



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 D618

ASTM D638

ASTM D3641

2.2 GM Standards/Specifications.

None

3 Resources

3.1 Facilities. Materials test laboratory with controlled temperature and humidity.

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 Apparatus. Per ASTM D543 Practice B Mechanical Stress and Reagent Exposure.

3.2.2 Fixed Strain Jigs. The following percent strains: 0%, 0.5%, 1.0%, 1.5%, and 2.0%.

3.2.3 Chemical Reagents. Per ASTM D543.

Note: Table A1 thru Table A9 in Appendix A contains chemical reagents that can be used, in addition to the list of reagents contained in ASTM D543.

3.3 Test Vehicle/Test Piece. Test samples per ASTM D638, Type I tensile bar, i.e., 3.2 mm thick, 216 mm long, injected molded according to ASTM D3641 or 3.2 mm × 12.7 mm × 21.6 mm strip cut from sheet or part.

Note: The sample thickness shall 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 d to 7 d per sample

Test time: 72 h to 168 h

Coordination time: 3 h to 24 h per sample

3.5 Test Required Information. List of chemical reagents, see 3.2.3, as required by the responsible GM Materials Engineer.

3.6 Personnel/Skills. Familiarity with the equipment, materials, and methods specified in ASTM D543, ASTM D638 and ASTM D3641.

4 Procedure

4.1 Preparation. Prepare the test samples, see 3.3, and the chemical reagents, see 3.2.3, as required by the responsible GM Materials Engineer.

4.2 Conditions.

4.2.1 Environmental Conditions. Per ASTM D543 Practice B Mechanical Stress and Reagent Exposure (ASTM D618).

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. Follow the procedure outlined in ASTM D543 Practice B Mechanical Stress and Reagent Exposure, using the following fix strain jigs: 0%, 0.5%, 1.0%, and 2.0%, and chemical reagents as required by the responsible GM Materials Engineer.

5 Data

5.1 Calculations. Not applicable.

5.2 Interpretation of Results. Report any visual observations made during the course of the experiment such as cracking, crazing, discoloration, etc.

5.3 Test Documentation. Per ASTM D543 Practice B Mechanical Stress and Reagent Exposure.

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.

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: (example)

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.