

Radiant Heating

Radiant heating is a highly effective method of heating a room. Radiant ceiling panels heat all of the room's surfaces (desks, floor, etc.), which in turn heat up the air within the room. Consequently, radiant heating affords an extremely comfortable indoor environment, where there is little risk of the person feeling too cold under the table or too hot on the head. Furthermore, radiant heating focuses on the areas where it is most required - the coolest items in the room (see figure 1). Unlike convective heating, an increase in ceiling height does not significantly increase the amount of heat required.

Radiant ceiling heating systems function in virtually all types of buildings, from large warehouses to small day-care centres. The system can be easily modified to suit changes to the wall or floor layout making it a flexible heating solution.

Key Features of High Level Radiant Heating:-

- Good thermal climate
- Saves on floor & wall space
- Heat goes where it is most needed - reduces the risk of cold draughts
- Low temperature gradient of the air within the office from floor to ceiling (as oppose to fan heaters)
- Simple to control & regulate

At Frenger we have the capability to predict your likely room heat loss and design the most appropriate radiant heating solution.

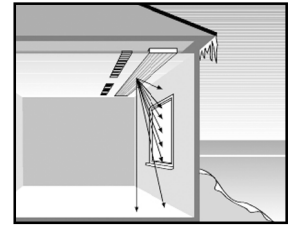


Figure 1
The Radiant Heater Heats up the Surface of the Window and hence Reduces the Down Draught

Radiant Ceiling Panels

A Radiant Ceiling Panel provides heat to the surrounding areas of a room through a mixture of convection and heat radiation. Convection heats up the air in the vicinity of the heater, while heat radiation is distributed in all directions in the room. The Ceiling heating system is based on a high share of heat radiation and a low share of convection (approximately 30% convection and 70% radiation). The share of the convective output corresponds approximately to the share of heat losses through the building's climate shell such as those made up by roof heat losses. The other parts of the building directly benefit from the remainder of energy from the ceiling panel, i.e. the radiation share.

A big advantage with radiant heat is that the colder a surrounding surface is, the more heat energy it will "attract". This means that radiant heat will automatically divide itself so that colder surfaces (eg. windows or badly insulated wall sections) will receive a greater share of the heat.

Heat radiation, as with light rays, spreads from the ceiling panel to the surrounding areas which will absorb most of the heat energy, but also reflect a small part. This part of the heat radiation "bounces" around to all the room's different surfaces and heats surrounding surfaces such as areas under a desk leading to a minimal difference in air temperature or radiant temperature in different parts of a room.

The surfaces to which the radiant heat is transferred will be heated to a temperature greater than if using conventional heating. Normally inner walls for example, would have a temperature just above the room's air temperature and the floor would be the coldest part of the area, whilst when using radiant heat the floor temperature is usually approximately 2-3°C above the room temperature.

Accordingly, the heat that the ceiling heater produces and which a person experiences, comes primarily from the indirect heat from surrounding surfaces.

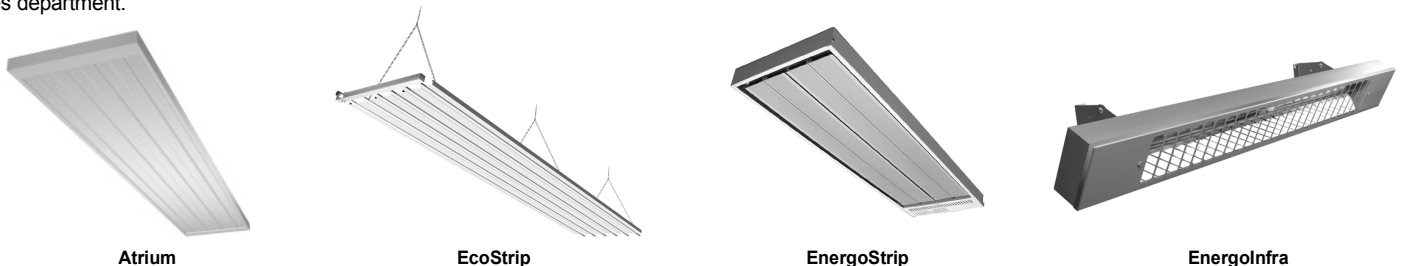
Only a very small part comes directly from the ceiling panel itself. The experience of the thermal climate is due to the human body losing less heat to the surroundings when the surfaces are warmer.

Design of Product

There are several ways to assess the quality, operation and service life of a ceiling heater mainly being:

- Choice of material
- Optimisation of the ceiling heater: heat output/cost
- Ease of installation
- Finish
- Effectiveness of the contact between the pipe & the heat emitting surface
- How well the product has been tested
- Flexibility
- Structure of the product

Frenger's radiant ceiling panels have been designed with the above criteria's in mind, and offer some of the market's most efficient solutions whilst remaining highly competitive. We have not only designed our products to achieve optimal performance, but also put a lot of consideration into installation costs and flexibility of the product, ensuring that we can offer a product that will be suitable for majority of projects. For further product information please contact Frenger's technical sales department.



Zone/Spot Heating

Shortwave radiant heating (such as infrared electric heating) is ideally designed for zone/spot heating.

This form of additional heating is commonly used in industrial applications, where set workstations are heated with infrared heaters to raise the thermal comfort in these areas whilst keeping the overall air temperature low, leading to reduced energy consumption and cost savings.

More recently, zone heating has been more and more utilised outside bars and restaurants, raising the thermal comfort in outside seating areas thus increasing overall capacities of the business for larger periods of the year.

Figure 2:
Zone Heating - Ambient Temperatures are Raised in Occupied Areas.

