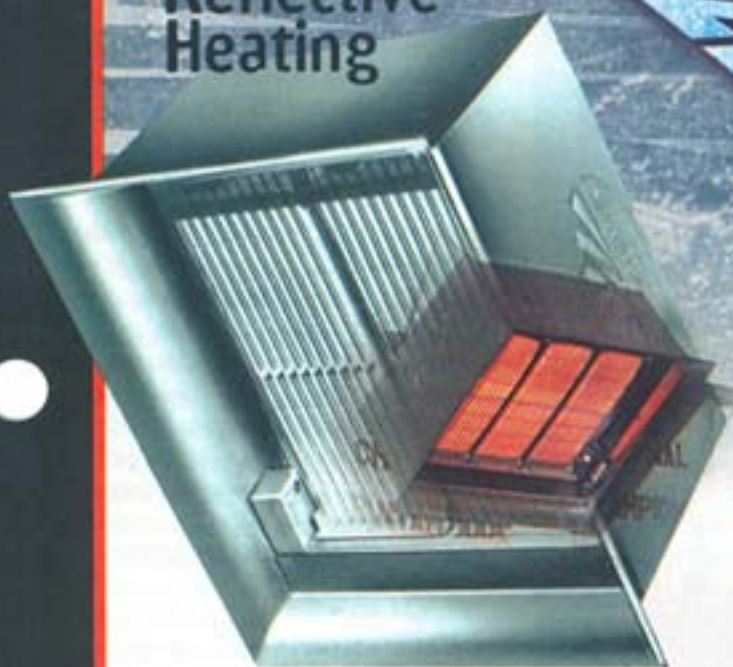


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Technology

# Breaking the Chill

## Gas-Fired Infrared Heaters: Safe, Economical Zoned Heat

Joseph A. Wortman

### Rink Concerns

When designing an ice rink, there is undoubtedly a need to address the refrigeration and humidity systems vital to maintaining the ice surface. What is often overlooked, however, is the need to provide supplemental heat within the facilities.

Many people who will not set foot onto the ice surface commonly frequent today's ice rinks. This includes spectators, family members, spouses, and friends of the players and skaters. Particularly with youth activities, the comfort of the paying parents is as critical as the amenities offered to the youth participants. Doesn't it make sense to provide a comfortably heated area in a facility that is designed to be cold 365 days per year? Most will agree that it does.

Gas-fired infrared heaters offer a solution to the problem of strategically heating spectator zones without



Gas-fired infrared heaters can provide heat that is absorbed by people, flooring, and seating, and directed to avoid heating the delicate ice surfaces.

heating the entire rink area. These heaters offer many advantages including high comfort levels and low operating costs.

### Theory of Infrared

The best natural heat source is the sun. Even when it is cool outside, we feel much warmer soaking in the sun's direct infrared rays. For it is the sun's heating of the Earth's surface that in turn heats the atmosphere. By mimicking the sun's infrared rays, gas-fired

infrared heaters can provide heat that is absorbed by people, flooring, and seating, and directed to avoid heating the delicate ice surfaces.

### Benefits

Infrared heaters offer a multitude of operational benefits including:

- Fuel savings of 20 percent to 50 percent over forced air heaters.
- Flexibility: place the heaters where they are needed.
- Modular design keeps capital costs low when compared to central systems.
- Zoned capability allows units to function together or independently.
- Condensation control helps protect and improve the environment.
- Superior comfort levels that allow people to move to and from the heat source as they desire.
- Quiet and clean operation.

### Types of Infrared

There are two main types of infrared heaters: low-intensity tube-type heaters and high-intensity ceramic heaters. Although both types use gas combustion (natural or liquid propane) to generate infrared radiation, there are a number of important differences between the two.

In low-intensity tube heating, flame and hot combustion gases from a burner box are either pulled through steel emitter tubes by a vacuum fan or they are pushed through by a blower motor. The emitter tube temperatures will peak in the 1000°F temperature range and decrease over the length of the unit to the 200–400°F range. Combustion gases are usually vented outside and the option to pro-

vide clean outside combustion air is available. Units are typically shipped in ten-foot sections from twenty to eighty feet in length and available from 50,000 to 200,000 BTUs.

With high-intensity heaters, gas is ignited on a ceramic refractory surface, which is heated to 1800° F and gives off an incandescent red glow. The compact box-like heaters (available from 30,000 to 160,000 BTUs), which discharge the products of combustion into the space, are more popular for spot or area heating. High-intensity heaters do require greater safety distances to combustibles and ventilation concerns need to be addressed.

### New Technology

Advanced features of the low-intensity heaters include the use of two-stage controls. A two-stage infrared heater is characterized by its ability to operate in pre-set "high" and "low" firing modes. The HL Series as manufactured by Detroit Radiant Products (Warren, MI) offers a 35 percent firing differential (100 percent in high, 65 percent in low) and claims to reduce on/off cycles by 35 percent. A two-stage heater also allows the user to adjust firing output based upon the changing environment found in most rinks.

By reducing the on/off cycles, the benefits of two-stage heaters include fuel savings, faster heat recovery, design flexibility, and reduced equipment stress. More importantly, a two-stage heater will provide a softer and more comfortable heat source when compared to a single-stage heater which is either on at 100 percent (sometimes too much heat) or off (not enough heat). Comfort levels are especially important when heating spectator areas.

### Design

Rink applications have unique design characteristics. However, in most



A low-intensity Tube Heater over bleachers at 30° angle at rink in Fraser, MI

cases there are some general application guidelines that can be followed. First and foremost, is the adherence of clearances to combustibles, or minimum safety distance around the heater to combustible materials.

Second, one should specify what they wish to heat. Most often, the seating area around the ice will be heated, with care taken not to allow infrared rays to hit the ice surface. "Spot heating" type models (short tubes or high-intensity heaters) are available and focus heat where needed such as Zamboni storage areas or busy entranceways. For comfort reasons, most rinks opt for low-intensity tube heaters thirty to fifty feet in length and 75,000 to 150,000 BTUs. They also avoid using long tube heaters (50-plus feet) or large BTU high-intensity models.

Last is the heater placement and operation. Heaters are usually placed ten feet or more above the seats and located five to seven feet in from the ice surface. Most often,

heaters are angled toward the sitting area, away from the ice. Typical reflector mounting angle is 15° to 30°. Side shields may be used if necessary to prevent infrared rays from striking the ice. Place the heaters so that the burner is located to provide optimal and even coverage. Heaters are typically vented through the roof. Outside combustion air is optional, but recommended. Heaters are best controlled with an on/off switch coupled to a thermostat. This allows operation of the units based on a temperature and time function.

### Price

The most economical heating system are the high-intensity models. Prices range from \$350 to \$800 depending on the size of the heater. However, there are drawbacks to purchasing high-intensity heaters for price reasons only. One must consider that more units are usually needed to provide coverage. This



translates to more equipment and installation costs. It may also be necessary to add an additional ventilation system when using high-intensity heaters. However, high-intensity heaters do offer a solution for cost-effective spot-heating applications.

In most new rink facilities, the use of low-intensity heaters is chosen over high-intensity. Low-intensity heaters offer many features and options and heat larger areas with a single unit. The price of a tube heater begins at \$700 to \$800 (depending on features)

for a twenty-foot model. The heater then increases in increments of \$100 to \$150 per ten-foot section. In most rinks, the desired heater measures thirty to fifty feet in length and costs between \$900 and \$1300 each.

Installation work will certainly have an impact on the overall cost of installing an infrared system. It is important to find a competent installing contractor who is familiar with infrared heaters. Certainly the location of gas and electrical sources impact the time on the job and the overall costs. On average, a full instal-

lation will cost one to two times the equipment cost depending upon job-site variables.

#### Distribution

Although the installation may be easy, system design and layout can be more difficult. It is critical that the equipment is laid out properly to assure a good, safe, effective heat system. Most manufacturers sell product via local manufacturer's representatives. This allows a professional to review the desired needs and select the proper equipment. The local representative may also provide guidance in suggesting a contractor familiar with installing infrared applications.

#### Summary

In the end, it comes down to whether you wish to provide heat sources within the rink area. Gas-fired infrared heaters offer the option of placing heat where and when it is needed. This ability, coupled with reasonable capital and excellent operating costs gives a clear advantage to infrared heaters. You can rest assured that providing a comfortable environment within a cold and chilly rink will be well received by your customers. ●

*To contact Detroit Radiant Products please call Mr. Wortman at (586) 756-0950 or visit their Web site at <http://www.reverberray.com>.*

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**DETROIT RADIANT PRODUCTS CO.**  
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E-MAIL: [sales@detroitradiant.com](mailto:sales@detroitradiant.com)  
WEBSITE: [www.reverberray.com](http://www.reverberray.com)