



EPDM Elastomer for Hydraulics Brake Cuff

1 Scope

1.1 Material Description. This standard covers the materials and performance of elastomeric brake cuffs for wheel brake cylinder and master brake cylinder. Materials covered by this specification are divided into Type A and Type B.

Note: Continuous and excursion temperature limits are defined by the Vehicle Technical Specifications (VTS).

1.1.1 Type A. Ethylene Propylene Diene Terpolymer (EPDM) cover for +125 °C continuous and +150 °C excursion temperatures.

1.1.2 Type B. Drawing defined (e.g., using SAE J200 or ASTM D2000 line callout).

1.2 Symbols. Not applicable.

1.3 Applicability. Elastomeric brake cuffs for wheel brake cylinder and master brake cylinder.

2 References

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

2.1 External Standards/Specifications.

ASTM D2000	ISO 188	ISO 23529	SAE J200
ISO 48	ISO 1817		

2.2 GM Standards/Specifications.

GMW3059	GMW14393	GMW16955
GMW14270	GMW15386	

2.3 Additional References.

Vehicle Technical Specifications (VTS)

3 Requirements

3.1 Resources.

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

Samples are finished parts or to be taken from finished parts. Where the dimensions on the finished parts do not allow preparing of test pieces, tests are to be performed on sheet material of same production batch. The same state of cure between slabs or buttons and finished parts must be assured by appropriate tests, which must be described in the test report.

If not otherwise stated, mechanical properties in delivery state and after heat or fluid immersion are to be tested at +23 °C ± 5 °C. Unless otherwise stated, ambient temperature test conditions shall be held to +23 °C ± 5 °C, all other temperatures shall be held to ± 3 °C.

Note: Samples of a new material quality and/or a new supplier must fulfil wear tests in the vehicle determined by the responsible engineering group without objections.

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

3.1.3 Equipment. Conforming to the relevant test methods. Diameter of the cuffs are to be measured without contact e.g., (microscope, shadowgraph or other suitable device) to 0.01 mm before and after storage in brake

fluid at the same points and with two (2) measurements at right angles to one another. Change is calculated from the arithmetic mean of the two (2) measurements before and after brake fluid immersion.

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 methods.

3.1.7 Deviations. Deviations from the requirements of this standard 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.

Table 1: Material and Performance Properties

Property	Test Method	Unit	Value
Hardness			
Type A	ISO 48 Method M	IRHD	75 ± 5
Type B	As specified on drawing/math data file	Shore A	As specified on drawing
Age Resistance (Heat Aging)			
Type A	ISO 188 Method B, 168 h -2 h at +125 °C ± 3 °C Change in Hardness Change in Appearance	IRHD	± 5 maximum No evidence of blistering, cracking or change in shape from original form.
Type B	As specified on drawing/math data file		As specified on drawing
Resistance to Brake Fluid			
Type A	ISO 1817, to GMW16955 Fluid A1, 125 °C ± 3 °C, 168 h - 2 h Change in Volume Change in outside diameter lip Change in outside diameter base Precipitation in brake fluid after 24 h at +23 °C ± 5 °C	% % % %	0 to +10 maximum 0 to +5.75 maximum 0 to +5.75 maximum 0.3 by volume maximum No crystalline precipitations allowed
Type B	As specified on drawing/math data file	%	As specified on drawing
Cold Resistance			
Type A	ISO 23529, -45 °C ± 3 °C; 22 h + 1 h Test piece is whole part Bending test α = 90 degrees		No cracks Part must have returned to original shape after 1 minute
Type B	As specified on drawing/math data file		As specified on drawing
Corrosion Resistance			
Type A	Test is performed on complete brake or master cylinder assemblies. Clean all parts with ethanol and moisten the parts with brake fluid to GMW16955 Fluid A1 before assembling. Fill the cylinder with brake fluid and store for 336 h -2 h at +70 °C ± 3 °C (for wheel brake cylinder leave inlet bore open and close bleeding screw.) After cooling down to +23 °C ± 5 °C, cylinders are disassembled and evaluated.		No evidence of rubber adhesion of the test seals shall appear during disassembly. Metal parts must be free from corrosion or other precipitations. Minor precipitations in the brake fluid are allowed.