How does Radiant Heating really work?

Source: Radiant Panel Association

Radiant heating works by warming surfaces and objects in a room, like windows, floors, and our bodies, instead of the air. Whenever there is a temperature difference between two surfaces, both surfaces will attempt to equalize. Radiant energy travels through space without heating the space itself. It only turns into heat when it contacts a cooler surface. Our human comfort relies just as much on radiant heat transfer as it does on air temperature, yet the majority of heating and air-conditioning professionals think only in terms of air temperature. As a result, Americans are missing out on a truly comfortable living environment in their own homes or places of business. By controlling both the air temperature and the radiant transfer, radiant panel systems deliver a comfort that is unsurpassed.

A radiant panel can be effectively mounted on any flat surface. The only requirement is the surface be sufficiently large enough. The larger the surface, the lower the actual surface temperature required. A wall radiator may have a surface temperature of 180° while an 81°F floor will do the same job.

Skin surface temperature, about 85°F, is generally warmer than the surrounding surfaces. This makes us a radiant panel. Stand by a large picture window in midwinter and you will feel the heat leaving your body. If the rate at which we radiate heat is correct, we feel comfortable. When the temperature difference between our body and the surrounding cool surfaces becomes too great, we have to put on a sweater to slow down the rate at which we are radiating. When the sun beats down on us through the window, we receive heat instead, and off comes the sweater. Our normal state is to lose heat at a constant, regulated rate. We are also designed to lose heat in other ways as well. Air coming in contact with our skin conducts away heat. Our skin is moist and moving air also causes evaporative cooling. A truly comfortable environment is one designed to draw heat away from our bodies at precisely the correct rate.

Increasing your comfort and, at the same time, saving money on your utility bill is a winning combination. Multiple zoning to allow unused rooms to be turned down, and use of thermal mass for off peak storage can reduce energy bills. Another energy savings comes from lower overall thermostat settings which you choose naturally. When both air temperature and radiant transfer are compensated for, you feel comfortable at room air temperatures which are lower. You no longer have to force yourself to turn down the thermostat to save, you will do it automatically to be comfortable.

Heat loss from any building is driven by the temperature difference between the inside of the structure and the outside. Conventional systems locate registers along outside walls, under windows and in front of sliding glass doors to compensate for cold surfaces. Hot air rises over the cold outside walls, across the ceiling and down to the cold air return. In other words, every place where heat loss occurs leads to a great waste of energy.

Radiant panels direct the heat to the interior of the space and reduce or eliminate the excessive temperatures on outside walls and ceilings. This can result in energy savings of 10% to 30% in most residences.