



Evaluating the Resistance of Plastics to Chemical Reagents

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 provides a means for evaluating the susceptibility of plastics to chemical exposure and environmental stress cracking.

1.2 Applicability. Plastic parts.

2 References

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

2.1 External Standards/Specifications.

ASTM D543

ASTM D638

ASTM D1897

2.2 GM Standards/Specifications.

None

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 The apparatus referenced in ASTM D543.

3.2.2 Fixed strain jigs with the following percent strains: 0%, 0.5%, 1.0%, 1.5%, and 2.0%.

3.2.3 Appendix A contains synthetic car wash solutions that can be used, in addition to the list of reagents contained in ASTM D543.

3.3 Test Vehicle/Test Piece. Test samples: ASTM D638, Type I tensile bar (3.2 mm thick, 216 mm long) injected molded according to ASTM D1897 or 3.2 mm x 12.7 mm x 21.6 mm strip cut from sheet or part.

Note: The sample thickness must be between 2.9 mm and 3.5 mm. The surface of a sample may be machined to obtain the required thickness, but only the molded surface of the sample shall be tested.

3.4 Test Time.

Calendar time: 3 to 7 days per sample

Test hours: 72 to 168 hours

Coordination hours: 3 to 24 hours per sample

3.5 Test Required Information. Not applicable.

3.6 Personnel/Skills. Not applicable.

4 Procedure

4.1 Preparation. The procedure outlined in ASTM D543, Practice B Mechanical Stress and Reagent Exposure, shall be employed using the following fix strain jigs: 0%, 0.5%, 1.0%, and 2.0%. Test to GMW15790 using the chemical reagents called out by the responsible GM Materials Engineer.

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. Procedure and instructions outlined in ASTM D543, Practice B.

5 Data

5.1 Calculations. Not applicable.

5.2 Interpretation of Results. Not applicable.

5.3 Test Documentation. The report shall contain the information outlined for reports in ASTM D543, Practice B Mechanical Stress and Reagent Exposure. It shall also contain any visual observations made during the course of the experiment such as cracking, crazing, discoloration, etc.

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.

7 Notes

7.1 Glossary. Not applicable.

7.2 Acronyms, Abbreviations, and Symbols.

CAS	Chemical Abstracts Service
DI	Deionized
EDTA	Ethylenediaminetetraacetic Acid
HF	Hydrofluoric Acid

8 Coding System

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

Test to GMW15790 exposed to chemical reagents in GMW15790 Appendix, A, Table A8 North American Windshield Washer Fluid and Table A9, European Windshield Washer Fluid.

9 Release and Revisions

This standard was originated in January 2008. It was first approved by GM Global Plastics Team in June 2009. It was first published in June 2009.

Issue	Publication Date	Description (Organization)
1	JUN 2009	Initial publication.
2	JUL 2014	Five year refresh of standard. No change to technical content. (Plastics Global Subsystem Leadership Team)