



Misuse Performance, Abusive Force of Plastic Components and Adjusting Elements on Front and Rear Seats

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. The purpose of this test procedure is to determine if the plastic components and adjusting elements can withstand a force with no physical damage, loss of function, or unintentional activation.

1.2 Applicability. Applicable to seat systems with plastic components and adjusting elements.

1.3 Remarks. Not applicable.

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

None

2.3 Additional References.

- Seat Subsystem Technical Specification (SSTS).

3 Resources

3.1 Facilities. An approved GM certified test lab with an adequate bedplate or equivalent work surface necessary for mounting of test samples and associated test fixtures.

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 Mounting Blocks. Appropriate model mounting blocks (fixture) to secure seat subsystem in body position and attachments.

3.2.2 Load Form for Applying Vertical Load. Rectangular form measuring 150 mm x 80 mm with 30 mm radius on corners and edges.

3.2.3 Load Form for Pushing or Pulling in the Horizontal or Actuation Direction. 90 degree, L-shaped hook with a width of 25 mm, inside length of 25 mm, and maximum outside length of 35 mm.

3.2.4 Load Application Device. (Zero (0) to 1000) N (0 - 200 lbf) capacity – hydraulic or air cylinder.

3.2.5 Load Measuring Device. (Zero (0) to 1000) N (0 - 200 lbf) capacity – (load cell, etc.)

3.2.6 Power Supply. A Direct Current (DC) power supply capable of supplying a constant 13.5 V into the seat wiring harness.

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3.3 Test Vehicle/Test Piece. Complete trimmed seat subsystem. An appropriate seat subsystem consisting of all components necessary to qualify as complete for the model and trim level specified by the Design Release Engineer (DRE).

3.4 Test Time.

Calendar time: (1 to 2) days

Test hours: (1 to 2) h

Coordination hours: (4 to 5) h

3.5 Test Required Information. Not applicable.

3.6 Personnel/Skills. The following individuals are necessary to complete this test procedure:

- DRE.
- GM Validation Engineer.
- Testing Organization's Test Engineer.
- Testing Organization's Test Technician.

4 Procedure

4.1 Preparation.

4.1.1 Obtain Necessary Details. Obtain the following test details from the DRE or GM Validation Engineer:

- a. Plastic part or adjusting element applicable to the loads described in this GMW.
- b. Locations for applying loads to the seat system plastic part or adjusting element.
- c. Directions for applying loads to the seat system plastic part or adjusting element.
- d. New part for each loading direction or applicable load. Parts may be reused for additional loading required in the case where no previous damage or loss of function is shown. This must be agreed upon with the DRE or GM Validation Engineer.
- e. Design position of the seat.
- f. For power seats, pinout of the seat wiring harness.

4.2 Conditions.

4.2.1 Environmental Conditions. $(22 \pm 5) ^\circ\text{C}$ and $(50 \pm 10)\%$ Relative Humidity (RH).

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. Install the seat on the test fixture representing body attachments and in the design position.

4.3.1 Load Applications.

4.3.1.1 Direction of Actuation Loads. Applies to plastic levers, plastic knobs, or any other adjusting element. Load the component in the direction of actuation to the force required in the Subsystem Technical Specification (SSTS) at a load rate of (50 ± 5) N/s. If the component is not specified in the SSTS, the adjusting element should be loaded to 500 N in the direction of actuation. After the specified load is complete, record the force achieved, and check the part for functionality and damage. Note any physical damage, loss of function, or looseness of the component.

4.3.1.1.1 Lever or Parachute Handle. Apply the load using the loading device described in 3.2.3. For a lever, apply the load to the center of the device, 10 mm from the end of the adjusting element along the axis of activation (see Figure A1 in Appendix A); for a parachute handle apply the load to the front edge and offset midway between the center of the handle and the outer surface biased toward the inboard side (see Figure A2 in Appendix A). Care should be taken to keep the load perpendicular to the adjusting element throughout the loading. The load should be applied with the actuation device at its travel limit.

4.3.1.1.2 Knob. Apply the load perpendicular to the outer diameter of the knob at a load rate of (50 ± 5) N/s. Use the loading device described in 3.2.3. In the case where this loading device is not sufficient for the knob, an appropriate loading device should be approved by the GM Validation Engineer (see Figure A5 and Figure A6 in Appendix A). The load should be applied with the actuation device at its travel limit.

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4.3.1.2 Horizontal Loads Perpendicular to the Actuation Direction. Using the load form described in 3.2.3, plastic levers, plastic knobs, or any other adjusting element should be loaded to the force required in the SSTs perpendicular to the direction of actuation and applied at a load rate of (50 ± 5) N/s. If the component is not specified in the SSTs, the adjusting element should be loaded to 250 N perpendicular to the actuation direction. After the load is complete, record the force achieved, and check the part for functionality and damage. Note any physical damage, loss of function, or looseness of the component.

4.3.1.2.1 Lever. Apply the load using the loading device described in 3.2.3 for pulling to the top of the device at a load rate of (50 ± 5) N/s, 10 mm from the end of the adjusting element horizontal and perpendicular to the actuation direction (see Figure A3 and Figure A4 in Appendix A).

4.3.1.2.2 Knob. Apply the load perpendicular to the outer diameter of the knob and horizontally outward using the loading device described in 3.2.3 for pulling at a load rate of (50 ± 5) N/s (see Figure A5 and Figure A6 in Appendix A).

4.3.1.3 Horizontal Loads Applied According to Vehicle Coordinate System ($\pm Y$ or $\pm X$).

4.3.1.3.1 General Plastic Components (Side Shields, Track Covers, End Caps, and Support Brackets). Using the load form for pushing or pulling described in 3.2.3, general plastic components should be loaded to the horizontal ($\pm Y$ or $\pm X$) force required in the SSTs when applied at a rate of (50 ± 5) N/s. If the component is not specified in the SSTs, the plastic component should be loaded to 250 N in the horizontal $\pm Y$ or $\pm X$ direction. Consult with the GM Validation Engineer for load application points. In general, the component should be loaded as close as possible to the attachment feature and at the midpoint between two attachment features along any edge that the consumer can likely grab (see Figure A4, Figure A7, Figure A8, and Figure A9 in Appendix A). Prior to applying the load, if the seat includes power mechanisms, connect 13.5 V from the power supply to the seat wiring harness using the pinout supplied by the GM Validation Engineer or DRE. After the specified loading is complete, record the force achieved, and check the part for functionality and damage. Note any physical damage, loss of function, or looseness of the component. In addition, note if any unintentional activation occurs for power seat mechanisms.

4.3.1.3.2 Ski Pass-Through. Using the load form for pushing described in 3.2.3, the ski pass-through should be loaded to the forward force required in the SSTs when applied at a rate of (50 ± 5) N/s. Apply the load to the center and top of the ski pass-through. After the specified load is complete, record the force achieved, and check the part for functionality and damage. Note any physical damage, loss of function, or looseness of the component.

4.3.1.3.3 Back Panel. Using the load form for pulling as described in 3.2.3, the back panel should be loaded in the rearward horizontal direction to the force required in the SSTs when applied at a rate of (50 ± 5) N/s. Consult with the GM Validation Engineer for load application points. In general, the back panel should be loaded as close as possible to the attachment features and at the midpoint between two attachment features along any edge that the consumer can likely grab (see Figure A10 in Appendix A). After the specified load is complete, record the force achieved, and check the part for functionality and damage. Note any physical damage, loss of function, or looseness of the component.

4.3.1.4 Vertical Loads.

4.3.1.4.1 General Plastic Components (Side Shields, Track Covers, End Caps, and Support Brackets). Using the load form for pushing described in 3.2.2, general plastic components should be loaded to the vertical force required in the SSTs when applied at a rate of (50 ± 5) N/s. If the component is not specified in the SSTs, the plastic component should be loaded to 500 N if it is in the path of occupant ingress or egress and 900 N for any component that may be stepped on by the consumer. Consult with the GM Validation Engineer for load application points and consumer interface. In general, the component should be loaded as close as possible to the attachment feature and at the midpoint between two attachment features along any edge that the consumer can likely grab (see Figure A11 in Appendix A). Prior to applying the load, if the seat includes power mechanisms, connect 13.5 V from the power supply to the seat wiring harness using the pinout supplied by the GM Validation Engineer or DRE. After the specified loading is complete, record the force achieved, and check the part for functionality and damage. Note any physical damage, loss of function, or looseness of the component. In addition, note if any unintentional activation occurs for power seat mechanisms.

5 Data

5.1 Calculations. Not applicable.

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