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 Process: ____________________ Production capacity, lb/h: ____________________
Furnace Temperature, °C or °F: ____________________ Furnace Power Rating, kW: ____________________
Number of Zones: ____________________ Firing Cycle: ____________________
Refractory/Insulation thickness: ____________________ Time to temperature: ____________________
Diameters of holes in refractory: ____________________ Refractory Insulation Composition: ____________________

Chamber/Zone dimension:
Width: ____________________ Height: ____________________ Length: ____________________

Furnace atmosphere: ____________________ Is atmosphere contained in muffle: ____________________
What is the atmosphere dew point?: ____________________
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, SSR or Contactor): ____________________
Transformer Manufacturer: ____________________

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) ____________________

Type of element holders used: ____________________

Element spacing from chamber walls: ____________________

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 or oxidaton, 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/cm²: __________________
- 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