By Jesse Robbennolt

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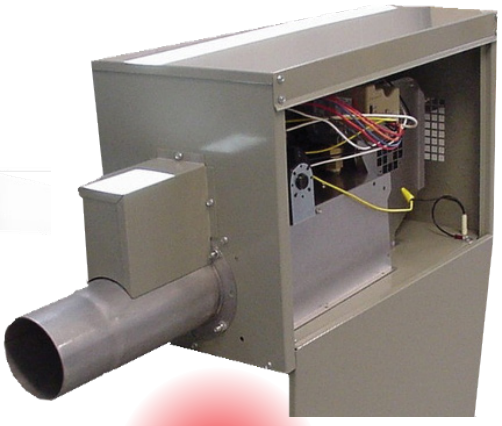

IS INFRARED RIGHT FOR YOUR CUSTOMER?

I was discussing the application of infrared radiant heat with another trade professional recently when he said something like, "The most important consideration for an infrared heating application is the heat load. Having an accurate heat-loss calculation is the foundation."

Well, that's close, but not exactly step number one. A solid heat load calc is important. It is a key piece of the foundation, but it's not the first and most important consideration. There's one part of the foundation that's even more fundamental or essential to the infrared (IR) equation, and that is: Is the application suitable for IR heat?

As a rule of thumb, IR is ideal for commercial spot heating needs within large, open facilities where small groups of people gather for assembly or factory work, for machining, or in areas where some type of administrative or production work happens in relatively small areas. Beyond spot heating, IR can also be applied with great results to provide partial building heat – say for areas such as an assembly line or office section located in an open area of a warehouse.

Generally, IR isn't best suited for the heating of entire facilities. To provide relatively uniform heat for large commercial spaces, forced air, hydro-air or in-floor radiant heat are far better and much more efficient choices since thermal efficiencies of IR equipment are normally about 70 per cent, while forced air units and condensing boilers can have thermal efficiencies of 90-plus per cent. Meeting the building heat loss with IR would require a 20-plus per cent fuel premium, which just doesn't make sense.

DESIGNING WITH IR

Let's say that you've determined infrared is well suited to your application. For the sake of providing an example, let's say that midwinter conditions in a machine shop become uncomfortably cool. Let's also say that the central heating system is pushed beyond its limit.

There are a dozen key workstations, or "pods," with several employees doing tasks at each pod. Rather than attempting to provide additional heat for the entire space (large air volume, with high ceiling), wouldn't it make sense to provide spot heating for the 12 pods?

Once it's seen that IR is a good fit, the heat load calculation is next on the list. Though we won't be concerned with warming an enclosed space, we'll at least need to determine that the IR systems chosen provide sufficient output to warm the workstations below.

Next is IR heater selection, though placement of the units also factors into this. Remember that IR relies on clear sight lines to be effective, so there can be no obstructions between the IR unit and the worker.

Another key consideration is the clearance to combustibles. Care must be taken to ensure that the units have adequate clearance around them so that combustible materials will not ignite or be damaged. Don't forget to consider such variables as:

- Are vehicles parked below the heater?
- Are sprinkler heads near the unit? (They're not compatible!)
- Will combustible materials be stored nearby?

For our spot heating needs, we've already determined that the chief need is to provide warmth for small teams of employees who remain throughout the day in relatively small areas, and that IR heat is not intended to provide significant warmth to the larger surrounding area.

For spot heating a very limited area, such as a desk or computer station near a loading dock, high intensity heaters are the best choice. It's preferable to use two or more heaters for heating people to ensure both the front and back sides are comfortable.

If it is impractical to use multiple heaters, it's usually advisable to use one heater of the next higher model at an increased mounting height. Heater ratings can be determined based on the available mounting height.

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Why Use Infrared?

- Operational energy savings. The use of infrared may result in significant energy cost reductions for spot heating applications. By design, conventional warm air heating systems must heat the air, but air is not the best heat transfer medium. Only after a large volume of air is warmed is heat transferred to people within the space. Infrared offers direct delivery.
- Infrared installations may actually use lower thermostat settings as the radiant heat reaches workers directly.
- Without a need for fans, infrared systems generally use less electricity.
- Since IR does not use fans, uncomfortable drafts, blown dust and allergens, and fan or blower noise are minimized.
- Temperature recovery is quick if cold air is introduced from open doors or windows.
- With IR, the ability to control heating in zones is ideal.

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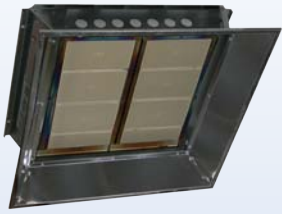
TYPES OF HEATERS

There are two basic types of infrared heaters, high-intensity and low-intensity.

High Intensity



Typically, these systems come equipped with a ceramic tile burner for maximum heat transfer, often housed in a metal frame. The flame burns on the outer surface of the tile(s) with the infrared energy efficiently directed by a reflector mounted on the metal frame. Source temperatures can range from 1,800°F to 2,200°F.

The units are often certified for indoor use only and operate unvented. A minimum positive air displacement of four cubic feet per minute per 1,000 BTUH input for natural gas, or five cubic feet per minute per 1,000 BTUH input for propane gas, is required for proper ventilation.

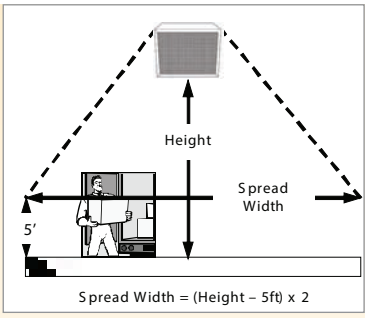
Low Intensity

Low-intensity IR units are made up of a burner box, a metal heat exchanger tube, and a polished reflector that focuses infrared energy. The burner is mounted at one end of the tube and exhaust gases are vented out the other end.

Tube systems are available in either straight or U-tube configurations. Source temperatures near the burner end of tube systems can reach 1,200°F.

Vented units are typically available as pressurized type systems which provide a power exhauster mounted at the same end as the burner to force the products of combustion through the tube. Units can be used for indoor or outdoor applications.

CHECK YOUR HEIGHT



Infrared heat spread and throw increases as the mounting height is increased. It is important to select units with specifications that work well for the installation height requirements. Mounting a unit higher than recommended can result in complaints of low heat output. Mounting a unit too low can result in complaints of too much heat.

While the coverage has changed, the infrared output has remained constant, resulting in an increase or decrease in the intensity of the infrared energy over the given area.

And keep in mind that high intensity units generally have to be mounted higher than low intensity units.

Understanding temperature distribution and resulting effects on comfort heating plays an important role in determining the effectiveness of IR applications.