" (15350)	239 (108)	None
STS-JZ-155-40	155,000 (45)	40' (12100)	40'-8" (12400)	197 (89)	10' (3050)
STS-JZ-155-50	155,000 (45)	50' (15150)	50'-4" (15350)	239 (108)	None
STS-JZ-155-60	155,000 (45)	60' (18300)	60'-0" (18300)	282 (128)	None
STS-JZ-175-50	175,000 (51)	50' (15150)	50'-4" (15350)	239 (108)	10' (3050)
STS-JZ-175-60	175,000 (51)	60' (18300)	60'-0" (18300)	282 (128)	10' (3050)
STS-JZ-175-70	175,000 (51)	70' (21350)	69'-8" (21230)	324 (147)	10' (3050)
STS-JZ-200-50	200,000 (58)	50' (15150)	50'-4" (15350)	239 (108)	10' (3050)
STS-JZ-200-60	200,000 (58)	60' (18300)	60'-0" (18300)	282 (128)	10' (3050)
STS-JZ-200-70	200,000 (58)	70' (21350	69'-8" (21230)	324 (147)	10' (3050)

*** Note: Due to 4" (100 mm) length of swaged overlap connection, the net length of each tube in the system is 9'-8" (2950 mm), except last tube is 10' (3050 mm).**

**** System Length includes burner and all tubes.**

Gas Supply	Line Pressure ("w.c.) Min.	Max.	Manifold Pressure ("w.c.)
Natural Gas	5.0	14.0	3.5
Propane Gas	11.0	14.0	10.0

Electrical Supply: 120V, 60Hz, 145VA; electrically grounded in accordance with National Electrical code ANSI/NFPA 70 or Canadian Electrical Code CSA C22.1

Thermostat: Heater includes 24V/120V relay switch for 24V, 120V, or "ON/OFF" switch control.

Part 1 — General

1.01 SYSTEM DESCRIPTION

Indoor 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. Heater will be tested in accordance with ANSI Z83.20-2004 / CSA 2.34-2004 Standards, and certified by CSA International.
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 ceramic burner cup, combustion and heat exchanger tubes, and three (3) 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:

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

The radiant tube type infrared heating unit(s) will be manufactured by Schwank.

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

B. Emitting Tube System:
   1. General:
      a. All tubes will be 4 inch (100 mm) diameter with an emitting surface area of 152 in^2 (982 cm^2) per linear foot (305 mm)
      b. For inputs up to and including 155,000 Btuh (45 kWh) the 10 foot (3050 mm) combustion tube adjoining to the burner will be constructed of 16 gauge aluminized steel
      c. For inputs greater than 155,000 Btuh (45 kWh) the 10 foot (3050 mm) combustion tube adjoining to the burner will be constructed of 16 gauge alumatherm with a subsequent 10 foot (3050 mm) length of 16 gauge aluminized steel
      d. The balance of the heat exchanger tube system (lengths as approved for burner input) will be 10 ft (3050 mm) lengths of 16 gauge hot rolled steel
      e. Hot rolled heat exchanger tubes will be coated with a high temperature emissive coating
      f. 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
      g. Each tube connection in the system will be secured in place with a 4 inch (100 mm) TorcTite® coupler
         i. For burner inputs of 100,000 Btuh (29 kWh), 175,000 Btuh (51 kWh) and 200,000 Btuh (58.5 kWh) a special coupling system will be used for securing the connection of the combustion chamber tube to the first heat exchanger tube as indicated in the Installation and Owners Manual

C. Reflector Shield System:
   1. General:
      a. Reflector shields will be constructed of high grade steel with a heat and corrosion resistant hot-bonded aluminum-silicon alloy coating.
      b. The reflector system will enclose the emitting tube system on the top and two sides and extend 1-5/8 " (41mm) below the bottom surface of the tube system to entrap convection heat around the tube system, thereby increasing overall tube temperature and infrared heat emission

D. 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 open-webbed hangers at each tube connection that will serve to join reflectors, act as intermediate supports for the system, and allow the 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

E. Burner:
   1. General:
      a. The burner will have a blower to create a positive pressure system
      b. The blower will provide combustion air flow directly to the burner assembly so that electronic burner components are isolated from the air flow
      c. The blower will be fitted with a 4 inch (100 mm) diameter collar in case site conditions warrant connection of outside combustion air
      d. The burner will operate on either natural gas or propane gas
      e. The burner will utilize a burner cup with ceramic tile that uses coaxial flow control elements to create a very **long, laminar and axially straight flame**.
      f. The burner will be housed in a pre-painted sheet metal protective cabinet
      g. The burner cabinet will be of a 'clam-shell' design that opens downward on a hinge to provide service access to all burner components
      h. The burner will operate with the housing cabinet in the 'open' service position

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 secure 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 25Vac transformer
      b. Burner will be complete with a low voltage (25Vac), solid state direct spark ignition and ionization flame sensing control module that will provide a 30 second pre-ignition purge of the system by the blower. Electrical Rating: 25Vac, 60Hz with current rating of 0.2A at 25Vac
      c. Burner will be complete with an igniter/sensor to provide spark ignition and flame sensing.
      d. 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.
      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 21 second trial-for-ignition period
      g. The ignition module will open the main gas valve and generate 30,000 volts at the spark igniter for direct ignition of the burner.

h. On a loss of burner flame the timed trial-for-ignition is repeated. Safety lockout occurs if flame is not reestablished within the 21 second trial-for-ignition period. 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 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 a 24/120Vac relay switch; inclusion or removal of a jumper wire will enable control of the heater using an optional thermostat of 120Vac or 24Vac
   b. If multiple heaters are to be controlled in a zone by a single 24Vac thermostat, an optional Transformer/Relay as supplied by the manufacturer must be employed in the system
   c. Space Heating: Each heater zone will be controlled by a 24 Vac infrared set-back thermostat (refer Part 4A), or other 24 Vac or 120Vac thermostat as supplied by the manufacturer

5. Safety Controls:
   a. Burner will be complete with a pressure switch in the ignition system electrical circuit that will close upon proving a sufficient supply of combustion air from the blower
   b. Burner will further be complete with a separate pressure switch in the ignition system electrical circuit that will open upon pressure resulting from a blocked flue condition in the tube system

G. Exhaust Requirements:
   a. Direct Vented gas fired infrared heating system installation will comply with the manufacturer's installation instructions, the current National Natural Gas and Propane Installation Code and all applicable local codes using:
      i. A 4 inch (100 mm) vent pipe of a gauge prescribed by national and/or local codes
      ii. Two heaters may be common vented using a 4 inch x 4 inch by 6 inch (100 mm x 100 mm x 150 mm) vent tee as supplied by the manufacturer; common vented heaters will be controlled by one common thermostat
   b. 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.
   c. 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 manual supplied by the manufacturer.

Part 3 — Performance

3.01 Combustion

Heater will ensure controlled combustion with complete conversion of fuel and clean combustion with resultant combustion products $C0_2$, H_2O, O_2 and N_2 and will produce a limited volume of noxious component CO (< 50 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 CSA international

b. Clearance to combustibles for horizontal or angle mounting as certified by CSA International will not exceed those listed in the Installation and Owner's Manual for the Schwank model STS-JZ

1. 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. prEN 15316 to fulfil the requirements of the EPBD (Energy Performance of Building Directive).

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, 60Hz

4.02 Other Heater Ancillaries

A. Gas Connection
   i. USA: Each heater will be connected to the gas supply piping using a CSA International certified stainless steel flexible gas connector sized according to heater input and as supplied by the manufacturer of the heater.
   ii. Canada: Each heater will be connected to the gas supply piping using a CSA International certified Type-1 Hose gas connector sized according to heater input and as supplied by the manufacturer of the heater.

B. Combustion Air intake:
   When located in an area with a negative air condition or a dust laden environment the heater will be fitted with a 4 inch (100 mm) diameter duct as described in the Installation and Owner's Manual. The duct termination will be fitted with an optional cap as supplied by the manufacturer

C. Modular 90° Elbow Kit:
   To enable a 90° bend in the tube system, the heater will be fitted with a 90° elbow kit complete with aluminized steel elbow, webbed hanger, tube coupler, and aluminized steel reflector cap as supplied by the manufacturer. The elbow kit will be modular in design to enable a 180° bend in the system by installation of two adjoining 90° elbow kits. Elbow kit will be installed in the system as per the Installation and Owner's Manual provided by the manufacturer, noting in particular minimum length location from the burner.

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.

GAS FIRED LOW INTENSITY INFRARED HEATERS								
Heater	**Location**	**Manufacturer**	**Model**	**Heating Capacity MBH**	**Gas Input cfm**	**System Length**	**Electrical (V/P/C)**	
IR-1		Schwank	STS-JZ-200-70				115/1/60	
IR-2		Schwank						
IR-3		Schwank						
IR-4		Schwank						
IR-5		Schwank						
IR-6		Schwank						
IR-7		Schwank						
IR-8		Schwank						
IR-9		Schwank						
IR-10		Schwank						

Copy & Paste Table – Conventional Units *(Metric Units ~ next page)*

Model	**Input** Btuh (kWh)	**System Length**** ft.-in. (mm)	**Weight** lb. (kg)	**Turbulator** ft. (mm)
STS-JZ-45-10	**45,000 (13)**	**11'-8" (3550)**	**68 (31)**	**5' (1525)**
STS-JZ-45-20	**45,000 (13)**	**21'-4" (6500)**	**111 (50)**	**14' (4270)**
STS-JZ-60-20	**60,000 (17.5)**	**21'-4" (6500)**	**111 (50)**	**14' (4270)**
STS-JZ-60-30	**60,000 (17.5)**	**31'-0" (9450)**	**154 (70)**	**14' (4270)**
STS-JZ-80-20	**80,000 (23)**	**21'-4" (6500)**	**111 (50)**	**14' (4270)**
STS-JZ-80-30	**80,000 (23)**	**31'-0" (9450)**	**154 (70)**	**14' (4270)**
STS-JZ-80-40	**80,000 (23)**	**40'-8" (12400)**	**197 (89)**	**10' (3050)**
STS-JZ-100-20	**100,000 (29)**	**21'-4" (6500)**	**113 (50)**	**10' (3050)**
STS-JZ-110-30	**110,000 (32)**	**31'-0" (9450)**	**154 (70)**	**14' (4270)**
STS-JZ-110-40	**110,000 (32)**	**40'-8" (12400)**	**197 (89)**	**10' (3050)**
STS-JZ-110-50	**110,000 (32)**	**50'-4" (15350)**	**239 (108)**	**None**
STS-JZ-130-30	**130,000 (38)**	**31'-0" (9450)**	**154 (70)**	**14' (4270)**
STS-JZ-130-40	**130,000 (38)**	**40'-8" (12400)**	**197 (89)**	**10' (3050)**
STS-JZ-130-50	**130,000 (38)**	**50'-4" (15350)**	**239 (108)**	**None**

STS-JZ-155-40	**155,000 (45)**	**40’-8” (12400)**	**197 (89)**	**10’ (3050)**
STS-JZ-155-50	**155,000 (45)**	**50’-4” (15350)**	**239 (108)**	**None**
STS-JZ-155-60	**155,000 (45)**	**60’-0” (18300)**	**282 (128)**	**None**
STS-JZ-175-50	**175,000 (51)**	**50’-4” (15350)**	**239 (108)**	**10’ (3050)**
STS-JZ-175-60	**175,000 (51)**	**60’-0” (18300)**	**282 (128)**	**10’ (3050)**
STS-JZ-175-70	**175,000 (51)**	**69’-8” (21230)**	**324 (147)**	**10’ (3050)**
STS-JZ-200-50	**200,000 (58)**	**50’-4” (15350)**	**239 (108)**	**10’ (3050)**
STS-JZ-200-60	**200,000 (58)**	**60’-0” (18300)**	**282 (128)**	**10’ (3050)**
STS-JZ-200-70	**200,000 (58)**	**69’-8” (21230)**	**324 (147)**	**10’ (3050)**