



I SQUARED R ELEMENT CO., INC.

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### CHECKLIST OF INFORMATION REQUIRED TO TROUBLESHOOT MOLY-D HEATING ELEMENT PROBLEMS

Date: \_\_\_\_\_

#### Customer data

Customer Name: \_\_\_\_\_

I2R Contact: \_\_\_\_\_

Contact Name: \_\_\_\_\_

Contact email: \_\_\_\_\_

Address: \_\_\_\_\_

Contact phone: \_\_\_\_\_

Products manufactured/Industry: \_\_\_\_\_

#### Furnace data

Furnace builder: \_\_\_\_\_

Furnace type: \_\_\_\_\_

Production capacity, lb/h: \_\_\_\_\_

Production Process: \_\_\_\_\_

Furnace Power Rating, kW: \_\_\_\_\_

Furnace Temperature, °C or °F \_\_\_\_\_

Firing Cycle: \_\_\_\_\_

Number of Zones \_\_\_\_\_

Time to temperature: \_\_\_\_\_

Refractory/Insulation thickness \_\_\_\_\_

Refractory Insulation Composition: \_\_\_\_\_

Diameters of holes in refractory: \_\_\_\_\_

Ceramic Terminal Tube used, size: \_\_\_\_\_

Width

Height

Length

Chamber/Zone dimension: \_\_\_\_\_

Furnace atmosphere: \_\_\_\_\_

Is atmosphere \_\_\_\_\_

What is the atmosphere dew point? \_\_\_\_\_

contained in muffle: \_\_\_\_\_

What volatiles are given off from the load during heating? \_\_\_\_\_

Is there any steam? \_\_\_\_\_

#### Electrical data:

Electrical orientation (Wye/Delta/Single-Phase): \_\_\_\_\_

SCR Rating: \_\_\_\_\_

Transformer Voltage taps: \_\_\_\_\_

SCR Manufacturer: \_\_\_\_\_

Transformer Rating: \_\_\_\_\_

Method of Control (SCR, \_\_\_\_\_

Transformer Manufacturer: \_\_\_\_\_

SSR or Contactor): \_\_\_\_\_

If SCR, what firing method is employed?(phase-angle, fast cycle with phase-angle start, etc?)

time base, if known): \_\_\_\_\_

RMS Current limit setting: \_\_\_\_\_

Volt (AC)

Phase

Hz

Main Line Power \_\_\_\_\_

**Element data**

Type of element & part number: _____	Number of elements _____
Element loading: _____	Power per element, kW: _____
Element temperature: _____	Hot Zone (Le) Length _____
Element dimension: _____	Cold End (Lu) Length: _____
Element Spacing (Centerline to Centerline) _____	Element spacing from chamber walls: _____
Type of element holders used: _____	Bent terminals?: _____
Sealed terminal lead throughs?: _____	Air cooled lead throughs? _____

**Connections and Installation**

What orientation are the elements installed in? (Normally vertical but can be horizontal resting on tile/supports, etc.) \_\_\_\_\_

How are the elements supported? (where applicable): \_\_\_\_\_

Are passage plugs/ terminal tubes/ lead-in bricks being used? \_\_\_\_\_

Are the terminal holes parallel with each other or made in some other way? \_\_\_\_\_

Are the terminal holes free of debris? (any signs of condensates in the holes?) \_\_\_\_\_

Are the element terminals being packed around with fiber at the ends where they pass through the refractories? \_\_\_\_\_

Are the elements still able to move freely in both linear and radial directions? (important for thermal expansion/contraction) \_\_\_\_\_

Is there sufficient slack in the length of the aluminum straps so as to not transfer stress to the elements? \_\_\_\_\_

Are there any signs of residues on the element hot zones?

Are there any signs of residues on the element cold ends? \_\_\_\_\_

If yes, do you know/what do you think the residues are? \_\_\_\_\_

Are all elements operating in the same environment? (usually yes, but if some elements are in a gas stream, while others are not, then the conditions between one element and another may be different. If no, please explain) \_\_\_\_\_

Are the element tapers all within the heating chamber and not back inside the insulation? \_\_\_\_\_

Are the aluminum braids showing signs of oxidation, arcing or heating up? \_\_\_\_\_

Are the connection clamps loose on the ends of the elements? \_\_\_\_\_

How are the elements connected in each control group?  
(Please describe and/or send a sketch or connection schematic) \_\_\_\_\_

**Element Radiant Protection Tube Data (where applicable)**

Tube material \_\_\_\_\_ Tube dimensions (mm): \_\_\_\_\_

Type(Straight,U, W, Inner) \_\_\_\_\_ Tube length (mm): \_\_\_\_\_

Tube orientation (Hor./Vert.) \_\_\_\_\_ Tube loading, W/cm<sup>2</sup>: \_\_\_\_\_

Number of tubes: \_\_\_\_\_ Net power per tube, kW: \_\_\_\_\_

**NOTE: PLEASE DESCRIBE THE ISSUE BEING EXPERIENCED AS THOROUGHLY AS POSSIBLE. USE SEPARATE SHEETS TO PROVIDE ADDITIONAL INFO/ WHEN THERE IS INSUFFICIENT SPACE ON THIS FORM. PLEASE SEND PHOTOS AND PROVIDE AS MUCH INFORMATION AS POSSIBLE ABOUT THE PROCESS. WHEN COMPLETE, PLEASE EMAIL THIS FORM, PHOTOS, AND ADDITIONAL INFO TO: [SALES@ISQUAREDRELEMENT.COM](mailto:SALES@ISQUAREDRELEMENT.COM)**