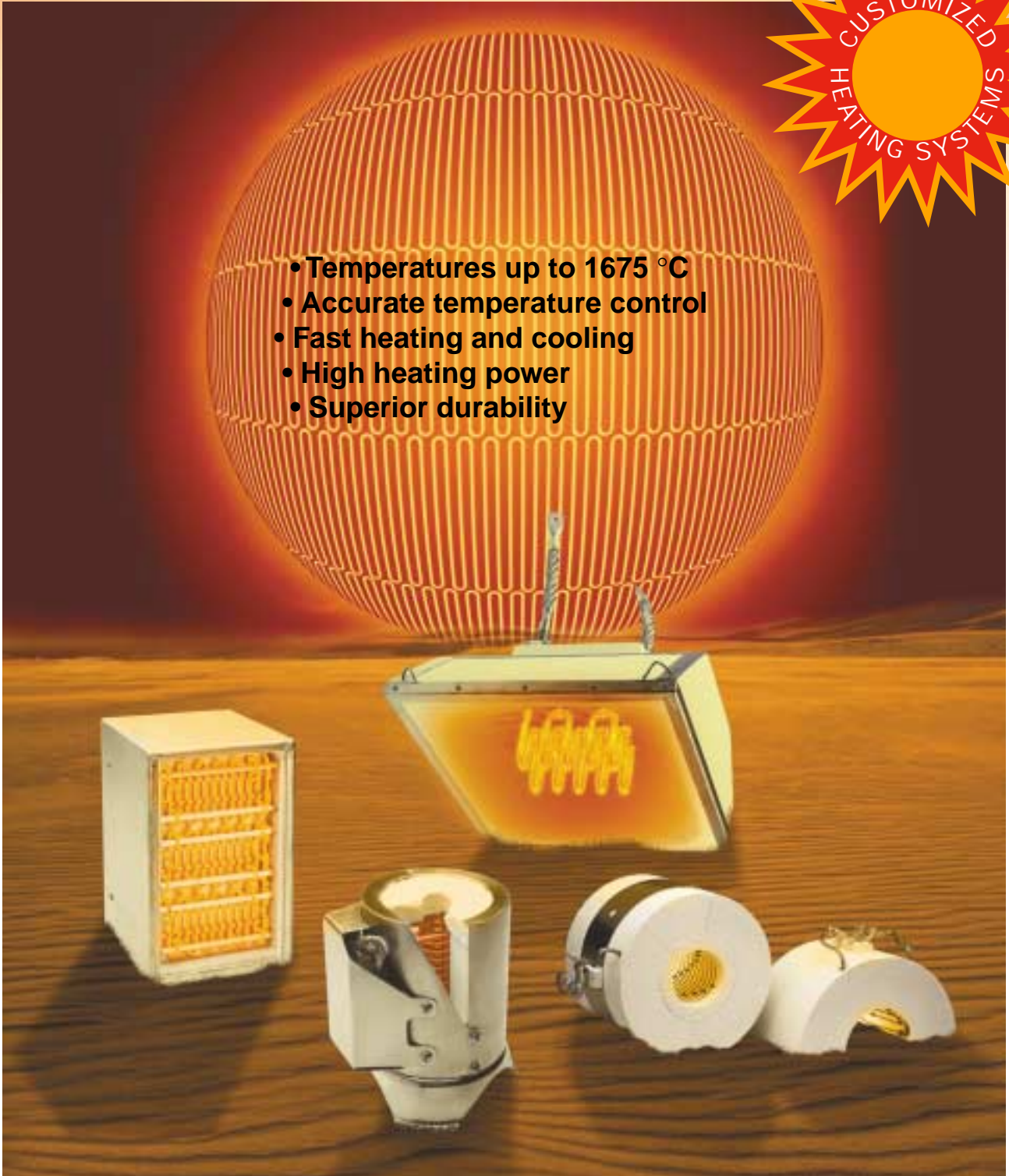


SUPERTHAL[®]

Heating Modules for Customized Furnaces and Heaters



- Temperatures up to 1675 °C
- Accurate temperature control
- Fast heating and cooling
- High heating power
- Superior durability



SUPERTHAL heating modules for customized solutions

SUPERTHAL heating modules consist of vacuum-formed ceramic fibre with an integral KANTHAL SUPER heating element. The modules are intended for use in laboratory or production furnaces/heaters, where compactness, rapid heating and accurate heating profiles and control are of utmost importance.

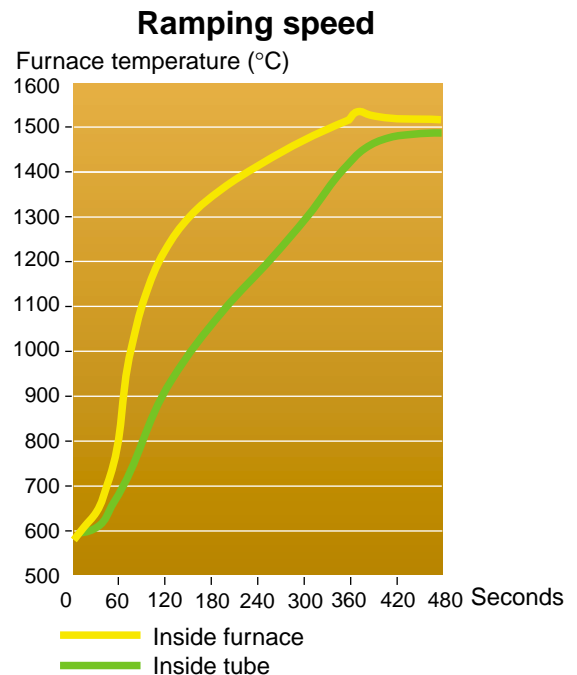
SUPERTHAL is available in a variety of standard sizes. The standard shapes are muffles, half cylinders, flat panels and radiators. Tailor-made modules can be supplied to optimize the design and function of your particular application.

SUPERTHAL rapid heating and accurate temperature profile

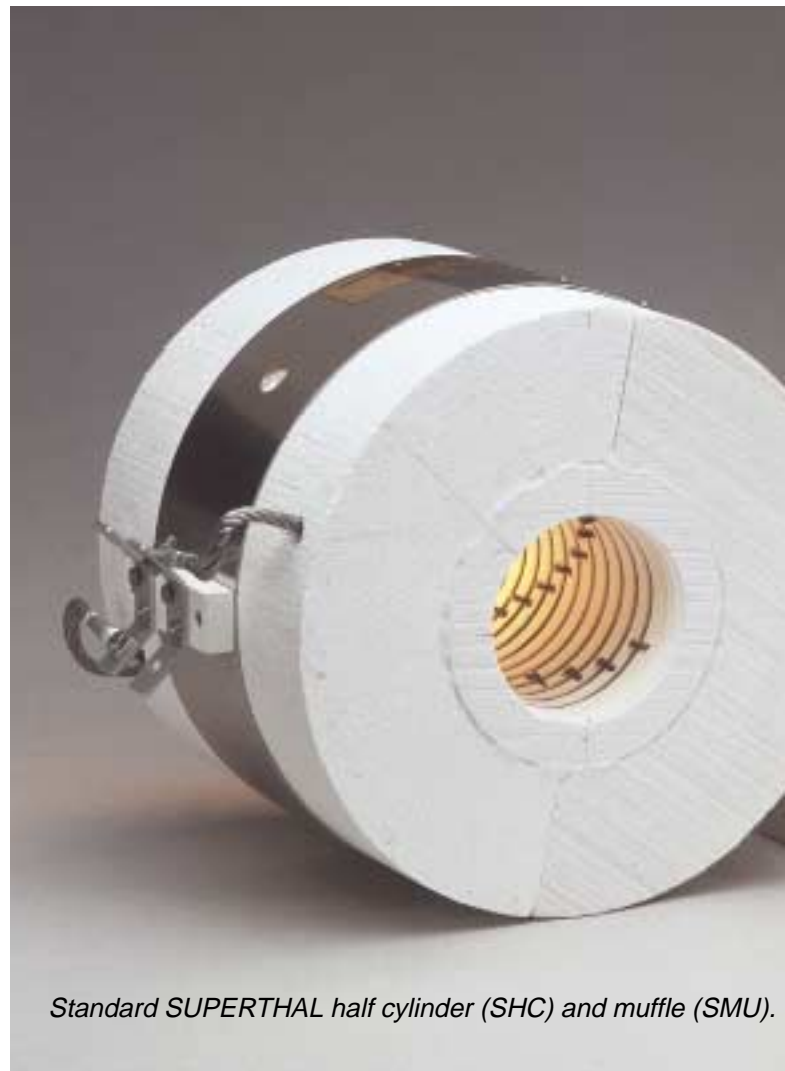
With SUPERTHAL very quick ramping is achieved during both heating and cooling. The possibility to obtain very accurate temperature control is one of the great benefits of the SUPERTHAL design.

The SUPERTHAL programme offers you

- The possibility of quick temperature ramping
- Accurate temperature profiles
- Flexible units – different tests and processes can take place in the same furnace set-up.
- Long life
- Very high power concentration
- Ease of installation and replacement
- Highly specialised units for certain applications

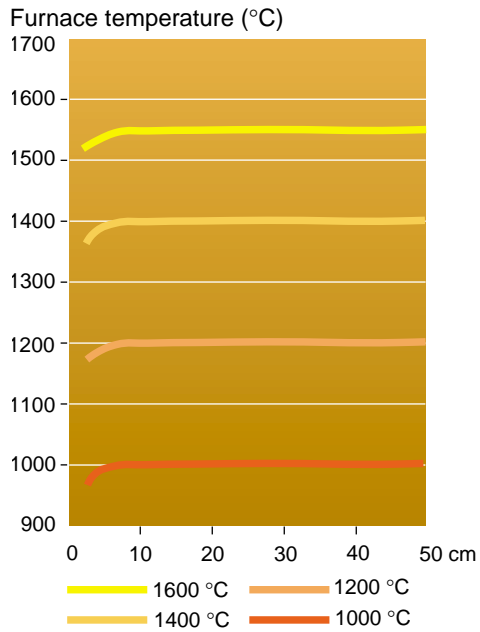


Heating speed for an SHC 200 furnace equipped with a ceramic working tube.

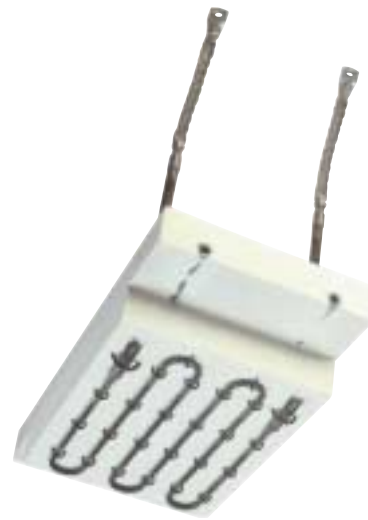


Standard SUPERTHAL half cylinder (SHC) and muffle (SMU).

Temperature profile



The temperature profile for a 3-zone SUPERTHAL furnace equipped with standard SHC 200 modules at different furnace temperatures.



SUPERTHAL flat panels for the heating of feeder forehearth in the glass industry.



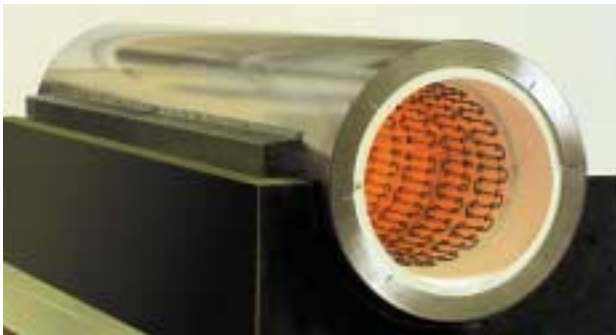
SUPERTHAL single wafer reactors (SWR) are specially designed for processing single silicon wafers in the semiconductor industry.



SUPERTHAL infrared radiators (SIR) allow high heating power to be applied on a limited surface.

Proven designs thoroughly tested in demanding applications

Since the introduction of SUPERTHAL in the early 1990s, it has efficiently contributed to the use of electrical heating and the cutting of energy and operating costs in many laboratories and process industries throughout the world. Being a unique combination of fast-reacting non-ageing KANTHAL SUPER elements and a ceramic fibre enclosure with low thermal mass, the SUPERTHAL modules meet all demands for accurate high-temperature control. This leads to higher product quality and fewer rejects as well as minimized energy and maintenance costs.



Diffusion furnaces in the electronics industry are crucial parts of the production chain for wafer processing. Furnaces equipped with SUPERTHAL modules offer rapid and accurate heating and cooling, a crucial part of the process. The cleanness of the KANTHAL SUPER heating elements is another property of importance in this application, where every impurity leads to production losses.

SUPERTHAL is used in laboratories and process industries all over the world.



SUPERTHAL modules are commonly used in furnaces for testing of ceramics and high-tech alloys. The testing temperatures range up to 1600°C.





Glass feeders are applications where SUPERTHAL flat panels are used to maintain molten glass at the correct temperature. SUPERTHAL contributes to the superb glass quality in many glassworks. It is also used as nozzle heaters for spot bowls and in optical fibre glass drawing.



SUPERTHAL heating packages can be given an extremely accurate temperature profile with a measured temperature tolerance of $\pm 1^\circ\text{C}$ over a sample length of 150 mm.



Horizontal and vertical tube furnaces equipped with SUPERTHAL modules are used in many different R&D fields. The units have very flexible and precise temperature and temperature profiles. SUPERTHAL also satisfies the demands for higher temperatures and maximum cleanness.

Customized solutions based on our proven standard range

The SUPERTHAL modules and heating packages form part of a compact modular system, which makes it easy to design compact and flexible set-ups that are easy to install and replace. Thanks to the ample possibilities of combining different modules, flexible and compact furnaces and heaters are available that meet the demands for accuracy in the heat

treatment of new high-tech materials. They also meet the repeatability demands of quality assurance systems and the reliability demands of continuous production installations.

Kanthal offers expertise engineering for applications where tailor-made heating modules are considered to be the best solution.

Customized SUPERTHAL heating packages can be built up from reliable standard SUPERTHAL muffle or half cylinder modules.



Standard range of modules

SUPERTHAL Muffle and Half Cylinder Modules

Muffle modules:

Max. element/furnace temperature
1550/1500 °C;

Half Cylinder modules:

Max. element/furnace temperature
1600/1550 °C;

Max. continuous current 75 A.



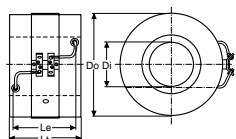
Technical data and dimensions

Type	Options ¹⁾	Dimensions ¹⁾				Data at furnace temperature:			
		Lenght Overall L _t	Element L _e	Diameter Inner D _i	Outer D _o	Power W	Voltage V	Power W	Voltage V
Muffle modules, SMU									
SMU 40	A, B	250	209	40	240	1440	34.3	1050	30.4
SMU 60	A, B	250	209	60	260	2100	50.0	1520	44.1
SMU 80	A, B	250	209	80	280	2760	65.7	2000	58.0
SMU 100	A, B	250	209	90	300	3420	81.4	2480	71.9
SMU 125	A, B	250	209	115	325	4240	101	3070	89.0
SMU 150	A, B	250	209	140	350	5040	120	3670	106
SMU 200	A, B	250	209	190	400	6720	160	4860	141
Half Cylinder modules, SHC									
SHC 100	A, B, C	200	150	85	300	1000	23.8	730	21.2
SHC 150	A, B, C	200	150	135	350	1490	35.5	1080	31.3
SHC 200	A, B, C	200	150	185	400	1980	47.1	1430	41.4
SHC 250	A, B, C	200	150	235	450	2460	58.6	1780	51.6
SHC 300	A, B, C	200	150	285	500	2950	70.2	2140	62.0

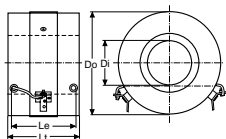
¹⁾ Options and dimensions

Muffle modules, SMU

Option A

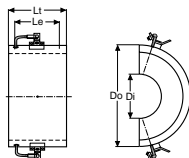


Option B

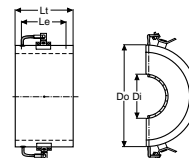


Half Cylinder modules, SHC

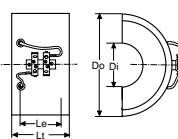
Option A



Option B



Option C



SUPERTHAL HT

For high furnace temperatures
up to 1675°C

The HT modules, for vertical operation, are available in standard sizes or as specially designed heating packages with heating modules, back insulation and stainless steel casing. On request, Kanthal can assist in calculating and manufacturing complete heating packages.

Technical data

Type	SHC HT
Element length	150 mm
Overall length	200 mm
Element temperature	1700 °C
Surface loading	14.2 W/cm ²
Current	80 to 90 A

Type	Diameter, mm		Data at furnace temperature 1650 °C		
	Inner*	Outer	Resistance Ohms	Voltage V	Power W
SHC 100 HT	55	300	0.25	23	2130
SHC 150 HT	105	350	0.38	35	3250
SHC 200 HT	155	400	0.51	47.2	4400
SHC 250 HT	205	450	0.64	59.3	5500
SHC 300 HT	255	500	0.77	71.4	6600

* Free inner diameter inside element.

SUPERTHAL HT modules are designed for a maximum element temperature of 1725 °C.



SUPERTHAL High-Power Reflector

Modular heaters for extra high power



The High-Power Reflector delivers concentrated heat at temperatures up to 1650 °C.

The High-Power Reflector is a new compact fibre-insulated modular heater with Kanthal Super integrated elements. The reflector is operated horizontally and is easy to install and connect to a standard power supply. It gives a concentrated, very high and clean heating power. Typical applications are single billet heaters up to 1350 °C, aluminium melting furnaces and ladle heaters.

Technical data

Width	600 mm
Height	600 mm
Depth	230 mm
Power	40 kW
Voltage at 1650 °C	66 V
Current at 1650 °C	605 A
Power density	110 kW/m ²
Element temperature, max.	1650 °C
Element type	Kanthal Super special, 12/24 mm

SUPERTHAL Flat Panel

For feeder forehearth in the glass industry and in metal holding furnaces



SUPERTHAL Flat Panels reduces energy consumption and improves product quality.

The Flat Panels are widely used as overhead heaters. The panels consists of KANTHAL SUPER heating elements integrated into reinforced ceramic fibre. The terminals are straight or bent 90°.

The Flat Panels are specially designed to meet the requirements of each application in terms of power and dimensions. The general experience of a great number of installations in the glass industry is that the energy consumption is greatly reduced – often up to 40 % – and that precise temperature control is obtained, which contributes to improved glass quality.

Technical data

Max. length	1000 mm
Number of supports	2 to 3 silicon carbide rods per panel
Standard thickness	125 mm
Max. power output	150 kW/m ²
Max. continuous operating temperature	1600 °C

Mini-SUPERTHAL

Compact heating at high temperatures

Mini-SUPERTHAL is a complete compact heater ready to connect to the power supply. It is widely used for all types of melting and processing in the dental and medical industries as well as for general material research and development.

The heating element is made of a special Kanthal Super material and the insulation is high-grade ceramic fibre. The stainless steel casing protects the heater and the electrical connections

Mini-SUPERTHAL is easy to control and can be rapidly heated and cooled. The temperature profile is uniform.

Technical data

Type	MS 26	MS 31
Inner diameter	26 mm	31 mm
Outer diameter	100 mm	100 mm
Height	115 mm	115 mm
Power at furnace temperature 1500 °C	300 W	400 W
Element temperature, max.	1550 °C	1550 °C
Voltage	19 V	24 V
Current	16 A	17 A
Element type	Kanthal Super special	



A tailor-made Mini-SUPERTHAL with 26 mm or 31 mm inner diameter for dental laboratories.

SUPERTHAL Single Wafer Reactor

For high power concentration and accurate control



SUPERTHAL Single Wafer Reactor for separate single wafer production.

Single Wafer Reactors are used in the electronics industry. The elements are mounted on a high-temperature fibre plate. The heater gives a high power concentration on a small surface and accurate control of the temperature ramping.

Technical data

Type	SWR
Available diameters, inches	4", 5", 6", 8" and 10"
Mountings	Vertical or horizontal
Element temperature, max.	1600 °C
Power ramp	0.9 to 5.6 kW

SUPERTHAL Infrared Radiators

For high heating power on limited surfaces

The SUPERTHAL Infra Red Radiators produce short-wave radiation at an element temperature of 1400 to 1550 °C. The IR Radiators are ready-to-install small, compact panels, in standard unit size, with very high power density.

The high power yield and optimized wavelength, which match better to the water absorption spectra, result in more efficient drying operations compared to halogen lamps or gas-fired radiators.

Technical data

Type	SIR
Width	150 mm
Height	230 mm
Depth	90 mm
Voltage	90 V
Current	80 to 90 A
Typical element temperature	1550 °C
Peak energy wavelength	1.5 µm
Maximum power concentration	≈ 240 kW/m ²



The SUPERTHAL Infra Red Radiator is very effective in drying operations like the soldering, enamelling or sintering of materials.

SUPERTHAL Micro Heater

High temperature capabilities up to 1700°C

The Micro Heater was originally designed for optical fibre welding and processing at temperatures of up to 1700 °C directly in air atmosphere. Apart from optical fibre processing, the Micro Heater can be used for various high-temperature operations on many other materials.

Technical data

Type	SMH
Width	28 mm
Depth	28 mm
Height	53 mm
Element temperature, max.	1700 °C
Power	185 W
Voltage	2.6 V
Current	71.2 A
Element material	Kanthal Super special

The Kanthal Super special heating element ensures a long life and a uniform temperature profile. The temperature can be kept within very close, stable tolerances. The ceramic high-temperature fibre insulation material allows fast heating and precise ramping.

The heater is protected in a stainless steel casing. The flexible cables are ready for connection to a power supply.

SUPERTHAL Micro Heater for optical fibre processing.



The World of Kanthal



Heating of furnaces and industrial processes is our business

We produce resistance material that creates heat but also material that protects from heat. Our broad range of resistance materials, finished electrical elements, radiant tubes and other components cover almost any heating application up to 2000 °C. We are also designing and manufacturing complete heating systems, ready to be installed in the furnace.

Product range

- Heating alloys, wire and strip
- Thermo-couple alloys
- Metallic elements
- Kanthal Super and silicon carbide electric heating elements
- Superthal heating modules
- Fibrothal modular heating and insulation systems
- Radiant tubes and complete systems for gas or electric heating

Services

Our service includes:

- Advice on choosing the right element material, element type, support system and insulation
- Design and calculation of elements and heating systems
- Supplying complete heating elements or heating systems ready to be installed
- Upgrading of old furnaces to higher power and more reliable operation
- Customized heating solutions for your specific needs

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