Heating elements

The Kanthal program of electric heating elements is the widest on the market. Our heating elements outperform in all temperature ranges, from element temperature 50 to 1850°C (120-3360°F), and atmospheres.

The long service life and consistent performance of Kanthal electric heating elements is due to our emphasis on quality control, from starting material to finished product. Our highly experienced engineers will provide you with expert design necessary for achieving the highest production efficiency at the lowest long-term cost.

MoSi2 heating elements

Molybdenum disilicide heating elements for element temperatures up to 1850°C (3360°F).

SiC heating elements

Silicon carbide electric heating elements for element temperatures up to 1625°C (2927°F).

Metallic heating elements

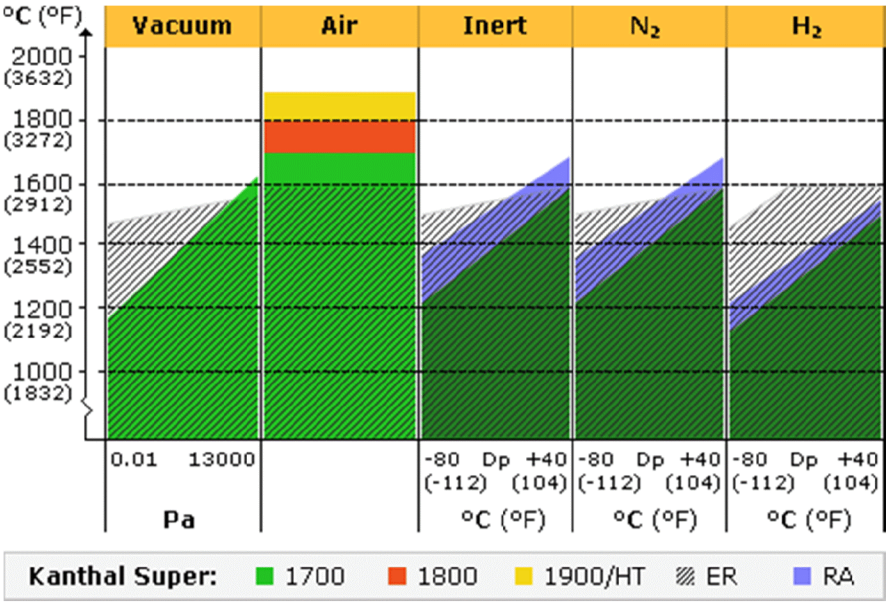
Metallic heating elements for element temperatures up to 1425°C (2600°F).

Kanthal Super MoSi2 heating elements

High-power electric molybdenum disilicide (MoSi2) heating elements for element temperatures up to 1850°C (3360°F). Kanthal Super MoSi2 heating elements are available as straight or bent elements in a wide range of**shapes and sizes**, all characterized by long life and consistent performance.

Seven grades for different applications

The Kanthal program of MoSi2 heating elements includes seven grades with specific features for use in demanding applications and atmospheres, including nitrogen, hydrogen, vacuum and mixtures of endogas and reducing atmospheres.



Special design

In addition to MoSi2 elements in standard shapes and sizes we provide special designed MoSi2 elements according to customer needs, enabling an optimized element design for each particular application.

The Kanthal program also includes **element accessories**.

MoSi2 heating element sizes and shapes

Kanthal Super MoSi2 heating elements are available as straight or bent elements in a wide range of sizes and shapes. The most commonly used design is a two-shank "U"-shaped element. The heating zone is welded to terminals which normally have a diameter double that of the heating zone. The two-shank element can be bent 45° or 90° either in the heating zone or in the terminals.

We also provide special designed elements according to customer needs.

Standard sizes

The table shows standard sizes for Kanthal Super MoSi2 heating elements.

	Element size **Heating zone diameter/Terminal diameter**				
Grade	**3/6**	**4/9**	**6/12**	**9/18**	**12/24**
Kanthal Super 1700	-	-	✔	✔	✔
Kanthal Super 1800	✔	✔	✔	✔	✔
Kanthal Super 1900	✔	✔	✔	✔*	-
Kanthal Super RA	-	-	✔	✔	✔
Kanthal Super ER	✔	✔	✔	✔	-
Kanthal Super HT	✔	✔	-	-	-
Kanthal Super NC	✔	✔	-	-	-

* 9/12/18

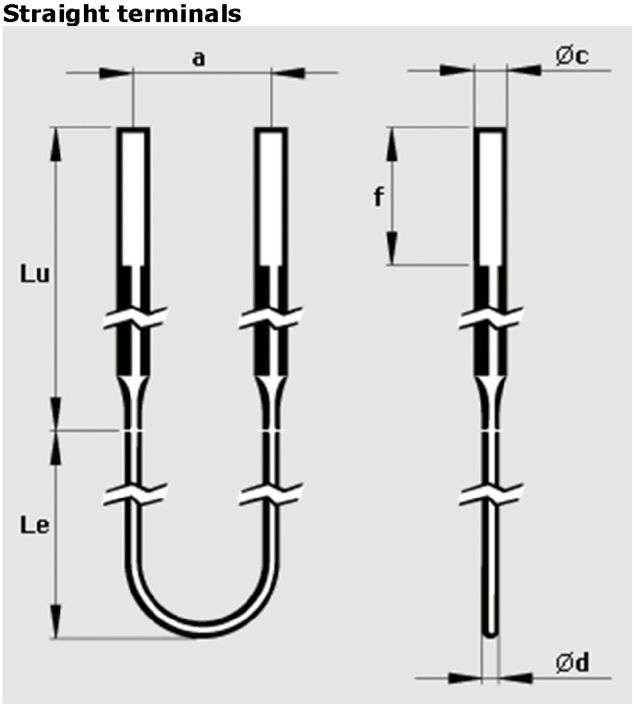
Element shapes

Kanthal Super MoSi2 heating elements can be delivered in a wide range of shapes. Below please find examples of some common shapes. Other shapes are available on request.

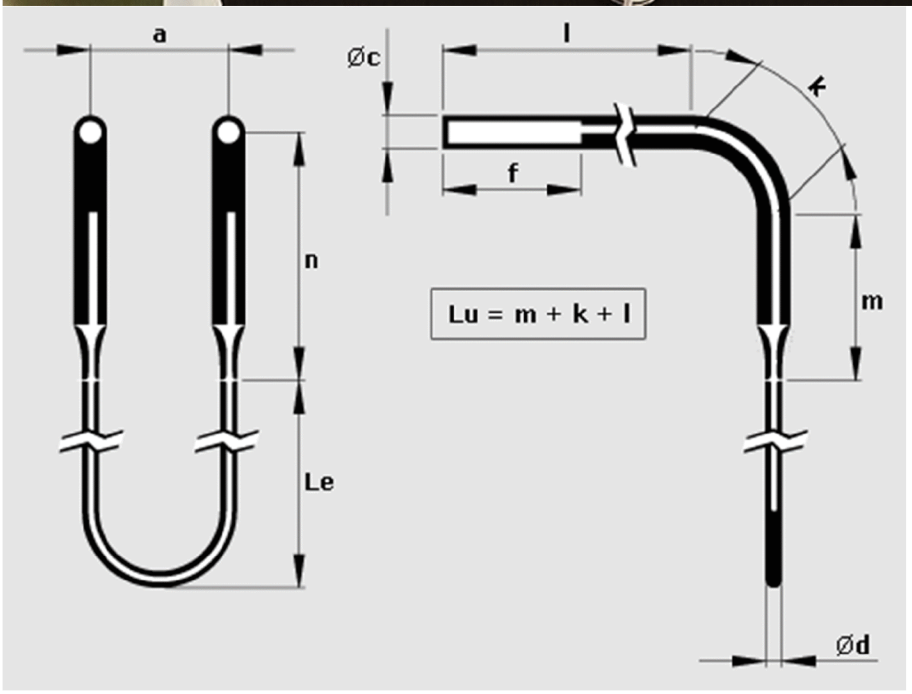
Element size d/c	a* mm (inch)	f mm (inch)	$k_{90°}$ mm (inch)	$k_{45°}$ mm (inch)	m mm (inch)	n* mm (inch)
3/6	25 (1.0)	25 (1.0)	19 (0.75)	9 (0.35)	30 (1.18)	42 (1.65)
4/9	25 (1.0)	25 (1.0)	19 (0.75)	9 (0.35)	35 (1.38)	47 (1.85)
6/12	50 (1.97)	45 (1.8)	47 (1.85)	24 (0.94)	60 (2.36)	90 (3.55)
9/18	60 (2.36)	75 (3.0)	71 (2.8)	35 (1.38)	90 (3.71)	135 (5.31)
12/24	80 (3.15)	100 (4.0)				

* Standard value

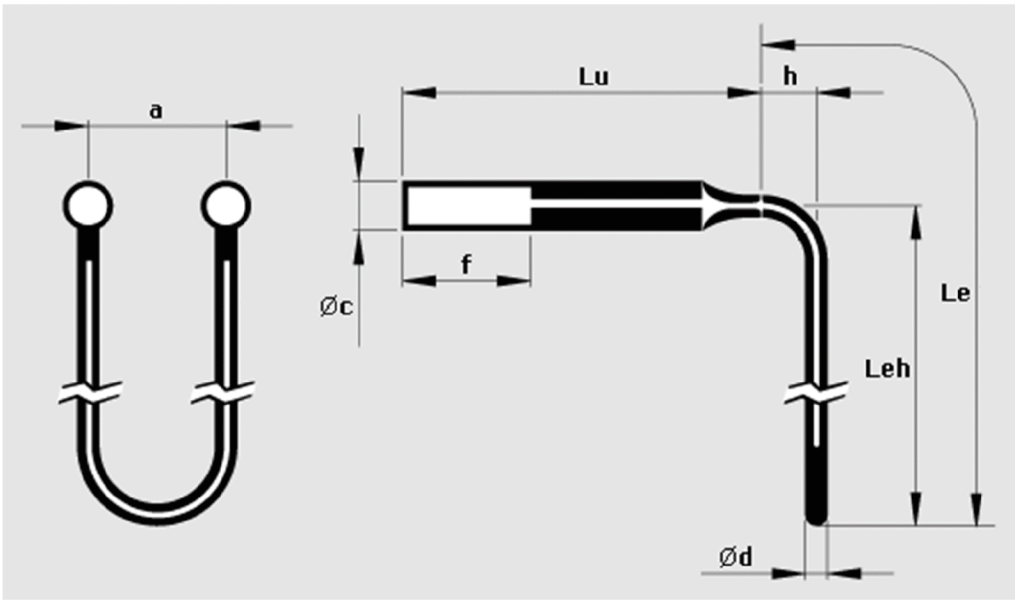
Straight terminals



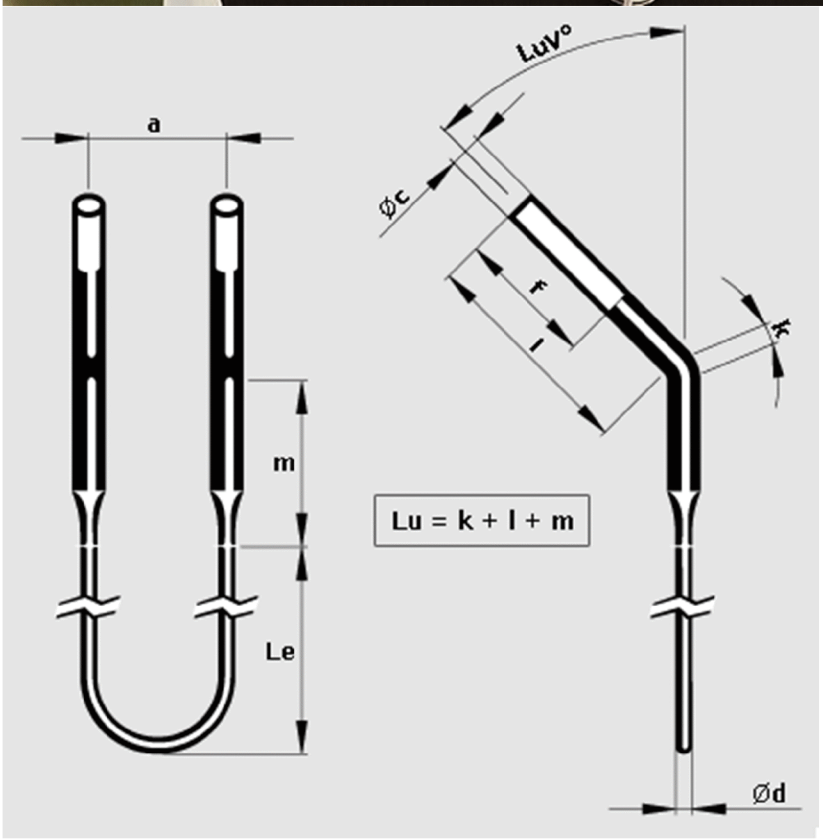
Element bent 90° at the terminals



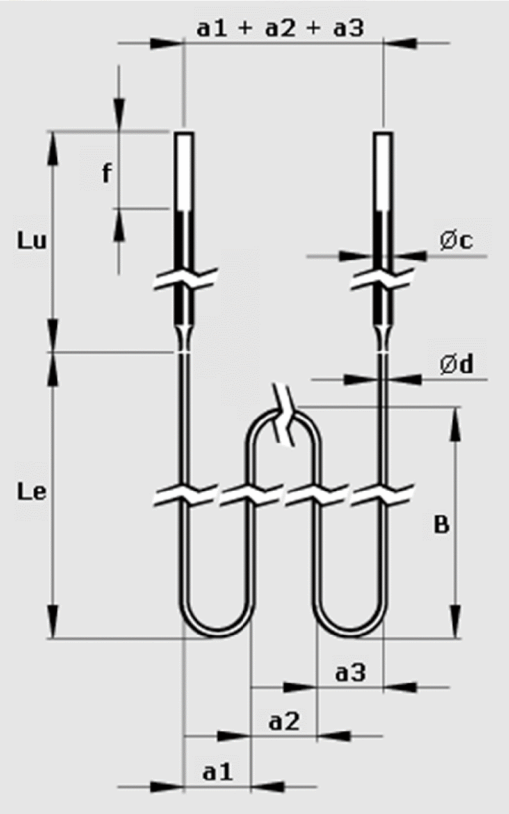
Element bent 90°



Element bent 45°at the terminals



Four-shank element for horizontal use



MoSi2 heating element grades

The Kanthal program of MoSi2 heating elements includes seven grades with specific features for use in demanding applications and atmospheres, including nitrogen, hydrogen, vacuum and mixtures of endogas and reducing atmospheres.

All Kanthal Super MoSi2 heating elements are characterized by good heat and electrical conductivity. They have low thermal expansion and withstand corrosion and oxidation.

Kanthal Super MoSi2 heating elements are available as straight or bent elements in a wide range of **sizes and shapes**.

Grade	Grade description incl. max. temperature [1)]
Kanthal Super 1700	Good heat and electrical conductivity. Low thermal expansion. Withstand corrosion and oxidation.

	Max. temperature 1700°C (3090°F)
Kanthal Super 1800	Same core characteristics as Kanthal Super 1700. **Max. temperature 1800°C (3270°F)**
Kanthal Super 1900	Same core characteristics as Kanthal Super 1700, but has higher purity and a surface with better adhesion. **Max. temperature 1850°C (3360°F)**
Kanthal Super RA	Same core characteristics as Kanhtal Super 1700, but offers long life at high temperatures in all reducing and oxygen deficient atmospheres. Specially designed for working in nitrogen. **Max. temperature 1700°C (3090°F)**
Kanthal Super ER	Same core characteristics as Kanthal Super 1700, but designed to alternate between atmospheres like oxidizing, inert, carburizing, nitriding, reducing and rough vacuum - without the need of a protecting muffle. Has a relative large power output at low temperature. **Max. temperature 1590°C (2895°F) 2)**
Kanthal Super HT	Same core characteristics as Kanthal Super 1700, but with better hot strength and form stability. Designed for a longer life of small dimension elements in temperature cycling conditions. **Max. temperature 1800°C (3270°F)**
Kanthal Super NC	Same core characteristics as Kanthal Super 1700, but designed to meet the demands for clean process heating in the research and electronics industries. **Max. temperature 1800°C (3270°F)**

1) Maxiumum recommended element temperature in air

2) Maxiumum recommended element temperature in air, dry nitrogen, hydrogen and endogas

Element accessories

The Kanthal program includes a wide range of element accessories for holding, connecting and assembling of MoSi2 heating elements. Examples are:

- air nozzles
- anchor systems
- contact straps
- holders
- passage bricks
- sealing plates

Globar SiC heating elements

Silicon carbide (SiC) electric heating elements for element temperatures up to 1625°C (2927°F), available in a wide variety of standard sizes and geometries, or in customized designs to meet the specific needs of various processes and equipment.

Globar SiC heating elements are capable of high power output, and may be mounted either vertically or horizontally. Because the element material remains rigid even at the maximum operating temperatures, no special supports are required, which simplifies the design of the equipment.

Standard grades

Grade	Description
Globar SD	Elements suitable for most applications in which silicon carbide elements are used. Kanthal Globar SD SiC heating elements feature hot zones of recrystallised silicon carbide, optimized for resistance to oxidation and common process gases. Available in rod or multi-leg designs.
Globar HD	SiC heating elements designed for the most challenging applications where conventional silicon carbide elements are unsuitable. Kanthal Globar HD SiC heating elements feature hot zones of high density, low permeability, reaction-bonded silicon carbide, which is highly resistant to oxidation, and to chemical attack by process volatiles and reactive atmospheres. Available in rod or multi-leg designs.
Globar SG/SR	Tubular spiralled SiC elements made from Kanthal Globar HD material.

Float glass heating elements

The Kanthal program includes several types of silicon carbide (SiC) heating elements for float baths used in the manufacture of soda-lime flat glass for architectural, automotive and solar-glass applications. Special float elements for flat panel display glass are also supplied.

Globar float glass heating elements

Silicon carbide heating elements designed to be utilized in float baths for the manufacture of soda-lime flat glass for architectural, automotive and solar-glass applications. Globar float glass elements have recorded campaign lengths up to 18 years.

3-phase elements

Globar 3-phase heating elements are available in special glazed quality, to minimize attack by volatiles present in the tin bath. Special grades are available for the production of display glass (TFT and PDP) as well as borosilicate glasses and other special glass formulations.

Horizontal heaters

The horizontal heaters that can be installed and replaced while the tin bath is operational. The standard Kanthal design uses a heated length of 1500 mm (59 inch) and delivers a power of up to 25 kW. The heaters can be installed through the side-seal, or more usually through the side of the bath roof, and are commonly used to extend campaign lives, where conventional elements in the side zones have been broken, and insufficient power is available.

Customized heating elements

We can supply special elements, customized to suit non-standard bath designs, or for special float applications.

Metallic heating elements

Ready-made metallic heating elements made from wire or strip in Kanthal iron-chromium-aluminium alloys or Nikrothal nickel-chromium alloys for element temperatures between 50-1425°C (120-2600°F).

Element types

We can manufacture metallic heating elements to any specifications and with short delivery times. Examples of element types are:

- Coiled elements (i.e. spiral elements and edge-wounded elements)
- ROB - Meander elements
- Cartridge elements (i.e. bundle rod elements and cage elements)
- **Tubothal heating element**

Metallic heating element alloys

Kanthal and Alkrothal FeCrAl alloys are characterized by high resistivity and capability to withstand high surface load. They can be used at maximum element temperature of 1425°C (2600°F).

The NiCr-based alloys are characterized by very good mechanical properties in the hot state as well as good oxdiation and corrosion properties. They are suitable for element temperatures up to 1250°C (2282°F).

Using Kanthal FeCrAl alloys instead of NiCr alloys results in both weight-saving and longer element life, leading to considerable cost savings.

Grade	Maximum continuous operating temperature	Resistivity at 20°C Ω mm2m-1 / 68°F Ω/cmf
FeCrAl alloys		
Kanthal APM	1425°C (2600°F)	1.45/872
Kanthal A-1	1400°C (2550°F)	1.45/872
Kanthal AF	1300°C (2370°F)	1.39/836
Kanthal D	1300°C (2370°F)	1.35/812

Alkrothal	1100ºC (2010ºF)	1.25/744
NiCr alloys		
Nikrothal 80	1200ºC (2190ºF)	1.09/255
Nikrothal 70	1250ºC (2280ºF)	1.18/709
Nikrothal 60	1150ºC (2100ºF)	1.11/668
Nikrothal 40	1100ºC (2010ºF)	1.04/626

Tubothal heating element

Metallic heating elements of cartridge element type designed for long life and trouble-free service. Tubothal heating elements are available in standard dimensions from 68 to 170 mm (2.6 to 6.6 inch) diameter and can be supplied in almost any length. Tubothal elements can be used inside all types of radiant tubes or as stand-alone elements.

Superior power output

Tubothal heating elements are capable at operating at a far higher power output than conventional cartridge heating elements.

With a power output up to 45 kW/m (12.2 LW/ft) length, a single Tubothal heating element may be capable of replacing up to three heating elements of standard design, leading to major savings in replacement and maintenance costs.

Tubothal heating elements combined with Kanthal APMT/Kanthal APM radiant tubes allow for higher power rating than any other metallic heating system available on the market. This combination also results in a practically maintenance-free production.

Kanthal alloys vs. Nikrothal alloys

For the furnace user, using Kanthal iron-chromium-aluminium (FeCrAl) alloys instead of nickel-chromium (NiCr) alloys results in less amount of material and also a longer element life, which mean considerable cost savings.

The table below shows an example of a 33% weight saving obtained by using a Kanthal alloy instead of a Nikrothal alloy. This lower element weight results in considerable cost savings, not only regarding element material but also support system, because fewer suspension hooks are necessary.

	Nikrothal alloy	**Kanthal alloy**
Furnace temperature °C (°F)	1000 (1832)	1000 (1832)
Element temperature °C (°F)	1068 (1954)	1106 (2022)
Hot resistance (Rw)	3.61	3.61
Temperature factor (Ct)	1.05	1.06
Cold resistance (R20)	3.44	3.41
Wire diameter mm (inch)	5.5 (0.216)	5.5 (0.216)
Surface load (W/cm2)	3.09	3.98
Wire length m (inch) 3 elements	224.9 (8.82)	174.6 (6.85)
Wire weight kg elements	44.4	29.6

44.4-29.6/44.4 = 33% weight saving (based on the same wire diameter).