Automotive Fluorosilicones

Technical Bulletin

No. ORD 5747

The "Gold Standard" for Low Temp Fuel

Because of their good hydrocarbon compatibility and unmatched low temperature performance, fluorosilicone O-ring materials have become the standard seal materials for use in low temperature fuel quick connect applications.

To meet the needs of multiple applications, Parker has three different hardnesses of fluorosilicone O-ring materials.

Extreme Low Temperature Performance

Fluorosilicones have long been used for their outstanding low temperature properties. With a functional temperature range of -100°F to +350°F (-73°C to +177°C), fluorosilicone rubber has the thermal stability to accommodate all automotive fuel applications. This thermal stability comes from the silicone backbone that forms the base polymer chain.

Outstanding Fuel and Oil Resistance

Fluorosilicone rubber also has fluorinated side chains branching off of the silicone backbone that give it chemical compatibility that approaches that of fluorocarbon rubber; resistance to petroleum-based oils, greases, and fuels is excellent. Fluorosilicones have become the seal material of choice for handling gasoline, E85, diesel fuel, biodiesel, and ULSD at extremely low temperatures.

Good Rebound Resilience

Historically, fluorosilicones have not offered good short-term rebound resilience. When stretched to fit into a male O-ring gland, fluorosilicone materials tended to sag rather than snap back tight against the groove. These new fluorosilicone compounds exhibit dramatic improvements in this category. While there are no industry standard test procedures for this type of test, it can be easily observed. This improvement in rebound resilience should make automated assembly more feasible and decrease the incidence of torn O-rings during installation.

Other Properties

Fluorosilicones generally have poor mechanical properties. As a result, they wear quickly in dynamic applications and are easy to tear during installation. Fluorosilicones also have poor gas permeation resistance, and generally will only meet fuel vapor emissions requirements when used in conjunction with a low permeation fluorocarbon seal material.

LM159-70

-100°F to +350°F (-73°C to +177°C)
Standard fluorosilicone O-ring material

LM158-60

-100°F to +350°F (-73°C to +177°C)
Softer fluorosilicone O-ring material
- **Lower compressive loads than LM159-70**
- **Lower insertion forces than LM159-70**
- **Conforms better to rough surfaces than LM159-70**

LM160-80

-90°F to +350°F (-68°C to +177°C)
Harder fluorosilicone O-ring material
- **Higher pressure rating than LM159-70**

Typical Applications Include:

- Fuel quick disconnects
- Fuel & air sensors

Gasoline
E85
Diesel
Biodiesel
ULSD

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AS9100 / ISO9001 / QS9000 /TS16949 Registered

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Typical Test Data

AS568-214 O-ring unless otherwise noted
Date: January 23, 2004 / February 5, 2004

PROPERTY	LM158-60	LM159-70	LM160-80
Original Physical Properties ASTM D1414, D2240, D297			
Shore A hardness	60	69	80
Tensile strength, min., psi	884	976	949
Ultimate elongation, min., %	327	267	166
Specific Gravity	1.48	1.53	1.56
Low Temperature Retraction, D1329			
TR-10, °F	-76.2	-73.3	-76.7
Compression Set (70h @ 23°C) ASTM D395 Method B			
Under 0.110 inch thickness, % loss of original deflection	8.8	9.1	8.8
Over 0.110 inch thickness, % loss of original deflection	11.8	13.2	12.0
Compression Set (22h @ 175°C) ASTM D395 Method B			
Under 0.110 inch thickness, % loss of original deflection	12.1	21.2	8.8
Over 0.110 inch thickness, % loss of original deflection	23.3	15.7	14.1
Heat Age (70h @ 200°C) ASTM D573			
Hardness change, pts.	+4	+3	+2
Tensile strength change, max., %	-16	-13	-12
Ultimate elongation change, max., %	0	-13	-18
Weight loss, max., %	-0.57	-0.03	-0.4
Fluid Resistance IRM 903 (168h @ 70°C) ASTM D471			
Hardness change, pts.	--	-10	--
Tensile strength change, max., %	--	-34	--
Ultimate elongation change, max., %	--	-37	--
Volume change, %	--	+30	--
Fluid Resistance Fuel B (22h @ 23°C) ASTM D471			
Hardness change, pts.	-10	-9	-9
Tensile strength change, max., %	-24	-28	-10
Ultimate elongation change, max., %	-10	-16	+3
Volume change, %	+23.3	+21.1	+19.5

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