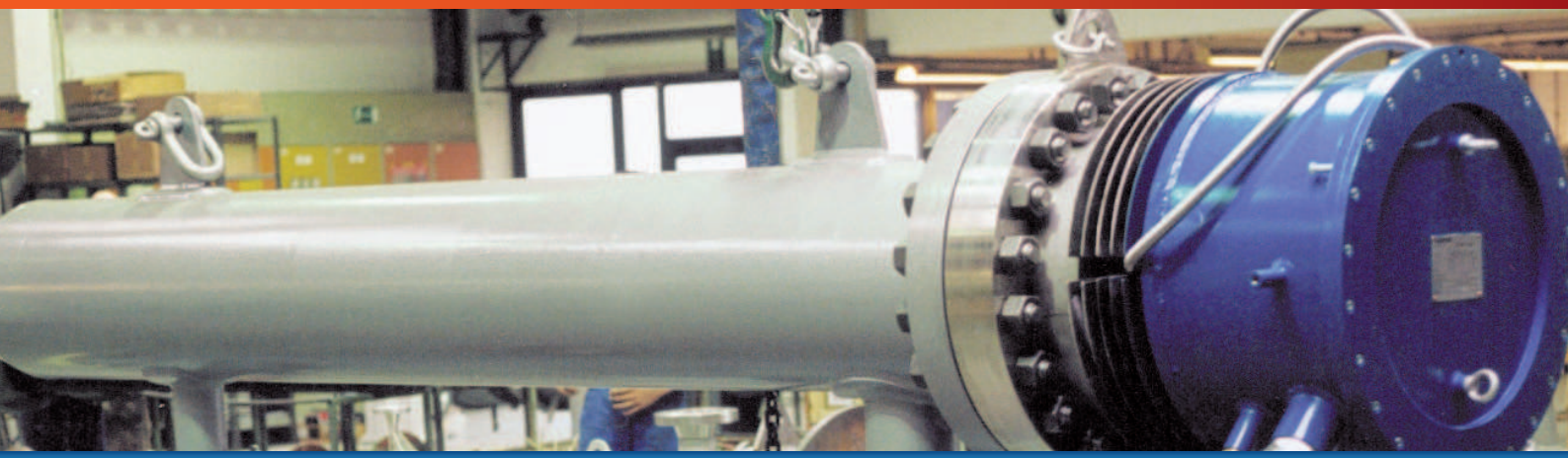
PRODUCT IN FOCUS

Our Heaters *for your Projects*



HEAT TRACING SYSTEMS | **HEATERS** | SURFACE HEATING SYSTEMS | BOILERS

KLÖPPER THERM

Electric Heaters

Electric heaters are used for direct or indirect heating or temperature maintenance (compensation of heat losses), vaporization and melting of solid, liquid and gaseous media.

THE SYSTEM AT A GLANCE

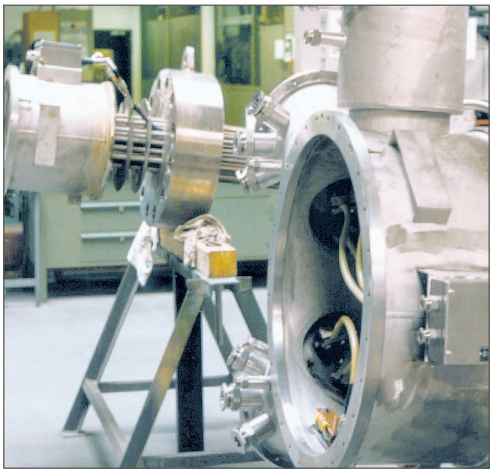
For the worldwide use of our products and services we are fulfilling the high quality requirements and expectations of our customers from design up to commissioning. We don't only want to keep these requirements but we strive to develop them continuously to the benefit of our customers. We achieve this by following strictly our integrated management system and the clearly defined mission statement. Each of our employees is involved in the management system and is responsible for the quality of our products and services.

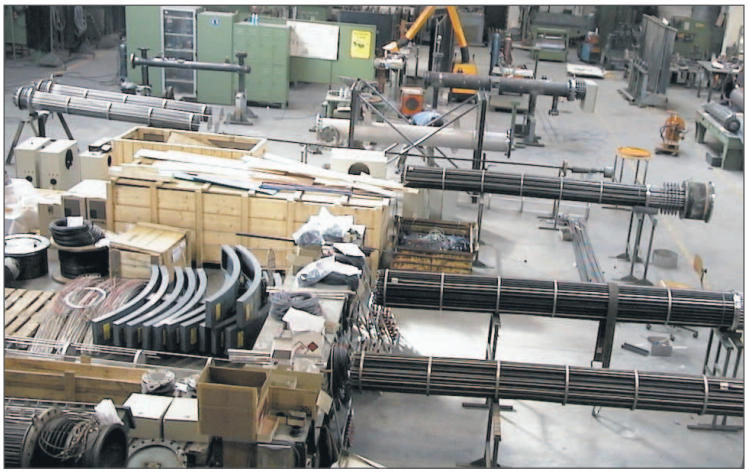
Quality right from the Start

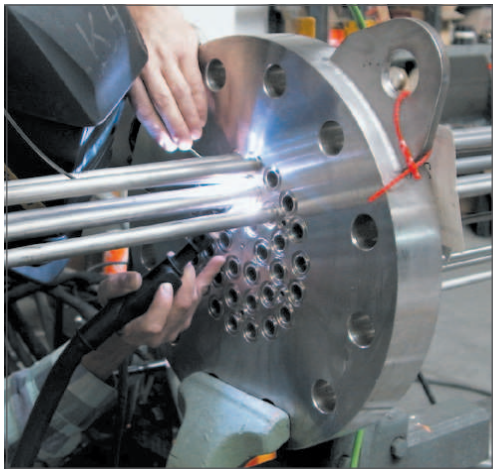
Our scope of supply

ranges from heating inserts up to the complete unit for the installation in the ex-threatened area.

All our electrical heating systems are customized to your needs. These include complementary components like condensate, collective container and balance container, water treatment, pump as well as valves. The power supply is controlled by a switch board with multi-stage or continuous control.







Our Management System

IECEx Quality Assessment Report

Quality Management System according to DIN EN ISO 9001

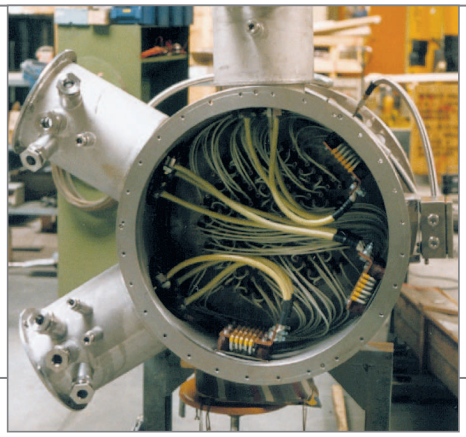
Safety Management according to SCC**-Catalogue

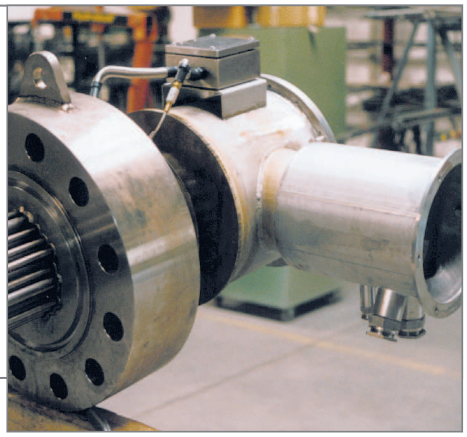
Ex-Directive 2014/34/EU (ATEX)

Pressure Equipment Directive according to 2014/68/EU

ASME U-Designator (U-Stamp)

Application





The Application Range

for heating inserts, heat exchangers and electrical heaters includes among others the chemical, petrochemical, pharmaceutical, steel, textile, cellulose, oil and gas industries as well as power stations and refineries.

The Erection

can take place industrial or in areas classified as Zone 1 or Zone 2 in the presence of gases and vapors of groups IIA, IIB and IIC. For use classified areas, the standard heating insert is delivered with a wiring room in “flameproof design”, “Exd”-certified, if required, additionally equipped with connection boxes “Exe” or “Exi”-certified, including EC type examination certificate/EU declaration of conformity, thereby the electrical part is separated from the instrumentation part.

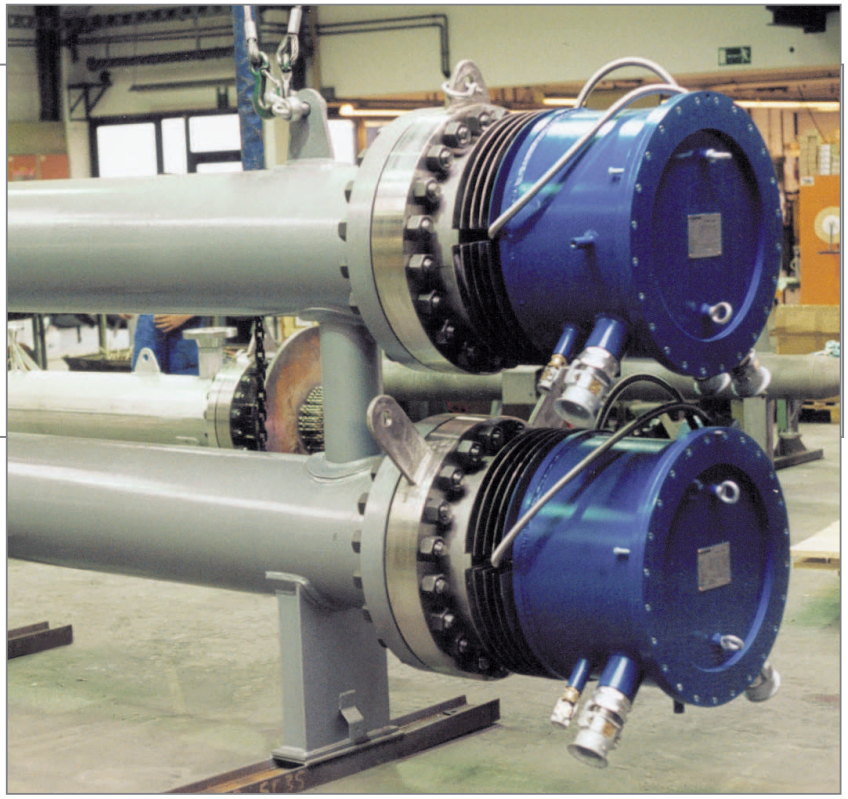
The Design

of an electric heater depends on the process temperature and pressure as well as on the power needed.
The material is selected taking the fluid to be heated, the temperature and pressure into consideration. Materials such as carbon steels, stainless and heat resistant steels, nickel-based alloys, titanium are used.

The limits of application need to be verified in each individual case. The following operating and design conditions have already been proved to be feasible:

- temperatures up to 650°C, unique constructions up to 850°C
- pressures up to 250 bar
- duty up to 10.000 kW can be reached in one unit
- supply ac-voltage level up to 690 V / dc-voltage level up to 1200 V

Construction



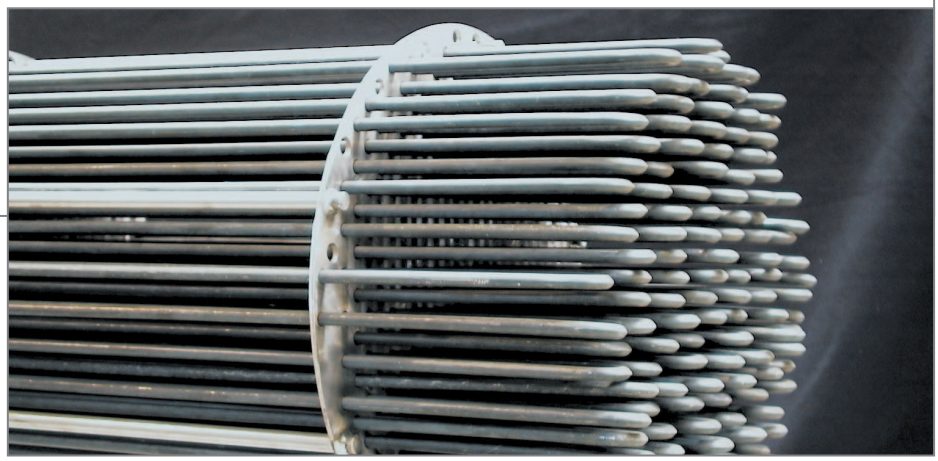
An electric heater is comparable with a conventional tube bundle heat exchanger and consists of the following components:

- cylindrical shell (flow pipe) with nozzles for fluid in- and outlet and, as required, with nozzles for drain, ventilation, safety valve etc.
- heating insert (tube bundle) equipped with electric heating elements
- girth flange for mounting the heating insert
- temperature sensors (limiters) for measuring the element surface temperature
- temperature sensor (controller) for measuring the fluid temperature
- supports for horizontal or vertical erection
- wiring room for the termination of heating elements
- connection box for temperature sensors

The fluid is heated while flowing throughout the shell. The flow is directed in one or several ways, transversely or longitudinally, depending on the medium and the operating conditions. The maximum temperature permitted on the heating surface (defined by the fluid to be heated) and the pressure loss permitted need to be taken into consideration.

The temperature of heating surface is monitored by at least two temperature sensors (thermocouple, PT100, thermostat), working as limiters. As soon the working temperature limit is exceeding, the total power of the heater is switched off. Re-starting is permitted when having clarified the reason for cut-off.

Construction



Different types of heating elements are used for the transmission of heat, such as hairpin heating elements and ceramic heating elements.

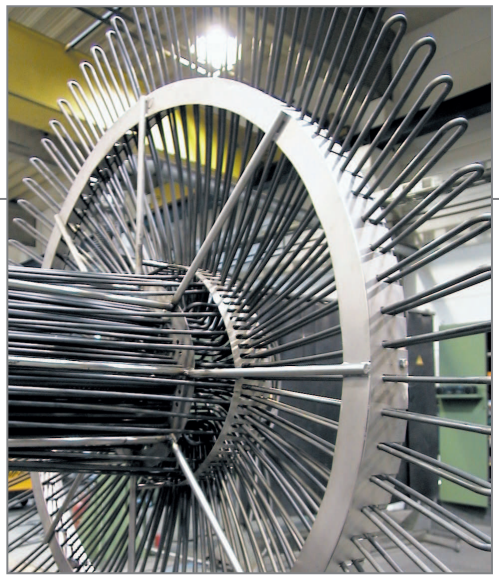
Hairpin heating elements

The standard hairpin heating element consists of a metal jacket pipe with a diameter of 8.5 up to 16 mm, bended U-shaped. The heating wire is located in the centre of the pipe, embedded in highly compressed magnesium oxide. This guarantees an excellent isolation resistance and a perfect heat conductivity between heating conductor and jacket pipe. The heating elements pass through the tubesheet via tube sleeves, are sealed in the main terminal box by brazing/welding or by bite couplings. Hairpin heating elements are mainly used for heating up gases and liquids.

Ceramic Heating Elements

mainly consist of ceramic parts, pushed and fixed onto a guide rod and the heating spiral. The ceramic heating element gets inserted into a metallic heating cartridge tube. The cartridge tube is sealed to avoid direct fluid contact and is seal-welded into the tubesheet. These elements can be replaced without interrupting operation. They are used for heating all kinds of oils or other highly viscose fluids in tanks.

Design



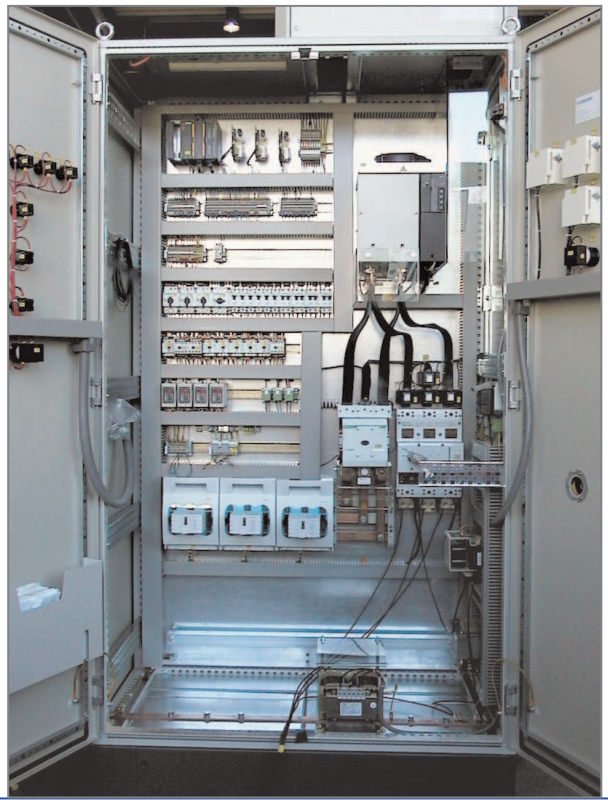
The installed power depends on the process requirements. Several operating conditions can be realized with one electric heater. The thermal design of an electric heater needs to consider that the medium can absorb the energy supplied without exceeding permitted temperature limit on the heating surface. The “know how” is based on the capability to distribute the power over a surface in a technically and economically optimum solution. Concentrating the power over a small surface produces a high watt density (W/cm”) and thus a higher temperature on the heating surface. In the most unfavorable case this might lead to a damage of medium or damage of heating elements. In comparison, a conventional heat exchanger needs to have sufficient exchange surface available to be able to supply the energy to the medium to be heated.

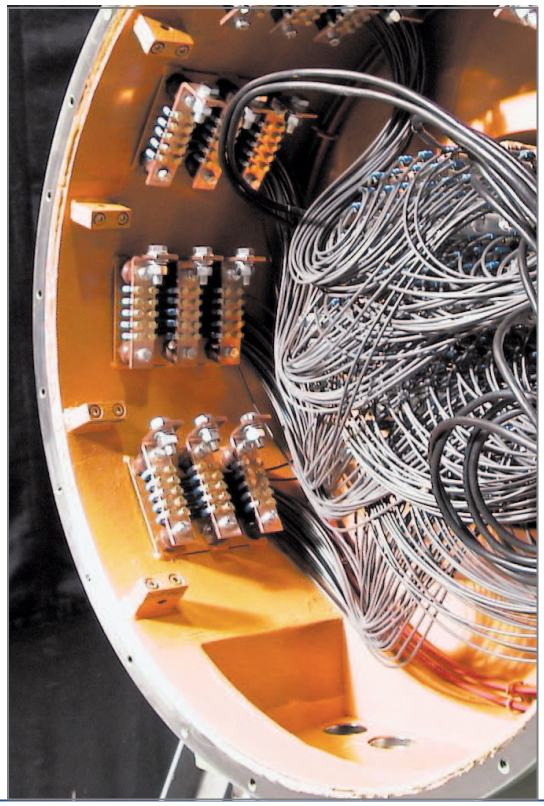
The mechanical design of pressurized components is calculated in accordance with harmonized norms such as EN 13445, EN 12593, on request, by applying the respective calculation rules in the country of installation or other international standards e.g. ASME and includes all necessary tests, certificates and inspections. Additional loads on nozzles and supports caused by pipelines as well as environmental loads due to wind and/or earthquake are also part of our design verification.

Switch and Control Cabinets

Regulation, Monitoring

For all electric heaters, we design and deliver switchboard and control panels for erection in distribution stations or outdoor, also in hazardous areas. The power is controlled by 4-20 mA signal, provided by the customer, either via several heating stages or infinitely variable via thyristor controller. Before delivery, functional testing is conducted; including full current testing on request.





References

The below-mentioned major projects briefly present some of the projects realized. Please contact us if you require additional information.

Gas heater

The gas heater is designed to heat up large amounts of H2-rich gas in classified areas. Because of the high pressure and temperature present in the process the overall heater power was distributed onto four identical heating bundles which has been proven as the technically and economically design option.

Technical Features:

- Heating Capacity: 4x = 850 kW = 3400 kW
- Design Temperature: 450° C
- Design Pressure: 122.6 bar
- Supply Voltage: 690 V / 3 ph

Manufacturing Standard:

- PED 97/23/EC
- ASME VIII Div. 1

The Range of Application:

- Heating of gas in the Ex-classified area

Our know-how consists in adjusting the exchange surface to the operating conditions.
The process temperature has to be met without exceeding the permissible film temperature or the allowable pressure drop.

Hot water boiler type series HWE

The hot water boilers are used as stand-alone consumers for grid stabilization (negative control energy) as well as to secure the district heating supply. The area of application comprises the control range products: Secondary control range (SRL), minute reserve (MRL).

Technical Features:

- Power Range: 1 to 5 MW
- Electrical Connection: 690 V / 3 ph
- Design Pressure: up to 30 bar
- Design Temperature: up to 230 °C

Manufacturing Standard:

- PED 97/23/EC
- EN 12953 / EN 13445 / AD-2000

Features:

- Virtually stepless power control
- All common water qualities acceptable
- Reduced element surface temperature / large heat transfer area
- Direct hydraulic connection to the district heating network / heat exchanger not required
- Supervision-free operation according to EN12953 (TRD 604)
- High redundancy by up to 250 single heating elements
- Operational-friendly and maintenance-free design

Take our word for it.
At any time with pleasure.

Besides from careful planning and manufacturing, a professional installation is essential for the proper function of a heating system.
This service is guaranteed by our skilled and qualified service team.
Our employees install, test and put our heating systems including respective control units into operation.

The quality of our work is ensured by regular training measures and the consistent application of our management system and the SCC** catalogue (safety, health and environment).

A continuous maintenance of our heating systems and a detailed technical documentation complete our service package.

SERVICE PROMISES

KTPR02.EN.11.16

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