



Electrical Component Fluid Compatibility

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. Electrical and electronic (E/E) components are exposed to a variety of different fluids. Exposure to these fluids may affect the functionality of these electrical or electronic devices. The fluid compatibility tests are intended to assure that vehicle operating liquids, chemicals and oils will not degrade the materials, identification or function of the E/E components. Although other fluids beyond those in the list could come into contact with the E/E component, these fluids were considered more aggressive. The following list of fluids was selected based on the likelihood of exposure and the severity of exposure. This document is to supplement GMW3172, GMW3431, and the component Statement of Requirements (SOR).

1.2 Applicability. All electrical components. Method A is only applicable to portions of the part that are visible to the vehicle occupants.

1.3 Remarks. Fluids, test procedures and pass/fail criteria may be adjusted, added or eliminated and detailed in the part specific Component Technical Specification (CTS) requirements based on component construction, IPC code (see 7.1), application location and propensity of fluids to come in contact with the component. Parts shall be evaluated with production intent stresses unless otherwise noted. Consult with responsible materials and electrical validation engineer prior to testing.

2 References

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

2.1 External Standards/Specifications.

ISO 105-A02

2.2 GM Standards/Specifications.

9981285	9986117	B 040 1068	GMW3221
9985010	9986153	B 040 1073	GMW3356
9985670	9986177	B 040 1370	GMW3431
9985809	9986196	B 040 1990	GMW14334
9985821	9986360	B 040 2030	GMW14444
9986086	B 040 0010	B 040 2071	GMW14445
9986102	B 040 0218	GMW3172	GMW17332

2.3 Additional References.

- Association Connecting Electronics Industries (IPC) located at www.ipc.org
- Component Technical Specification (CTS)
- Statement of Requirements (SOR)

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. Apparatus for conditioning to GMW3221.

3.2.1 Containers of sufficient capacity to hold test pieces.

3.2.2 Test Medium. Refer to table in Appendix A, Table A1. Fluids listed under the test specification/part number shall be used for each region. If a specific product is not available in your area, use similar products, obtain agreement from material and/or validation engineer, and note deviation in the test plan and results.

3.3 Test Vehicle/Test Piece. Three (3) test pieces required per chemical unless other arrangements are made with the materials engineer.

3.4 Test Time.

Calendar time: 2 days

Test hours: 24 hours

Coordination hours: 1 hour

3.5 Test Required Information. Not applicable.

3.6 Personnel/Skills. Standard Laboratory safety best practices.

4 Procedure

4.1 Preparation. Test pieces shall be tested immediately after conditioning to GMW3221, Code A.

4.2 Conditions. Conditioning and testing shall not be performed within 72 h of manufacture.

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 Method A "Normal Cleaning". Apply 1 mL each of commercial window cleaner and commercial vehicle cleaning agent in separate locations to the sample. Wait 60 s; then rub the area with at least 50 mm long strokes for 10 double rubs using a folded cheesecloth. Allow the sample to condition for 24 h prior to evaluating.

4.3.2 Method B "Brush Test". If the component is large enough, more than one fluid may be applied but not at the same location. Apply a brushed on coating uniformly over the surface of the sample. Follow with a 48 h soak in a closed container or bell jar approximately 500% of the part(s) volume in capacity. The brush shall be a toothbrush (or equivalent) with a handle made of a non-reactive material. The toothbrush shall be used exclusively for a single solvent; and when there is any evidence of softening, wear, bending or loss of bristles, it shall be discarded and replaced.

4.3.3 Method C "Pour Test" Unpowered Device. Mount sample in a manner consistent with its application position. Pour 200 mL of fluid over part. Wipe excess fluid from the surface and allow to dry for 24 h.

4.3.4 Method D "Pour Test" Powered Device. Follow GMW3172, Sugar Water Functional Impairment.

4.3.5 Method Z "Other". Per referenced specification listed in Appendix A, Table A1.

5 Data

5.1 Calculations.

5.2 Interpretation of Results. Acceptance Criteria is outlined in 5.2.1 through 5.2.3.

5.2.1 Method A "Normal Cleaning". There shall be no objectionable soiling, staining or change in appearance. A reading of 4 will be considered a pass per the American Association of Textile Chemists and Colorists (AATCC) Gray Scale per ISO 105-A02.

5.2.2 Methods B and C. The fluid shall not melt, crack, craze, or crystallize the surface of the part. Graphics and labeling appliques shall not chip, crack, dissolve, or be removed upon application of the fluid. The device

shall be capable of meeting all performance requirements upon completion of the exposure method. Pictures or samples must be provided to responsible GM Materials engineer. If specified per Component Technical Specification (CTS), part shall pass the functional/parametric test per GMW3172 after exposure to fluid.

5.2.3 Method D. Follow GMW3172, Sugar Water Functional Impairment.

5.3 Test Documentation. Results shall be presented in a test report for each fluid detailed in Appendix A, Table A1.

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.

GMB: Products intended for sale in Brazil.

GMNA: Products intended for sale in North America.

Holden: Products intended for sale in Australia.

IPC: Association Connecting Electronics Industries (www.ipc.org).

7.2 Acronyms, Abbreviations, and Symbols.

AATCC	American Association of Textile Chemists and Colorists
CTS	Component Technical Specification
E/E	Electrical/Electronic
GMB	General Motors do Brasil
GMPT	General Motors Powertrain
GMNA	General Motors North America
GSSLT	Global Subsystem Leadership Team
SOR	Statement of Requirements

8 Coding System

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

Test to GMW16449

9 Release and Revisions

This standard was originated in October 2010. It was first approved by the Plastics GSSLT in January 2011. It was first published in January 2011.

Issue	Publication Date	Description (Organization)
1	JAN 2011	Initial publication.
2	SEP 2011	Update Table A1. (Plastics GSSLT)
3	SEP 2012	Correct meaning of IPC. (Plastics GSSLT)
4	DEC 2017	Revised to current template. Update GM Goodwrench materials to genuine GM materials. Updated degreaser. (Materials – Plastics Global Subsystem Leadership Team (GSSLT))