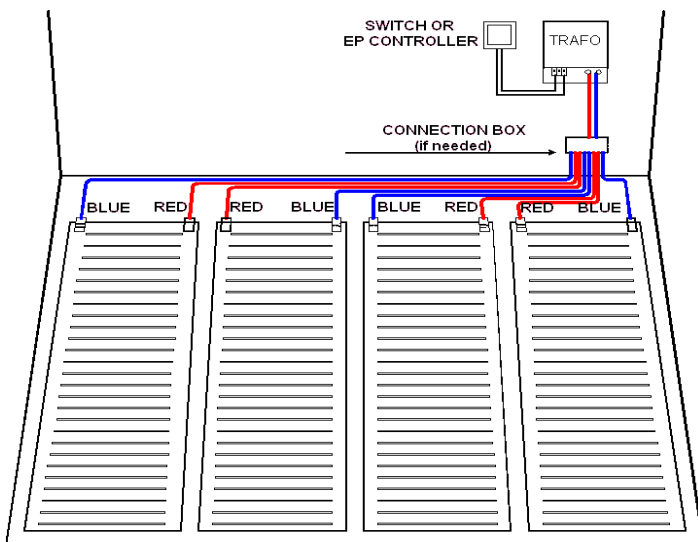


PRODUCT INFORMATION

EP warmfloor is a Norwegian developed system made for future demands of healthy heating. The priority is comfort for the human need, safety and energy efficiency. A building height from 1,2 mm, easy installation, self-regulation and 24 Volt makes the product unique. More than 20 years of continuous development ensures that the advanced technology makes it durable and easy to use. EP warmfloor has been tested by several international laboratories and is approved for installation in dry, damp and wet rooms according to norms and regulations. Installation of elements can be done by anybody, but before covering, a certified electrician must inspect and connect the wires to the house net.

THE EP WARMFLOOR SYSTEM

The EP warmfloor is based on 1,2 mm thick and 34 cm wide heating elements of carbon-enriched polyethylene with copper braid embedded along both edges. All of the plastics is electrically conductive. Because of the resistance in the material, heat is developed. An advantage of this technology is the self-regulating effect. The elements are cut to desired lengths and clips are mounted for wire connection. Safety transformers running on 24 Volt ensures a secure system.



The self-regulating effect (PTC), means that every little piece of the plastic is its own thermostat. When room temperature increases, the resistance in the material increases and electricity consumption decreases. This also happens under local area covering, in this way the elements can not overheat. The temperature on the heating elements rarely exceeds 27 to 28°C when connected to 24 Volt. Floor surface temperature will normally be 25 - 26°C, giving a comfortable and healthy floor heating for both people and animals.

DESIGN FOR PERSONAL NEED

To ensure optimal heating solutions, every installation is specified for the individual need. Insulation standards, type of room, usage, number of outside walls, climate etc. are all factors that influences the calculation for energy consumption. In this way, special considerations can be taken to achieve a satisfying solution both in comfort, quality and price. When ordering, the heating elements can be cut to desired lengths, clips mounted and a box containing all components will be packed for the individual floor.

Our policy is to supply customers with all relevant information to be able to make a decision on material selection and the way to make the floor. In the following information there are short descriptions on issues that may be important to know. More detailed information can be supplied on different topics, and the installation manual also give further instructions on how to build the complete floor.

ENERGYSAVING

There is a lot of energy needed to compensate for a lack of insulation. The building standards of today means half the energy consumption compared to the insulating standards 50 years ago. There are materials and methods today to improve the insulation level in an easy manner. It is important to evaluate every single installation for optimum performance and easiest possible building method.

Different types of heating sources have variable energy efficiency. A small heating surface demands higher temperature than a bigger area to obtain the same result. The higher temperature you need, the less energy efficient it is. Energy used directly as heating source is normally the most effective.

Political authorities sometimes influences and subsidize alternative energy sources, but rarely this means a better energy efficiency or cost saving for the consumer. Always calculate investment costs plus running costs for the life expectancy of the heating source

EP warmfloor is very economical in use with measured savings of more than 40 % compared to conventional heating. This is due to a low temperature heating across a big area, self-regulation, and closeness to floor surface. By principle, it is expensive to heat up all underlying material, so considerations about insulation means cost efficiency.

SAFETY AND HEALTH

Building materials of today may contain numerous chemical connections. High temperature releases more toxic fumes than low temperature. The ideal temperature on the floor is 22—23°C and about 19°C around your head. In some countries the temperature on the floor is defined by Health Authorities to be between 18 and 26 degrees in Kindergarten. Temperatures above 28°C is by some regarded to be a health risk. Our experience define a temperature of 25 to 26 degrees on the floor as what most people feel is pleasant, and normally this is enough to secure a nice living comfort.

The low temperature EP heating element give an ideal heat distribution in a room where it is warmer on the floor than underneath the ceiling. When the feet are warm, there is less need for heat in the rest of the room. The average room temperature can often be lowered by 2—3 degrees with an increased comfort. The lower temperature means that dust is not burned and that allergic people get a substantially improved living condition.

The self-regulation secure that the EP element can not be overheated when connected to 24 Volt. This low Voltage is safe to touch even if a damage to the floor should occur. A mechanical damage in the floor seldom leads to a loss of heat. The safety transformer is made with fuses to secure that if a faulty situation should occur, no serious damage will develop.

ENVIRONMENTALLY FRIENDLY

Polyethylene is an environmentally friendly plastic that will give no toxic fumes. It is environmentally friendly to nature as it is degradable by sunlight. It can be resirculated and used for other purposes. All materials used in the EP system are waterbased products or others that are harmless to human being and nature.

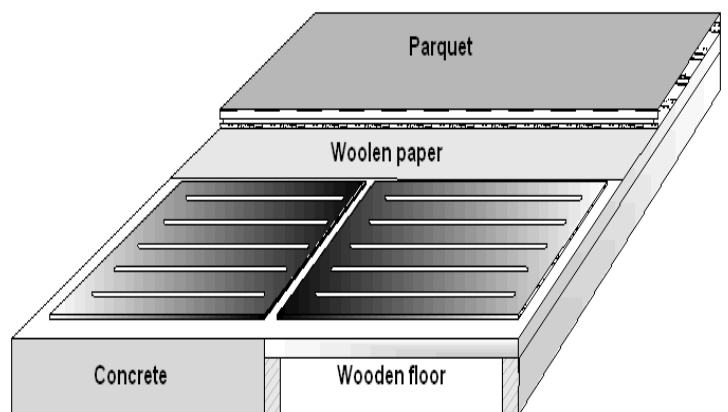
TOTAL OR COMFORT HEATING

EP warmfloor can be used as a total heating source with sufficient capacity to heat single rooms or the full house. Normal calculation is about 50 Watt per m² in a living room, depending on insulation, usage, size, geographic vicinity, number of outer walls etc. Bathrooms and small entrance areas will normally have a higher capacity. This is made by installing the elements closer together and closer to the wall. In a living room or bedroom there are furniture along most walls, and heat is normally not placed under fixed installations.

Comfort heating is when you just want to avoid the cold floor where you walk and sit. The elements are placed further apart and concentrated to the areas where people move. Capacity can be as low as 30 - 40 Watt per m², but in most cases there must be an extra heat source for the colder days.

WOOD, PARQUETTE AND LAMINATE

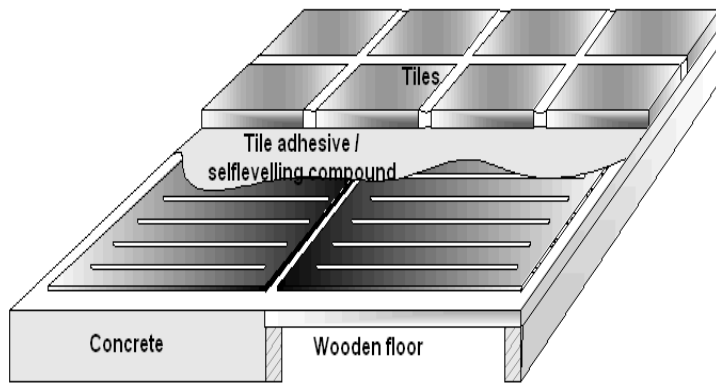
These are excellent floor materials for a nice-looking and comfortable floor to walk on, especially when you have a warmfloor underneath. There are, however, considerations to be taken as wood is a live material: The relative humidity in the room and material demands a special attention. The underfloor heating must maintain a low and even temperature. Special consideration must also be taken where the floor is placed directly on the ground to avoid moisture. In some cases there would be an advantage to have some heat on throughout the whole year.



There is a variation between the sorts and types of wooden floors. How much they move should be checked before purchase. It is very important that the materials acclimatize in the room before laid down. When covering the floor with carpets, bookshelves and other furniture, one should be aware that the temperature increases substantially underneath when constant heating sources is installed. The EP element is the most gentle heating source for wooden floors because of the low temperature, even heating and the self-regulation.

CERAMIC TILES

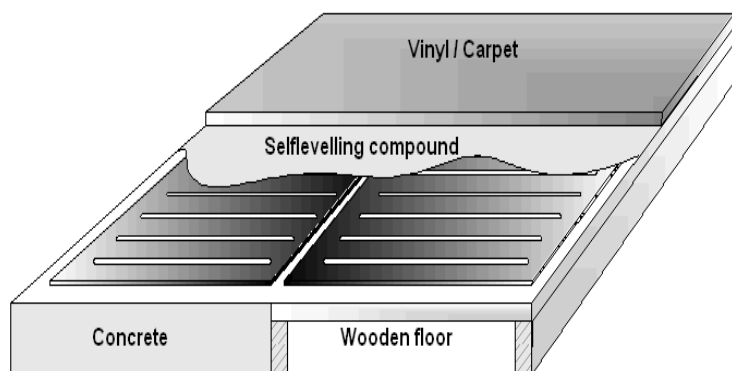
Ceramic tiles is a heat-conducting material that is eminently suitable for underfloor heating. It is important that the mechanical construction is of “sandwich” type where all layers stick together. All materials used must be adapted to each other - also chemically. Compounds and tile adhesive must be flexible. Some products can be used directly onto the heating element which will give a minimal building height.



When the EP warmfloor is used in a wet or damp room, a membrane must always be placed above the heating elements.

CARPETS AND VINYL FLOORING

This is also an application where EP warmfloor is suitable. To get a nice-looking floor there must be a covering above the heating element to get an even surface before a carpet or vinyl can be installed. This must either be a self-levelling compound (flexible) or a wooden sheet. The thickness of these depends on the underlying floor.



INSULATION

No heating source can replace a failing insulation as up to 40 % of the energy may be used for heating up the underlying masses. On concrete floors and where there is uncertainty of the insulation values, we recommend to use 3 or 6 mm Kapron or Depron insulation. This will not replace a full insulation, but contribute to divide cold and warm zones and direct the heat upwards.

These products are excellent under wooden floors, have high values on sound insulation and can be used for walls and ceiling as well. They do not absorb water and have the highest insulating capabilities.

Draft from doors and windows are also factors that influences strongly the energy consumption and should be mended.

EASY INSTALLATION

EP warmfloor has a quick, easy and clean installation procedure. To get the best result just follow the installation instructions, which have the following main points:

- 1 Roll the elements out on the floor, check measurements and mark the placing.
- 2 Peel off the adhesive back paper and press the element down to the floor.
- 3 Install wires, connect the transformer and check the installation before covering.

All types of flooring materials can be installed on top of the EP warmfloor: Woolen paper should be used for parquet, wood and laminate. For carpets and vinyl there has to be a selflevelling compound of 5 - 12 mm or a sufficiently thick wooden board. Some tile adhesive may be used directly on top of the heating element. Dependant on type of construction, the heat can be turned on after 0—7 days.

TEMPERATURE CONTROL

Normally the self-regulation in the EP element is sufficient in smaller rooms. The transformers for these also have a switch for adjusting the temperature. Autumn and spring may give variations by sunshine that influences the need for heating. Therefore in bigger areas it may be necessary to control the temperature. If heating is left on throughout the summer, it is essential that the floor is warm without increasing the room temperature too much. Then there is a need for regulating the temperature.

The best control is a precise thermostat or regulator that have adjustment within 1° C so that the floor does not get cold before turning on again. EP regulator can be used both as a thermostat or effect regulator. In addition there is a night lowering function, child safety, frost safety etc. and it is developed for transformer load. It is possible to use simple bimetal thermostats or time switches, but they must be able to take transformer loads. The effect can also be adjusted in the transformer.

RADIATION AND MAGNETISM

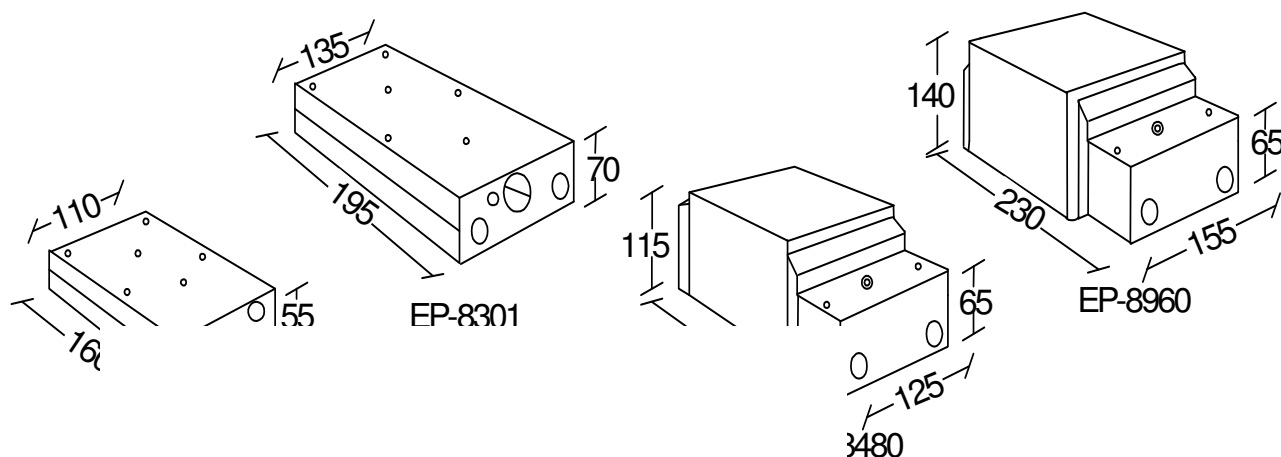
EP warmfloor have low values on radiation and magnetism. If care shall be taken to extreme sensitive persons, please get in touch with us. The heating element do not give any disturbance on electronic systems and may be used in connection with sensitive machinery.

APPLICABILITY

The self-regulation, low surface temperature, massive plastics, flexibility, softness, tear strength and mechanical load capacity makes the EP element suitable to a lot of other purposes than floors. Also the Voltage can be changed for other temperature levels. Other heating elements are also available.

TECHNICAL SPECIFICATIONS

- EP warmfloor: Floor warming system, low surface temperature, within SELV regulation, to be run on 24 Volt. The system consists of the following parts:
- EP-element: 1,2 mm thick and 340 mm wide to be cut to desired length. Massive polyethylene carbon-enriched ("intelligent") with copper braid embedded in both sides for current connection. Resistance changes with temperature - self-regulating (PTC). Supplied with self-adhesive underside along edges. Can also be supplied with full adhesive underside.
- Connecting clips: Crocodile clips for 2,5 mm² wire. Crimped on the element by special tool.
- Wire secondary: 2 x 2,00 mm² red/black type RKUB or equal.
- Transformer: Safety transformer with galvanically split circuit:
EP-8135 135 VA toroidal core with switch 0-24-28 Volt
EP-8301 325 VA toroidal core with switch 0-20-22-24-26-28 Volt
EP-8480 480 VA iron core with connection for 24-28-31 Volt
EP-8960 960 VA iron core with connection for 24-28-31 Volt



- EP-regulator: Electronic thermostat / effect regulator build for transformer, with soft-start, switch with 2-polarity cut-off and night-lowering function. Fit standard wall-box. Connection primary side max load 10 A.



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