



Susceptibility to Chloride Stress Corrosion Cracking

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 standard is an aggressive characterization of the susceptibility of a plastic component to Stress Corrosion Cracking. It accomplishes this by exposing it to different artificial environments with the presence of chlorides. It requires that an appropriate stress level be imparted on the component. The tests are not a direct comparison to field exposure and can only indicate whether the component is susceptible to attack at the stress level that was induced on it.

The two chlorides identified in this standard are calcium chloride and zinc chloride. Calcium Chloride is a common chemical used in de-icing solutions and gravel road dust control. Zinc Chloride only occurs from a reaction of zinc and other chlorides (e.g., sodium or calcium).

It is not recommended to directly fasten any plastic component which is susceptible to chloride stress corrosion cracking directly to a zinc surface.

1.2 Applicability. Testing is recommended for certain polymers (as defined in Table 1) exposed to the underbody and lower underhood atmosphere in critical applications. If the polymer is not identified within the table, GM Materials Engineering shall be consulted to determine the appropriate disposition.

Table 1: Material List

Testing Recommended	Testing Not Recommended
Polyamide (including but not limited to PA46, PA6, PA66, PA12, PA612) Polyphthalamide (PPA) Polyketone (PK)	Acetal (POM) Polyethylene (PE) Polyester (PBT or PET) Polypropylene (PP) Polyphenylene Sulfide (PPS)

The chloride tests are intended to be a determination of the susceptibility of the plastic component to Stress Corrosion Cracking. Evidence of cracking, crazing, or other damage should be a strong indication that the component is not adequately stress crack resistant.

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW3059

3 Test Preparation and Evaluation

3.1 Resources.

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 Facilities. Not applicable.

3.1.4 Equipment. Not applicable.

3.1.4.1 Container. Recommended material for the container is High Density Polyethylene or Austenitic Stainless Steel.

3.1.4.2 Deflection Fixture. Recommended deflection fixture should be made out of Austenitic Stainless Steel.

3.1.5 Test Vehicle/Test Piece. Test pieces shall be the production intent plastic components. Prototype components can be substituted if determined to be sufficiently similar to production. In the case where the component would contain fluid, the area that would contain fluid shall be sealed off preferably with the production intent connectors. Any electrical ports shall also be sealed with the appropriate production intent connector. Exposed metal components of an assembly could have an adverse effect on the solution and/or the remaining structure and should not be included in the test of the plastic component if possible.

3.1.6 Test Time.

Calendar time: 17 days

Test hours: Up to 400 hours

Coordination hours: 4 hours

3.1.7 Test Required Information. Not applicable.

3.1.8 Personnel/Skills. Not applicable.

3.2 Preparation.

3.2.1 Calcium Chloride Test Fluid. Mix a 50% aqueous solution (by weight) of Calcium Chloride in water.

3.2.2 Zinc Chloride Test Fluid. Mix a 50% aqueous solution (by weight) of Zinc Chloride in water.

3.3 Conditions.

3.3.1 Environmental Conditions. Not applicable.

3.3.2 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.

3.4 Instructions. Not applicable.

3.5 Data. Not applicable.

3.6 Safety. This standard may involve hazardous materials, operations, and equipment. This standard does not propose to address all the safety problems associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

3.7 Documentation. Samples of components or material released to this standard shall be tested for conformity with the requirements of this standard and approved by the responsible GM Department prior to the start of delivery of production level components or materials.

Any change to the component or material, e.g., design, function, properties, manufacturing process and/or location of manufacture requires a new release of the product. It is the sole responsibility of the supplier to provide the customer, unsolicited, with documentation of any change or modification to the product/process, and to apply for a new release.

If not otherwise agreed to, the entire verification test shall be repeated and documented by the supplier prior to start of delivery of the modified or changed product. In some cases, a shorter test can be agreed to between the responsible GM department and the supplier.

3.7.1 Test Results. Not applicable.

4 Requirements and Procedure

4.1 Calcium Chloride Exposure.

4.1.1 Apply a simulated deflection, representative of the part's usage in the assembly, to the part.

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