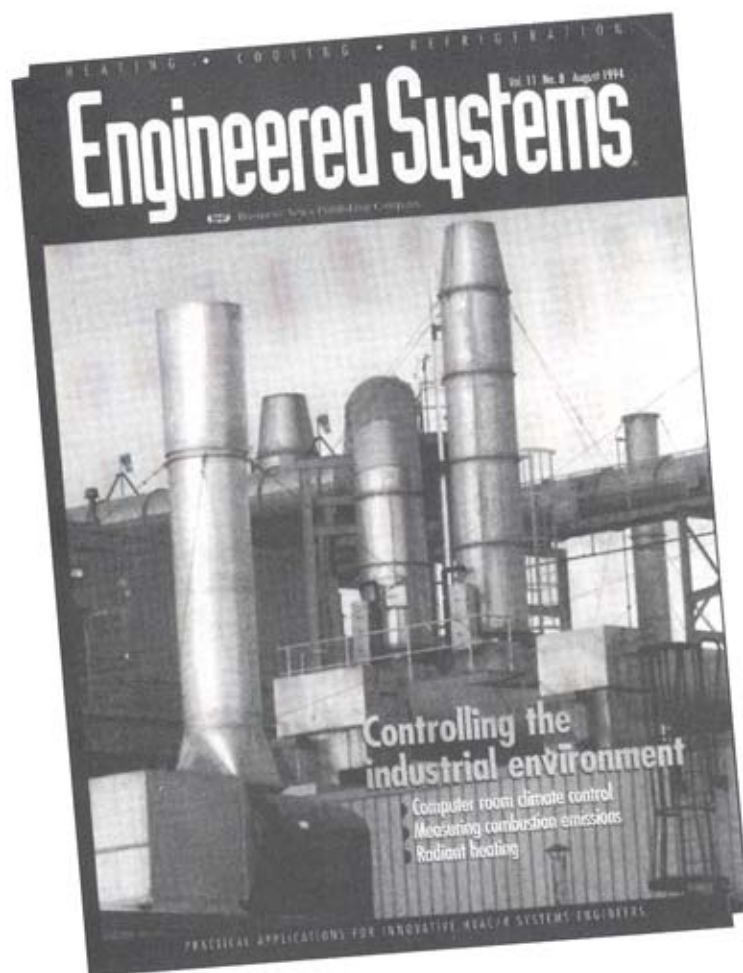


SPECIFYING RADIANT HEATING



RADIANT HEATING IS A TECHNOLOGY WITH LONGEVITY, PROVIDING EFFICIENT COMFORT, OFTEN IN DIFFICULT ENVIRONMENTS.

Gas-fired radiant heaters cut fuel bill in half

Wood dust circulated by direct-heat air blowers inside a cabinet-making shop presented both housekeeping and safety problems. When the Aurora Wood Products Co. rebuilt and expanded its facility in Aurora, IL, an alternate means of heating was sought.

Aurora Wood Products produces high-craftsmanship cabinets, mill work, laminations, and other wood products in its attractive 4,000-sq-ft building, occupied in December 1981.

Radiant heat, which requires no

air movement, was an attractive option. The most-economical fuel in the area was natural gas. So, steps were taken to combine the two advantages safely.

The heating choice

After comparing various types of heaters, Aurora installed three 60,000-Btuh gas-fired, tubular overhead radiant heaters with polished aluminum reflectors.

Each emitter is a 4-in.-dia aluminumized steel tube, nominally 40 ft long with a close U-bend, permitting use in a 20-ft fixture. The inlet end is provided with a compact gas burner, with a 1/2-in. inlet connection and full

complement of AGA-approved fail-safe valving and controls.

Single-phase, 120-V, 60-Hz current with 0.9-A running load is standard. The burner includes a combustion air fan and silicon carbide ignitor.

The burner discharges into the tube, where the hot products of combustion move through the tube, around the bend, to exit at the outlet. This outlet is provided with a 4-in. galvanized pipe to conduct the exit gas at above dewpoint temperature out of the building.

An internal baffle increases heat exchange contact and controls flow of products of combustion.

The side-by-side effect of the tube, which has been doubled on itself, averages differentials in temperature of the two sides. Since the reflectors cover both tubes, an even and uniform radiation reaches the specified areas beneath the fixture.

The reflector is shaped to capture the radiation emanating from the top and sides of the tubes, and redirect this toward the floor beneath.

Suspension of the units is by chain, with clamps located along the tubes at convenient intervals.

Both the gas burner and the exit connection are housed in a metal enclosure and isolated from room atmosphere.

In this case, advantage was taken of a 4-in.-dia duct, which was run from outside the building into the burner connection to provide the air necessary for natural gas combustion. Thus, the combustion process was effectively isolated from the ambient (and possibly dust-laden) air within the building.

The units are "Re-Verber-Ray" models from Detroit Radiant Products Co., Warren, MI.

The three burners have supplied comfortable and even heating since the winter of 1982. Before-and-after analyses of fuel bills show heating costs are now about \$0.04/sq ft, as compared to a previous \$0.08/sq ft before expansion and renovation of the building.

It is important that no flame is exposed to the wood dust. Housekeeping and working conditions are improved by the elimination of blower-operated heating devices.

THOUGHTS ON SPECIFYING RADIANT HEATING

Detroit Radiant Products Co. offers these considerations when specifying commercial-industrial radiant heat.

- **Burner head:** First, all burner head components, such as the combustion blower, gas valve, and ignition devices, should be protected in a sealed and completely enclosed box, thus protecting them from the environment. Provisions for outside combustion air are a must.

Second, some manufacturers, in an attempt to reduce costs, sell the burner box partially assembled. This is unacceptable.

Third, an enamel covering on the box not only enhances the appearance, but increases longevity.

Last, a side location of the combustion air inlet is preferred; this is the location least likely to draw in harmful contents. A top location is not acceptable.

- **Air-safety switches:** All radiant heaters use differential pressure safety switches to monitor exhaust and air supply. Better designs will utilize dual switches to provide a wider operating range and separate functions.

- **Ignition switches:** Generally, two types of controls are available. They are a hot surface ignitor (also known as a "glo-bar") or a direct spark ignitor.

Glo-bars are used in everything from clothes dryers to infrared heaters. The reason they are so widely used is, they work — especially in harsh environments, when direct spark is likely to experience problems (from chemicals, moisture, dust, and so forth).

- **Radiant tubes:** Hot rolled steel is a good emitter, but it is prone to corrosion inside and out. Some products may use aluminized steel in the first section, but the better emitters on the market use 16-ga aluminized steel — that will meet the Mil 500 salt spray test — throughout.

High-Btu models should also use a titanium alloy in the first 10-ft section, to provide extra protection from higher temperatures. U-tube models should have smooth, 180-degree turns to ensure smooth flow and prevent stress in the pipe.

- **Tube joints:** The cheapest method of joining tubes is with a simple butt joint, as opposed to the tubes being interlocked. Unfortunately, a butt joint can leave a small gap, allowing room for corrosion and not providing a strong union.

The preferred method utilizes a swedged joint, where the end of the upstream tube is reduced, allowing it to slip inside the next tube (at least 4 in.) before it is joined. This results in a much stronger heater.

- **Turbulator baffle:** A well-designed heater will use a baffle to slow down the exhaust gases, thus increasing the heat transfer. All models benefit from this.

- **Reflectors:** Reflectors are available in various shapes and sizes. However, polished aluminum is the material of choice (due to its ability to re-radiate). The features that make a reflector unique are endcaps, to reduce roll-out convective loss; the ability to rotate the reflector (0 to 45 degrees), thus allowing more mounting options; and a tension-spring device that eliminates rattling.

- **Btu and lengths:** Because there are so many applications in which infrared heaters can be used, versatility is a must. Some heaters can output up to 200,000 Btu and can have runs up to 80 ft. This versatility should be considered when laying out your application.

- **AGA approval:** The American Gas Association tests most gas products, ensuring that they conform with ANSI standards. While most all of the products being manufactured are AGA design-certified for industrial applications, that is not the case for residential heaters.

- **Two-stage radiant heating:** The latest breakthrough in infrared technology is a heater capable of operating in either a high- or low-firing mode. Its mode is dictated by momentary environmental demands, not by a clock.

This means the heater is responding to your building's needs. In doing so, you can expect the most efficient and economical heat possible. Add this to fuel savings in excess of 20% (over any other type of infrared), and one can see the many advantages of two-stage heating.

Engineered Systems