

COMPANY & PRODUCTS

The
Specialists
for Electrical Heating Systems

HEAT TRACING · HEATERS · SURFACE HEATING · BOILERS

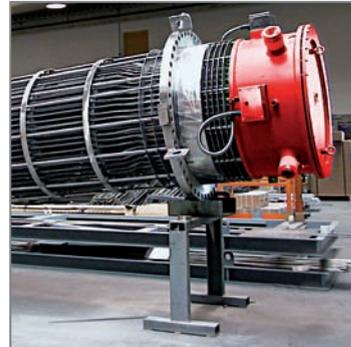
SWITCHGEARS · UNIPLEX · AUTOMATION

PROJECT DESIGN · INSTALLATION · SERVICE



KLÖPPER
THERM

“Specialist
someone with expert knowledge
and abilities on a certain subject.”





**What matters for us is what you want to implement.
Electrical Heating Systems by Klöpper-Therm.**

Our reputation as a specialist for electrical heating systems is due to the safe operation, top quality and high efficiency of our products. We take pride in translating this into action for you and your project. Our experience is your advantage.

Everything fits: We offer all services under one roof, from developing and planning to manufacturing and commissioning. Based at Dortmund with a staff of more than 80 employees, we realise projects all around the world – and are therefore close to you, our customer.

**Electrical Heating Systems from the Specialist.
Take our word for it.**



KLÖPPER
THERM

With Tradition and Vision, looking to the Future.

We know our roots. In 1928, Eugen Klöpfer established an engineering office. His entrepreneurial spirit – combined with courage, creativity and energy – made him establish a group of companies, from which Klöpfer-Therm was the first company to become independent in 1986. We remain faithful to his pioneering spirit, and know where we want to be tomorrow.

As an established company, we grow with our ideas. The collaboration with our business partners is based on continuity and reliability. Our products are the result of many decades of experience and enthusiasm in innovation.

To prepare ourselves for future tasks, we rely on modern calculation procedures for planning and on well-established, mature technologies for manufacturing our products – always striving to improve ourselves.



Eugen Klöpfer

Much can be said.



Firmly established quality and safety standards are always the key factors for our products and services. Our products are manufactured and documented in accordance with the applicable guidelines and standards.

All Klöpper-Therm employees pull together. You can rely on the best quality in all fields thanks to our integrated quality management system as well as clearly defined company objectives. Our promise – your satisfaction.

Our Certifications:

- ▶ ISO 9001
- ▶ SCC**
- ▶ ATEX 94/9/EC
- ▶ IECE_x
- ▶ PED 97/23/EC
- ▶ ASME U-Stamp
- ▶ AD 2000-Rules
- ▶ GOST TR/R
- ▶ RTN
- ▶ and others

This is what you want from a heater: Customized for you and your plant, quickly set up and ready for operation.

Innovative Heaters for your Processes.

Whether for keeping temperatures in storage tanks, compensating heat losses in supply pipes, liquefying firm substances such as wax, or vaporising water or thermal oils – electric heaters by Klöpper-Therm are the answer. They provide optimised, energy-efficient, reliable process control for all kinds of plants: chemical, petro-chemical and pharmaceutical as well as power plants and refineries.

Invest in the safety of your plants by using our explosion-proof heaters. We supply approved designs for operation in the explosion-endangered areas of zones 1 and 2.

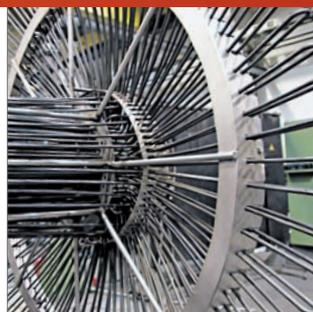
Apart from a direct heating, liquids, solid or gaseous substances can also be heated indirectly by an electrically heated carrier such as thermal oil.

Functional Principle:

An electric heater works by converting electric energy into heat. The required exchange surfaces are established with so-called hairpin heating elements, cartridge heating elements or special heating cables, which the medium circumflows.



PRODUCTION

**Your Advantages:**

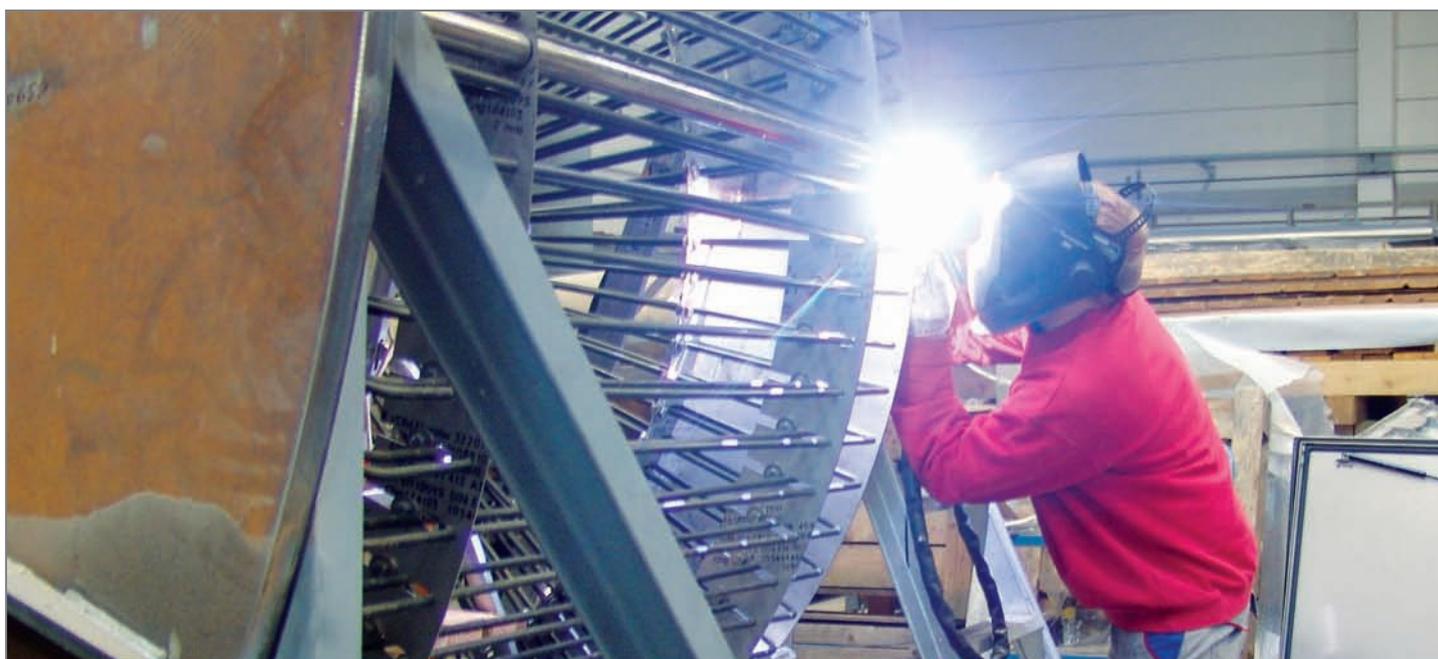
- ▶ operation even in explosion-endangered areas
- ▶ large power spectrum and high-energy density
- ▶ high efficiency as the energy is almost completely converted into heat
- ▶ high operating safety
- ▶ simple regulating concept and high temperature constancy
- ▶ material selection on request
- ▶ simple installation and commissioning
- ▶ no local emission sources
- ▶ low investment costs

Solid Calculations for Sound Implementation.

Based on your specifications, we verify the technical feasibility for each order and transform it into a concrete design. Developing individual solutions using modern calculation methods – combined with our experience – guarantees an optimal product.

We have implemented solutions with such operating parameters as:

- ▶ medium temperature up to 700 °C
- ▶ operating pressure up to 30 MPa
- ▶ installed power up to 10.000 kW even larger in modular arrangements
- ▶ supply voltage up to 690 V AC, in special cases up to 1200 V DC

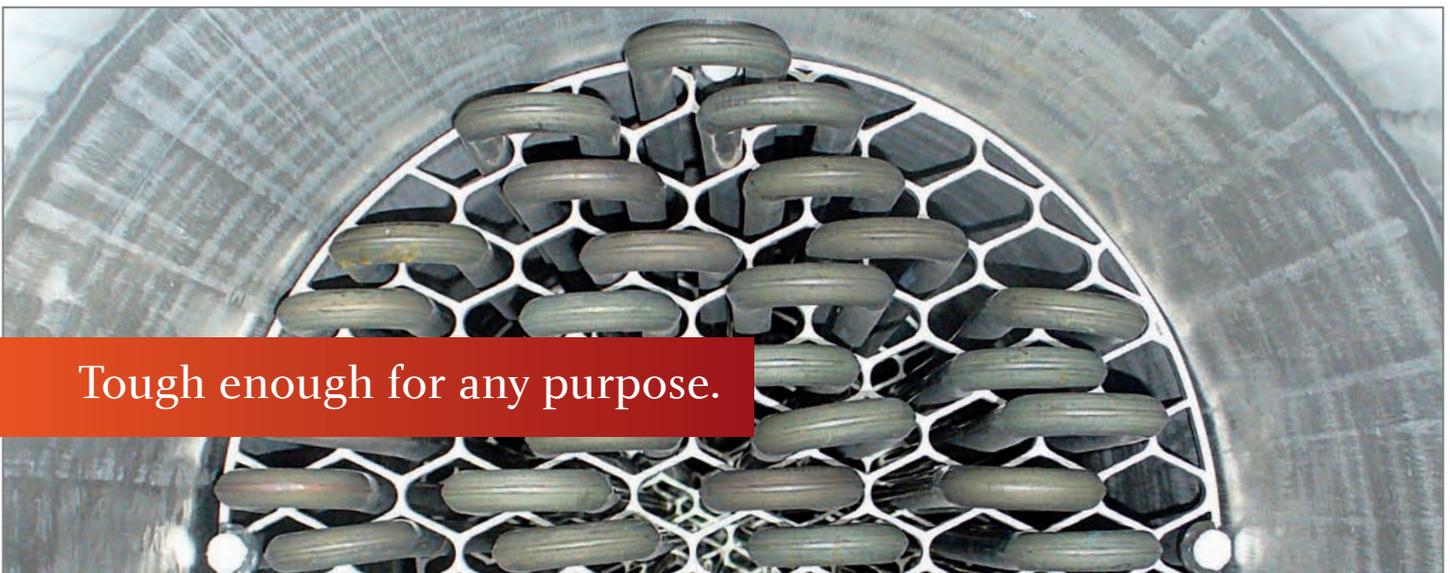




Longevity Thanks to Precision, Functionality and Suitable Materials.

Excellent quality requires excellent material. We use a wide range of materials. Depending on the process medium and the desired operating temperature, we determine the suitable structural material. The choice goes from unalloyed steel to low-alloyed steel to corrosion- and heat-resistant steel. Nickel-based alloys are available for high operating temperatures, with sufficient rigidity even at temperature ranges above 700 °C.

Surfaces that come in contact with highly corrosive media, particularly in the offshore industry, can be manufactured from titanium alloy.



Tough enough for any purpose.



“Ex | pe | ri | ence
*knowledge obtained through
practical work or by repetition; routine,
discovery through which somebody
becomes more knowledgeable.”*

Better manufactured by Klöpper-Therm: fully wired, turn-key heaters for every performance class.

The Right Design for Each Application.



Heating up Liquids

Liquids stand for high heating capacities and good thermal conductivity. They have low requirements in terms of operating temperature and pressure. Our expert knowledge is nonetheless required to prevent the medium from thermally disintegrating or vaporising caused by overheating (cracking). The Klöpper-Therm know-how lies in distributing the heating power across a surface – for the best solution in terms of technology and operational efficiency.



Heating up Gases and Vapours

Heating gases with a heater is a complex task. High temperatures must often be regulated while maintaining a high operating pressure. Heaters from Klöpper-Therm meet these requirements by an application-oriented dimensional design. Our formula for success includes suitable materials, optimal flow and an individual regulating and control concept – this ensures continuously safe operation and reduces maintenance costs.

Connect. Ready. Go.

Our systems combine heaters and switchgears into a compact and easy-to-use package. A perfect, self-contained solution that requires little space and is quickly and easily installed. Plug and play: just connect to the pipes and electric supply, and our systems will work trouble-free – right from the start. All documents required for our heaters by authorities as well as all technical descriptions are part of the overall delivery. Your process and our system solution come together and belong together.

Customized Switch and Control Cabinets

For our electric heaters, we design and supply made-to-order switch and control cabinets. Only this can ensure the plant's proper functioning and functional safety. Communication with the control system is achieved according to your specifications, either by an analogous or digital signal exchange, or by a bus system.

The power is regulated either infinitely variably by a thyristor power unit or by several independently adjustable heating stages, or as a combination of both. Our switchgears are produced and tested in accordance with EN 61439/EN 61000 and meet the requirements regarding electro-magnetic compatibility of guideline 2004/108/EC. The relevant declarations of conformity are included as part of the delivery.

Our switch and control cabinets are subject to a continuous inspection as well as a final:

- ▶ inspection of functions
- ▶ heating-up inspection (upon customer request)
- ▶ circuit feedback (upon customer request)
- ▶ acoustic emission measuring (upon customer request)



Things are heating up – and your maintenance costs will remain cool thanks to the electric boilers by Klöpper-Therm.

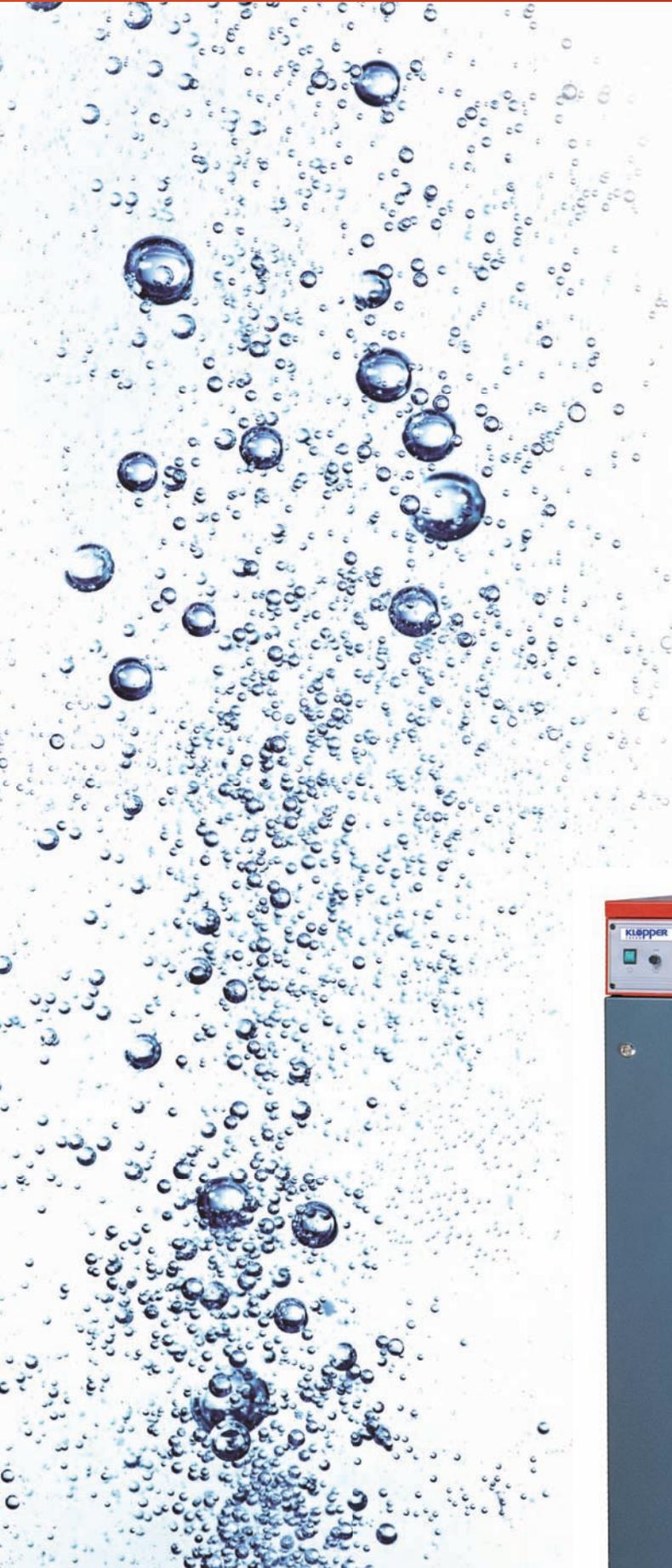
A future-oriented boiler design is the result of many years of research and development. Electric flow boilers are used for generating hot water in heating plants and for direct heating, storage operation or in combination with other heating systems. As an alternative to other energy types in new buildings or when converting central heating plants, these boilers offer a range of applications: radiator heating, floor heating, mixed systems or bivalent operation with other energy types. Depending on the relevant operating conditions of the energy supplier, electric flow boilers are used for direct or storage heating by utilising the free electric performance during off-peak times.

Your Advantages:

- ▶ efficient use of electric power
- ▶ optimising the operating costs with bivalent operation
- ▶ operation in off-peak periods
- ▶ secure supply of energy
- ▶ high availability, short reaction times
- ▶ easily integrated with existing plants and systems
- ▶ increased plant efficiency
- ▶ emission-free heat production
- ▶ long service life
- ▶ low space requirements
- ▶ low maintenance costs

Electric hot water boilers (electrode-type) and electric steam boilers (electrode-type) round off the product offer in the upper performance range. They serve to produce hot water or steam for the industrial purposes in the performance range of up to about 70 MW. Applications include the areas of municipal, industrial and local heating and district heating, such as:

- ▶ in off-peak periods in a combined operation, parallel or alternatively to other energy carriers
- ▶ in direct heating operation by using free electric connecting performances or for raising the temperature during heat recovery
- ▶ in thermal storage operation at night and during off-peak periods and for integrating with combined heat and power plants or as an operating reserve

**Hot Water Boiler Type MB****Power range 30 – 150 kW****Hot Water Boiler Type SB****Power range 180 – 1200 kW****Electric Hot Water Boiler (electrode-type)****Power range 1 – 50 MW****Electric Steam Boiler (electrode-type)****Power range 2 – 70 MW**

Compact construction and various boiler sizes with different regulating designs are available. Further performance and operation options can be achieved by connecting boilers in series or parallel.



Quality in every detail – heat tracing for your process, highly flexible in its design.

Heat Tracing by Klöpper-Therm

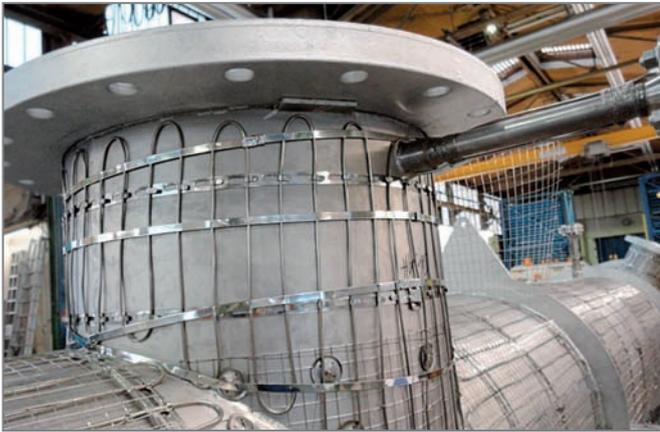
Different purposes, applications and processes require individual solutions made to measure. We are passionate about designing custom-fit electrical heating systems for every plant, for the industrial sector as well as for explosion-endangered areas.

Heat tracing is used in many industrial sectors to heat-up products in pipes and vessels to process temperatures, to maintain such temperatures or to keep the products from freezing. Heat tracing in filter and conveyor systems is used to prevent condensation.

The Advantages of Heat Tracing:

- ▶ useable even in explosion-endangered areas
- ▶ highly flexible and highly customisable
- ▶ effective and economic exploitation of the input energy
- ▶ highly accurate temperature regulation
- ▶ low maintenance costs





Series Resistance Heating Cables

are mainly 1-core cables with these features:

- ▶ defined Ohm-resistance per meter
- ▶ nearly constant heating power across the overall temperature range
- ▶ variable connecting voltage up to 750 V
- ▶ optimal monitoring by series connection of resistances
- ▶ can be used in explosion-endangered areas
- ▶ simple heating circuit set up
- ▶ useable for large heating circuit lengths with only one feed and thus low power cabling

Series resistance heating cables are divided into two main groups:

One-Core Plastic Heating Cables

- ▶ suitable for aggressive ambient conditions
Temperature range from -60 °C to +260 °C

Mineral-insulated Heating Cables

- ▶ high temperatures with a high heating power
Temperature range from -60 °C to +800 °C

Heating Tapes

Self-limiting Heating Tapes

- ▶ features a heating element with PTC properties between the two connections, permitting a lower flow of electric current at higher temperatures, thus reducing the power output in self-limiting manner
- ▶ suitable as frost protection as well as to maintain process temperatures up to 150 °C, intermittently up to max. 250 °C, e.g. during steam cleaning

The Main Features:

- ▶ temperature-dependent output
- ▶ easy handling
- ▶ lengths adjustable nearly infinitely
- ▶ useable in explosion-endangered areas

Parallel Heating Tapes

- ▶ have no temperature-dependent heating element and thus provide a constant heat output

Measuring Sensors and Thermostats

- ▶ temperature regulating and temperature limiting

Connection and Fastening

- ▶ by easy-to-install components

The ideal control for heating systems has a long life span, is always accurate and well connected.

UNIPLEX III

The Heating Circuit Controller of the Future

Klöpper-Therm has a long tradition of developing special electronic heating circuit controllers and monitoring devices for controlling electrical heat tracing systems. With our heating controller UNIPLEX III, we have successfully introduced the third generation of heating controllers in the market.

Development competence and future-oriented technology: several functional elements for control and monitoring have been combined into one device. Temperature controller, safety temperature limiter and current regulator have been arranged in a space-saving way on a 19" plug-in board in European standard size.



Your Advantages with UNIPLEX III:

- ▶ high safeness by safety temperature limiter (STB), certified to ATEX and SIL 2-graded
- ▶ continuously control of heating system by driving a solid state relay (SSR)
- ▶ adjusting the desired effective heating current by an integrated current regulator
- ▶ reducing the number of used resistance types
- ▶ adapting the heating current to variable maintain temperatures
- ▶ limit monitoring for temperatures and current
- ▶ automatic self-testing
- ▶ serial RS-485 interface and Ethernet interface for connecting to DCS systems

UNIWIN Visualising Software

The visualising software UNIWIN allows the heating controllers UNIPLEX III to be clearly displayed and easily operated. The software is based on Java™ and is compatible with the Windows or Linux operating systems.

Plants consisting of a number of individual electric heating systems can be configured as groups by the UNIWIN software. This provides simple and trouble-free access to the current state of the heating circuits – including data storage. The software offers all key data of the heating circuit as well as a status overview and a message system. Trend curves show graphically both temperatures and current.

Your Advantages with UNIWIN:

Password-protected operation, data exchange through standard interfaces and remote diagnosis and service enhance the operation. UNIWIN supports the use of different languages.

Switch and Control Cabinets

Supplementary to the regulating technology, Klöpper-Therm plans and supplies complete switchgears for indoor and outdoor installation.

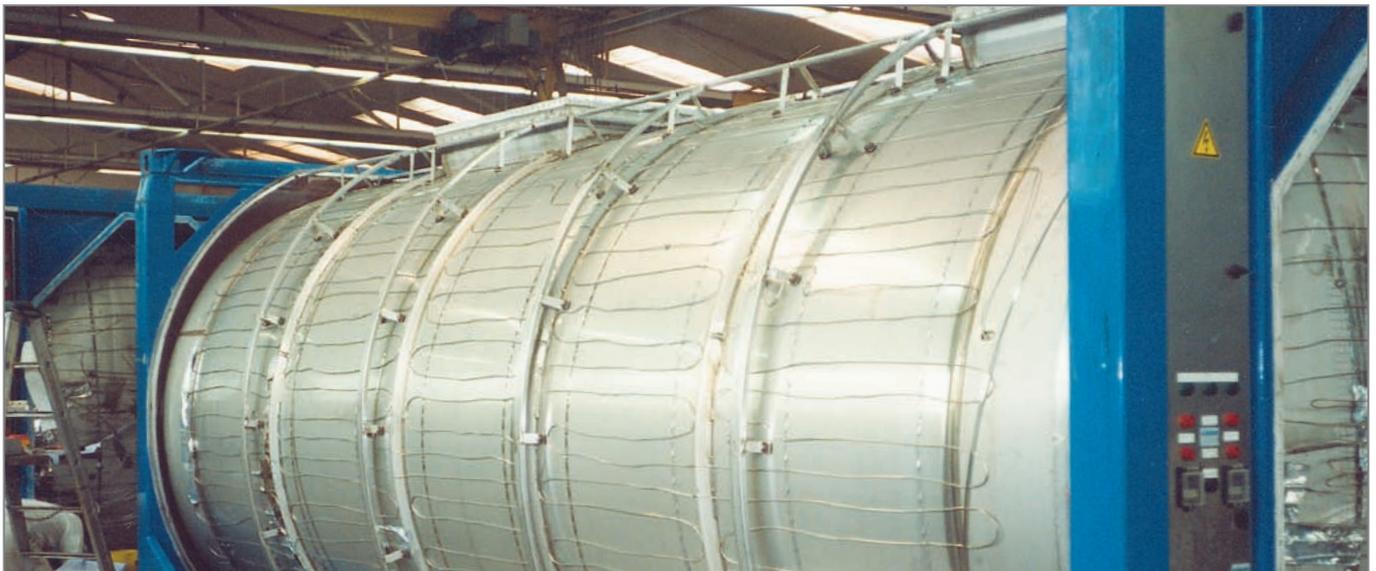


For us, the unusual is always a special challenge – special heating systems for your project.

Special Heating Systems Made by Klöpper-Therm

Individual solutions are our speciality. Heating systems by Klöpper-Therm are sophisticated complete solutions with optimally matched components, including delivery and installation. Everything from a single source – with no go-betweens.

Our special heating systems are well equipped for particular requirements. They offer an effective and economic use of energy, perfect temperature regulation and low maintenance costs. Our products' flexible installation, their transportability and sophisticated concepts have already proven themselves many times in practice – they are the solution for your project, even in explosion-endangered areas.



Reactor Heating

- ▶ high power density at temperatures up to 650 °C
- ▶ design as per customer requirements
- ▶ quick and easy installation thanks to fully wired heating mats

Heating Hoses

- ▶ ideal for transporting gaseous or liquid substances over short or long distances
- ▶ maintaining the temperature of media constantly

Heating for Tank Trucks and Containers

- ▶ heating systems for a maintain temperature of up to 250 °C
- ▶ matching control
- ▶ transportable solutions as an option

Heating plates for valves and rotary valves

- ▶ high power density
- ▶ optimal Transmission by dimensionally accurate adjustment

Internal Pipe Heating Systems

- ▶ ideal for non-insulated underground pipes
- ▶ also for underwater pipes

Foundation Heating

- ▶ frost heave protection for liquid gas tank foundations, e.g. LNG tanks
- ▶ exchangeable and easy to install



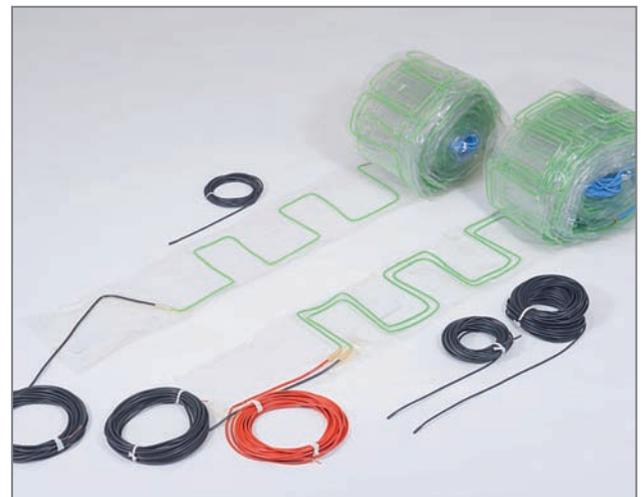
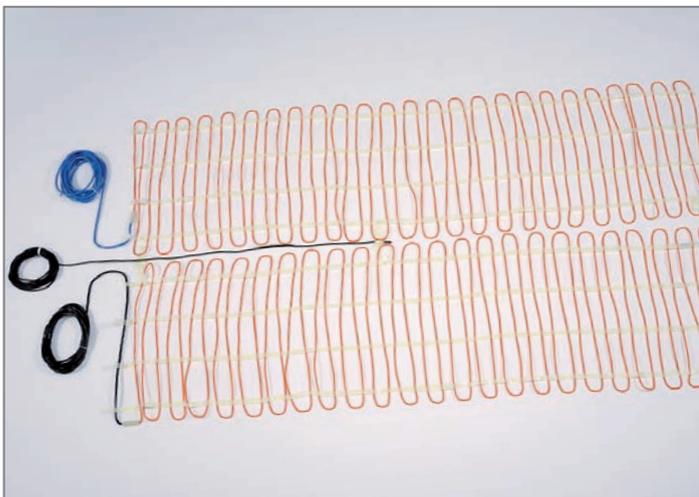
“Cre | a | ti | vi | ty
*creative thinking, combining
 information anew, based on the ability
 to make new sense of the already known,
 finding new ways.*”

When you see this sign, you are surely thinking about solutions made by Klöpper-Therm.

Surface Heating Made by Klöpper-Therm



We offer reliable products and concepts that bring heat to cold areas – for cold storage and cooling chambers as well as industrial plants and open spaces. For several decades, we have been designing and realising electric surface heating. Our turn-key solutions for you include engineering, production, delivery, installation and service all in a reliable package – matching components from a single source for high effectiveness.





Heating Mat Systems

Everything for the Cold Store

Cold storages and cooling chambers use a range of heating systems depending on the design. Klöpper-Therm offers sophisticated solutions for the most varied requirements.

Floors and Foundations (Frost Heave Protection)

- ▶ prevents frost heaving of the floor/foundation
- ▶ object-specific laying plans
- ▶ easy installation of heating mats

Walls and Ceilings

- ▶ for cold storage walls completely or partly adjacent to ground soil
- ▶ for fire protection walls between cold store rooms
- ▶ for insufficiently ventilated cavities
- ▶ to prevent condensation or ice on the cold storage's sluice walls and ceilings

Support Heating

- ▶ compensates the cold stream towards the ground soil or roof through higher power density

Heating for Concrete in the Door Area

- ▶ prevents the door sealing from freezing to the floor
- ▶ prevents icing of the entrance area

Heating Systems and Control

Outdoor Surface Heating

- ▶ to keep public and private outside areas such as traffic routes, roads, driveways and stairs free from snow and ice
- ▶ for industrial plants, for example rotating scraper bridges in round or oblong sewage treatment basins
- ▶ in explosion-endangered areas, for example for ice-free access to pumping stations

Domestic Applications

- ▶ constant draining of melting water from roofs into gutters, downpipes and drains
- ▶ prevents refreezing
- ▶ maintains the temperature of warm water pipes

Control Systems

- ▶ switchgears and control boxes
- ▶ electronic temperature controllers
- ▶ use inside cold store rooms possible

Emergency Equipment

- ▶ Emergency call alarm system for Cold Stores with "Wake On LAN Function"
- ▶ for cold stores of more than 10 m³ volume and below 0°C operating temperature (mandatory in Germany acc. to DIN EN 378-1)



**We are there for you, wherever you need us.
Service is always close by.**

We want to be there for you. KlöpPer-Therm is therefore always available to give advice – with representations and business partners throughout the world.

We take pleasure in supporting you in planning and designing your electric heating system and optimizing your processes. We are your partner for electric heating systems – from installing or monitoring the assembly to commissioning and training your team by specially trained supervisors.

We look forward to meeting you and hearing about your new tasks.

“Sa | tis | fac | tion
*being well balanced inside and not wanting
anything other than one has got.*”

**Your satisfaction is our benchmark.
The added-value promise from Klöpper-Therm.**

Your contract counts. Your project is important to us. Working as a team with our business partners is an essential part of our work. A flexible delivery programme and the latest calculation methods provide the necessary flexibility and comprehensive quality assurance concept to achieve the desired process security. Experienced and creative employees are behind the Klöpper-Therm idea: custom-fit solutions for electric heating systems.



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