

Viton® in Aerospace Applications

Excellence in the Most Challenging Applications



The first commercial use for Viton® fluoroelastomer occurred in 1957 when the U. S. Air Force needed o-rings that had the ability to seal at high temperature in aggressive fluids, including jet fuels, engine lubricating oils and hydraulic fluids. Reliability of materials under extreme exposure conditions is a prime requisite for aerospace and aircraft service. In the air, absolute sealing integrity is essential. Today, the vast majority of the world's commercial and military aircraft depend on the reliability and performance of Viton®.

O-rings of Viton® have a usable thermal range of -45°C to +275° C. Viton® also resists the effects of thermal cycling, encountered in rapid ascent to and descent from the stratosphere. Other desirable characteristics of Viton® that are pertinent to aerospace applications are its excellent abrasion resistance and its ability to seal against hard vacuum, as low as 10⁻⁹mm Hg (133nPa),

absolute.

Seals fabricated with Viton® are routinely used in commercial and military aircraft turbine engines, auxiliary power units and hydraulic actuators. The high performance properties of Viton® have been well documented in many aircraft and missile components over the past 40+ years. They include:

- O-rings used in line fittings, connectors, valves, pumps and oil reservoirs
- Radial lip seals used in pumps
- T-seals
- Cap-seals
- Manifold gaskets
- Coated fabric covers for jet engine exhausts between flights
- Firewall seals
- Abrasion-resistant solution coating over braid-sheathed ignition cable
- Clips for jet engine wiring harnesses tire valve stem seals
- Siphon hose for hot engine lubricants

Prevailing trends in aircraft turbine engine applications are pushing current elastomeric seal materials to their limits. These trends include the continued drive towards more powerful, lighter weight engines, with accompanying reductions in noise, emissions and fuel consumption, as well as ongoing improvements in reliability, maintainability and longer intervals between engine overhauls.

These trends converge to push engine thermodynamics to their limits, which manifests in higher operating and soakback temperatures. As a result, engine manufacturers are driven towards high temperature stabilized oils in order to achieve engine performance and life targets. Specialty types of Viton® (GLT) are being adopted, since they display outstanding resistance to these aggressive HTS-type oils.