KANTHAL®

Part of Sandvik Group

WIDEST PRODUCT RANGE
OUTSTANDING PERFORMANCE

PRODUCT OVERVIEW

HEATING ELEMENTS

Clic on the symbols to read more.

Our 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.

KANTHAL® SUPER

High-power electric molybdenum disilicide ($MoSi_2$) heating elements for element temperatures up to 1850°C (3360°F). Kanthal® Super $MoSi_2$ 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.

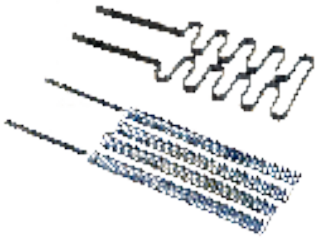
ELEMENT TEMPERATURE UP TO 1850°C (3360°F)
Manufactured as ready-made elements in several material grades.
Kanthal® Super 1700, 1800, 1900, ER, RA, HT and NC.
Standard element dimensions: 3/6 mm, 4/9 mm, 6/12 mm, 9/18 mm, 12/24 mm.

GLOBAR® SiC HEATING ELEMENTS

Silicon carbide (SiC) electric heating elements are extremely versatile heating elements manufactured in straight, spiraled, single or multi-shank designs for a broad range of applications including heat treatment, melting, and sintering.

ELEMENT TEMPERATURE UP TO 1650°C (3000°F)
Size range from 10 mm up to 75 mm Ø (0.375 – 2.95 in.).
Length of up to 6 meters.
High power concentration.
Can be installed in any orientation.
Simple installation – No support necessary inside the furnace.
Product types: Globar® SD, HD, SG/SR, HD Max and Glass seal.

METALLIC HEATING ELEMENTS



Ready-made metallic heating elements made from wire or strip in Kanthal® iron-chromium-aluminium alloys or Nikrothal® nickel-chromium alloys. Metallic heating elements can be manufactured to any specifications and with short delivery times.

ELEMENT TEMPERATURES UP TO 1425°C (2600°F)
Examples of element types are: Coiled wire and strip heating elements (i.e. spiral and edge-wound elements).
ROB – Sinuated wire elements.
Sinuated (corrugated) strip elements.
Cartridge elements (i.e. bundle rod elements and cage elements).

TUBOTHAL® ELEMENTS

Metallic heating elements of cartridge element type designed for long life and trouble-free service. Tubothal® elements can be supplied in almost any length used inside all types of radiant tubes or as stand-alone elements.

ELEMENT TEMPERATURES UP TO 1250°C (2280°F)
Size range from Ø68 mm up to Ø 170 mm
Lengths from 0,5 to 6 meters
Low aging
Low thermal mass
No oxide spallation

HEATING MODULES

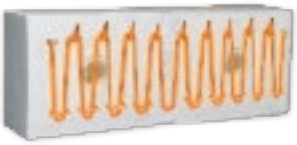
Kanthal prefabricated heating modules are designed for a wide range of thermal processing applications up to 1700°C (3090°F) element temperature. Combining the best properties of electric heating and fiber or dense ceramic insulation, Kanthal heating modules are suitable for the smallest laboratory furnace to the largest production furnace.

SUPERTHAL® HEATING MODULES

Superthal® heating modules are intended for use in laboratory or production furnaces/ heaters wherever concentrated heat is needed. They also provide major energy savings in several applications. The flexibility allows for different tests and processes to take place in the same furnace set-up.

ELEMENT TEMPERATURE UP TO 1750°C (3180°F)
Fast and easy to install and replace
Quick temperature ramping
Accurate temperature profiles
Very high power concentration (150KW/m², 14KW/ft²)
Long service life

FIBROTHAL® HEATING MODULES



The construction method of Fibrothal® heating modules ensures accurate positioning of the coils and eliminates the distortion or other problems connected to the conventional open coil elements in grooves or on tubes. Fibrothal® heating modules also provide major energy savings in several applications. RCF free grades available.

ELEMENT TEMPERATURES UP TO 1350°C (2460°F)
Fast and easy to install and replace
Improved furnace efficiency
High power concentration
Virtually any shape and size
Ideal for huge furnaces
Low weight construction
Low thermal mass
Muffles, cylinders, half cylinders, part cylinders, panels, custom shapes
Retorts

FIBROTHAL® GSO

The Fibrothal® GSO heater module has a unique support structure for fixing in tough conditions which contributes to a vastly improved service life and provides power loadings up to 100 kW/m². The module offers high temperature uniformity while being flexible in design.

FIBROTHAL® GSO PANEL TYPE
Easy to apply to line voltage.
Applicable to any sizes from 100x100 mm (3.94x3.94 inches) up to 1075x650 mm (42.3x25.6 inches).

FIBROTHAL® GSO CYLINDRICAL TYPE
Applicable to any sizes from 150 mm (5.9 inch) ID up to 2000 mm (78.7 inch) ID.

MODUTHAL® HEATING MODULES

The construction method of Moduthal® heating modules ensures accurate positioning of the elements and eliminates the distortion or other problems connected to the conventional open coil elements in grooves or on tubes.

ELEMENT TEMPERATURES UP TO 1350°C (2460°F)
A fiber-free version is available for up to 1250°C (2280°F) element temperature.

AIR HEATERS

High-temperature industrial electrical air heaters of different types for a large variety of applications. Compared to gas burners, electrical heaters offer pollution free processes, easier installation, and fewer safety risks.

FLOW HEATER

The unique patented design of the Kanthal® Flow Heater allows maximum gas outlet temperatures of 1100°C, what is more than 250°C higher than any conventional air heater based on metallic heating elements. The Kanthal® Flow Heater gives excellent controllability and a provides a very wide (mass) flow range or pulsed flow operation.

MAXIMUM GAS OUTLET TEMPERATURE 1100°C (2012°F)

- Power 3.5 to 40 kW (standard models) and customized designs.
- High range of (mass) flow rates (up to 1:30)
- Extremely small heater size per kW, 1 and 3 phase designs available.
- Direct connection to line voltage, usage in high pressure applications possible, easy to control and large turn down ratio, no contamination of gas flow.
- For use with air, N_2, O_2, CO_2. Other gases on request.

AIR HEATING CASSETTES

With Kanthal air heating cassettes it is possible to heat air or gases up to 800°C (1470°F) and maintain a uniform temperature throughout the furnace. The air heating cassettes can be produced to fit most existing or new furnace designs.

- Compact design
- Easy to install
- High power output
- Long service life
- Light weight
- Customized designs for high power and high mass flow rates.

DIFFUSION CASSETTES

Fibrothal® diffusion cassettes for atmospheric and/or LPCVD processing of semiconductors and solar cells.

FIBROTHAL® DIFFUSION CASSETTES

The Fibrothal® diffusion cassettes are a 'plug and heat' solution for the production of high-quality crystalline silicon wafers for solar cells and semiconductors.

ELEMENT TEMPERATURES UP TO 1350°C (2460°F)

- The diffusion cassettes are of heavy or low mass design for both vertical or horizontal furnace system applications.
- Customized heaters for specific applications can be delivered on request.

MRL, VERTICAL HEATING ELEMENTS

MRL vertical replacement heating elements are available in more than fifty designs for OEM vertical furnaces. The flexible design allows radical changes in process parameters. Provides uniform heating from hot faces, accurate centering of heating element chamber, and forced air cooling options to increase production capability and decrease recovery time.

OPERATING TEMPERATURES UP TO 1300°C (2372°F)

- Magna AMR, AZ, S and SW.
- Currently available with up to 300 mm (11.81 in.) wafer capability.
- Increased reliability, extended life and improved throughput and yield.
- Vacuum formed hot face insulation and advanced heating element alloys.
- Particulate reduction through the use of proprietary surface coatings.
- Forced air and water cooling options to maximize throughput.

FURNACE TUBES

High temperature tubes made from Kanthal® APMT and Kanthal® APM and Kanthal® AF iron-chromium-aluminium (FeCrAl) and nickel-chromium (NiCr) alloys for gas-heated or electrically heated furnaces.

Long life, robust, high performance tubes for a wide range of furnace applications, including radiant protection tubes for electrically heated and gas fired systems. Superior resistance to, for example, carburization, thermal shock, sagging and distortion. Excellent mechanical properties and the ability to form a dense and adhesive oxide film that protects against corrosion and atmospheric attack.

TUBE TEMPERATURES UP TO 1250°C (2280°F)
Std. size range from 26.7 mm dia to 260 mm dia (1.05–10.24 in.).
Long tube life.
Maintenance free operation.
Kanthal® APM/Kanthal® APMT tubes, Kanthal® AF for carburizing and sulfidizing conditions.
Sandvik 353 MA tubes for nitriding conditions.
Muffle tubes for strand annealing furnaces.
Thermocouple protection tubes.
Inner and outer tubes for SER gas burners.
Retorts.
Available as straight, U- and W-shaped tubes.

I-TYPE RADIANT TUBES KANTHAL® APM AND KANTHAL® APMT

Radiant tubes available as complete ready-to-install assemblies made according to customer specifications. For use in both vertical and horizontal positions. Radiant tubes made from our Kanthal® APM and Kanthal® APMT FeCrAl alloys offer several advantages compared to ceramic tubes, silicon carbide tubes and nickel-chromium (NiCr) alloy-based tubes.

KANTHAL® AF TUBES

Kanthal® AF Tubes are the most recent innovation in the range of Kanthal® radiant tubes. I-shaped radiant tubes available as complete ready-to-install assemblies made according to customer specifications. For strength reasons only suitable to be used as vertically positioned (hanging) tubes, but used as such, with a demonstrated ability to outdo most other metallic nickel-chromium (NiCr) alloy-based radiant tube alternatives in electrically heated conventional batch, or continuous furnaces operating at furnace temperatures above 900°C. Kanthal® AF is a ferritic iron-chromium-aluminum alloy (FeCrAl alloy) intended for use at tube temperatures up to 1200°C (2280°F). The alloy is characterized by superior resistance to oxidation and corrosion, and forms an excellent, non-scaling surface oxide, which provides effective protection in most furnace environments.

U AND W-TYPE RADIANT TUBES

U- and W radiant tubes for tube temperatures up to 1250°C (2280°F). The Kanthal program of U- and W radiant tubes includes nickel-chromium (NiCr) alloys or Kanthal® APM and Kanthal® APMT iron-chromium-aluminium (FeCrAl) alloys for extremely demanding environments, or as hybrid solutions with combinations of the different material types for maximized performance.

FURNACE ROLLERS

Furnace rollers in different alloys that suit both the hot and cool zones of your furnace.
Our furnace rollers are available in outside diameters from 26 to 1,800 mm (1 to 70 inch).

KANTHAL® APMT FURNACE ROLLERS

Our sophisticated Kanthal® APMT rollers ensure the best performance in critical 'hot zones', with operating temperatures up to 1250°C (2250°F). Kanthal® APMT furnace rollers provide longer service life compared to conventional materials, for high temperature and demanding applications Kanthal® furnace rollers are available in outside diameters from 26 to 260 mm (1 to 10 in.).

MAIN ADVANTAGES

- High mechanical strength and form stability. No bending or elongation.
- High resistance to oxidation and corrosion.
- Excellent in most oxidizing, carburizing, sulfurizing and inert or controlled atmospheres.
- Not sensitive to thermal shock.
- No water cooling required for roller temperatures up to 1250°C (2280°F).

HEATING MATERIAL – WIRE

Wire in a wide range of alloys optimized for use in, for example, resistance, high-temperature and conductive applications.

RESISTANCE HEATING WIRE

Round and flat resistance heating wire and resistance wire with bright annealed or oxidized surface, depending on size. Round resistance wire sizes up to 0.40 mm (0.0157 inch) are available with insulation and coating.

Kanthal® D, A-1, AF, APM
Nikorthal® 40, 60, 80

SIZE RANGE

Round wire

0.010–12 mm (0.00039–0.472 inch).

Other sizes are available on request.

Ribbon (flat wire)

Thickness: 0.023–0.8 mm (0.0009–0.031 inch).

Width: 0.038–4 mm (0.0015–0.157 inch).

Width/thickness ratio max 40, depending on alloy and tolerance.

Other sizes are available on request.

Stranded wire

Some resistance heating alloys and pure nickel are available as stranded wire.

SPRAY WIRE

Thermal spray wire in a wide range of alloys for high-temperature corrosion protection, bonding layers, build-up coating and sealing.

SIZE RANGE

Standard sizes are 1.20, 1.60 and 2.00 mm (0.0472, 0.0693 and 0.0787 inch).

Other sizes can be offered on request.

The standard delivery form is tight wound on SD 300K spools.

HEATING MATERIAL – STRIP

Strip in a wide range of alloys optimized for use in electrical resistance and high-temperature applications. Standard sizes range from thickness 0.10 to 3.5 mm (0.0039 to 0.1378 inch) and width 4–195 mm (0.157–7.68 inch).

RESISTANCE HEATING STRIP

Resistance heating strip for furnace heating elements and other heat-generating applications. The strip is normally delivered in cold-rolled condition with ground surface.

SIZE RANGE

Thickness: 0.10–4 mm (0.00394–0.157 inch).

Width: 4–200 mm (0.157–7.874 inch).

Other sizes can be delivered on request.

THERMOCOUPLE WIRE AND STRIP

Thermocouple wire and thermocouple strip for use at temperatures up to 1260°C (2300°F). Kanthal® thermocouple wire is supplied with bright or oxidized surface according to standard or special EMF requirements.

THERMOCOUPLE

We offer thermocouple materials (types K, T, E, J, N) for a range of temperatures to 1260°C. Kanthal offers homogeneous and stable melts that withstand the test of time for demanding applications.

WIRE

Kanthal thermocouple wire ranges from 0.05 to 8.0 mm (0.0019 to 0.315 inch).

Thermocouple wire in the size range 0.0254 mm to 0.51 mm (0.001 to 0.0201 inch) can be supplied with or without an insulating coating.

STRIP

Standard sizes for thermocouple strip range from thickness 0.10 to 3.0 mm (0.0039 to 0.181 inch) and width from 4 to 195 mm (0.157 to 7.68 inch).

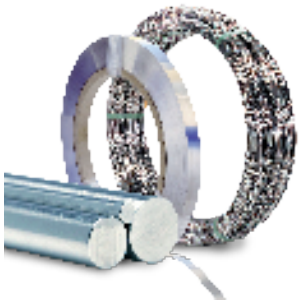
THERMOTHAL® KM

This is a new alloy for Mineral Insulated Cable (MIC) thermocouple manufacturers. Thermothal® KM is an austenitic nickel-chromium alloy (NiCr alloy) used for the positive leg of thermocouple type K.

CONSTRUCTION MATERIAL

Kanthal® APMT high-temperature construction materials for the manufacturing of furnace accessories like furnace furniture and furnace rollers.

HIGH-TEMPERATURE CONSTRUCTION MATERIALS



The Kanthal program of high-temperature construction materials includes an advanced powder-metallurgical, iron-chromium-aluminum alloy (FeCrAl). It offers high creep strength and good oxidation properties at high temperatures of 1100–1425°C (1980–2565°F) where conventional metallic materials cannot operate – all available in a variety of product forms and dimensions (tube, plate, rod, bars, square bars, forging blanks, wire, strip).

FOR MATERIAL TEMPERATURES UP TO 1425°C (2565°F)
Kanthal high-temperature construction materials are suitable for the manufacturing of construction parts.
Fixtures
Supports
Tube hangers
Fasteners and holders
Burner nozzles
Muffles and retorts
Rotative drums
And many others, where conventional alloys fail.

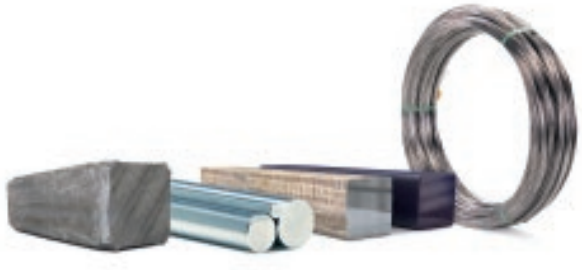
STEEL PRODUCTS

In our melting shop in Hallstahammar, Sweden, we can give you all the flexibility you need in terms of shapes, alloys mix and, best of all, volumes. We can supply batches as small as 5–10 tonnes.

STEEL PRODUCTS

Our main scope of supply is wire rod (size range: 5.5–12.5 mm), billets and ingots. We can also deliver round bars and profiles through our network of distributor contacts. We offer: Fe-based alloys; nickel alloys with Ni levels ranging from ~30 % to 75 %; and special grades, such as C-276, 625.

OUR TOTAL RANGE INCLUDE 550 DIFFERENT ALLOYS IN:
Heat resistant alloys
FeNi alloys
Corrosion resistant alloys
Ni based alloys
Stainless alloys



Are you looking for larger quantities?
No problem – we also have a bigger steel plant within the Sandvik group, with a capacity of up to 60 tonnes per batch.

ELECTRIC HEATING SYSTEMS

With climate change high on the worldwide agenda Kanthal offers a wide range of electrically heated systems to remove the use of fossil fuel and the accompanying CO_2 emission's from our customers production facilities.

LADLE HEATING SYSTEMS

Our ladle heaters are typically used in primary, melt shop and foundry industries. The standard range covers inner diameter 500–2100 mm (20–83 in.), custom sizes outside this range are also available.

Heliothal™ LT
– for ladle heating up to 1382°F (750°C).

Heliothal™ MT
– for ladle heating up to 2282°F (1250°C).

Heliothal™ HT
– for ladle heating up to 2732°F (1500°C).

Our heaters distribute heat more evenly – which results in improved safety, process control and an extended liner lifetime.

All models can be used for drying and preheating of ladles with the High temperate model (HT) offering additional curing and holding of liquid metal capability.

Do not emit toxic gases, NO_x, SO_x or Carbon monoxide into the workspace and environment.

Virtually silent in operation.

Can be powered by 100% renewable power.

CATHODE HEATING SYSTEMS

ANODE HEATING SYSTEMS

MOULD PREHEATERS

INGOT SURFACE IMPROVERS

These systems are designed to improve safety in the Aluminium industry by offering controlled and uniform heating to prevent water vapour explosions.

Electric systems remove the requirement for gas or oil heating which produces water vapour, CO, CO_2 and NO_x into production and the wider environment.

They also offer significant efficiency improvements and financial payback!

SERVICES

Improve your productivity, optimize the quality of your end-product or design an entirely new heating solution, we can help you.

GAS TO ELECTRIC CONVERSIONS

FOSSIL FUEL TO ELECTRIC CONVERSIONS

ELECTRIFICATION OF THERMAL PROCESSES

Looking to upgrade your existing Fossil fuel powered furnace / process and convert to a clean green electric solution?

From the initial feasibility study through engineering design, thermal modelling, payback calculation to a fully delivered Turn key solution, Kanthal® Services can help your company reach its efficiency and environmental commitments.

- Feasibility Studies
- Full Thermal, Fluid and mechanical modelling of processes.
- Lab and pilot scale testing of electrified processes.
- Business case and payback support.
- Engineering Design from concept to detailed production drawings.
- Full Turn key supply, installation and commissioning.

ENGINEERING AND THERMAL MODELLING

Looking for an inexpensive way of verifying your design or process with computer modelling?

Do you need engineering design from a dedicated design team with in depth knowledge across many industries and applications.

- Thermal, mechanical and fluid modelling using Ansys™ Software
- Full design capability from initial concept to full manufacturing drawings.
- Mixing extensive knowledge and experience of high temperature heating with the latest engineering capabilities and techniques.

KANTHAL® PROCESS LABS

When you are looking to develop a new high temperature process or application and do not have the resource, equipment or capability to do this in house

Kanthal can run small scale tests, analyse the results and offer insights to fine tune your process ready for commercialisation.

- Testing under custom atmospheres and pressures.
- Accredited chemical laboratory and extensive metallurgical investigation capabilities
- Full access to Kanthal's extensive R&D facilities.
- Small scale custom setups possible

KANTHAL® PILOT PLANT

Taking your process or application testing to the next level

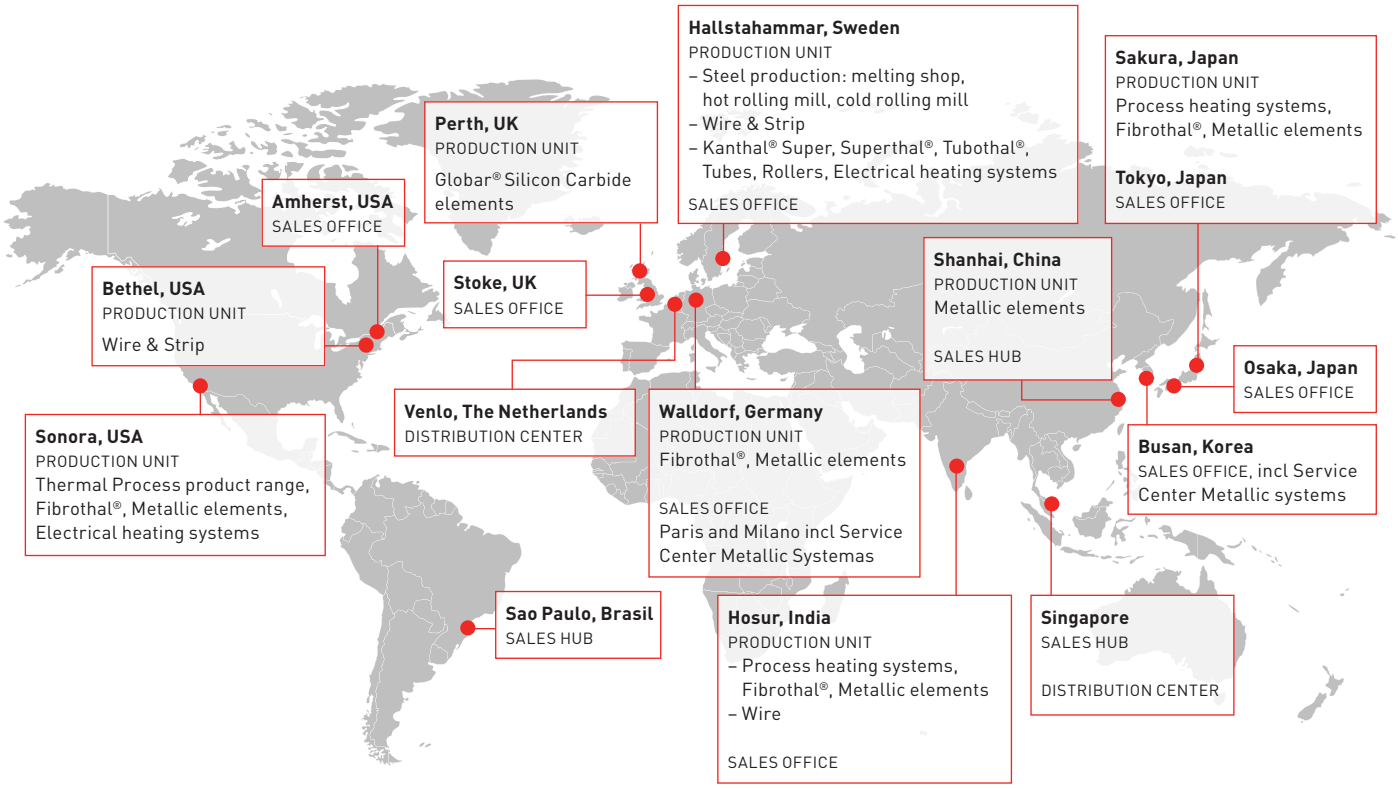
Kanthal can upsize your proven high temperature process into a fully operational pilot plant in our dedicated industrial testing area. Once proven your pilot plant can be relocated to your own production site.

- Located on our large Industrial site with full access to process gases and power at an industrial scale.
- Technicians available to run custom tests.
- Powered by low cost and environmental hydroelectric power.
- Backed up by our full range of testing and laboratory capabilities.

KANTHAL®

Part of Sandvik Group

KEY LOCATIONS



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