



Horizontal Expansion Test for Preformed Sealers

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 to measure the horizontal expansion, or bridging, of expanding pre-formed sealers.

1.2 Applicability. This test procedure may be used for body shop or paint shop expanding preformed sealers.

1.3 Remarks. Not applicable.

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW11

GMW3008

GMW14019

GMW15477

2.3 Additional References.

Material Specification

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 Bridging Test Fixture. See Appendix A, Figure A1. The angle formed between Panel B and Panel C is 9 degree and is equivalent to angle " α " in Appendix A, Figure A2. The thickness of the spacer block is 4 mm.

3.2.2 Measuring Scale. With 1 mm increments

3.2.3 Oven. Forced air, circulating-type oven, capable of maintaining a set temperature within $\pm 3^\circ\text{C}$.

3.3 Test Vehicle/Test Piece. All dimensions are as specified, unless otherwise specified or agreed upon by the GM approving engineer.

3.3.1 Test Material. Preformed sealer, cut to 30 mm $\times$ 185 mm. Thickness shall be 4 mm for sealers with volumetric expansion $\leq 500\%$, and 2 mm for sealers with volumetric expansion $> 500\%$.

3.3.2 Steel Substrate. For body shop sealers, Electrogalvanized (EG) steel panels per GMW11, oiled with any GM approved GMW14019 lubricant according to GMW15477, are recommended. For paint shop sealers, electrocoated (ELPO) steel panels with any GM approved GMW3008, ELPO are recommended.

3.3.2.1 Panel A. Size is: 30 mm $\times$ 210 mm.

3.3.2.2 Panels B and C. Size is: 100 mm $\times$ 150 mm (minimum length).

3.3.3 Number of Test Samples. Testing shall be completed with a minimum of three (3) test pieces per condition, unless otherwise specified.

3.4 Test Time.

Calendar time: 1 day

Test hours: 2 hours

Coordination hours: 1 hour

3.5 Test Required Information. See 5.3.

3.6 Personnel/Skills. Test technician capable of running the test.

4 Procedure

4.1 Preparation. Not applicable.

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 Apply test material to Panel A (see Appendix A, Figure A1) such that the material covers the panel, with the exception of 25 mm at the end of the panel that meets the spacer block which is left bare.

4.3.2 Loosen set screws and insert substrate Panel B and Panel C in the slots provided on the test fixture (see Appendix A, Figure A1). Tighten set screws to hold panels securely in place.

4.3.3 Loosen the set screws on the sliding base plate and slide it back to create an opening wide enough to allow Panel A (with the test material on it) to be placed on the support shelf. Panel A should be positioned with the bare end flush with the edge of the support shelf at the same end of the test fixture as the spacer block.

4.3.4 Secure Panel A to the support shelf at the bare end of the panel. Then slide the moveable base plate so that the spacer block touches the edge of Panel A and tighten the set screws to secure the position of the base plate. Take care to slide the base plate straight toward Panel A. The sliding plate may have a tendency to shift slightly and this would change the effective angle between Panel C and the sample.

4.3.5 Place the fixture, with the sample attached, into an oven and bake according to the Material Specification requirements.

4.3.6 After all the appropriate bakes have been run and the fixture and sample have cooled to room temperature, loosen all the set screws that secure Panel B and Panel C and remove any clips used to secure Panel A. Carefully lift the whole assembly (Panel C, Panel B and Panel A with cured sealer) out of the fixture.

4.3.7 Measure the length = ((H) see 5.1 "H"), in Millimeters (mm) of the material contact patch on Panel C. See Appendix A, Figure A2 and Appendix A, Figure A3. Start at the end of Panel C nearest to the spacer block, at the base of the angle where the unbaked test sample began. Disregard any expansion of sealer backward from the initial unbaked point. End where the expanded material fails to maintain adhesion to the panel. This distance is set equal to H, the hypotenuse of angle " α ".

5 Data

5.1 Calculations. Use the following formula to determine the distance the expanded material will bridge:

$$X = (H * 0.156) + S$$

Where:

- **X** = Distance the expanded material will bridge in Millimeters (mm).
- **H** = Length of material contact patch on Panel C, measured in Millimeters (mm) according to 4.3.7.
- **0.156** = Sine of angle " α ", equal to 9 degree unless otherwise specified.
- **S** = Thickness of the spacer block in Millimeters (mm), equal to 4 mm unless otherwise specified.

5.2 Interpretation of Results. Not applicable.