

Perlast® G67P & G100XT

Trace Metal Content of Elastomer Materials for Semiconductor Applications

Metallic ion contamination

Particles and metallic ion contamination are a constant threat to the manufacture of semiconductor devices with numerous potential sources of such contamination in semiconductor processing. The smaller the device, the greater the potential for harm and increased cost as the level of permissible contamination reduces.

The doped regions are particularly sensitive areas requiring highly controlled resistivity. A small amount of metallic ion contaminant can change the electrical characteristics and impact the device performance and hence the yield. Reliability problems may also be introduced that could go undetected until after the device has been shipped and built into an electrical system.

Sodium is one of the most common metallic ion contaminants. It is highly mobile and can diffuse across surfaces, interfaces and through the bulk of layers making up the device.

When choosing elastomer seals for critical applications, device manufacturers must ensure that they select appropriate materials with ultra-low levels of trace metals, in order to avoid contamination and device degradation.

A number of elastomers have been analysed for trace metal content. PPE's products were compared with many other materials that are specifically marketed for semiconductor applications. The results are shown in figure 1.

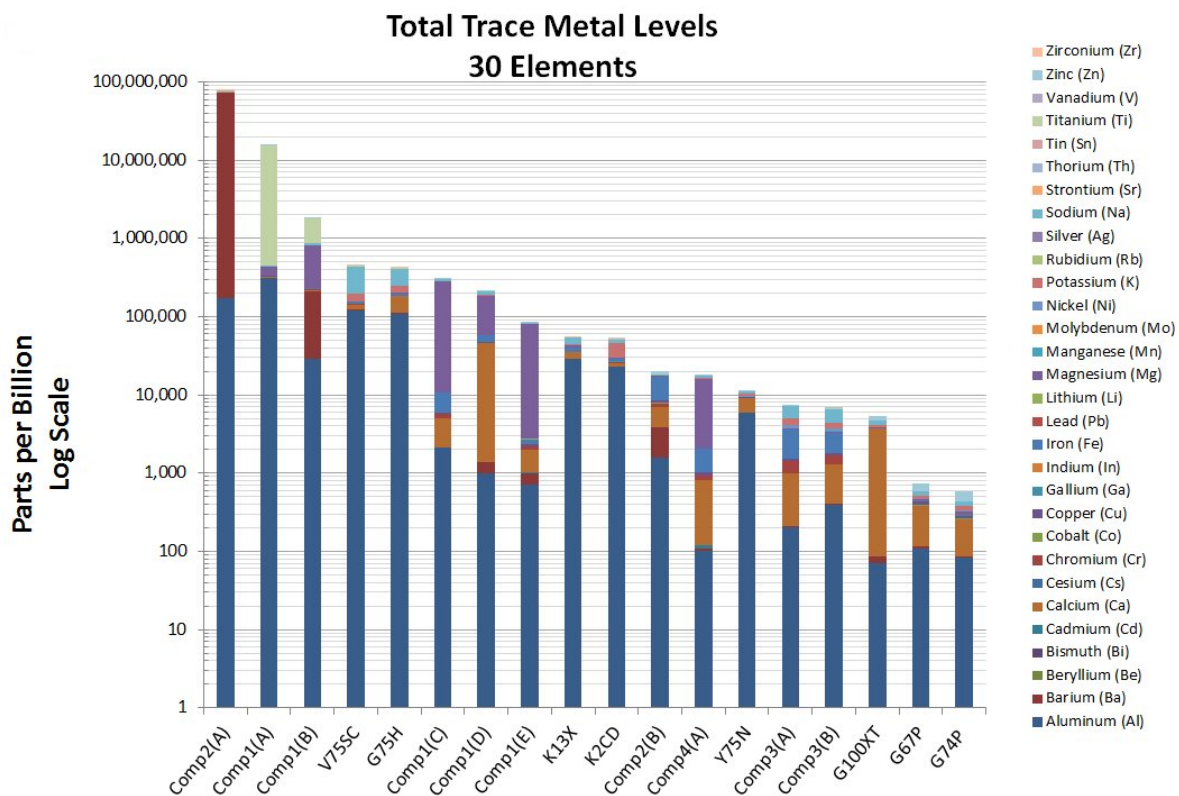


Fig 1: Comparative testing of elastomer materials



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The samples were analysed at a specialist external test facility. The analysis technique used inductively coupled plasma mass spectrometry (ICP-MS) for the determination of low and ultra-low level metallic impurities, down to part per billion (ppb) levels.

Summary of Test Results

The top three elastomer sealing materials that achieved the lowest trace metal content of all 22 materials tested were Perlast® G74P, Perlast® G67P and Perlast® G100XT. All of these perfluoroelastomers remain at the forefront of technology and provide industry leading levels of cleanliness.



How low is low?

The graphics below provide a visual representation of the actual trace metal content of PPE's elastomer materials*.

Perlast® G74P metal ion content:



Perlast® G67P metal ion content:



Perlast® G100XT metal ion content:



Conclusion

It is inevitable that elastomer seals and O-rings in key tool locations will show signs of wear during normal wafer processing, or system re-conditioning cycles. Wafers will be exposed to the by-products of the interaction between elastomer and process chemistry and therefore also impurities within the elastomer. Perlast grades with ultra-low levels of metallic contaminants are ideal for manufacturers of devices at advanced technology nodes and those wishing to ensure the integrity of device electrical specifications and minimise reliability failures.

* Values provided are typical results achieved

