

# Moly-D<sup>®</sup> RT

## MOLYBDENUM DISILICIDE HEATING ELEMENTS

### GENERAL DESCRIPTION

The Moly-D RT element is a dense cermet material consisting of MoWSi<sub>2</sub> and an oxide, glassy phase component that has been specifically designed for high temperature **Rapid Thermal** cycling applications up to 1700°C (3090°F).

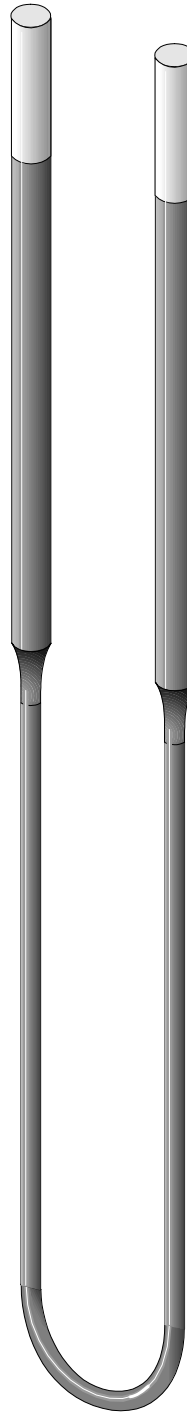
Moly-D RT is a silica former, so forms a protective surface oxide glaze of SiO<sub>2</sub>. In oxidizing atmospheres this thin silica scale provides excellent protection against further oxidation, and provides a very long element life.

Moly-D RT develops its protective oxide at a much slower growth rate compared to other Moly-D grades. Forming a thinner oxide film that takes much longer to develop, significantly reduces the tension between the oxide scale and the bulk during thermal cycling. The result is a much-improved heater life with reduced tendency for spallation. A far greater number of cycles being possible between spallation events.

This is especially important when considering smaller diameter element sizes, such as 3/6 and 4/9 mm, where other grades of Moly-D may be prone to stress breakage due to tension resulting from the large thermal expansion coefficient differential between the oxide scale and the bulk, particularly when used with longer cycle times and rapid thermal cycling between very high temperatures and room temperature.

### THE UNIQUE PROPERTIES

- Thinner forming protective oxide scale
- Slower growing protective oxide
- Superior performance and greater life in high temperature Rapid Thermal cycling applications.
- High purity material
- Specially developed and ideally suited for sintering of YSZ dental zirconia restorations (crowns, bridges, implants, etc.) with none of the discoloration of the zirconia parts that's often seen in sintering furnaces equipped with other types of MoSi<sub>2</sub> elements.



Molybdenum  
Disilicide  
Heating Elements

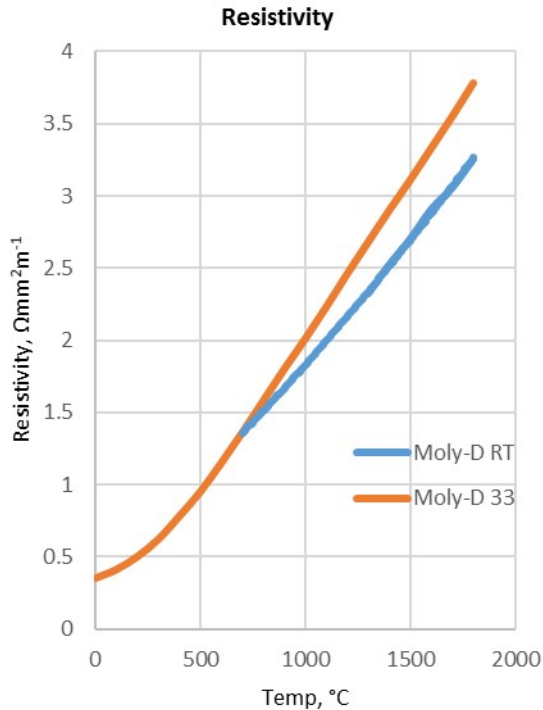


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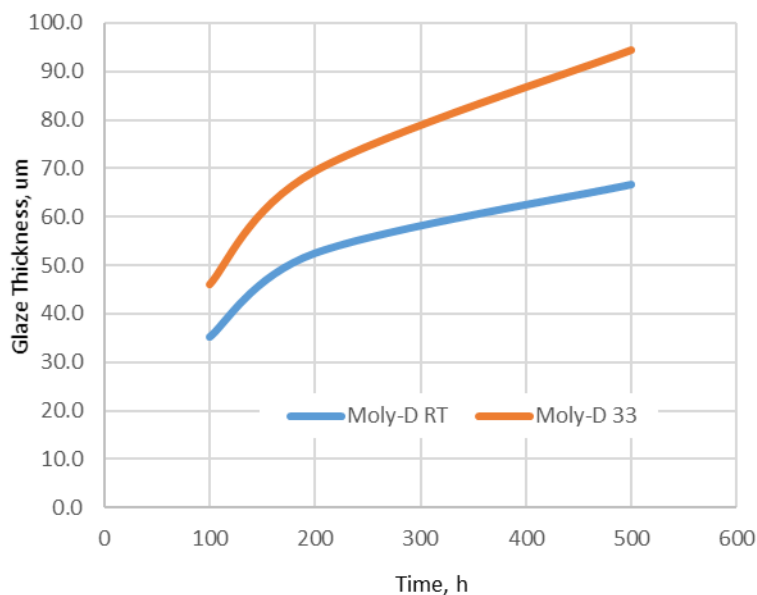
## TECHNICAL INFORMATION

### Resistivity

The electrical resistivity of Moly-D RT is at about the same level as Moly-D grades as shown in figure below.



Oxide growth rate in air, 1700°C



## AVAILABILITY

Moly-D RT are available in sizes 3/6 and 4/9. Contact us for other sizes.

Available as 2-shank and 4-shank elements with optional fixed contacts for safe and reliable electrical connections.

Supplied also as part of Moly-D Module Heaters.

MOLY-D RT						
SIZES AVAILABLE						
Size	Heating Zone Le Ø		Terminal End Lu Ø		Standard "A" Distance	
	mm	in	mm	in	mm	in
3/6	3	0.12	6	0.24	25	0.98
4/9	4	0.16	9	0.35	25	0.98

## PROPERTIES

Density	7.0 g/cm <sup>3</sup>	0.25 lb/in <sup>3</sup>
Thermal Expansion	7.5 x 10 <sup>-6</sup> K <sup>-1</sup>	4.1 x 10 <sup>-6</sup> °F <sup>-1</sup>
Porosity	<1%	
Emissivity	0.7 – 0.8	
Thermal Conductivity	20 – 600 °C	30 Wm <sup>-1</sup> K <sup>-1</sup>
	68 – 1110 °F	208 BTU/hr-ft <sup>2</sup> -°F/in
	601 – 1200 °C	15 Wm <sup>-1</sup> K <sup>-1</sup>
	1111 – 2192 °F	104 BTU/hr-ft <sup>2</sup> -°F/in
Specific Heat Capacity @ 20°C	420 Jkg <sup>-1</sup> K <sup>-1</sup>	0.10 BTU/lb-°F

## APPLICATIONS

**Dental zirconia sintering furnaces:** High purity element formulation and super adherent protective oxide glaze, prevents discoloration of YSZ material after conditioning the elements by forming a protective oxide glaze on the elements surface prior to introducing the zirconia parts. Prior to 1<sup>st</sup> firing cycle, and after a spallation event, it is necessary to re-establish a new protective glaze by heating the furnace empty to 1600°C, hold for 1-2 hours, cool down, before running the next sintering cycle.

**Rapid Sintering Furnaces:** Moly-D RT elements are recommended for all high temperature furnaces where rapid thermal cycling is used.

## DELIVERY

Most sizes and types can be shipped 2 to 3 weeks after receipt of an order. Emergency shipments for smaller quantities can usually be made in 2 to 3 days.

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