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Laird Use of Fluorosilicone Elastomer for Conductive Gaskets and Seals

Laird currently uses fluorosilicones in elastomer formulations for a variety of parts for its military aerospace customers. The properties that make fluorosilicones desirable for military aerospace application are as follows:

- **Fuel Resistance-** Fluorosilicone elastomers have excellent resistance to aircraft fuel, hydraulic fluids, engine oil, and aircraft deicers.
- **Temperature resistance-** Many vehicles have several temperature requirements. Many areas have temperature requirements of 250-280 degrees F. In these applications urethane materials are used. For higher temperature applications fluoroelastomer or fluorosilicone elastomers are specified.
- **Compressibility-** Silicones and fluorosilicones are generally used for gasketing materials due to their softness and good compressibility. In the case of gaskets, silicone is used in applications where chemical resistance is not necessary. Where temperature, chemical resistance, and good compressibility and compression set resistance are required, fluorosilicone elastomers are the material of choice.

Laird has fluorosilicone elastomers qualified in several military programs. They are an integral part of national security for the US military.

- **Joint Strike Fighter-** this program is the number 1 priority program in the US. Laird has qualified several hundred-part numbers for the aircraft. This material was qualified for mod temp applications. No other material met the overall requirements of the specifications. Application areas include:
 - Conductive gaskets for areas where chemical resistance and higher temperatures are required.
 - Molded details to be bonded onto exterior of aircraft. All mod temp parts are produced by Laird
 - Thermal insulative materials- protecting areas where hot gases are deteriorating the structure of the aircraft.
 - Gap filler materials to fill seams and caulk areas of the external airplane
- **Additional New Programs-** Laird has qualified several fluorosilicone materials for application on new aircraft programs. These applications are very similar to the ones listed above. Companies are also investigating perfluoroelastomer for even higher temperature and more rigorous requirements. Development programs are currently in work.
- **Military Electronics-** New programs are using fluorosilicone elastomers for EMI mitigation in military electronics in missile control systems. Over the long lifetime required for missiles, fluorosilicone EMI materials offer improved lifetime especially when exposed to fuel vapors.
- **US Government conductive elastomer specifications-** The government currently has a specification written for conductive elastomers; MIL DTL 83528. It contains several materials that have been qualified for use in military electronics. There are several categories of



conductive fillers used, but only two types of elastomers: silicones and fluorosilicones. Military designers can choose qualified materials to this specification and ensure adequate testing has been done to verify its effectiveness. For designers where fuel is a consideration, qualified fluorosilicone elastomers are used.

In summary fluorosilicone elastomers are of vital importance to the US military community for the performance that is required in these applications.