



Determination of Water Absorption of Cured Adhesives and Sealants

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 determines the amount of water absorbed by tested materials by means of the change in sample weight before and after water soak.

1.2 Applicability. Materials include pumpable and preformed adhesives, structural foams, sealants, and pillar filler/baffles.

1.3 Remarks. Cured adhesives and sealants can absorb water. Excessive water absorption can negatively affect the performance of the material.

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

None

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. Not required for preformed materials.

3.2.3 Balance. With an accuracy of 0.01 g.

3.3 Test Vehicle/Test Piece.

3.3.1 Number of Test Samples. For initial approval the water absorption shall be determined with a minimum of three (3) test samples per curing condition.

3.3.2 Sheet Metal. Electro Deposition/Electro Coat (ELPO) coated sheet metal. Approximate size: 125 mm length, 50 mm width and 0.8 mm thickness.

3.3.3 Adhesive/Sealer. To be tested.

3.3.3.1 Bead Size for Pumpable Materials. Diameter is 8 mm to 10 mm and length is 80 mm.

3.3.3.2 Sample Size for Preformed Materials. Length is 80 mm, diameter is 10 mm and thickness is 2 mm to 3 mm, or as limited by the properties of the material.

3.3.4 Distilled Water.**3.4 Test Time.**

Calendar time:	1 d
Test time:	24 h
Coordination time:	1 h

3.5 Test Required Information. Not applicable.**3.6 Personnel/Skills.** The Testing Engineer shall be trained to perform this test.**4 Procedure****4.1 Preparation.**

4.1.1 Curing Schedule. Minimum and Maximum bakes per the relevant material standard, unless otherwise specified.

4.1.2 Deviations. Per special data called out by the approving GM engineer.

4.2 Conditions.

4.2.1 Environmental Conditions. All measurements shall be performed at 23 °C ± 5 °C.

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 Weight of ELPO-coated Sheet Metal. The ELPO coated sheet metal shall be weighted: **W1** in grams (g).

4.3.2 Weight of Sheet Metal and Cured Adhesive/Sealer before Water Storage. Adhesive/Sealer to be tested shall be applied to the ELPO coated sheet metal. Material sizes per 3.3.3.1 and 3.3.3.2. The test sample shall be cured in an oven per the curing schedule in 4.1.1. After cooling down to 23 °C ± 5 °C, the test sample shall be weighed: **W2** in grams (g).

4.3.3 Weight of Sheet Metal and Cured Adhesive/Sealer after Water Storage. The test sample from 4.3.2 shall be stored entirely immersed in distilled water at 23 °C ± 5 °C for 24 h unless otherwise specified in the relevant material standard. After taking out the test sample from the water, remove all surface moisture by shaking the test samples and lightly wipe off all remaining surface water with a dry cloth. The test sample shall be weighed immediately: **W3** in grams (g).

5 Data

5.1 Calculations. The percentage gain in weight shall be calculated per the following formula:

$$\text{Absorbed Water (in \%)} = \frac{(W_3 - W_2)}{(W_2 - W_1)} \times 100$$

Where:

W1 = Weight of ELPO-Coated Sheet Metal

W2 = Weight of ELPO-Coated Sheet Metal and Cured Adhesive/Sealer before water storage

W3 = Weight of ELPO-Coated Sheet Metal and Cured Adhesive/Sealer after water storage

5.2 Interpretation of Results. Not applicable.

5.3 Test Documentation. With reference to this test procedure, the test results shall be represented in a test report.