GM	WORLDWIDE ENGINEERING STANDARDS	General Specification	GMW17333

Adhesive Compatibility Approval for Foam Tape

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 specification describes the process and requirements for obtaining GM Adhesive Compatibility Approval for exterior trim components using double coated foam tape as the primary method of attachment.

1.2 Applicability. Pressure-sensitive adhesive foam tapes.

1.3 Remarks. Approval is required prior to Integration Vehicle Engineering Release General Assembly Material Requirement Date (IVER GA MRD) in accordance with the latest revision level of this standard.

1.3.1 Approvals are specific to a substrate/adhesive combination. Cohesive failures are required to gain approval. If cohesive failure is not possible, a different adhesive must be chosen, or an adhesion promoter must be introduced prior to bonding.

1.3.2 All required testing within is considered design validation work and is to be performed at the plaque level. The product level Adhesive Application Approval (AAA) for individual parts is covered by GMW15625.

2 References

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

2.1 External Standards/Specifications.

ISO/IEC 17025	ISO/TS 16949

2.2 GM Standards/Specifications.

GMW3059	GMW14729	GMW15625	GMW16982
GMW14124	GMW15201	GMW16830	

3 Test Preparation and Evaluation

3.1 Resources.

3.1.1 Facilities. All testing shall be performed in a laboratory accredited to ISO/IEC 17025. Laboratories meeting the requirements of ISO/TS 16949 can be used with the consent of GM Materials Engineering.

3.1.1.1 Calibration. The test facilities and equipment shall be in good working order and shall have a valid calibration label.

3.1.1.2 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.

3.1.2 Equipment.

3.1.2.1 Instron or other suitable tensile testing equipment capable of maintaining a constant jaw separation speed.

3.1.2.2 Rolling sled or equivalent fixture to maintain 90 degree peel angle throughout testing.

3.1.2.3 Six point eight kilograms (6.8 kg) (15 lb) hand roller.

3.1.3 Test Vehicle/Test Piece.

3.1.3.1 For 90 Degree Peel Test. Plaque length should allow for at least 150 mm of tape bond length with an additional 25 mm of tape length to be gripped by the Instron clamp.

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3.1.3.2 For Low-Angle Peel Resistance (L-jig). Substrate plaques shall be at least 50 mm x 50 mm. Reference Figures B1 and B2 for visual representation of test fixture and sample dimensions.

3.1.4 Test Time. Longest lead time test is 2 weeks + 72 hours for initial setup.

3.1.5 Test Required Information. Not applicable.

3.1.6 Personnel/Skills. A qualified laboratory technician shall perform testing.

3.2 Preparation.

3.2.1 Isopropyl Alcohol (IPA) Wipe. All samples shall be wiped with a 50/50 Isopropyl alcohol (IPA)/water solution and allowed to air dry prior to application of tape.

3.2.2 Adhesion Promoter. If required for the application, apply adhesion promoter to the substrate plaque and allow 30 s to 1 minute for solvent flash.

3.2.3 Tape Application.

3.2.3.1 Apply non-liner side of tape to substrate required for testing (foil or substrate plaque).

3.2.3.2 Roll twice with 6.8 kg roller.

3.2.3.3 Apply liner side of tape to the remaining substrate. Roll twice with 6.8 kg roller.

3.2.4 Dwell Time. Allow 72 h dwell period prior to peel testing, or 24 h period for L-jig testing.

3.3 Conditions.

3.3.1 Environmental Conditions. Specific exposure conditions listed in section 3.4.1.

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. Testing must be performed on flat plaques of production intent material with standard size widths of the proposed tape.

3.4.1 Required Testing. The following testing from GMW15201 is required for approval to this specification:

- 90 degree peel after 72 h room temperature (RT) dwell
- 90 degree peel after 168 h exposure at 70 °C
- 90 degree peel after 2x GMW14124, Cycle C
- 90 degree peel after 168 h humidity per GMW14729
- 90 degree peel after 30 minutes exposure at 80 °C (peel at temperature)
- Low angle peel resistance with L-jig fixture
  - RT exposure with 1.5 kg applied weight
  - 80 °C exposure with 500 g applied weight
- Cold Slam per GMW16982. This test is optional at the discretion of the materials engineer.

3.4.1.1 For 90 Degree Peel Test.

3.4.1.1.1 Follow procedure outlined in GMW16830 (section titled Test Procedure) with plaques of production-intent substrate material. Liner or non-liner side of the tape may be applied depending on the application. Specifics on aluminum foil required for peel testing are also outlined in GMW16830.

3.4.1.1.2 Allow for 72 h dwell at room temperature prior to starting any conditioning or peeling any samples.

3.4.1.2 For Low-Angle Peel Resistance (L-jig).

3.4.1.2.1 Cut a section of foam tape to 25 mm x 25 mm.

3.4.1.2.2 Clean reusable L-jig with citrus cleaner to remove adhesive residue and wipe dry with a lint free cloth.

3.4.1.2.3 Wipe the substrate panel and L-jig with IPA solution. Allow 30 s to dry.

3.4.1.2.4 Apply adhesion promoter 3M N200J to the L-jig in the area where the tape will be applied.

3.4.1.2.5 Affix the tape (liner side or non-liner side, depending on application) to the center of the primed L-jig.

3.4.1.2.6 Apply firm, even pressure to the tape.

3.4.1.2.7 Remove liner (if not previously removed), place L-jig in the center of the substrate plaque, and apply firm, even pressure.

3.4.1.2.8 Roll twice with a 6.8 kg (15 lb) roller.

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3.4.1.2.9 Allow 24 h dwell at 23 °C x 50% relative humidity (RH).

3.4.1.2.10 Condition at specified temperature and hang specified weight from L-jig to begin the test.

3.4.1.2.11 Record time to failure (up to 168 h) and failure mode.

3.4.1.3 Cold Slam Test (GMW16982). This test is optional at the discretion of the materials engineer reviewing the test plan. Bond a production intent body side molding to a 100 mm x 300 mm painted steel test panel with the paint system identified in 3.4.1.3.1. Condition fixture with panel and bonded molding for 4 h minimum at -30 °C. Slam 10 times. Report any adhesion loss, and then cycle to failure (adhesion loss).

3.4.1.3.1 Painted Steel Panel Requirements. North America: BASF R98/R99 basecoat, R10CG060X clearcoat. Other Regions: Select the most commonly used paint system(s).

3.5 Data. Peak and average peel force shall be recorded, in addition to the failure mode of the tape.

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. Report with average peel force and failure modes for each sample in Test Data Sheet C1. Provide this document to Materials Engineering along with a completed Table A1.

4 Requirements and Procedure

4.1 Testing Requirements. Perform testing as specified in Data Sheet C1. In addition, Table A1 must be completed by the party performing testing.

4.1.1 Failure modes for all tests must be cohesive in nature to gain approval to this standard. If cohesive failure is not achieved by the tape alone, an adhesion promoter must be introduced, or a new tape must be selected for the application.

4.2 Test Results. A summary of test data must be provided as part of the approval process. Test Data Sheet C1 may be used for this purpose. Test reports for a substrate/adhesive combination shall be submitted to Materials Engineering and kept on file, regardless of results.

4.3 Deviations from this Standard. Deviations from the requirements of this standard shall have been agreed upon. Such requirements shall be specified on component drawings, test certificates, reports, etc.

5 Provisions for Shipping

Not applicable.

6 Notes

6.1 Glossary. Not applicable.

6.2 Acronyms, Abbreviations, and Symbols.

AAA	Adhesive Application Approval
AF-F	Adhesive Failure from Aluminum Foil
AF-P	Adhesive Failure from Plaque
CF	Cohesive Foam Split
IPA	Isopropyl Alcohol

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