



## Molybdenum Disilicide Electric Heating Elements up to 1,800°C

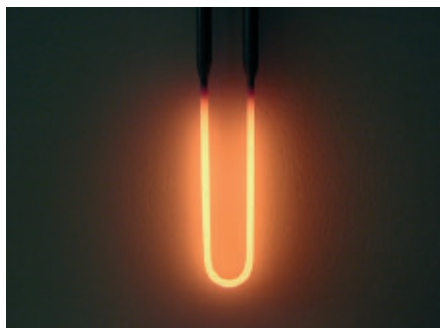
### Introduction

Electric Heating Elements are dense cermet materials, mainly composed of  $\text{MoSi}_2$  (molybdenum disilicide) and some Ceramic Components. Above 900°C service temperature the surface will form a protective high temperature layer of pure quartz, which gives the Molycom®-Ultra material a high resistance to oxidation. If this glassy phase should be exposed to contaminants, a lower melting phase forms. This material literally drips off the element exposing more molybdenum disilicide on which a new protective oxide layer forms. Molycom®-Ultra elements become somewhat ductile at approximately 1,200°C.

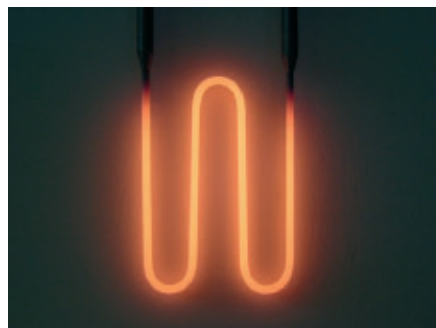
used up to a surface temperature of 1,800°C in oxidizing atmospheres. Long service life and ease of replacement contribute to high furnace utilization and low maintenance costs. New and old elements can be used together and in series.

manufactured according to established industry standards. The elements can also be used in combination with other molybdenum disilicide elements as an alternative or replacement part.

At low temperatures, an oxidation of molybdenum and silicon on the surface of the elements can occur at temperatures around 550°C. The oxidation product is a yellowish powder known as „pest“ and has normally no detrimental effect on the performance because the material is dense.



U-Element



W-Element

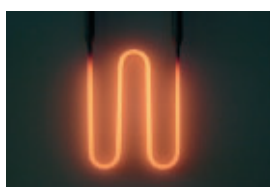
- HEATING
- INSULATION
- MEASURING
- FIRING & MELTING



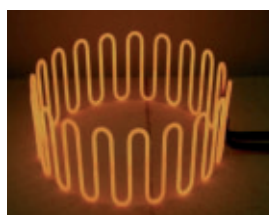
## NEW/UNIQUE!

high purity glassy silica layer and this layer works as an oxidation protection layer with very low oxidation permeability. Therefore the heating elements show less deformation, an excellent low temperature oxidation ("pest") resistance and long life use. The High-Purity and No-Pest Grades are available in 3/6 and 4/9mm at a maximum temperature of 1,800°C.

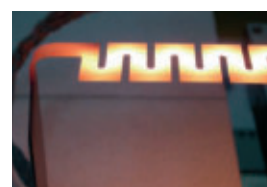
HyperHeater U & W shape



HyperHeater 360° shape



HyperHeater Flat shape



### HyperHeater 1800

	Al	Fe	Mg	Ca	Ti	Na	K	Cr	Ni	Mn	Cu
Competitor	3500	1200	740	560	114	104	95	53	43	13	<10
	<10	590	<10	<10	<10	<10	<10	20	11	<10	<10

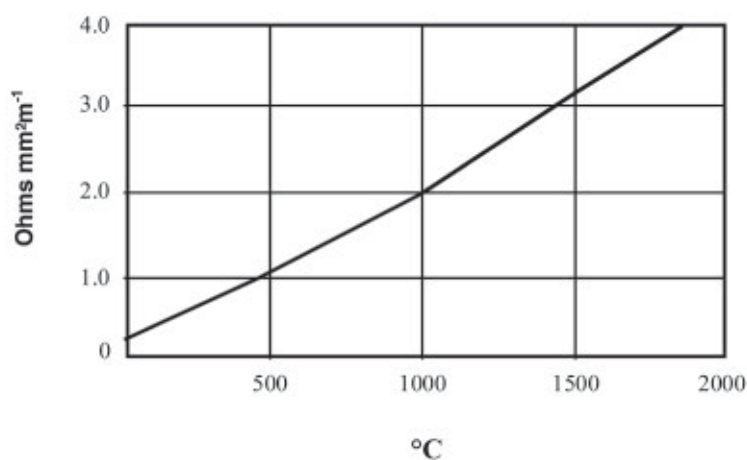
## Material properties

	MolyCom-Ultra® 1700	MolyCom-Ultra® 1800
Density (kg/m <sup>3</sup> )	5.60	5.60
Melting point (°C)	1,950	1,950
Bending Strength at 20°C (Nmm <sup>2</sup> )	400-450	400-450
Porosity (%)	< 1	< 1
Max. Element-Surface Temperature (°C)	1,700	1,800
Max. recommended Furnace Temperature (°C)	1,600	1,720

## Maximum recommended element temperatures in atmospheres (°C)

Atmosphere	MolyCom-Ultra® 1700	MolyCom-Ultra® 1800
Air	1,700	1,800
Nitrogen	1,600	1,700
Argon, helium	1,600	1,700
Dry hydrogen, dewpoint -80°C	1,150	1,150
Moist hydrogen, dewpoint 20°C	1,450	1,450
Exogas (e.g. 10% CO <sub>2</sub> , 5% CO, 15% H <sub>2</sub> )	1,600	1,700
Endogas (e.g. 40% H <sub>2</sub> , 20% CO)	1,400	1,450
Cracked & partially converted ammonia (approx. 8% H <sub>2</sub> )	1,400	1,400

## Resistivity of elements

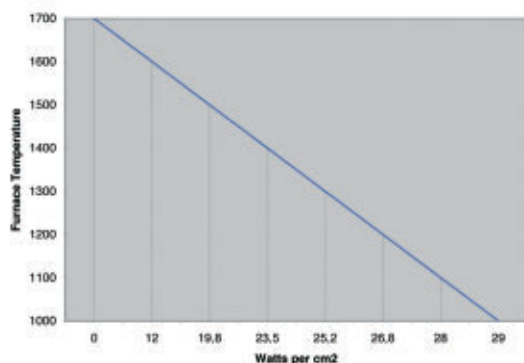


- HEATING
- INSULATION
- MEASURING
- FIRING & MELTING

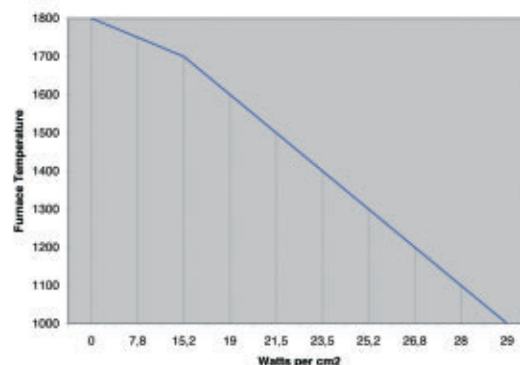


## Surface Loads

Maximum Surface Loads for MolyCom®-Ultra 1700



Maximum Surface Loads for MolyCom®-Ultra 1800



## Standard types available

Heating Elements are manufactured by the Powder-Metallurgy-Technology. They are made in U-, W- and L-shapes, diameters 3/6, 4/9, 6/12, 9/18, 12/24 mm and in total length up to about 2,000 mm and more.

1,700 and 1,800 are precisely manufactured and hot bended.

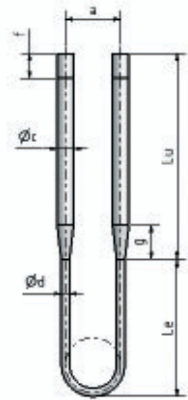
Size	Heating Zone Le ø (mm)	Terminal End Lu ø (mm)	Standard "A" Distance (mm)
3/6	3	6	25
4/9	4	9	25
6/12	6	12	50
9/18	9	18	60
12/24	12	24	80

All diameters are available for both grades

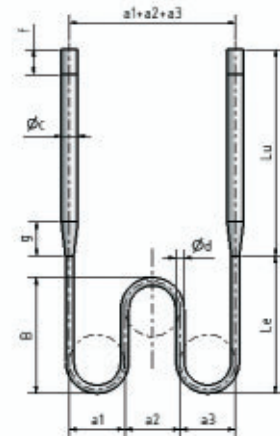
- HEATING
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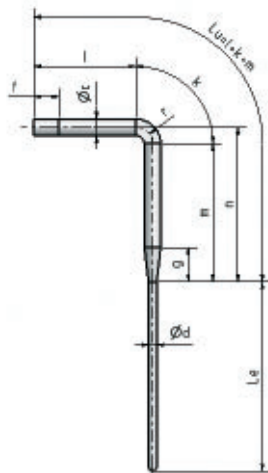
## Standard types available



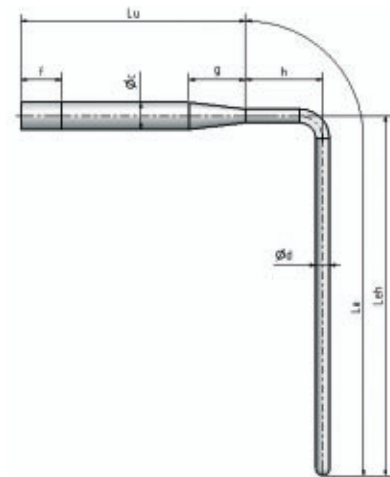
U-shape



W-shape and Multi-Shank



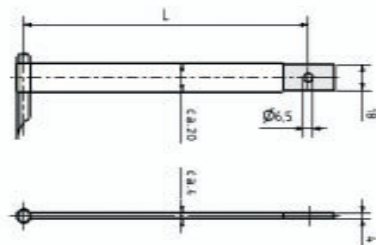
L-shape (bent 90° at  $L_u$ )



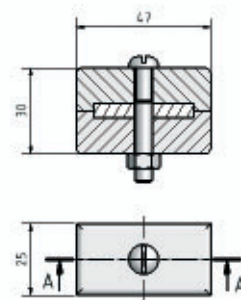
L-shape (bent 90° at  $L_e$ )

## Accessories

All necessary accessories like contact-straps, single & double holders, Clips, passage fibrous-blocks are in the range of HIGH TEMPERATURE TECHNOLOGY.

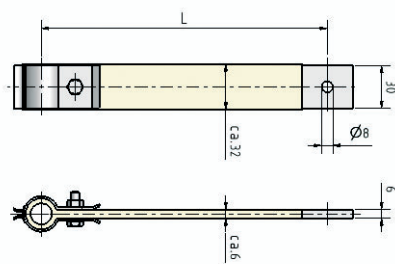


Power to Element

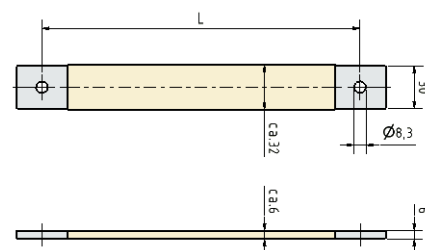


Element Holder

Element Size 3/6 mm & 4/9 mm



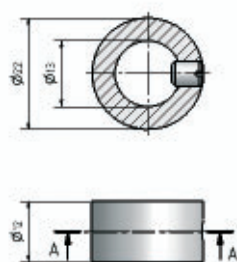
Power to Element with clamp



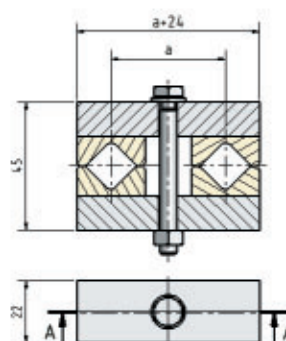
Power to Power

Element Size 6/12 mm (Part 1)

## Accessories

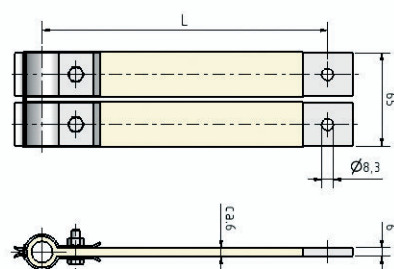


Single Shank Holder

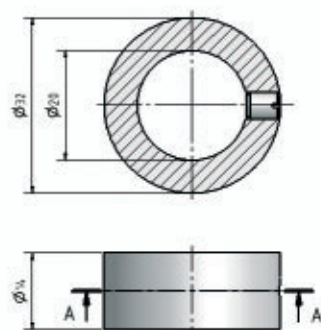


Two-Shank Holder

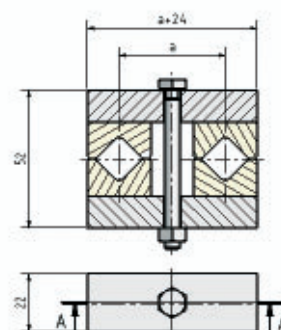
Element Size 6/12 mm (Part 2)



Power to Element



Single Shank Holder



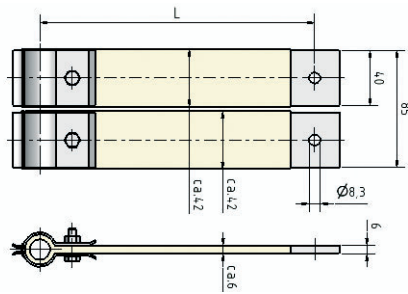
Two-Shank Holder

Element Size 9/18 mm

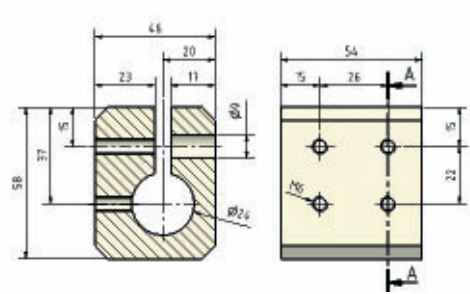


**During**  
**Freezing & Melting**

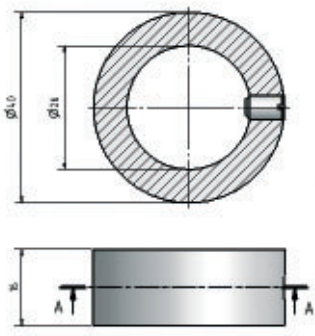
**Accessories**



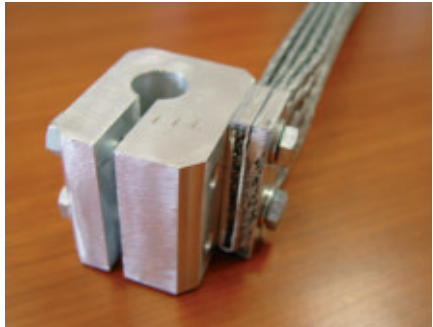
### Power to Element



### Aluminium Block



### Single Shank Holder



Element Size 12/24 mm