SunStar® Heaters FAQ

Why is a SunStar infrared radiant gas heater more efficient than unit heaters?

The major difference between a gas-fired infrared heating system and a forced hot air heating system is the method used to create a comfortable temperature. Infrared heats the floor slab, the machinery and the people first and then the air by using all three methods of heat transfer: radiation, conduction and convection. The storage of the heat in the slab floor creates a low temperature emitter and a faster recovery time when large overhead doors are opened and closed. With a forced air system, the hot air rises to the ceiling and stratifies, gradually working its way down to thermostat level so that the floor slab never becomes warm enough to be comfortable. It literally acts as a heat sink, draining heat from the air and from personnel standing on the floor. The ceiling area of a high bay building using a forced air system can be easily 30° to 40° warmer than the floor area. In the same type building heated with an infrared system, the temperature is much more uniform and the loft or roof area usually will be at a slightly lower temperature than the floor level . . . a good condition for minimizing heat loss. Comfort can be maintained with a lower air temperature that will reduce infiltration and heat loss through the walls and roof. In addition, instead of adding Btu/hr capacity to a computed building heat loss based on the thermal efficiency of a forced air system, the capacity is normally reduced by as much as 15%. An added plus is that an infrared system has minimal power requirements, needing electricity only for burner ignition, the gas valve and the draft inducer (where applicable). It is, therefore, easy to understand that infrared commonly can save 30% to 50% in energy costs over unit heaters, frequently even more.

How do you size infrared when replacing existing forced air unit heaters?

An infrared heating system is always sized at a lower input capacity when compared to forced air (convection) heating. This is due to different modes of heat transfer (radiation vs. convection), thermal mass and minimal stratification between ceiling and floor temperatures. For retrofit purposes, provided the unit heaters are maintaining the desired inside design temperature at ASHRAe design conditions, the following reduction can be utilized when recommending an infrared heating system.

Type	Thermal Efficiency	% Reduction in System Sizing
High Efficiency Unit Heater	80%	32%
Convectional Unit Heater	62%	48%

Assuming that the ASHRAE heat loss for a building is 100,000 Btu/hr, then the heater selection for this building would be as follows:

	Infrared Heater	Unit Heater
Building Heat Loss	100,000 Btu/hr.	100,000 Btu/hr.
Infrared Compenssation Factor (for radiant heating)	0.85	-
Thermal Efficiency (for convection heating)	-	80%
Heater Input Required	85,000 Btu/hr (100,000 x 0.85)	125,000 Btu/hr (100,000 / 0.80)

Wouldn't it be more efficient to use unvented heaters so heat wouldn't be lost out the flue?

No. The National Fuel Gas Code (NFPA54) and local codes require a minimum ventilation flow of 4 CFM per 1000 Btu/hr of heater input by either mechanical or gravity ventilation if the heaters themselves are not vented to the outside. This additional ventilation requirement increases the building heat loss and the fuel cost as indicated in this example:

Temperature Differential (inside temp less outside design temp)	65° F
Building Heat Loss	125,000 Btu/hr
Infrared Compensation Factor (based on 16' mounting height)	0.80
Infrared Heat Required	100,000 Btu/hr

	VENTED	UNVENTED
Input	100,000 Btu/hr	100,000 Btu/hr
Additional Ventilation Required:	0 CFM	4 CFM per 1000 Btu/hr = 400 CFM
Heat Loss Due to Ventilation	0 Btu/hr	Q = CFM x 60 min/hr x TD x 0.018 400x600x65°x0.018=28,080 Btu/hr
Total Input Required	100,000 Btu/hr	128,080 Btu/hr

CONCLUSION:It will require a 28% larger capacity unvented infrared heating system to satisfy the building heat loss and comply with codes. In addition, the fuel cost of the unvented infrared heating system can be as high as 28% more than the vented infrared heating system.

How many square feet does a SunStar infrared radiant gas heater cover?

The heater model and capacity are not necessarily a function of the square footage of the area needing to be heated. The model generally is chosen after the Btu/hr heat loss for the building or spot area to be heated has been determined, which is a function of not only the size of the area, but geographic location, building materials, building usage and other factors. Area coverage could be as little as 500 sq. ft for residential garage heaters or as much as 10,000 sq. ft. for a large commercial size heater.

Are there applications for which SunStar radiant gas heaters are NOT suitable?

You may not use gas-fired infrared heaters inside paint booths or in buildings where explosion-proof lights are required. Although infrared is not ideal as an air curtain, it is very effective in spot-heating work areas inside of doorways, in dock areas and on outdoor docks.

How low can i hang my SunStar infrared radiant gas heaters?

SunStar infrared heaters have been mounted as low as 8' above the finished floor (in home garages and workshops) to as high as 70' (in high bay aircraft hangars). The mounting height depends on the Btu/hr capacity and model of the heater. Please refer to the heater's specification sheet for minimum recommended mounting height and required clearances to combustible materials.

What extra items are needed for installation?

Depending on your particular application, you will want to consider the following six accessories for all series of SunStar infrared tube heaters:

1. Thermostat
2. Manual Cutoff Valve
3. Flexible Gas Connector (Included as part of the SunStar tube heaters)
4. Second Stage Regulator if supply pressure is over 14" W.C.
5. Vent Cap
6. Chain Kit with S hooks for hanging heater.
7. End Reflector Kit for SIS & SPS Series (optional, but recommended).

For the SIU Series, also consider including two additional accessories:

8. Two End Reflector Kits per heater (optional, but recommended)
9. U-Bend reflector (optional, but recommended)

For the SunStar ceramic heaters, you will not need a vent cap.

How are SunStar infrared radiant gas heaters controlled?

Primarily, the heater is controlled by a line voltage thermostat. Alternatively, you may use a 24-volt thermostat with a relay kit or an on/off switch.

Do SunStar infrared radiant gas heaters have UL certification?

Because our infrared gas heaters are gas appliances, it is not necessary that they be listed by UL (a nationally recognized testing laboratory - NRTL); however, all of the electrical component parts are UL listed (e.g., the draft inducer motors, which are equipped with CSA and UL approved thermal protectors). Our heaters are certified by C.S.A. (a nationally recognized testing laboratory - NRTL) and carry the C.S.A. seal. All heaters are tested and meet or exceed all safety requirements set forth in American National Standard Z83.20 for infrared heaters.

Do SunStar infrared radiant gas heaters have FM certification?

Generally, Factory Mutual certification (a nationally recognized testing laboratory - NRTL) is applicable to products that cannot be certified at the manufacturer's facility according to American National Standard and, therefore, need to be certified at the installation site. Our heaters are certified by C.S.A.(a nationally recognized testing laboratory - NRTL) and carry the CSA seal. All heaters are tested and meet or exceed all safety requirements set forth in American National Standard Z83.20. Factory Mutual recognizes International Approval Services certification.

12. What are the emission levels of SunStar infrared radiant gas heaters?

Air-free CO emission levels are 0.0010 - 0.0020%, or 20 to 40 times lower than the maximum acceptable level as indicated in American National Standard Z83.20. SunStar utilizes burners that are made of heavy duty cast iron and are designed to enhance maximum primary and secondary air flow around the venturi assembly. The high velocity of the flame and the delayed flame-quench period minimize the products of combustion which include aldehyde, formic acid, nitrous oxide, and carbon monoxide.