



## Seat Cushion Wrinkle Durability Test

### 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 is to evaluate the appearance of a trimmed seat cover for wrinkling by simulating the usage of a customer. The test is a subjective assessment based on boundary sample pictures.

**1.2 Applicability.** This test procedure applies to all front seating positions. However, if the driver seat is trimmed similarly to the passenger seat, then judgment can be made to test only the driver seat.

**1.3 Remarks.** This test procedure consists of three series of simulated usage. If, at any time after a series, the seat does not meet the criteria, the seat assembly is required to complete remediation and then retested.

### 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.

Not applicable.

### 3 Resources

**3.1 Facilities.** A laboratory approved by the General Motors validation or Test Engineer.

**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** A form representing the lower torso and thighs of a 5<sup>th</sup> percentile female Anthropomorphic Test Dummy (ATD) HIII or equivalent construction and dimensions. The form shall contain a rigid bar extending from the hip point of the form at an angle of  $(72.5 \pm 2.5)$  degrees and with a diameter of  $(27.5 \pm 2.5)$  mm as shown in Figure 1 for holding the weights in place during the test.

**Note:** The form shall be covered with cotton cloth (not shown in Figure 1).

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Figure 1: 5<sup>th</sup> Percentile ATD Lower Torso and Thigh Form

**3.2.2** An environmental chamber capable of maintaining 60 °C and of suitable size for a trimmed seat on a fixture.

**3.2.3** 68 kg (150 lb) loose weights for placement on the 5<sup>th</sup> percentile anthropomorphic dummy.

- 4.5 kg (10 lb) 205 mm (8 in) diameter weight (quantity 6).
- 4.5 kg (10 lb) 240 mm (9.5 in) diameter weight (quantity 6).
- 13.6 kg (30 lb) weighted sand bag or equivalent (quantity 1).

**3.2.4** Rigid fixture capable of mounting a trimmed seat with a seated ATD and 68 kg weights.

**3.2.5** Trimmed seat suitable for test specimen.

**3.2.6** Power Supply for applying Direct Current (DC) power to the motors.

**3.2.7** Digital inclinometer capable of measuring degrees.

**3.2.8** Camera with external flash. A point and shoot camera with the flash right on it is not recommended. However, it may be used with an additional studio light, the flash turned off, and the shutter speed set to 1/60<sup>th</sup> of a second or faster to avoid blurring.

### 3.3 Test Vehicle/Test Piece.

The test specimen is a trimmed seat with production intent foam and trim. Head restraint is not required. Not all plastic trim is required, unless it would influence the test. The seat cushion as delivered shall be defect free and wrinkle free.

### 3.4 Test Time.

Calendar time: 4 days

Test hours: 90 h

Coordination hours: 6 h

### 3.5 Test Required Information.

The level of the part shall be provided with the seat. The seat shall have either been H-pointed before usage or assured that it is of production intent H-point. Obtain the seating arrangement drawing or from the DRE, the design position of the seat (seat back angle, cushion frame angle, H-point location, track position, and height adjust position).

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

- General Motors Seat DRE.

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- General Motors Seat SVE.
- Test Engineer.
- Test Technician.

## 4 Procedure

### 4.1 Preparation.

**4.1.1 Visual Inspection.** The Design Release Engineer and Validation Engineer shall visually inspect the seat assembly for correct part numbers, quality of cushion trim cover with respect to wrinkles, proper fit and assembly and the presence of all required parts. The seat cushion trim cover shall be wrinkle free prior to testing. Record the test information, seat information, seat cushion foam information, and seat cushion trim and lamination information in the appropriate sections of Data Sheet B1: Seat Cushion Wrinkle Durability provided in Appendix B.

**4.1.2 Mounting.** Mount the seat subsystem on the appropriate model mounting blocks or rigid fixture representative of the vehicle body anchor points.

**4.1.3 Seat Positioning.** Engage the seat adjuster (tracks and height adjuster) in its design location. Set the seat back frame to the design back angle (measure the back angle on the outboard portion of the seat back). Set all other components to the off position (lumbar, adjustable bolster, etc.)

**4.1.4 Photographs.** Prepare the area for photography so that consistent photo aspect and lighting is used throughout the duration of the test. All photographs must be taken from the same aspect relative to the seating surface, and with the same lighting. The following photographs are required prior to the initial load application and at the intervals specified in 4.3:

- **Isometric View:** 45 degrees from the front outboard corner of the seat, and 45 degrees from the top surface of the seat cushion.
- **Other:** Any other view or close-up photo that may be needed to investigate wrinkle performance.

**Note:** If photos are taken with a camera that does not have an external flash capable of holding it out at 45 degrees from the front of the seat, a studio light shall be used. The studio light should be set directly in front of the center of the seat pointing at the seat cushion from a similar height that the camera will be set.

**4.1.5 Environmental Conditioning.** Prepare the environmental chamber to the temperature specified in 4.2.1. The seat shall be conditioned at an ambient temperature of  $(20 \pm 2)^\circ\text{C}$  with relative humidity  $< 20\%$ , for a minimum of 2 h prior to starting the test.

### 4.2 Conditions.

**4.2.1 Environmental Conditions.** Perform the photography at ambient temperature,  $(20 \pm 2)^\circ\text{C}$  with relative humidity  $< 20\%$ . Perform the test at  $60^\circ\text{C}$ .

**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 Photographs.** Test photos of the seat cushion are taken prior to the application of any weight as specified in 4.1.4.

#### 4.3.2 Environmental Cycle.

**4.3.2.1** Move the seat on its test fixture into the environmental chamber at  $60^\circ\text{C}$ .

**4.3.2.2 Add Form to the Seat.** Place the 5<sup>th</sup> percentile seating dummy form on the seat. Ensure that the center of the form is aligned with the centerline of the seat, and the back of the form is just touching the seat back.

**4.3.2.3 Add Weights to the Form.** Add the weights to the form as shown in Figure 2, and in the following order:

1. Place the six (6) 4.5 kg (10 lb) 205 mm (8 in) diameter weights on the rigid bar at the rear of the form.
2. Place the 13.6 kg (30 lb) sandbag across the front of the form as evenly distributed as possible.
3. Place the six (6) 4.5 kg (10 lb) 240 mm (9.5 in) diameter weights on top of the weights added in Step 1.

Once the weights have been added, confirm that the form is level in the cross-car direction with a digital inclinometer or bubble level gage. Small adjustments to the form may be made to achieve level. Once level position is achieved, do not move the seat, the weight, or the form.

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