

# TOTRATERM – UNDERFLOOR HEATING SYSTEM

The **Totraterm system** is a low temperature system for heating, where the floor is the main heating body.

## Underfloor heating has many advantages over the classic heating systems:

- low temperature of water (up to 55 °C)
- high recovery
- thermal energy savings
- uniform distribution of temperature through space
- more useful area in the space
- possibility of using all types of heat sources
- quick and simple installation

## The pipes are manufactured from heat stabilised copolymer polypropylene (random copolymer PP-R) with the following characteristics:

SPECIFIC WEIGHT	$> 0,900 \text{ g/cm}^3$
LINEAR ELONGATION FACTOR	$\approx 0,15 \text{ mm/mK}$
THERMAL CONDUCTION	$\approx 0,20 \text{ WK}^{-1} \text{ m}^{-1}$
ELASTICITY MODULUS	$E_{(1\text{min})} \geq 1050 \text{ MPa}$
SURFACE ELECTRICAL RESISTANCE	$> 2 \times 10^{16} \Omega$



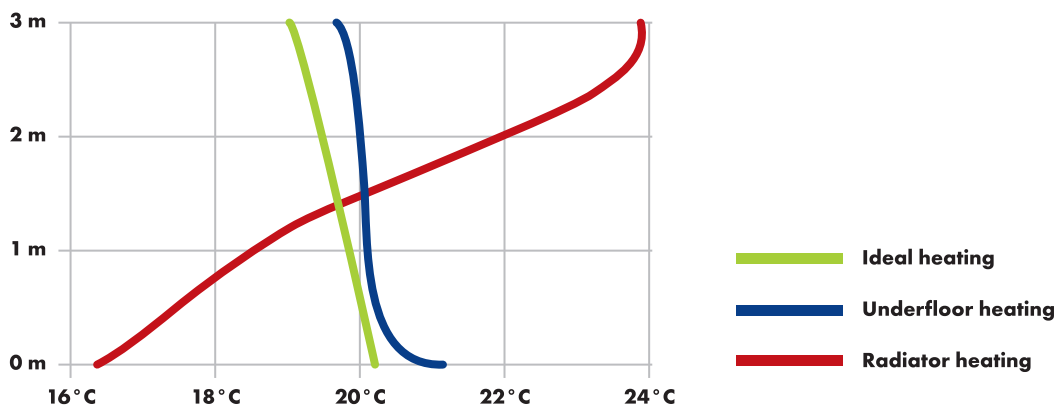
## The pipes are manufactured in 2 dimensions:

- d 16mm with wall thickness of s=2mm and weight of  $\approx 0.086 \text{ kg/m}$
- d 20mm with wall thickness of s=2 and weight of  $\approx 0.113 \text{ kg/m}$

The pipe geometry is adapted to operation at temperatures from 45 to 55 °C, at a pressure of 3 bar. At these conditions, even after 50 years, the pipe still retains twice the safety factor for hardness.

The pipe colour is usually light gray. They are coiled in 100m coils. Allowable length deviation of uncoiled pipe is 1%. The pipes are marked at each meter with appropriate markings.

## Space temperature profile



## Preparation of the floor for laying in living spaces

The building must be closed, with installed windows and doors, plastered walls, installed plumbing and electricity. The manifold system is installed in the most appropriate place in the building. The first condition with the underfloor heating, like with any other heating system, is to correctly and accurately calculate the heat loss of all spaces, where climate conditions, insulation of the building, method and type of heating (especially the duration of the heating season), influence of wind and position of the building etc. are taken into account. The entire calculation of heat dissipation has to be made in accordance with the specifications of appropriate standards and current guidelines.

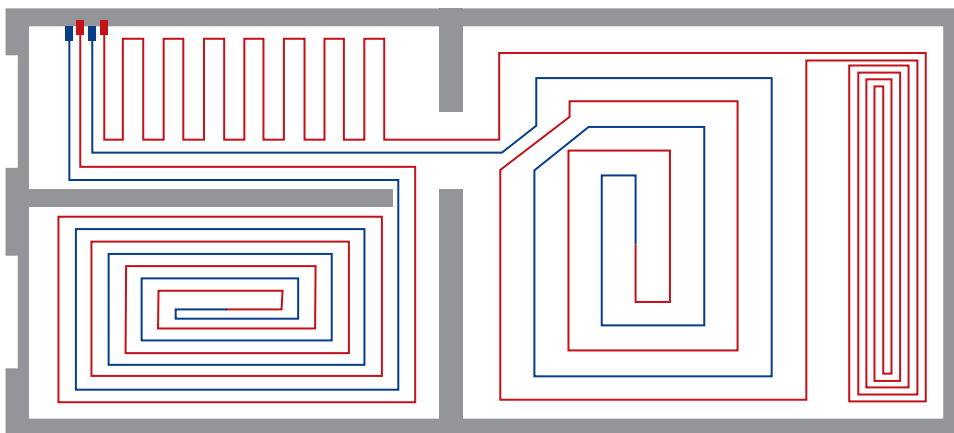
## Installation

The pipes are usually installed in the shape of a coil, serpentine or a combination of both with the distance between pipes of 5, 10, 15 and 20 centimeters or more, or as specified. Bend radius  $r = (8-10) d$  (mm)

If two ends of the pipe must be jointed, joint both ends with a double coupling with a poly-fusion welding procedure at the temperature of 260°C. Metal fittings are prohibited.

Heating power of the floor surface is approximately 100 W/m<sup>2</sup>, where the temperature should not exceed  $t_{max} = 29^{\circ}C$ .

Before covering with concrete the pressure test of the system must be carried out at the pressure of 6 bars. A single loop should not be longer than 120m. The pipes are then covered with a concrete screed (dry concrete), prepared with a sand grain size of 0.4mm and cement in the 1:4 ratio, with the addition of a required plasticiser. During the installation the system must be pressurised. Expansion joints should be made on all walls, at doors and in spaces larger than 20m<sup>2</sup>. A 10mm Styrofoam band should be inserted into the expansion joints, which reach down to the polyethylene foil. Floor coverings are not to be laid over the joints; they should be filled with an expansion sealant. Floor covering (tiles, wood, etc.) can be laid after the screed has dried for 28 days.



## Joint fittings

Joint fittings, required for fitting the pipes to the pipe fixing template and connecting the pipes to a manifold system:



More information is available at the technical and marketing services of the company.