



Scab Corrosion Creepback of Paint Systems on Metal Substrates

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 outlines the procedure to be followed when evaluating scab corrosion resistance on painted metal substrates such as steel, zinc coated steel, and aluminum. Scab corrosion is the loss of paint adhesion and corrosion of the base metal which results in the distortion or upheaval of the paint film.

1.2 Applicability. Painted metal substrates such as steel, zinc coated steel, and aluminum.

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW3286

GMW15282

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 Humidity Cabinet. The apparatus for the humid stage shall have the ability to maintain the following environmental conditions:

- Temperature: 60 °C ± 2 °C
- Humidity: 85% ± 3% relative humidity (RH)

3.2.2 Thickness Measuring Device. Electrical film thickness measuring device.

3.2.3 Test Solution and Container. A plastic reservoir (open at the top) of 5% sodium chloride solution (per GMW3286) used for test sample immersion.

3.2.4 Test Panel/Parts Mounting Rack. Non-metallic racks for test samples.

3.2.5 Scribe Equipment. Refer to GMW15282 for equipment necessary.

3.3 Test Vehicle/Test Piece. Not applicable.

3.4 Test Time.

Calendar time: 28 d

Test time: 672 h

Coordination time: 1 h to 2 h

3.5 Test Required Information. Not applicable.

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

4 Procedure

4.1 Preparation. When this specification appears on an engineering drawing, actual parts coated with the representative paint system shall be used. Visually examine the painted surface and record any adverse conditions such as sags, solvent pops, or scratches.

4.1.1 Film Thickness. Measure paint film thickness in multiple locations with three measurements minimum on each part/panel and record the average film thickness in micrometers (μm) for potential use in future analysis.

4.1.2 Scribe Installation. Scribe the test panel/parts as specified in GMW15282. Length and number of scribes to be determined based on part size and test requestor.

4.1.3 Panel/Part Mounting. Place the test panel/parts with the scribed mark in horizontal position on a suitable nonmetallic rack.

4.1.4 Test Duration. Expose the panels/parts for 20 cycles unless otherwise specified in the material specification.

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 Monday.

4.3.1.1 Hold the samples at $60\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ for 1 h in air-circulating oven.

4.3.1.2 Transfer the samples to cold cabinet at a temperature of $-25\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ and hold for 30 minutes.

4.3.1.3 Transfer the samples to 5% sodium chloride solution at ambient conditions, immersing for 15 minutes.

4.3.1.4 Take samples out of sodium chloride solution and hold at ambient conditions for 1 h, 15 minutes.

4.3.1.5 Transfer the samples to humidity cabinet; holding for 21 h (Monday only).

4.3.2 Tuesday through Friday.

4.3.2.1 Transfer the samples to 5% sodium chloride solution at ambient conditions, immersing for 15 minutes.

4.3.2.2 Take samples out of sodium chloride solution and hold at ambient conditions for 1 h, 15 minutes.

4.3.2.3 Transfer the samples to humidity cabinet; hold for 22 h, 30 minutes $85\% \pm 3\% \text{ RH}$ at $60\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$.

4.3.3 Saturday and Sunday.

4.3.3.1 Samples shall remain in humidity cabinet over the weekend.

Note: The exposure sequence described in the preceding, from Monday to Monday, constitutes five cycles.

4.3.4 Test Panel/Part Rinse. After completion of the last cycle, remove the test panels from the cabinet and immediately rinse with warm water.

4.3.5 Test Panel/Part Examination. Examine test panels and parts.

4.3.6 Scribe Creepback Measurement. Unless otherwise stated on the specification or drawing, evaluate scribe line creepback by measuring the distance between the 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 GMW15282, Appendix C.

5 Data

5.1 Calculations. Scribe creepback measurement is illustrated in GMW15282, 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 example data documentation sheet is shown