



Performance Tests for Seat Mounted Armrest

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. Performance testing of front seat and rear seat mounted armrests, single and dual pivot, with or without an integrated storage bin/box. Also applicable for lids of storage box/bin that can be used as an armrest.

1.2 Applicability. Applicable to all armrests attached to front or rear seats. Depending on the design, the test setup may change. All test procedures apply to both single pivot and dual pivot armrests unless otherwise noted. All test procedures apply to stand-alone or supported armrests unless otherwise noted.

1.3 Remarks. Definitions of the different armrest constructions used within this specification are defined within 6.1 Glossary, and shown in Figure 14, Figure 15 and Figure 16.

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW3059

GMW14011

GMW14264

GMW14363

GMW3428

2.3 Additional References.

- Assembly Drawing
- Statement of Requirements (SOR) Appendix C1
- Statement of Requirements (SOR) Appendix C2
- Subsystem Technical Specification (SSTS)

3 Test Preparation and Evaluation

3.1 Resources.

3.1.1 Facilities. An approved GM certified lab with an adequate bed plate or equivalent work surface necessary for mounting the test sample and associated test fixtures appropriate for the procedure to be run.

- Dudenhofen Test Center or equivalent proving ground
- Climatic Chamber
- Durability Test Stand

3.1.1.1 Calibration. The test facilities and equipment shall be in good working order and shall have a valid calibration label. Record measuring devices (see Appendix A, Table A1).

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 Tensile/compression gauge with universal testing device (stamps 10 mm, 20 mm, and 40 mm diameter).

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3.1.2.2 Torque wrench.

3.1.2.3 Tape measure.

3.1.2.4 Filling material for volumetric measurement (storage box).

3.1.2.5 Standard disk weight (3 kg).

3.1.2.6 Hook or similar device for testing anti-theft protection system.

3.1.2.7 Rigid device with original add-on parts.

3.1.2.8 Recording instrument for cycle counting.

3.1.2.9 Cycling device.

3.1.3 Test Vehicle/Test Piece.

3.1.3.1 Complete armrest including all relevant parts to check the system.

3.1.3.2 Armrest Testing Shall be Done Attached to Seat Frame for Loading Conditions. Complete trimmed seat subsystem, consisting of all components necessary to qualify as complete for the model and trim level for durability and efforts testing as specified by the Design Release Engineer (DRE) is required.

3.1.4 Test Time.

Calendar time: 1 day

Test hours: 1 hour

Coordination hours: 8 hours

3.1.5 Test Required Information. The results shall be entered in the relevant Data Sheet A1 thru Data Sheet A5, see Appendix A.

3.1.6 Personnel/Skills. Engineering personnel with appropriate training and background to inspect engineering documentation and evaluate conformance to requirements.

3.2 Preparation. See respective tests in Section 4.

3.3 Conditions.

3.3.1 Environmental Conditions. All requirements for each test must be fulfilled within a temperature range of $-30\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ unless otherwise specified within this document, Global Subsystem Technical Specification (SSTS), or Assembly Drawing. The durability test may be performed at temperatures representative of vehicle profile. Validation engineer to use engineering judgment based on materials used. The temperature ranges for the durability test are described in 4.9.1.10.1.

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. See respective tests in Section 4.

3.5 Data. Record pertinent test results on the supplied data sheets, (see Appendix A).

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.

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3.7.1 Test Results.

3.7.1.1 The required values for each specification are defined in the Global SSTS (Statement of Requirements (SOR) Appendix C1). Variables shall be provided for values which are not explicitly listed. Agreed deviations to the values are entered into the Global SSTS (SOR Appendix C2).

3.7.1.2 Objective evaluation shall be performed according to GMW14011.

3.7.1.3 Subjective evaluation shall be performed according to GMW14264.

3.7.1.4 The results shall be entered in the relevant Data Sheet A1 thru Data Sheet A5, see Appendix A.

4 Requirements and Procedure

4.1 General Requirements.

4.1.1 The armrest shall be checked for conformance to the current development, drawing or release status before each test.

4.1.2 All design released fasteners shall be present, undamaged and correctly installed. If this is not the case, the fasteners shall be supplemented or corrected. Any modifications shall be noted in Data Sheet A1, see Appendix A. The dimensions of the armrest shall be determined using the tape measure.

4.1.3 The volume of the storage box shall be determined with filling material.

4.2 Test Requirements.

4.2.1 Measurement of the Release Force for Height Adjustment F1, if so Equipped. The tensile/compression gauge with stamp (diameter 10 mm) shall be used to measure the release Force (F).

4.2.1.1 The stamp shall be applied to the release feature (button, lever, etc.,) horizontally with the armrest folded down and shall push the release feature until it releases (see Figure 1).

4.2.1.2 After the release feature has been actuated, it shall rebound to its initial position.

4.2.2 Measurement of the Folding Force F2. The tensile/compression gauge with stamp (diameter 20 mm) shall be used for measuring the folding force.

4.2.2.1 The stamp shall be applied vertically from below to the released and folded-down armrest at a distance of 20 mm from the front edge of the armrest, pushed into the folded (upright) position until just before the locking point (see Figure 1).

4.2.2.2 A deviation of 15% maximum is permitted between the minimum and maximum folding force values along the folding distance.

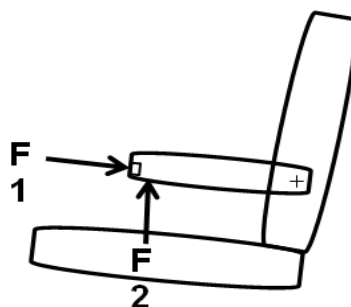


Figure 1: Release Force and Folding Force of Height Adjustment

4.2.3 Downward Folding Force F3. The tensile/compression gauge with stamp (diameter 20 mm) shall be used for measuring the folding force.

4.2.3.1 The stamp shall be applied horizontally to the armrest when released and folded up at a distance of 20 mm from the front edge of the armrest, and shall push it into the folded down position (see Figure 2).

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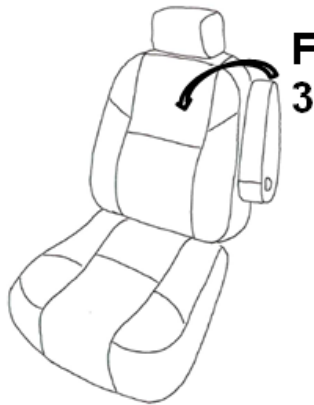


Figure 2: Downward Folding Force

4.2.4 Upward Inclination Adjustment Force F4. Only applicable for vertically adjustable armrests. The tensile/compression gauge with stamp (diameter 20 mm) shall be used for measuring the inclination adjustment force.

4.2.4.1 With the actuation feature (button, lever, etc.) released for the inclination adjustment, the stamp shall be applied vertically from below to the armrest in the horizontal position at a distance of 20 mm from the front edge of the armrest, and shall push the armrest upward into the position with the maximum inclination (see Figure 3).

4.2.4.2 Downward Inclination Adjustment Force F5. Only applicable for vertically adjustable armrests. The tensile/compression gauge with stamp (diameter 20 mm) shall be used for measuring the inclination adjustment force.

4.2.4.3 With the actuation feature (button, lever, etc.) for the inclination adjustment released, the stamp shall be applied vertically from above to the armrest in the horizontal position at a distance of ≤ 20 mm from the front edge of the armrest and shall push the armrest downward into the position with the least inclination (see Figure 3).

4.2.4.4 A deviation of 15% maximum between the minimum and maximum values for the inclination adjustment force is permitted.

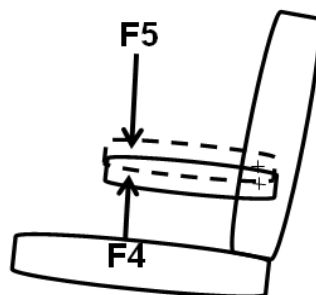


Figure 3: Inclination Adjustment Forces

4.2.5 Measurement of the Stand-alone Armrest Locking Force F6, if Equipped. The tensile/compression gauge with stamp (diameter 20 mm) shall be used for measuring the locking force.

4.2.5.1 The stamp shall be applied horizontally from the front to the folded up armrest just before the locking position at a distance of 20 mm from the front edge of the armrest and shall push the armrest to the rear until it locks completely (see Figure 4).

4.2.6 Measurement of the Stand-alone Armrest Upward Release Force F7. The tensile/compression gauge with stamp (diameter 20 mm) shall be used for measuring the release force.

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4.2.6.1 The stamp shall be applied horizontally from the rear to the folded up armrest at a distance of 20 mm from the front edge of the armrest and shall push the armrest forward until it is released (see Figure 4).



Figure 4: Locking Force and Release Force

4.3 Armrest Actuation Forces.

4.3.1 Measurement of the Armrest Storage Box Release Force F8. The tensile/compression gauge with hook shall be used for measuring the release force.

4.3.1.1 The hook shall be centrally located to the actuation feature (button, lever, etc.) and the force applied in the direction of release until the storage box lid is released (see Figure 5).

4.3.2 Measurement of the Armrest Storage Box Locking Force F9. The tensile/compression gauge with stamp (20 mm diameter) shall be used for measuring the locking force.

4.3.2.1 The armrest storage box lid shall be folded down until just before the locking position. At a distance of 20 mm from the front edge of the storage box lid, apply the force downward until the lid of the storage box latches closed (see Figure 5).

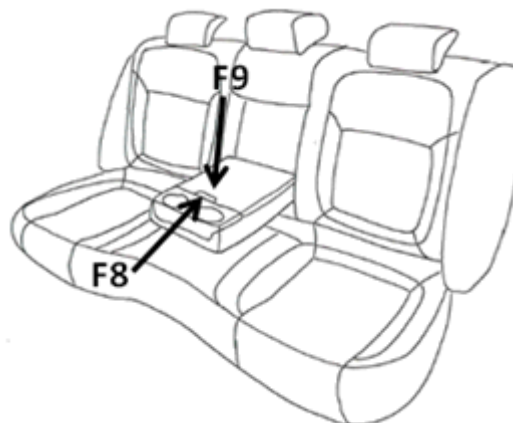


Figure 5: Armrest Storage Box Release Force and Locking Force

4.3.3 Measurement of the Armrest Storage Box Opening Force F10. The tensile/compression gauge with hook shall be used for measuring the opening force.

4.3.3.1 With the armrest folded down and the storage box lid unlatched, apply the hook to the actuation feature (button, lever, etc.) and pull in the opening direction until the storage bin lid is in the fully open position (see Figure 6).

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4.3.3.2 A deviation of 10% maximum between the minimum and maximum values is permitted for the opening force along the opening travel but must always be within the range defined in the Global SSTs.

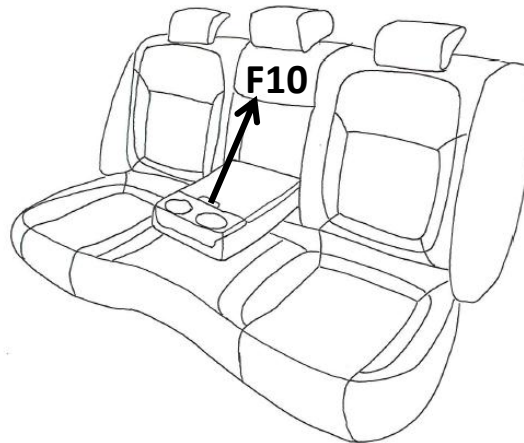


Figure 6: Armrest Storage Box Opening Force

4.3.4 Measurement of the Armrest Storage Box Closing Force F11. The tensile/compression gauge with stamp (20 mm diameter) shall be used for measuring the closing force.

4.3.4.1 The stamp shall be applied to the actuation feature (button, lever, etc.) area on storage box lid at a distance of ≤ 20 mm from the front edge of the lid and shall push the lid into the folded down position (see Figure 7).

4.3.4.2 A deviation of 10% maximum between the minimum and maximum values for the closing force along the closing travel shall be permitted but must always be within the range defined in the Global SSTs.

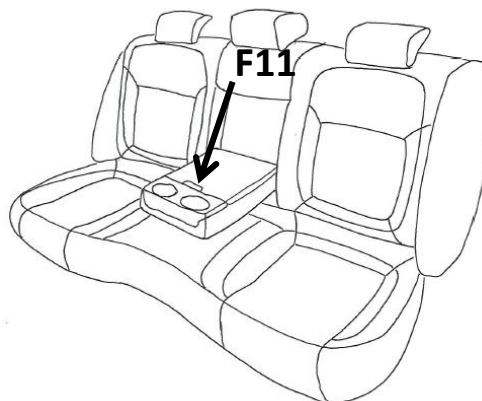


Figure 7: Armrest Storage Box Closing Force

4.3.5 Measurement of Armrest Sliding Force F12 (see Figure 8). Only applicable for longitudinally adjustable armrests. The tensile/compression gauge with stamp (20 mm diameter) shall be used for measuring the sliding force.

4.3.5.1 The stamp shall be applied to the armrest center in sliding direction when the armrest is folded down. The measurement shall be performed in both sliding directions over the entire sliding distance (see Figure 8).

4.3.5.2 Longitudinal adjustments with intermediate engagements shall conform to the specifications and may deviate 20% maximum from one another. For longitudinal adjustments without intermediate engagements, the minimum sliding force shall be 80% of the maximum sliding force.

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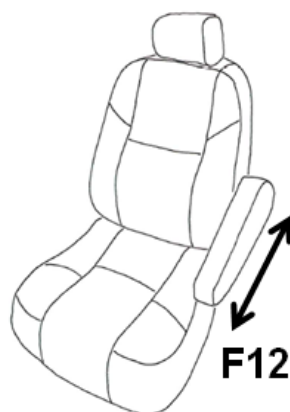


Figure 8: Armrest Sliding Force

4.4 Deflection.

4.4.1. Vertical Loading of the Folded Down Armrest F13. The tensile/compression gauge with stamp (diameter 20 mm) shall be used for measuring the vertical force.

4.4.1.1 The force shall be applied from above vertically at a distance of ≤ 20 mm from the front edge of the armrest (see Figure 9).

4.4.1.2 The deflection shall be measured at the same location that the load is applied. Permanent set shall be reported from zero.

4.4.2. Horizontal Loading of the Folded Down Armrest from the Front F14. The tensile/compression gauge with the stamp (diameter 20 mm) shall be used to measure the horizontal force from the front.

4.4.2.1 The force shall be centrally located to the armrest and applied to the front surface (see Figure 9).

4.4.2.2 The deflection shall be measured at the same location at which the load is applied. Permanent set shall be reported from zero.

4.4.3. Horizontal Loading of the Folded Down Armrest from the Side F15. The tensile/compression gauge with the stamp (diameter 20 mm) shall be used to measure the horizontal force from the side.

4.4.3.1 The force shall be applied with the stamp at a distance of ≤ 20 mm from the front edge of the armrest. The folded down armrest shall be independently loaded horizontally with the force F15 from the driver and passenger side (see Figure 9).

4.4.3.2 The deflection shall be measured at the same location at which the load is applied. Permanent set shall be reported from zero.

4.4.3.3 Each measurement shall be recorded independently. The results for the driver and passenger side shall not be added together.

4.4.4. Horizontal Loading of the Folded Down Armrest from the Side in the Pivot Area F16. The tensile/compression gauge with the stamp (diameter 20 mm) shall be used to measure the horizontal force from the side.

4.4.4.1 The force shall be applied with the stamp to the folded down armrest horizontally with the force F16 in the pivot area from the driver and passenger side (see Figure 9).

4.4.4.2 The deflection shall be measured at the same location at which the load is applied. Permanent set shall be reported from zero.

4.4.4.3 Each measurement shall be recorded independently. The results for the driver and passenger side shall not be added together.

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