

**KANTHAL®**

Part of Sandvik Group

# HIGH POWER HEATING MODULES FOR CUSTOMIZED FURNACE AND HEATERS

SUPERTHAL™



# HEATING MODULE FOR CUSTOMIZED FURNACES AND HEATERS

Superthal™ heating modules consist of vacuum-formed ceramic fiber with an integral Kanthal® Super molybdenum disilicide ( $\text{MoSi}_2$ ) heating element. The modules are intended for use in laboratory or production furnaces/heaters, where compactness, rapid heating, accurate heating profiles and control are of utmost importance.

Superthal™ is available in a variety of sizes. The standard shapes are muffles, half-cylinders, flat panels and reflectors. Tailor made modules are supplied to optimize all of your particular application.

Most of our products are developed by our own heating specialists and are at the forefront of performance and quality.

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 Superthal™ design.

## THE SUPERTHAL™ PROGRAM 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
- Optimized installation and easy to replace
- Highly specialised units for certain applications

## PROVEN DESIGN THOROUGHLY TESTED IN DEMANDING APPLICATIONS

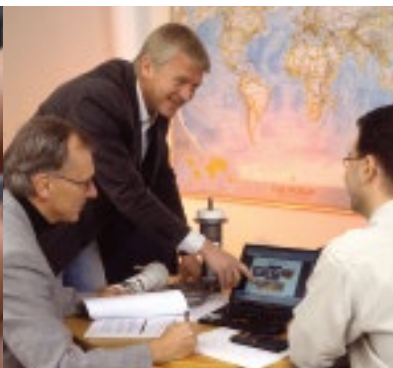
Since the introduction of Superthal™ in the early 1990s, it has efficiently contributed to the use of electrical heating and the cutting of energy and operating costs in heating applications throughout the world. Being a unique combination of fast-reacting non-ageing Kanthal® Super elements and a ceramic fiber enclosure with low thermal mass, 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.

## OUR SERVICE INCLUDES

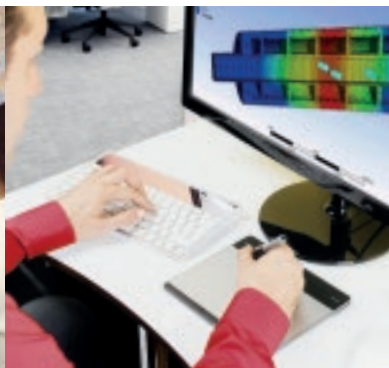
- Advice on choosing the right element grade, element type, support system and insulation
- Design, calculation and simulation of elements and heating systems
- Supplying complete heating elements or heating systems ready to be installed
- Upgrading of old furnaces to higher power and more reliable operation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



Needs



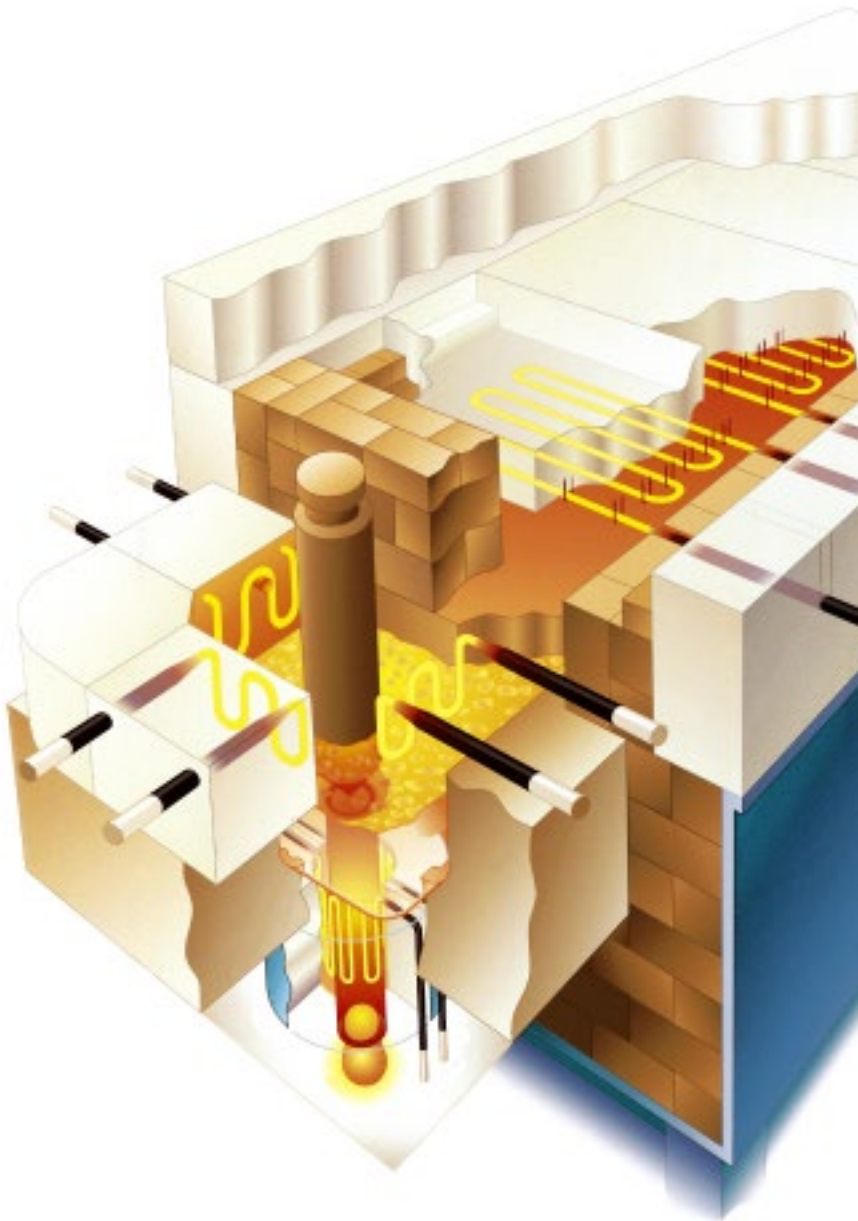
Analysis



Test and simulation



Solution



## GRADES FOR DEMANDING APPLICATIONS

**Superthal™ program includes several design of standard modules with specific features for use in demanding applications.**

### SUPERTHAL™ SHC

Superthal™ Half-cylinders, SHC is used both for horizontal and vertical furnace applications. The SHC are specially designed to meet the requirements of each application in terms of power and dimensions. Max. operating temperature 1550°C (2820°F).

### SUPERTHAL™ SMU

Superthal™ Muffles SMU is used both for horizontal and vertical furnace applications. The SMU are specially designed to meet the requirements of each application in terms of power and dimensions. Max. operating temperature 1500°C (2730°F).

### SUPERTHAL™ FLAT PANELS

Superthal™ Flat panels are widely used as overhead heaters. The panels consist of Kanthal Super heating elements integrated into reinforced ceramic fiber. The terminals are straight or bent 90°. Superthal™ flat panels are specially designed to meet the requirements of each application in terms of power and size. Max. operating temperature 1600°C (2910°F).

### SUPERTHAL™ HIGH-POWER REFLECTORS

The high-power reflector is a compact fiber-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 (2462°F), aluminum melting furnaces and ladle heaters. Max. operating temperature 1600°C (2910°F).

### SUPERTHAL™ HT

For high furnace temperatures up to 1675°C (3045°F). Superthal™ HT modules, for vertical operation, are available in standard sizes or as specially designed heating packages. Superthal™ HT is only available as half-cylinder, SHC.

### SUPERTHAL™ MINI

Superthal™ Mini is a complete compact heater ready to connect to the household 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. Max. operating temperature 1500°C (2730°F).



Delivery



Follow up

# APPLICATIONS

Superthal™ high power heating modules forms a compact modular system. This makes it easy to design compact and flexible set-ups that are easy to install and replace. The combining of modules meets the demands for accuracy, quality assurance and reliability in the system for continuous production installations.

We offer infinite options due to our customized designs where demands on high temperature solutions is needed. Our products are best used by customers looking for energy savings, economic benefits, increased productivity and low maintenance.

## GLASS INDUSTRY

The Kanthal® Super program includes products for the primary glass manufacturing, such as technical, specialty and fiber glass. Here are two typical glass processes:

- Glass forehearth (feeders)
- Glass fusions/downdraw process



Superthal™ Mini.

## CERAMIC INDUSTRY

The Kanthal® Super program offers several products for the production of traditional ceramics, functional ceramics and ceramics used as engineering materials. For example, Kanthal® Super products are widely used in:

- Ceramics sintering
- Ceramics firing
- Heat treatment of ceramics





Superthal™ Flat panels.



Superthal™ HT.

### ALUMINUM

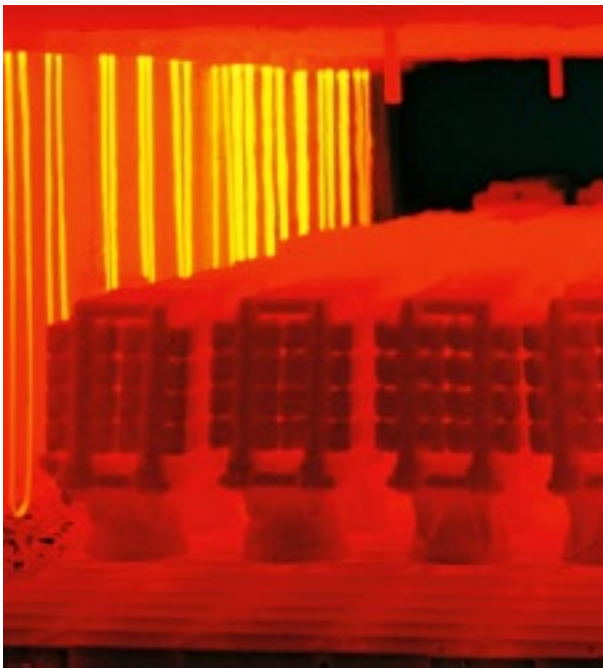
The Kanthal® Super program includes a wide range of products for primary aluminum production and secondary aluminum processing. For example, our products are widely used in the following applications:

- Primary aluminum production
- Secondary aluminum processing

### ELECTRONIC INDUSTRY

The Kanthal® Super program offers products for the heating processes in the electronic industry. Our products are used in, for example:

- Furnace for single growth crystal Si,GaAs
- Diffusion cassettes
- MLCC sintering
- ITO sintering



# TECHNICAL INFORMATION

The optimal choice in the wide range of Superthal™ modules depends on a number of factors, such as ramping speed and temperature profile.

Your local Kanthal sales representative will be happy to supply you with further detailed information.

Visit [www.kanthal.com](http://www.kanthal.com) to find your local contact.

## SUPERTHAL™ MUFFLE AND HALF-CYLINDER MODULES

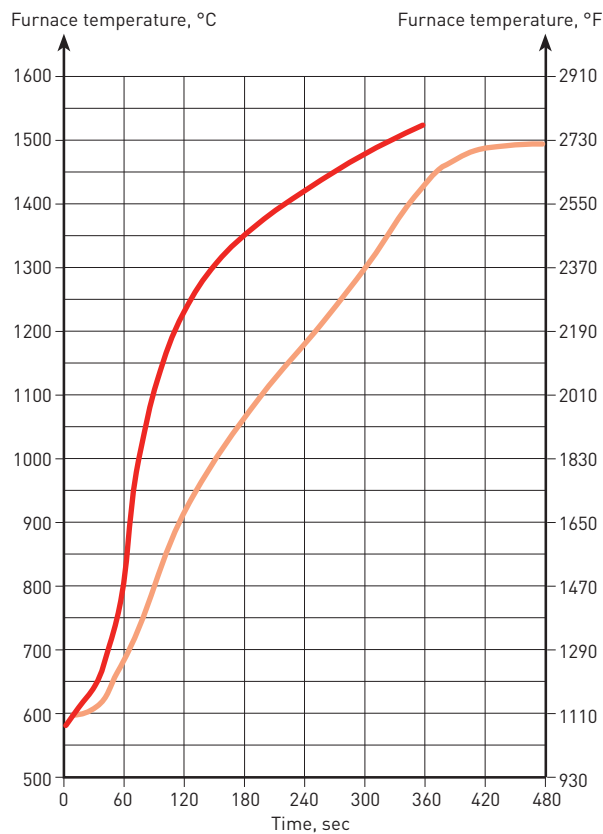
### SUPERTHAL™ MUFFLE MODULES, SMU

Element temperature can reach 1550°C (2820°F)  
Furnace temperature can reach 1500°C (2730°F)

### SUPERTHAL™ HALF-CYLINDER MODULES, SHC

Element temperature can reach 1600°C (2910°F)  
Furnace temperature can reach 1550°C (2820°F)

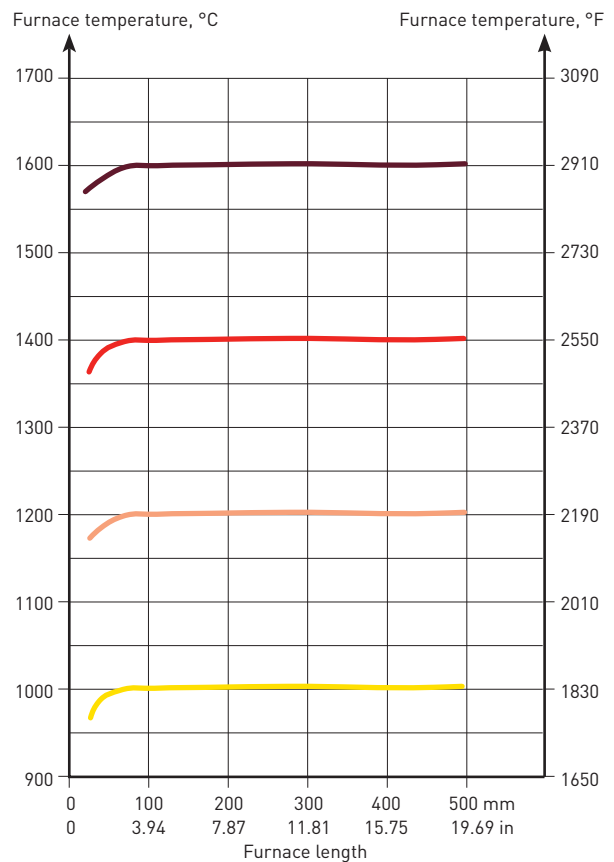
#### RAMPING SPEED



■ Inside furnace ■ Inside tube

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

#### TEMPERATURE PROFILE



■ 1600°C (2910°F) ■ 1400°C (2550°F) ■ 1200°C (2190°F)  
■ 1000°C (1830°F)

Temperature profile for a three-zone Superthal™ furnace equipped with standard Superthal™ SHC 200 modules at different furnace temperatures.

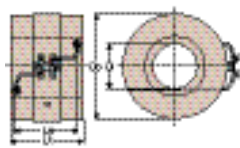
Technical data and dimensions for typical modules.  
 For information of other dimensions, contact your local  
 office [www.kanthal.com/contact-us](http://www.kanthal.com/contact-us)

## TECHNICAL DATA AND DIMENSIONS

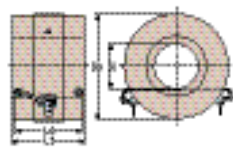
TYPE	OPTIONS	OPTIONS AND DIMENSIONS								DATA AT FURNACE TEMPERATURE:			
		LENGTH				DIAMETER				1400°C (2550°F)		1550°C (2820°F)	
		OVERALL, L <sub>T</sub>		ELEMENT, L <sub>E</sub>		INNER, D <sub>I</sub>		OUTER, D <sub>O</sub>		POWER	VOLTAGE	POWER	VOLTAGE
MM	IN	MM	IN	MM	IN	MM	IN	W	V	W	V		
SMU 40	A, B	250	9.84	209	8.23	40	1.57	240	9.45	1440	34.3	1050	30.4
SMU 60	A, B	250	9.84	209	8.23	60	2.36	260	10.23	2100	50.0	1520	44.1
SMU 80	A, B	250	9.84	209	8.23	80	3.15	280	11.02	2760	65.7	2000	58.0
SMU 100	A, B	250	9.84	209	8.23	90	3.54	300	11.81	3420	81.4	2480	71.9
SMU 125	A, B	250	9.84	209	8.23	115	4.53	325	12.80	4240	101	3070	89.0
SMU 150	A, B	250	9.84	209	8.23	140	5.51	350	13.78	5040	120	3670	106
SMU 200	A, B	250	9.84	209	8.23	190	7.48	400	15.75	6720	160	4860	141
SHC 100	A, B, C	200	7.87	150	5.91	85	3.35	300	11.81	1000	23.8	730	21.2
SHC 150	A, B, C	200	7.87	150	5.91	135	5.31	350	13.78	1490	35.5	1080	31.3
SHC 200	A, B, C	200	7.87	150	5.91	185	7.28	400	15.75	1980	47.1	1430	41.4
SHC 250	A, B, C	200	7.87	150	5.91	235	9.25	450	17.71	2460	58.6	1780	51.6
SHC 300	A, B, C	200	7.87	150	5.91	285	11.22	500	19.68	2950	70.2	2140	62.0

Superthal™ Muffle modules, SMU

Option A

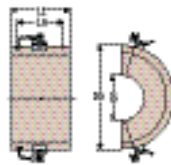


Option B

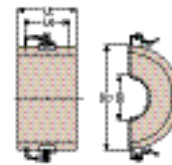


Superthal™ Half-cylinder modules, SHC

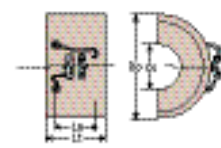
Option A



Option B



Option C



### SUPERTHAL™ FLAT PANELS

For energy saving roof heater.

#### TECHNICAL DATA

Max. length	1000 mm	39.37 in
Standard thickness	125 mm	4.92 in
Max. power output	150 kW/m <sup>2</sup>	96.8 W/in <sup>2</sup>
Max. continuous operating temperature	1600°C	2910°F

### SUPERTHAL™ HIGH-POWER REFLECTORS

Modular heaters for extra high power.

#### TECHNICAL DATA

Power density	110 kW/m <sup>2</sup>	1.8 W/in <sup>2</sup>
Max. element temperature	1650°C	3000°F
Element type	Kanthal® Super	



Superthal™ High-power reflector.

### SUPERTHAL™ MINI

Compact heating at high temperatures.

#### TECHNICAL DATA

	MS 26		MS 31	
Inner diameter	26 mm	1.02 in	31 mm	1.22 in
Outer diameter	100 mm	3.94 in	100 mm	3.94 in
Height	115 mm	4.53 in	115 mm	4.53 in
Power at furnace temperature 1500°C (2730°F)	300 W		400 W	
Max. element temperature	1550°C	2820°F	1550°C	2820°F
Voltage	19 V		24 V	
Current	16 A		17 A	
Element type	Kanthal® Super			





### SUPERTHAL™ HT

Superthal™ 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. Superthal™ HT is only available as half-cylinder, SHC.

The tables below show examples of configurations and dimensions.

#### TECHNICAL DATA

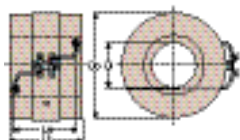
Type	Superthal™ SHC HT	
Overall length	200 mm	7.87 in
Element length	150 mm	5.91 in
Element temperature	1700°C	3090°F
Surface loading	14.2 kW/m <sup>2</sup>	232.7 W/in <sup>2</sup>
Current	80 to 90 A	

### TECHNICAL DATA AND DIMENSIONS

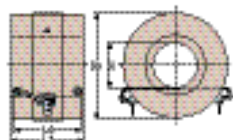
TYPE	OPTIONS	OPTIONS AND DIMENSIONS								DATA AT FURNACE TEMPERATURE:			
		LENGTH				DIAMETER				1400°C (2550°F)		1550°C (2820°F)	
		OVERALL, L <sub>T</sub>		ELEMENT, L <sub>E</sub>		INNER, D <sub>I</sub>		OUTER, D <sub>O</sub>		POWER	VOLTAGE	POWER	VOLTAGE
MM	IN	MM	IN	MM	IN	MM	IN	W	V	W	V		
SHC 100	A, B, C	200	7.87	150	5.91	85	3.35	300	11.81	1000	23.8	730	21.2
SHC 150	A, B, C	200	7.87	150	5.91	135	5.31	350	13.78	1490	35.5	1080	31.3
SHC 200	A, B, C	200	7.87	150	5.91	185	7.28	400	15.75	1980	47.1	1430	41.4
SHC 250	A, B, C	200	7.87	150	5.91	235	9.25	450	17.71	2460	58.6	1780	51.6
SHC 300	A, B, C	200	7.87	150	5.91	285	11.22	500	19.68	2950	70.2	2140	62.0

Superthal™ Muffle modules, SMU

Option A



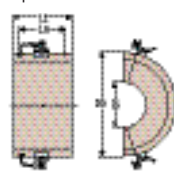
Option B



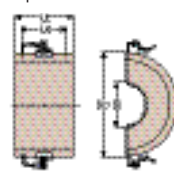
Max. inner diameter is 300 mm (11.81 in)

Superthal™ Half-cylinder modules, SHC

Option A



Option B



Option C

