

Technical Paper

The "Dry" Floor Heating System

Effective energy saving, improved comfort and quicker installation

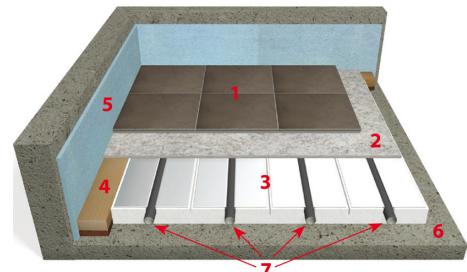
If you have floor heating, maybe you have experienced having to open one or more windows while you are entertaining guests because the room just gets too hot? Or maybe your house is a little too hot when you return from work on a sunny spring day? The lack of comfort can be frustrating not to mention the unnecessary waste of heat in times when focus is on energy saving and CO2 reductions.

The traditional floor heating system utilises a "wet system" where floor heating pipes are cast in concrete. This results in a thermal "heavy" floor construction which has slow reaction time and is therefore difficult to regulate and adjust over a short period.

A "dry" floor heating system such as Danfoss' SpeedUp™ (or the ecological version SpeedUp Eco™) counteracts these problems and is at the same time quicker and more effective to install. A "dry" floor heating system is thermally separated from the building's basic concrete flooring construction and typically consists of the following components:

1. Flooring, such as wood, tiles, carpet etc.
2. Load distribution plate
3. Insulated heat panel
4. Support batten
5. Perimeter insulation

6. Concrete construction of building
7. Concrete construction of building



In this way, the heat is led effectively up towards the flooring and out into the room instead of first having to heat up or cool off heavy materials like concrete.

"Dry" Floor Heating System

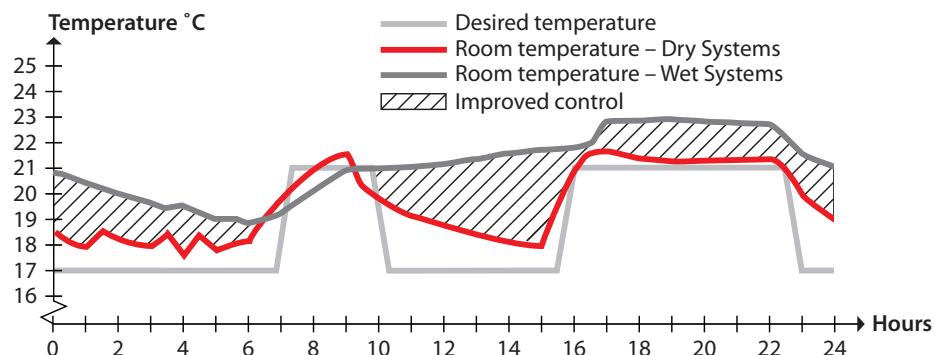
A "dry" floor heating system means:

- Floors that quickly reach a comfortable temperature, after approx. 30 min.
- Fast response and adjustment in cases where the sun is shining or a lot of people are gathered.

In the diagram below, Danfoss has - using the acknowledged simulation program IDA Indoor Climate and Energy 3.0 - simulated a traditional

heavy wet concrete floor heating system and compared it to a "dry" floor heating system for a 24 hour period at the beginning of March in a typical house in Germany.

The lines show the room temperatures with 2 setback periods where the desired comfort temperature is 21°C and the setback temperature is 17°C.



Significant Cost Reductions

The active "dry" floor heating system is ideal in combination with room thermostats with programmable temperature setback functions resulting in very precise comfort control and significant energy and cost savings in heating. This can be achieved, for instance, with Danfoss' wireless CF2 control system with remote control CF-RC from Danfoss. The annual energy consumption for a typical house in Germany would be as follows.

With "dry" floor heating you can save up to 15 % of the energy consumption of an equivalent heavy wet concrete floor heating system. Index is essentially unaffected by geographical location.

Application	Energy consumption [kWh]	Index
Wet system with room thermostats – without timer / setback	11185 (reference)	100
Wet system Significant cost reductions with room thermostats and 2 setback periods	10723	96
Lightweight flooring with room thermostats and 2 setback periods	9129	82

Exact Comfort**Exact comfort**

The graph also clarifies that the "dry" floor heating system, due to lightweight materials and quick reaction time, constantly ensures a room temperature that is significantly closer to the desired room temperature compared to a heavy

wet concrete floor heating system. This again gives the home user a more prominent experience of comfort.

Quick and Simple Installation

Entrepreneurs, heating installers, and fitters achieve a number of advantages by installing a "dry" floor heating system on top of the building's basic concrete construction:

- The floor heating pipes can be mounted in an upright working position with Danfoss SpeedUp™.
- A shorter building process: work can be quickly assumed after installation as there is

no drying time involved as with a heavy wet concrete system.

- The working procedure between the builder and the heating installer/fitter is simplified.

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