GM WORLDWIDE ENGINEERING STANDARDS	Test Procedure	GMW15282

Corrosion/Undercutting Scribe Creepback

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 method describes the procedure to be used for scribing previously coated (painted, plated, etc.,) specimens, removal of scribe line corrosion products and the measurement of the loss of adhesion from the scribe line due to corrosive creepback.

1.2 Applicability. Evaluation of the adhesion properties of painted metal, plastic and sealer before and after environmental testing.

2 References

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

2.1 External Standards/Specifications.

ASTM D3330M

2.2 GM Standards/Specifications.

GMW14829

3 Resources

3.1 Facilities. No special facilities required.

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 Scribe Tool. A straight-shank tungsten carbide tip, lathe cutting tool or carbide-tipped pencil type tools with tip angle of 60 degrees ± 15 degrees or equivalent.

3.2.2 Template. Any straightedge of sufficient length and thickness to guide the scribing tool in a straight line may be used. The shank of the tool should follow the guide in order to ensure a uniform V cut. The carbide tip must not come in contact with the guide.

3.2.3 Continuity Tester. An electrical ohmmeter with needle tips should be used to ensure that based bare metal (electrically conductive) is exposed along each entire scribe line.

3.2.4 Millimeter Scale (Ruler). Any scale (or ruler) with 1 mm divisions may be used. A transparent scale is helpful for obtaining the measurements.

3.2.5 Additional Equipment.

3.2.5.1 Pressure Sensitive Adhesion Tape. Tape adhesively bonds to steel according to ASTM D3330M (refer to GMW14829 for detailed tape specifications).

3.2.5.2 Application Device. Use a rubber eraser or equivalent device for applying tape.

Note: Figure A1 in Appendix A contains photographs and information regarding typical equipment used.

3.3 Test Vehicle/Test Piece. Not applicable.

3.4 Test Time. The typical time to execute this procedure is less than 5 minutes per scribe.

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3.5 Test Required Information. Not applicable.

3.6 Personnel/Skills. Test technician familiar with test facilities and equipment.

4 Procedure

4.1 Preparation.

4.1.1 The scribe tool/tip should be inspected prior to use and replaced if any damage is observed. The scribe tool/tip should be replaced if any inconsistencies in the scribe installation are observed.

4.1.2 Prepare specimens for test by scribing in a direction that will allow the scribe line to be exposed in a vertical direction unless otherwise specified. Hold the scribing tool at approximately 45 degrees to the surface. Position tool and scribe in such a manner that the tip will make point contact resulting in a uniform V cut. The scribe must penetrate all pre-treatment and coatings on the based bare metal leaving a uniform bright line. Avoid scribing near any edges. An electrical ohmmeter with needle tips should be used to ensure that based bare metal (electrically conductive) is exposed along each entire scribe line.

Note: If test panels have a hole on the upper area and the test panel cannot be placed in reverse direction (hole on the lower side), do not scribe the line directly under the hole. In this case, scribe the line a bit left or right to prevent corrosion from the hole edge that may influence the corrosion mechanism and creepback behavior.

Note: Figure B1 in Appendix B contains photographs and illustrations regarding proper scribe installation.

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 Sample Preparation.

4.3.1.1 After testing of coated and scribed samples to corrosion environment, different phenomena may appear around the scribe: delamination and corrosion. Both phenomena may also occur jointly. Careful sample preparation must be done to detect both.

4.3.1.2 Rinse the test sample with fresh water directly after the exposure to the load. Remove any remaining water from the surface and investigate the test sample for visible changes. If necessary, rinse the sample plate again with fresh water from the tap.

4.3.1.3 Dry specimens and dispense or cut a strip of tape off long enough to cover scribed area, being careful not to come in contact with anything before the test application.

4.3.1.4 Press the tape down firmly on the surface with sufficient rubs of the eraser to remove air bubbles and to ensure good contact between the tape and paint surface.

4.3.1.5 After 5 s to 10 s, hold the specimen not to move, and then grasp the tail end of the tape between thumb and forefinger and pull upward with a rapid jerking motion perpendicular to the paint film.

Note: For interim scribe creepback measurements, the sample should be rinsed with fresh water and dried using a soft towel or cloth so as not to damage the sample.

Note: Based on different circumstances (e.g., availability of equipment on the workplace, base material of the sample, number of samples, sample size, etc.,) alternative and/or additional measures may have to be taken to remove particles from the affected scribe area.

4.3.2 Scribe Creepback Measurement. Unless otherwise stated on the specification or drawing, evaluate scribe line creepback by measuring the distance between the scribe line and unaffected paint surfaces on each side of the scribe line. The summation of the maximum left hand side creepback measurement and maximum right hand side creepback measurement is defined as the documented scribe creepback performance. This technique is referred to as “zero to peak + zero to peak” and is illustrated in Appendix C. Affected paint surfaces are those that have been removed by tape, or in the case of interim results, those surfaces which exhibit blistered or lifted (loose, poor adhering) paint.

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5 Data

5.1 Calculations. Scribe creepback measurement is illustrated in Appendix C.

5.2 Interpretation of Results. Acceptance criteria shall be specified on the engineering drawing or in the material specification.

5.3 Test Documentation. At a minimum, document maximum scribe creepback. In addition scribe creepback measurements in standard increments along the scribe line may be taken in order to establish an individual sample average. An example of scribe creepback evaluation and an example data documentation sheet is shown in Appendix D, Data Sheet D1.

6 Safety

This Engineering Standard may involve safety requirements for hazardous materials, the method of operations and equipment. This standard does not propose to address all the safety issues associated with its use. It is the responsibility of the user of this standard to ensure compliance with all appropriate safety and health practices. This would include any specific training that may be required. The safety and health standards include site specific rules and procedures, company rules and procedures, and Government Standards. Contact shall be made with the appropriate site Safety and Health personnel for further direction and guidance in these matters.

7 Notes

7.1 Glossary. Not applicable.

7.2 Acronyms, Abbreviations, and Symbols.

GSSLT Global Subsystem Leadership Team

8 Coding System

This standard shall be referenced in other documents, drawings, etc., as follows:

Test to GMW15282.

9 Release and Revisions

This standard was originated in March 2006. It was first approved by the Global Laboratory Corrosion Testing Harmonization Team in September 2006. It was first published in November 2006.

Issue	Publication Date	Description (Organization)
1	NOV 2006	Initial publication.
2	SEP 2011	Five year refresh of document. Modified paragraphs 3.4, 4.3, 8. Added new note at 4.1, 4.3. (Corrosion Global Subsystem Leadership Team)
3	OCT 2012	Added paragraph 4.1.1, previous 4.1 is now 4.1.2. (Corrosion Global Subsystem Leadership Team)
4	OCT 2017	Five year refresh of document. Modified 3.1, 3.4, 4.3.1.2, 4.3.2, 6. (Materials - Corrosion GSSLT)

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