

Carbon Fiber Electro Heating System

Carbon is an element:

- Durable
- There is no thermal expansion
- It keeps the same efficiency at any temperature condition
- Do not oxidize
- It's flexible
- It has a thermal efficiency significantly higher than other heating cables

Heating systems with components in Carbon Fiber

- Innovative systems for floor, wall, ceiling heating, producing custom made or modular
- Radiating elements such as radiators, towel warmer, radiant panels, platforms
- Cables and heating bands in technical textiles

TT Heating systems offer:

- Reduce the installation and management costs
- No Maintenance
- Adaptability to install, ideal for special solutions
- Do not require technical rooms, chimneys, pipes
- There are no moving parts subject to wear

Indoor floor



Radiant Panels



Modular Panels



Outdoor



Radiators



Radiant Platforms



1 – Interior floors

In floor heating spreads the heat radiation, so widespread, are absent convection and require ambient temperatures lower than all other systems.

The system of floor and wall heating has been designed to meet various requirements for new buildings and renovations, both in the civil, industrial and marine. Due to its versatility is applicable in any situation: homes, offices, laboratories, gymnasiums, schools, churches, museums, and outdoor pathways.

The system is formed by a net system or heating pad made of carbon fiber resistors. This system has a thickness of only 4 mm and can therefore be installed in new or refurbished buildings occupying an area far less than any other system.

It comes pre-sized sheets in each room to be heated. The installation is very simple and fast.

Possibility of installation under the floor made by concrete marble slabs, wood, carpet etc.

All systems on the floor are designed to be regulated by a simple thermostats.

The cost of the installation, its ease of installation and use, the total lack of maintenance, are the strengths of the system.

The system produces no harmful emissions into the atmosphere. Greatest economic benefit if combined with photovoltaic power plant and "Energy Account".

HEATING MATTRESS

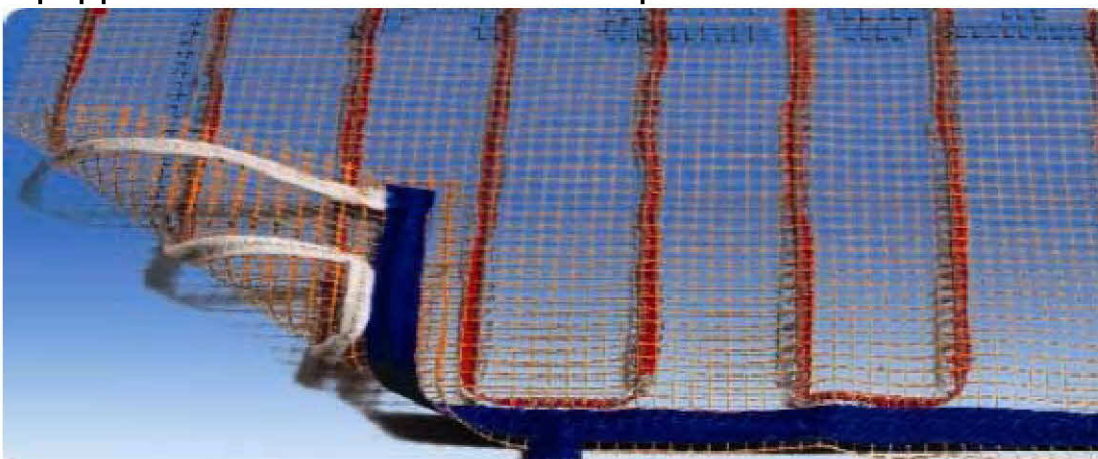
The heating pad allows a uniform spread of heat and all pointing upwards, thanks to its composition of insulating layers, thermo reflective. It can be installed under the slab, which thanks to its thermal inertia, keeping the temperature of the room after turning off the system.



This system is ideal for new construction, also where it is used floor with an high thick layer (eg marble), where it was chosen for environments the installation of a prefinished floor (eg parquet), for those special situations where there is the 'need to maintain the existing floor and covered with a new floor or the need to install a heating system that is not visible (eg religious sites or museums).

HEATING NET

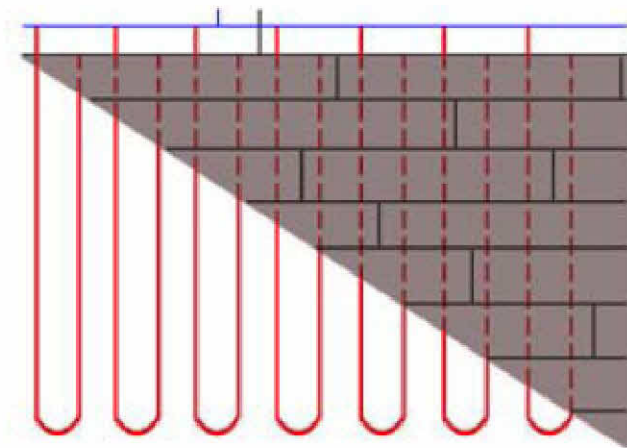
The net consists of heating carbon fiber conductors insulated in accordance with regulations, the glass fiber net as support for the cable, which is equipped with thermal insulation strips to reduce heat loss down.



Ideal for rooms to be heated rapidly and where the operation had to be adjusted dynamically. Thanks to the reduced mass of the system thermal inertia times are significantly reduced, this makes it particularly suitable for environments where heat intermittently (second homes, offices, shops, hotel rooms, etc. ...). The net is placed between the heater substrate (or an existing floor) and the floor. The installation is simple and needs a shave with elastic glue to anchor the network to the screed before laying the floor.

Technical details

Arrangement of Carbon: Resistors, anchored to the network or embedded in the mattress, slide along the surface and are attached to a side pillar. This keeps the system running even in the event of damage by the user.



The consequences are so much less irritating than traditional floor heating systems (eg loss of fluid in the case of water systems).

Power installed

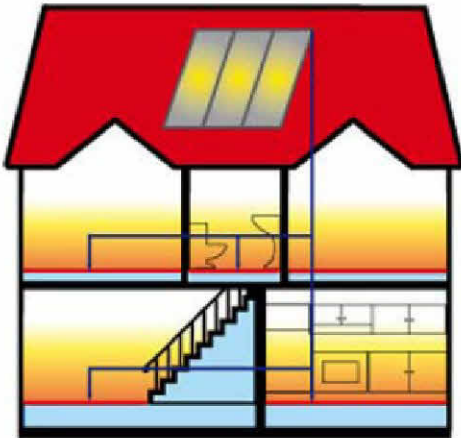
The power that is prepared for a correct use of the system depends on several factors: size of the area to be heated, thermal insulation of the building, type of materials used for construction, display, especially from different climates and different needs.

Must run a specific size and then the power is planned to be used which can vary from 50 to 70 watts per square meter, or may even be increased in case you want a faster response or reduced if the building has low dispersions. In normal applications using a power of 55 watts / m which corresponds, in terms of consumption, about 22 Watts / h m for an average of 14 hours.

Application where yachts must be guaranteed comfort, marble bathrooms example, power can be raised up to 100/150 watts / sqm

The photovoltaic and its integration with electric heating

The photovoltaic system produces electricity cleanly and contributes to safeguarding the environment.



The electronics and thermoregulation

All carbon fiber heating systems are designed to be regulated by thermostats and can be enriched by an electronic control that regulates the power allowing you to customize the use and not to take additional powers which involve the application of increased energy delivered by the managing of resources.

The optional electronic control can manage up to 8 zones and goes to the thermostat that regulates each area (we recommend using a thermostat for each room).

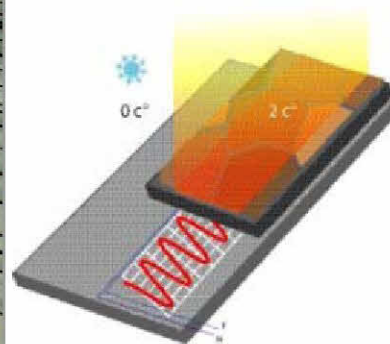
This additional control allows you to limit the energy input and can also be set not to exceed a certain maximum number of watts. So, besides having the advantage of monitoring consumption, can leave more than enough power available for use any other appliances or electrical equipment.

OUTDOORS ANTI-FREEZE SYSTEM

The anti-freeze can be heated by electricity to areas outside the pavement eliminating the problem of ice formation or melting snow permitting. It is particularly suitable for installation on slides, ramps, terraces and also for sports fields. The system comprises a network for concrete coupled with the threads of resistance in carbon, a probe to measure the surface temperature artifact from heat and power unit with electronic control.



When the probe detects a surface temperature below 2 ° C, resistance is fed so that the temperature does not fall below certain values. The operation of the system is automatic, and comes into operation only when needed, so it can be operated year-round without the danger of wasted energy. The photos show the installation of the system, in the case of sliding access garage or truck routes. It is sufficient to apply two strips to form impressions of the media. The temperature probe is placed along with the cast concrete near the surface. In the case that the system was switched off and the ice was formed, the power of that would allow the melting of ice or snow and the elimination of the disruption that it would have been achieved.



Radiant heating panels

The radiant panels are adaptable to any situation (integrated in the false ceiling panels, fixed to the ceiling, suspended at a given height, etc. ...), are removable and easily retrievable. The radiant panels are ideal for heating specific areas or jobs in a single environment, such workshops, storehouses, workshops, mark fresh or arcades in public spaces such as bars, restaurants, etc. ...

This heating radiant system use the principle of radiation.

The radiation has a heat exchange system that uses infrared waves as carrier transfer. Indeed, two bodies or two objects having different temperatures radiate naturally towards each other and the flow of heat from the element to be warmer to the colder. The radiation released into the panels becomes warm to touch an object to a colder wall or a person. Waves, therefore, are not absorbed from the air but from solids that turn them into heat, which is transmitted to the environment, creating, thus, the optimal conditions for occupant comfort.



Technical data of radiant panels

Radiant panel heaters save energy because it means, precisely due to the effect of radiation, all power is concentrated by heating the man, the floors, walls, objects, and only indirectly the air. The panels are easy to install as light and handy. The cost of acquisition, installation and operation are highly competitive compared to any other similar type of plant (thermo strips water, forms radiant gas heat umbrellas, etc. ...). The heating elements have a very low thermal inertia and allow entry scheme in the area to be heated quickly. No maintenance and support, require or permit any special rule to be respected.

CONFORMITY

This product complies with electrical safety measures in accordance with the Low Voltage Directive 73/23/EC and CEI EN 60335-1:1998 (CEI 61-150) EN 60204-1:1998 and IEC Giordano Institute: the product complies CEI EN 50366:2004 relating to electromagnetic emissions.

POWER INSTALLED

200x50 panels have more power (400 Watts / 800Watt / 1200Watt) as needed and you can run them with the necessary power-all designed to get forever comfort and consumption monitored. The panels have a 60x60 single 200Watt power and are suitable for office use.

TEMPERATURE CONTROL

The panels can be adjusted by chrono-thermostats with probes or by a computer programmed to contain consumption optimizing operating costs.

APPLICATIONS

A typical installation will install over the workplace. The map below shows such as in a machining the panels are placed on the operator or on areas of greatest presence. The panels can also be used to heat office areas. Are also valid for installation in farms.

Application Examples

Ambiente di lavoro



*Ristorante
Officina meccanica*



*Pannelli
da controsoffitto*



POWER CONTROL

200x50 panels have three labor-intensive 1 / 3, 2 / 3 and 3 / 3 of maximum power. For the connection of the panels is simply a power cord and a switch.

RADIATORS

WALL RADIATORS

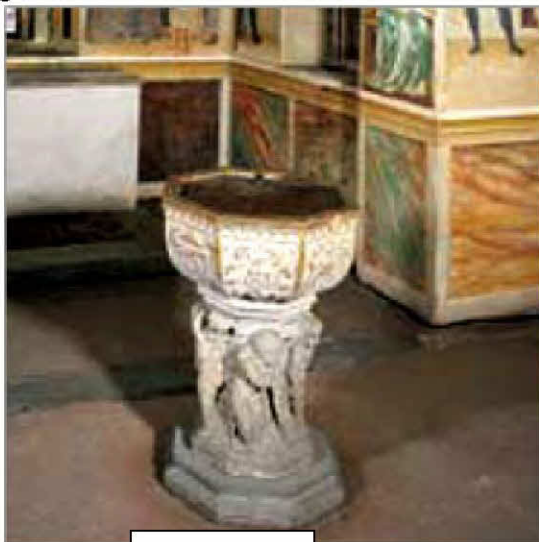
Completely customizable system of radiators on the wall. The radiator is no longer conceived only as a heating unit and functional but also decorative and design, all with an energy-efficient technologies for energy savings. Unlike traditional radiators radiator heat by radiation and convection for the radiant heating can warm bodies who are facing the radiant panel and is not limited to heating the air. This allows for optimal comfort and save energy.



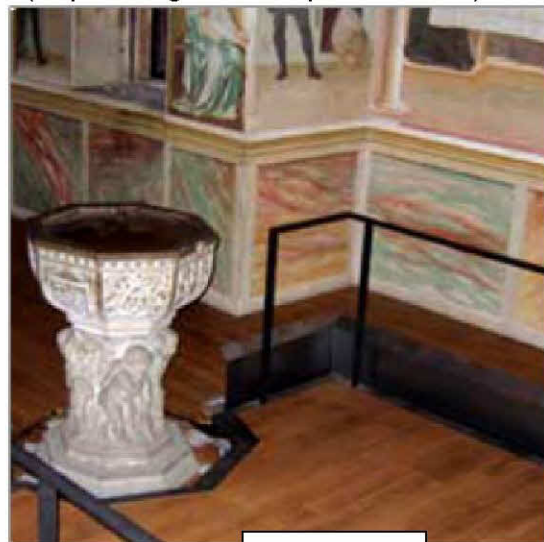
Radiators are available in two sizes and can be painted with a broad color palette to suit every taste. In addition, he designed and patented a design line that can coat the panel with ceramic tile, marble and mosaic making a piece of furniture or fully integrated with the environment.

HEATING PLATFORM

The heating platform is a platform for electricity with carbon fiber heating wire suitable for heating of houses of worship, museums and ancient buildings. The platform is placed on the floor and warms the room by radiation. The heating in the case of large environments, such as churches, can be localized only to affected areas such as desks and area zone celebration. The method of construction optimizes the flow of useful heat, minimizing the loss to the existing floor, so as to optimize operating costs. The system is covered by several international patents. The system is suitable for intermittent operation, it can be turned on one hour before use of the space, creating a benefit for those who occupy the spaces above the platforms, it is generally sized to heat the air around the room. The temperature is adjusted by the platforms of the probes. The platforms may be constructed divided into zones, so you can turn on only those necessary. The system is maintenance-free as boilers, pumps, hydraulic systems. Composition Platforms section • Structure perimeter aluminum frame 15x15 mm • Coverage area size sheet aluminum platform raised 15 mm from the base • Heating constructed measure applied under the aluminum plate with a special thermal conductive resin • Insulating layer of wood and by insulating 12 mm • Maximum size of 300 x 200 cm (depending on the specific case)



BEFORE



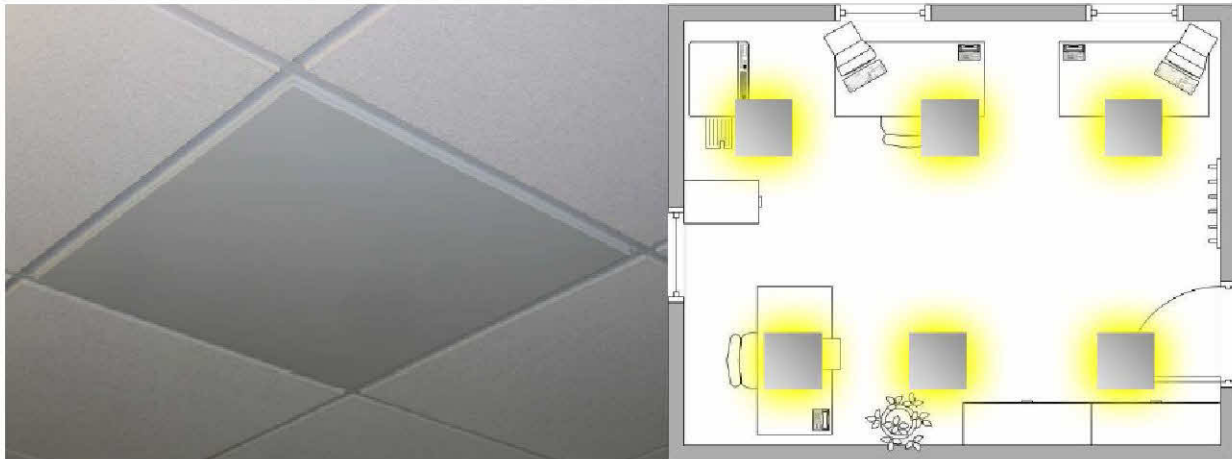
AFTER

Composition platforms constructed by

- Structure perimeter wood frame with aluminum edge
- Heating made to measure
- Insulating layer of wood and insulating 12 mm
- Protection of TNT on existing floor features
- carbon fiber heating cables placed in several layers of other reflective materials, heat conductive and insulation material with a total thickness of 3mm
- Power 230 Watts
- Power consumption 100 watts / sqm or as needed
- Temperature control platforms available with electronic sensors operated by

The platforms can be built separated from each other or work and can have different finishes.

RADIANT CEILING PANELS FOR HEATING



Radiant ceiling panels are suitable for heating the workplace. The heating radiation is very comfortable ventilated environments such as offices or medium volumes. A typical installation will install in the workplace, the plant shows such as in an office panels are placed over areas of greater staff presence.

Technical Data

- Heating by radiation
- Power supply 230Vac
- Max Temp 130 ° C surface

Ceiling panel

60 x 60cm 220W Weight: 5 Kg

POWER CONTROL

By a thermostat or by on/off

CONFORMITY

This product complies with electrical safety measures in accordance with the Low Voltage Directive 73/23/EC and CEI EN 60335-1:1998 (CEI 61-150) and CEI EN 60204-1:1998
No emissions for electromagnetic induction in accordance with EN 50366.

WARRANTY

The branded products are produced by TT Thermal Technology Ltd Marika. Marika Ltd provides a guarantee of the product 24 months from date of purchase.

ELECTRIC BLANKETS FOR LITTLE TANKS

TECHNICAL DATA

GENERALS:

- Power supply: 230 Vac
- Absorption: 1500 Watt max
- Weight: Electric blanket 5 Kg, Cover 2,5 Kg., Control unit 1,5 Kg.
- Dimensions : Electric blanket 118 cm* 100 cm , Cover 123 cm*103 cm

ELECTRIC BLANKET:

- External fabric made up of heavy teflon-coated polyester
- Inner bulk-insulation of 3 layers
- Carbon fibre heating cable
- Thermal conductive membrane
- The surface in contact with the tank is made up of aramidic fabric (nomex/kevlar)
- ml 0,5 power supply cable of neoprene with IP68 connector
- The fastening of the electric blanket is made up of velcro with 3 elastic tensionings to make the blanket adhere
- Prepared for an electronic controller (temperature probe installed on the electric blanket)
- Provided with an upper cover which covers the vertical wall for 30 cm. This cover is made up of polyester with bulk-insulation, velcro for the fixing on the corners and on the central wall.

ECHNICAL DATA



- Power supply: 230 Volt 50Hz
- Made-to-measure electric blanket
- External fabric of heavy teflon-coated polyester
- 3 layers bulk-insulation
- Heating carbon cable
- Thermal conductive membrane
- Surface in contact with the antenna made up of aramidic fabric (nomex/kevlar)
- 1,00 ml power supply cable made up of neoprene
- Velcro fastening of the electric blanket
- Power: 1.500 Watt max

ELECTRONIC CONTROLLER:

- Controller installed on a plastic box, which will be hanged on the wall or free
- ml 3 power supply cable with industrial 230V plug
- ml 4 power supply cable of the electric blanket provided with IP68 connector
- Weight: 1,5 Kg

HEATING BANDS

Thermal Technology produces made-to-measure heating bands with carbon fibre heating elements, both mass produced and small amounts or prototypes. The heating bands can be of different powers, sizes and they can be powered by different voltages (line voltage 230Vac or low voltage 12/24V).

These types of bands are versatile and useful in different particular applications: industry, civil, construction or to heat small tanks, pipings, mechanical parts that are sensitive to low temperatures.

Useful also in the phase of production for the working of plastic material. They are very flexible and resistant, they adapt to the surface to heat, they are provided with velcro for the fastening wrapping completely around the object to heat, they can be adapted at the hole for pipings, inspections and other.



Carbon Physical Properties

	Carbon	Copper	Description
α ($^{\circ}\text{C}^{-1}$)	-0,0005	0,0043	Temperature Coefficient
D (kg/m^3)	2260	8920	Density
S (m^2)	0,0000025	0,0000025	Cable Section
ρ ($\Omega \cdot \text{m}$)	$3,5 \times 10^{-5}$	$1,7 \times 10^{-8}$	Electrical Resistance
Ce ($\text{J}/\text{kg} \cdot \text{m}$)	710	384,4	Specific Heat

Starting from the law of conservation of energy, where the electricity is transformed into heat, if we fix the time and temperature, we need less power with carbon than using copper.

This is due by the main difference in the material as:

- Carbon density is 25% compared to copper
- Carbon specific heat is 54% bigger than copper
- Electrical resistance is 2.058 times bigger than copper, this does the carbon one of the most efficient material used to heat

The Joule effect is bigger for a material with higher electrical resistance.