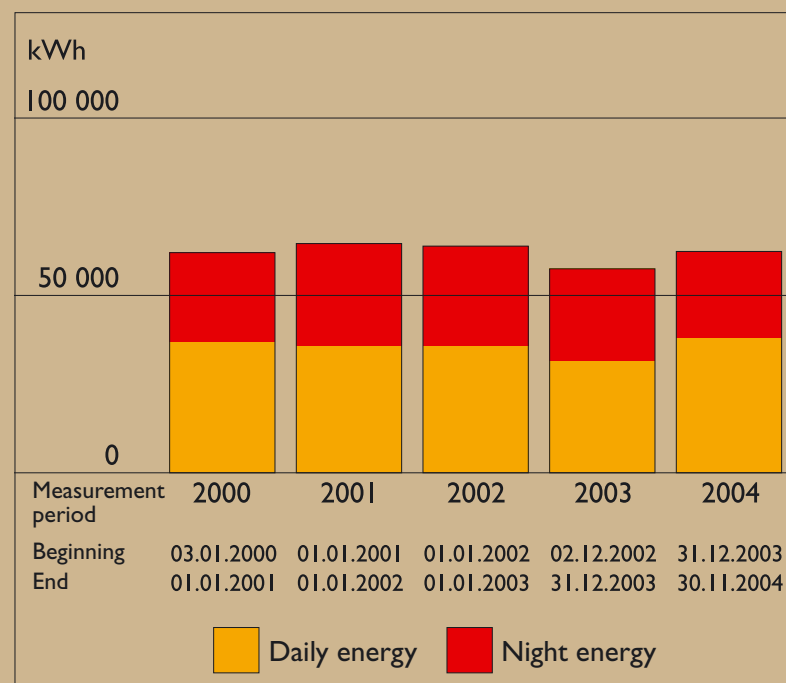


The energy consumption of Polarheat OY's production facilities is covered only with using ceiling heating (all immovable property's electricity consumption).

The area size of the production facilities 540 m² / 2200 m²

In the upper columns, you can see the development of use of the energy, and in the lower table, there are shown the volumes of the electricity consumption per a year. As the length of the measurement periods is different (depending on a year), the measurement period is transformed into consumption per a calendar year (365 days).



Electricity consumption transformed into consumption per a calendar year (kWh)

| | 2000 | 2001 | 2002 | 2003 | 2004 |
|--------------|--------|--------|--------|--------|--------|
| Daily Energy | 37,269 | 35,660 | 35,420 | 29,998 | 37,773 |
| Night Energy | 26,367 | 30,120 | 30,135 | 27,818 | 25,281 |
| All together | 63,636 | 65,780 | 65,555 | 57,816 | 63,054 |



POLARHEAT OY

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Polarheat Oy

The Polarheat product family consists of the Infraheat heater elements, regulators, heating cables, heater lights, moderate, medium and high-temperature heating panels as well as underfloor heating systems. Among our new products are e.g. the Sunray heat rooms.

We offer versatile services. We calculate the costs for and dimension the heating elements according to the customer's wishes. We also deliver the regulators and thermostats exactly according to the timetable agreed upon.



We have been active in the branch since 1978 and we can state that we are among the pioneers in low-energy heating. We started our factory in Kontiomäki in 1987, when we introduced the Infraheat brand on the market.

Our sales office is situated in the absolute centre of Oulu in Finland.

Even if many things have changed during the time we have been active, we are proud to state that we have fulfilled the requirements set for low-energy houses during this entire period.

Our product range has been broadened so that our products today cover the heating needs of houses as well as manufacturing halls and public premises.

The target areas of our greatly expanded export activities are today, in addition to Scandinavia, the EU countries as well as Russia. A subsidiary of ours started operations in Poland in 2003.

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Our entire staffs has been in our employ for a fairly long time, which implies that it is easy to rely on their expert knowledge in the choice of devices, calculations as well as delivery timetables.

Our profound product development has given birth to many improvements in the Infraheat systems both production-wise and installation-wise. Nevertheless, we do not nestle on our previous achievements, but develop products in our factory laboratory for especially challenging environments such as e.g. cold/warm storage, where the temperature must vary over a very short distance.

We gladly take on new challenges and try to find the best possible solution for our customer from the Infraheat product family.

Our production is efficiently computerized in such a way that we are able to answer demand even at times of hectic building activities.

We test our products thoroughly and we guarantee that they fulfil all requirements on electrical safety.

We pre-manufacture to our storehouse standard-size heating elements and electrical appliances, which ensures that our delivery speed and reliability are optimal.

According to the customer's wish we deliver orders either by mail, Matkahuolto or any other means of transport.



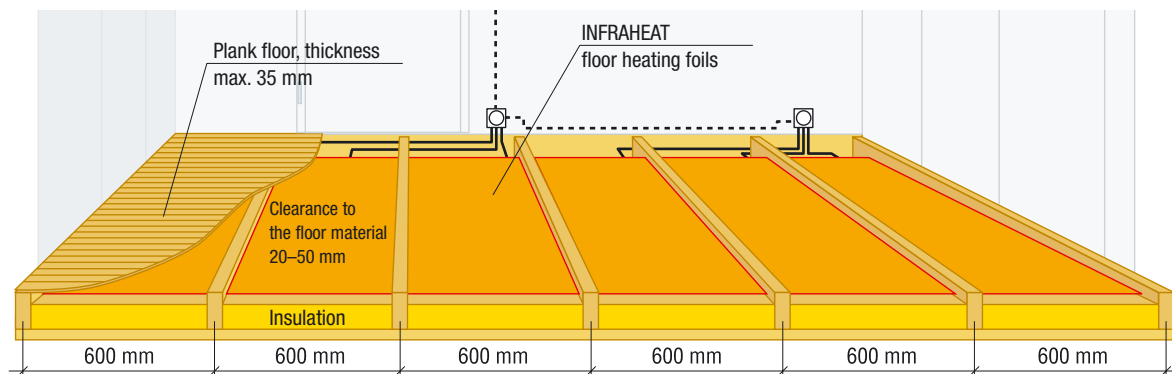
In case of need, we test the Infraheat equipment with a mobile tester on the client's premises and in the actual working environment.

Floor Applications of the Infraheat Heating Foils

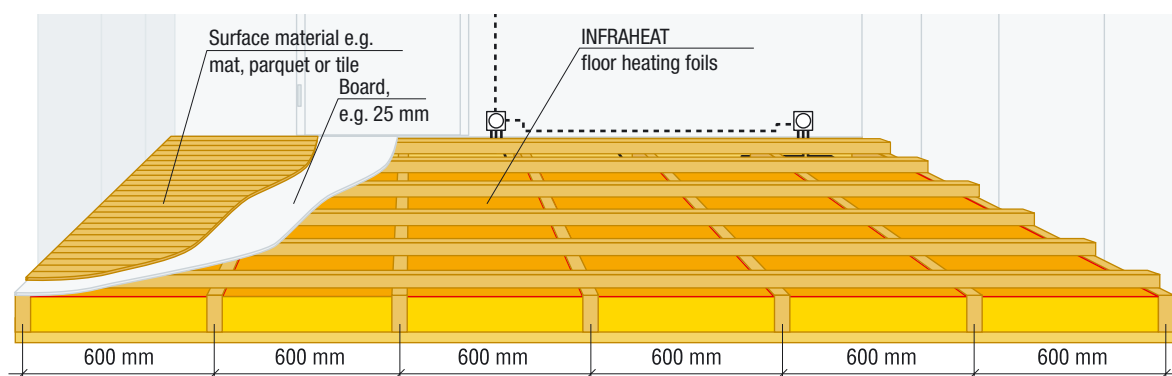
Examples of installation of the INFRAHEAT floor heating foils.

Ensure before installation that enough space has been left for the elements and that the building activities are at a suitable stage for the installation of the elements. Ensure that the elements are not exposed to mechanical disturbances.

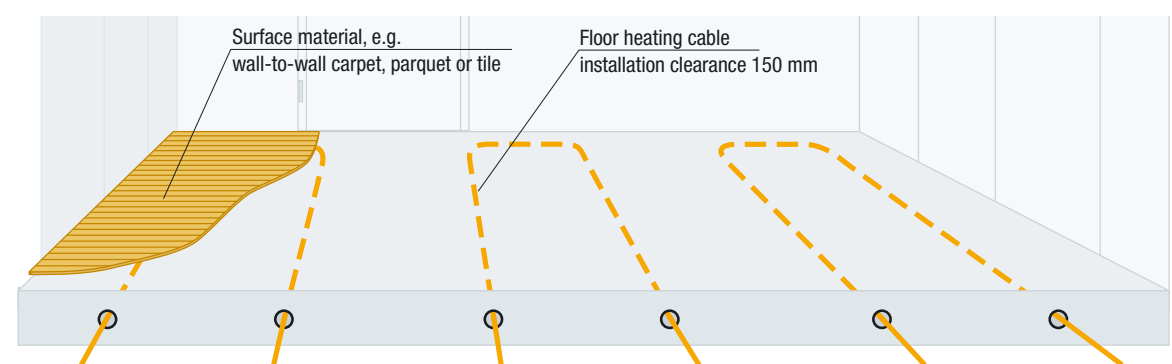
Shored floor 1.



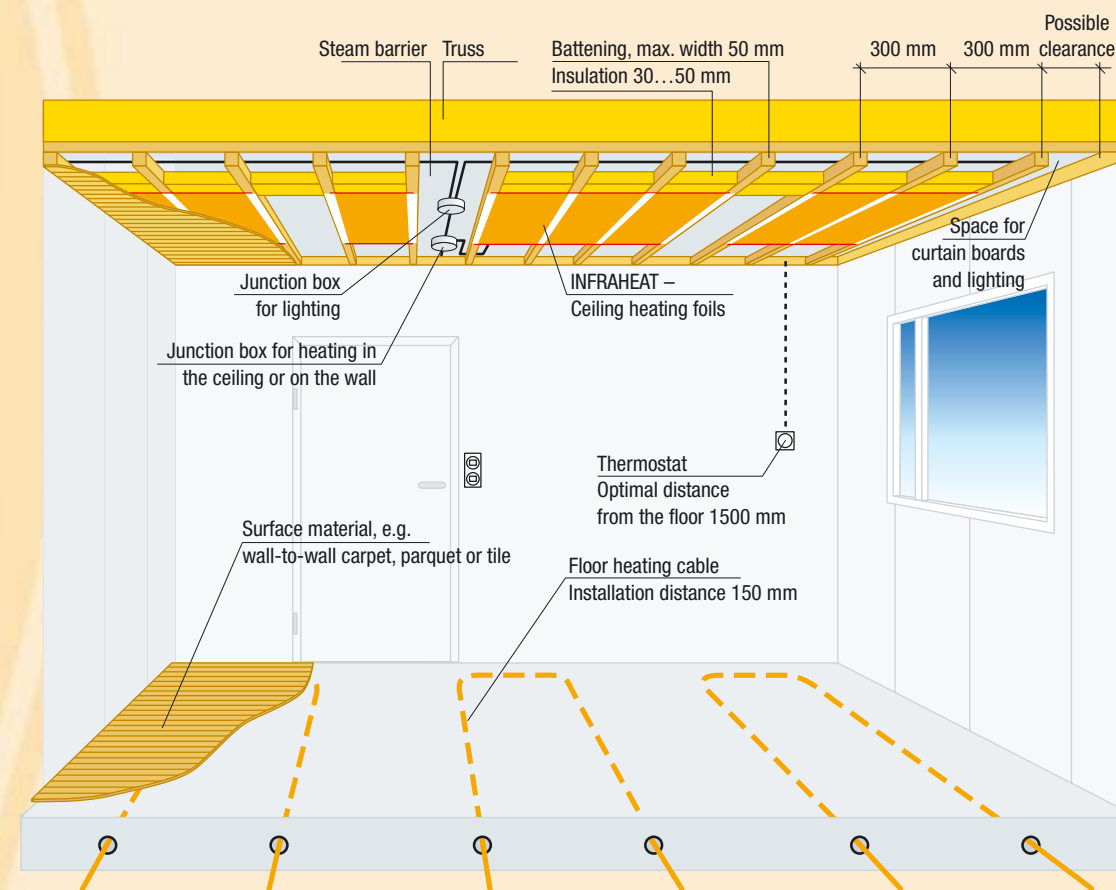
Shored floor 2.



Concrete slab floor



Combined Ceiling- and Underfloor Heating



Ceiling and floor heating in combination is an exceptionally sensible mode of heating:

A house with extensive floor heating can be considered as a top-class solution with regard to living comfort. Most of the heat is generated with cheap night-rate electricity. The heat accumulated in the concrete is during the day released to the indoor air. The heat release is mainly dependent on the floor covering material. It is possible to achieve a perfectly constant room temperature by ceiling heating. Using ceiling heating the thermostats keep room temperature within 0.5 degrees of the desired level.

Combined ceiling- and underfloor heating is the perfect solution for all new single-family houses. Did you know that you get a top-class electrical heating system for half the price of a water-circulation based heating system? There is a significant difference between the systems with regard to easiness to use and living comfort to the advantage of electrical ceiling/floor heating.

How the heating foils are constructed:

The INFRAHEAT heating foils consist of a metal folio, laminated between two double-layer plastic coatings.

The connections in one end are waterproof. The connections are protected by heat-resistant tape; there is tape also at the further end. There is a product label on the foils, where there is stated the surface power (W/m^2), width (dm), total power (W) and mains voltage (V).

A special feature of the metal is that it melts at a temperature of app. 140°C. The heating foils are thus fully fireproof. The standard width of the floor heating elements is 540 mm. Other widths are also available by special order.

Infraheat Ceiling and Underfloor Heating

Standard Dimensions of the Infraheat Ceiling and Underfloor Heating Elements

By special order we also deliver other sizes

Example of a floor heating combination:

Infraheat floor heating cables (voltage 230V)

| Type | Power W | Length m | Length to heat | Area m ² partly accumulating |
|----------|---------|----------|----------------|---|
| 240/11 | 240 | 11 | 1,8-3,5 | 0,8-2,5 |
| 440/20 | 440 | 20 | 3,0-5,5 | 2,5-4 |
| 600/29 | 600 | 29 | 4,3-7,5 | 3,8-6 |
| 870/40 | 870 | 40 | 6-11 | 5-9,5 |
| 1160/54 | 1160 | 54 | 8-14 | 7,5-12,5 |
| 1160/72 | 1550 | 72 | 11-16 | 10-14 |
| 2200/106 | 2200 | 106 | 15-28 | 12-21 |
| LASK S | | | | |
| 29/300 | 300 | 29 | | |
| 42/400 | 400 | 42 | | |
| 59/600 | 600 | 59 | | |
| 79/800 | 800 | 79 | | |
| 106/1100 | 1100 | 106 | | |

The concrete slab is cast in two steps
(recommended alternative)

1. Ground
2. Compressed gravel
3. Heat insulation
4. Plastic foil
5. Slab of reinforced concrete
 - clean the surface of the slab thoroughly before laying out the cable
6. Installation batten
 - the installation batten is attached to the cast slab for instance by TC fasteners
7. Heating cable
8. Levelling concrete
 - do not use a vibrator
 - the installation depth of the cable is app. 30 mm for direct heating, 50 mm for accumulating heating
 - a slab exceeding 100 mm is not recommended for accumulating heating
9. Surface material
10. Thermostat
11. The thermostat's sensor
 - the sensor is in a plastic pipe (M20), which is closed at both ends and is situated in the middle of two cable loops.

The concrete slab is cast in one step

1. Ground
2. Compressed gravel
3. Heat insulation
4. Plastic foil
5. Reinforcement net
6. Heating cable
 - fastened to the reinforcement net
7. Concrete cast
 - do not use a vibrator
 - the installation depth of the cable is app. 30 mm for direct heating, 50 mm for accumulating heating
 - a slab exceeding 100 mm is not recommended for accumulating heating
8. Surface material

Can be used for instance in dwellings, leisure-time cottages, shops and industrial premises, carpenter workshops, day-care centres, churches...

- Infraheat ceiling and underfloor heating represents already today the low-energy heating technology of tomorrow
- Folio temperature 30-40 degrees C
- A safe alternative for allergic persons

Standard dimensions of the Infraheat ceiling elements

| Surface power 125 W/m ² | | | | | |
|------------------------------------|------|------------------|-----|-----|-----|
| Voltage Power | | Element width cm | | | |
| V | W | 30 | 60 | 90 | 120 |
| 115 | 85 | 220 | 110 | | |
| | 110 | | 100 | | |
| 230 | 120 | | 160 | 110 | 80 |
| | 165 | 440 | 220 | 150 | 110 |
| | 190 | 500 | 250 | 170 | 125 |
| | 220 | 590 | 295 | 200 | 150 |
| | 255 | 680 | 340 | 225 | 170 |
| | 285 | 760 | 380 | 255 | 190 |
| | 330 | | 440 | 295 | 220 |
| | 380 | | 500 | 340 | 250 |
| | 440 | | 590 | 395 | 295 |
| | 520 | | 690 | 460 | 345 |
| | 570 | | | | 380 |
| | 660 | | | | 440 |
| | 880 | | | | 590 |
| | 1040 | | | | 690 |

| Surface power 150 W/m ² | | | | | |
|------------------------------------|------|------------------|-----|-----|-----|
| Voltage Power | | Element width cm | | | |
| V | W | 30 | 60 | 90 | 120 |
| 115 | 95 | 205 | 105 | | |
| | 125 | | 90 | | |
| 230 | 155 | | 150 | 100 | 75 |
| | 185 | 410 | 205 | 140 | 105 |
| | 210 | 460 | 230 | 155 | 115 |
| | 245 | 540 | 270 | 180 | 135 |
| | 280 | 620 | 310 | 205 | 155 |
| | 315 | 700 | 350 | 235 | 175 |
| | 360 | | 400 | 270 | 200 |
| | 420 | | 460 | 310 | 230 |
| | 490 | | 540 | 360 | 270 |
| | 570 | | 630 | 420 | 315 |
| | 630 | | | | 350 |
| | 720 | | | | 400 |
| | 980 | | | | 540 |
| | 1140 | | | | 630 |

Floor Foils

Standard sizes

| Em power 60 W/m ² | | |
|------------------------------|---------|-----------|
| Size cm | Power W | Voltage V |
| 54 x 120 | 40 | 77 |
| 54 x 170 | 50 | 77 |
| 54 x 180 | 55 | 115 |
| 54 x 250 | 80 | 115 |
| 54 x 300 | 90 | 115 |
| 54 x 360 | 110 | 230 |
| 54 x 400 | 125 | 230 |
| 54 x 500 | 150 | 230 |
| 54 x 580 | 180 | 230 |

| Em power 90 W/m ² | | |
|------------------------------|---------|-----------|
| Size cm | Power W | Voltage V |
| 54 x 100 | 50 | 77 |
| 54 x 140 | 65 | 77 |
| 54 x 95 | 50 | 115 |
| 54 x 150 | 70 | 115 |
| 54 x 190 | 100 | 230 |
| 54 x 210 | 95 | 115 |
| 54 x 290 | 135 | 230 |
| 54 x 330 | 150 | 230 |
| 54 x 410 | 185 | 230 |
| 54 x 470 | 215 | 230 |
| 54 x 565 | 260 | 230 |

Ceiling heating

40 cm module

| Em power 150 W/m ² | | |
|-------------------------------|---------|-----------|
| Size cm | Power W | Voltage V |
| 40 x 200 | 125 | 230 |
| 40 x 295 | 180 | 230 |
| 40 x 340 | 205 | 230 |
| 40 x 390 | 235 | 230 |
| 40 x 460 | 280 | 230 |
| 40 x 500 | 300 | 230 |
| 80 x 100 | 125 | 230 |
| 80 x 195 | 235 | 230 |
| 80 x 230 | 280 | 230 |
| 80 x 250 | 300 | 230 |
| 80 x 295 | 360 | 230 |

40 cm module

| Em power 90 W/m ² | | |
|------------------------------|---------|-----------|
| Size cm | Power W | Voltage V |
| 40 x 130 | 45 | 115 |
| 40 x 190 | 70 | 115 |
| 40 x 220 | 80 | 115 |
| 40 x 300 | 105 | 115 |
| 40 x 260 | 95 | 230 |
| 40 x 360 | 130 | 230 |
| 40 x 440 | 160 | 230 |
| 40 x 510 | 190 | 230 |
| 40 x 600 | 210 | 230 |

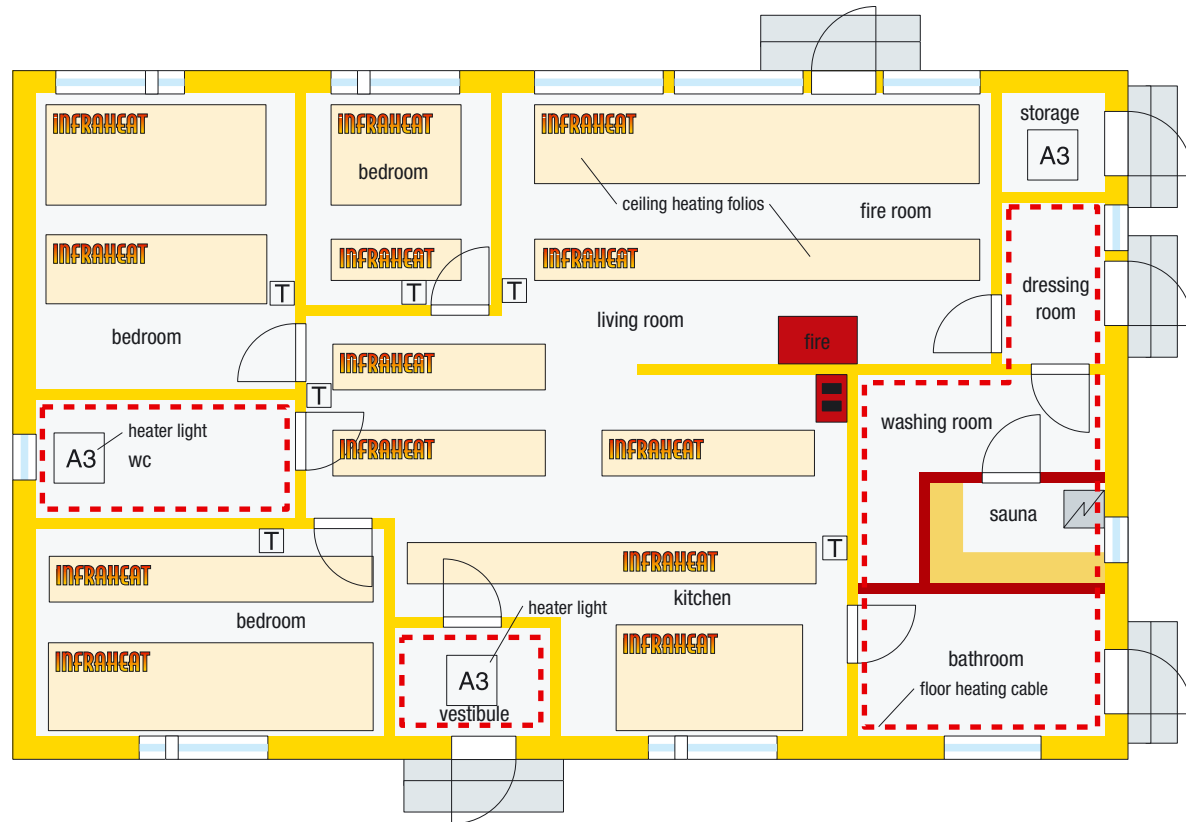
Ceiling Heating in Living areas and Floor Heating in Wet Rooms

Please contact us - we help you to calculate a cost estimate

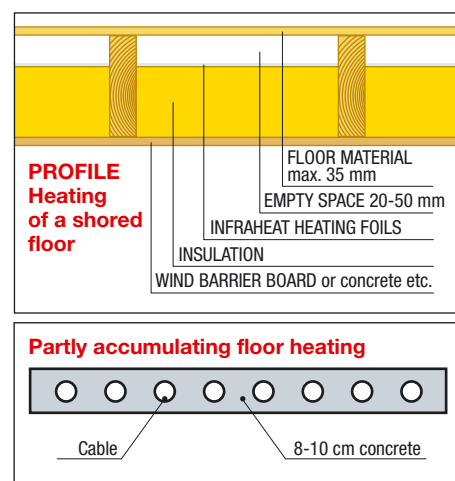
Please contact us, so we can calculate an advantageous offer for you even for distinctive heating needs. You can also calculate a cost estimate for the equipment by yourself by using the Infraheat counter for calculating device costs at our web page: www.infraheat.com

Steam barrier

A steam barrier is needed in cold upper beam frameworks and for the insulation of wet rooms. The steam barrier is normally installed above the Infraheat heaters, but may also be installed between the covering material and the heater in order to ensure that the heat is transmitted to the covering material when heating. As steam barrier may in addition to plastic also be used a board with laminated plastic.



- Floor area 120 m²
 - Combined ceiling and floor heating
 - Equipment cost for the heating system 20 EUR/gross square metre
 - Annual heating costs app. 500 EUR
- The Infraheat ceiling heating elements according to the picture
- Infraheat heater light
 - Infraheat floor heating cables
 - In the picture 4 Eberle room thermostats
 - 8 Eberle floor heating thermostats



You can get all heating elements and accessories from us:

- Heater light
- Ceiling heating foils
- Floor heating foils
- Church bench heaters
- A portable heater for animal shelters
- Cornice strip heaters
- Low density heating panel MLP/ALK
- Medium density heating panels KLP and EPS
- High density heating panel TAS
- Floor heating cables
- Self-adjusting floor heating cables
- Renovating with floor heating foils
- Water and sewage pipe defrosting
- Trough gutter defrosting
- Terrace radiation heating
- Caravan heating
- Dog house heating
- Thermostats
- Concrete structure dryers

Coating materials allowed in connection with Infraheat heating:

| Coating material | Thick-ness mm | Element 125 W/m ² | Element 150 W/m ² |
|---|---------------------|------------------------------|------------------------------|
| CHIPBOARDS e.g. Leijona, Vibopan (laminated) | 8 10 12 16 | yes yes yes yes | yes yes yes yes |
| BOARD PANEL e.g. battened or frame panel | 8 12 16 22 | yes yes yes yes | yes yes yes no |
| PLASTER-BOARDS e.g. Gyproc | 9 11 13 | yes yes yes | yes yes yes |
| WALLBOARDS hard | 5 6 | yes yes | yes yes |
| WALLBOARDS Semihard e.g. Leijona (burlap) | 8 10 | yes yes | yes yes |

When using other coating materials one should take care that the maximum allowed heat resistance values are not exceeded.

| Maximum allowed heat resistance (m ² °C/W) | 125 W/m ² | 150 W/m ² | 175 W/m ² |
|---|----------------------|----------------------|----------------------|
| | 0,16 | 0,13 | 0,09 |

$$\text{Heat resistance } m = \frac{\text{Thickness of the coating material (m)}}{\text{The conductivity of the material (W/m}^2\text{C)}}$$

KLL Cornice Strip Heater

The Infraheat cornice strip heaters are used among others in dwellings, washrooms, shower rooms, garages, summer cottages, halls, offices etc.

The cornice strip heater is a suitable alternative, when there is a need for an additional heating system in existing rooms and you want to avoid extensive repairs. The heater core is encapsulated and recessed in the front panel, which is made of extruded aluminium. The heater frame is made of aluminium-galvanized steel plate. The heater is stylish and inconspicuous. Since the heater is splash proof, it is also suitable for wet rooms.

Heater control

There is a thermostat available for the heater; its sensor is situated at the end of the connection box of the heater or is mounted at the wall under the heater or further away (in this case a sensor with a separate casing is used). The cable to the sensor is a power-current cable.

The cornice strip heater is mounted at a suitable spot in the corner between the ceiling and the wall. The device is furnished with fasteners, which automatically determine the distance from the ceiling and thus expedite mounting. The connection voltage is 230 volts.

There are accessories available to the heater, by which it is possible to mount the heater also in difficult places. The accessories are among others a flange for wall mounting, a ceiling mounting adapter and a cooling panel.

A wall-mounted room thermostat can control the heater. The mounting height of the thermostat is 1500 mm.

Different centralized systems are suitable for the control of the cornice strip heater. The localization of the sensor or the measuring gauge is the same as that of the thermostat.

Technical data:

| Type | Power W | Voltage V | Encapsulating class | Dimensions | |
|---------|---------|-----------|---------------------|------------------|-----------|
| KLL330 | 330 | 230 | | 900 x 120 x 100 | |
| KLL495 | 495 | 230 | | 1200 x 120 x 100 | |
| KLL660 | 660 | 230 | | 1500 x 120 x 100 | |
| KLL990 | 990 | 230 | | 2400 x 120 x 100 | |
| KLL330T | 330 | 230 | △ | 900 x 120 x 100 | + < 200 ° |
| KLL495T | 495 | 230 | | 1200 x 120 x 100 | |
| KLL660T | 660 | 230 | | 1500 x 120 x 100 | |
| KLL990T | 990 | 230 | | 2400 x 120 x 100 | |

PP Low Density Heating Panel

As additional heat source in wash-rooms, for removing draught from large windows, in skating halls, fish industries, exposition halls...

Technical data:

| Type | Power W | Voltage V | Dimensions |
|--------|---------|-----------|------------------|
| PP 250 | 250 | 230 | 600 x 160 x 100 |
| PP 450 | 450 | 230 | 840 x 160 x 100 |
| PP 700 | 700 | 230 | 1250 x 160 x 100 |
| PP 900 | 900 | 230 | 1530 x 160 x 100 |

Heater Light

The heater lights are used in offices, washrooms, locker rooms, toilets, lounges etc.

The heater lights may be connected in chain; thus one light may control e.g. heater lights in a corridor.

The connection is performed as for a normal light, meaning that you may perform the installation yourself. The light is attached to the ceiling or junction box through the bottom of the coupling casing. There are holes for screws in the light's housing.

The light heater can also be installed in dropped ceilings on a T-moulding console, for instance the CATTOXT moulding system.

| Model | |
|--|--|
| A1 | Heater |
| A2 | Heater, thermostat and switch |
| A3 | Heater, thermostat, switch and lamp 9 W PL |
| A1 lj | (with connection cable) |
| A2 lj | (with connection cable) |
| Power 200W, Voltage: 230V, Dimensions: 585x585x45 mm | |



SL – Movable Heater

A heater for animal care, for use in chicken houses, stables, cowsheds, kennels, greenhouses, for the care of burns, for drying up after damages caused by water...

| Type | Power W | Dimensions |
|---------|---------|---|
| ALK 600 | 600 | SL 1020 x 550 x 35 liitosjohto + ketjut |

Dog House Heating

The safest heating for the dog, ceiling heating foils, hidden above the coating material, a healthy and evenly working heating

| Type | Power W | Voltage V | Transformer | Dimensions |
|----------|---------|-----------|-------------|------------|
| Haukku 1 | 60 | 24 | 24 / 230 V | 600 x 600 |
| Haukku 2 | 60 | 24 | 24 / 230 V | 600 x 800 |

ALK Medium Density Heating Panel

Pleasant heating for offices, shops, hobby rooms, bathrooms, halls, carpenter workshops and animal sheds.

Technical data:

| Type | Power W | Voltage V | Dimensions |
|------------|---------|-----------|-----------------|
| ALK 300 | 300 | 230 | 1020 x 350 x 35 |
| ALK 600 | 600 | 230 | 1020 x 550 x 35 |
| ALK 600 SL | 600 | 230 | 1020 x 550 x 35 |

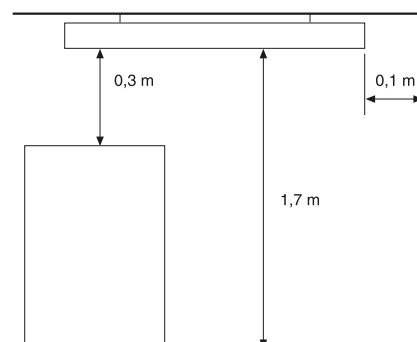
The heaters have a cable with a contact plug.

The moderate heat heating panels can be installed in wet and humid rooms and rooms containing corrosive substances. The panels are manufactured from galvanized steel sheets and painted with heat-resistant powder paint. The heat is generated by a film resistor, which guarantees a pleasant and even heating.

Installation:

Decide where the heater shall be placed in the ceiling or on a hanging bar and fasten it thoroughly in its place.

Minimum distances:



Control:

The regulation of the heater is done through a separate operating switch, thermostat or control system. A programmed regulation system is recommended in industrial applications in order to balance consumption peaks.

EPS Medium Density Heating Panel

For heating high manufacturing premises

| Type | Power W | Voltage V | Dimensions |
|----------|---------|-----------|-----------------|
| EPS 1600 | 1600 | 230 | 960 x 300 x 75 |
| EPS 2000 | 2000 | 230 | 960 x 300 x 75 |
| EPS 3200 | 3200 | 230/400 | 1330 x 300 x 75 |

KLP Medium Density Heating Panel

Heating for manufacturing halls and storehouses. Save energy using radiation heat.

Heating based upon infrared radiation is an efficient and economic heating solution. The infrared radiation can be directed where it is most needed and the temperature can by a control system flexibly be regulated so that is suitable. The medium heat heating panels are especially well suited for high manufacturing halls and storehouses. Other suitable locations are working spaces, workshops, washing stands, sports halls and shops.

Technical data:

| Type | Power W | Voltage V | Dimensions |
|----------|---------|-----------|------------------|
| KLP 700 | 660 | 230 | 770 x 300 x 120 |
| KLP 1000 | 990 | 230 | 1010 x 300 x 120 |
| KLP 1600 | 1580 | 230 | 1420 x 300 x 120 |
| KLP 2000 | 1980 | 230 | 1700 x 300 x 120 |

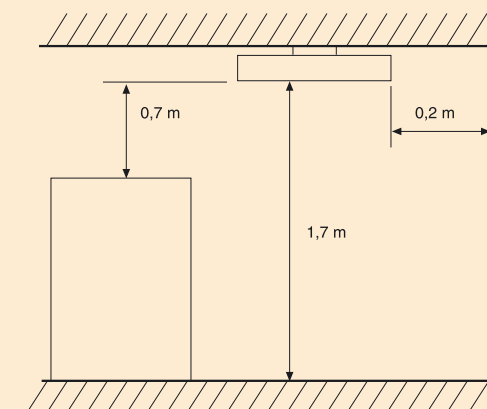
Construction:

The medium heat heater panel consists of two separate thermal radiators, consisting of a thermal resistance and an aluminium panel. In the upward direction the thermal radiation is stopped by efficient heat insulation. The heater frame is manufactured in baked powder-painted aluminium galvanized steel. There are attachment fixtures on both ends of the heater.

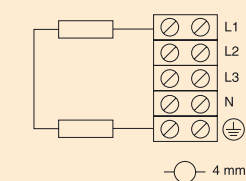
Installation:

The heater can be fastened to the ceiling or a fastening rail for lamps, using the installation stands. The heaters must be installed in a horizontal position in order to prevent air circulation. The minimum distances to walls, furniture and combustible materials must be observed when installing. The installation height of the heating panel is at least 1.7 m., the recommended height is, however, at least over 3.5 m. Connection to mains may be performed only by an approved electrical company.

Minimum distances:



Wiring:



Control and regulation:

The heater cluster can be controlled either through a separate control switch or a thermostat. In industrial spaces the control is best carried out using PLC's. This ensures even heating and peak power can be levelled out over 24 hours.



TAS Open Radiation Heaters for Industrial Applications

For heating large halls and open spaces

The open radiation heaters for industrial applications are because of their high surface temperature especially well suited for heating large halls and open spaces.

Technical data:

| Type | Power W | Voltage V | Dimensions | Encapsulating class |
|----------|---------|-----------|------------------|---------------------|
| TAS 1500 | 1500 | 230 | 1500 x 150 x 280 | IP 23 ⌀ |
| TAS 2000 | 2000 | 230 | 1900 x 150 x 280 | IP 23 ⌀ |
| TAS 3000 | 3000 | 230 | 1900 x 240 x 390 | IP 23 ⌀ |
| TAS 4500 | 4500 | 400 | 1500 x 300 x 390 | IP 23 ⌀ |
| TAS 6000 | 6000 | 400 | 1900 x 300 x 390 | IP 23 ⌀ |

Most common applications:

- Warehouses and processing halls in the metal industry
- Packaging and loading areas
- Corridors and tunnels
- Spot heating and working area heating in cold spaces
- Sports halls and public galleries, station waiting halls
- Large exhibition and meeting halls
- Courtyards, calving and foaling areas

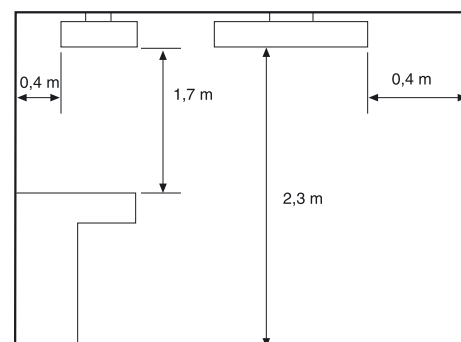
Construction:

The housing material of the tube resistors is stainless steel; the surface temperature is app. 750°C. The reflector is of smooth-ground chrome steel, guaranteeing good reflecting and endurance properties. The corrosion tolerance of the housing of aluminium zinc steel is superior to ordinary zinc coatings.

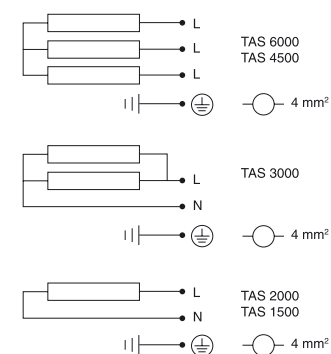
Installation:

The heater is fastened by attachments fixtures direct to the ceiling or a hanging rail. In case of need the attachment fixtures may be fastened in such a way that the heater may be turned in the desired angle. One should observe the minimum distances from combustible surfaces in the installation.

Minimum distances:



Wiring:



Control and regulation:

The regulation of the heater takes place using either a separate control switch or a thermostat. An integrated control and regulation system for the heating is recommended in large halls.

The connection to mains should be fixed and there should be an all-polarity switch of type IEC 947.3 on the series cable. The installation may be performed only by an approved electrical company.

KPL Bench Heater

Heats seats and benches in churches and other public places



Technical data:

| Type | Power W | Dimensions |
|----------|---------|-----------------|
| KPL 100 | 100 | 700 x 200 x 37 |
| KPL 150 | 150 | 1020 x 200 x 37 |
| KPL 200 | 200 | 1300 x 200 x 37 |
| KPL 250 | 250 | 1580 x 200 x 37 |
| KPLS 150 | 150 | 700 x 300 x 37 |
| KPLS 250 | 250 | 1020 x 300 x 37 |
| KPLS 300 | 300 | 1300 x 300 x 37 |
| KPLS 400 | 400 | 1580 x 300 x 37 |
| KPLT 100 | 100 | 540 x 350 x 37 |
| KPLT 200 | 200 | 700 x 350 x 37 |
| KPLT 300 | 300 | 1020 x 350 x 37 |
| KPLT 350 | 350 | 1300 x 350 x 37 |
| KPLT 450 | 450 | 1580 x 350 x 37 |
| KPLT 450 | 450 | 1530 x 350 x 37 |

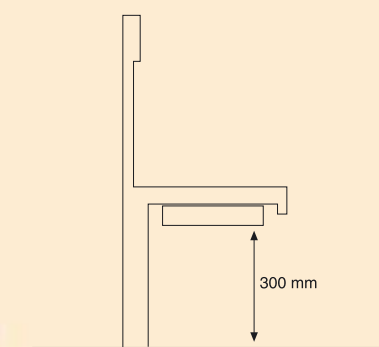
The heater is installed under the seat. The heat is mainly radiated downwards, thus giving a good heat distribution over the cold legroom. The upwards-radiating heat increases the temperature of the seat. The bench heater saves energy, because it is necessary to heat only a part of the buildings and spaces. It also efficiently prevents excessive drying of statues and wooden parts, caused by traditional heating methods.

Because of their design and silence the inconspicuous KPL heaters are well suited also in historically valuable objects. Upon agreement one may choose a heater colour of one's choice from the colours in the RAL colour map.

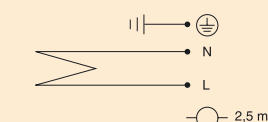
Installation:

Define a place for the heater below the bench and fasten the heater. Connect the mains supply cable and the installation lid. Only approved personnel may perform the installation.

Minimum distances:



Connection:



Control and regulation:

The regulation of the heater takes place using either a separate control switch or a thermostat. Because of its easy care an integrated control and regulation system is recommended in church applications.

Infraheat for Drying Structures

FIMKON safety certificate FI 16619

Drying of Concrete Structures

Infraheat is especially well suited for drying concrete structures in new buildings and in objects, damaged by humidity. Depending on the circumstances the correct degree of dryness can be obtained after 1 – 7 weeks' drying.

The temperature of the object to be drying rises during drying to app. 50 – 60 °C, when there is free ventilation around the object (for instance a joist slab).

If there is heat insulation under the slab, the surface temperature of the concrete may maximally rise to 50 – 60 °C. A 100 mm concrete slab, which is insulated underneath, will achieve an even temperature in 2.5 – days.

The energy consumption of the apparatus is low and heating is, if one so wishes, noiseless.

Using the Infraheat Dryer

The drying power of Infraheat is based upon increasing the temperature of the structure, as a result of which the partial pressure of the water vapour in the pores of the structure increases and the water vapour is released from the structure into the surrounding air. The warm structure also heats the ambient room space and improves the condensing power of the air in the room. One should also take care that ventilation is sufficient in the space to be dried, so that the air in the room may receive the humidity released from the structures.

The drying power of the device is better, the higher the temperature of the structure is during drying. A high temperature may cause cracking in a fresh concrete or filler surface, which must be taken into account when regulating the drying temperature. New concrete surfaces shall be well finished and the structure must be sufficiently solid before drying. The use of a ventilator decreases surface temperature significantly. The best drying results are obtained in objects with a normal room temperature.

Infraheat heats the object to be heated immediately below the heater. The 20 mm distance between the device and the surface to be dried allows the humidity to be released also upwards.

The humidity of the structure to be dried is measured at a spot that has been cooled off to normal, ambient temperature.

If several Infraheat heaters are used parallel, the distance between the heaters must not exceed 300 mm in order to keep drying performance optimal.

Infraheat is also well suited for drying wall and ceiling structures and drying of all other structures, which can withstand a temperature of 80 – 85 °C.

Infraheat product Information

Product types

Maxi 400

Dimensions:
1300 x 600 x 70 mm
Weight 14 kg

Maxi 400T (ventilator)

Dimensions:
1300 x 600 x 70 mm
Weight 14 kg
Height of the ventilator 90 mm

Mini 200

Dimensions:
1300 x 600 x 70 mm
Weight 6 kg

The power of the devices is 200W in the Mini type and 400W in the Maxi range

The devices may be connected directly to 230V mains. 8/16 Maxi/Mini devices can simultaneously be connected to a net with a 16-ampere fuse.

Instructions for use:

Clean the area to be dried. Place the device above the area to be dried. Connect the device to mains. Keep the heating surfaces of the device clean. Do not cover the dryer and keep the surroundings free. Do not step on the device. Carry the dryer in a vertical position or on its side. The operating switch of the ventilator type is underneath the device.



Foilpoint Low-voltage Underfloor Heating System

BET Heating Cable Mat

No more cold floors

The Foilpoint underfloor heating system revolutionizes your views on floor heating. The system consists of one or several heating elements of desired length and power together with a mains cable fitted at the factory and a safety voltage converter, ready to plug in.

An ingenious floor heating method

No drilling, casting or floor lifting

The heater core is only 0.2 mm thick. It can be laid out directly on top of old surfacing. The new surfacing is laid out on top of the heating folio without casting or floor lifting.

You can perform the installation yourself

Installation of Foilpoint underfloor heating does not require any special permits. You can install it yourself by following the instructions. The heating elements are already at the factory fitted with connections cables. The connection to mains is done through a safety voltage converter.

Heating element

Material: Polyester-Aluminium-Polyester
 Dimensions: Breadth 600 mm
 Length 1-4 m in 500 mm sections
 Thickness 0.2 mm
 Voltage: 20-22-24VAC
 Power: Type 93-003A (tile floors, floor with plastic coating and parquet floors)

U=20VAC, P=56 W/m²
 U=22VAC, P=67 W/m²
 U=24VAC, P=80 W/m²

Cables: 2 x 1.5 mm², length 3 m

Transformer

Voltage: 230VAC/20-22-24VAC
 Power: 140VA, 350VA, 500VA, 720VA and 1200VA
 Feeder cable: Length 1.5 m, contact plug
 Protection class: IP 44

An absolutely safe heating solution

The low 20-22-24 voltage guarantees the electrical safety of the system. An accurate dimension of the power of the elements according to the place of usage prevents overheating.

An economical way to implement floor heating

The Foilpoint underfloor heating system is suitable for new houses and especially well for renewal of the heating system in old buildings. The sophisticated manufacturing method of the heating elements and the simple components ensure quick and easy installation. The Foilpoint underfloor heating system offers an extremely economical heating solution.

The BET floor heating element SF is best suited for nurseries, kitchens, hobby rooms, leisure-time houses, offices and shops, i.e. all rooms, where an adjustable / for you suitable room temperature is desired. The width of the special-order SF heating element is 0.5 m. SF is extremely thin! Thanks to the small installation height the SF element can also be installed in places with an

existing heating system. The BET heating element SF fulfils the quality requirements according to DIN VDE 0700 and Din VDE 0100. The temperature can also be controlled by a timer.

There is a complete installation instruction in the package.

| Power 155 W/m ² | | | |
|----------------------------|---------|----------|-------------|
| Type | Power W | Length m | sstl number |
| 2395-78 | 78 | 0,5 x 1 | 8167571 |
| 2395-155 | 155 | 0,5 x 2 | 8167572 |
| 2395-240 | 240 | 0,5 x 3 | 8167573 |
| 2395-330 | 330 | 0,5 x 4 | 8167574 |
| 2395-400 | 400 | 0,5 x 5 | 8167575 |
| 2395-480 | 480 | 0,5 x 6 | 8167576 |
| 2395-560 | 560 | 0,5 x 7 | 8167577 |
| 2395-640 | 640 | 0,5 x 8 | 8167578 |
| 2395-720 | 720 | 0,5 x 9 | 8167579 |
| 2395-800 | 800 | 0,5 x 10 | 8167580 |
| 2395-930 | 930 | 0,5 x 12 | 8167582 |
| 2395-1120 | 1120 | 0,5 x 14 | 8167584 |
| 2395-1240 | 1240 | 0,5 x 16 | 8167586 |
| 2395-1360 | 1360 | 0,5 x 17 | 8167587 |
| 2395-1395 | 1395 | 0,5 x 18 | 8167588 |
| 2395-1550 | 1550 | 0,5 x 20 | 8167590 |
| 2395-1860 | 1860 | 0,5 x 24 | 8167591 |