

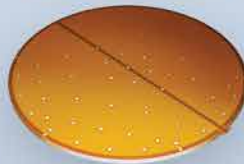
# **FRALOCK**<sup>®</sup>

**DEVELOPING HIGH PERFORMANCE SOLUTIONS  
FOR TECHNICALLY ADVANCED OEMS**

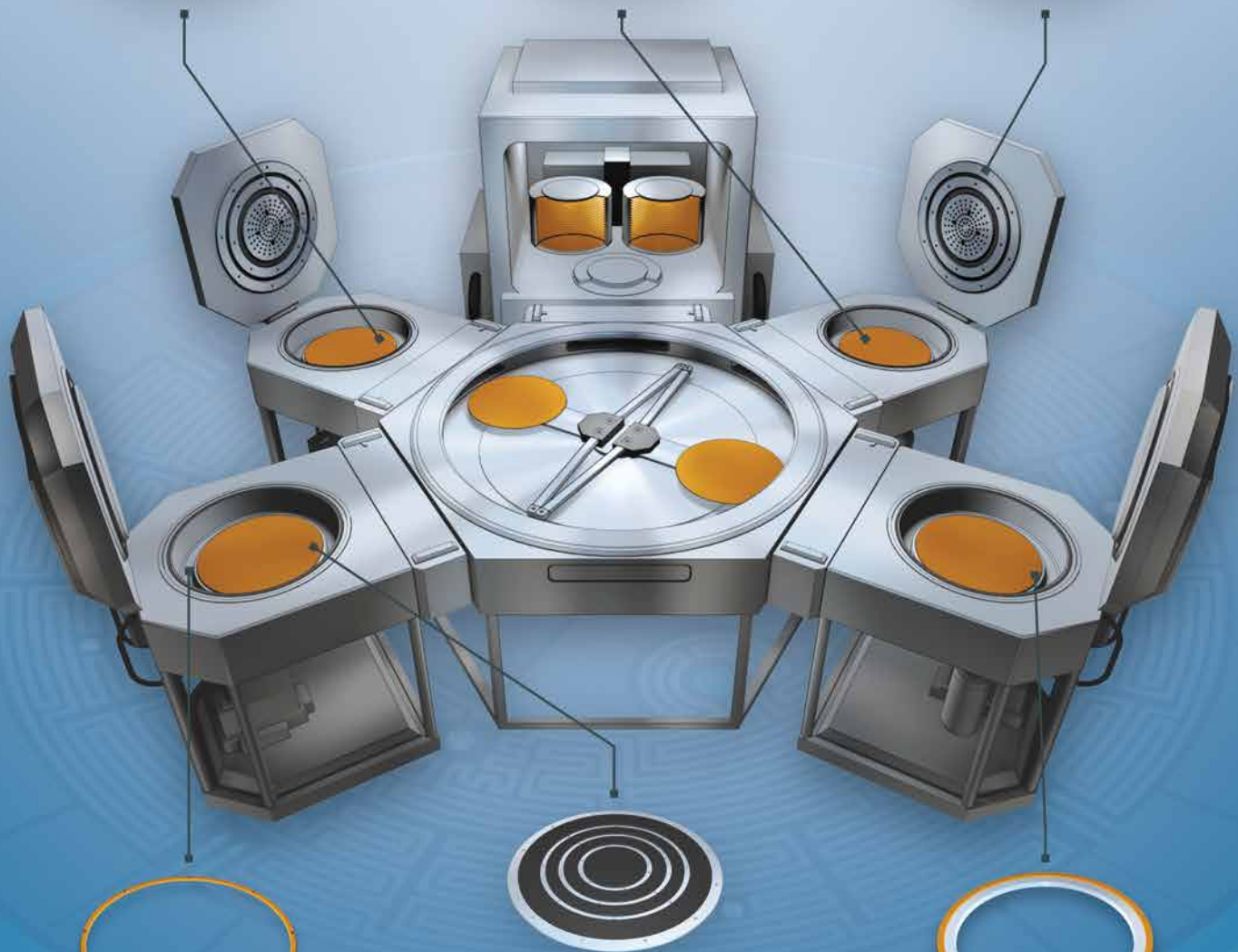
**MULTI-ZONE  
HEATERS**



**E-CHUCKS**



**SHOWER HEAD  
GASKETS**



**PLASMA RESISTANT  
SHIMS**



**THERMAL INTERFACE  
SOLUTIONS**



**EDGE RING  
SUB-ASSEMBLIES**



# DEVELOPING HIGH PERFORMANCE SOLUTIONS FOR TECHNICALLY ADVANCED OEMS

Fralock's Adhesiveless Laminate Technology (ALT) multi-zone heaters are efficient, thinner, lighter, and far more durable than any comparable product on the market and offer many options, including thermal barriers, and thermal conductive layers within our All-Polyimide assemblies. Other multi-zone heaters that use adhesives to bond trace elements to its insulation material render them fragile, vulnerable to high heat, and prone to gas pockets that may lead to cracking, further delamination, and failure. Designs manufactured with commonly used adhesives such as PTFE may also be prone to failure due to circuit "swimming" with traces moving too close to each other at high temperatures and creating a short circuit or "hot spot". By contrast, Fralock All-Polyimide Heaters can be folded, wrapped, or even crumpled without affecting performance.



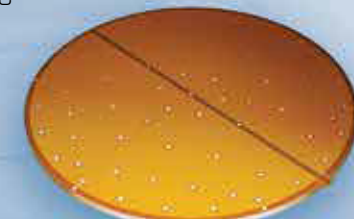
**MULTI-ZONE HEATERS**



**SHOWER HEAD GASKETS**

Fralock has several superior material choices for showerhead manufacturability, providing uniform thickness and excellent thermal performance as thin as 0.006". The showerhead gas delivery mechanism uniformly dispenses reactant gases over a secondary surface or wafer. A constant temperature across the surface of the showerhead during processing is critical in preventing deposition reactions that can clog up the pores, or holes, in the showerhead, possibly disrupting uniform gas delivery and jeopardizing wafer yield. Choosing the right material for a showerhead gasket is critical for thermal management and thickness uniformity to maintain a consistent electrode gap between the showerhead and the secondary surface. When you need the right showerhead gasket material manufactured, let Fralock be your solution provider.

Fralock's ALT is used to manufacture replaceable and reusable E-Chucks with accurate thermal controls that can improve yields and increase wafer processing rates. Fralock's ALT circuitry provides the highest level of thermal performance in wafer processing applications accommodating multiple zones and layers. Fralock has integration capabilities that are compatible with various metal and ceramic substrates depending on the specific application, including the addition of plasma-resistant substrates to reduce erosion rates during processing. Our technology allows the creation of very thin substrates (< 0.008") which are bonded directly to the surface of Aluminum without the use of adhesives. E-chucks can be replaced and refurbished to extend the life of the platen, providing a cost-effective, yet technologically driven solution.



**E-CHUCKS**



**THERMAL INTERFACE SOLUTIONS**

Fralock's Thermal Interface Solutions include materials that allow heat to pass through the Z-axis efficiently, spread heat effectively through the X-Y axis, or prevent heat from passing through from one surface to another. Fralock utilizes its advanced materials and manufacturing techniques to work directly with OEM's and assist with material selection to provide thermal interface solutions to improve tool effectiveness. Fralock has high thermally conductive silicone rubber gap fillers (with TC-Z surface as high as 17 W/m·K) available as thin as 0.3mm, or effective thermal spreaders to assure uniform heat dispersion across an entire surface (with TC-XY surface >200 W/m·K), or Fralock's own Cirlex® to create a thermal break between two surfaces. Fralock has what you need.

Fralock technology provides a solution that merges the fluorine plasma erosion protection qualities of a PTFE or PFA (Teflon) protective film over more rigid polymer shims and gaskets manufactured using a Kapton polymer material. Fluorinated plasmas can erode polymer shims and gaskets quickly, significantly reducing the Mean Time Between Clean (MTBC), increasing tool downtime, and escalating replacement costs. Fully encapsulated shims and gaskets allow all surfaces and features to be precisely controlled and protected, including thru holes and alignment slots. Increase MTBC, increase uptime, and reduce maintenance costs.



**PLASMA RESISTANT SHIMS**



**EDGE RING SUB-ASSEMBLIES**

Fralock solves the edge ring sub-assemblies challenge for both the end customer and the OEM by utilizing its expertise in cleanroom services and advanced manufacturing techniques to provide custom solutions. Controlling these edge properties is the key to competitive success. We work directly with the OEM to help develop the complete material solution to address the thermal, chemical, and physical issue, then integrate the material solution onto the edge ring using our advanced manufacturing techniques in our ISO Class 6 cleanrooms. Our value-added approach to incorporating our precision custom material solutions onto a customer's proprietary edge ring designs can greatly increase your customer's productivity and wafer yield.



 **FRALOCK<sup>®</sup>**

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