



# THIN HEATING MATS

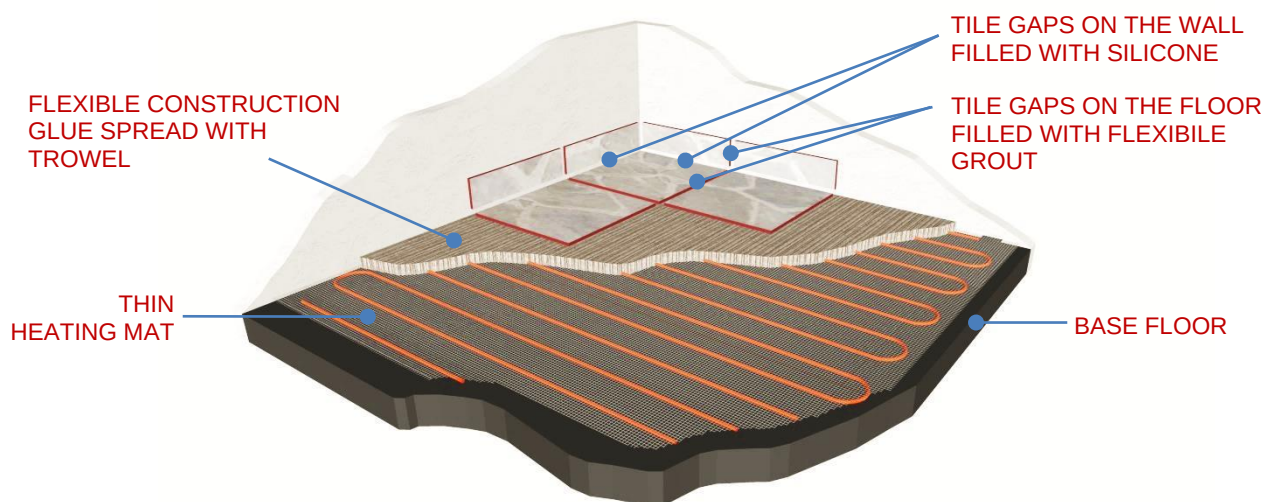
application recommendations

APPLICATION

Thin heating mats are used for direct and combined electric underfloor heating. The mats are installed into flexible ceramic tile glue, self-leveling mortar or into thin layer of cement slab.

They are embedded into the construction glue under ceramic or stone tiles, into the adhesion layer under industrial carpets, wooden, laminate or synthetic floor finishes.

The installation starts from the base floor, which is usually an armored cement slab. If there is enough room it is desirable to put a layer of thermal insulation between the base floor and the mat (for example high density EPS foam), at least 20 mm thick. When reconstructing a floor, the base floor can be the old floor with ceramic or terrazzo tiles. On rare occasions the base floor is made of wood or some type of plaster or hard thermal insulating boards.



## Installation procedure

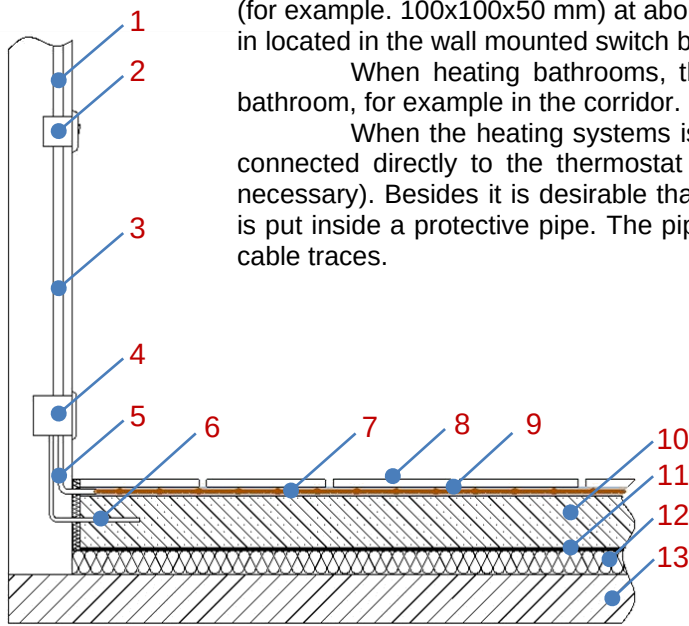
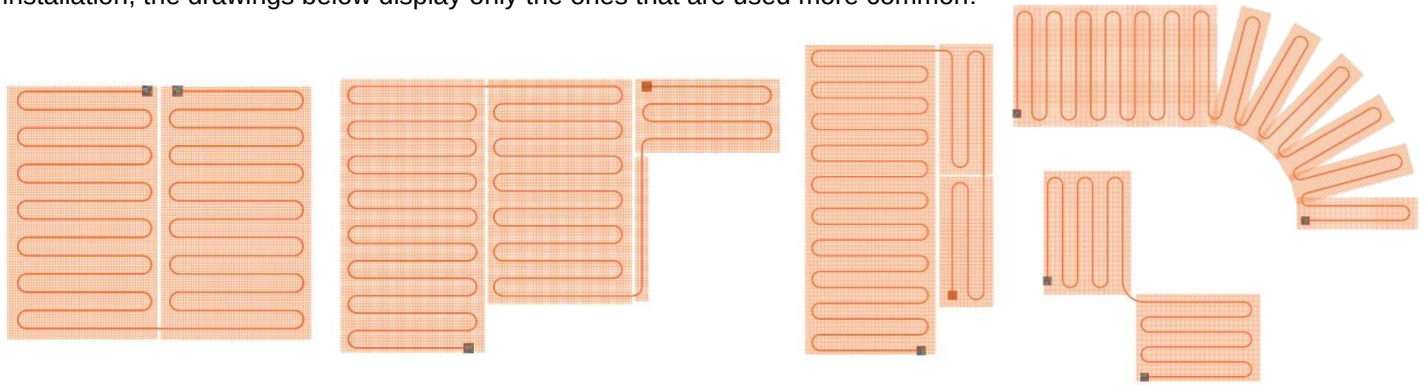
The installation procedure depends on the type of the base floor and available materials, but there are some common principles to all variants:

- the base floor must be clean, without grease, sharp pieces or dust
- heating mats must be positioned according to the designed installation plan
- it is desirable that the side of the mat with the heating cable faces down (to the base floor), because that simplifies the spreading of the construction glue with a trowel
- the power supply connection cables („cold ends“) must not cross with the heating cables on the mat, additionally on thicker parts of the mat (connection between heating and supply cable, when multiple connection cables run adjacent in parallel, or when there is a protective pipe for the temperature sensor) there needs to be a slot on the base floor, in order to avoid unnecessary increase of construction glue thickness
- check the electrical parameters of the mat by measuring nominal and insulation resistance before and after tiles are laid on the floor
- careful handling with all materials, machines and tools, in order to prevent accidental damage of the heating cable insulation
- obliging to all construction glue and other material manufacturer recommendations
- heating mats should not be turned on for at least two weeks after the tiles have been laid down

Recommendations for the tile installer are especially difficult to provide, because there are so many ways professional tile installers work, which is not dictated by the base floor and available materials but also with the installer working habits. Despite all there are three basic principles how to work with mats:

- 1. way:**
  - lift a part of the heating mat and put glue on the base floor with a trowel
  - lower the mat and press it into the construction glue
  - spread a new layer of glue and make a smooth finish
  - on the prepared glue put the tiles immediately
- 2. way:**
  - using a trowel, press the construction glue over the mat down to the floor
  - put the tiles on the glue (glue thickness should be 4-6 mm)
- 3. way:**
  - using a trowel, press the construction glue over the mat down (glue thickness 3-4 mm)
  - leave the glue to dry
  - apply a new layer of glue the next day and put the tiles

When positioning the mats, it is a common case that the mat must be cut with scissors (**not the heating cable only the netting!!!**), in order to get the desired shape in the installation plan. There are many variations of the installation, the drawings below display only the ones that are used more common:



Connection cables („cold ends“), from the heating mat, end up in the connection box (for example. 100x100x50 mm) at about 30 cm above the finished floor, the electronic thermostat is located in the wall mounted switch box (φ 60x40 mm) about 150 cm above the floor.

When heating bathrooms, the recommendation is to put the thermostat outside the bathroom, for example in the corridor.

When the heating systems is made of only one or two heating mats, the mats can be connected directly to the thermostat in the thermostat box (the lower connection box is not necessary). Besides it is desirable that the sensor (for example NTC sensor) for the thermostat is put inside a protective pipe. The pipe should end up in the cement slab between two heating cable traces.

- 1 – pipe φ 16 mm for the power supply
- 2 – connection box φ 60x40 mm for the thermostat
- 3 – pipe φ 16-32 mm (or 2 x φ 16 mm)
- 4 – “cold end” connection box
- 5 – pipe φ 16-32 mm
- 6 – copper pipe φ 10-14 mm for the thermostat sensor
- 7 – heating mat
- 8 – ceramic tile or similar floor finish
- 9 – tile construction glue
- 10 – armored cement slab
- 11 – PE foil
- 12 – thermal insulation
- 13 – base floor (armored-concrete slab)

## CONSTRUCTION MATERIALS

When we talk about materials, it is necessary to use flexible ceramic tile construction glue (intended for use with heated floors), used with a flexible tile gap grout. The filling of tile gaps should not start earlier than 24 hours after the tiles have been laid down. The tile gaps at the edges between the floor and the wall must be filled with construction silicone (preferably in the same color as the tile gap grout), in order to enable floor dilatation.

For the construction glue one can use one of the following:

SAMOBORKA: Teratekt fleks, Teratekt fleks unilevel, Teratekt F

MUREXIN: Maksimo M41, KGF65, KWF61

LASSELSBERGER-KNAUF: Flex, Flex W

SIKA: Sika Ceram-253, Sika Ceram-203

For the tile gap grout one can use one of the following:

SAMOBORKA: Terafil fleks

MUREXIN: SFX70, SM60

LASSELSBERGER-KNAUF: ProCol

SIKA: Sika Ceram-520TG, Sika Ceram CleanGrout

For the filling of tile gaps near the wall one can use different construction silicone kits such as:

MUREXIN: Sanitar Silikon SIL60, Silicone for natural stone

LASSELSBERGER- KNAUF: Silikon Sanitar

SIKA: Sanisil

With unlevelled floors flexible self-leveling mortar can be used, and when preparing the base floor different emulsions can also be used (example when putting new tiles over the old ones the old ones must be coated with: SAMOBORKA –Kontakt grund, MUREXIN – Supergrund D4 or LASSELSBERGER-KNAUF- Grundreinger).