



**Q: Will elastomers meet outgassing requirements typically required for space applications?**

**A:** Hutchinson offers inorganic silicone and fluorosilicone elastomers with very low levels of outgassing that can meet NASA specification SP-R-0022 “*General Specification Vacuum Stability Requirements of Polymeric Material for Spacecraft Application*” when processed with special post cure procedures.

These materials will have a volatile condensable material content (VCM) of 0.1% maximum and a total mass loss (TML) of 1.0% maximum when tested to the SP-R-0022 Test protocol:

- Pressure - 10<sup>-6</sup> torr or less
- Temperature of specimen - 125°C±1°C
- Temperature of condensable plates - 25°C±1°C
- Vacuum exposure time - 24 hours

Depending on the elastomer material and the specific outgassing requirement, a basic post cure for silicone or fluorosilicone may consist of a simple ramp up in temperature, typically to >300°F, followed by a soak at temperature for a fixed period of time, usually several hours. Special post cure processes for further reductions in outgassing can include more complex, longer stepped increases in temperature and an extended soak that may be as long as 48 hours. Vacuum bake in a special oven may also be employed in the process.

Other elastomers commonly used in Hutchinson isolators, e.g. Natural Rubber, Chloroprene (Neoprene), Nitrile, Butyl, etc., are generally unsuitable for applications with strict outgassing requirements due to organic elements and the presence of oil and carbon black in the compounds.

Please contact us when your application requires lower than normal outgassing performance so we can select and process the materials accordingly. By choosing the right elastomer and process, we should be able to meet or exceed your outgassing requirements.