

# Kanthal® Super RA

## High-temperature element for protective atmospheres and reactive environments

Kanthal® Super RA is specially designed to work in nitrogen at temperatures above 1250°C (2280°F). Other Kanthal Super molybdenum disilicide (MoSi<sub>2</sub>) heating elements have an excellent lifetime in oxidizing atmospheres but, when operating in nitrogen, nitration occurs. At temperatures above 1250°C (2280°F), the protective



glaze is consumed and the silicon in the silicide of the elements may react with nitrogen forming silicon nitride, which can cause scaling. The speed of the process depends on the dew point and the time in the atmosphere. The solution to these problems has been to run the elements in air at high temperature for a couple of hours to restore the glaze.

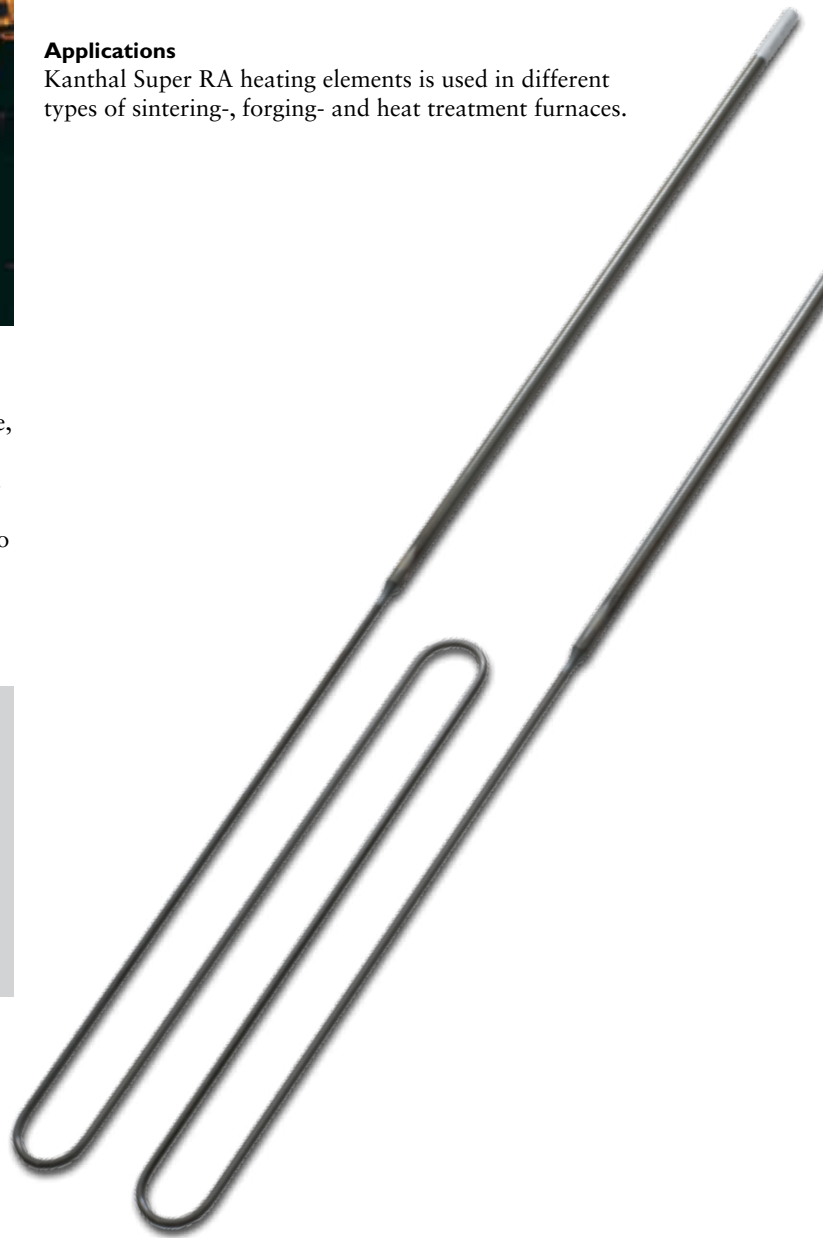
### SPECIAL FEATURES

- Longer life at high temperatures in reactive atmospheres
- Long life in all reduced and oxygen deficient atmospheres
- Can be used in nitrogen up to 1700°C (3090°F) at a 40°C (105°F) dew point
- Standard and specially designed elements

Kanthal Super RA heating elements withstands nitration at high temperatures better than any other type of Kanthal Super MoSi<sub>2</sub> heating element. The nitration process still occurs, but to a 50% lower rate than for Kanthal Super 1800. The temperature, at which the weight reduction starts, is about 75°C (135°F) higher. The element has also a substantially longer lifetime in all reduced and oxygen-deficient atmospheres and is characterized by a high tolerance in other aggressive environments.

### Applications

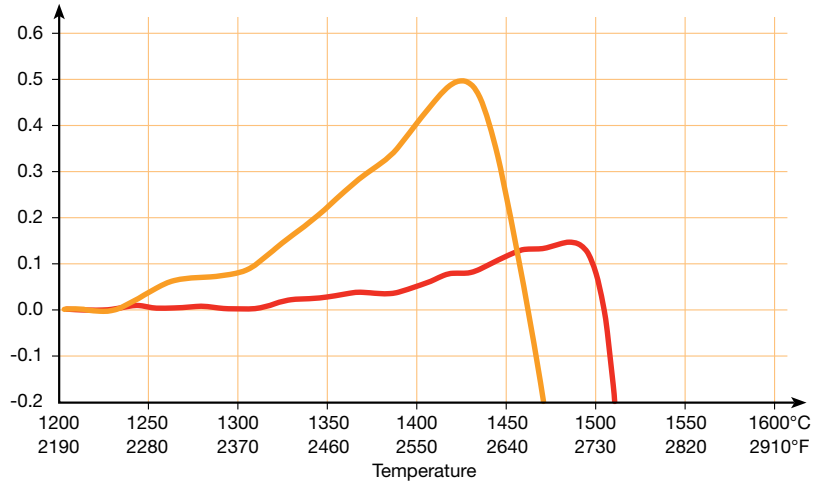
Kanthal Super RA heating elements is used in different types of sintering-, forging- and heat treatment furnaces.



## Technical information

### Rate of nitration

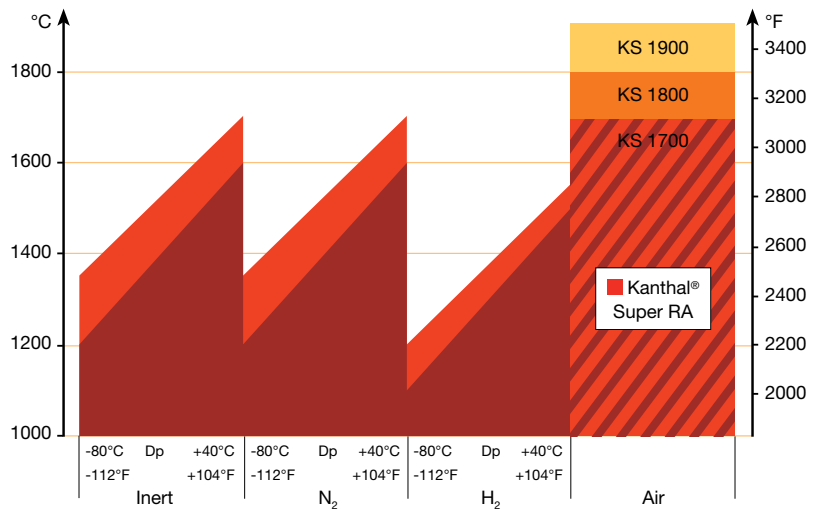
Mass change, mg/cm<sup>2</sup>



TG-analysis of Kanthal® Super RA and Kanthal Super 1800 in N<sub>2</sub>, Dp -40°C (-40°F)

■ Kanthal® Super RA ■ Kanthal Super 1800

### Maximum recommended element temperatures in different atmospheres

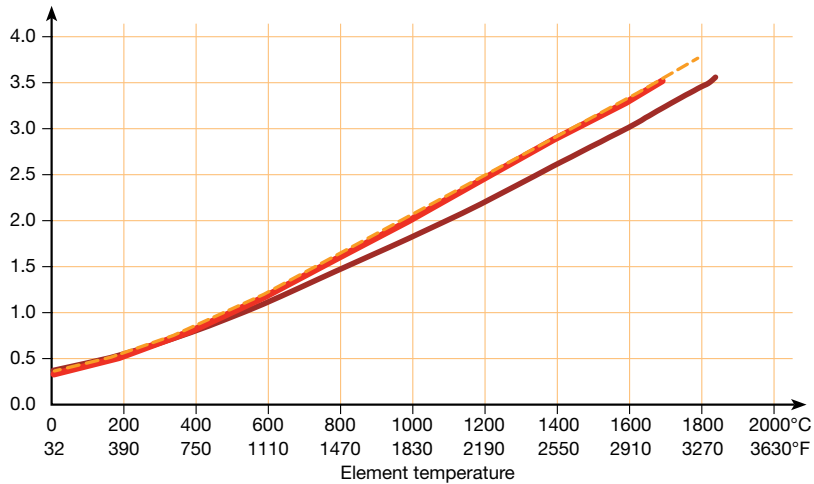


The diagram is a guide to maximum temperatures in different atmospheres depending on dew point, vacuum etc.

For details regarding specific applications, we recommend contact with Sandvik.

## Resistivity

Resistivity,  $\Omega \text{ mm}^2 \text{ m}^{-1}$



Electrical resistivity vs. element temperature for Kanthal Super 1700, 1800, 1900 and RA

■ Kanthal® Super RA/1700 ■ Kanthal Super 1800 ■ Kanthal Super 1900

### PROPERTIES

Maximum operating temperature	1700°C (3090°F)
Composition	Mainly $\text{MoSi}_2$
Density	5.6 g/cm <sup>3</sup> (0.2 lb/in <sup>3</sup> )
Thermal conductivity	
20–600°C (68–1110°F)	30 Wm <sup>-1</sup> K <sup>-1</sup>
600–1200°C (1110–2190°F)	15 Wm <sup>-1</sup> K <sup>-1</sup>
Coefficient of linear expansion	7–8 10 <sup>-6</sup> K <sup>-1</sup>
Specific heat capacity at 20°C (68°F)	0.42 kJ kg <sup>-1</sup> K <sup>-1</sup>
Emissivity	0.70–0.80

Kanthal® Super RA	Heating zone diam. Le		Terminal diam. Lu	
	mm	in	mm	in
	6	0.24	12	0.47
	9	0.35	18	0.71
	12	0.47	24	0.94

### Standard product range

Kanthal Super RA is delivered as two- and four-shank elements with fixed terminals as an option for safe and reliable electrical connections. Special designs are available on request.

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