

# ELEKTRISCHE BEHEIZUNGSTECHNOLOGIEN

ABSCHLUSSVERANSTALTUNG „CO<sub>2</sub>-NEUTRALE  
PROZESSWÄRMEERZEUGUNG“: WIE GELINGT DIE UMSETZUNG IN DER  
PRAXIS?

2023-04-23 · MARKUS MANN · KATHAL GMBH

# Alleima. A world-leading advanced materials company.

High value-added products in advanced stainless steels and special alloys as well as products for industrial heating.

Revenues

20,669

SEK M, 2023

Recycled steel

80%

in products

Originates from

1862

# FTE's

~6,500

Sales

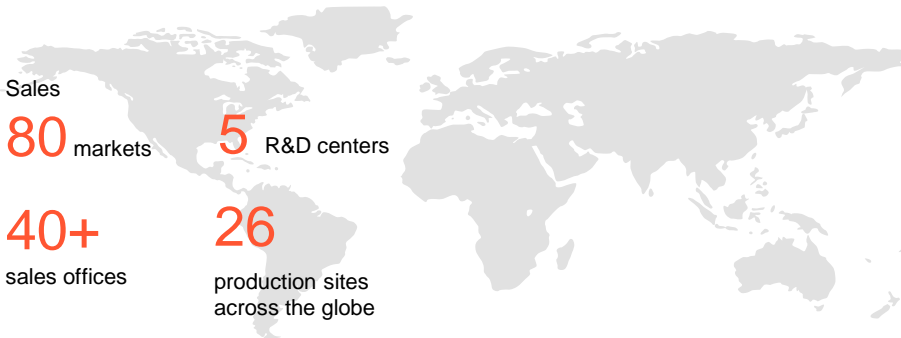
80 markets

5 R&amp;D centers

40+

sales offices

26

production sites  
across the globe

## Customer segments



Industrial

Chemical and  
Petrochemical

Oil and Gas



Industrial Heating



Consumer



Nuclear

Mining and  
Construction

Transportation



Medical

Hydrogen and  
Renewable energy

Europe

49%

Americas

2...

APAC

20%

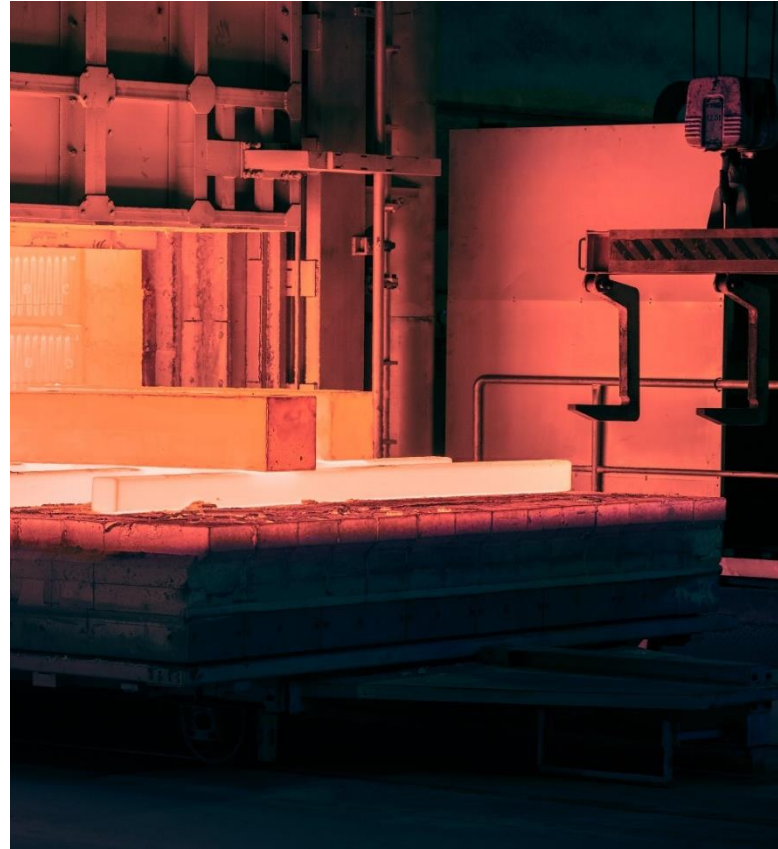
Other

9%



## ELECTRIFICATION BENEFITS

- > 30% Higher efficiency compared to fossil heating technology
- More than 2 times more cost efficient than green hydrogen
- Excellent temperature control:  $\pm 1^{\circ}\text{C}$
- Reduction of  $\text{CO}_2$  emissions to zero if renewable energy is used
- Elimination of  $\text{NO}_x$  and  $\text{SO}_x$  emissions
- Safer and quieter production environment



# METALLIC ELEMENTS

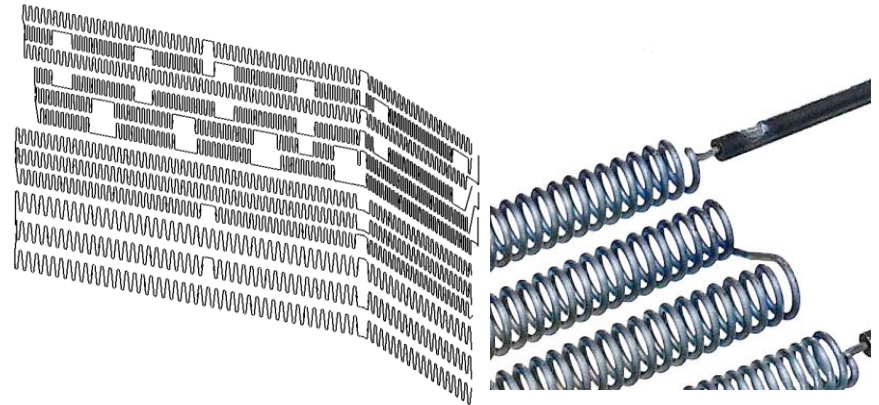
## THE CORE OF INDUSTRIAL HEAT

Wall loading: 50 kW/m<sup>2</sup> @ T<sub>f</sub> = 1,000°C

FeCrAl Alloys	T <sub>max</sub> (°C)	Shapes
AF	1300	Wire, strip, SW tubes
A-1	1400	Wire, strip
APM	1425	Wire, strip, SL tubes

NiCr Alloys	T <sub>max</sub> (°C)	Shapes
N40	1100	Wire
N70	1200	Wire, strip
N80	1250	Wire, strip



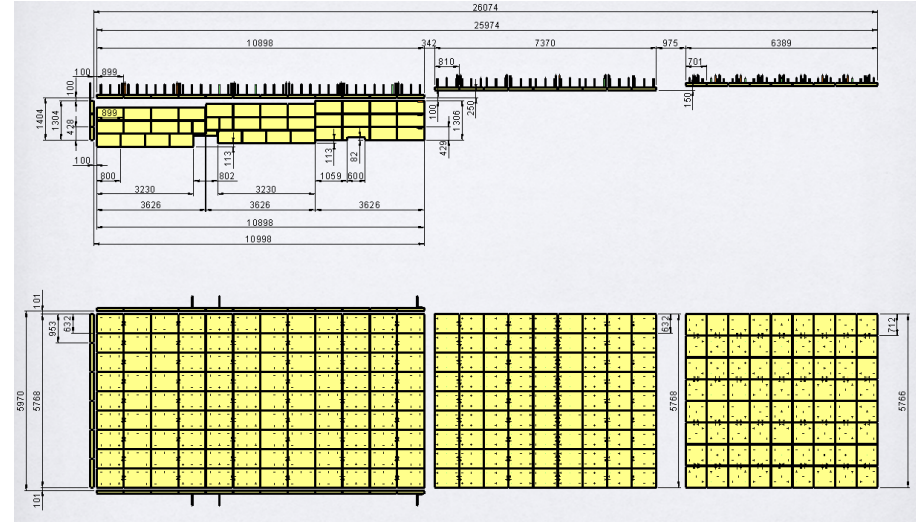
**KANTHAL®**



# FIBROTHAL®

## COMBINED HEATING + INSULATION MODULES

- Custom designs – (almost) no limitations in shape
- Wall loading up to 100 kW/m<sup>2</sup>
- Typical insulation thickness 125 + 175 mm (for  $T_f = 1100^{\circ}\text{C}$ )



Case **Re-heating kiln**

Electrical Power **5 MW**

Dimensions **26 x 5 x 1.6 m**

**KANTHAL®**

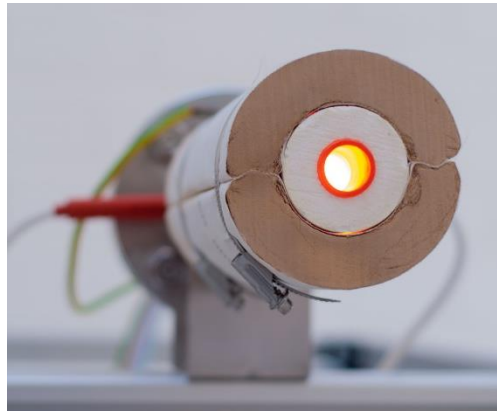
# PROCESS GAS HEATERS

Direct heat, excellent process control.



## PORCUPINE HEATING SYSTEMS

- 300...800°C
- < 0.1 bar<sub>g</sub>
- Air (or non-dangerous gases)



## KANTHAL FLOW HEATER / PROTHAL FH

- 800°...1100°C
- 3.5 ... 800 kW
- 0...40 bar<sub>g</sub>
- Clean Air, N<sub>2</sub>, H<sub>2</sub>, Syngases, ...

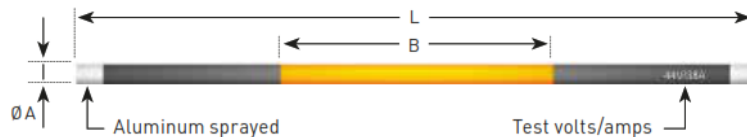


## PROTHAL DH / PROTHAL NH

- 600...1,000°C
- 120... 2,000 kW
- 0..10 bar<sub>g</sub>
- Air, N<sub>2</sub>, H<sub>2</sub>, Syngases, ...

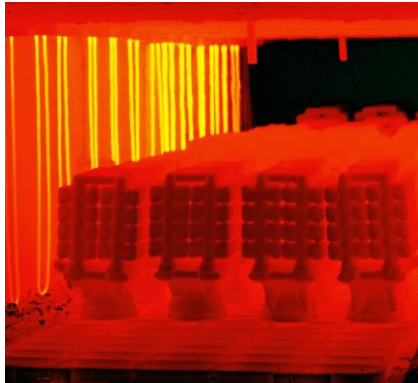
# GLOBAR - SILICON CARBIDE ELEMENTS

- Typical emperature range 600...1600°C
- Higher loading comparted to metallic elements
- Self stabilizing
- Multishank designs
- Ideal in contineous operation
- Typical diameter range 10...55 mm
- Heated length B up to 3.500 mm

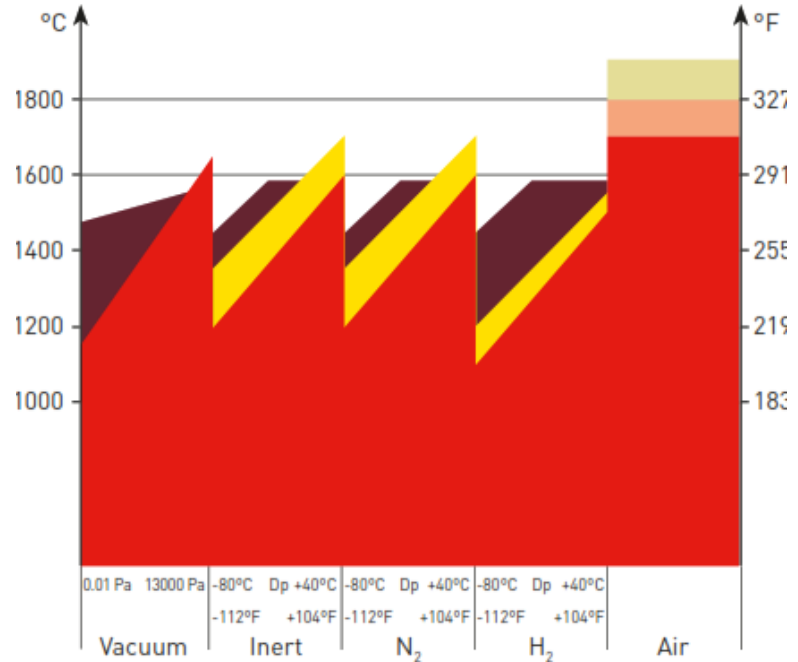


## KANTHAL SUPER©

- Up to 1850°C element temperature
- > 2x higher loading than ME or SiC
- Fast thermal cycling possible without element degradation
- Longest life of all heating elements



### MAX TEMPERATURE IN DIFFERENT ATMOSPHERES



- Kanthal® Super ER
- Kanthal® Super RA
- Kanthal® Super 1700
- Kanthal® Super 1800
- Kanthal® Super 1900, Kanthal® Super HT, Kanthal® Super NC



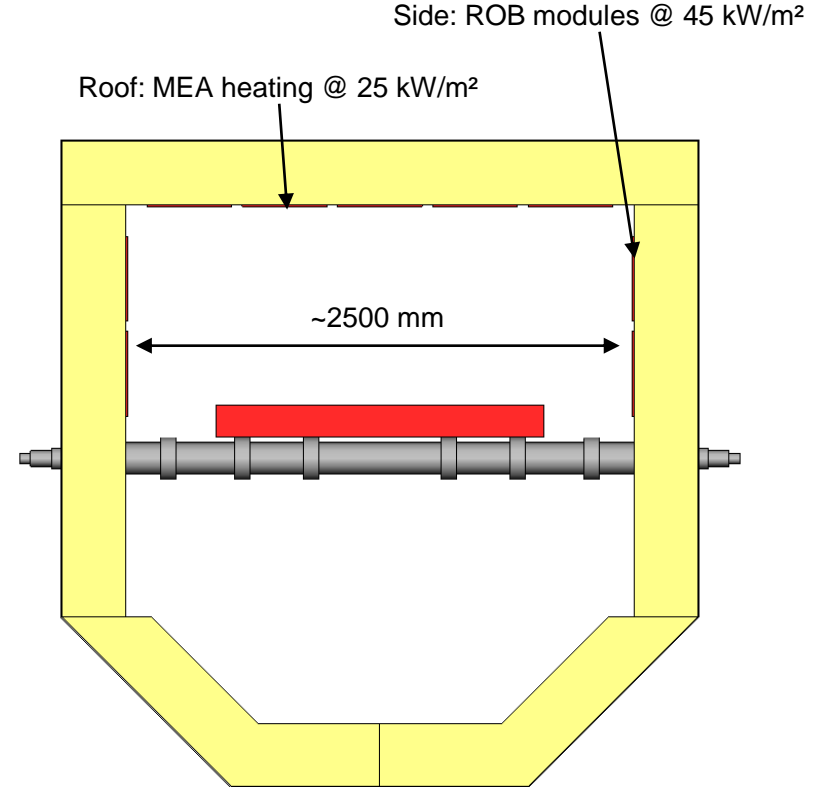
# DECARBONIZING THE STEEL SECTOR



# SLAB RE-HEATING

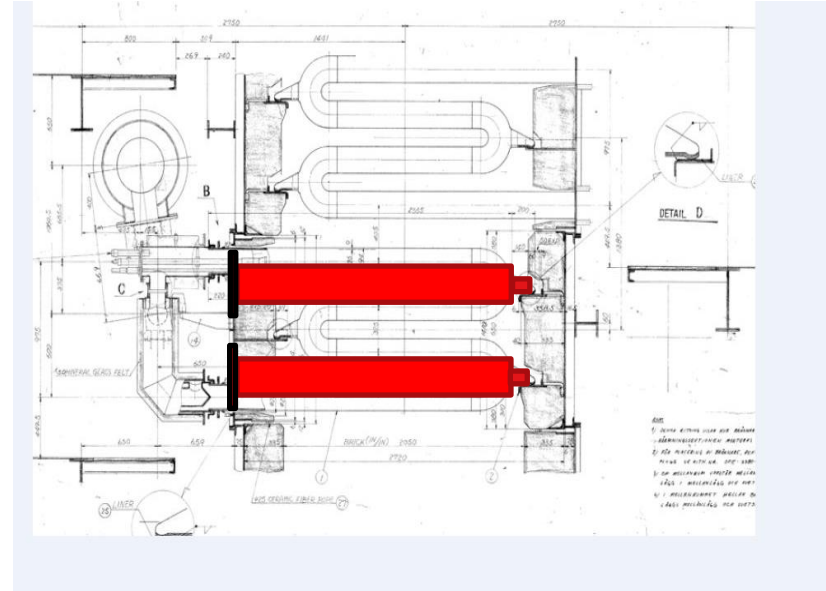
## FIBROTHAL specification

Furnace type	Roller hearth kiln
Dimensions	2.5 x 120 m
Heating power	> 10 MW
Atmosphere	Air
Furnace temperature	1150°C
Heating system	FIB ROB (side) FIB MEA (roof)
Installation location	Northern Europe
Commissioning	2025



## VERTICAL STRIP ANNEALING LINE

- Continuous furnaces for annealing and galvanizing of steel strip
- Atmosphere: 95% N 2-5% H<sub>2</sub>, Temperature around 1000°C
- Heated with gas burners in Ni-Cr radiant tubes (W, U, P-type)
- Large power requirement (100-200 kW per burner) or 20-30 MW per kiln
- Electrification: ~ 30% energy saving potential



## CHANCEN

- Eine Vielzahl der Thermoprozessanlagen lässt sich elektrisch beheizen.
- Bis 1200°C werden bereits Anlagen im Megawatt-Bereich elektrifiziert (Retrofit und Neuanlagenbau).
- Für den Bereich > 1200°C sind MW-Konzepte in der Entwicklung / Adaptierung.
- Hybride Beheizungskonzepte bieten zusätzliche Chancen.

## VORAUSSETZUNGEN

- Konsequenter Ausbau regenerativer Energien und der E-Netze → wettbewerbsfähige Preise!
- Speichertechnologie realisieren!
- Internationaler Ansatz – Deutschland alleine kann das Klima nicht retten, aber wir können Technology-Leader sein.







**THANK YOU!**  
THE FUTURE OF  
HEATING TECHNOLOGY  
– IT'S ELECTRIC

CONTACT

[markus.mann@kanthal.com](mailto:markus.mann@kanthal.com)

18 April 2024

**KANTHAL®**