

SPACE-RAY®
INFRARED GAS HEATERS



SUBMITTAL DATA

INFRARED RADIANT CERAMIC TUBE HEATER

DK SERIES

NATURAL GAS

(CHECK ONE)

PROPANE GAS

PROJECT:

NAME: _____

DATE: _____

ADDRESS: _____

ARCHITECT/ENGINEER:

NAME: _____

ADDRESS: _____

CONTRACTOR:

NAME: _____

ADDRESS: _____

SUBMITTED BY: _____

EQUIPMENT USED:

ACCESSORIES:

- Chain Mounting Kit _____
- Thermostat _____
- Gas Pressure Regulator _____

- Gas Shut-Off Valve _____
- Other _____
- Other _____

1) GENERAL INFORMATION

This heater is a self-contained infrared radiant ceramic heater for use in locations where flammable gases or vapors are not generally present (as defined by OSHA acceptable limits) and is intended for the heating of nonresidential spaces.

INSTALLATION REQUIREMENTS

Installation of this heater must be in accordance with all applicable codes shown in the instructions and/or the local codes and authorities having jurisdiction. In Canada, the installation must conform to current CAN/CGA-B149.1/2 Installation Code in the absence of local codes. Heaters shall be installed by a licensed contractor or licensed installer. Clearances to combustibles as outlined in this manual should always be observed. In areas used for storage of combustible materials where they may be stacked below the heater, NFPA54 requires that the installer must post signs that will "specify the maximum permissible stacking height to maintain the required clearances from the heater to combustibles."

Every heater shall be located with respect to building construction and other equipment so as to permit access to the heater. Each installer shall use quality installation practices when locating the heater and must give consideration to clearances to combustible materials, vehicles parked below, lights, overhead doors, storage areas with stacked materials, sprinkler heads, gas and electrical lines, and any other possible obstructions or hazards. Consideration also must be given to service accessibility.

The heater, when installed in aircraft hangars and public garages, must be installed in accordance with ANSI/NFPA 409-latest edition (Standard for Aircraft Hangars), ANSI/NFPA 88a-latest edition (Standard for Parking Structures), and ANSI/NFPA 88b-latest edition (Standard for Repair Garages) with the following clearances:

- At least 10 feet above the upper surfaces of wings or engine enclosures of the highest aircraft that may be housed in the hangar and at least 8 feet above the floor in shops, offices, and other sections of hangars communicating with aircraft storage or service areas.
- At least 8 feet above the floor in public garages. **▲WARNING:** Minimum clearances marked on the heater must be maintained from vehicles parked below the heater.

(FOR CANADA ONLY)

- Installation of this appliance is to be in accordance with latest edition of CAN 1-B149.1 (Installation Code for Natural Gas Burning Appliances and Equipment), and/or CAN B149.2 (Installation Code for Propane Gas Burning Appliances and Equipment).
- For installation in public garages or aircraft hangars, the minimum clearances from the bottom of the heater to the upper surface of the highest aircraft or vehicle shall be 50 percent greater than the certified minimum clearance, but the clearance shall not be less than 8 feet.

Although these heaters may be used in many applications other than space heating (e.g., process heating), Gas-Fired Products, Inc. will not recognize the warranty for any use other than space heating.

This heater is for Indoor Installation only and can be used in Unvented mode. The term Unvented actually means Indirect Vented. While the products of combustion are expelled into the building, national codes require ventilation in the building to dilute these products of combustion. This ventilation may be provided by gravity or mechanical means.

This heater is not an explosion proof heater. Where the possibility of exposure to volatile and low flash point materials exists, it could result in property damage or death. This heater must not be installed in a spray booth where the heater can operate during the spraying process. Consult your local fire marshal or insurance company.

▲WARNING: Certain materials or objects, when stored under the heater, will be subjected to radiant heat and could be seriously damaged. Observe the Minimum Clearances to Combustibles listed in the manual and on the heater at all times.

2) DK SERIES SPECIFICATIONS

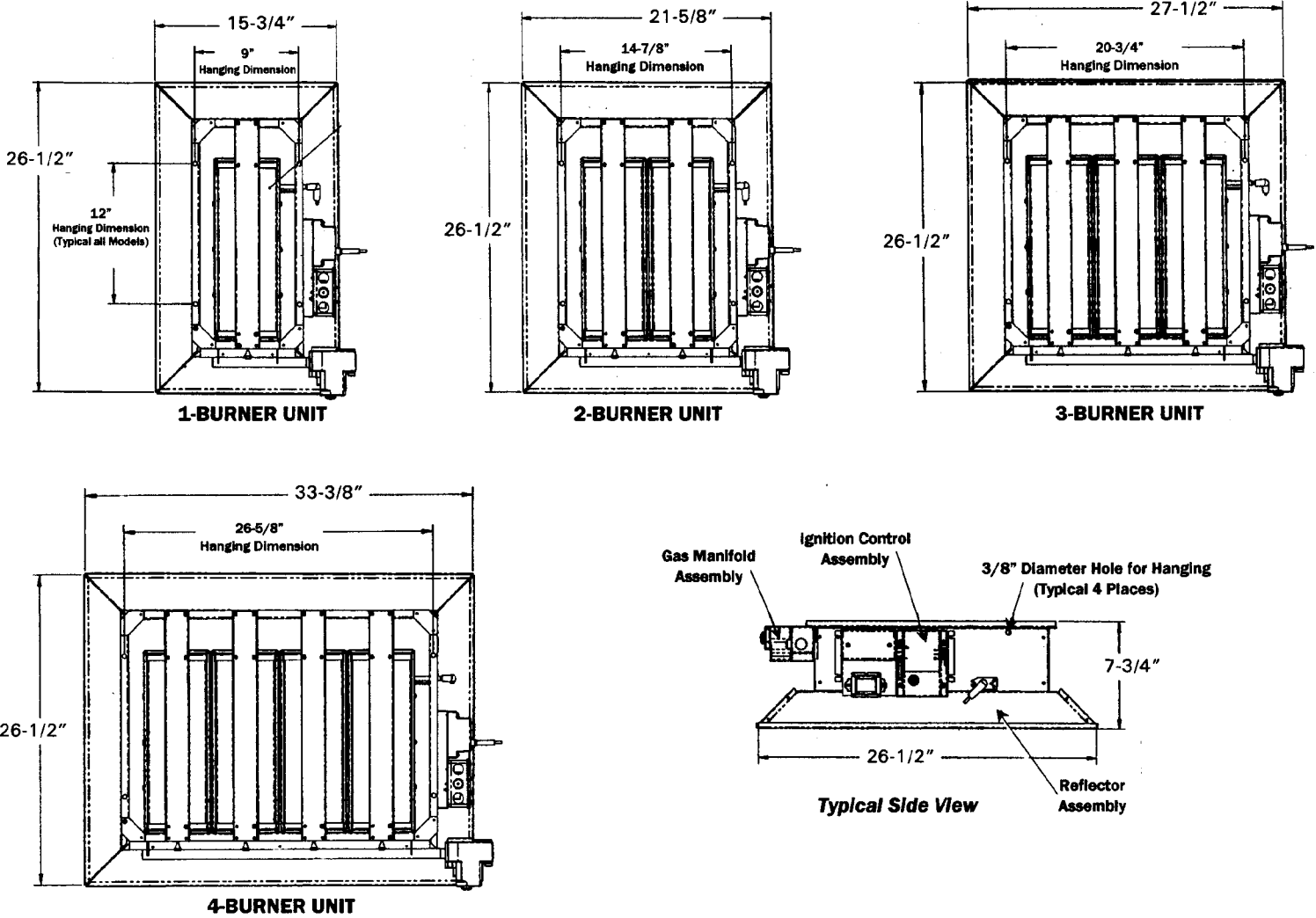
MODEL NO.	BTU/HR INPUT	NUMBER OF BURNERS	ORIFICE SIZE*		SHIPPING WEIGHT
			Natural Gas	Propane Gas	
DK30-N5A	30,000	1	2.3mm	n/a	30 lbs.
DK35-N5A	35,000	1	#41	n/a	30 lbs.
DK40-N5A	40,000	1	#38	n/a	30 lbs.
DK60-N5A	60,000	2	2.3mm	n/a	35 lbs.
DK70-N5A	70,000	2	#41	n/a	35 lbs.
DK80-N5A	80,000	2	#38	n/a	35 lbs.
DK100-N5A	100,000	3	#41	n/a	48 lbs.
DK120-N5A	120,000	3	#38	n/a	48 lbs.
DK140-N5A	140,000	4	#41	n/a	58 lbs.
DK160-N5A	160,000	4	#38	n/a	58 lbs.
DK33-L5A	33,000	1	n/a	#52	30 lbs.
DK66-L5A	66,000	2	n/a	#52	35 lbs.
DK100-L5A	99,000	3	n/a	#52	48 lbs.
DK132-L5A	132,000	4	n/a	#52	58 lbs.

MODEL SUFFIX	
Gas Type:	Ignition System:
N = Natural L = Propane	5 = Direct Spark (115 Volt / 0.40 Amp / 60 Hz)

GAS PIPE CONNECTION
1/2" NPT (Female)

* One Orifice Per Burner

3) DK SERIES DIMENSIONS

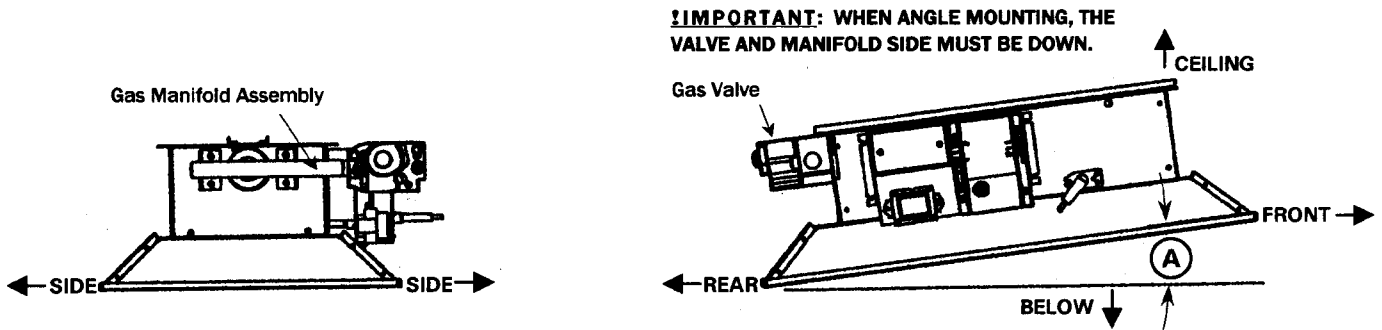


4) HANGING

The heater can be mounted with the reflector horizontal or angled up to 35° from horizontal. When the heater is to be angle mounted, make sure the gas manifold assembly is on the lower side of the heater. Coil chains (No. 2 or larger) or rigid supports may be used to mount the heater, which must be suspended from a permanent structure with adequate load capacity. The gas manifold assembly tube must be level, and for angled mounting, it must be at the LOWER end of the heater. All "S" hooks and eyebolts must be manually crimped closed by the installer.

5) MINIMUM CLEARANCES TO COMBUSTIBLES

Minimum clearances shall be measured from the outer surfaces as shown below:

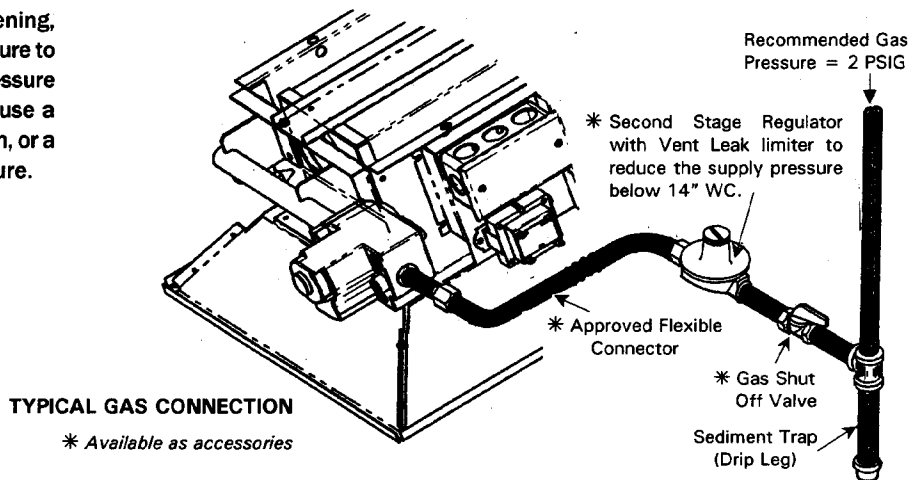


MINIMUM CLEARANCES TO COMBUSTIBLES											
MODEL	Mounted Horizontally					Mounted at 35° Angle					Ⓐ Angle Mounting (degree)
	SIDES	CEILING	BELOW		BELOW		FRONT		REAR		
			w/Standard Reflector	w/Reflector Extension	w/Standard Reflector	w/Reflector Extension	w/Standard Reflector	w/Reflector Extension			
DK30 DK35 DK33 DK40	30"	36"	72"	100"	72"	100"	36"	50"	30"	0° min 35° max	
DK60 DK70 DK66 DK80	48"	48"	98"	137"	98"	137"	48"	68"	36"	0° min 35° max	
DK100 DK120	48"	64"	128"	180"	128"	180"	60"	84"	48"	0° min 35° max	
DK132 DK160 DK140	60"	64"	136"	190"	136"	190"	64"	90"	48"	10° min 35° max	

NOTE: The clearances specified above must be maintained to combustibles and other materials that may be damaged by temperatures 90°F above ambient temperature. Clearances to combustibles are posted on the reflector near the control end of the heater. In locations used for storage of combustible materials where they may be stacked below the heater, NFPA 54 requires that the installer must post signs that will "specify the maximum permissible stacking height to maintain the required clearances from the heater to combustibles." Space-Ray recommends posting these signs adjacent to the heater thermostat or other suitable location that will provide enhanced visibility.

6) GAS CONNECTIONS

This appliance is equipped with a snap-opening, combination gas valve. The maximum supply pressure to the appliance is 14" W.C. or 1/2 P.S.I. If the line pressure is more than the maximum supply pressure, then use a line regulator as indicated in the following illustration, or a line regulator that corresponds to the supply pressure.

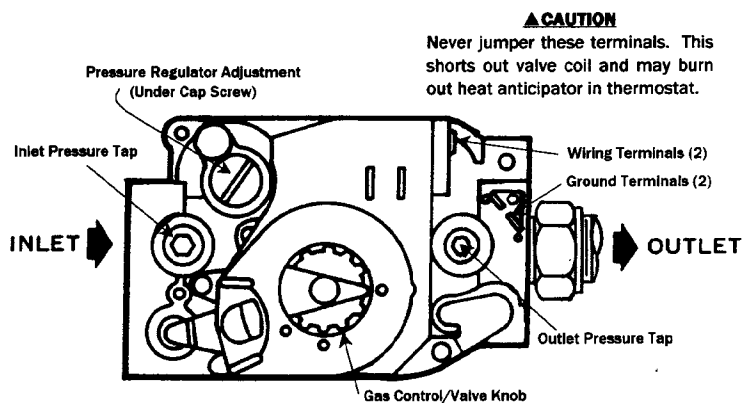


7) GAS PRESSURE TABLE

Supply Pressure - The installer will provide a 1/8" N.P.T. plugged tapping, accessible for test gauge connection immediately upstream of the gas supply connection to the heater.

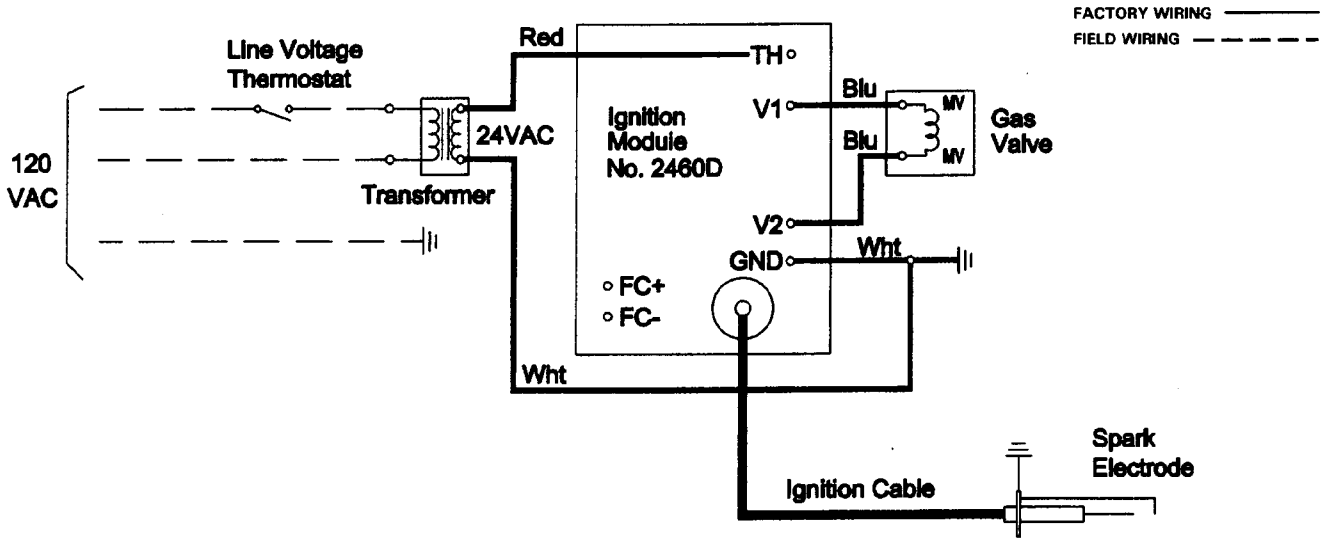
GAS PRESSURE TABLE				
HEATER MODELS	GAS TYPE	MANIFOLD PRESSURE	SUPPLY PRESSURE	
			*Minimum	Maximum
DK (30, 35, 40, 60, 70, 80, 100, 120, 140 & 160)	Natural	6" w.c.	7" w.c.	14" w.c.
DK (33, 66, 100 & 132)	Propane	10" w.c.	11" w.c.	14" w.c.

* Minimum permissible gas supply pressure for purpose of input adjustment.



8) ELECTRICAL CONNECTIONS

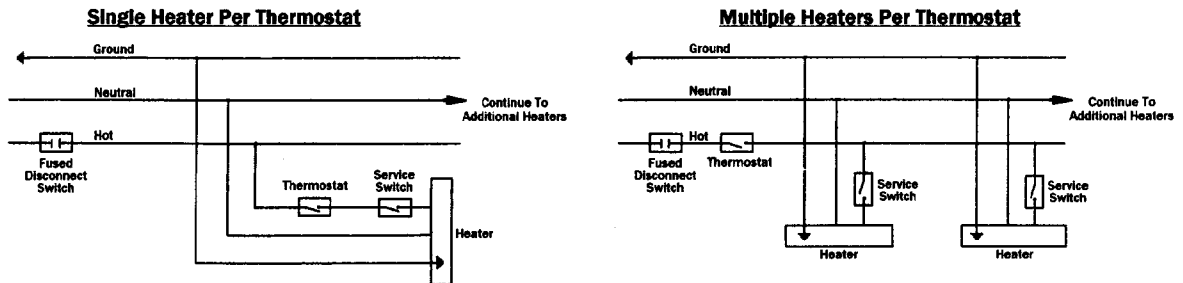
CONNECTION WIRING DIAGRAM
For Direct Spark Ignition System with Fenwal Module



NOTES: 1) If any of the original wire as supplied with the appliance must be replaced, it must be replaced with wiring material having a temperature rating of at least 105°C (18Ga. CSA-600V-Type TEW). 2) When connecting the supply circuit to the heater, wiring material having a minimum size of 14 AWG and a temperature rating of at least 105°C shall be used.

9) THERMOSTAT CONNECTIONS

TYPICAL THERMOSTAT CONNECTIONS



10) VENTILATION

This heater requires ventilation in the building to dilute the products of combustion and provide fresh air for efficient combustion. Power ventilation is recommended and the minimum vent flow required is as follows:

DK30, DK33, DK35	128 cfm	DK100	384 cfm
DK40	150 cfm	DK120	448 cfm
DK60, DK66, DK70	256 cfm	DK132, DK140	512 cfm
DK80	300 cfm	DK160	600 cfm

If gravity ventilation is used, the required square feet of inlet and outlet vent area (depending on height and temperature difference) is as follows:

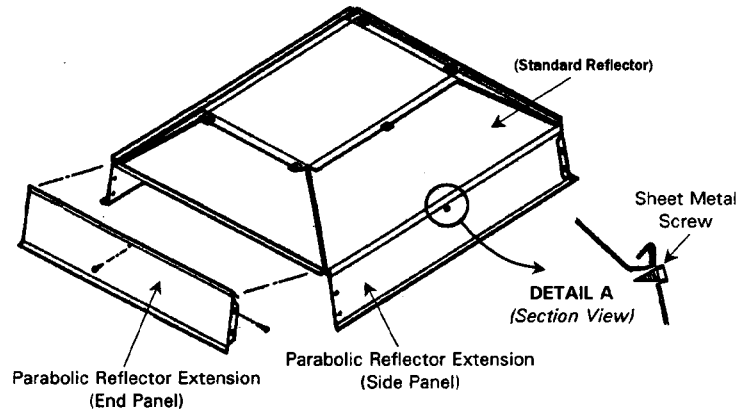
DK30, DK33, DK35	0.49 s/f	DK100	1.48 s/f
DK40	0.57 s/f	DK120	1.72 s/f
DK60, DK66, DK70	0.98 s/f	DK132, DK140	1.97 s/f
DK80	0.98 s/f	DK160	2.30 s/f

The General Ventilation Rules outlined in ASHRAE GUIDE AND DATA BOOK should be observed when locating vents. Exhaust vents must be located at the highest point above and in the vicinity of the heaters and the inlet vents must be located below the level of the heaters.

11) OPTIONAL PARABOLIC REFLECTOR EXTENSION ASSEMBLY

The heater is completely factory assembled and requires no field assembly. If the optional parabolic reflector extension is utilized, locate and identify the end panels and side panels as shown in the following diagram. Attach the side panels as shown. Attach the end panels so that the end flanges of the end panels overlap the side panels. Attach the side panels and end panels together with the screws provided in the kit. Attach the remaining screws as shown in Detail A. This is to ensure that the Parabolic Reflector Extension is securely attached to the reflector. The clearances to combustibles (shown on the clearance label that is secured to the reflector on the control end of the heater and in Section 5 of these instructions) must be closely observed. *Please order the Parabolic Reflector Extension Kit using the Part Numbers below:*

Model No.	Parabolic Reflector Extension Kit Number
DK30, DK33, DK35, DK40	#43822010
DK60, DK66, DK70, DK80	#43822020
DK100, DK120	#43822030
DK132, DK140, DK160	#43822040



12) OPTIONAL PROTECTIVE REVERB SCREEN

The optional protective Reverb Screen acts as a safety net in the unlikely event that the ceramic tile assembly is broken by an outside force. In addition, it increases the overall emissivity of the radiating surface with a blackbody radiation effect. It is recommended in high-traffic areas as well as where improved radiant output is desired. *Please order the Protective Reverb Screen using the Part Numbers below:*

Model No.	Reverb Screen Kit Number
DK30, DK33, DK35, DK40	#43876010
DK60, DK66, DK70, DK80	#43876020
DK100, DK120	#43876030
DK132, DK140, DK160	#43876040

13) LIMITED WARRANTY

LIMITED WARRANTY: Gas-Fired Products, Inc., the manufacturer, warrants to the original owner of any Space-Ray infrared gas heater that said heater will be free from defects in material or workmanship under normal use and service. The heater(s) shall be installed, used and maintained strictly in accordance with the manufacturer's instructions. The manufacturer's sole obligation under this warranty shall be limited to furnishing replacement parts, F.O.B. Charlotte, NC, for 12 months from the date of installation, or 18 months from the date of shipment by the manufacturer, whichever period shall expire first. Labor charges for removal of defective parts and the installation of the replacement parts are not included. This warranty applies only within the USA and Canada.

WARNING: Manufacturer's warranty shall not apply: (a) to damage to the heater when used in an atmosphere containing halogenated hydrocarbons or other corrosive chemicals. Some compounds in the air can be ingested into the equipment and can cause an accelerated rate of corrosion of some of the parts of the heating components. The use of such chemical compounds in or near the operating environment of the heater should be avoided where a longer heater life is desirable; (b) to any heater or components which have been repaired or replaced with other than factory parts, modified in any way, misused or damaged, or which have been used contrary to the manufacturer's written instructions. Replacement parts are available through Space-Ray representatives or their distributors.

LIMITATION OF WARRANTY: THERE ARE NO WARRANTIES, EXPRESS OR IMPLIED, WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. WITHOUT LIMITING THE FOREGOING, THE MANUFACTURER EXPRESSLY EXCLUDES ANY AND ALL IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE AND ANY IMPLIED WARRANTY OF MERCHANTABILITY FOR ITS PRODUCTS.

If any provision of this warranty is found to be void, unenforceable or unconscionable, then the same is hereby severed and the remainder of this warranty is hereby saved and shall remain in force.

EXCLUSIVE REMEDY: The sole and exclusive remedy under this warranty is the replacement of the defective parts or heaters as hereinabove specified. THE MANUFACTURER DOES HEREBY EXPRESSLY EXCLUDE ANY AND ALL LIABILITY FOR INCIDENTAL AND CONSEQUENTIAL DAMAGES UNDER THIS OR ANY OTHER WARRANTY. Without intending to limit the aforesaid exclusion, THE MANUFACTURER DOES HEREBY EXCLUDE ANY LIABILITY UNDER THIS OR ANY OTHER WARRANTY FOR INJURIES AND COMMERCIAL LOSSES TO PROPERTY THAT RESULT FROM THE OPERATION, PROPER OR IMPROPER, OF ITS PRODUCTS.

ADDITIONAL WARRANTY ON HEAT EMITTING SURFACE AND BURNER: Manufacturer warrants to the original owner of any CSA design certified heater that, if installed, used and maintained strictly in accordance with the printed instructions received with the heater, the manufacturer will at any time during the below listed time periods, furnish at no cost to the original owner, replacement emitters or burners which have become inoperative by reason of any defect in our workmanship, materials or construction. The manufacturer's obligation under this warranty shall be limited to furnishing replacements under the following time periods from the date of installation:

	<u>Emitter</u>	<u>Burner</u>
DK Series:	5 Years	1 Year

The manufacturer will not be responsible for labor charges incurred for removal or installation of emitters. Any transportation charges involved in the return or repair are excluded.

ADDITIONAL TERMS: Manufacturer assumes no liability for delay in performing its obligations under the aforesaid warranty. Manufacturer assumes no liability for failure in performing its obligations thereunder if failure results directly or indirectly from any cause beyond its control, including but not limited to acts of God, acts of Government, floods, fires, shortages of materials, strikes and other labor difficulties or delays or failures of transportation facilities.

This is a Non-Residential product (excluding the CB Series which is certified for residential and non-residential use). Installation and service shall be by a Licensed Contractor and in accordance with National and Local Codes.

When presenting warranty claims, proof of date of purchase must be submitted.

No Representative is authorized to assume for the manufacturer any liability except as set forth above.

SPACE-RAY®

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