GM WORLDWIDE ENGINEERING STANDARDS	Test Procedure	GMW3154

Mandrel Bend Test

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. This test procedure is intended for the determination of the cold resistance of sealing compounds and adhesives, such as seam sealants, flange sealants, underseal, filler adhesives, etc. For testing bending at cold temperatures of carpets or other flexible materials, see GMW14108.

1.2 Applicability. This procedure is applicable to adhesives/sealers.

1.3 Remarks. None.

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW14108 GMW15477

2.3 Additional References. None.

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 Circulation oven capable of maintaining a set temperature within ± 3 °C.

3.2.2 Cartridge gun (capable of being heated).

3.2.3 Cartridge nozzle with respective opening diameter.

3.2.4 Cold chamber capable of maintaining -40 °C ± 3 °C.

3.2.5 Doctor blade (see Figure 1).

3.2.6 Test mandrel (see Figure 2).

3.3 Test Vehicle/Test Piece.

3.3.1 Sheet Metal. Approximate size: 250 mm x 100 mm x 0.8 mm (length x width x thickness) minimum. The test sheet metal shall consist of flat and burr-free original body sheet metal.

3.3.1.1 For Paint and General Assembly Applications. The surface quality of the test sheet metal shall be selected to correspond to the information on the part drawing or in material specifications.

© Copyright 2020

Documents
Document Sharing Hub

Copyright General Motors
Provided by IHS Markit under license with General Motors

Full document details: GMW GMW3154 2020

3.3.1.2 For Body Shop Applications. The surface quality of the test sheet metal shall be according to the relevant material specification.

Test panel preparations as per GMW15477.

Quality of corrosion protection oil/lubricant shall be as required in the relevant material specification.

3.3.2 Adhesive/Sealer to be tested.

3.4 Test Time.

Calendar time:	2 d
Test time:	8 h
Coordination time:	8 h

3.5 Test Required Information. Not applicable.

3.6 Personnel/Skills. Personnel performing this testing shall have experience or training in basic laboratory operation and safety.

4 Procedure

4.1 Preparation.

4.1.1 For Paint and General Assembly Applications. The sealing compound/adhesive being tested shall be applied to a test panel, as per 3.3, by means of a suitable doctor blade (see Figure 1).

4.1.2 For Body Shop Applications. Body Shop sealer/adhesive to be tested shall be applied to test panels as per 3.3. Test material application parameters shall be according to the relevant material specification. Test material dimensions as per GMW15477 or the relevant material specification.

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.

4.2.2.1 The baking of the sealing compound/adhesive shall be carried out according to the relevant material specification.

4.3 Instructions.

4.3.1 Test Procedure. After curing as per 4.2.2.1, the test pieces shall be stored for 1 h minimum at +23 °C ± 5 °C. Subsequently, the test pieces with the test mandrel shall be stored in the cold chamber as stated by 3.2.4. The test temperature shall be selected according to the data in the part drawings or material specifications. After 24 h minimum cold storage, the test pieces shall be bent around the test mandrel (see Figure 2) at an angle of 90° in approximately 2 s. The test shall be performed immediately after removing the test piece from cold chamber.

5 Data

5.1 Calculations. Not applicable.

5.2 Interpretation of Results. Not applicable.

5.3 Test Documentation.

5.3.1 Evaluation and Rating.

5.3.1.1 After performance of the test, the adhesion of the sealing compound/adhesive shall be evaluated, e.g., adhesive/cohesive fracture, partial detachment from test sheet metal, etc.

© Copyright 2020

Documents
Document Sharing Hub

Copyright General Motors
Provided by IHS Markit under license with General Motors

Full document details: GMW GMW3154 2020