Heating safely with gas-fired infrared heaters

Patio Heaters

High Intensity Ceramic Heaters

Low Intensity Tube Heaters

Construction Heaters

FROM THE

INFRARED HEATER

SAFETY COUNCIL

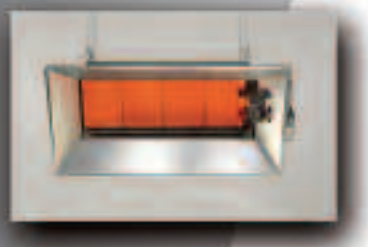
IRSC

INFRARED HEATER SAFETY COUNCIL

An AHRI Initiative

AHRI

irsafetycouncil.org



High Intensity Ceramic Heater

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WHAT IS A GAS-FIRED, INFRARED HEATER?

There are several types of gas-fired, infrared heaters, such as ceramic heaters, tube heaters and patio heaters. These heaters use a burner containing gas combustion controls, a heat exchanger element and reflectors.

CLEAN, QUIET AND EFFICIENT HEATING

There are many benefits to using gas-fired, infrared heaters. Just as the sun heats the earth, infrared heaters heat people and objects directly. Warmed objects in turn create a heat sink which allows for quick heat recovery and greater comfort at lower air temperatures. The result is proven lower fuel and electricity costs.

Unlike air heaters, infrared heaters do not blow dirt and dust, helping to provide quiet and clean comfort. They are easy to install as well as maintain; and with the many models on the market today, infrared heaters offer design flexibility to fit a variety of floor plans and building types.

REFER TO THE IRSC FOR CURRENT, ACCURATE INFORMATION

The Infrared Heater Safety Council (IRSC) was created by gas-fired, infrared heating equipment manufacturers, to enhance user safety through education of building inspectors, fire authorities and end users on safe practices.

Infrared heating technology has a long history of safety and has been widely used in a variety of commercial and industrial applications such as warehouses, manufacturing facilities, fire stations, vehicle service facilities and aircraft hangars. Like all gas burning products, infrared heaters have installation, operation and service procedures that must be followed to ensure safety.

Note: While this brochure covers basic concepts, it does not replace manufacturers' Installation, Operation and Service manuals. Read the instructions and follow them. The IRSC recommends that all installation, service and annual inspection work be done by a qualified person or agency.

WHY BUILDING OWNERS CHOOSE INFRARED HEATING ...

- Average 30% fuel savings over conventional heating methods.
- Heating the floor level, not the ceiling, provides superior comfort.
- Flexible heater placement allows heat concentration where it is needed most.
- Infrared heaters are durable and can be easily maintained and cleaned.
- Infrared heaters do not push dirt and dust around resulting in a quiet and clean environment.

PROPER USE

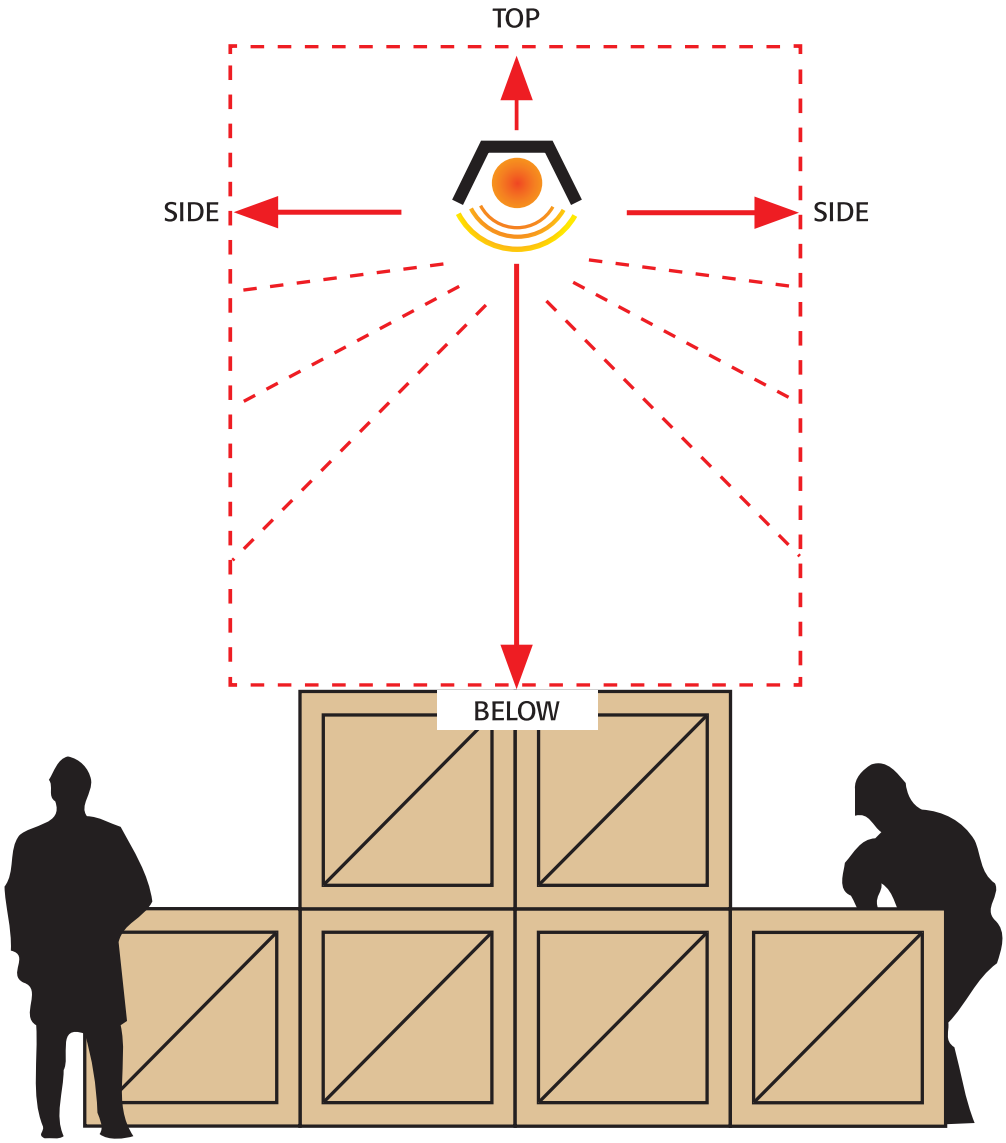
Infrared heaters are designed to provide warmth and comfort for commercial, industrial and some approved residential applications. Most infrared heaters* are not approved for:

- Residential indoor living or sleeping areas.
- Process heating, such as paint booths, grain bins, material drying.
- Hazardous (class 1 or 2) environments.

⚠WARNING

Apply infrared heaters only as allowed by the manufacturer or as set forth by National, State or Local Codes.

* Only applies to infrared heaters certified to ANSI Standards Z83.20 [Low Intensity], Z83.19 [High Intensity], Z83.7 [Construction] or CSA Standard 5.90 [Patio Heaters]



CLEARANCES TO COMBUSTIBLES

RESPONSIBILITY OF THE INSTALLERS AND USERS

Ensure that building materials with a low heat tolerance are protected to prevent degradation.

"...in locations used for storage of combustible materials, signs shall be posted to specify the maximum permissible stacking height to maintain the required clearances from the heater to the combustibles."

This is quoted from the *National Fuel Gas Code* (ANSI Z223.1/NFPA 54), and the *Standard for Gas-Fired Low-Intensity Infrared Heaters* (ANSI Z83.20).

ANSI Z83.20 further states "and that such signs must either be posted adjacent to the heater thermostats or in the absence of such thermostat in a conspicuous location."

CLEARANCES TO COMBUSTIBLES SAFETY ISSUES

Clearances are the required minimum distances that combustible objects can be placed from the heater to prevent fire hazards. Combustibles are materials which may catch on fire and include common items such as wood, paper, rubber and fabric. Clearances to combustibles must be maintained at all times to ensure safety.

Even if equipment is installed with the proper clearances to combustibles, some materials may be present that have lower heat tolerances and may be subjected to degradation.

All infrared heaters shall have the clearances to combustibles prominently displayed on the product, as well as in the Installation, Operation and Service manual.

Read, understand and follow the safety guidelines below:

- Keep gasoline or other combustible materials including flammable objects, liquids, dust or vapors away from the heater or any other appliance.
- Maintain clearances from heat sensitive material, equipment and workstations.
- Maintain clearances from heat sensing devices, such as sprinkler systems, and make sure these devices are not overheated.
- Maintain clearances from vehicles parked below the heater.
- Maintain clearances from swinging and overhead doors, overhead cranes, vehicle lifts, partitions, storage racks, hoists, building construction, etc.
- Hang heater in accordance with manufacturer's suspension requirements.
- Do not run gas pipe or conduit in the area of exhaust discharge of flue products or in the clearance zone.

WHEN BUILDING OWNERSHIP CHANGES

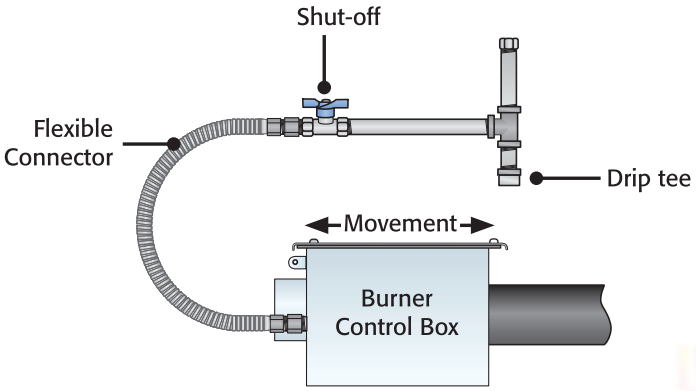
It is imperative that current and future building owners are well informed regarding the infrared heating system in their building. If the building is sold to a new owner, it is the responsibility of the seller to transfer all documentation of the heating system, including the Installation, Operation and Service manual to the new owner. Placards should be properly placed and/or relocated. Contact the factory for additional copies of the Installation, Operation and Service manual.

CHANGE TO BUILDING CONSTRUCTION AND/OR HEATING SYSTEM

Special consideration is required if:

- Building has been remodeled or renovated since the last inspection.
- Additional heaters or racking system(s) have been added.
- Equipment has not been operated for an extended period of time.
- Usage of the building has changed.
- User has questions or concerns about the operation of the equipment.

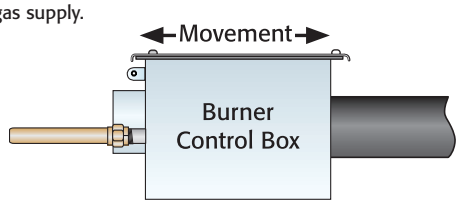
PROPER GAS CONNECTION



Connect heater to gas supply using the proper equipment as set forth by ANSI standards, NFPA codes and the manufacturer. Consult manual for instructions on pressure, expansion and other safety requirements; including local codes.

IMPROPER GAS CONNECTION

Do not directly connect gas supply line to heater inlet. **Do not** use copper piping to connect unit to the gas supply.



Failure to properly connect the gas supply to the unit may result in leaks, improper heater operation and possible system failure including explosion or fire.

PROPER GAS CONNECTION

⚠WARNING

Fire Hazard | Explosion Hazard

Tighten gas connector fittings to connect gas supply.

Gas connector moves during normal operation.

Failure to follow these instructions can result in death, injury or property damage.

When connecting an infrared heater to the supply line, allowances for heater expansion are required. A flexible gas connector of approved type must be used. The gas piping system shall not bear any weight of any appliance. See NFPA 54/ANSI Z223.1 National Fuel Gas Code, latest revision.

GAS CONVERSION

⚠WARNING

Carbon Monoxide Hazard | Fire Hazard

Install heater with proper ventilation per installation instructions.

Failure to follow these instructions can result in death, injury or property damage.

Gas conversions must be done by a qualified person or agency following the manufacturer's conversion instructions. Contact the manufacturer for proper instructions and parts.

PROPER VENTILATION

Heaters must be vented per all applicable codes. All infrared heating manufacturers provide a variety of vent terminations and piping. For specific ventilation requirements, reference the manufacturer's Installation, Operation and Service manual.

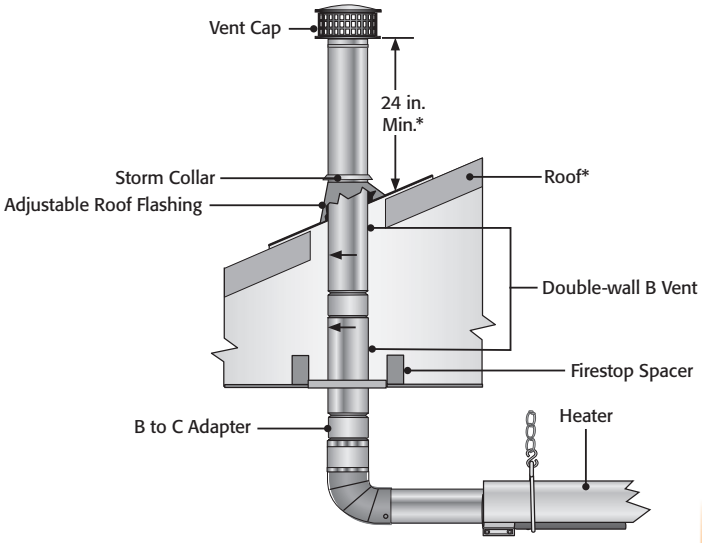
Where unvented infrared heaters are used, natural or mechanical means shall be provided to supply and exhaust at least 4 cfm/1000 Btu/h of input of installed heaters.

CAREFULLY FOLLOW ALL VENTILATION INSTRUCTIONS!

- ☑ Provide proper fire guarding (thimbles, flashing, etc.) when venting through a combustible wall.
- ☑ Provide mechanical or natural ventilation of 4 cfm/1000 Btu/h of input when operating unvented.
- ☑ Provide fresh air for combustion when operating in harsh environments.
- ☑ Use a single control when common venting.
- ☑ Provide adequate separation from heater exhaust to air intake.
- ☑ Verify vent lines(s) are free of obstructions and debris and comply with minimum and maximum vent lengths.

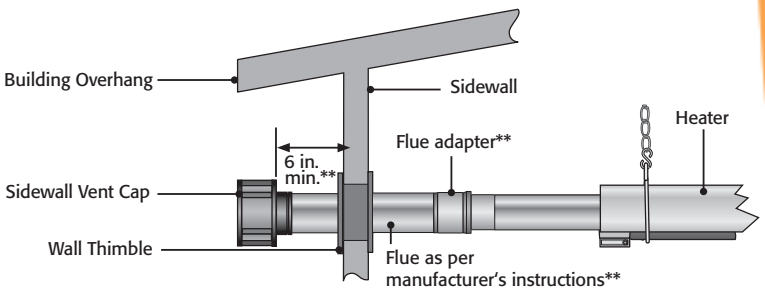
Consult manual for specific installation guidelines as each application may vary.

ROOFTOP VENTING REQUIREMENTS



*Consult the NFPA 54/ANSI Z223.1 or CAN/CSA-B149.1 Gas Vent Termination criteria if roof pitch exceeds 9:12 and refer to manufacturer's installation instructions for vent size and length.

SIDEWALL VENTING REQUIREMENTS



**Refer to manufacturer's installation instructions for vent size and length.

SAFETY INSPECTION CHECKLIST

For optimum performance and safety, the IRSC recommends that all installation, service and annual inspection be done by a qualified person or agency. This is not a comprehensive list. For a complete checklist, reference the Installation, Operation and Service Manual.

Make sure that:

- ☑ Clearances to combustibles warning signs are posted as indicated on page 4.
- ☑ The manufacturer's Installation, Operation and Service Manual is legible. Keep manual in a clean, dry place. Contact the manufacturer for replacement labels or manuals.
- ☑ All warning labels are attached and legible.
- ☑ The area around the heater is free of combustibles.
- ☑ Reflector is in good condition and free of dust and debris. Clean outside surface with a damp cloth, if needed. Reflector must be properly resting on mounting brackets and not the tube itself.
- ☑ Vent pipe and outside air inlet are free of dirt, obstructions, cracks, gaps in the sealed areas or corrosion. Look for bird or insect nests. Remove any carbon deposits.
- ☑ Tubes are connected and suspended securely. There should be no holes, cracks or distortion on any part of the tube, especially the top.
- ☑ Gas line has no gas leaks. Check gas connection; See Proper Gas Connection in this brochure and refer to the the manufacturer's Installation, Operation and Service Manual.
- ☑ Combustion chamber and burner observation windows are clean and free of cracks or holes.
- ☑ Blower scroll wheel and motor are clean.
- ☑ Burner and orifice are clean.
- ☑ Igniter and electrode are not cracked, broken, eroded or showing signs of wear. Replace as needed.
- ☑ Thermostats, sensors and control devices have no exposed wire nor damage to the device or its wiring. Verify that clearance to combustible placards are posted and in accordance with manufacturer's requirements.
- ☑ Suspension of the heater is secure and in accordance with manufacturer's requirements. Look for signs of wear on the chain or ceiling.
- ☑ Pump and blower inlets and outlets are free of blockage or soot.
- ☑ Ceramic tiles in burner assembly are not operating in a flashback condition (burning behind grids).
- ☑ Ceramic tiles are not cracked. Ceramic burner assembly gaskets must be in place. Do not clean with high pressure air.

APPLICABLE STANDARDS AND CODES

Installation must comply with national and local codes and requirements of the local gas company.

GAS CODES

United States: Refer to National Fuel Gas Code, ANSI Z223.1 – latest revision (same as NFPA 54). Canada: Refer to CAN/CSA-B149.1 Natural Gas and Propane Installation Code.

AIRCRAFT HANGARS

United States: Refer to Standard for Aircraft Hangars, ANSI/NFPA 409 – latest revision. Canada: Refer to CAN/CSA-B149.1 Natural Gas and Propane Installation Code.

PUBLIC GARAGES

United States: Standard for Parking Structures NFPA 88A – latest revision or the Code for Motor Fuel Dispensing Facilities and Repair Garages, NFPA 30A – latest revision. Canada: Refer to CAN/CSA-B149.1 Natural Gas and Propane Installation Code.

ELECTRICAL

United States: Refer to National Electrical Code®, ANSI/NFPA 70 – latest revision. Canada: Refer to Canadian Electrical Code, CSA C22.1 Part 1 – latest revision.

VENTING

The venting must be installed in accordance with the unit's Installation, Operation and Service Manual and the following codes. United States: Refer to NFPA 54/ANSI Z223.1 – latest revision, National Fuel Gas Code. Canada: Refer to CAN/CSA-B149.1 Natural Gas and Propane Installation Code.

ADDITIONAL CONSIDERATIONS

SIGNAGE REQUIREMENTS

- In locations used for storing combustible materials, signs must be posted to specify the maximum permissible stacking height to maintain the required clearances from the heater to the combustibles.
- Signs must be posted adjacent to the heater thermostat. In the absence of a thermostat, signs must be posted in a conspicuous location.

LOCATION OF EQUIPMENT

Infrared heaters must be installed by a qualified person or agency per applicable codes and the manufacturer's Installation, Operation and Service manuals. Installers are also responsible for the following:

- To install the heater in accordance with the clearances to combustibles.
- To provide access for servicing.
- To give a copy of the manufacturer's Installation, Operation and Service manual to the owner.
- To ensure there is adequate air circulation around the heater.
- To ensure the heater is placed in an approved application.

TYPE OF FUEL

The type of gas appearing on the heater's nameplate must be the type of gas used.

Patio Heaters

High Intensity Ceramic Heaters

Low Intensity Tube Heaters

Construction Heaters

INFRARED HEATER TYPES

Patio Heaters:

Sometimes referred to as – suspended, radiant, mushroom style, free standing or decorative patio heaters.

- Ceramic or stainless steel radiant emitters.
- Designed to heat a concentrated outdoor area.
- Permanent or portable products that may be deck mounted or suspended.

High Intensity Ceramic Heaters:

Sometimes referred to as – box heaters, unvented heaters, spot heaters, luminous heaters, radiant heaters or plaque heaters.

- Combustion takes place on a ceramic tile surface with surface temperatures of approximately 1800°F. Higher temperatures (hence, "high-intensity") result in higher clearance to combustibles.
- Direct fired operation releases products of combustion into a properly ventilated heated space.
- Often used in high bay or high air change applications.

Low Intensity Tube Heaters:

Sometimes referred to as – positive/negative pressure heaters, tube heaters, radiant heaters, stick heaters, tube brooders or pipe heaters.

- Hot exhaust gases travel through the inside of the tube resulting in tube surface temperatures commonly in the 800-1100°F temperature range (hence, "low-intensity").
- Can be vented and commonly has the capability to use fresh air for combustion.
- The most popular choice for total building heat.

Construction Heaters:

Sometimes referred to as – salamanders, spot heaters, portable construction heaters and tank top heaters.

- Heat turns a ceramic or stainless steel emitter red hot.
- Used in spot heat applications and/or as warm up stations.
- While commonly used in outdoor applications, units may also be used in industrial applications or temporarily used inside buildings under construction or repair. At no time shall construction heaters be used in residential applications.

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