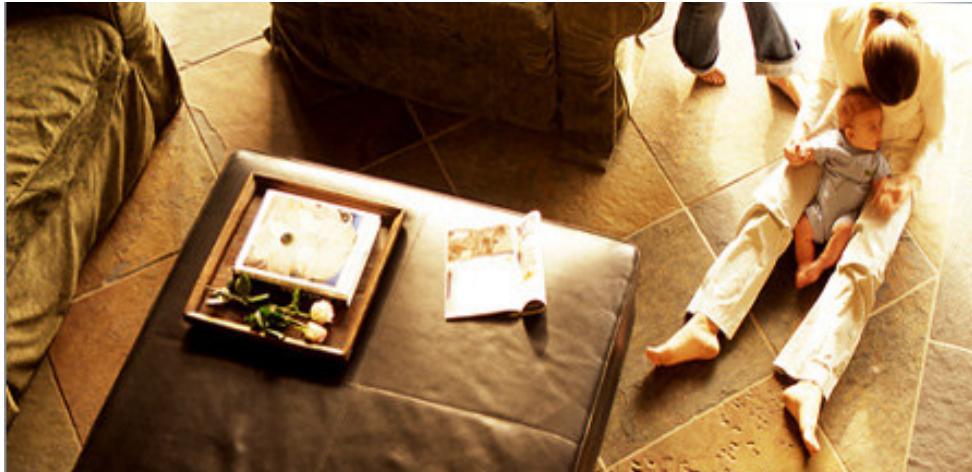


FROM WARM STONE TO WARM FLOOR – ELECTRIC FLOOR SYSTEMS

By Carol Lamkins, CMKBD, CID



Courtesy of Nuheat

Warming floors is not a new system. It is thought that the early Greeks were the first to develop such a system. But it was the Romans who put it to practical use with their hypocaust system. In many Roman buildings, mosaic tile floors were supported by columns below, which created air spaces or ducts. At a site central to all the rooms to be heated, charcoal, brushwood and in Britain, coal was burned and the hot gases traveled beneath the floors, warming them in the process. The hypocaust system disappeared with the decline of the Roman Empire and "central heating" was not reintroduced until some 1,500 years later.

The Romans were not alone in their development. The ancient Koreans had their own system of floor heating. With temperatures in winter dropping to as low as 20 degrees below zero there was obviously a great deal to be gained by developing a system to keep warm. Since the fifth century they have built their homes with an "ondol" (which translates as "warm stone") floor. While similar to the Roman hypocaust system the ondol relies on warm water. This system is used in Korea to this day!

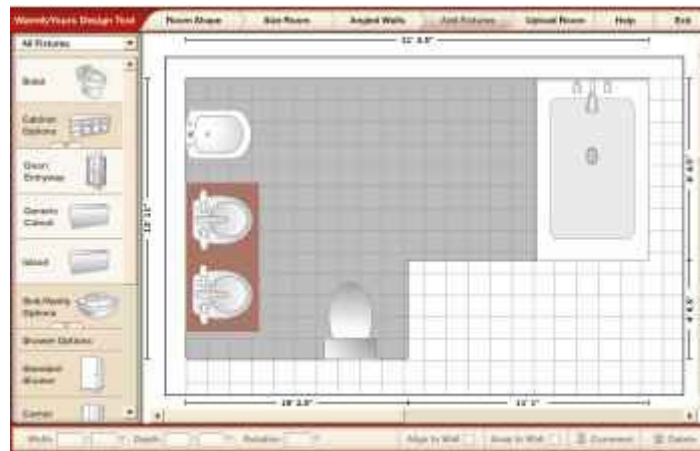
Today, electric floor warming systems are widely used in many countries of the world. By the end of 1970, electrical radiant floor became very widespread, particularly in Germany, Switzerland, Austria and the Scandinavian countries.

California has always been a tile marketplace which is influenced by our history, traditions and moderate climate. Tile is by nature cold to the touch. That is great in the summer months for lowering the temperature of the home but no one likes cold feet in the chilly months, especially first thing in the morning. As interior designers we can change that negative experience in new construction or in the remodel phase to the comfort of warm floors. Floor heating can be used practically in all types of premises both as the sole

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method of heating or in combination with other forms of heating. There are a significant number of homeowners who remain unaware that this is an available option for them.



Courtesy of WarmlyYours

An electric radiant heating system is an excellent way to bring warmth and coziness to the home because it offers warmth from the ground on up. Most homeowners can turn on the heated floor thermostat and enjoy warm floors in about one-half hour to two hours, depending on the type of flooring. Generally the cables will warm a floor to a maximum of about 90°F.

Floor heating systems generate an even temperature from floor to ceiling, thus creating the most comfortable environment for all who live in the home. Unlike forced air heat, which rises to the upper level of a room, radiant heat is maintained in the lower level and keeps occupants warmer. The heating wires under the floor surface are specially engineered and designed so they provide heat via the specific wire's electrical resistance. Special insulation is used to provide protection and durability to the heating wires. When the thermostat is turned on (or the timer is activated) electricity is sent to the floor heating system, the wires heat up due to resistance, and in turn heats the floor. This heat then radiates from the ground up throughout the room, heating objects and people within the heated area.

This heating solution is comfortable and cost-effective and results in between 10 and 30 percent savings on the monthly heating bills simply because the client does not need to crank up their thermostats to compensate for drafty or large rooms. This system is designed to be used in tandem with another source of heat for colder environments.

Electric floor heat systems are designed for 120V or 240V applications. The current draw of the largest size cable is around 11 amps. The system can be installed to dissipate either 12 to 15 watts per square foot (when using standard 3" spacing) or around 16 watts per square foot (when using alternating 3-1/2" spacing). The electrical consumption is similar to a operating several lamps. A 60 square foot bathroom may cost around 10 to 20 cents per day.

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Systems are available for specific types of installations such as for ceramic, porcelain, granite, marble, slate, pavers and other hard surfaces. Some systems are even designed for installing under hardwood floors (glued or floated), laminates, vinyl or linoleum, bamboo, cork and even carpet.

For concrete slabs, special cork insulation is recommended to prevent heat transferring to the concrete slabs thus limiting the transfer of heat to the flooring. Heat always moves toward colder surfaces, so it goes both up and down when the floor warming system is in direct contact with a concrete slab. Adding a simple layer of cork between the slab and floor provides a "thermal break" slowing the flow of heat into the slab and allowing more heat transfer into the flooring quicker. Installing insulation on top of slab and under the heating system translates into more heat, faster response times and less energy used.

Electric heating systems installed under hard surface flooring have a number of advantages:

1. The floor warmers are well protected from moisture and humidity which is why electric floor heating is especially recommended to be installed in bathrooms.
2. Electric heating systems are also environmentally friendly, as no greenhouse gasses are emitted.
3. Passive radiant heating is also beneficial to allergy sufferers because it does not stir up allergens such as dust or mold.
4. Electric radiant heating is always 100% efficient. Electric floor systems work through a thin network of cables or mats placed underneath the floor. This type of system warms the floor evenly allowing heat to radiate from the floor to the ceiling.
5. Floor warmers are economical to operate. Since the system warms a room through the floors, the body warms through the feet instead of the air. The areas of the home can be divided into separate zones that are controlled independently for efficiency. The zone-heating method is energy efficient and reduces the home's overall energy consumption.
6. Electric floor warming systems, thermostats, and relay kits have withstood rigorous safety testing by the Underwriter's Laboratory and have received UL listing for the United States. In addition, thermostats contain a Ground Fault Interrupter (GFI) that provides protection against electrical shock. Confirm that these two safety features are listed on the selected electric floor warming system.
7. The World Health Organization has defined the level of acceptable exposure to EMF's at 100 mG (milliGauss). A typical measurement of electric floor warming in the field at a distance of 1" from use, generates an exposure of 0 to 6 mG. Each manufacturer should be able to provide the testing details of their specific products.

Electric radiant floor heating can be easily installed. Electric under floor heating cables have the toughest and thinnest electric in-floor heating elements that are placed in the cementitious material (such as mortar) just underneath the tiles. Floors with heating systems installed are typically 3/16" higher than those without heating cables or mats. It is

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recommended that the heating cables or mats be the only load on the electric circuit supplying power to the system. Always check with the local electrical inspection agency prior to installing electric floor warmers.



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There are a wide range of different options for you to choose from even within the sphere of electric in floor heating, including different voltages, levels of programmability and the material of the system itself (mats versus cables). Once installed, the system does not require any maintenance. Limited warranties are available for most systems.

It is a luxury to get up in the cool morning or during the night to step on warm floor tiles in the bathroom. A heated floor is not just a luxury add-on to the home for hard surfaces, but an amazingly cost-effective method of keeping the home comfortable through those cool fall and winter months. Be sure that your clients are aware of this excellent option before the construction begins.

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