



Wash-off Resistance Test for Adhesives and 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 used to determine the wash-off resistance of adhesives, sealers and other materials that are processed through assembly plant cleaning, pre-treatment and electrocoat (ELPO) systems.

1.2 Applicability. This test procedure is intended for use with adhesives, sealers and other materials that are applied at the metal center or body shop, and are subsequently processed through cleaning, pre-treatment and ELPO systems at the assembly plant. This procedure may be used for materials that are pumpable or pre-formed. Test materials are evaluated in the uncured or gelled condition, as applicable for the specific test material.

- Method A is an assembly plant test.
- Method B is a laboratory test with direct spray impingement.
- Method C is a laboratory test with dynamic flow rate for wash off from between metal.

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.

GMW8 GMW14019 GMW15477

2.3 Additional References.

Relevant Material Specification

Supplier's Technical Data Sheet

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.

3.1.3 Method A: Plant Test. Facilities required for Method A only.

3.1.3.1 Induction Gelling System. Production.

3.1.3.2 Degreasing, Pre-treating and Electro-coating Baths. Production.

3.1.4 Method B: Laboratory Test with Direct Spray Impingement. No facilities required for Method B only.

3.1.5 Method C: Laboratory Test. With dynamic flow rate for wash out from between metal.

3.2 Equipment.

3.2.1 Method A, Method B and Method C. Equipment required for all methods.

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3.2.1.1 Cartridge Gun. For pumpable materials.

3.2.1.2 Cartridge Nozzle. For pumpable materials with respective opening diameter.

3.2.1.3 Oven. For heating warm-applied pumpable materials prior to manual application.

3.2.1.4 Roller. For controlled wet-out of pre-formed materials, especially constrained layer damper pads. Roller weight $2000 \text{ g} \pm 20 \text{ g}$, unless otherwise specified.

3.2.2 Method A: Plant Test. Additional equipment required for Method A only.

3.2.2.1 Body-in-White (BIW).

3.2.2.2 Panel Holder. Fixture for attaching test pieces to the BIW.

3.2.3 Method B: Lab Test with Direct Spray Impingement. Additional equipment required for Method B only.

3.2.3.1 Induction Gelling System. Production-representative.

3.2.3.2 Spray Nozzle. Sixty-five degree V-fan nozzle with 20 L per minute at three (3) bar.

3.2.3.3 Rubber Hose. With inner diameter (ID) approximately 10 mm.

3.2.3.4 Tap Water Source. Capable of maintaining a temperature of 58°C .

3.2.3.5 Water Pressure Gauge. Units in bar.

3.2.3.6 Large Clips. Capable of holding test panels in place.

3.2.4 Method C: Lab Test for Dynamic Flow Rate Test for Wash out From Between Metal. Additional equipment for Method C only.

3.2.4.1 Stirrer. Electric variable speed stirrer capable of up to 180 rpm.

3.2.4.2 Water Bath. Capable of maintaining 60°C temperature and deep enough to fully immerse the material on test samples.

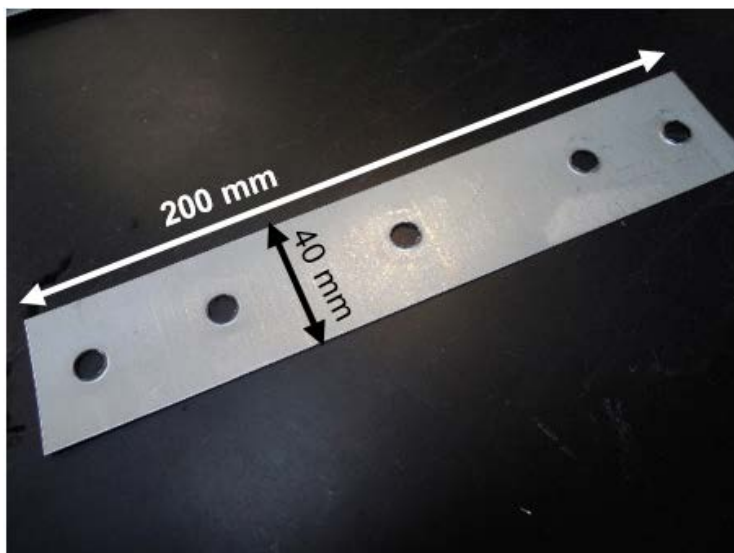
3.2.4.3 Rig to mount test samples to stirrer.

3.2.4.4 Quantity of either 1 mm or 3 mm thick "washer/spacers".

3.2.4.5 Quantity of nuts and bolts for assembling test samples.

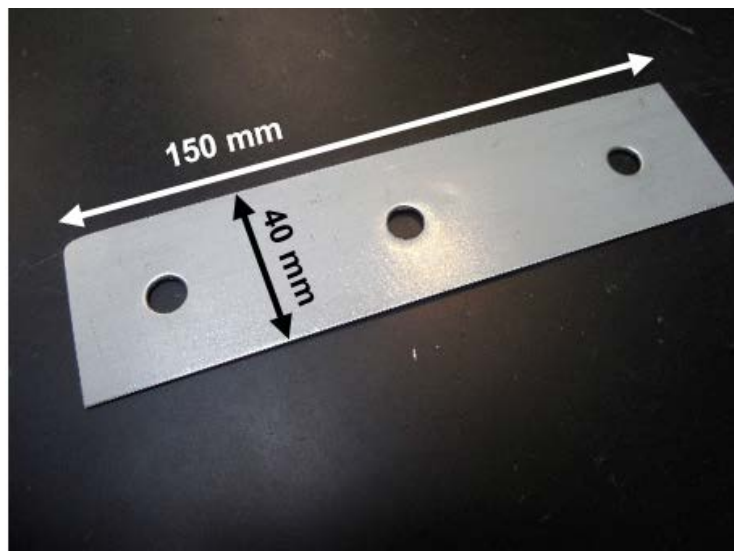
3.2.4.6 Quantity of metal test panels (base panels) 200 mm x 40 mm with holes drilled at each end for mounting to the test rig and three (3) holes spaced out down the middle of the panel (see Figure 1).

Figure 1: Base Panel; Metal Test Panel Dimensions and Hole Spacing



3.2.4.7 Quantity of metal test panels (cover panels) 150 mm x 40 mm with three (3) holes drilled along the middle of the panel that are of the same size and spacing as the three (3) middle holes on the longer "base panel" (see Figure 2).

Figure 2: Cover Panel; Metal Test Panel Dimensions and Hole Spacing



3.3 Test Vehicle/Test Piece.

3.3.1 Metal Panels. Substrates, lubricants and panel configuration shall be according to the relevant material specification or the responsible material engineer. If no substrates, lubricants or panel configurations are specified, use unconstrained (open-faced), hot-dipped galvanized (HDG) steel panels per GMW8 with minimum dimensions 100 mm x 250 mm. Oil panels according to GMW15477 with a challenging GMW14019 lubricant.

3.3.2 Test Material. For Method A, apply the test material according to GMW15477, the relevant material specification, or the responsible material engineer. For Method B, apply the test material across the width of the panel, centered approximately 125 mm from either end of the panel. For Method C, material to be applied according to Figure "X" on test assembly drawing.

3.3.2.1 Pumpable Test Material. For Method A, bead dimensions according to GMW15477, the relevant material specification, or the responsible material engineer. For Method B, bead with dimensions: 13 mm wide x 7 mm high, unless otherwise specified. For Method C, bead diameter to be 5 mm to 6 mm unless otherwise required by the relevant material specification.

3.3.2.2 Pre-formed Test Material. For Method A, test material with dimensions according to GMW15477, the relevant material specification, or the responsible material engineer. For Method B, sample with dimensions: 20 mm wide x 100 mm long x 2 mm thick, unless otherwise specified. Method C, not applicable for preformed sealers.

3.3.3 Gelling. Testing shall be completed with uncured material. Test material shall be gelled when gelling is specified by the relevant material specification, the supplier's technical data sheet, or by the responsible material engineer.

3.3.3.1 Inductive Gelling. If inductive gelling is specified, the test material shall be applied directly to the test panel and inductively gelled. The production induction system is recommended to be used whenever possible. The temperature and temperature distribution of the induction system shall be verified to be operating within specifications prior to test piece preparation.

3.3.3.2 Two-Component Materials. Two-component (2K) test materials shall be evaluated after handling stiffness has been achieved due to the 2K reaction. The period to reach handling stiffness shall be according to the relevant material specification, the supplier's technical data sheet or the responsible material engineer.

3.3.4 Aging. Test material shall be aged for a minimum of 2 h after application or after gelling, prior to testing.

3.3.5 Number of Test Pieces. Testing shall be completed with a minimum of one (1) test piece per condition, unless otherwise specified.