GM WORLDWIDE ENGINEERING STANDARDS	Test Procedure	GMW14458

Copper-Accelerated Acetic Acid Salt Spray (CASS) Test

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. The Copper-Accelerated Acetic Acid Salt Spray (CASS) test is typically used to evaluate the performance of decorative plating applied to metallic and non-metallic substrates. It has also been used to evaluate the performance of anodic coatings applied to aluminum.

1.2 Applicability. The CASS test is typically used for quality control and process control evaluations, and not for simulating field performance.

1.3 Remarks. This standard establishes test equipment and test specimen requirements for conducting the CASS test. The chamber operation and test procedures are based on ISO 9227. Clarifications to ISO 9227 requirements are defined in this document.

2 References

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

2.1 External Standards/Specifications.

ISO 9227

2.2 GM Standards/Specifications.

GMW3286

2.3 Additional References.

- Component Technical Specifications (CTS)
- Part Drawings
- Subsystem Technical Specifications (SSTS)
- Vehicle Technical Specifications (VTS) (ID)

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3 Resources

3.1 Facilities. Laboratory (preferably with controlled ambient conditions).

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 Test Chamber. The apparatus shall consist of an environmental chamber, a suitable water supply conforming to ISO 9227 requirements, provisions for humidification and heating of the chamber, the necessary means of control along with the ability to maintain the following environmental conditions:

- Chamber Temperature: 50 °C ± 2 °C (122 °F ± 4 °F).
- Humidity: Approximately 100% Relative Humidity (RH).

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- Humidification/Bubble Tower Temperature: May be adjusted such that the specified operating conditions are met.
- Humidification/Bubble Tower Pressure: May be adjusted such that the specified operating conditions are met.

Note: Refer to ISO 9227, Annex A for schematic diagram of one possible design of test chamber.

3.2.2 Fog/Water Collection. Suitable collecting devices include glass or plastic funnels with the stems inserted into collection vessels. Funnels with a diameter of 10 cm have an area of about 80 cm^2.

3.2.2.1 At least two (2) clean fog collectors shall be placed within the exposure zone so that no drops of solution from the test specimens or any other runoff source shall be collected.

3.2.2.2 The collectors shall be placed in the proximity of the test specimens.

3.2.2.3 Collection rates for each 80 cm^2 of horizontal collection area should be in the range of 1.0 mL/h to 2.0 mL/h in each collector. Exposure zones for test specimens shall be established based on demonstrated conformance to the collection rate range.

3.2.2.4 The pH of the collected solution must be in the range of 3.1 to 3.3, when measured at 25 °C ± 3 °C. It may be necessary to adjust the pH by adding hydrochloric acid or sodium hydroxide or sodium bicarbonate solution of analytical grade.

3.2.2.5 The specific gravity of the collected solution shall be 1.025 to 1.040 when measured at 25 °C ± 3 °C.

3.2.3 Corrosivity of Test Chamber. Verification of the test apparatus, to determine the repeatability of results for a specific chamber, or to establish correlation between two (2) different chambers, may be performed at regular intervals or as agreed upon between interested parties (reference ISO 9227).

Note: Test chamber parameters, collection rates, pH, and specific gravity shall be monitored and recorded daily (excluding weekends) during normal operation.

3.3 Test Vehicle/Test Piece. Not applicable.

3.4 Test Time.

Calendar time:	1 d to 5 d
Test time:	24 h to 120 h
Coordination time:	1 h to 4 h

3.5 Test Required Information. Not applicable.

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

4 Procedure

4.1 Preparation.

4.1.1 Test Solution Preparation. The salt solution prepared per GMW3286 shall be the base solution for preparing the CASS solution. To prepare the CASS solution, dissolve 0.26 g of cupric chloride dehydrate ($CuCl_2$ X $2H_2O$) per liter (1 g/gal) of the GMW3286 salt solution. Add 1.3 mL to 1.6 mL of glacial acetic acid per liter (5 mL/gal to 6 mL/gal) of the GMW3286 salt solution.

4.1.2 Sample Preparation.

4.1.2.1 Samples shall be suitably cleaned, if necessary, prior to exposure. The cleaning method shall be optional depending upon the nature of the surface and the type of contaminants. The cleaning shall not include the use of abrasives or solvents which may compromise the test surface.

4.1.2.2 Cut edges, backs, and other test specimen imperfections shall be suitably coated or protected per the discretion of the test engineer, or per agreement between the test engineer and the requester, prior to the initiation of the test.

4.1.2.3 Test specimens are generally oriented in the test chamber so that the dominant test surface is exposed to the CASS fog at approximately 15 degrees to 30 degrees from vertical. Specimens may be oriented at other angles if agreed upon by the requester and the test engineer.

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