

MAKING MODERN LIVING POSSIBLE

Danfoss

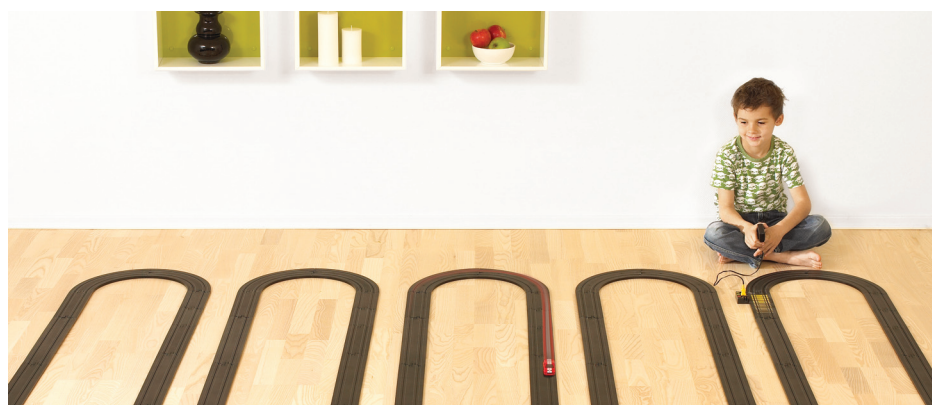


SpeedUp™ Heating Systems

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SpeedUp™ and SpeedUp Eco™

Dry installation and fast reacting wet screed underfloor heating with low construction height and weight, and quick response time. Wherever a low construction floor is required to save on headroom, or a screed floor is unsuitable, the SpeedUp™ dry installation is a suitable alternative. It is also suitable for wet screed where the floor level in heated rooms must stay the same as in any adjoining unheated room. SpeedUp™ solves individual heating problems.



Heating systems

The SpeedUp™ underfloor heating systems are universal and optimum for all new and old buildings. They are particularly suitable for retrofitting in restoration work, extensions, and for use in dry and timber installations. The individual heat panels are only 30 mm thick and are prefabricated. In contrast to steel (thermal conductivity 45 W/mK) the aluminium covering all heat panels is a very good conductor of heat (thermal conductivity 200 W/mK) so that the heat is distributed equally and fast over the entire area. The pipes are 100% impervious to air so that over the mid and long term the metal parts of the heating system cannot suffer from corrosion. Heat exchangers are not required. Dry screed (20-25 mm) as well as engineered flooring and laminates are suitable for load bearing. Wherever floor height is a problem, Danfoss Strongboard (5 mm) load bearing panels offer the opportunity to lay tiles straight onto SpeedUp™. In contrast to traditional underfloor heating systems, a very thin layer of liquid screed can be applied to SpeedUp™, saving mass, weight and height.

The system is able to react very quickly to temperature changes and is adjustable like light. The whole system is available from one source. Heat output is achieved quickly. The extremely low flow temperatures are energy efficient which makes the system ideally suited for condensing boilers, heat pumps and solar energy. Via accessories (mixing shunts, RTB valves) the system can be connected to existing heating systems.

System variations

Depending on the type of installation, system panels are manufactured from different materials:

- **SpeedUp™** with highly resilient insulation, EPS 035 DEO 240 kPa.

- **SpeedUp Eco™** with ecological wood fibre insulation 140 kPa, which reduces impact sound.

Advantages

- Fast response time.
- Heat is only emitted when required.
- Prefabricated and easy to install system panels.
- Maintenance free and energy efficient.
- Clean and healthy warm air.
- Fast dry installation without residual moisture.



Standards and guidelines

For planning and construction legal requirements and regulations have to be followed.
 For dry underfloor heating EN 1264 is applicable.
 Three Danfoss basic constructions are possible under EN 13813 'Screed in the Building Industry'.

They meet the minimum required insulation in relation to use and position in the home.
 For minimum thermal resistance of insulation under underfloor heating see EN 1264, part 4.

Minimum thermal resistance of insulation under floor heating systems from EN 1264, part 4

Construction	Heated room below	Unheated room or occasionally heated room below or room on ground floor *	Outside air temperature below construction		
			Design outside temperature Td > 0° C	Design outside temperature 0° C > Td ≥ -5° C	Design outside temperature -5° C > Td ≥ -15° C
Thermal resistance (R) (m² K/W)	0.75	1.25	1.25	1.5	2

* When ground water table is ≤ 5 m this value should be raised !

System parts

The Danfoss SpeedUp™ system parts are made of compression resistant polystyrene EPS DEO 240 kPa or of wood fibre 140 kPa. The wood fibre load bearing panels serve as thermal and sound insulation.

To achieve optimum lateral heat transfer (edge/outside wall much heat - inner area less heat) the heat panels have pre-formed pipe channels with two distances. The edge zone can be covered by EZ-Panels with pipe distances of 12.5 cm and in the comfort zone CZ-Panels with pipe distances of 25cm are installed. Both systems are pre-channelled and are covered with heat conducting aluminium sheet for optimum heat distribution. The aluminium pipe channels are omega shaped so that the pipes easily snap in when installed but cannot 'spring' out afterwards. The channels are beaded at the ends to avoid damage to the composite pipe during and after installation. The 1 m long and 0.5 m wide system panels are pre-scored with the heating plates already cut in the appropriate places so that the panels can be snapped over the knee without tools, thus avoiding unnecessary breaks (this does not apply to SpeedUp Eco™ panels).

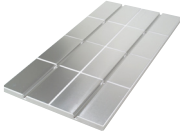
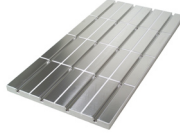









This way the system can be adapted to any room dimensions, even the most awkward corners can be fully covered.

Together with the two different panel types there are matching 25 cm header panels, EZ and CZ, to allow the pipe to return. The header panel CO allows the cross over between 12.5 cm and 25 cm pipe distances. Panels for flow and return pipes CZ and EZ without aluminium plates make it possible to take supply and returns through unheated rooms and rooms with low temperature requirement without losing heat. Remaining areas or areas in front of manifold require blank panels BP. These are pre-scored as well. Speedup Eco™ makes up the system with additional 12.5 cm wide and 1 m long flow and return panels with routed pipe channels and 90° curve panels (to allow change of direction in the flow and return area).

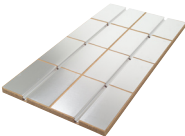

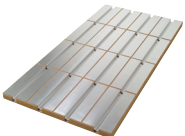











Support battens for stabilisation and sound insulation as well as load bearing steel sheets (stabilisation in front of manifold) and heating aluminium plates (for header panels) complete the system.



SpeedUp Panels

 <p>088X0100 SpeedUp Heat Panel Comfort Zone CZ</p>	 <p>088X0110 Heating plate (aluminium)</p>
 <p>088X0101 SpeedUp Heat Edge Zone EZ</p>	 <p>088X0111 Load Bearing Sheet (Steel)</p>
 <p>088X0102 SpeedUp Header Panel Comfort Zone CZ</p>	 <p>088X0134 Support Batten</p>
 <p>088X0103 SpeedUp Header Panel Edge Zone EZ</p>	 <p>088X0135 Threshold Support Batten</p>
 <p>088X0104 SpeedUp Header Panel Cross Over CO</p>	 <p>088X0122 Perimeter insulation</p>
 <p>088X0105 SpeedUp Blank Panel BP</p>	 <p>088X0001 FH Composite pipe, 200 m, 16 x 2 mm</p>  <p>088X0003 FH Composite pipe, 500 m, 16 x 2 mm</p>
 <p>088X0106 SpeedUp Flow and Return Panel CZ</p>	
 <p>088X0107 SpeedUp Flow and Return Panel EZ</p>	

SpeedUp Eco Panels

 <p>088X0201 SpeedUp Eco Heat Panel Comfort Zone CZ</p>	 <p>088X0209 SpeedUp Eco Flow and Return Panel CZ</p>
 <p>088X0202 SpeedUp Eco Heat Panel Edge Zone EZ</p>	 <p>088X0210 SpeedUp Eco Flow and Return Panel EZ</p>
 <p>088X0203 SpeedUp Eco Header Panel Comfort Zone CZ</p>	 <p>088X0134 Support Batten</p>
 <p>088X0204 SpeedUp Eco Header Panel Cross Over CO</p>	 <p>088X0135 Threshold Support Batten</p>
 <p>088X0205 SpeedUp Eco Header Panel Edge Zone EZ</p>	 <p>088X0110 Heating plate (aluminium)</p>
 <p>088X0206 SpeedUp Eco Blank Panel BP</p>	 <p>088X0111 Load Bearing Sheet (Steel)</p>
 <p>088X0207 SpeedUp Eco Flow and Return Panel</p>	 <p>088X0123 Perimeter insulation</p>
 <p>088X0208 SpeedUp Eco 90° Curve Panel</p>	 <p>088X0001 FH Composite pipe, 200 m, 16 x 2 mm</p>  <p>088X0003 FH Composite pipe, 500 m, 16 x 2 mm</p>

Tools

Pipe cutter

The Danfoss pipe cutter, incl. corrugate pipe cutter for trimming of Danfoss composite pipes 16 x 2.00 mm / 20 x 2.25 mm and the Danfoss corrugated protective pipe.



Pipe cutter

Danfoss universal pipe cutter for trimming of Danfoss composite pipes up to 32 x 3 mm and the Danfoss clip rail BasicRail



Bevelling tool

Danfoss bevelling tool for calibrating and bevelling the Danfoss Composite Pipes. The handle is removable so the tool can be attached to rechargeable drills (< 500 U/min). Dimensions of 16-20 mm allow inner and outer bevels which facilitates installation.



Pipe bending springs

The Danfoss pipe bending springs are able to form radiuses of up to 4 x D. It facilitates installation and reduces strain on fittings.



Pressing tool

The Danfoss pressing tool is, together with the inserts, suitable for pressing of Danfoss composite pipe fittings with dimensions of 16-20 mm.



SpeedUp™ hot wire cutter

The Danfoss hot wire cutter, with its hot blade and channel cutter, will cut pipe curves, pipe channels and cleanly cut polystyrene panels.



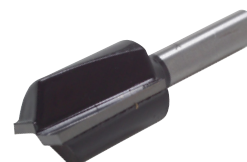
Pipe dispensing wheel

The Danfoss pipe dispensing wheel is indispensable for one-man installations. It holds up to 200 m of coiled pipe, is compact and easy to transport and will fit into narrow spaces. An expansion kit for up to 500 m of coiled pipe is available.



Ball nose routing bit

The Danfoss ball nose routing bit is used for milling tracks in the SpeedUp Eco™ blank panels.



Substrate requirements

The following requirements have to be met when installing Danfoss SpeedUp™ heating systems: The substrate must be dry and firm, it must be

rigid and free from cracks, as well as free from cleaning agents and dirt.

Tolerance levels for evenness

Group	Reference	Maximum deviation in mm, over distance in m				
		0.1 m	1 m	4 m	10 m	15 m
4	Finished floors but subject to more stringent requirements. e.g. self-levelling fillers	1 mm	3 mm	9 mm	12 mm	15 mm

The system panels must lie fully flat on the surface since load bearing steel plates in dry installations cannot compensate for unevenness. If the prerequisites are not met, levelling and adjustments have to be undertaken dependent on the deviation and surface (see table).

Greater installation height with unevenness or many pipe channels may require levelling and build up of extra height with screed on insulation. The screed will achieve the necessary evenness and will make further measures unnecessary. It is also possible to add further height using commercial insulation material.

Levelling of substrate (Danfoss recommends)

<p>Correct minor unevenness with levelling products typically from builders merchants. Up to 10 mm levelling (e.g. Maxit Floor 4010). Up to 20 mm filler (e.g. Maxit 4160). Prime unfinished floor (e.g. Maxitfloor 4716).</p>	<p>For unevenness over 20 mm use levelling screed (Maxit 446), dry compound if moisture and weight are not important factors. Prime unfinished floor (e.g. Maxitfloor 4716). Level service channels up to 50 mm level with composite screed.</p>	<p>Depressions and built-up height over 30 mm are levelled with dry screed composite panel Fermacell 2E31 (20 mm gypsum fibre board plus 10 mm wood fibre insulation). Level minor unevenness first.</p>	<p>Cover dry levelling compound between 10-50 mm for small objects with load bearing panel (10 mm gypsum fibre).</p>	<p>Cover service channels over 3 cm and construction over 11 cm with screed on insulation.</p>
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Unevenness of up to 3 mm is not a problem. Thin wood fibre insulation or moisture barriers (e.g. Gefitas/Firma Gefinex) eliminate this problem. Unevenness of up to 10 mm can be eliminated with self-leveling compound. Greater height differences can be overcome with bonded dry levelling compound (e.g. Danfoss dry levelling compound). Before installing the compound on the suspended floor the prepared area should be lined to protect against any compound falling through. As a rule the thickness of the levelling compound is between a minimum of 10 mm and a maximum of 60 mm. It is advisable to read the manufacturer information. A finishing board is used to make the compound safe to walk on. The use of additional insulation with Danfoss dry levelling compound makes the installation of the board unnecessary. The additional insulation can be installed directly on the leveling compound. It is always advisable to follow the manufacturer information when installing dry screed panels. If there is residual moisture in the building, a 0.2 mm PE foil will prevent the rising of the moisture

into the building. Length of foil overlap by 20 cm, at the edge up to floor level. Floors between storeys don't need a moisture seal since there is no residual moisture. Suspended floors should not have any lining since moisture could be trapped and cause lasting damage. In accordance with EN 13967 constructions on ground floors must be protected against any moisture entering the floor. In the absence of a lining, bitumen or synthetic lining can be used; the floor will need levelling afterwards. Such measures may have to be decided by the builder. For floors with greater exposure to humidity e.g. bathrooms or entrance halls, dry screed panels such as Fermacell will need a thick coating or a sealing system before tiling. For shower rooms and washrooms with floor drains in public and commercial premises, Fermacell screed panels are not suitable. For wet areas, Fermacell Powerpanel SE can serve as an alternative.

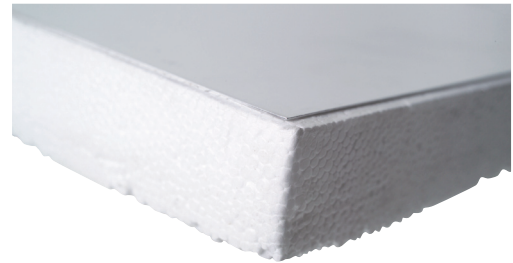
Separation of pipe from load bearing layer

SpeedUp™ is the Danfoss underfloor heating system, where pipes are integrated into the system panels and decoupled from the load bearing layer.

This means that the joints of the load bearing panels do not have to be taken into consideration when planning the heating circuit.

Low surface weight

The relatively light weight of dry screed makes the whole construction light weight, which is an advantage as well as essential in restoration of older buildings, where floors are of lower load bearing construction.

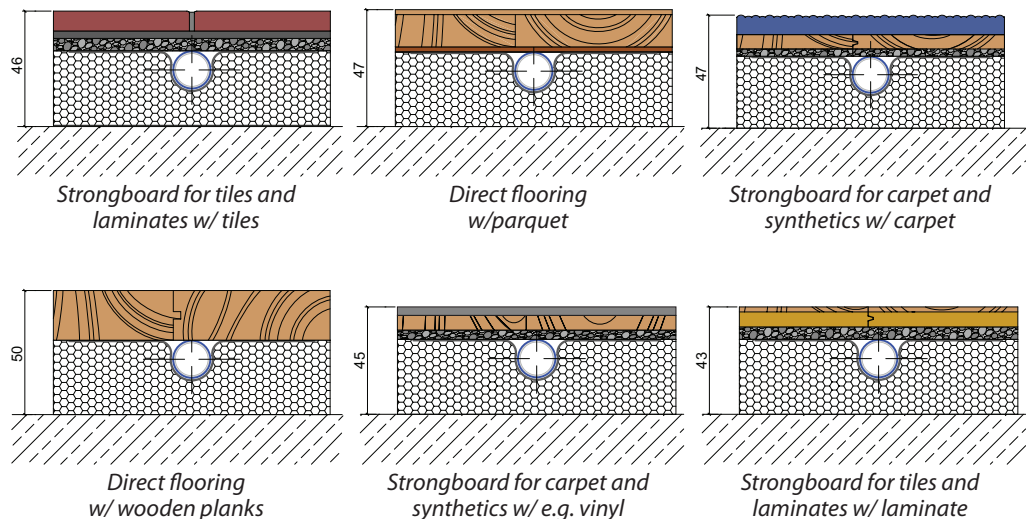


Level free surface

Danfoss Strongboards provide a unique solution for level free floors. With a thickness of only 5 mm the Strongboard for Tiles and Laminates provides sufficient stability as a load bearing layer to comply with the demands of EN 1991 (Actions of structures). The Strongboard for Carpet and Synthetics provides the same stability, but with a thickness of 10 mm. Danfoss Strongboards are made of recycled materials mixed with shreds of aluminium, which ensure good heat transfer through the Strongboard to floor finish.

Where Strongboard for Tiles and Laminates does not have a completely smooth surface, the Strongboard for Carpet and Synthetics can serve as a smooth surface for floor finishes like carpet, linoleum, vinyl etc. A smooth surface can therefore be achieved with only 10 mm instead of the 20 mm or more that dry or wet screed requires. Danfoss Strongboards can be used as a replacement for the Fermacell 20 mm or 25 mm panels.

Danfoss Strongboards gives you the possibility to have almost level free floor surfaces - no matter which floor finish you choose.



Basic construction

Because of their constituent material and construction, Strongboard, 20-35 mm dry screed panels, engineered timber or laminates are used in homes. For higher active loads the dry screed is reinforced. As an additional insulation under the heating panels (thickness depending on use and position

in the house) extruded rigid foam and expanded Polystyrene (200 kPa density) can be used. If necessary, the load bearing panels have to be reinforced (see table on page 11).

**Additional insulation
Maximum layers (number)
and thickness of insulation**
SpeedUp™ Heating System

Applications	Areas for domestic and residential activities (e.g. rooms in residential buildings and houses; bedrooms and wards in hospitals; bedrooms in hotels and hostels; kitchens and toilets), office areas. Point load: 2.0 KN*; Actual load: 2.0 kN/m ²						
Load bearing surface	Strongboard for tiles and laminates	Strongboard carpet	Laminate	Engineered timber floor	Solid timber on battens	Fermacell	Fermacell
Thickness (mm)	5	10	8 / 5	15	20-22	20	25
EPS DEO 200 kPa WLG 035 (mm)	max. 20	max. 20	max. 20	max. 20	max. 40	max. 50	max. 70
Maximum layers (pcs.)	1	1	1	1	1	1	2
XPS DEO 300 kPa WLG 035 (mm)	max. 30	max. 30	max. 30	max. 30	max. 40	max. 50	max. 70
Maximum layers (pcs.)	1	1	1	1	1	2	2
XPS DEO 500 kPa WLG 035 (mm)	max. 60	max. 60	max. 60	max. 60	max. 60	max. 70	max. 90
Maximum layers (pcs.)	1	1	1	1	2	1	2
Wood fibre insulation 150 kPa (mm)	-	max. 20	max. 20	max. 20	max. 20	-	max. 40
Maximum layers + 12.5 mm filler panel under SpeedUp (pcs.)	1 (essential)				1		1
Levelling with Danfoss dry levelling compound	Not possible	+ 12.5 mm load bearing panel					
		Additional insulation > 30 mm or dry levelling compound >30 mm: Reduce the maximum permitted additional insulation by the level of the dry compound					

* Point load: area at least 20 cm², maximum distortion ≤ 3 mm; allowances to be made for particularly heavy items, e.g. aquariums, baths.

SpeedUp Eco™ Heating System

Applications	Areas for domestic and residential activities (e.g. rooms in residential buildings and houses; bedrooms and wards in hospitals; bedrooms in hotels and hostels; kitchens and toilets), office areas. Point load: 2.0 KN*; Actual load: 2.0 kN/m ²						
Load bearing surface	Strongboard for tiles and laminates	Strongboard carpet	Laminate	Engineered timber floor	Solid timber on battens	Fermacell	Fermacell
Thickness (mm)	5	10	8 / 5	15	20-22	20	25
Wood fibre insulation 150 kPa (mm)	max. 20	max. 20	max. 20	max. 20	max. 40		max. 20
Maximum layers plus OSB-load bearing surface under SpeedUp	1 22 mm	1 15 mm	1 15 mm	1 15 mm	1		1
Wood Fibre > 150 kPa (mm) Pavatex Pavaboard 150 kPa Gutex Thermowall - gf 200 kPa Glunz Agepan THD 230	max. 20	max. 20	max. 40	max. 40	max. 40		max. 20
Maximum layers plus OSB-load bearing surface under SpeedUp	1 22 mm	1 18 mm	1 18 mm	1 15 mm	1		1
Levelling with Danfoss dry levelling compound	Not possible	Additional insulation > 30 mm or dry levelling compound > 30 mm: Reduce the maximum permitted additional insulation by the level of the dry compound					

* Point load: Load area min. 20 cm², maximum distortion ≤ 3 mm; allowances to be made for particularly heavy items e.g. aquariums, baths.

Categories of loaded areas

The Danfoss construction sheets describe the approved type of use. Depending on active and point load, EN 1991 is also applicable for constructions other than home and office buildings.

Category	Use	Examples	qK (Active load) [kN/m²]	QK (Point load) [kN]
A1	Areas for domestic and residential activities	Floors	1.5 - 2.0	2.0 - 3.0
A2		Stairs	2.0 - 4.0	2.0 - 4.0
A3		Balconies	2.5 - 4.0	2.0 - 3.0
B	Office areas		2.0 - 3.0	1.5 - 4.5
C1	Areas where people may congregate (with the exception of areas defined under category A, B, D)	Areas with tables , e.g. areas in schools, cafés, restaurants, dining halls, reading rooms, receptions	2.0 - 3.0	3.0 - 4.0
C2		Areas with fixed seats, e.g. areas in churches, theatres or cinemas, conference rooms, lecture halls, assembly halls, waiting rooms, railway waiting rooms	3.0 - 4.0	2.5 - 7.0 (note 3)
C3		Areas without obstacles for moving people, e.g. areas in museums, exhibition rooms etc. and access areas in public administration buildings, hotels, hospitals, railway station forecourts	3.0 - 5.0	4.0 - 7.0
C4		Areas with possible physical activities, e.g. dance halls, gymnastic rooms, stages	4.5 - 5.0	3.5 - 7.0
C5		Areas susceptible to large crowds, e.g. in buildings for public events like concert halls, sports halls including stands, terraces and access areas and railway platforms	5.0 - 7.5	3.5 - 4.5
D1	Shopping areas	Areas in general retail shops	4.0 - 5.0	3.5 - 7.0 (note 3)
D2		Areas in department stores	4.0 - 5.0	3.5 - 7.0

Note 1: Depending on their anticipated uses, areas likely to be categorised as C2, C3, C4 may be categorised as C5 by decision of the client and/or National annex.

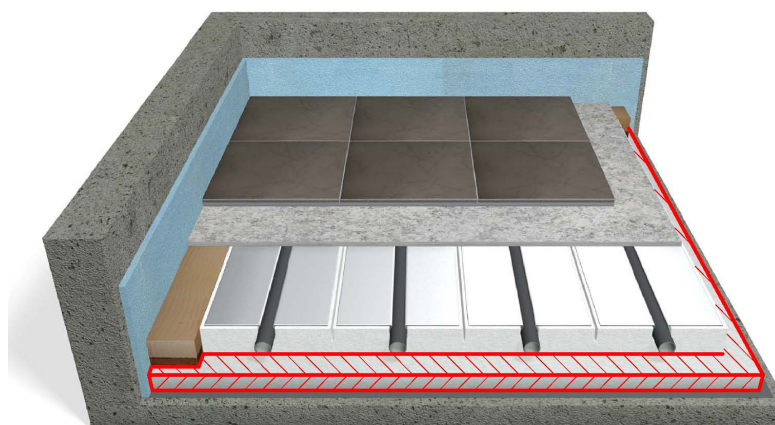
Note 2: The National annex may provide sub categories to A, B, C1 to C5, D1 and D2.

Note 3: Recommended values are highlighted. For categories C2 and D1 the recommended value is 4.0.

Insulation values

Thickness	EPS WLG 035		Wood Fibre			
	R-value incl. SpeedUp panel	U-value incl. SpeedUp panel	R-value incl. SpeedUp Eco panel	U-value incl. SpeedUp Eco panel	R-value incl. SpeedUp panel	U-value incl. SpeedUp panel
	m ² K/W	W/m ² K	m ² k/W	W/m ² K	m ² K/W	W/m ² K
10 mm	1.14	0.76	0.95	0.89	1.06	0.81
20 mm	1.43	0.63	1.15	0.76	1.26	0.70
30 mm	1.71	0.53	1.35	0.66	1.46	0.61
40 mm	2.00	0.46	1.55	0.58	1.66	0.55
50 mm	2.28	0.41				
60 mm	2.57	0.36				
70 mm	2.86	0.33				
80 mm	3.14	0.30				
90 mm	3.43	0.28				

Please note that the thickness of the additional insulation is based on the insulation being placed between the loadbearing substrate and the SpeedUp panels, see tables on page 11 for load bearing capabilities of the insulation.



Min. thermal resistance of insulating layers (m²K)/W below the floor heating/cooling system

	Heated room below	Unheated or intermittent heated room below or directly on the ground *)	External air temperature below		
			External design temperature ϑd ≥ 0°C	External design temperature 0°C > ϑd ≥ -5°C	External design temperature -5°C > ϑd ≥ -15°C
Thermal resistance (m ² K)/W	0.75	1.25	1.25	1.50	2.00

*) with ground water level ≤ 5 m below the supporting base, the value should be increased.

When installing the insulating layer, the insulating panels shall be butted tightly together. Multiple insulating layers shall be staggered or placed in such a way that the joints between panels of one layer are out of line with the next layer.

Sound impact

Sound impact improvement without raising the floor level can be realised with the SpeedUp Eco™ heating system (sound insulation up to 28 dB). Other measures, such as a suspended ceiling in the room below, or the use of approved sound insulating material, such as Silentboard, wood fibre insulation or mineral wool, can also bring improvement. The 15 mm Silentboard is a particularly good sound insulation for suspended floors. Soft

sound insulation panels are not permitted under dry screed panels. Calculations are always made of the whole floor. Sound insulation approval for a one family home is not required but the general regulations in accordance with EN ISO 140-8 and DIN 4109 'Sound Insulation in the Building Industry' do apply. The following tables show the impact sound behaviour of constructions using SpeedUp™.

Sound impact in different constructions - Table 1

Floor construction	Height	Sound impact level, unfinished floor L'n,w,p	Sound impact improvement	Measured impact sound level, floor L'n,w,p	R-value of insulation (top of unfinished floor)	Weight
	[mm]	[dB]	[dB]	[dB]	[m²K/W]	[kg/m²]
Unfinished floor: Reinforced concrete						
Finished floor 20 mm Fermacell screed panel, 30 mm SpeedUp heat panel, floor (120 mm), suspended ceiling below *	50	83	14	69	0.86	27
		70	14	56		
Finished floor 25 mm Fermacell screed panel, 30 mm SpeedUp heat panel, floor (120 mm)	55	83	14	69	0.86	33
Finished floor 25 mm Fermacell screed panel, 30 mm SpeedUp heat panel, 20 mm mineral wool SPT/G 22/20**, floor (120 mm), suspended ceiling below*	75	70	29	41	1,3	30
Finished floor 20 mm Fermacell screed panel, 30 mm SpeedUp Eco heat panel, floor (160 mm)	50	79	28	51	0.75	34
Finished floor 45 mm cement screed (CT F4), 30 mm SpeedUp heat panel, 6 mm Danfoss impact sound insulation, floor (120 mm)	81	78	27	51	0.87	93
15 mm easy assembly engineered flooring, 2 mm impact sound insulation (cork), 30 mm SpeedUp heat panel, 30 mm Fermacell (with wood fibre insulation), 20 mm additional insulation EPS DEO 200 kPa, floor (200 mm)	97	76	28	48	1.69	40
15 mm easy assembly engineered flooring, 2 mm impact sound insulation (cork), 30 mm SpeedUp Eco heat panel, 30 mm Fermacell (with wood fibre insulation), 20 mm additional insulation EPS DEO 200 kPa, floor (200 mm)	97	72	26	46	1.58	45
15 mm easy assembly engineered flooring, 2 mm impact sound insulation (cork), 30 mm SpeedUp Eco heat panel, 15 mm Silentboard, 20 mm additional insulation EPS DEO 200 kPa, floor (200 mm)	82	71	21	50	1.4	38
17 mm tiles and adhesive, 5 mm Strongboard, 30 mm SpeedUp heat panel, 30 mm Fermacell (with wood fibre insulation), 20 mm additional insulation XPS 200 kPa, floor (200 mm)	102	75	32	43	1.69	71

* Suspended ceiling : 350 mm suspended metal-UK with 50 mm mineral fibre , 2 x 10 mm Fermacell.

** Note: When laying the mineral wool do not walk on it since it will destroy the sound absorbing nature of the material.

Sound impact in different constructions - Table 2

Floor construction:	Height	Sound impact level, unfinished floor L'n,w,p	Sound impact improvement	Measured impact sound level, floor L'n,w,p	R-value of insulation (top of unfinished floor)	Weight
Unfinished floor: Suspended timber floor	[mm]	[dB]	[dB]	[dB]	[m²K/W]	[kg/m²]
Finished floor 20 mm Fermacell screed panel, 30 mm SpeedUp Eco heat panel, 28 mm plywood, 80/ 200 mm suspended floor	78	80	15	65	0.75	34
Finished floor 20 mm Fermacell screed panel, 30 mm SpeedUp heat panel, 10 mm Fermacell, 20 mm mineral wool SPT/G 22/20**, 28 mm chipboard, 100 / 200 mm suspended floor with 60 mm mineral fibre, 30/ 50 mm battens, 10 mm Fermacell	108	72	11	61	1.34	47
Finished floor 20 mm Fermacell screed panel, 30 mm SpeedUp heat panel, 28 mm chipboard, 100 / 200 mm suspended floor with 60 mm mineral fibre, 30/ 50 mm battens, suspended 10 mm Fermacell	78	72	9	63	0.86	27
Finished floor 25 mm Fermacell screed panel, 30 mm SpeedUp heat panel, 10 mm Fermacell, 20 mm floor rock GP (mineral fibre)**, 30 mm honeycomb/gravel filling, tongue and groove joints, suspended floor with 100 mm mineral fibre, 50 mm resilient bar, 10 mm Fermacell	115	65	20	45	1.51	98
Finished floor 25 mm Fermacell screed panel, 30 mm SpeedUp heat panel, 10 mm Fermacell, 20 mm floor rock GP (mineral fibre)**, 30 mm honeycomb/gravel filling, tongue and groove joints, suspended floor	115	94	37	57	1.4	98
Finished floor 25 mm Fermacell screed panel, 30 mm SpeedUp heat panel, 10 mm Fermacell, 20 mm floor rock GP (mineral fibre)**, tongue and Groove joints, suspended floor	85	94	23	71	1.37	52.5

** Note : When laying the mineral wool do not walk on it since it will destroy the sound absorbing nature of the material.

SpeedUp™ perimeter insulation

The SpeedUp™ perimeter insulation consists of 8 mm PE-Foam and is 100 mm high. The double-sided adhesive strip allows it to be easily attached to the wall.
The SpeedUp Eco™ perimeter insulation consists of waxed corrugated cardboard and is 140 mm high.

Both types of perimeter insulation conform to EN 1264. They can be pressed together 5 mm and prevent thermal and sound bridges.

Tanking for wet screed

When installing wet screed the heat panels have to be covered with system foil. Instead of SpeedUp™ perimeter insulation the Basic perimeter insulation will have to be installed.

Using the self-adhesive strip, fix down the flap attached to the perimeter insulation to the system foil. This now forms the tank for the screed. For liquid screed overlap system foil and tape up.

Sound impact insulation and wet screed

The constituent material of the heat panels is just for thermal insulation (EPS 035 DEO 240 kPa). If additional sound insulation is required, the 6 mm Danfoss sound impact insulation would achieve an improvement of up to 27 dB.

This insulation should only be used in combination with wet screed.

Active load and height of screed

Both in the Basic and in the SpeedUp™ heating systems the thickness of the screed depends on

the use and load bearing requirements of the floor.

Nominal thickness in mm for load capacity, SpeedUp™ heating systems

	< 2 kN/m ²	< 3 kN/m ²	4 kN/m ²	5 kN/m ²
		Point load up to 2 kN/m ²	Point load up to 3 kN/m ²	Point load up to 4 kN/m ²
CT F4 with "Screed Additive Normal"	45	65*	70*	75*
CAF F4	40	50*	60*	65*
CT F5 with "Screed Additive Special"	40*	55*	60*	65*
CAF F5	30**	45*	50*	55*

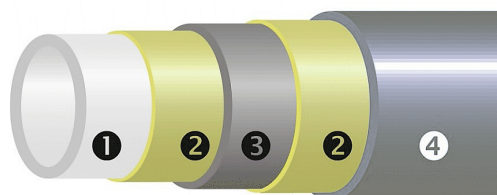
* For insulation < 40 mm the screed depth can be reduced by 5 mm.

** For stone and ceramic finishes the nominal thickness of the screed is 40 mm, in accordance with EN 13813.

However, many manufacturers offer screed that fulfils these requirements with a minimum thickness of 35 mm.

Danfoss composite pipes

The grey Danfoss composite pipe is 100 % impervious to air, temperature resistant, and highly flexible. It consists of an aluminium pipe which is covered inside and out with a Polyethylene layer. All layers are permanently bonded with each other through a layer of adhesive. Unlinked Polyethylene with its Raised Temperature Resistance (PE-RT) is used, in accordance with EN ISO 22391. The octen side chains of the molecular structure of the PE-RT (Polyethylene Raised Temperature resistance) give it a similar effect to that of the linked PE. A minimum performance over a time of 50 years has to be proved for the Danfoss composite pipes.

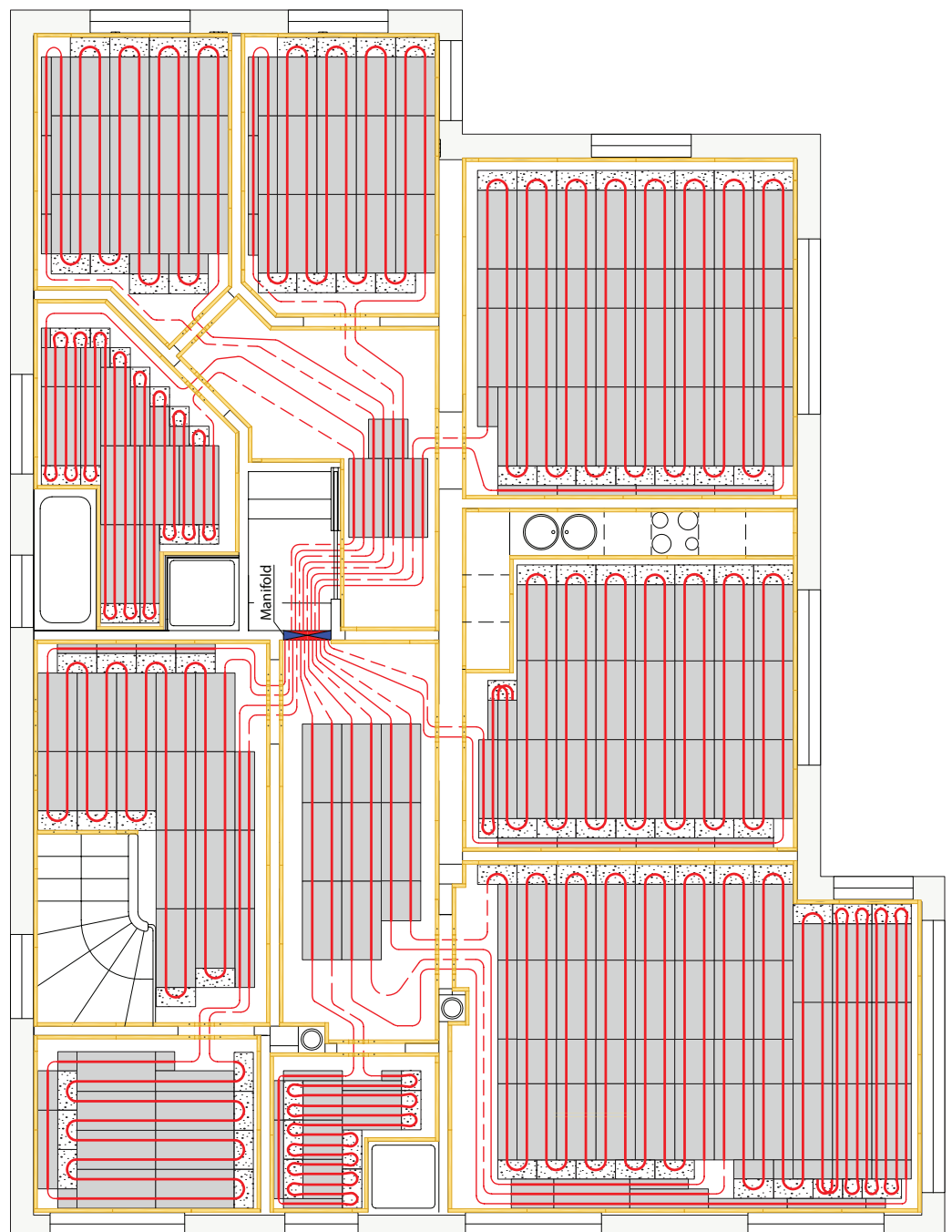


1. Water carrying inner pipe of Polyethylene (PE-RT)
2. Bonding adhesive
3. Aluminium pipe
4. Protective outer Polyethylene pipe (PE-RT)

Danfoss lay-out pattern

As with the BasicRail heating system the pipes are laid in meander form. Edge zones EZ and comfort zones CZ are combined. The supply and return pipes take the heating water to the edge zone and are installed with a distance of up to 1 m. Via a header panel cross over zone CO, the change to the wider pipe distances is achieved and the cooler water is taken to the comfort zone.

It should be noted that dry screed panels must only be installed under maximum 50° C supply temperatures. It is important not to exceed the maximum surface temperature as recommended by the manufacturer of the floor finish.



Determine number of SpeedUp™ system parts
Edge and comfort zone (mixed)

System part	Quantity / m ²
Heat panel edge zone EZ	0,30
Heat panel comfort zone CZ	1,26
Header panel EZ (1/5), CZ (4/5)	0,24
Blank panel BP	0,15
Supply and return panel EZ	0,05
Header panel cross-over CO = Number of heating circuits (minus number of header panel EZ)	
Composite pipe	5,00
Perimeter insulation	1,00
Support batten	1,20
Threshold support batten	2 per threshold and heating circuit

Comfort zone (pipe distance 25 cm)

System part	Quantity / m ²
Heat panel edge zone EZ	-
Heat panel comfort zone CZ	1,46
Header panel CZ	0,24
Blank panel BP	0,25
Supply and return panel CZ	0,05
Composite pipe	4,00
Perimeter insulation	1,00
Support batten	1,20
Threshold support batten	2 per threshold and heating circuit

Edge zone (pipe distance 12,5 cm)

System part	Quantity / m ²
Heat panel edge zone EZ	1,46
Heat panel comfort zone CZ	-
Header panel EZ	0,24
Blank panel BP	0,25
Supply and return panel EZ	0,05
Composite pipe	8,00
Perimeter insulation	1,00
Support batten	1,20
Threshold support batten	2 per threshold and heating circuit

**Example:
Calculation
of SpeedUp™**

Calculation for 100 m² underfloor heating with comfort zone - and edge zone (Mix):

EZ 100 m² x 0.3 panels/m² = 30 panels

CZ 100 m² x 1.26 panels/m² = 126 panels

H/EZ / H/CZ 100 m² x 0.24 panels/m² = 24 panels

Unit /EZ: 5 panels

Unit /CZ: 19 panels

BP 100 m² x 0.2 panels/m² = 20 panels

6 combined heating circuits (with EZ und CZ):

6 individual pieces CO -> They are deducted from the unit H/EZ

(With the SpeedUp Header Panels one panel consists of four individual pieces)

6 individual pieces correspond to 1 unit K/CO: 1.5 panels

New unit H/EZ: 3.5 panels

Important!

All calculations are based on average experience per m² and also included unheated areas

e.g. in front of the manifold. All values are based on calculation without waste.

Determine number of SpeedUp Eco™ system parts
Edge and comfort zone (mixed)

System part	Quantity / m ²
Heat panel edge zone EZ, C-C = 125 mm	0,30
Heat panel comfort zone CZ, C-C = 250 mm	1,26
Header panel EZ (1/5), CZ (4/5)	0,96
Blank panel BP	0,15
Supply and return panel EZ	0,20
Header panel cross-over CO = Number of heating circuits (minus number of header panel EZ)	
90° curve panel	0,40
Composite pipe	5,00
Perimeter insulation	1,00
Support batten	1,20
Threshold support batten	2 per threshold and heating circuit

Comfort zone (pipe distance 250 mm)

System part	Quantity / m ²
Heat panel edge zone EZ, C-C = 125 mm	-
Heat panel comfort zone CZ, C-C = 250 mm	1,46
Header panel EZ (1/5), CZ (4/5)	0,96
Blank panel BP	0,25
Supply and return panel CZ	0,20
90° curve panel	0,20
Composite pipe	4,00
Perimeter insulation	1,00
Support batten	1,20
Threshold support batten	2 per threshold and heating circuit

Edge zone (pipe distance 125 mm)

System part	Quantity / m ²
Heat panel edge zone EZ, C-C = 125 mm	1,46
Heat panel comfort zone CZ, C-C = 250 mm	-
Header panel EZ (1/5), CZ (4/5)	0,96
Blank panel BP	0,25
Supply and return panel EZ	0,20
90° curve panel	0,10
Composite pipe	8,00
Perimeter insulation	1,00
Support batten	1,20
Threshold support batten	2 per threshold and heating circuit

**Example:
Calculation of
SpeedUp Eco™**

Calculation for 100 m² underfloor heating with comfort- and edge zone:

EZ: 100 m² x 0.3 piece/m² = 30 panels

CZ 100 m² x 1.26 piece/m² = 126 panels

H/EZ / H/CZ 100 m² x 0.96 piece/m² = 96 individual pieces:

Unit H/EZ: 20 individual pieces

Unit H/CZ: 76 individual pieces

BP 100 m² x 0.15 panels/m² = 15 panels

100 m² x 0.2 piece = 20 pieces

100 m² x 0.2 piece = 20 pieces

6 combined heating circuits (with EZ and CZ):

6 individual pieces CO -> They are deducted from the unit H/EZ H/EZ

New unit H/EZ: 14 individual pieces

Important!

All calculations are based on average experience per m² and also included unheated areas

e.g. in front of the manifold. All values are based on calculation without waste.

Installation

Prerequisite for installation is an even and load bearing substrate.
 Before installation the SpeedUp™ heating systems checklist should be consulted.
 The following illustrations show the chronological sequence of how to achieve an even substrate up

to installing the load bearing panels. Depending on the unevenness of the floor and the existing built-up height different variations are possible (see table; Levelling of substrate).

Check-list for installation of SpeedUp™ heating system

A. Interior finish

- A1 The building is plastered and boarded, all breaking work for recesses, e.g. manifold, have been done, open floors have been closed.
- A2 The building has been sealed against moisture and water in accordance with standards in effect at the time.
- A3 Supply and return from heat source to manifold has been installed, manifold is correctly positioned.
- A4 Fence off open areas and overhangs for stairs to retain screed.
- A5 Clearly mark position of stair base on the sub-floor.
- A6 Position for shower trays and baths without side panels are fixed with timber batten to the lower edge of SpeedUp and screwed down.
- A7 Measuring base points on all floors.
- A8 Changes in flooring have been agreed by installer and been included in the floor plan.
- A9 The floor has been fully prepared: the substrate is dry and able to support a load and is ready for installation of the heating system. For solid floors with a possibility of residual moisture a moisture barrier should be laid.
- A10 The load bearing substrate should be prepared within the tolerance (maximum height difference of 3 mm per 1 m) as follows:
 - Even, rough concrete floor/ suspended floor.
 - Screed on insulation.
 - Composite screed.
 - Dry screed with approved substructure.
 - Danfoss dry levelling compound up to 50 mm with 10 mm gypsum fibre board or equivalent, covered (pipe channels - in the additional insulation - with a width of more than 10 cm must be covered with a metal plate (min. 1 mm). If the pipe channels have a width of more than 15 cm a special load bearing plate (min. 18 mm) must be used.
 - Connected levelling insulation as load bearing base, approved for dry installations and smoothed (minimum strength: 0.5 N / mm²).

- A11 Approved additional insulation (maximum height and suitable insulation material see construction leaflets).
 - Installed on site.
 - Is delivered and installed.
- A12 The installation of load bearing panels: Strongboard for tiles or carpet, engineered timber floor, laminates: All dry and decorating work is completed. There is no more installation work requiring heavy equipment.

B. Building Site Conditions

- B1 Water and electricity are connected.
- B2 Storage facilities are assured.
- B3 On -site disposal of building waste, e.g. packing material, bricks, etc., is assured.
- B4 During the installation no other work should be done in the room and all areas should be cleared and freely accessible.
- B5 After installation, the heating surface should not be walked upon until the finished floor/load bearing panels are laid.

C. Technical Information

- C1 The electrical supply 230 V / 50 Hz is installed in manifold cabinet.
- C2 Room thermostats:
 - Wireless control.
 - Hard wired control: cabelling (5 core x 1,5 mm²) between room thermostat and manifold are installed.
 - Isolating switch for turning off the underfloor heating is installed.

Strongboard for tiles, check-list before and during installation
A. Substrate

- A1 Perimeter insulation is installed all round and visible at least 5 cm.
- A2 Support batten installed all round and fixed down in door threshold.
- A3 SpeedUp heat panels are optically well installed, lie firmly and without give on the substrate.
- A4 Header and fitted blank panels (e.g. in thresholds) as well as available and approved additional insulation are fixed to the substrate.
- A5 The Danfoss pipe layout is installed free of sharp corners and fixed down. Raised pipe curves are adjusted and lie flush.
- A6 The existing floor construction is conform with Danfoss and the heat panels are installed in accordance with tolerance levels for evenness (maximum 3 mm per 1 m).
- A7 Movement gap strips (maximum size of area 60 m²; ratio to sides < 1:2) have been agreed by installer and underpinned with support battens.

Note: Until the finished floor is laid, it is advisable that only qualified personnel walk on the heat panels.

B. Building Site Conditions

- B1 It is advisable to lay load bearing plates (e.g. 15 mm OSB or 50 mm XPS) in order to avoid damage from pedestrian traffic.

- B2 It is important to store material safely and outside the area to be installed. Strongboard should be stored flat and not leant against a wall (risk of deformation).
- B3 During the installation no other work should be done in the room and all areas should be cleared and freely accessible.

C. Notes

It is important continually to inspect the Strongboard installation. If a Strongboard seems to give, it is an indication of unevenness of the base which needs to be checked: Determine the give by placing a straight edge on the installed board, put on load and measure the drop with a measuring wedge.

- C1 Advice for maximum unevenness up to 3 mm (on 1 m):
Strongboard slightly warped and pipe curves are slightly proud, install tile lightly:
 - if the tile only lightly pushes down the Strongboard no action is necessary
 - if the tile is too light, apply action C2.
- C2 For unevenness of below 5 mm:
The installer will decide. However, in this case the Strongboard will have to be fully fixed down with MAPEI ECO-FIX onto the SpeedUp.

Installation time
Installation time for SpeedUp™ heating systems*

Article/ Unit	Min. per unit	Unit
Manifold without cabinet	55.00	piece
Manifold with cabinet	75.00	piece
Additional insulation without perimeter insulation - per layer	2.50	m ²
C-C = 125/250 mm installation - SpeedUp™	10.00	m ²
C-C = 125 mm installation - SpeedUp™	12.00	m ²
C-C = 250 mm installation - SpeedUp™	8.00	m ²
C-C = 125/250 mm installation - SpeedUp Eco™	14.00	m ²
C-C = 125 mm installation - SpeedUp Eco™	16.00	m ²
C-C = 250 mm installation - SpeedUp Eco™	12.00	m ²
Strongboard for tiles	10.00	m ²
Strongboard for carpet	15.00	m ²

* Date 06/2004 - Values based on many years of practical experience.

**Output table,
Danfoss SpeedUp™
heating system**

Differential temperature (δ K) 5.
Heat output based on EN 1264.

Strongboard

Mean central heating water temperature	Room temperature	EZ 12.5 cm tiles on Strongboard 5 mm	Surface temperature	CZ 25 cm tiles on Strongboard 5 mm	Surface temperature	EZ 12.5 cm carpet on Strongboard 10 mm	Surface temperature	CZ 25 cm carpet on Strongboard 10 mm	Surface temperature
θ_m	θ_l		θ_F		θ_F		θ_F		θ_F
°C	°C	W/m ²	°C	W/m ²	°C	W/m ²	°C	W/m ²	°C
30	15	100.6	24.0	75.5	22.0	56.2	20.3	44.4	19.3
30	18	80.1	25.4	60.1	23.7	44.7	22.3	35.4	21.5
30	20	66.3	26.2	49.7	24.8	37.0	23.6	29.3	22.9
30	22	52.4	27.0	39.3	25.8	29.2	24.9	23.1	24.4
30	24	38.2	27.7	28.6	26.9	21.3	26.2	16.8	25.8
35	15	134.7	26.8	101.1	24.1	75.2	21.9	59.5	20.6
35	18	114.3	28.2	85.7	25.8	63.8	24.0	50.5	22.8
35	20	100.6	29.0	75.5	27.0	56.2	25.3	44.4	24.3
35	22	86.9	29.9	65.2	28.1	48.5	26.7	38.4	25.8
35	24	73.2	30.8	54.9	29.2	40.9	28.0	32.3	27.2
40	15	168.7	29.5	126.6	26.1	94.2	23.5	74.5	21.9
40	18	148.3	30.9	111.3	27.9	82.8	25.6	65.5	24.1
40	20	134.7	31.8	101.1	29.1	75.2	26.9	59.5	25.6
40	22	121.1	32.7	90.9	30.2	67.6	28.3	53.5	27.1
40	24	107.5	33.6	80.6	31.4	60.0	29.7	47.4	28.6
45	15	202.7	32.1	152.1	28.2	113.1	25.1	89.5	23.1
45	18	182.3	33.5	136.8	30.0	101.8	27.1	80.5	25.4
45	20	168.7	34.5	126.6	31.1	94.2	28.5	74.5	26.9
45	22	155.1	35.4	116.4	32.3	86.6	29.9	68.5	28.4
45	24	141.5	36.3	106.2	33.5	79.0	31.3	62.5	29.9
50	15	236.6	34.7	177.5	30.2	132.1	26.6	104.5	24.4
50	18	216.2	36.1	162.2	32.0	120.7	28.7	95.5	26.6
50	20	202.7	37.1	152.1	33.2	113.1	30.1	89.5	28.1
50	22	189.1	38.1	141.9	34.4	105.6	31.5	83.5	29.6
50	24	175.5	39.0	131.7	35.6	98.0	32.8	77.5	31.1
55	15	270.5	37.2	202.9	32.1	151.0	28.1	119.4	25.6
55	18	250.2	38.7	187.7	33.9	139.6	30.2	110.5	27.8
55	20	236.6	39.7	177.5	35.2	132.1	31.6	104.5	29.4
55	22	223.0	40.7	167.3	36.4	124.5	33.0	98.5	30.9
55	24	209.5	41.6	157.1	37.6	116.9	34.4	92.5	32.4

Maximum floor surface temperature in accordance with EN 1264:

- Edge Zone 1.00 m 35° C
- Comfort Zone. 29° C
- Bathrooms. 33° C

**Output table,
Danfoss SpeedUp™
heating system**

Differential temperature (δ K) 5.
Cork panels 2 mm for sound insulation included
in output figures.

Heat output based on EN 1264.

Engineered timber & laminate

Mean central heating water temperature	Room temperature	EZ 12.5 cm timber 14 mm	Surface temperature	CZ 25 cm timber 14 mm	Surface temperature	EZ 12.5 cm laminate with Strongboard 8 mm	Surface temperature	CZ 25 cm laminate with Strongboard 8 mm	Surface temperature
θ_m	θ_i		θ_F		θ_F		θ_F		θ_F
°C	°C	W/m ²	°C	W/m ²	°C	W/m ²	°C	W/m ²	°C
30	15	50.5	19.8	40.3	18.9	63.5	21.0	49.9	19.8
30	18	40.2	21.9	32.0	21.2	50.5	22.8	39.7	21.9
30	20	33.3	23.3	26.5	22.7	41.8	24.1	32.9	23.3
30	22	26.3	24.7	21.0	24.2	33.0	25.3	26.0	24.6
30	24	19.2	26.0	15.3	25.6	24.1	26.5	18.9	26.0
35	15	67.6	21.3	53.9	20.1	85.0	22.8	66.8	21.2
35	18	57.4	23.4	45.7	22.4	72.1	24.7	56.7	23.4
35	20	50.5	24.8	40.3	23.9	63.5	26.0	49.9	24.8
35	22	43.6	26.2	34.8	25.4	54.8	27.2	43.1	26.2
35	24	36.7	27.6	29.3	26.9	46.1	28.5	36.3	27.6
40	15	84.7	22.7	67.5	21.3	106.4	24.5	83.7	22.7
40	18	74.5	24.9	59.4	23.6	93.5	26.5	73.6	24.8
40	20	67.6	26.3	53.9	25.1	85.0	27.8	66.8	26.2
40	22	60.8	27.7	48.5	26.7	76.4	29.0	60.1	27.7
40	24	54.0	29.1	43.0	28.2	67.8	30.3	53.3	29.1
45	15	101.8	24.1	81.1	22.4	127.8	26.2	100.6	24.0
45	18	91.5	26.3	73.0	24.8	115.0	28.2	90.5	26.2
45	20	84.7	27.7	67.5	26.3	106.4	29.5	83.7	27.7
45	22	77.9	29.2	62.1	27.8	97.8	30.8	77.0	29.1
45	24	71.1	30.6	56.6	29.4	89.2	32.1	70.2	30.5
50	15	118.8	25.5	94.7	23.6	149.2	27.9	117.4	25.4
50	18	108.6	27.7	86.5	25.9	136.4	29.9	107.3	27.6
50	20	101.8	29.1	81.1	27.4	127.8	31.2	100.6	29.0
50	22	94.9	30.6	75.7	29.0	119.2	32.6	93.8	30.5
50	24	88.1	32.0	70.2	30.5	110.7	33.9	87.1	31.9
55	15	135.8	26.9	108.3	24.7	170.6	29.6	134.2	26.8
55	18	125.6	29.1	100.1	27.0	157.7	31.6	124.1	29.0
55	20	118.8	30.5	94.7	28.6	149.2	32.9	117.4	30.4
55	22	112.0	32.0	89.3	30.1	140.6	34.3	110.7	31.9
55	24	105.2	33.4	83.8	31.7	132.1	35.6	103.9	33.3

Maximum floor surface temperature in accordance with EN 1264:

- Edge Zone 1.00 m 35° C
- Comfort Zone. 29° C
- Bathrooms. 33° C

**Output table,
Danfoss SpeedUp™
heating system**

Thermal resistance of finished floor surface:
R_{λ,B} m² K/W 0,00 (e.g. tiles)

Differential temperature (Δ K) 5.
Heat output based on EN 1264.

Fermacell

Mean central heating water temperature	Room temperature	EZ 12.5 cm Fermacell 20 mm	Surface temperature	CZ 25 cm Fermacell 20 mm	Surface temperature	EZ 1.5 cm Fermacell 25 mm	Surface temperature	CZ 25 cm Fermacell 25 mm	Surface temperature
θ _W	θ _i		θ _F		θ _F		θ _F		θ _F
°C	°C	W/m ²	°C	W/m ²	°C	W/m ²	°C	W/m ²	°C
30	15	74.6	21.9	57.7	20.5	67.5	21.3	52.6	20.0
30	18	59.4	23.6	45.9	22.4	53.7	23.1	41.9	22.1
30	20	49.1	24.7	38.0	23.7	44.4	24.3	34.6	23.4
30	22	38.8	25.8	30.0	25.0	35.1	25.5	27.4	24.8
30	24	28.3	26.9	21.9	26.3	25.6	26.6	19.9	26.1
35	15	99.9	24.0	77.2	22.1	90.3	23.2	70.4	21.5
35	18	84.7	25.7	65.5	24.1	76.6	25.1	59.7	23.6
35	20	74.6	26.9	57.7	25.5	67.5	26.3	52.6	25.0
35	22	64.4	28.0	49.8	26.8	58.3	27.5	45.4	26.4
35	24	54.3	29.2	41.9	28.1	49.1	28.7	38.3	27.8
40	15	125.1	26.0	96.7	23.7	113.1	25.1	88.2	23.0
40	18	110.0	27.8	85.0	25.8	99.4	27.0	77.5	25.1
40	20	99.9	29.0	77.2	27.1	90.3	28.2	70.4	26.5
40	22	89.8	30.2	69.4	28.5	81.2	29.4	63.3	27.9
40	24	79.7	31.3	61.6	29.8	72.0	30.7	56.2	29.3
45	15	150.3	28.0	116.1	25.3	135.9	26.9	106.0	24.5
45	18	135.2	29.8	104.5	27.4	122.2	28.8	95.3	26.6
45	20	125.1	31.0	96.7	28.7	113.1	30.1	88.2	28.0
45	22	115.0	32.2	88.9	30.1	104.0	31.3	81.1	29.4
45	24	104.9	33.4	81.1	31.4	94.9	32.6	74.0	30.8
50	15	175.4	30.0	135.6	26.9	158.6	28.7	123.7	25.9
50	18	160.3	31.8	123.9	28.9	145.0	30.6	113.0	28.1
50	20	150.3	33.0	116.1	30.3	135.9	31.9	106.0	29.5
50	22	140.2	34.2	108.4	31.7	126.8	33.2	98.9	30.9
50	24	130.1	35.4	100.6	33.0	117.7	34.4	91.8	32.3
55	15	200.5	31.9	155.0	28.4	181.4	30.5	141.4	27.3
55	18	185.5	33.8	143.3	30.5	167.7	32.4	130.8	29.5
55	20	175.4	35.0	135.6	31.9	158.6	33.7	123.7	30.9
55	22	165.3	36.2	127.8	33.2	149.5	35.0	116.6	32.3
55	24	155.3	37.4	120.0	34.6	140.4	36.3	109.5	33.8

Maximum floor surface temperature in accordance with EN 1264:

- Edge Zone 1.00 m 35° C
- Comfort Zone. 29° C
- Bathrooms. 33° C

**Output table,
Danfoss SpeedUp™
heating system**

Thermal resistance of finished floor surface:
R_{λ,B} m² K/W 0,05 (e.g. tiles).

Differential temperature (Δ K) 5.
Heat output based on EN 1264.

Fermacell

Mean central heating water temperature	Room temperature	EZ 12.5 cm Fermacell 20 mm	Surface temperature	CZ 25 cm Fermacell 20 mm	Surface temperature	EZ 12.5 cm Fermacell 25 mm	Surface temperature	CZ 25 cm Fermacell 25 mm	Surface temperature
θ _m	θ _i		θ _F		θ _F		θ _F		θ _F
°C	°C	W/m ²	°C	W/m ²	°C	W/m ²	°C	W/m ²	°C
30	15	57.7	20.5	46.5	19.5	53.2	20.1	43.1	19.2
30	18	45.9	22.4	37.0	21.6	42.3	22.1	34.3	21.4
30	20	38.0	23.7	30.6	23.1	35.0	23.5	28.4	22.9
30	22	30.0	25.0	24.2	24.5	27.7	24.8	22.4	24.3
30	24	21.9	26.3	17.6	25.9	20.2	26.1	16.3	25.7
35	15	77.2	22.1	62.3	20.8	71.2	21.6	57.7	20.5
35	18	65.5	24.1	52.8	23.0	60.4	23.7	48.9	22.7
35	20	57.7	25.5	46.5	24.5	53.2	25.1	43.1	24.2
35	22	49.8	26.8	40.2	25.9	46.0	26.4	37.2	25.7
35	24	41.9	28.1	33.8	27.4	38.7	27.8	31.3	27.1
40	15	96.7	23.7	78.0	22.2	89.2	23.1	72.3	21.7
40	18	85.0	25.8	68.6	24.4	78.4	25.2	63.5	24.0
40	20	77.2	27.1	62.3	25.8	71.2	26.6	57.7	25.5
40	22	69.4	28.5	56.0	27.3	64.0	28.0	51.9	27.0
40	24	61.6	29.8	49.7	28.8	56.8	29.4	46.0	28.4
45	15	116.1	25.3	93.7	23.5	107.2	24.6	86.8	22.9
45	18	104.5	27.4	84.3	25.7	96.4	26.7	78.1	25.2
45	20	96.7	28.7	78.0	27.2	89.2	28.1	72.3	26.7
45	22	88.9	30.1	71.7	28.6	82.0	29.5	66.4	28.2
45	24	81.1	31.4	65.4	30.1	74.8	30.9	60.6	29.7
50	15	135.6	26.9	109.4	24.8	125.1	26.0	101.3	24.1
50	18	123.9	28.9	100.0	27.0	114.3	28.2	92.6	26.4
50	20	116.1	30.3	93.7	28.5	107.2	29.6	86.8	27.9
50	22	108.4	31.7	87.4	30.0	100.0	31.0	81.0	29.4
50	24	100.6	33.0	81.1	31.4	92.8	32.4	75.2	30.9
55	15	155.0	28.4	125.0	26.0	143.0	27.5	115.8	25.3
55	18	143.3	30.5	115.6	28.3	132.3	29.6	107.1	27.6
55	20	135.6	31.9	109.4	29.8	125.1	31.0	101.3	29.1
55	22	127.8	33.2	103.1	31.2	117.9	32.5	95.5	30.6
55	24	120.0	34.6	96.8	32.7	110.7	33.9	89.7	32.2

Maximum floor surface temperature in accordance with EN 1264:

- Edge Zone 1.00 m 35° C
- Comfort Zone. 29° C
- Bathrooms. 33° C

**Output table,
Danfoss SpeedUp™
heating system**

Thermal resistance of finished floor surface:
R_{f,B} m² K/W 0.10

Differential temperature (Δ K) 5.
Heat output based on EN 1264.

Fermacell

Mean central heating water temperature	Room temperature	EZ 12.5 cm Fermacell 20 mm	Surface temperature	CZ 25 cm Fermacell 20 mm	Surface temperature	EZ 12.5 cm Fermacell 25 mm	Surface temperature	CZ 25 cm Fermacell 25 mm	Surface temperature
θ _m	θ _i		θ _F		θ _F		θ _F		θ _F
°C	°C	W/m ²	°C	W/m ²	°C	W/m ²	°C	W/m ²	°C
30	15	47.0	19.5	38.9	18.8	44.0	19.3	36.6	18.6
30	18	37.4	21.7	31.0	21.1	35.0	21.5	29.1	20.9
30	20	30.9	23.1	25.6	22.6	29.0	22.9	24.1	22.5
30	22	24.4	24.5	20.3	24.1	22.9	24.4	19.0	24.0
30	24	17.8	25.9	14.8	25.6	16.7	25.8	13.9	25.5
35	15	62.9	20.9	52.1	20.0	58.9	20.6	48.9	19.7
35	18	53.3	23.1	44.2	22.3	50.0	22.8	41.5	22.0
35	20	47.0	24.5	38.9	23.8	44.0	24.3	36.6	23.6
35	22	40.6	26.0	33.6	25.3	38.0	25.7	31.6	25.2
35	24	34.2	27.4	28.3	26.9	32.0	27.2	26.6	26.7
40	15	78.7	22.2	65.3	21.1	73.8	21.8	61.3	20.8
40	18	69.2	24.4	57.4	23.4	64.8	24.1	53.9	23.1
40	20	62.9	25.9	52.1	25.0	58.9	25.6	48.9	24.7
40	22	56.5	27.4	46.9	26.5	52.9	27.0	44.0	26.3
40	24	50.1	28.8	41.6	28.1	47.0	28.5	39.0	27.8
45	15	94.6	23.6	78.4	22.2	88.6	23.1	73.6	21.8
45	18	85.1	25.8	70.5	24.6	79.7	25.3	66.2	24.2
45	20	78.7	27.2	65.3	26.1	73.8	26.8	61.3	25.8
45	22	72.4	28.7	60.0	27.7	67.8	28.3	56.4	27.3
45	24	66.0	30.2	54.8	29.2	61.9	29.8	51.4	28.9
50	15	110.4	24.8	91.5	23.3	103.4	24.3	86.0	22.8
50	18	100.9	27.1	83.7	25.7	94.5	26.5	78.6	25.2
50	20	94.6	28.6	78.4	27.2	88.6	28.1	73.6	26.8
50	22	88.2	30.0	73.2	28.8	82.7	29.6	68.7	28.4
50	24	81.9	31.5	67.9	30.3	76.7	31.1	63.8	30.0
55	15	126.2	26.1	104.7	24.4	118.2	25.5	98.3	23.9
55	18	116.7	28.4	96.8	26.7	109.4	27.8	90.9	26.2
55	20	110.4	29.8	91.5	28.3	103.4	29.3	86.0	27.8
55	22	104.1	31.3	86.3	29.9	97.5	30.8	81.0	29.4
55	24	97.7	32.8	81.0	31.4	91.6	32.3	76.1	31.0

Maximum floor surface temperature in accordance with EN 1264:

- Edge Zone 1.00 m 35° C
- Comfort Zone. 29° C
- Bathrooms. 33° C

**Output table,
Danfoss SpeedUp™
heating system**

Thermal resistance of finished floor surface:
R_{λ,B} m² K/W 0.15

Differential temperature (ΔK) 5.
Heat output based on EN 1264.

Fermacell

Mean central heating water temperature	Room temperature	EZ 12.5 cm Fermacell 20 mm	Surface temperature	CZ 25 cm Fermacell 20 mm	Surface temperature	EZ 12.5 cm Fermacell 25 mm	Surface temperature	CZ 25 cm Fermacell 25 mm	Surface temperature
θ _m	θ _i		θ _F		θ _F		θ _F		θ _F
°C	°C	W/m ²	°C	W/m ²	°C	W/m ²	°C	W/m ²	°C
30	15	39.7	18.9	33.4	18.3	37.6	18.7	31.7	18.2
30	18	31.6	21.2	26.6	20.7	29.9	21.0	25.2	20.6
30	20	26.1	22.7	22.0	22.3	24.8	22.5	20.8	22.2
30	22	20.6	24.1	17.4	23.8	19.6	24.0	16.5	23.7
30	24	15.0	25.6	12.7	25.4	14.3	25.5	12.0	25.3
35	15	53.1	20.1	44.8	19.3	50.3	19.8	42.4	19.1
35	18	45.1	22.4	38.0	21.7	0.0	18.0	35.9	21.5
35	20	39.7	23.9	33.4	23.3	37.6	23.7	31.7	23.2
35	22	34.3	25.4	28.9	24.9	32.5	25.2	27.3	24.8
35	24	28.9	26.9	24.3	26.5	27.3	26.8	23.0	26.4
40	15	66.5	21.2	56.1	20.3	63.0	20.9	53.1	20.1
40	18	58.5	23.5	49.3	22.7	0.0	18.0	46.7	22.5
40	20	53.1	25.1	44.8	24.3	50.3	24.8	42.4	24.1
40	22	47.7	26.6	40.2	25.9	45.2	26.4	38.1	25.7
40	24	42.4	28.1	35.7	27.5	40.1	27.9	33.8	27.4
45	15	79.9	22.3	67.3	21.3	75.7	22.0	63.8	21.0
45	18	71.9	24.7	60.6	23.7	0.0	18.0	57.3	23.4
45	20	66.5	26.2	56.1	25.3	63.0	25.9	53.1	25.1
45	22	61.2	27.8	51.5	26.9	58.0	27.5	48.8	26.7
45	24	55.8	29.3	47.0	28.5	52.9	29.0	44.5	28.3
50	15	93.3	23.4	78.6	22.2	88.4	23.0	74.4	21.9
50	18	85.3	25.8	71.9	24.7	0.0	18.0	68.0	24.3
50	20	79.9	27.3	67.3	26.3	75.7	27.0	63.8	26.0
50	22	74.6	28.9	62.8	27.9	70.7	28.6	59.5	27.6
50	24	69.2	30.4	58.3	29.5	65.6	30.1	55.2	29.2
55	15	106.7	24.5	89.9	23.2	101.1	24.1	85.1	22.8
55	18	98.6	26.9	83.1	25.6	0.0	18.0	78.7	25.2
55	20	93.3	28.4	78.6	27.2	88.4	28.0	74.4	26.9
55	22	87.9	30.0	74.1	28.9	83.3	29.6	70.2	28.5
55	24	82.6	31.6	69.6	30.5	78.3	31.2	65.9	30.2

Maximum floor surface temperature in accordance with EN 1264:

- Edge Zone 1.00 m 35° C
- Comfort Zone. 29° C
- Bathrooms. 33° C

**Output table,
Danfoss SpeedUp™
heating system**

Thermal resistance of finished floor surface:
R_f, m² K/W 0.00 (e.g. tiles)

Differential temperature (Δ K) 5.
Heat output based on EN 1264.

Cement - & liquid screed

Mean central heating water temperature	Room temperature	EZ 12.5 cm cement screed 45 mm	Surface temperature	CZ 25 cm cement screed 45 mm	Surface temperature	EZ 12.5 cm liquid screed 35 mm	Surface temperature	CZ 25 cm liquid screed 35 mm	Surface temperature
θ _m	θ _i		θ _f		θ _f		θ _f		θ _f
°C	°C	W/m ²	°C	W/m ²	°C	W/m ²	°C	W/m ²	°C
30	15	96.6	23.7	74.6	21.9	110.7	24.9	85.1	22.8
30	18	76.9	25.1	59.4	23.6	88.1	26.0	67.8	24.3
30	20	63.6	26.0	49.1	24.7	72.9	26.8	56.1	25.3
30	22	50.3	26.8	38.8	25.8	57.6	27.4	44.3	26.3
30	24	36.6	27.6	28.3	26.9	42.0	28.1	32.3	27.2
35	15	129.3	26.4	99.9	24.0	148.2	27.9	114.0	25.1
35	18	109.7	27.8	84.7	25.7	125.7	29.1	96.7	26.7
35	20	96.6	28.7	74.6	26.9	110.7	29.9	85.1	27.8
35	22	83.4	29.6	64.4	28.0	95.6	30.6	73.6	28.8
35	24	70.3	30.5	54.3	29.2	80.5	31.4	61.9	29.8
40	15	162.0	28.9	125.1	26.0	185.6	30.8	142.8	27.4
40	18	142.4	30.4	110.0	27.8	163.2	32.0	125.5	29.1
40	20	129.3	31.4	99.9	29.0	148.2	32.9	114.0	30.1
40	22	116.2	32.3	89.8	30.2	133.2	33.7	102.5	31.2
40	24	103.1	33.3	79.7	31.3	118.2	34.5	90.9	32.3
45	15	194.5	31.5	150.3	28.0	223.0	33.7	171.5	29.7
45	18	175.0	33.0	135.2	29.8	200.6	34.9	154.3	31.3
45	20	162.0	33.9	125.1	31.0	185.6	35.8	142.8	32.4
45	22	148.9	34.9	115.0	32.2	170.7	36.6	131.3	33.5
45	24	135.9	35.9	104.9	33.4	155.7	37.5	119.8	34.6
50	15	227.1	34.0	175.4	30.0	260.3	36.5	200.2	31.9
50	18	207.6	35.5	160.3	31.8	237.9	37.8	183.0	33.6
50	20	194.5	36.5	150.3	33.0	223.0	38.7	171.5	34.7
50	22	181.5	37.5	140.2	34.2	208.0	39.5	160.0	35.8
50	24	168.5	38.5	130.1	35.4	193.1	40.4	148.5	36.9
55	15	259.7	36.4	200.5	31.9	297.6	39.2	228.9	34.1
55	18	240.1	38.0	185.5	33.8	275.2	40.6	211.7	35.8
55	20	227.1	39.0	175.4	35.0	260.3	41.5	200.2	36.9
55	22	214.1	40.0	165.3	36.2	245.4	42.3	188.7	38.0
55	24	201.1	41.0	155.3	37.4	230.4	43.2	177.2	39.1

Maximum floor surface temperature in accordance with EN 1264:

- Edge Zone 1.00 m 35° C
- Comfort Zone. 29° C
- Bathrooms. 33° C

**Output table,
Danfoss SpeedUp™
heating system**

Thermal resistance of finished floor surface:
R_{λ,B} m² K/W 0,05 (e.g. tiles)

Differential temperature (Δ K) 5.
Heat output based on EN 1264.

Cement- & liquid screed

Mean central heating water temperature	Room temperature	EZ 12.5 cm cement screed 45 mm	Surface temperature	CZ 25 cm cement screed 45 mm	Surface temperature	EZ 12.5 cm liquid screed 35 mm	Surface temperature	CZ 25 cm liquid screed 35 mm	Surface temperature
θ _m	θ _i		θ _F		θ _F		θ _F		θ _F
°C	°C	W/m ²	°C	W/m ²	°C	W/m ²	°C	W/m ²	°C
30	15	69.8	21.5	56.8	20.4	76.8	22.1	62.6	20.9
30	18	55.6	23.3	45.2	22.4	61.1	23.8	49.8	22.8
30	20	46.0	24.4	37.4	23.7	50.6	24.8	41.2	24.0
30	22	36.3	25.6	29.5	25.0	40.0	25.9	32.6	25.2
30	24	26.5	26.7	21.5	26.2	29.1	26.9	23.7	26.4
35	15	93.5	23.5	76.0	22.0	102.9	24.2	83.8	22.7
35	18	79.3	25.3	64.5	24.0	87.3	25.9	71.1	24.6
35	20	69.8	26.5	56.8	25.4	76.8	27.1	62.6	25.9
35	22	60.3	27.7	49.0	26.7	66.4	28.2	54.0	27.1
35	24	50.8	28.9	41.3	28.0	55.9	29.3	45.5	28.4
40	15	117.1	25.4	95.2	23.6	128.8	26.3	104.9	24.4
40	18	103.0	27.2	83.7	25.7	113.2	28.1	92.2	26.4
40	20	93.5	28.5	76.0	27.0	102.9	29.2	83.8	27.7
40	22	84.1	29.7	68.3	28.4	92.5	30.4	75.3	29.0
40	24	74.6	30.9	60.6	29.7	82.0	31.5	66.8	30.2
45	15	140.7	27.3	114.3	25.2	154.7	28.4	126.0	26.1
45	18	126.5	29.1	102.8	27.2	139.2	30.2	113.3	28.1
45	20	117.1	30.4	95.2	28.6	128.8	31.3	104.9	29.4
45	22	107.7	31.6	87.5	30.0	118.4	32.5	96.4	30.7
45	24	98.2	32.9	79.8	31.3	108.1	33.7	88.0	32.0
50	15	164.2	29.1	133.5	26.7	180.6	30.4	147.1	27.8
50	18	150.1	31.0	122.0	28.8	165.1	32.2	134.4	29.8
50	20	140.7	32.3	114.3	30.2	154.7	33.4	126.0	31.1
50	22	131.2	33.5	106.7	31.5	144.4	34.6	117.6	32.4
50	24	121.8	34.8	99.0	32.9	134.0	35.7	109.1	33.7
55	15	187.8	31.0	152.6	28.2	206.5	32.4	168.2	29.4
55	18	173.6	32.9	141.1	30.3	191.0	34.2	155.5	31.4
55	20	164.2	34.1	133.5	31.7	180.6	35.4	147.1	32.8
55	22	154.8	35.4	125.8	33.1	170.3	36.6	138.7	34.1
55	24	145.4	36.6	118.2	34.5	159.9	37.8	130.2	35.4

Maximum floor surface temperature in accordance with EN 1264:

- Edge Zone 1.00 m 35° C
- Comfort Zone. 29° C
- Bathrooms. 33° C

**Output table,
Danfoss SpeedUp™
heating system**

Thermal resistance of finished floor surface:
R_f, m² K/W 0,10

Differential temperature (Δ K) 5.
Heat output based on EN 1264.

Cement- & liquid screed

Mean central heating water temperature	Room temperature	EZ 12.5 cm cement screed 45 mm	Surface temperature	CZ 25 cm cement screed 45 mm	Surface temperature	EZ 12.5 cm liquid screed 35 mm	Surface temperature	CZ 25 cm liquid screed 35 mm	Surface temperature
θ _m	θ _i		θ _f		θ _f		θ _f		θ _f
°C	°C	W/m ²	°C	W/m ²	°C	W/m ²	°C	W/m ²	°C
30	15	54.8	20.2	45.8	19.4	59.0	20.6	49.5	19.7
30	18	43.6	22.2	36.4	21.6	46.9	22.5	39.4	21.9
30	20	36.1	23.6	30.1	23.0	38.9	23.8	32.6	23.2
30	22	28.5	24.9	23.8	24.4	30.7	25.1	25.7	24.6
30	24	20.8	26.2	17.4	25.8	22.4	26.3	18.8	26.0
35	15	73.4	21.8	61.3	20.8	79.0	22.3	66.3	21.2
35	18	62.3	23.8	52.0	23.0	67.0	24.3	56.2	23.3
35	20	54.8	25.2	45.8	24.4	59.0	25.6	49.5	24.7
35	22	47.4	26.6	39.5	25.9	51.0	26.9	42.8	26.2
35	24	39.9	27.9	33.3	27.3	42.9	28.2	36.0	27.6
40	15	91.9	23.3	76.7	22.1	98.9	23.9	83.0	22.6
40	18	80.8	25.4	67.5	24.3	87.0	25.9	72.9	24.8
40	20	73.4	26.8	61.3	25.8	79.0	27.3	66.3	26.2
40	22	66.0	28.2	55.1	27.2	71.0	28.6	59.6	27.6
40	24	58.6	29.5	48.9	28.7	63.0	29.9	52.8	29.0
45	15	110.4	24.8	92.2	23.4	118.8	25.5	99.7	24.0
45	18	99.3	26.9	82.9	25.6	106.9	27.6	89.7	26.1
45	20	91.9	28.3	76.7	27.1	98.9	28.9	83.0	27.6
45	22	84.5	29.7	70.6	28.6	90.9	30.3	76.3	29.0
45	24	77.1	31.1	64.4	30.0	83.0	31.6	69.6	30.5
50	15	128.9	26.3	107.6	24.6	138.7	27.1	116.4	25.3
50	18	117.8	28.4	98.4	26.9	126.8	29.2	106.3	27.5
50	20	110.4	29.8	92.2	28.4	118.8	30.5	99.7	29.0
50	22	103.0	31.2	86.0	29.8	110.9	31.9	93.0	30.4
50	24	95.6	32.6	79.8	31.3	102.9	33.2	86.3	31.9
55	15	147.4	27.8	123.0	25.9	158.6	28.7	133.0	26.7
55	18	136.3	29.9	113.8	28.1	146.7	30.7	123.0	28.9
55	20	128.9	31.3	107.6	29.6	138.7	32.1	116.4	30.3
55	22	121.5	32.7	101.4	31.1	130.8	33.5	109.7	31.8
55	24	114.1	34.1	95.3	32.6	122.8	34.8	103.0	33.2

Maximum floor surface temperature in accordance with EN 1264:

- Edge Zone 1.00 m 35° C
- Comfort Zone. 29° C
- Bathrooms. 33° C

**Output table,
Danfoss SpeedUp™
heating system**

Thermal resistance of finished floor surface:
R_{λ,B} m² K/W 0.15

Differential temperature (Δ K) 5.
Heat output based on EN 1264.

Cement- & liquid screed

Mean central heating water temperature	Room temperature	EZ 12.5 cm cement screed 45 mm	Surface temperature	CZ 25 cm cement screed 45 mm	Surface temperature	EZ 12.5 cm liquid screed 35 mm	Surface temperature	CZ 25 cm liquid screed 35 mm	Surface temperature
θ _m	θ _i		θ _F		θ _F		θ _F		θ _F
°C	°C	W/m ²	°C	W/m ²	°C	W/m ²	°C	W/m ²	°C
30	15	45.2	19.4	38.5	18.8	48.0	19.6	41.0	19.0
30	18	35.9	21.5	30.6	21.1	38.2	21.8	32.6	21.3
30	20	29.8	23.0	25.4	22.6	31.6	23.2	27.0	22.7
30	22	23.5	24.4	20.0	24.1	25.0	24.5	21.3	24.2
30	24	17.1	25.8	14.6	25.6	18.2	25.9	15.6	25.7
35	15	60.5	20.7	51.5	19.9	64.3	21.0	54.9	20.2
35	18	51.3	22.9	43.7	22.2	54.5	23.2	46.6	22.5
35	20	45.2	24.4	38.5	23.8	48.0	24.6	41.0	24.0
35	22	39.0	25.8	33.3	25.3	41.5	26.0	35.4	25.5
35	24	32.9	27.3	28.0	26.8	34.9	27.5	29.8	27.0
40	15	75.7	22.0	64.5	21.0	80.5	22.4	68.8	21.4
40	18	66.6	24.2	56.7	23.4	70.8	24.6	60.5	23.7
40	20	60.5	25.7	51.5	24.9	64.3	26.0	54.9	25.2
40	22	54.4	27.2	46.3	26.5	57.8	27.5	49.4	26.7
40	24	48.2	28.6	41.1	28.0	51.3	28.9	43.8	28.2
45	15	91.0	23.3	77.5	22.1	96.7	23.7	82.6	22.6
45	18	81.8	25.5	69.7	24.5	87.0	25.9	74.3	24.9
45	20	75.7	27.0	64.5	26.0	80.5	27.4	68.8	26.4
45	22	69.6	28.5	59.3	27.6	74.0	28.8	63.2	27.9
45	24	63.5	30.0	54.1	29.2	67.5	30.3	57.7	29.5
50	15	106.2	24.5	90.5	23.2	112.9	25.0	96.4	23.7
50	18	97.1	26.8	82.7	25.6	103.1	27.3	88.1	26.0
50	20	91.0	28.3	77.5	27.1	96.7	28.7	82.6	27.6
50	22	84.9	29.8	72.3	28.7	90.2	30.2	77.1	29.1
50	24	78.8	31.2	67.1	30.3	83.7	31.7	71.5	30.6
55	15	121.4	25.7	103.5	24.3	129.0	26.3	110.3	24.8
55	18	112.3	28.0	95.7	26.6	119.3	28.6	102.0	27.2
55	20	106.2	29.5	90.5	28.2	112.9	30.0	96.4	28.7
55	22	100.1	31.0	85.3	29.8	106.4	31.5	90.9	30.3
55	24	94.0	32.5	80.1	31.4	99.9	33.0	85.4	31.8

Maximum floor surface temperature in accordance with EN 1264:

- Edge Zone 1.00 m 35° C
- Comfort Zone. 29° C
- Bathrooms. 33° C



Your Key to Optimum Floor Heating

Floor heating is much more than pipes! The optimum floor heating solution provides accurate temperature control, instant heat, comfort and energy efficiency. Danfoss will provide you with optimum floor heating solutions.

The Danfoss solutions rank among the best and the most advanced in the world; combining years of experience with development and technical know-how. We provide floor heating solutions which are both quickly and easily installed for you.

Our wide range of products and our technical expertise make Danfoss your one-stop provider, saving you both time and worries. And the more time you save on installation and servicing, the more time you have to optimise your business opportunities.

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