GM	WORLDWIDE ENGINEERING STANDARDS	Material Specification	GMW15023

O-Rings Quick Fittings for Vacuum Brake System

1 Scope

1.1 Material Description. Materials covered by this specification are divided into three (3) types.

- **Type A:** Fluorocarbon Rubber (FKM) Color code: black.
- **Type B:** Fluorosilicone Rubber (FVMQ) Color code: blue.
- **Type C:** Drawing defined (e.g., using SAE J200 or ASTM D2000 line callout).

1.2 Symbols. Not applicable.

1.3 Applicability. This specification covers the materials and performance of elastomeric O-rings used for tightening quick fittings of vacuum brake system.

2 References

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

2.1 External Standards/Specifications.

ASTM D2000	ISO 48	ISO 815-1	ISO 23529
ISO 37	ISO 188	ISO 1431-1	SAE J200

2.2 GM Standards/Specifications.

GMW3059	GMW14270	GMW14914	GMW17821

2.3 Additional References.

Drawing/Math Data File

Relevant Test Method

3 Requirements

3.1 Resources.

3.1.1 Test Samples. Unless otherwise specified, the shape, size and number of test pieces shall be in accordance with the relevant test method.

3.1.1.1 Unless otherwise specified, samples are finished parts or to be taken from finished parts. If not otherwise stated, mechanical properties in delivery state and after heat or fluid immersion are to be tested at +23 °C and with the same test method.

3.1.2 Conditioning. Conditioning shall be as specified in the relevant test method.

3.1.3 Equipment. Conforming to the relevant test method.

3.1.4 Calibration. The test facilities and equipment shall be in good working order and shall have a valid calibration label.

3.1.5 Alternatives. Alternative test facilities and equipment may also be used; however, all measuring variables as specified in this specification shall be determined correctly with respect to its physical definition.

3.1.6 Facilities. Conforming to the relevant test method.

3.1.7 Deviations. Deviations from the requirements of this specification shall have been agreed upon. Such deviations shall be specified on component drawings, test certificates, reports, etc.

3.2 Material and Performance Requirements. Material and performance requirements are summarized in Table 1.

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3.3 All materials supplied to this standard must comply with GMW3059, Restricted and Reportable Substances, including the requirement to submit a full material composition disclosure to GM via the International Material Data System (IMDS) or via a completed GMW3059 report form.

Table 1: Material and Performance Properties

Property	Test Method	Unit	Value
Hardness			
Type A	ISO 48 Method M (measured on cross section)	IRHD	As specified on drawing
Type B	ISO 48 Method M (measured on cross section)	IRHD	As specified on drawing
Type C	As specified on drawing/math data file	Shore A	As specified on drawing
Elongation at Break			
Type A and Type B	ISO 37, on complete O-ring 500 mm/minute ± 50 mm/minute	Percent (%)	150 minimum
Type C	As specified on drawing/math data file	%	As specified on drawing
Tensile Strength			
Type A	ISO 37, on complete O-ring 500 mm/minute ± 50 mm/minute	Megapascal (Mpa)	7.5 minimum
Type B	ISO 37, on complete O-ring 500 mm/minute ± 50 mm/minute	MPa	5 minimum
Type C	As specified on drawing/math data file	%	As specified on drawing
Age Resistance (Heat Aging)			
Type A and Type B	ISO 188 Method B, 168 h -2 h at +150 °C ± 3 °C Change in Hardness	IRHD	+10 maximum
Type C	As specified on drawing/math data file		As specified on drawing
Fuel Resistance			
Type A and Type B	GMW14914, Table 1, Conventional Gasoline, 48 h - 2 h at +23 °C ± 5 °C whole O-ring Change of volume (15 minutes after removal) bending test after storage in air for 48 h - 2 h at +23 °C ± 5 °C until opposite points meet	%	+30 maximum No cracks
Type C	As specified on drawing/math data file	%	As specified on drawing

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