

# DÈCOR HEATING PANEL

## Energy efficient and decorative wall panels

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# DÉCOR HEATING PANEL

## Energy efficient and decorative wall panels

### 1 Offer to our distribution partners

<b>The Idea</b>	We have developed a heating system that consumes less energy and is included in thin panels that can be fixed to the wall or be mounted to stands for free-standing in the room. No construction or laying of pipes, no chimney or tanks. We look for distributors and production partners with or without showrooms and for respectable internet-sellers.	
<b>Our Offer</b>	<p>You will become our exclusive distribution partner and represent and sell the product in the agreed country, province or region.</p> <p>We offer you access to the innovative technology and an attractive product with many design options .</p> <p>You will also automatically get access to a range of additional products that are in the pipeline of our production and development network: non-heated wall panels, heating mats and underfloor heating modules, body-heating products etc.</p> <p>Of course you receive technical training and material on the physics of heating and the advantages of our system.</p>	
<b>Your qualification</b>	<p>If you are an established firm, this will speak for itself. If you are an entrepreneur, here is our view:</p> <p>We believe in persons, not schools. Therefore we look for basic technical and commercial knowledge and persons who want to do good and reliable work in selling our products.</p>	
<b>Financing</b>	You can start this business with as little as 8.000 EUR, depending on the level of stock and way of selling.	
<b>Your job</b>	<p>Your prime job is to sell the décor heating panels in your country or region. You may do this with a showroom, a shop, a web shop or by direct selling, just as you like.</p> <p>Selling also includes the invoicing, shipment and handling of requests.</p>	
<b>Additional option: Local Assembling</b>	As an additional option you can do the local assembling of the parts that are delivered by us. For details, please contact us.	

# DÈCOR HEATING PANEL

## Energy efficient and decorative wall panels

### 2 Product information

#### Product philosophy

- Low investment
- Low energy costs due to low surface temperature
- Slim and elegant design
- No construction work, just hang/screw it to the wall
- Can also be used freestanding or integrated into furniture
- Clean heating with renewable electricity
- Comfortable infra-red heat
- Hightech polymer heating foil, the next generation



See also our flyer with pictures in the attachments!

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<p><b>About the product</b> The décor heating panel consists of a hightech heating foil included in a sandwich of wood-composite materials. The panel is only 2-4 cm thick and can be fixed to the wall or mounted to the ceiling.</p> <p><b>Power supply</b> The décor heating panel comes with a special security power supply at 12V. Overheat protection is included and power regulation is available on request. You can operate the panel (or more of them) with a room thermostat or with a programmable time switch (optional, please observe local legislation – a professional electrician may be required).</p>	<p><b>Designs</b> The basic version of the heating panel comes in a neutral white with a slim wooden frame that fits everywhere. Many other surfaces are available, like stone, marble, wood or other designs.</p> <p>For the do-it-yourselfer: you may use adhesive décor foil from qualified suppliers. You may do the lamination on a standard white surface yourself and save money with it.</p> <p><b>Cost</b> Use of low-temperature infrared heating is one of the most efficient systems. Similar systems like underfloor heating require expensive installation and high investment. Décor heating panels</p>	<p>have low investment costs, low energy consumption and can be installed one at a time. If you can hang a picture, you will also be able to hang the panels to the wall.</p> <p>Perfect for later changes, additional rooms and to warm your preferred place.</p> <p>The ideal solution for holiday homes and garden houses that are not used full-year.</p> <p><b>Where to use:</b> Auxiliary heating Bathrooms (dry place, no splash water), Bedrooms, Living rooms, (Home-) Offices, Holiday homes, Garden houses, Workshops, Hobby rooms and for your loved pets.</p>
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# DÉCOR HEATING PANEL

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### 3 Product specification

#### 3.1 Specification Sheet

##### 3.1.1 Standard Models

Model	Rating (Watt)	H (cm)	W (cm)	D (cm)	Weight (kg)	Connection
A60	95	60	60	2-4	ca.4,5	230 V/ 50Hz power cable, switch, plug
A80	132	60	80	2-4	ca.6,5	230 V/ 50Hz power cable, switch, plug
A120	190	60	120	2-4	ca.9,0	230 V/ 50Hz power cable, switch, plug

Note: these are the measures of the heating module. Depending on the type and material of the front cover the outside size may vary.

##### 3.1.2 Power supply

The heating has a 12V power supply. This is a “safe low voltage” level that has many advantages over direct 230V (or 100/110/120 V) grid current.

The power supply itself has an overload / overheat protection (self-resetting).

##### 3.1.3 Temperatures

The panels are constructed as infra-red low-temperature heating device. This means that the surface temperature will be between 28 and 45°C, typically at only 36°C. This technology provides comfortable warmth to the body and helps to save energy, because the average room temperatures can be lower than with convector heating.

To carry out the complete heating of a building, a professional calculation of the required numbers of panels will be needed that takes into account the insulation, climate and use of the building..

The panels can also be installed at the ceiling using an adequate holding structure. For this use modifications may be required. Please contact your local representative with details about your project.

##### 3.1.4 Certifications

The power supply, cable and switch carry the CE-mark. The power supply has certifications / approvals for:

CE, RoHs, Electromagnetism, UL

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Note: for use outside the EU the power supply is exchanged with a locally available and certified electronic power supply that converts the national grid voltage to 12V. Typically power supplies for halogen lighting are used as most competitive solution.

## 4 Technical description

### 4.1 Product Description

#### 4.1.1 Use of the product

The product is a decorative panel with integrated electric heating function. The product works on the principle of dark infrared heating and has low surface temperatures, similar to underfloor heating systems. The product is designed for wall fixing, but can be adjusted to fit on ceilings, integrate into furniture or partition walls or to compose free standing elements.

#### 4.1.2 Application

The panels are hung to the wall in typical use. The heating function requires a conventional electric power socket in the range of the place where you install the panel. Each panel comes with a separate power plug, power switch and cable. For combining more than one panel please contact the supplier for alternative options.

Heating is controlled by a simple on/off switch or by thermostats. Several models of thermostats, (wall mounted, radio controlled and thermostats with clock and week programming) are available. Also the inclusion of a thermostat directly into the panel is possible on request. Installation of in-wall components may require that the work is done by a professional electrician. Please observe the respective local regulations.

#### 4.1.3 Surface materials

The heating panel can be produced with different surface materials:

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- wood (HDF, MDF, HPL)
- glass and plexiglass, polycarbonate
- metal (aluminium, steel, polished steel)
- plastics

### 4.1.4 Designs

Please consult our current design listing to see the available designs. In principle nearly all designs from the furniture industry are available, but some may require minimum order quantities. For glass and metal surfaces the decor can be made in painting or the use of various decoration foils.

You may also use wallpaper instead of decoration, in this case please select a standard white wood-product surface and apply suitable wallpaper and the right glue by yourself.

For special projects there is also the possibility to use individual designs (for technical restrictions and minimum orders please contact us.)

### 4.1.5 Technical description

### 4.1.6 Power supply

The heating has a 12V power supply. This is a so-called safe low voltage level that has many advantages over direct 230V grid current.

The power supply itself has an overload / overheat protection (self-resetting).

### 4.1.7 Formats

The product is available in the following formats:

Model	Rating (Watt)	H (cm)	W (cm)	D (cm)	Weight (kg)	Connection
A60	95	60	60	2-4	ca.4,5	230 V/ 50Hz power cable, switch, plug
A80	132	60	80	2-4	ca.6,5	230 V/ 50Hz power cable, switch, plug
A120	190	60	120	2-4	ca.9,0	230 V/ 50Hz power cable, switch, plug

The formats can be combined to cover the typical construction formats used in drylining. Of course it is also possible to cover a full wall and mix heated and unheated panels with the same decor and thickness.

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### Notes:

Additional heating on request.

The total thickness of the panels depends on the required backside-insulation and the format of the power supply used. Standard issue is 25-45mm, depending on selected design.

For vertical fixing (e.g. 120x60) only small changes in construction are required.

Formats with width of 30 cm are possible on request.

Larger formats and made-to-measure are on request.

### 4.1.8 Weights

The weight depends on design options. Please contact us for specific questions.

### 4.1.9 Handling

- **Cutting**

The panels are ready-made. Cutting the heating pad would destroy the integrated heating function and lead to electric malfunctions. But you can use a heating module that is small enough and use a larger cover that can be cut to dimension or produced to measure.

- **Treating and painting the front**

For decorative reasons you may paint the standard front with acrylic colours. In this case please do a trial with the paint first to detect eventual reactions with the laminate.

## 4.2 *Quality description*

### 4.2.1 Available design and colours

The product is available in four forms:

A) with selected surfaces known from furniture (white, wood, tone and marble imitations, uniform colours) or glass (security glass with paint or enamel coating)

B) on request it is available without décor for decoration by the customer (painting, wall-papering, adhesive foils)

C) with decorative sandcoating foil from SandOpal

D) for commercial users the heating module alone is available for build-in into wall-covers, ceilings, furniture etc.

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### 4.2.2 Colours and UV-radiation of the decor layer

The front surface of the wood is designed to the norm EN 438. The colours comply with the standard for interior products against greying / loss of colour.

Since this EN is valid for furniture, carpets and similar goods the use is limited to the interior. In case you intend to expose the material to higher levels of UV radiation, please check with us.

### 4.2.3 Edges

In the standard product the edges are not treated. You may paint the wood, oil it with varnish or other products intended for colouring furniture.

Other variations for the edges include hidden edges (for build-in use e.g. in furniture), aluminium edges / frames, especially for use with glass front. In this case the aluminium can be visible at the front or hidden behind the glass - visible only from the side. Steel and aluminium cassettes typically have no edges but are made by bending of the front surfaces.

### 4.2.4 Backside

The backside is screwed to the wall and therefore only protected with a foil or textile. In case you use the product as a freestanding heating unit it will be fixed to a stand and the backside will be covered with a second (or different) front cover.

For higher heating output this version is also available with two heating modules and therefore two warm fronts. Whether this makes sense or is a waste of energy depends on the use.

### 4.2.5 Thermal stress

The product is not very sensitive to thermal stress.

Short, local heat of up to 80 °C will not pose a problem. For security reasons the heating function is equipped with an overheating sensor that shuts off at inner temperatures above a critical value.

Never place the panel in a place where the heat cannot dissipate into the room. Never cover the panel or the frontside with textiles or other material.

### 4.2.6 Mechanical stress

The product is made of durable material and should endure normal mechanical stress. In the interest of a long life and good visual impression treat the panel like a piece of furniture. In case you use cleaning agents or furniture polish, please be careful to check if the product is intended for the use with the materials of the heating panel.

Avoid wet cleaning.

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### 4.2.7 Water and vapour

The product is not intended to be used in wet or moist places, but under certain conditions it can be used in the dry parts bathrooms without problems. Shield the electric components from water and moisture and observe the technical standards and regulations.

Special water-proof panels are in development, please contact your agent.

### 4.2.8 Chemicals

The material is not intended to withstand chemicals, but the product should not be affected by typical household chemicals, cleaners, soap that can also be used for furniture.

### 4.2.9 Cleaning

The product can be cleaned with ordinary furniture polish and soft tissue respectively glass cleaning products for glass and metal cleaning for metal surfaces. Avoid wet and direct water, as you would when handling an electric appliance.

Do not use steam- or high pressure water cleaners.

Unplug the heater during the cleaning process.

### 4.2.10 Technical Design

Changes in design are reserved by the manufacturer without notice.

## 5 Benefits to the user / sales arguments

### 5.1 *The concept*

The basic concept is to replace bulky and hot radiators with slim, flat surfaces that give a warm and comfortable heat. Logically it requires a larger surface if the heating temperature is only 35 degrees compared to when the radiator is 75 degrees hot.

Since the décor heating panel is a slim wall decoration that is available in many colours and designs, you don't have to hide it, you can integrate it as a part of your wall design or you can make it "optically disappear" by giving it the same surface as the remaining wall parts.

### 5.2 *Warm surface – quickly*

The typical surface temperature will be between 28 °C- the temperature that the air has in summer – and 38°C – a bit above the body temperature.

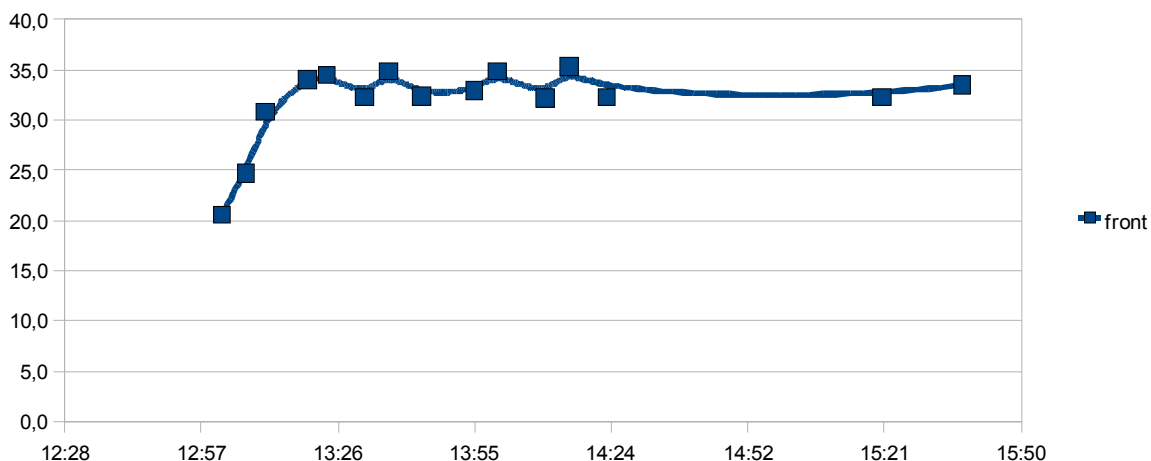
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Depending on the actual room temperature and the power that is used the panel will reach its heating level in about 15-30 minutes. After only 5 minutes you will start to feel the panel heating up. (Please note that these numbers are for the standard product. Products that include more thermal mass - like glass or thick wood composites - have a slower heat-up, but also a longer cool-off time.)

The thermo-protectors that are built in switch off the panel automatically at a safe temperature. After that the thermo-protector will switch on after a certain cooling down period, then switch on again and switch off at reaching the target temperature.

A rule of thumb is that the heating up is a bit shorter (by 25-35%) than the cooling down. You can see the typical heating up and the oscillations on the following graph.



### 5.3 Some scenarios for use

#### 5.3.1 Supplementary / auxiliary heating

Many houses have rooms that are not properly heated, even if the heating runs at full load. In this case you may install the décor heating panel as additional heating for a space where you need more comfort.

#### 5.3.2 Just a bit too cold?

Depending on the climate you will have days when it is just not comfortable. But often it does not pay off to start the central heating. Or you depend on someone else to start the heating. With the décor heating panel you are independent and can bridge the low-season for heating without stop-and-go operation of the central heating. (Which typically has higher consumption, more emissions and reduces the lifetime of conventional heating)

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systems – just as you know it from cars in the city).

### 5.3.3 Holiday homes, garden houses, sporadically used rooms

Many people have rooms that are used only a few hours or days each year. Maybe there is no heating at all or it is too expensive to heat the room all year round. Then you can use the décor heating panels instead of investing into an expensive central heating system. The capital cost is much lower and the panels can be installed one by one, just as your budget allows. There is no need to invest 10.000 EUR or more just to have it warm for a few days per year.

### 5.3.4 Expanding your house?

When you add one or more rooms to an existing house this typically means that the heating central has to be re-designed. Or you have to live with suboptimal performance in terms of consumption, emissions and comfort.

In this case it is easy to use décor heating panels, because they don't require the large overhead of a central system. Temperature control, time-switching and other features are available to have a comfortable solution.

### 5.3.5 Low-energy houses

In countries like Austria, Germany and Switzerland most newly constructed houses already have a very low energy consumption. This trend is spreading across Europe and North America. The downside is that an optimized state-of-the-art central heating cannot recover its high investment, because the heating requirements are so low. In this case it makes perfect sense to invest into décor heating panels.

### 5.3.6 You like design for the radiator?

If you spend a lot of money on your home then you want it to look perfect. You may use designer radiators that come at a very high cost, or you may use marble- or stone-heaters which run on electricity, but are heavy, very hot and expensive in purchase and operation.

Or you may use décor heating panels and select from a wide range of designs: from plain white to special colours, from marble imitation (without its cost and weight) to wooden surfaces. You can even order the standard product and paint it, put wallpaper on it or decorate it with suitable vinyl décor foil of your own choice.

### 5.3.7 Problems with underfloor heating?

Many people like underfloor heating systems, but they cannot install them. One group is afraid of varicosity in the legs, which must be considered. You don't want to change your heating system when you get older and your legs begin to ache.

The other group simply has technical limits that do not allow an underfloor heating or that

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make it rather expensive to install.

In both cases you can decide for décor heating panels to have a similar effect for heating without the headaches that underfloor heating can bring with it.

### 5.3.8 Partition walls and special applications

There is hardly a limit to the creativity of the user. It is for example relatively easy to use the wall panel as front for a partition wall. You may use it to create a mobile folding screen or you may use it to heat narrow workplaces, unheated toilets or fix it on the ceiling. For any special requirements, please contact the nearest representative or distributor.

### 5.4 Investment and operation cost

If you want to use a state-of-the-art central heating system today, you will get an optimized product with low emission and low consumption. Still, it will be very expensive and more likely than not, it will run on fossile fuel: oil or gas

If you have also a state-of-the-art insulation in your building the heating system will in fact become very expensive, because of its fixed costs: investment (ammortization), interest, service costs, chimney inspection and repairs make the bulk of costs. Even if you don't heat.

The décor heating panel is cheaper in investment and has no service or inspection costs. The lifetime can be expected to be much longer than for gas- or oil heating systems, because there are no moving parts, no wear-and-tear.

Although gas and oil are – at the moment – cheaper than electricity, the higher efficiency of the décor heating panel makes up for much of it. The rest is compensated by the lower investment and the flexible use.

***If you want to produce your own electricity with wind or photovoltaics (only few will have the option to use mini-hydro), you can do this as prices for these products fall year by year. Technically feasible today, it is your decision if you want to go indepent one day.***

***Until then you can always change your power supplier and buy 100% renewable energy from the public grid. This will typically be a mix of wind and hydropower that is certified by an independent supervision body.***

## 6 Competition

This section is currently not open for publication.

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### 7 The theory and physics behind infrared heating

#### 7.1 *The basics: what is heated?*

Typically the heating of rooms has the task of compensating the loss of energy through walls, doors, windows, floor and ceiling when the outside temperature is lower than the room temperature. In the course of heat loss the surfaces (walls, windows, ceilings, floors) get colder and warm bodies - like that of the persons in the room - have to compensate for the lost energy.

What is felt as a cold room is therefore mostly the feeling that walls and other surfaces in the room are colder than wanted.

A conventional heating system heats up the air in the room first and the air heats up the wall (and other surfaces) to replace the lost heat. This way the feeling for the person is a warm room.

The well-known underfloor heating system solves the problem in a different way: instead of heating relatively small objects (radiators) to temperatures of 50, 60, 70 or more degrees Celsius, it heats a large area (typically the full floor) to only 28-35 degrees.

The effect is that less energy is used for the same level of comfort. Variations of the technical concept are wall-and ceiling heating systems.

The décor heating panel is a wall panel that can be heated. The temperature can be selected in a certain range, most people feel comfortable with 30-38 degrees (a temperature that is not recommended by doctors for underfloor heating systems, because it might cause problems with the veins in the legs).

Basically the energy is transferred to persons and objects in the room, but not through the feet, but directly to the front or back. A very good insulation towards the backside of the décor heating panel makes sure that the energy is going into the room and not into the wall.

#### 7.2 *Energy saving and clean heating*

The best thing you can do for saving energy is to insulate the building. This will probably be the best investment you can make. Only after that you have to look for a heating system that covers the remaining heating load with the lowest investment.

Many studies have proven that the room temperature is lower for the same level of comfort, if low-temperature heating systems are used. This is because the persons and objects are heated, not the wall. In the case of the décor heating panel the panel itself is a part of the wall and this part is warmer than the wall would be with conventional heaters. And the heat arrives not only at the feet, but at the full surface of a standing or sitting person.

Lower room temperatures mean that less energy can be lost and must be replaced by the heating. So energy consumption is less because of this factor.

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But electric heating also has the advantage that practically 100% of the power is converted to heating. There are no losses in chimneys or problems with fuel efficiency when burning oil, gas, coal or wood. There are also no losses in pipes that run badly insulated somewhere in the basement or in the neighbor's flat.

Since nothing is burnt, there is also no emission of NOx-gases, sulfur gases, smoke or respirable dust.

And if you want to heat perfectly environmental friendly, you can always decide to buy the electric power from 100% renewable energy like hydropower or wind.

You may even produce the power yourself with a mini-windmill or with photovoltaics. This is technically possible today, but the investment is still quite high. Prices come down significantly each year, while energy costs go up. So it is probably only a matter of time and you can be prepared today.

### ***7.3 Infrared heater explained***

Although the décor heating panel is not a typical infra-red heater, the physics behind it is still the same. The panel can be understood as a "far infrared" heater that requires only extremely low temperatures (basically the temperature that you can feel at the front side: 28-45 °C). It is clear that this is a big advantage over heaters that require 600, 900 or even over 1000 degrees to produce infrared radiation.

The principles of the working compared to convection heating is the same as described below in the article by Wikipedia.

#### **7.3.1 From Wikipedia, the free encyclopedia**

An **infrared heater** is a body with a higher temperature which transfers energy to a body with a lower temperature through electromagnetic radiation. Depending on the temperature of the emitting body, the wavelength of the [infrared](#) radiation ranges from 780 nm to 1 mm. The relationship between temperature and wavelength is expressed by the [Stefan-Boltzmann Law](#). No contact or medium between the two bodies is needed for the energy transfer. A rough classification of infrared heaters is connected to wavelength bands of major emission of the energy: short wave or near infrared for the range from 780 nm to 1400 nm, these emitters are also named bright because still some visible light with glare is emitted; medium infrared for the range between 1400 nm and 3000 nm; far infrared or dark emitters for everything above 3000 nm.

#### ***Elements of infrared heaters***

For practical purposes, most infrared heaters are constructed by either using the emission of a flame (usually soot or a heated matrix) or an electrically heated [filament](#) as the emitting body. If an electrically operated infrared heater (infrared

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lamp) is used, the filament is usually protected by a heat-resistant quartz glass tube. Depending on the filament temperature, a filling of the quartz tube with inert gas (e.g., halogen) may be required to prevent filament degradation. These emitters use the same materials and principle as a [light bulb](#).

The most common filament material used for electrical infrared heaters is [tungsten](#) wire, which is coiled to provide more surface area. Low temperature alternatives for tungsten are [carbon](#), or alloys of iron, chromium and aluminum (brand name 'kanthal'). While carbon filaments are more fickle to produce, they heat up much quicker than a comparable medium-wave heater based on a FeCrAl filament.

Industrial infrared heaters sometimes use a gold coating on the quartz tube that reflects the infrared radiation and directs it towards the product to be heated. Consequently the infrared radiation impinging on the product is virtually doubled. Gold is used because of its oxidation resistance and very high IR reflectivity of approximately 95 %

### ***Types of infrared heaters***

Infrared heaters are commonly used in infrared modules (or emitter banks) combining several heaters to achieve larger heated areas.

Infrared heaters are usually classified by the [wavelength](#) they emit. Near infrared (NIR) or short-wave infrared heaters operate at high filament temperatures above 1800 °C and when arranged in a field reach high power densities of some 100s of kW/m<sup>2</sup>. Their peak wavelength is well below the absorption spectrum for water, making them unsuitable for many drying applications. They are well suited for heating of silica where a deep penetration is needed.

Medium-wave and carbon (CIR) infrared heaters operate at filament temperatures of around 1000 °C. They reach maximum power densities of up to 60 kW/m<sup>2</sup> (medium-wave) and 150 kW/m<sup>2</sup> (CIR).

Far infrared heaters are typically used in low-temperature [infrared saunas](#).

### ***Efficiency of infrared heaters***

Theoretically, the efficiency of an infrared heater is 100% as it converts nearly all electrical energy into heat in the filament. The filament then emits its heat by infrared radiation that is directly or via a reflector impinging on the product to be heated. Some energy is lost due to conduction or convection.

For practical applications, the efficiency of the infrared heater depends on matching the emitted wavelength and the absorption spectrum of the material to be heated.

For example, the absorption spectrum for [water](#) has its peak at around 3000 nm. This means that emission from medium-wave or carbon infrared heaters are much better absorbed by water and water-based coatings than NIR or short-wave infrared radiation.

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The same is true for many plastics like PVC or polyethylene. Their peak absorption is around 3500 nm. On the other hand, some metals absorb only in the short-wave range and show a strong reflectivity in the medium and far infrared. This makes a careful selection of the right infrared heater type important for energy efficiency in the heating process.

### ***Applications of infrared heaters***

IR heaters are used in industrial manufacturing processes including curing of coatings; heating of plastic prior to forming; plastic welding; processing glass; cooking and browning food. They are used when high temperatures are required, fast responses or temperature gradients are needed or products need to be heated in certain areas in a targeted way. Their application is difficult for objects with undercuts.

They are also used to provide warmth to suckling animals whose mother cannot or will not provide them with natural warmth as well as to captive animals in zoos or veterinary clinics, especially for lizards and other reptiles, and tropical animals such as birds.

### ***Further reading and references***

Deshmukh, Yeshvant V.: Industrial Heating, Principles, Techniques, Materials, Applications, and Design. Taylor and Francis, Boca Raton, FL: 2005.

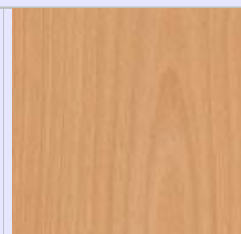
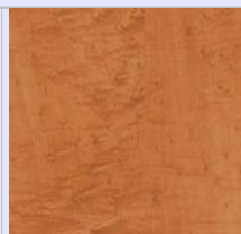
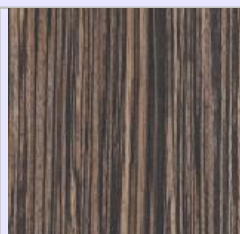
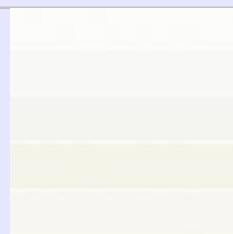
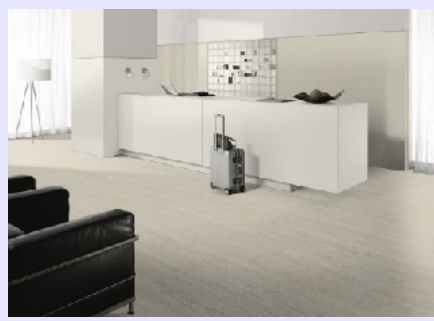
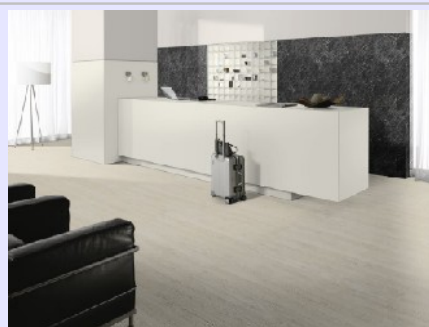
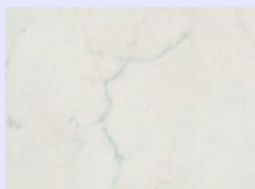
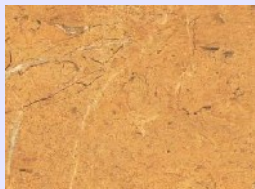
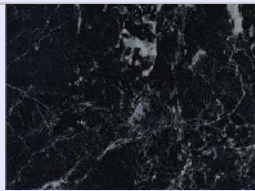
Siegel, Robert and Howell, John R.: Thermal Radiation Heat Transfer. 3rd Ed. Taylor and Francis, Philadelphia, PA:

# DECOR HEATING PANEL

Invisible -Low Energy Consumption - Low Investment

## 8 Design examples

### 8.1 Attachment: design examples



# DECOR HEATING PANEL

## Invisible -Low Energy Consumption - Low Investment

### 8.2 Colours and designs

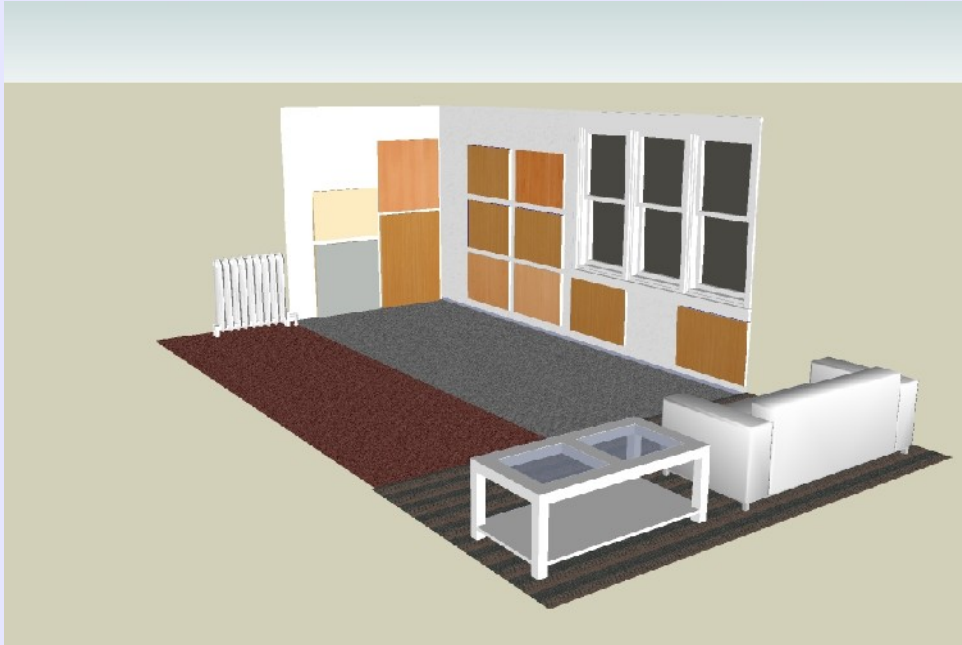
				
85	73	65	651	74
				
107	165	227	275	291
				
408	35	504		

Decors are subject to change and availability. Ask for special decors and minimum quantities of panels.

# DECOR HEATING PANEL

Invisible -Low Energy Consumption - Low Investment

## 8.3 Showroom Picture 1



## 8.4 Showroom Picture 2

