

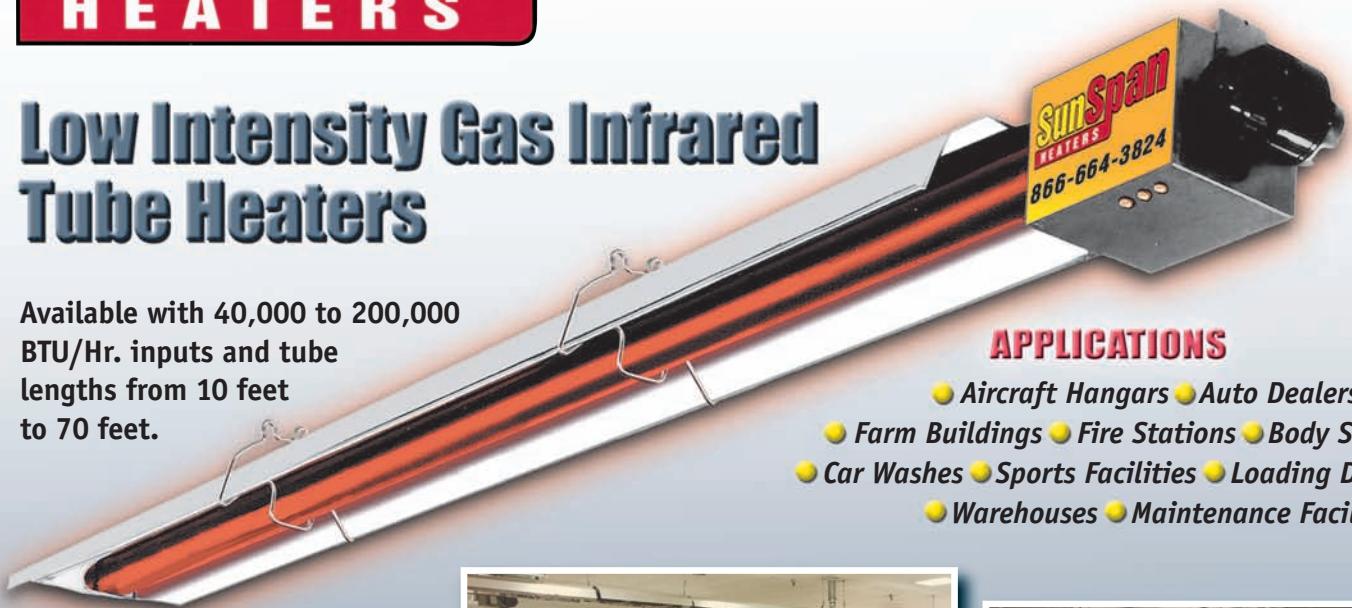
SunSpan™

HEATERS

SQ
SERIES

Low Intensity Gas Infrared Tube Heaters

Available with 40,000 to 200,000 BTU/Hr. inputs and tube lengths from 10 feet to 70 feet.



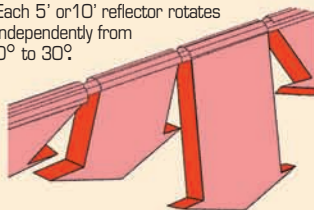
APPLICATIONS

- Aircraft Hangars ● Auto Dealerships
- Farm Buildings ● Fire Stations ● Body Shops
- Car Washes ● Sports Facilities ● Loading Docks
- Warehouses ● Maintenance Facilities



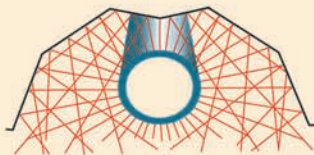
Direct the heat where you want it.

Each 5' or 10' reflector rotates independently from 0° to 30°.



Superior Reflectational Efficiency of 91.7%.

33 of 36 infra-red rays are directed to the floor, not back on the tube.



WARRANTY

10 year limited warranty on Burner Core

5 year limited warranty on All combustion and heat exchanger tubes

2 year limited warranty on All Burner Controls

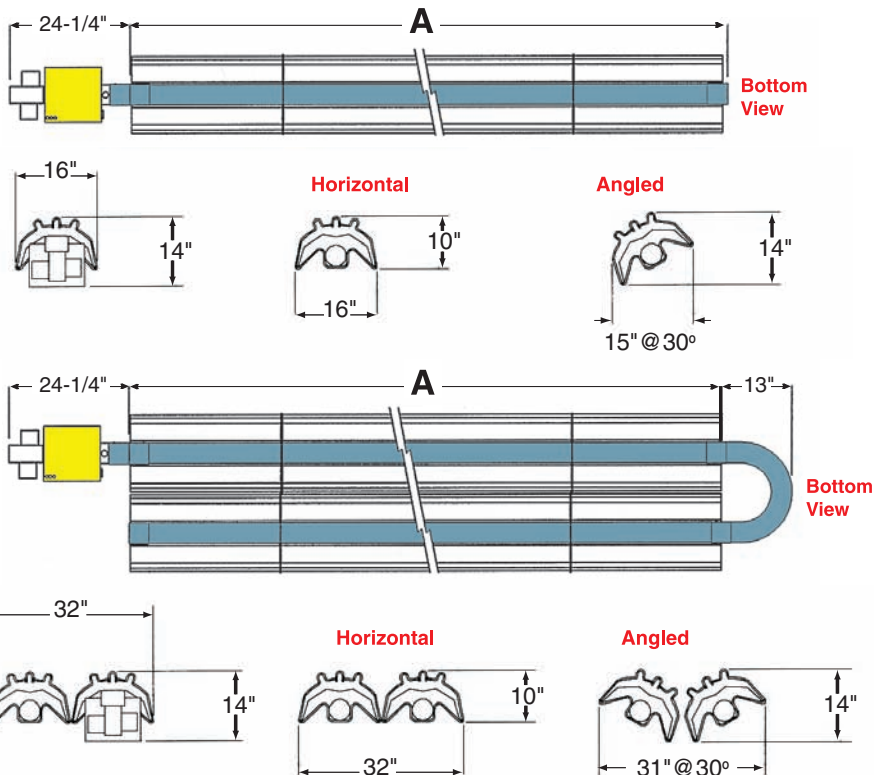
Save up to 75% In Energy Costs

FEATURES

- Proven system design – over 30 years
- Aluminized titanium alloy combustion chamber
- Corrosion resistant 16 gauge, 4" O.D. heat exchanger
- Flared/swaged tubes for easy installation
- Simple chain mounting
- CSA International Design Certified to ANSI/CGA Standards
- Brite aluminum reflectors
 - 98% reflectivity ● 91.7% reflectational efficiency (shape)
- Rotatable reflector arrangements from 0° to 30°
 - Each reflector rotates independently ● All reflectors in fixed overlapped position ● Combination of both arrangements
- Burner fully assembled & tested – ready to hang
- Factory installed wave turbulator for high efficiency
- Safe, reliable operation
 - Durable direct spark ignition ● 100% safety shut-off ● Pre-purge cycle for safety ● System validation lights
- **Options:** Recessed Ceiling Kit; Side Reflector; 90° Elbows; "U"-Bends; "Y" Couplers; Inlet and Exhaust Kits; 50 Hz for Worldwide Operation



Low Intensity Gas Infrared Tube Heaters



Note: Check overall space available for proper installation.

STRAIGHT

MODEL	MBTUH	LENGTH "A" MIN.	LENGTH "A" MAX.	SERIES	SHIP WT. (lbs.)
SQS	40	10'	14' 9"	A	75-90
SQS	40-60	19' 9"	19' 9"	A	110
SQS	65-85	19' 9"	24' 6"	MB	110-130
SQS	65-95	29' 6"	39' 3"	B	154-196
SQS	100	29' 6"	49' 0"	B	154-240
SQS	105-120	39' 3"	49' 0"	B	196-240
SQS	125N	39' 3"	49' 0"	B	196-240
SQS	125L	39' 3"	49' 0"	C	196-240
SQS	130-150	39' 3"	49' 0"	C	196-240
SQS	155-200	49' 0"	49' 0"	C	240
SQS	150-200	53' 9"	68' 6"	C	260-323

U-TUBE

MODEL	MBTUH	LENGTH "A"	SERIES	SHIP WT. (lbs.)
SQU	40	10'	A	90
SQU	40-60	10'	A	110
SQU	65-85	10'	MB	110
SQU	65-100	14' 9"	B	154
SQU	65-100	19' 9"	B	196
SQU	100	24' 6"	B	240
SQU	105-120	19' 9"	B	196
SQU	105-120	24' 6"	B	240
SQU	125N	19' 9"	B	196
SQU	125L	19' 9"	C	196
SQU	125L	24' 6"	C	240
SQU	130-150	19' 9"	C	196
SQU	130-200	24' 6"	C	240
SQU	150-200	29' 6"	C	280
SQU	150-200	34' 3"	C	323

Clearances to Combustibles

MBTUH INPUT NAT OR LP	40	45,50	55,60	65,70	65,70	100	105,110	130,135	150	155,160	180,185
				75,80	75,80		115,120	140,145		165,170	190,195
				85	85,90,95		125			175	200
AVAILABLE TUBE LENGTH (FEET)	10',15'	20'	20'	20'	30',35'	30',35'	40',45'	40',45'	40',45'	50',55'	50',55'
	20'			25'	40'	40',45'	50'	50'	60',65'	70'	60',65'
						50'			60',65'	70'	70'
CLEARANCES* (INCHES)											
TOP OF REFLECTOR	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"	12"
FRONT OF REFLECTOR											
MOUNTED 0	40"	40"	50"	24"	24"	24"	32"	48"	48"	58"	68"
MOUNTED 1 TO 30	40"	40"	50"	24"	24"	24"	32"	48"	48"	58"	68"
MOUNTED 31 TO 45	40"	40"	50"	X	X	X	X	70"	70"	80"	90"
REAR OF REFLECTOR											
MOUNTED 0	40"	40"	50"	24"	24"	24"	32"	48"	48"	58"	68"
MOUNTED 1 TO 30	40"	40"	50"	24"	24"	24"	32"	48"	48"	58"	68"
MOUNTED 31 TO 45	12"	12"	12"	X	X	X	X	12"	12"	12"	12"
BELOW REFLECTOR	40"	40"	50"	60"	60"	60"	72"	82"	82"	92"	102"

* FOR ALL SYSTEMS: 12" FROM BURNER END AND 68" FROM U-BEND ■ NOT AVAILABLE IN U-TUBE CONFIGURATION

System Information

Manifold Operating Pressure
 Natural Gas & LP/Propane:
 40-100 MBTUH 3.5" WC
 105-200 MBTUH 5" WC

Minimum Inlet Pressure
 Natural Gas:
 40-125 MBTUH 6" WC
 130-200 MBTUH 7" WC
 LP/Propane:
 All MBTUH 11" WC

1/2" FPT Gas Inlet
Electrical Rating:
 120 VAC-60 Hz-1 Phase
 Blower: 1/24 h.p. motor
 1.30 max. amp. draw
 @ 138 cfm/free air



GAS INFRARED HEATERS

P.O. Box 80217, Rochester, MI 48308
 Phone: 866-664-3824 • Fax: 248-651-0357
 E-Mail: sales@sunspanheaters.com
 Web: sunspanheaters.com



SQ SERIES TUBE HEATERS



ENGINEERING SUBMITTAL DATA – ALUMINIZED STEEL SINGLE-STAGE GAS-FIRED LOW-INTENSITY INFRA-RED RADIANT TUBE HEATERS

WARNING! These heaters must be installed and serviced by trained gas heater installation and service personnel only! Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operating, and maintenance instructions thoroughly before installing or servicing this equipment. Observe all safety information. Retain instructions for future reference.

MOST FREQUENTLY SPECIFIED MODELS

Additional C.S.A. design certified models are available in 5 MBTUH increments from the low MBTUH to high MBTUH listed for each heater length. Contact SunSpan for additional models.

Straight Heater Length	5-foot Option ***	MBTUH	Natural Gas			LP / Propane Gas			Typical Mounting Height	Wt.**	U-Tube Heater Length		
			Straight Heaters		U*	Straight Heaters		U*					
			Model #	Qty	U*	Qty	Model #	Qty				U*	Qty
12'-1/4"	+5'	40	SQS 40-10AN		U*+5'		SQS 40-10AL		U*+5'		9' – 14'	75#	13'-1-1/4"
21'-9-1/4"	na	40	SQS 40-20AN		U*		SQS 40-20AL		U*		9' – 14'	110#	13'-1-1/4"
21'-9-1/4"	na	50	SQS 50-20AN		U*		SQS 50-20AL		U*		10' – 15'	110#	13'-1-1/4"
21'-9-1/4"	na	60	SQS 60-20AN		U*		SQS 60-20AL		U*		10' – 15'	110#	13'-1-1/4"
21'-9-1/4"	+5'	65	SQS 65-20MBN		U*		SQS 65-20MBL		U*		11' – 16'	110#	13'-1-1/4"
21'-9-1/4"	+5'	75	SQS 75-20MBN		U*		SQS 75-20MBL		U*		11' – 16'	110#	13'-1-1/4"
21'-9-1/4"	+5'	80	SQS 80-20MBN		U*		SQS 80-20MBL		U*		11' – 18'	110#	13'-1-1/4"
21'-9-1/4"	+5'	85	SQS 85-20MBN		U*		SQS 85-20MBL		U*		11' – 18'	110#	13'-1-1/4"
31'-6-1/4"	+5'	65	SQS 65-30BN		U*		SQS 65-30BL		U*		11' – 16'	154#	17'-10-1/4"
31'-6-1/4"	+5'	75	SQS 75-30BN		U*		SQS 75-30BL		U*		11' – 16'	154#	17'-10-1/4"
31'-6-1/4"	+5'	100	SQS 100-30BN		U*		SQS 100-30BL		U*		12' – 20'	154#	17'-10-1/4"
41'-3-1/4"	na	65	SQS 65-40BN		U*		SQS 65-40BL		U*		11' – 16'	196#	22'-10-1/4"
41'-3-1/4"	na	75	SQS 75-40BN		U*		SQS 75-40BL		U*		11' – 16'	196#	22'-10-1/4"
41'-3-1/4"	+5'	100	SQS 100-40BN		U*		SQS 100-40BL		U*		12' – 20'	196#	22'-10-1/4"
41'-3-1/4"	+5'	125	SQS 125-40BN		U*		SQS 125-40CL		U*		14' – 25'	196#	22'-10-1/4"
41'-3-1/4"	+5'	130	SQS 130-40CN		U*		SQS 130-40CL		U*		15' – 27'	196#	22'-10-1/4"
41'-3-1/4"	+5'	150	SQS 150-40CN		U*		SQS 150-40CL		U*		16' – 30'	196#	22'-10-1/4"
51'-1/4"	na	100	SQS 100-50BN		U*		SQS 100-50BL		U*		12' – 20'	240#	27'-7-1/4"
51'-1/4"	na	125	SQS 125-50BN		U*		SQS 125-50CL		U*		14' – 25'	240#	27'-7-1/4"
51'-1/4"	na	130	SQS 130-50CN		U*		SQS 130-50CL		U*		15' – 27'	240#	27'-7-1/4"
51'-1/4"	+5'	150	SQS 150-50CN		U*		SQS 150-50CL		U*		16' – 30'	240#	27'-7-1/4"
51'-1/4"	+5'	175	SQS 175-50CN		U*		SQS 175-50CL		U*		17' – 35'	240#	27'-7-1/4"
51'-1/4"	+5'	200	SQS 200-50CN		U*		SQS 200-50CL		U*		19' – 42'	240#	27'-7-1/4"
60'-9-1/4"	+5'	150	SQS 150-60CN		U*		SQS 150-60CL		U*		16' – 30'	280#	32'-7-1/4"
60'-9-1/4"	+5'	175	SQS 175-60CN		U*		SQS 175-60CL		U*		17' – 35'	280#	32'-7-1/4"
60'-9-1/4"	+5'	200	SQS 200-60CN		U*		SQS 200-60CL		U*		19' – 42'	280#	32'-7-1/4"
70'-6-1/4"	na	150	SQS 150-70CN		U*		SQS 150-70CL		U*		16' – 30'	323#	37'-4-1/4"
70'-6-1/4"	na	175	SQS 175-70CN		U*		SQS 175-70CL		U*		17' – 35'	323#	37'-4-1/4"
70'-6-1/4"	na	200	SQS 200-70CN		U*		SQS 200-70CL		U*		19' – 42'	323#	37'-4-1/4"

Additional Models Specified:

MBTUH = 1000 BTU per hour.

na = not available.

U* = SQU replaces SQS in the model number for U-tube heaters.

Wt.** = Shipping Weight. Add 10# to weight for U-tube heaters. Add 25# to weight for +5' option.

5-foot Option*** = +5' indicates a 5-foot heater section may be added to straight models only, increasing heater length by 4'-9".

Submitted by: _____ Date: _____

Job Title: _____

Address: _____ City: _____ State: _____ Zip: _____

Contractor: _____ Phone #: _____

Address: _____ City: _____ State: _____ Zip: _____

Engineer: _____

Local Representative: _____

Notes: _____

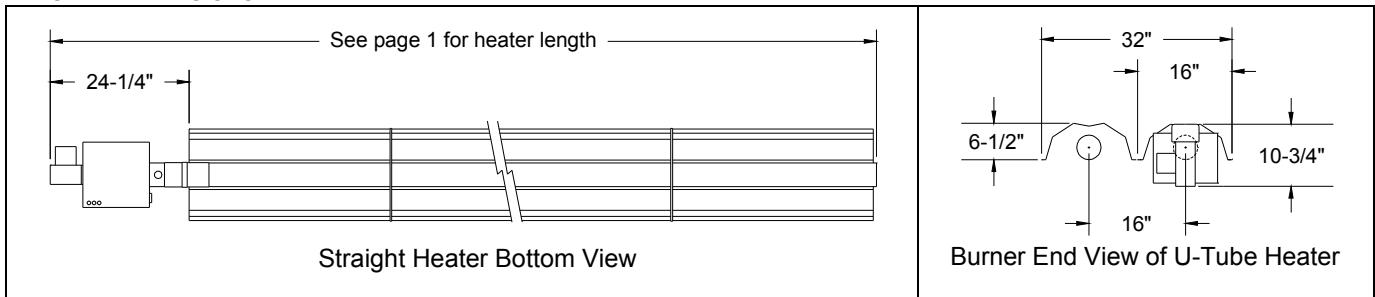


SPECIFICATIONS AND CLEARANCES

SQ SERIES SPECIFICATIONS

<p>APPROVALS</p> <ul style="list-style-type: none"> • CSA International Design Certified, Report # 163199-1063506. AGA / CGA Approval. • Indoor / Outdoor Approval. • Commercial / Industrial Approval. <p>BURNER AND CONTROLS</p> <ul style="list-style-type: none"> • Blower thermally protected and permanently lubricated. • Blower impeller balanced statically and dynamically. • Controls isolated from combustion air. • Safety differential pressure switch. • Redundant gas safety shut-off 100%. • Durable direct spark ignitor. • Independent flame rod sensing. • Sight glass for burner observation. • 3 trials for ignition and automatic recycle after inadvertent shutdown. • 3 validation lights: power on, air pressure normal & operation normal. • Controls easily accessible – 3 sides. 	<p>COMBUSTION TUBES</p> <ul style="list-style-type: none"> • 4" O.D. Aluminized 409 Stainless steel for excellent corrosion resistance. <p>HEAT EXCHANGER TUBES</p> <ul style="list-style-type: none"> • 16 ga. 4" O.D. heat treated aluminized steel for excellent corrosion resistance. • Turbulator baffle factory installed. • 16 ga. 4" I.D. burner coupler. • Swaged/flared force fit heat exchanger joints. <p>REFLECTORS</p> <ul style="list-style-type: none"> • 91.7% reflectional efficiency. • Brite finished aluminum. • Rotate sections independently or continuous overlap. <p>POWER SUPPLY</p> <ul style="list-style-type: none"> • 120 VAC, 60 Hz, 1 phase. • Maximum current draw is 3 amps. • 3-prong plug power cord 36" long. <p>GAS CONNECTION</p> <ul style="list-style-type: none"> • ½" FPT gas inlet. • 36" long flexible gas connector. 	<p>GAS SUPPLY (W.C.)</p> <table border="1"> <tr> <td>Manifold pressure</td> <td></td> <td></td> </tr> <tr> <td>40 to 100 MBTUH</td> <td>3.5"</td> <td>3.5"</td> </tr> <tr> <td>105 to 200 MBTUH</td> <td>5"</td> <td>5"</td> </tr> </table> <p>• Minimum inlet pressure</p> <table border="1"> <tr> <td>40 to 125 MBTUH</td> <td>6"</td> <td>11"</td> </tr> <tr> <td>130 to 200 MBTUH</td> <td>7"</td> <td>11"</td> </tr> </table> <p>• Maximum inlet pressure 14" 14"</p> <p>COMBUSTION AIR / VENTING</p> <ul style="list-style-type: none"> • Wall or roof venting – 4" diameter pipe up to 35 linear feet for 40 to 125 MBTUH units and up to 40 linear feet for 130 to 200 MBTUH units. (No more than two 90-degree elbows; one elbow equals 10 linear feet.) <p>LIMITED WARRANTY</p> <ul style="list-style-type: none"> • 10 years on Burner Core. • 5 years on All Heat Exchanger & Combustion Tubes. • 2 years on All Burner Controls. <p>MADE IN THE USA</p>	Manifold pressure			40 to 100 MBTUH	3.5"	3.5"	105 to 200 MBTUH	5"	5"	40 to 125 MBTUH	6"	11"	130 to 200 MBTUH	7"	11"
Manifold pressure																	
40 to 100 MBTUH	3.5"	3.5"															
105 to 200 MBTUH	5"	5"															
40 to 125 MBTUH	6"	11"															
130 to 200 MBTUH	7"	11"															

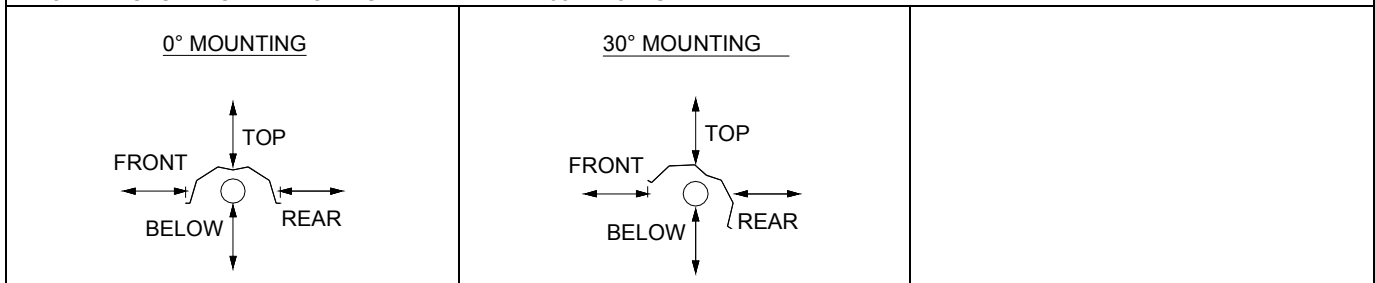
PHYSICAL DIMENSIONS



CLEARANCES

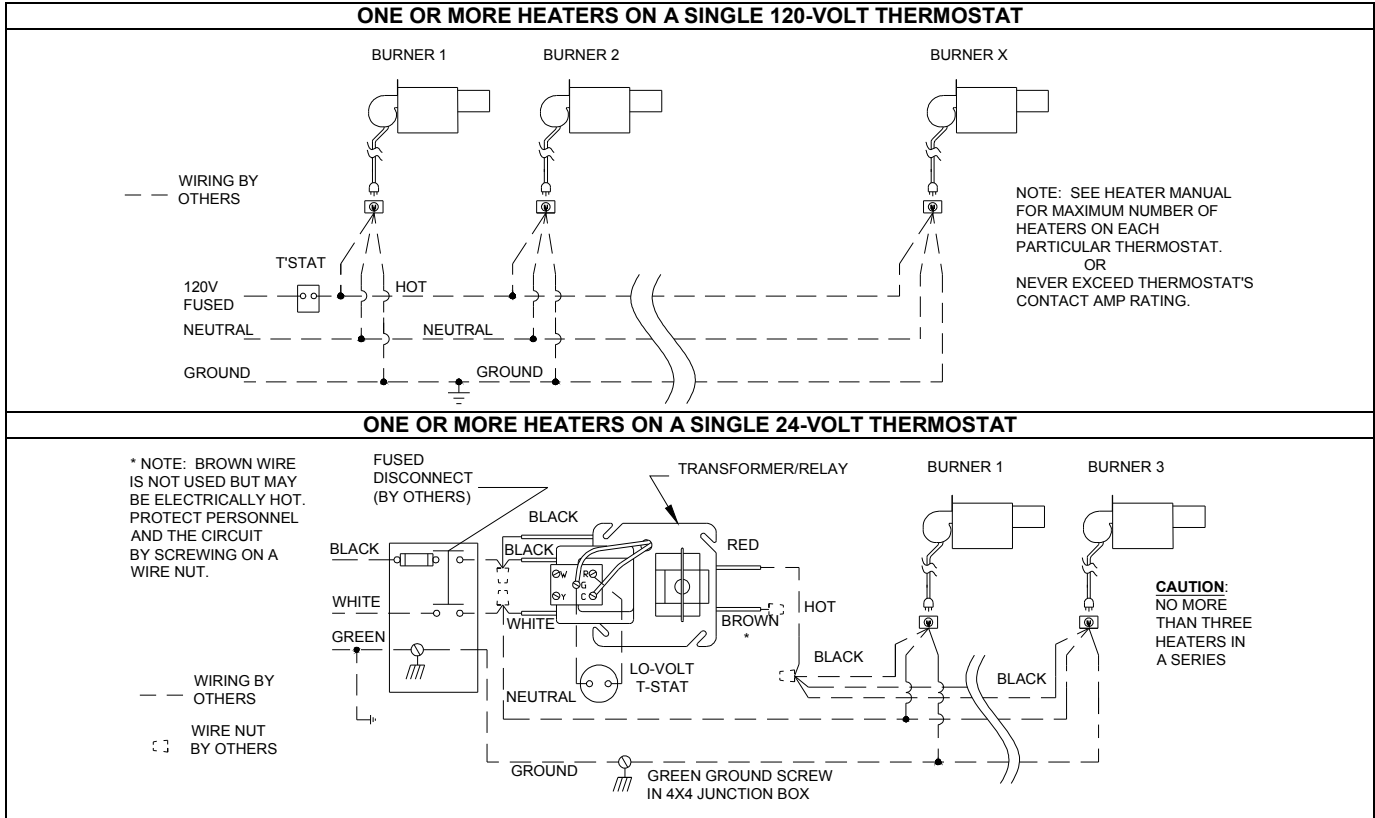
CLEARANCES TO COMBUSTIBLES* (INCHES)					
MBTUH (1000 BTU per hour)	MOUNTING ANGLE	FRONT	REAR	TOP	BELOW
40, 45 & 50	0°-30°	40	40	12	40
	31°-45°	40	12	12	40
55 & 60	0°-30°	50	50	12	50
	31°-45°	50	12	12	50
65, 70, 75, 80, 85, 90, 95 & 100	0°-30°	24	24	12	60
105, 110, 115, 120 & 125	0°-30°	32	32	12	72
130, 135, 140, 145 & 150	0°-30°	48	48	12	82
	31°-45°	70	12	12	82
155, 160, 165, 170 & 175	0°-30°	58	58	12	92
	31°-45°	80	12	12	92
180, 185, 190, 195 & 200	0°-30°	68	68	12	102
	31°-45°	90	12	12	102

* FOR ALL SYSTEMS: 12" FROM BURNER END AND 68" FROM U-BEND.



FIELD WIRING & ACCESSORIES

FIELD WIRING



RECOMMENDED ACCESSORIES

QTY	ITEM #	DESCRIPTION	NOTES
	132026-4	Standard thermostat	(40-80°F) 120V or 24V for heaters up to 2640VA total. Up to 7 heaters.
	CH-50	Mounting chain set	50 feet of chain plus 16 S-hooks.
	0002-10-133	Gas ball valve	½" full port ball valve with ½" female NPT pipe threads for gas supply.
	131402	4" roof vent cap for single heater	Required for single 4" roof vents.

OTHER ACCESSORIES

QTY	ITEM #	DESCRIPTION	NOTES
	132654	Blower enclosure installed	Protects burner blower motor in harsh environments. Factory installed with air collar.
	132685	90-degree 4" OD tube GQ elbow	For L-shaped heater. 16 ga. aluminized steel 90-degree GQ elbow for GQ models only.
	132486	Raintight 120V thermostat	(40-100°F) NEMA-4X, weather resistant, with stainless steel coil. Up to 5 heaters.
	0002-42-157	Night setback 120V thermostat	(50-90°F) mechanical 120V for heaters up to 1920 VA total. Up to 5 heaters.
	0002-42-121	Night setback 24V thermostat	(45-90°F) microelectronic 24V for heaters up to 36VA total. Use with 0002-42-119.
	0002-42-119	120V transformer / relay	(8A94-2) Use with 132026-4, or 0002-42-121 for 24V thermostatic control of 120V heaters.
	0002-42-114/5	Locking thermostat guard	Plastic / or metal guard. Specify material:
	132860	4" wall vent cap for single heater	Standard for single 4" wall vents.
	132336	4" wall air supply kit for single heater	Required for single 4" wall supply. Wall cap, flex duct, sleeve & collar.
	132337	4" roof air supply kit for single heater	Required for single 4" roof supply. Roof cap, flex duct, sleeve & collar.
	132687	4"x4"x5" SQ Y-coupler for dual vent	Joins two SQ heaters to one common 5" vent using one thermostat. 16 ga. aluminized steel Y for SQ models only.
	132149	5" roof vent cap for venting 2 heaters	Required for common 5" roof vents.
	132861	5" wall vent cap for venting 2 heaters	Required for common 5" wall vents.
	132746	4"x4"x6" dual vent coupler (Y)	Joins two heaters to one common 6" vent using only one thermostat. Sheet metal.
	131461	Indoor venting kit	Required for all units when operating unvented. Cap & elbow.
	132115	U-bend reflector assembly	Use when ordering U-tube heater. Includes (2) pipe hangers.
	131421	Corner reflector assembly	Use with 132685 SQ elbow. Includes (2) pipe hangers.
	132481	Reflector side extension assembly	Focus radiant heat below and in front of heater. 5-foot long with S-hooks.
	132129	Parabolic reflector assembly	Focus radiant heat below heater. 10-foot long with support brackets.
	132352	End cap for reflector	Cap for reflector at the end of the heater.

WRITTEN SPECIFICATIONS

SECTION 23 55 23 – FUEL-FIRED RADIANT HEATERS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, and Division 01 Specification Sections apply to this Section.

1.2 SUMMARY

- A. Section includes:
 1. Gas-Fired Infra-Red Tube Heaters
- B. Related Sections:
 1. Division 23, Section 23 10 00 "Facility Fuel Systems"
 2. Division 23, Section 23 51 00 "Breechings, Chimneys, and Stacks"

1.3 QUALITY ASSURANCE

- A. Building Codes and Standards
 1. Gas-fired radiant tube heaters shall be Design Certified by CSA (American Gas Association and Canadian Gas Association) and comply with current ANSI, CAN/CSA and Occupational Safety and Health (OSHA) Requirements. The supplier shall provide the CSA Certification Number and the heaters shall bear the CSA Seal of Certification.
 2. Gas-fired radiant tube heaters shall be furnished and installed in accordance with local codes, building drawings and manufacturer's recommendations.

1.4 SUBMITTALS

- A. The supplier shall furnish the owner/contractor with _____ copies of the engineering specification forms, showing physical dimensions, installation detail, recommendations, and field wiring.

1.5 WARRANTY

- A. The supplier shall provide a manufacturer's published warranty covering the heater's burner core for a period of ten (10) years, heat exchanger and combustion chamber tubes for a period of five (5) years, and all components utilized in the heater control assembly and hardware for a period of two (2) years.

PART 2 – PRODUCTS

2.1 MANUFACTURER

- A. Gas-fired radiant tube heaters shall be SUNSPAN SQ SERIES of the model numbers and inputs in MBTUH as manufactured by SunSpan, Rochester, Michigan 48308.

2.2 DESCRIPTION

- A. Gas-fired radiant tube heaters shall be designed to satisfactorily operate at a minimum inlet pressure of: 6 inches W.C. for 40-125 MBTUH units, and 7 inches W.C. for 130-200 MBTUH units, when specified for natural gas; or 11 inches W.C. when specified for LP/propane gas; and at a maximum inlet pressure of 14 inches W.C.
- B. Gas-fired radiant tube heaters shall be designed to operate without adjustments when burning natural gas having a heat value of 1000 BTU per cubic foot with a specific gravity of .65, or when burning LP/propane gas having a heat value of 2500 BTU per cubic foot with a specific gravity of 1.53.

2.3 CONSTRUCTION

- A. The heater's controls shall be totally enclosed with a corrosion resistant housing. The controls shall be easily accessible from three sides by removing the cover. The burner core assembly shall be constructed of durable materials specially designed for high efficiency, maximum heat transfer, extremely quiet operation and extended life.
- B. The heater's combustion chamber shall be 4" O.D. Aluminized 409 stainless steel (40-100 MBTUH); or Aluminized 409 stainless steel finished with a high emissivity rated, corrosion resistant, black coating (105-200 MBTUH). Aluminized 409 stainless steel provides excellent mechanical properties at elevated temperatures and for corrosion / oxidation resistance is coated with 8% silicon/aluminum alloy, and shall meet MIL 500 hour salt spray test.
- C. The heater's heat exchanger shall be 4" O.D., 16 ga. (.065") wall thickness heat treated aluminized steel for corrosion and oxidation resistance, and shall meet MIL 500 hour salt spray test.
- D. The burner coupler joining the burner to the combustion chamber shall be cylindrical 4" I.D. by 8" long with a 16 ga. (.065") wall thickness; coupler shall be aluminized steel for corrosion and oxidation resistance, and shall meet MIL 500 hour salt spray test; center of the coupler shall have an internal radiused extrusion limiting and assuring proper tube insertion, seating and concentricity with two (2) sets of two (2) clearance holes for screws; burner coupler connection shall couple only the burner to the combustion chamber with four (4) hi-tech multi-metal self-drilling screws.
- E. The heat exchanger joint connections shall be a forced fit flared/swaged configuration; swaged end of heat exchanger shall have a black line visual indicator, 3" from the swaged end, where the flared end of the next heat exchanger shall be forcibly aligned to assure proper insertion,

- seating and concentricity; flared end of a heat exchanger shall have two clearance holes, for two (2) hi-tech multi-metal self-drilling screws.
- F. The direct spark ignitor shall be durable to resist breakage.
- G. Reflectors shall be .025" thick - #3003H25 aluminum brite finish with a geometrically designed configuration not having less than 91.7% reflectional efficiency, shall be held by a .229" diameter aluminized steel wire hanger. Hanger shall incorporate the geometric ability to rotate the reflector up to 45 degrees, in either direction from horizontal using the center of the combustion chamber or heat exchanger as the axis of rotation.
- H. Each 5 or 10-foot reflector section shall have the ability to be independently rotated from all other 5 or 10-foot sections, or overlapped between 5 or 10-foot sections, or a combination of both over the entire length of the system. The heater's reflector hanging system shall be designed to permit expansion while minimizing noise and/or rattles. Reflectors shall be assembled to the heater without the use of tools.
- I. Heaters shall utilize a downstream turbulator that shall be factory installed in the last 10-foot heat exchanger section, wave formed for optimal turbulence, acceleration and impingement of the products of combustion resulting in appropriate velocity pressure and momentum for maximum thermal efficiency.
- J. Heaters shall be equipped with a sight glass permitting a visual inspection of the spark ignitor and burner operation from the floor.
- K. Tube heaters shall be designed such that, at the customer's option, outside combustion air may be supplied without the use of additional supply fans.
- L. Heaters shall be either directly vented outdoors with insulated flue pipe, or indirectly vented by positive air displacement of 4 CFM and one square inch of net free area per 1,000 BTUH input.
- M. Heaters shall come with a 36" long stainless steel flexible gas connector.

2.4 CONTROLS

- A. Heater controls shall be isolated from combustion air to prevent corrosion from wet or dirty air.
- B. Heaters shall be equipped with a direct spark ignition system with three (3) trials-for-ignition and upon loss of flame sensing three (3) re-trials-for-ignition. Flame sensing shall be via an independent sensing rod and circuit.
- C. Power supplied to each burner shall be 120 VAC, 60 Hz. (Optional 50 Hz units available.) Maximum heater electrical current draw shall not exceed 3 amps.
- D. The heater controls shall have a three (3) copper conductor electrical power cord extending a minimum of thirty-six (36) inches from the control box with a three (3) prong plug.
- E. Heater controls shall include a safety differential pressure switch, factory set (non-field adjustable), to monitor combustion airflow, so as to provide complete burner shutdown due to insufficient combustion air or flue blockage.
- F. The heater's control system shall be designed to shut off the gas flow to the burner in the event either a gas supply or power supply interruption occurs.
- G. Combination gas control shall have a step open feature for softer ignition. Gas valve shut-off shall be of the redundant type. 100% safety shut-off.
- H. The heater shall automatically recycle itself after an inadvertent shutdown.
- I. The heater shall have three (3) system validation lights easily visible on the bottom of the burner housing. Lights shall validate "Power On," "Air Pressure Normal," and "Operation Normal."
- J. The heater's blower motor shall be thermally protected, permanently lubricated and the blower motor's impeller shall be both statically and dynamically balanced.
- K. The heater's airflow control system shall provide a pre-purge prior to initiating burner operation.
- L. No condensation shall form as a result of combustion in the combustion chamber or heat exchanger tubes while at operating temperatures.
- M. Total heater shutdown shall occur in the event of circuit control lockout, including burner operation and combustion air blower. An interruption of power (reset thermostat) will restart the firing sequence.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Installation shall be in accordance with the requirements of the manufacturer.
- B. An Installation, Operation, and Maintenance Manual shall be supplied with each heater.