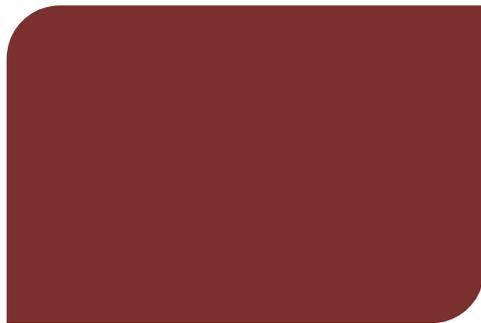


What is Radiant Heat and What are its Advantages?



White Paper





The sun is the largest provider of radiant heat

Most of us have lived with forced air heating systems. These systems, utilizing natural gas, propane or fuel oil, heat air within the furnace as its blower forces the heated air throughout the house via ducts. Radiant heat, however, is a completely different, more efficient, method of heating a home.

Radiant heat is transferred by invisible infrared waves. These waves go through space without heating it and it is then absorbed by another body or element.

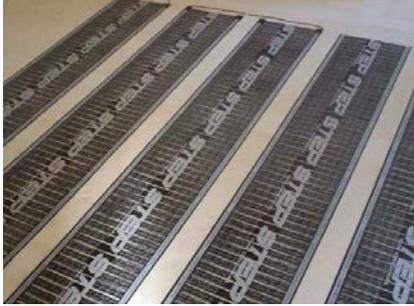
Radiant heat is different than conduction heat where heat is transferred between two stationary systems due to a temperature difference between them. Imagine warm feet and a cold floor. All of us appreciate radiant heat on a daily basis without realizing it. Our sun is the largest provider of radiant heat. It doesn't heat the air, it heats objects which, in turn, release heat. Other forms of radiant heat we are accustomed to include a fireplace, portable electric heaters, and in recent decades, radiant, in-floor heating systems in homes.

There are options to radiant floor heating. Some use water tubing systems, referred to as hydronic systems. These are designed to pump heated water from a boiler through tubing which is placed in a pattern underneath the floor. A cementitious material is required to evenly distribute the heat. The water temperature from a heating source, like a boiler, is generally 85 to 140 degrees Fahrenheit. These systems generally require 9 – 10 watts per ft² of floor space to operate.

Another radiant heating option utilizes electric cables and flexible heating films to convert electric power into heat. Such systems require a thermal mass or an air gap to distribute the heat. The power generated is fixed and is controlled by on/off thermostats and floor sensors, creating differential temperature changes in the floor. Systems such as these require 11 – 12 watts per ft² of flooring.

A third choice uses self-regulating elements made of a semi-conductive material which acts as a sensor. The heat output increases automatically as the temperature decreases. Conversely, the heat output decreases as the temperature increases. The self-regulating element is a homogeneous mat which cannot overheat, and is safely placed directly under the floor covering. This system has been tested against the others in terms of efficiency. It was found to use only 4.5 watts per ft², or about half of the energy required by water tubing and nearly two-thirds less than electrical cable systems.

One heating system that has been scientifically proven to be more efficient than others is STEP Warmfloor[®], due in part to its 12-inch wide footprint. This width covers over 60% of the floor directly under the floor covering, thereby evenly distributing heat with a lower temperature than required by other systems. Its self-regulating properties enhance efficiency further.



STEP Warmfloor® can reduce energy consumption 40-60%, due in part to its 12-inch wide footprint

The properties of STEP Warmfloor® reduce energy consumption by 40-60% compared to other heating options. It creates a continuous even temperature, more efficient than an on-and-off heating system. The self-regulating element acts as a floor sensor, supplying more wattage when cold and less wattage as they warm.

STEP Warmfloor® heats where and when you want a room heated. Each room can be independently zoned and kept at different temperatures making it more efficient than forced air. Radiant heat heats the whole room, evenly from the floor, providing better comfort at a lower temperature. When your feet are warm, you are more comfortable even if the air temperature is a bit lower. And,

there is virtually no maintenance: no duct cleaning, air filters to replace or ignition switches to go bad in the dead of winter.

STEP Warmfloor® can reduce energy consumption 40-60%, due in part to its 12-inch wide footprint. Families concerned about allergies greatly enjoy the health benefits of radiant heat. Forced air systems push heated air that carries pollens, pet dander, dust and other allergens throughout the home. The evidence is accumulated in the ducts, which is why heat ducts require periodic cleaning.

STEP Warmfloor® provides continuous, even, self-regulating heat in large and small rooms. It can be installed directly under hardwood, laminate, carpet, tile or stone. Its low-voltage 24 V energy requirement makes it absolutely safe. There is added safety in homes with radiant heat due to the fact there is no need to have a gas line coming in to the house, or a storage tank for propane or fuel oil. The payoff time for a STEP Warmfloor® system is usually less than five years.

STEP Warmfloor® is a US manufacturer of electric radiant underfloor heating, roof de-icing and snow melt systems located in Saint Louis, Missouri. Its 35,000 square foot LEED-registered building is a “living laboratory” as proof of the comfort properties and energy efficiencies of STEP Warmfloor®. For more information on residential or commercial STEP Warmfloor® systems visit www.warmfloor.com