



## 1.10.00 Resistors – heating elements

All types of tubular heating elements can be used as resistors. The use of large diameter resistance wires, gives low resistance elements that withstand high loads. Large element diameter withstands high voltage.

### >> Types of cooling

Air; convection or forced convection  
Liquid; water, oil etc.

### >> Materials

Steel – grade D  
Stainless steel – EN 1.4301, EN 1.4404, UNS S31254 UNS N08904, Incoloy 800, Incoloy 825  
Aluminium AA6060, AA6063

### >> Dimensions

Tubular elements: Ø 8,5, Ø 14, Ø 21 mm  
Aluminium I or X shaped with or without cooling fins.

### >> Example of applications

Cranes  
Trains  
Trams  
Vehicles  
Hybrid vehicles  
Frequency converters  
Sine-wave filter resistors

### >> Fastening of elements

Flanges; welded or brazed  
Nipples; pressed or brazed

### >> Electric connections

Cables  
Threaded pins M4/M6

### >> Designs

Numerous elements are often connected together, series and/or parallel, to achieve intended properties.

### >> Safety

The elements are 100 % tested for insulation and dielectric rigidity. Also, the elements are often built into protection cages to prevent contact with heated parts. Connection boxes with different IP classes can be used.

### >> Others

Computerized pulse load simulation is done to optimize each resistor application.

Specific element data on the back side of this leaflet.



>> Technical Specifications

	Ø 8.5 al-profiles	Ø 14 al-profiles	Ø 18	Ø 21
Minimum resistance/ element	0.12 ohm/m	0.06 ohm/m	1.6 ohm/m	1.5 ohm/m
Resistance tolerance	± 5 %	± 5 %	± 5 %	± 5 %
Dielectric strength	1.5 kV DC 1 min	4 kV DC 1 min	7 kV DC 1 min	9 kV DC 1 min
Length	300–6000 mm	300–6000 mm	300–1500 mm	300–1500 mm
Minimum bending radius	12.5 mm	25 mm	40 mm	60 mm
Inductance	0.5–1 µH / element			