



Mirror Button/Hardware Bonded to Glass Performance

1 Scope

1.1 Material Description. This specification covers the durability and adhesion performance of inside rearview mirror support studs, sensor farm brackets, movable glass clips, and other hardware bonded to automotive glass.

1.2 Symbols. Not applicable.

1.3 Applicability. Typical applications include, but are not restricted to: bonded mirror buttons, remote function antenna brackets, antenna studs/brackets, lane departure warning, movable glass clips, and sensor farm pins.

1.4 Remarks. Materials used for and subject to this performance requirement, are adhesive bonding systems with glass hardware, metal, or plastic.

2 References

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

2.1 External Standards/Specifications.

ASTM D412	ASTM E145	ISO 179	SAE J2412
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2.2 GM Standards/Specifications.

GMW3041	GMW3371	GMW14729	GMW15851
GMW3059	GMW14124	GMW15201	
GMW3221	GMW14162	GMW15329	
GMW3368	GMW14270	GMW15671	

3 Requirements

3.1 Requirements on Test Specimens.

3.1.1 Sample Conditioning. All samples are to be conditioned prior to each requirement test to GMW3221, Code A.

3.1.2 As-Received. As-received refers to the production parts/test samples in the as-received state at the intended GM vehicle assembly center. This includes full cure conditions of the adhesive systems based upon the manufacturer's recommended requirements.

3.1.3 Bonded Hardware. This specification pertains to mirror buttons, brackets, bracket attachment pins, locator pins, and other hardware that are adhesively attached to automotive glass.

3.1.3.1 Bonding systems specific to mirror buttons, mega-brackets and sensor farm pins must be approved by GM Materials Engineering and listed in the GM Materials Approved Source List under this standard. The approved bonding system listing shall include adhesive(s), primer(s), bonded substrates and coatings as applicable, material and process supplier names and a process control plan defining steps using the materials required to create a robust system.

3.1.3.1.1 Refer to the Appendix A, Data Sheet A1:Request Form and complete the information for an approval submission. Include all required test data and reports when submitting.

3.1.3.1.2 Test data and reports must have all substrates and materials defined (see bonding substrates) within the Appendix A, Data Sheet A1: Request Form.

3.1.3.2 Less Than Full Cure State Shipped Parts. If assemblies are shipped in less than the full cure state, they must meet the requirements of this GMW16016 when obtained at the GM assembly facility. Cure times and environments must be defined by validation capability to ensure the bonded hardware meets GM engineering

and manufacturing requirements. Notify the responsible GM engineering group for assessment if shipping bonded hardware components in a less than full cure state.

3.1.4 Test Samples. Production intent hardware, adhesive, glass, and processes, shall be used when creating samples for this test. Hardware with adhesive shall be mounted on production glazing or laminated glass samples measuring 70 mm x 150 mm minimum. Three (3) test samples are to be used for each test environment per each test condition.

3.1.5 Adhesive Coverage and Wet-Out. Adhesive coverage is the design intent area adhesive verses the part area surface to be bonded, e.g., mirror button or bracket, sensor farm or locator pin. Adhesive wet-out defines the percentage of adhesive of contact to the bonded surface verses the design adhesive area. The adhesive system can be Pressure Sensitive Adhesive Tape (PSAT) or non-PSAT such as polyurethane glass adhesive.

3.1.5.1 Requirement. The area of adhesive must cover the full area part bonded surface with a maximum gap to edge of 1.2 mm around the perimeter of the part surface and demonstrate a minimum of 85% wet-out.

3.1.5.2 Wet-out of any surface may be confirmed by applying a non-bondable material like i.e., Teflon tape, lubricant, or water art paint, to the intended substrate. If cure or dry time is required, perform per manufacturer's recommendations. Apply adhesive and allow cure/setup via production intent processes. After cure/setup, separate adhesive from the substrate(s). Observe the adhesive and substrate. Measure and calculate the total adhesive coverage verses the design intent adhesive area. Report in percentage of adhesive wet-out.

3.2 Adhesive Type.

3.2.1 Autoclave Adhesives. Autoclave adhesives are types that require a bake condition performed generally during the autoclave process, e.g., Polyvinyl Butyral (PVB), Structural Bonding Tape (SBT). The bake is not restricted to autoclave, so it may also be performed for post autoclave bonding applications.

3.2.2 Post/Non-Autoclave, Low Modulus, High Elongation Adhesives. Adhesives for post autoclave laminated and tempered glass bonding applications, shall have a Modulus < 3.5 MPa and elongation > 200% when tested per GMW15329 and ASTM D412, Method A, Die C respectively. These are typically glass bonding, moisture cure polyurethane adhesives. Deviations to this type adhesive must specifically be requested to the regionally responsible GM Materials Engineering Group prior to any production intent validation.

3.2.3 Pressure Sensitive Adhesive Tape (PSAT). See 3.5 it defines the bonding performance for post autoclave, pressure sensitive adhesive tape attached hardware. This attachment method is intended for light trim and assembly aid applications, e.g., locator pins. It is not intended for hardware that retains functionally attached components, e.g., mirror bracket, glass hinges, movable glass clips, or sensor farm pins.

3.3 Test Requirements.

3.3.1 Mirror Button/Bracket Creep Resistance. In addition to the described test sample preparation, mount a 64 mm (from glass) rigid extension arm to the required mirror button/bracket with a 1000 g weight attached no more than 6 mm inward from the end of the extension. With the glass in vehicle position, mount the extension arm to the button/bracket on the glass parallel to horizontal. In the case of bonded clips on movable glass, mount the glass vertically with the clip at the glass bottom with the weight attached below.

3.3.1.1 Creep Resistance for Hardware Other Than Mirror Buttons/Brackets, e.g., Farm Sensor Bracket/Pins. In applications where bonded pins are used to hold bracketed hardware, mount a 150% mass of the intended production assembly to the attached hardware and expose. The mass distribution should be as production intent. The test sample/assembly must be tested in vehicle position. Locator pins are excluded.

3.3.1.2 Environmental Exposures.

3.3.1.2.1 One Thousand Hours (1000 h) Humidity. Expose to 1000 h at 65 °C ± 3 °C and 80% ± 5% Relative Humidity (RH).

3.3.1.2.2 Heat Aging, ASTM E145. As-received and 336 h at 80 °C ± 3 °C.

3.3.1.3 Requirement. The bonded assemblies must withstand the environmental exposures without separation or movement from the original exposed position.

3.3.2 Side Impact Adhesion. All attached hardware must meet impact adhesion. See Figure 1 and Figure 2 for test setup. Hardware, mirror buttons, brackets, sensor farm pins, and movable glass clips, to be run as-received and at -30 °C, low temperature soak per 3.3.2.1.2. Locator pins are excluded. As shown in Figure 2, this overlap shear setup evaluates the integrity of the adhesive system bond to production intent substrates, ceramic enamel

on glass and/or painted hardware. Variations from the overlap shear setup in Figure 2 must be agreed to by GM Engineering prior to the onset of testing.

Figure 1: Impact Tester

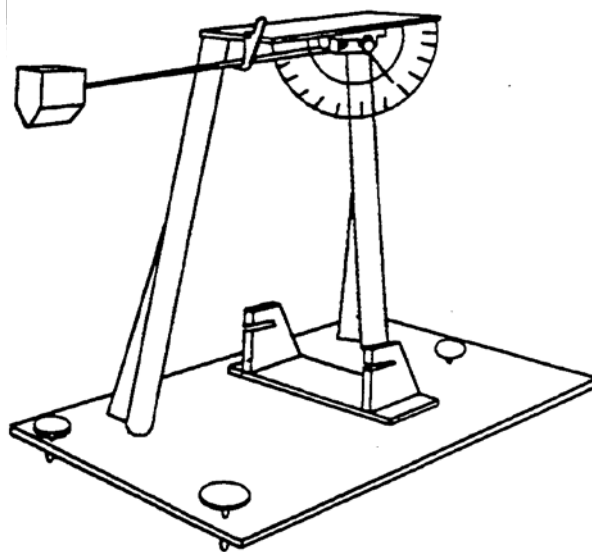
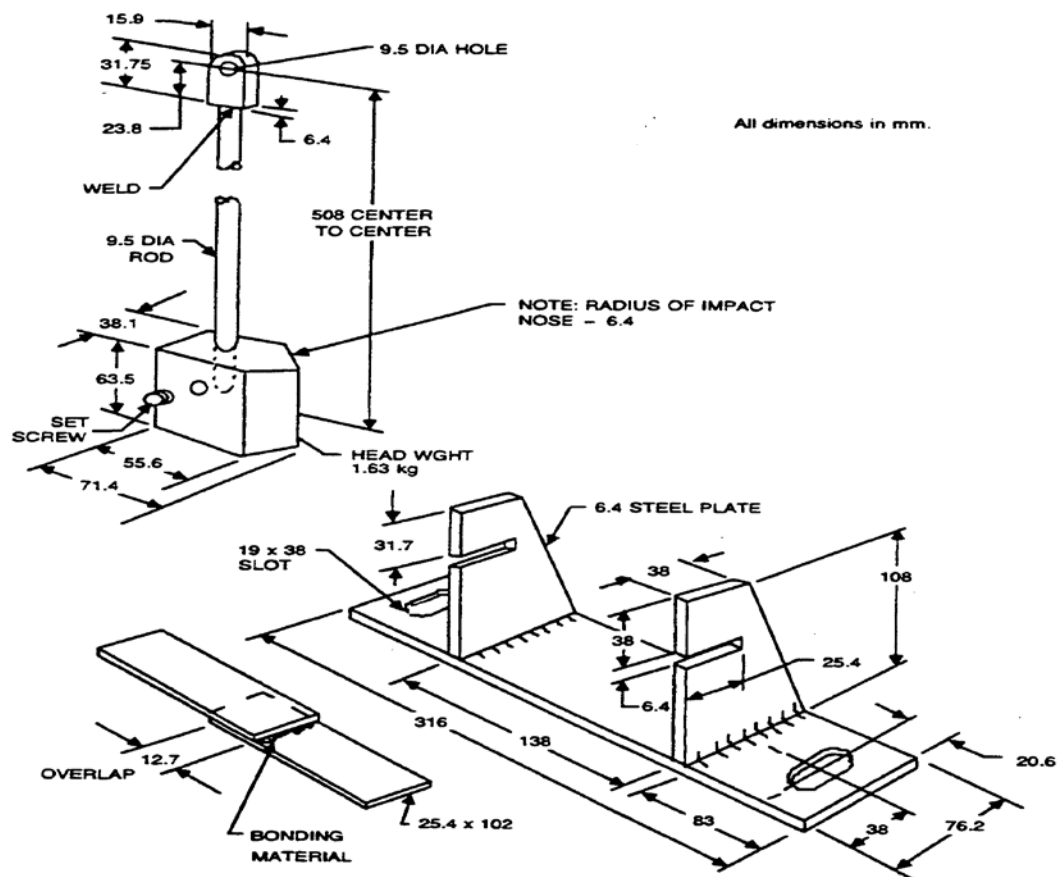


Figure 2: Impact Test Setup (all dimensions in millimeters)



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Documents

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