

HeatersOnLine Heavy-Duty Gas Infra-Red Tube Heaters Submittal Data



Low Intensity Single Stage Tube Heaters



ENGINEERING SUBMITTAL DATA SINGLE-STAGE LOW INTENSITY GAS-FIRED INFRA-RED 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. Email HeatersOnline.net for additional information.

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	STG 40-10AN		U*+5'		STG 40-10AL		U*+5'		9' - 14'	135#	13'-4-1/4"
22'-1/4"	NA	40	STG 40-20AN		U*		STG 40-20AL		U*		9' - 14'	150#	13'-4-1/4"
22'-1/4"	NA	50	STG 50-20AN		U*		STG 50-20AL		U*		10' - 15'	150#	13'-4-1/4"
22'-1/4"	NA	60	STG 60-20AN		U*		STG 60-20AL		U*		10' - 15'	150#	13'-4-1/4"
22'-1/4"	+5'	65	STG 65-20MBN		U*		STG 65-20MBL		U*		11' - 16'	150#	13'-4-1/4"
22'-1/4"	+5'	75	STG 75-20MBN		U*		STG 75-20MBL		U*		11' - 16'	150#	13'-4-1/4"
22'-1/4"	+5'	80	STG 80-20MBN		U*		STG 80-20MBL		U*		11' - 18'	150#	13'-4-1/4"
22'-1/4"	+5'	85	STG 85-20MBN		U*		STG 85-20MBL		U*		11' - 18'	150#	13'-4-1/4"
32'-1/4"	+5'	65	STG 65-30BN		U*		STG 65-30BL		U*		11' - 16'	225#	18'-4-1/4"
32'-1/4"	+5'	75	STG 75-30BN		U*		STG 75-30BL		U*		11' - 16'	225#	18'-4-1/4"
32'-1/4"	+5'	100	STG 100-30BN		U*		STG 100-30BL		U*		12' - 20'	225#	18'-4-1/4"
32'-1/4"	+5'	125	STG 125-30MCN		U*		NA		NA		14' - 25'	225#	18'-4-1/4"
32'-1/4"	+5'	130	STG 130-30MCN		U*		NA		NA		15' - 27'	225#	18'-4-1/4"
42'-1/4"	NA	65	STG 65-40BN		U*		STG 65-40BL		U*		11' - 16'	275#	23'-4-1/4"
42'-1/4"	NA	75	STG 75-40BN		U*		STG 75-40BL		U*		11' - 16'	275#	23'-4-1/4"
42'-1/4"	+5'	100	STG 100-40BN		U*		STG 100-40BL		U*		12' - 20'	275#	23'-4-1/4"
42'-1/4"	+5'	125	STG 125-40BN		U*		STG 125-40CL		U*		14' - 25'	275#	23'-4-1/4"
42'-1/4"	+5'	130	STG 130-40CN		U*		STG 130-40CL		U*		15' - 27'	275#	23'-4-1/4"
42'-1/4"	+5'	150	STG 150-40CN		U*		STG 150-40CL		U*		16' - 30'	275#	23'-4-1/4"
52'-1/4"	NA	100	STG 100-50BN		U*		STG 100-50BL		U*		12' - 20'	350#	28'-4-1/4"
52'-1/4"	NA	125	STG 125-50BN		U*		STG 125-50CL		U*		14' - 25'	350#	28'-4-1/4"
52'-1/4"	NA	130	STG 130-50CN		U*		STG 130-50CL		U*		15' - 27'	350#	28'-4-1/4"
52'-1/4"	+5'	150	STG 150-50CN		U*		STG 150-50CL		U*		16' - 30'	350#	28'-4-1/4"
52'-1/4"	+5'	175	STG 175-50CN		U*		STG 175-50CL		U*		17' - 35'	350#	28'-4-1/4"
52'-1/4"	+5'	200	STG 200-50CN		U*		STG 200-50CL		U*		19' - 42'	350#	28'-4-1/4"
62'-1/4"	+5'	150	STG 150-60CN		U*		STG 150-60CL		U*		16' - 30'	400#	33'-4-1/4"
62'-1/4"	+5'	175	STG 175-60CN		U*		STG 175-60CL		U*		17' - 35'	400#	33'-4-1/4"
62'-1/4"	+5'	200	STG 200-60CN		U*		STG 200-60CL		U*		19' - 42'	400#	33'-4-1/4"
72'-1/4"	NA	150	STG 150-70CN		U*		STG 150-70CL		U*		16' - 30'	475#	38'-4-1/4"
72'-1/4"	NA	175	STG 175-70CN		U*		STG 175-70CL		U*		17' - 35'	475#	38'-4-1/4"
72'-1/4"	NA	200	STG 200-70CN		U*		STG 200-70CL		U*		19' - 42'	475#	38'-4-1/4"

Additional Models Specified:

MBTUH = 1000 BTU per hour.

NA = Not Available.

U* = U (STU) replaces G (STG) in the model number for U-tube heaters.

Wt.** = Shipping Weight. Add 25# to weight for U-tube heaters. Add 45# to weight for +5' option.

5-foot Option*** = +5' indicates a 5-foot heater section may be added to the straight heater models only.

Submitted by: _____ Date: _____

Job Title: _____

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

Contractor: _____ Phone #: _____

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

Engineer: _____

Local Representative: _____

Notes: _____

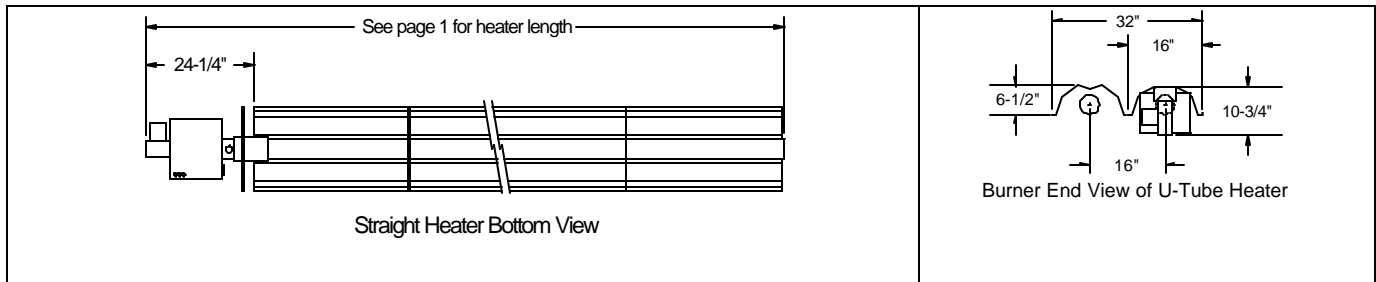
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SPECIFICATIONS AND CLEARANCES

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>HEAT EXCHANGER TUBES</p> <ul style="list-style-type: none"> Heavy-duty 12 ga. 4" O.D. black steel for excellent heat transfer emissivity and durability. Turbulator baffle factory installed. 8" long clamps of 2 layers of 18 ga. aluminized steel with 4 clamping bolts. <p>COMBUSTION TUBES</p> <ul style="list-style-type: none"> 4" O.D. Alumina Therm for excellent corrosion resistance. <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. 	<p>GAS SUPPLY (W.C.)</p> <table border="1"> <tr> <td>Manifold pressure</td> <td>NAT</td> <td>LP</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. 10 years on All Heat Exchanger & Combustion Tubes. 2 years on All Burner Controls. <p>MADE IN THE USA</p>	Manifold pressure	NAT	LP	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	NAT	LP															
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"															

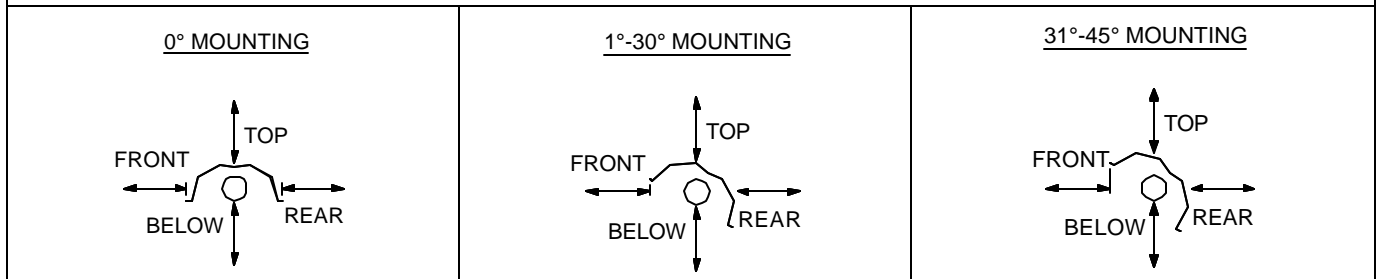
PHYSICAL DIMENSIONS



CLEARANCES

MBTUH (1000 BTU per hour)	CLEARANCES TO COMBUSTIBLES* (INCHES)				
	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

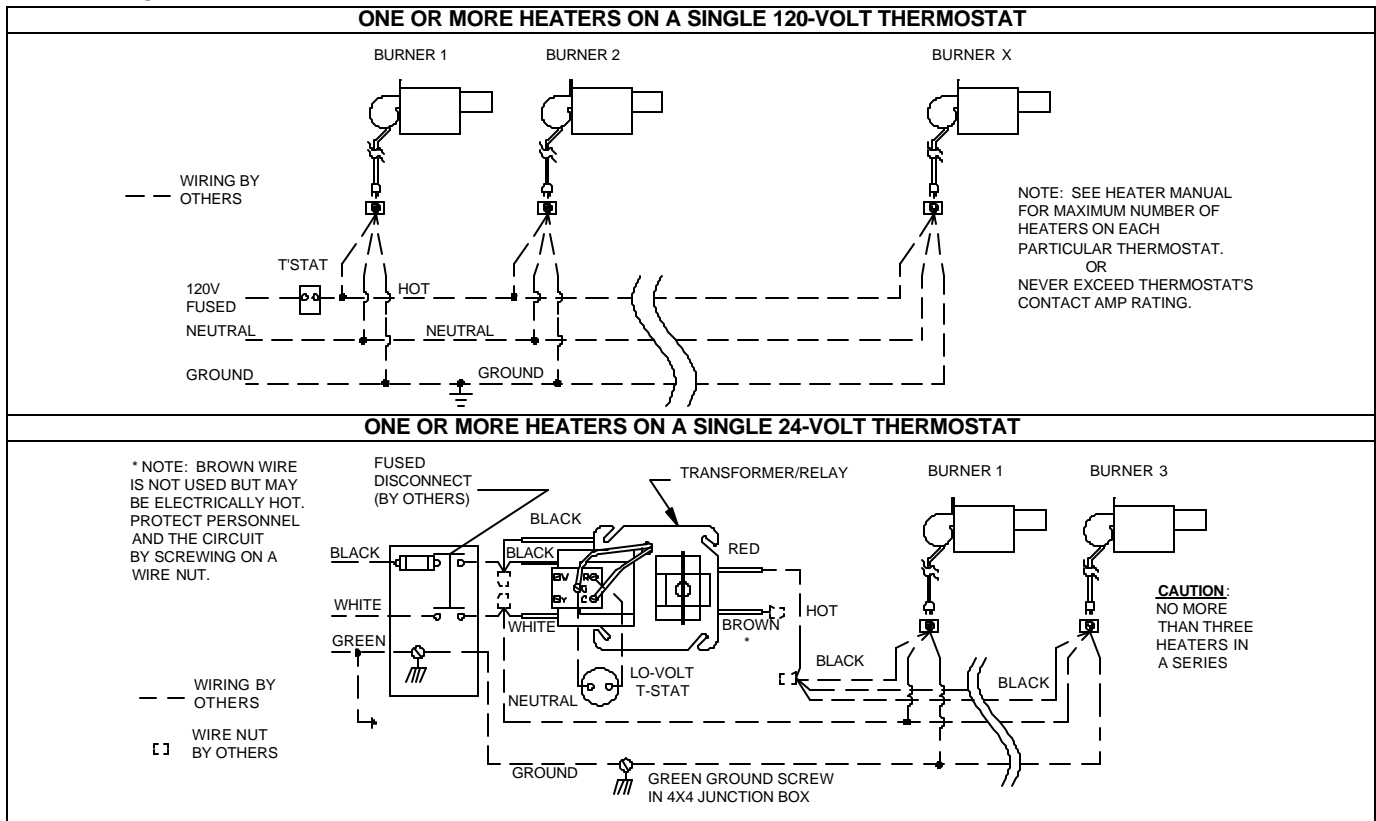
* FOR ALL SYSTEMS: 12" FROM BURNER END AND 68" FROM U-BEND.



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FIELD WIRING & ACCESSORIES

FIELD WIRING



RECOMMENDED ACCESSORIES

QTY	ITEM #	DESCRIPTION	NOTES
	132026-4	Standard thermostat	(S-22 PO), (40-80F) 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.
	0002-10-046	Gas supply flex connector	24" long, stainless steel, 1/2" psi. max. with 1/2" gas cock & 1/8" tap.
	132237	4" wall vent kit for single heater	Required for single 4" wall vents. Tee, cap, screen & braces.
	131402	4" roof vent cap for single heater	Required for single 4" roof vents. Cap.
	131461	Indoor venting kit	Required for all units when operating unvented. Cap & elbow
	132336	4" wall air supply kit for single heater	Required for single 4" wall supply. Wall box, flex duct, sleeve & collar.

OTHER ACCESSORIES

QTY	ITEM #	DESCRIPTION	NOTES
	132654	Burner / Blower Enclosure	Protects blower in harsh environments. 5-way air access for all burners. Factory installed.
	132446	90-degree 4" OD tube elbow & clamp	For L-shaped heater. 16 ga. aluminized steel 90-degree elbow with tube clamp 132571.
	132448	45-degree 4" OD tube elbow & clamp	For angled heater. 16 ga. aluminized steel 45-degree elbow with tube clamp 132571.
	132486	Raintight 120V thermostat	(T115), (40-100F) NEMA-4X raintight, weather resistant, with stainless steel coil. Up to 5 hrs.
	0002-42-157	Night setback 120V thermostat	(PSP510), (50-90F) mechanical 120V for heaters up to 1920 VA total. Up to 5 heaters.
	0002-42-121	Night setback 24V thermostat	(PSP511), (45-90F) 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	Plastic locking thermostat guard	Clear plastic guard, ID: 4.5"H x 7"W x 3"D.
	0002-42-115	Metal locking thermostat guard	Baked enamel finished metal guard, ID: 4.625"H x 7.125"W x 3.25"D.
	S132796	PVC coated gas flex connector	24" long, coated stainless steel for harsh environments, 1/2" psi. max., 1/2" gas cock & 1/8" tap.
	130828	4"x4"x5" Y-coupler for dual venting	Joins two (2) heaters to one common 5" vent using one thermostat. 16 ga. aluminized steel Y with (2) tube clamps 132571.
	132238	5" wall vent kit for venting 2 heaters	Required for common 5" wall vents. Tee, cap, screen & braces.
	132149	5" roof vent cap for venting 2 heaters	Required for common 5" roof vents. Cap.
	132746	4"x4"x6" Individual vent coupler (Y)	Joins two (2) heaters to one common 6" vent using one or two thermostats. Sheet metal.
	132239	6" wall vent kit for venting 2 heaters	Required for common 6" wall vents. Tee, cap, screen & braces.
	132150	6" roof vent cap for venting 2 heaters	Required for common 6" roof vents. Cap.
	132747	Vent cap for individual vent coupler	Required with 132746 to independently vent two (2) heaters thru one 6" roof vent when using two thermostats.
	132338	6" wall air supply kit for 2 heaters	Required for common 6" wall supply. 6" wall box, (2) 4" flex ducts, (2) 4" sleeves & (2) collars.
	132115	U-bend reflector assembly	Use when ordering U-tube heater. Includes (2) pipe hangers.
	131421	Corner reflector assembly	Use with 132446 elbow. Includes (2) pipe hangers.
	132481	Reflector side extension assembly	Reflector side guard to reduce side clearances. 5-foot long with S-hooks.
	132129	Parabolic reflector assembly	Focus radiant heat in one direction. 10-foot long with support brackets.
	132352	End cap for reflector	Cap for reflector at the end of the heater.

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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 ten (10) 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 SOLARONICS SUNTUBE IV VERSAMOUNT SERIES of the model numbers and inputs in MBTUH as manufactured by Solaronics, Inc. Rochester, Michigan 48307.

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. Aluma Therm (aluminized titanium alloy steel) or Aluma Therm finished with a high emissivity rated, corrosion resistant, black coating. Aluma Therm 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 tube shall be heavy-duty 12 ga. (.109") wall thickness 4" O.D. black steel.
- D. The heaters are CSA Design Certified for alternate construction utilizing radiant tubes of all Aluma Therm finished with a high emissivity rated, corrosion resistant, black coating.
- E. The 4" O.D. tubes shall be joined by two layers of 18 ga. (.052") wall thickness aluminized steel tube clamp assembly and shall be a minimum of 8" in length for maximum support. Clamp shall be of a compression coupling design for uniform draw and pressure, and four (4) 5/8"-11x2" zinc plated carriage bolts and nuts to draw up (tighten to a minimum of 65 foot-pounds of torque).

- 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 ten (10) feet of heat exchanger, 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.

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 have an 1/8" – 27 FPT externally accessible inlet gas pressure test point.
- I. The heater shall automatically recycle itself after an inadvertent shutdown.
- J. 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."
- K. The heater's blower motor shall be thermally protected, permanently lubricated and the blower motor's impeller shall be both statically and dynamically balanced.
- L. The heater's airflow control system shall provide a pre-purge prior to initiating burner operation.
- M. No condensation shall form as a result of combustion in the combustion chamber or heat exchanger tubes while at operating temperatures.
- N. 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.