



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

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

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

3 Resources

3.1 Facilities. Not applicable

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 2 mm to 3 mm thickness, or as limited by the properties of the material.

3.3.4 Distilled Water.

3.4 Test Time. Twenty four hours (24 h) unless otherwise specified in the relevant standard.

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 according to material standard, unless otherwise specified.

4.1.2 Deviations. According to special data called out by approving engineer.

4.2 Conditions.

4.2.1 Environmental Conditions. All measurements shall be performed at $+23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$.

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 weighed: W_1 in grams.

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 according to 3.3.3.1 and 3.3.3.2. The test sample shall be cured in an oven according to the curing schedule in 4.1.1. After cooling down to $+23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$, the test sample shall be weighed: W_2 in grams.

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 $+23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ for 24 h unless otherwise specified in the relevant material standard. After taking out the test sample from water, remove all surface moisture by shaking it gently and lightly wipe off all remaining surface water with a dry cloth. Test sample shall be weighed immediately: W_3 in grams.

5 Data

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

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

- W_1 = Weight of ELPO-Coated Sheet Metal
- W_2 = Weight of ELPO-Coated Sheet Metal and Cured Adhesive/Sealer before Water Storage
- W_3 = 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.

6 Safety

This standard may involve hazardous materials, operations, and equipment. This standard does not propose to address all the safety problems associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

7 Notes

7.1 Glossary. Not applicable.

7.2 Acronyms, Abbreviations, and Symbols.

ELPO Electro Deposition/Electro Coat