GM WORLDWIDE ENGINEERING STANDARDS	Test Procedure	GMW17650

Water Impermeability Testing for Foams

1 Introduction

Note: Nothing in this standard supercedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

1.1 Purpose. The purpose of this test is to evaluate the water impermeability of flexible expanded rubber and rubber-like materials to be used as water seals and gaskets.

1.2 Applicability. Typical applications include all expanded rubber and rubber-like materials that will be used for water sealing applications.

1.3 Remarks. Glass plates are used for material comparisons and qualifications. Representative substrates and part dimensions/design should be tested on appropriate test fixtures to evaluate the material performance in specific applications.

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW3221

3 Resources

3.1 Facilities.

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

3.1.2 Alternatives. Alternative test facilities and equipment may also be used. However, all measuring variables as specified in this standard shall be determined correctly with respect to their physical definition.

3.2 Equipment.

3.2.1 Two (2) 12.5 mm × 203 mm × 203 mm clear glass plates. Plates must be fixed with appropriate means to keep the specified distance (See Appendix A, Figure A1).

3.2.2 Spacers of various thicknesses. Non-corrosive metal or plastic spacers may be used to control compression (See Appendix A, Figure A1).

3.2.3 Air circulating test chamber capable of programming temperature cycles from -40 °C to 200 °C.

3.2.4 Die for cutting U-shaped gasket.

3.3 Test Vehicle/Test Piece. The test specimen shall consist of a U-shaped gasket, die-cut from a foam sheet, without adhesive. See 4.1 for additional specifications for the test specimen.

3.4 Test Time. See 4.3.1 through 4.3.1.4.

3.5 Test Required Information. Not applicable.

3.6 Personnel/Skills. Per laboratory accreditation requirements.

© Copyright 2016 General Motors Company All Rights Reserved

Documents Document Sharing Hub

Copyright General Motors Company
Provided by IHS Markit under license with General Motors Company
Reproduction, distribution or publication of these standards is expressly prohib
Licensee=/, User=,
Not for Resale,
Full document details: GMW GMW17650 2016

4 Procedure

4.1 Preparation. A U-shaped gasket 12.5 mm width, 127 mm wide at open outside ends of "U", and 140 mm deep, shall be cut with a special die (See Appendix A, Figure A2). Foam samples shall be tested without adhesive. Test at part thickness per blueprint requirements; for general material qualification, sample thickness shall be 12.7 mm. In the event that the material is not available in this thickness, it shall be tested at the maximum thickness available, and documented in the test report. The percent (%) compression shall be defined per the respective material specification or the requestor, and the corresponding spacers shall be placed along the sides of the fixture. The material is then sandwiched between the plates.

4.2 Conditions.

4.2.1 Environmental Conditions. Not applicable.

4.2.2 Test Conditions. Deviations from the requirements of this standard shall have been agreed upon. Such requirements shall be specified on component drawings, test certificates, reports, etc.

4.3 Instructions.

4.3.1 Test Procedure. Test method shall be specified in the respective material specification. If no method is specified, testing shall be according to Method A.

4.3.1.1 As-Received Sealability – All Materials. Condition the test setup per GMW3221 Code B for 1 h. Fill the test fixture with water up to 10 mm below upper rim of test sample, and record whether or not leakage occurs.

4.3.1.2 Aged Sealability – Method A (Default Conditions). After testing the as received sealability, the material shall be thermal cycled in the fixture for 7 days without water in the fixture in an air circulating test chamber capable of programming temperature cycles from -40 °C to 200 °C. One (1) cycle consists of:

- 12 h at 121 °C
- 20 minute ramp (7.5 °C/minute) to -29 °C
- 12 h at -29 °C
- 20 minute ramp (7.5 °C/minute) to 121 °C

At the end of the 7 day test, allow the fixture to stabilize per GMW3221 Code B for 1 h. Pour water into the fixture up to 10 mm below upper rim of test sample and record whether or not leakage occurs.

4.3.1.3 Aged Sealability – Method B (Exterior Lighting Applications). After testing the as-received sealability, the material shall be thermal cycled in the fixture for 7 days without water in the fixture in an air-circulating test chamber capable of programming temperature cycles from -40 °C to 200 °C. One (1) cycle consists of:

- 12 h at 80 °C
- 20 minute ramp (7.5 °C/minute) to -29 °C
- 12 h at -29 °C
- 20 minute ramp (7.5 °C/minute) to 80 °C

At the end of the 7 day test, allow the fixture to stabilize per GMW3221 Code B for 1 h. Pour water into the fixture up to 10 mm below the upper rim of the test sample and record whether or not leakage occurs.

4.3.1.4 Aged Sealability – Method C (Requester Defined). After testing the as-received sealability, the material shall be thermal cycled in the fixture for 7 days without water in the fixture in an air-circulating test chamber capable of programming temperature cycles from -40 °C to 200 °C. One (1) cycle consists of:

- 12 h at Requestor Defined High Temperature
- 20 minute ramp (7.5 °C/minute) to Requestor Defined Cold Temperature
- 12 h at Requestor Defined Cold Temperature
- 20 minute ramp (7.5 °C/minute) to Requestor Defined High Temperature

At the end of the 7 day test, allow the fixture to stabilize per GMW3221 Code B for 1 h. Pour water into the fixture up to 10 mm below the upper rim of the test sample and record whether or not leakage occurs.

© Copyright 2016 General Motors Company All Rights Reserved

Documents
Document Sharing Hub
Copyright General Motors Company
Provided by IHS Markit under license with General Motors Company
Reproduction, distribution or publication of these standards is expressly prohib
Licensee=/, User=,
Not for Resale,
Full document details: GMW GMW17650 2016