



Low Permeating Seals for Fuel Applications

1 Scope

This specification describes the requirements of low permeating fluorocarbon elastomer seals with good resistance to fuel and fuel/alcohol blends.

1.1 Material Description. To fully describe the material, a type must follow the specification number.

Type I - Fluorocarbon Elastomer (FKM containing 67 wt% Fluorine) with -20 °C low temperature flexibility.

Type II - Fluorocarbon Elastomer (FKM containing 70 wt% Fluorine) with -5 °C low temperature flexibility.

1.2 Symbols. Not applicable.

1.3 Applicability. This specification is applicable to fuel sender seals.

1.4 Remarks. In addition to the test requirements listed in this specification, additional testing may be required for validation of the seal used in the sender closure Module Reservoir Assembly (MRA). Satisfactory completion of those validation tests, as defined by the GM Materials Engineer, must be demonstrated prior to approval to this specification.

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

ASTM D395	ASTM D624	ISO 34-1	ISO 1817
ASTM D412	ASTM D1329	ISO 37	
ASTM D471	ASTM D2240	ISO 188	
ASTM D573	ASTM D3182	ISO 868	

2.2 GM Standards/Specifications.

GMW3059	GMW14270	GMW14759	GMW17113
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2.3 Additional References.

- Association for Rubber Products Manufacturers (ARPM) guidelines from the latest edition of the O-ring (OR) technical bulletins, inspection (OR-1), dimensions (OR-6), and specifications (OR-9)
- GMPT-3-18
- GMPT-6-006
- GMPT-6-025

3 Requirements

3.1 Requirements on Delivery. Association for Rubber Products Manufacturers (ARPM) guidelines from the latest edition of the O-ring (OR) technical bulletins, inspection (OR-1), dimensions (OR-6), and specifications (OR-9) shall be followed with noted exceptions. Seals must meet all dimensional requirements specified, must be free of flash or any other surface imperfections, must be of the correct rubber formulation and must be fully cured.

3.2 Requirements on Test Specimens. Tests shall be conducted using the latest issue of the test methods indicated. Suitable precautions should be taken to ensure that applicable safe limits are not exceeded when conducting test procedures, processes and/or handling the materials required by this specification.

Unless otherwise specified, test specimens shall be cut from molded sheets prepared in accordance with the requirements of ASTM D3182. Cure state of test material must be equivalent to that of the production parts.

3.3 Compound Requirements. Test to the requirements of Table 1.

Table 1: Compound Requirements

Property	Test Method	Unit	Type I	Type II
Hardness	ASTM D2240 or ISO 868, instantaneous, plied	Shore A	70 ± 5	65 ± 5
Tensile Strength	ASTM D412, Die C or ISO 37, Type 1 or 4 specimen	MPa	10 min	8.5 min
Elongation at Break	ASTM D412, Die C or ISO 37, Type 1 or 4 specimen	%	225 min	175 min
Tensile Stress at 100% Elongation	ASTM D412, Die C or ISO 37, Type 1 or 4 specimen	MPa	3.8 min	2 min
Tear Strength	ASTM D624, Die C or ISO 34-1, Method B	kN/m	16 min	14min
Low Temperature Flexibility	ASTM D1329, TR ₁₀	°C	-20 max	-5 max
Compression Set	ASTM D395, Method B, plied, 336 h at 200 °C	%	50 max	60 max
Heat Aging Resistance	ASTM D573 or ISO 188, 70 h at 250 °C	Points	+10 max	+5 max
• Hardness Change		%	-30 max	-20 max
• Tensile Strength Change		%	-20 max	-20 max
• Elongation at Break Change				
Long Term Heat Aging	ASTM D573 or ISO 188, 1000 h at 150 °C	Points	+10 max	+5 max
• Hardness Change		%	-30 max	-20 max
• Tensile Strength Change		%	-25 max	-20 max
• Elongation at Break Change				