



Seat Belts, Equipment and Adjustment

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. To determine whether a vehicle's seat belt system meets the functional operation and design requirements of:

- Federal Motor Vehicle Safety Standard Number 208 (FMVSS 208)
- Canada Motor Vehicle Safety Standard Number 208 (CMVSS 208)

1.2 Applicability. Passenger cars, trucks, buses, and multipurpose passenger vehicles equipped with seat belt systems manufactured on or after September 1, 1991. Primarily applicable to vehicles having a Gross Vehicle Weight Rating (GVWR) of 4545 kg (10 000 lb) or less. Some sections may pertain to vehicles having a Gross Vehicle Weight Rating (GVWR) more than 4545 kg (10 000 lb).

Although CMVSS 208 and FMVSS 208 requirements may apply, this specification was not written to evaluate the following (see FMVSS 208 for definitions):

- Forward Control Vehicles
- Open-Body Type Vehicles
- Vehicles Outfitted for Handicap Use

1.3 Remarks. If vehicle is equipped with air bags, see GMW14614 for equipment evaluation. Other related CMVSS 208 and FMVSS 208 requirements are found in GMW14614.

2 References

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

2.1 External Standards/Specifications.

CMVSS 208	FMVSS 208	FMVSS 210
CMVSS 209	FMVSS 209	

2.2 GM Standards/Specifications.

GMW14614

2.3 Additional References.

- GM Safety Center Safety and Regulatory Affairs Legal Requirements
- Sensor Developments, Incorporated, Orion, Michigan
- Single Control Drawing (CD) Process (ID):
(<https://share.gm.com/sites/RestraintsDesign/Shared%20Documents/Restraints%20Design%20Process/Compliance%20Drawing%20Process/Single%20CD%20Compliance%20Drawing%20Process.pptx>)
- Vehicle Owner's Manual

(ID) = This standard is limited to internal distribution within General Motors and shall not be distributed outside this company. Contact the GM Lead Engineer for further instructions.

3 Resources

3.1 Facilities.

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 Anthropomorphic Test Device (ATD)/dummy or surrogate physical model representing the following (see Table A6, Appendix A):

- 50th Percentile 6 Year Old Child (6 YO)
- 5th Percentile Adult Female (5% F)
- 50th Percentile Adult Male (50% M)
- 95th Percentile Adult Male (95% M)

Note: Each dummy must be clothed in a form-fitting cotton stretch shirt with short sleeves. Arms, head or legs are removed as appropriate for the test being run.

Note: Contact GM Safety Test Lab at Milford Proving Grounds or Global Equivalent Test Facility for dimensions of the ATDs, if required.

Note: Vehicles built on or after September 1, 1997 only the Hybrid III dummy is allowed.

3.2.2 Force gauges with 267 N (60 lbf) capacity or higher.

3.2.3 Load cell, amplifier, and readout device to measure belt pressure exerted normal to and 2.54 cm (1 in) from ATD's chest load cell equivalent to: Sensor Developments, Incorporated, Orion, Michigan (Model 90424).

3.2.4 Inboard reach string, 49 cm (19 3/8 in) long.

3.2.5 Outboard reach string, 71 cm (28.0 in) long if Hybrid III dummy is used.

3.2.6 Flexible tape measure.

3.2.7 Clearance test block, 102 mm x 203 mm x 63.5 mm (4 in x 8 in x 2.5 in) with 12.5 mm (0.5 in) radius. (See FMVSS 208 Standard)

3.2.8 Webbing tension pull device as described in Figure A5 (Appendix A).

3.2.9 Inclinator or equivalent.

3.2.10 Force gauge capable of reading outputs of 200 g (7 oz) and a 500 g (17.5 oz) dead weight for belt contact force calibration.

3.2.11 Equipment to provide pull forces as specified in 4.3.11 Child Restraint Lockability.

Note: Record instrumentation details and date of calibration on Data Sheet A1 (Appendix A), unless the information is otherwise preserved in the test facility records.

3.3 Test Vehicle/Test Piece. A vehicle or test-buck with appropriate:

- Seats
- Seat belts
- Column/wheel
- Doors
- Door trim
- Any and all other parts which may contact belts during occupant use

Note: Ensure the seat belt anchorages and H-point locations on the test vehicle are to design intent.

3.4 Test Time. The following is an estimate on the amount of time (work-hours) needed to perform this procedure.

Calendar time:	5 d
Test time:	4 h (Technician) and 8 h (Engineer)
Coordination time:	8 h

Note: Consider prep and other downtime, actual test, and analysis of data in capturing a total calendar time.

3.5 Test Required Information.

3.5.1 Available version of the vehicle Owner's Manual information.

3.5.2 Seat Back Design Angle (to position the ATD at the correct Torso Angle).

3.5.3 Seat Track Travel.

3.5.4 Seat Configuration Matrix/Options.

3.6 Personnel/Skills.

A skilled technician or an engineer can perform this test procedure. Test personnel shall have a working knowledge/privileges as follows:

- Familiarity with CMVSS 208 and FMVSS 208 seat belt test procedures and requirements
- Familiarity with the use of load cells (selection, location and calibration) for belt contact force
- Familiarity with the use of force gauges (selection and calibration) for child lockability
- A general knowledge of the product being tested

4 Procedure

4.1 Preparation. Complete vehicle and test subject identification on Data Sheet A2 (Appendix A). The Testing Engineer shall determine testing position(s) of seat for Child Restraint Lockability, CMVSS 208 and FMVSS 208 requirements apply to all positions, however engineering judgment may obtain a worst case" test position. Record the seat position used in testing.

4.2 Conditions.

4.2.1 Environmental Conditions. Not applicable.

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.

4.2.2.1 As an option, test subjects representing a 5th Percentile adult female and 95th Percentile adult male may be used to conduct latch evaluation in 4.3.

4.3 Instructions.

4.3.1 Seat belt Installation.

4.3.1.1 Determine the type of seat belt assembly installed at each designated seating position. Record the information on Data Sheet A3 (Appendix A).

4.3.1.2 Determine the type of seat belt assembly retractor installed at each designated seating position. Record the information on Data Sheet A3 (Appendix A).

4.3.1.3 Answer the questions on Data Sheet A4 (Appendix A).

4.3.2 Webbing - Tension Relieving Device (Only applies to seat belt assemblies with a tension relieving device).

4.3.2.1 Determine if the available vehicle Owner's Manual:

4.3.2.1.1 Explains how the tension relieving device works.

4.3.2.1.2 Specifies the maximum amount of slack (in centimeters/inches) recommended to be introduced into the upper torso belt under normal use conditions.

4.3.2.1.3 Warns that introducing slack beyond the amount specified by the manufacturer could significantly reduce the effectiveness of the upper torso restraint in a crash. Record the results on Data Sheet A5 (Appendix A).

4.3.2.1.4 Note: The required owner's manual content will be verified during the Regulatory Compliance Process.

4.3.2.2 Adjust seat as specified in Table A3 (Appendix A).

4.3.2.3 Place 50th Percentile adult male dummy in the seat as specified in Appendix A procedure in Section A1.

4.3.2.4 Close the adjacent door.

4.3.2.5 Place and adjust the seat belt as follows:

4.3.2.5.1 Active Belt with Tension Relieving Device. Place the belt around the test dummy and fasten the latchplate. Then introduce the maximum amount of slack into the upper torso belt that is recommended by the available Vehicle Owner's Manual.

4.3.2.5.2 Passive Belt with Tension Relieving Device. Place dummy in test vehicle and then introduce the maximum amount of slack into the upper torso belt that is recommended by the available Vehicle Owner's Manual.

4.3.2.6 Open the adjacent door (for rear seat positions open the door which is designed to allow occupant entry and egress). For an active belt system, if the webbing does not automatically retract at this time, reach in and release the latchplate.

4.3.2.7 Assess cancellation of the tension relieving device for active and passive systems.

4.3.2.8 Repeat for a total of three (3) times 4.3.2.4 through 4.3.2.7. Record the results on Data Sheet A5 (Appendix A).

4.3.2.9 Repeat 4.3.2.2 through 4.3.2.8 for each outboard seating position with tension relieving devices.

4.3.3 Belt Contact Force. (Does not apply to active or passive seat belt assemblies that have a tension-relieving device.)

4.3.3.1 Adjust the seat and anchorages as shown in Table A3 (Appendix A).

Note: If an adjustment position does not exist midway between the forward most and, rearmost positions, the closest adjustment position to the rear of the midpoint is used.

4.3.3.2 Place the 50th Percentile adult male test dummy in the seat as specified in section A1 (Appendix A). Close adjacent door. Fasten latch.

4.3.3.3 Calibrate the measurement equipment with a 200 g (7 oz) and 500 g (17.5 oz) dead weight or equivalent method.

4.3.3.4 Locate the centerline of the dummy's chest. Mark the center of the upper torso restraint webbing where it intersects this line (Figure A1, (Appendix A)). Position the load cell under this point, belt pressure is to be measured normal to and 2.54 cm (1 in) from dummy's chest (Figure A2, (Appendix A)).

4.3.3.5 From near the dummy's chest pull 30 cm (12 in) of belt webbing, or the maximum amount available, whichever is less, from the retractor and then release it, allowing the webbing to return to the dummy's chest.

4.3.3.6 Pull the webbing off the load cell and check if the zero adjustment is maintained. Adjust the zero setting if necessary.

4.3.3.7 Next, pull from near the dummy's chest, the belt webbing 7.6 cm (3 in) from the dummy's chest. Then allow the webbing to retract and gently return to the load cell. Record the force on Data Sheet A6 (Appendix A).

4.3.3.8 Repeat 4.3.3.5 through 4.3.3.7 for a total of three (3) measurements. Determine if each measured belt contact force is 3.1 N (0.7 lbf) or less. Record the results on Data Sheet A6 (Appendix A).

4.3.3.9 Repeat for each seating position equipped with a Type 2 or passive seat belt assembly.

4.3.4 Upper Torso/Lap Belt Intersection Point.

4.3.4.1 Adjust the seat and anchorage as shown in Table A4 (Appendix A).

4.3.4.2 Place the 50th Percentile adult male test dummy in the seat as specified in Appendix A.

4.3.4.3 Buckle belt system if disengaged. Mark the intersection of the upper torso belt and lap belt. Locate by using the centerlines of the belt webbing.

4.3.4.4 Measure the distance from the front vertical centerline of the dummy to the intersection of the upper torso belt and lap belt. Measure along the centerline of the lap belt. Record the distance on Data Sheet A7 (Appendix A).

4.3.4.5 Indicate if the results from 4.3.4.4 satisfy the CMVSS 208 and FMVSS 208 requirement on Data Sheet A7 (Appendix A).

4.3.4.6 Repeat 4.3.4.1 through 4.3.4.5 for each seating position with a Type 2 or passive seat belt assembly.

4.3.5 Latchplate Access (Active Systems Only). (Front out-board seating positions only).

4.3.5.1 Adjust a front outboard seat and anchorage for the 50th Percentile adult male test dummy as specified in Table A5 (Appendix A).

4.3.5.2 Position the 50th Percentile adult male test dummy as specified in Appendix A.

4.3.5.3 Define the inboard and outboard reach envelopes as outlined in Figure A3 (Appendix A).

4.3.5.4 Place latchplate in normal stowed position. Assess if the outboard latchplate is within the outboard reach envelope of either the outboard arm or inboard arm. Record the findings on Data Sheet A8 (Appendix A).

4.3.5.5 Remove test dummy from seating position.

4.3.5.6 Tester shall sit in outboard seating position. Close adjacent door.

4.3.5.7 Grasp the clearance test block. Using one continuous movement, try to place it between the seat and vehicle interior in the direction of the latchplate. (Figure A4, Appendix A.)

4.3.5.8 Determine if the test block can touch the latchplate or buckle with "unhindered transit," (see CMVSS 208 and FMVSS 208). Record the results on Data Sheet A8 (Appendix A). Consult GM Safety Regulations and Certification group if interpretation of "unhindered transit" is needed.

4.3.5.9 Repeat 4.3.5.6 through 4.3.5.8 for the other front outboard seating position. Attachment point for outboard reach string will be in symmetric location on left hand side of torso in Figure A3 (Appendix A).

4.3.6 Retraction (Active Systems Only).

4.3.6.1 Adjust driver's seat as specified previously in Table A3.

4.3.6.2 Place 50th Percentile adult male dummy, with arms removed, in the driver's seat as specified in Appendix A. Do not compensate for arm weight.

4.3.6.3 Close the adjacent door.

4.3.6.4 Place and adjust the seat belt as specified in 4.3.6.4.1 through 4.3.6.4.2.

4.3.6.4.1 Active Seat Belt. Place the belt around the test dummy and fasten the latchplate. Adjust the belt as specified in the available Vehicle Owner's Manual.

4.3.6.4.2 Active Belt with Tension Relieving Device. Place the belt around the test dummy and fasten the latchplate. Then introduce the maximum amount of slack into the upper torso belt that is recommended by the available Vehicle Owner's Manual.

4.3.6.5 Release the latchplate. Open the adjacent door. Outboard armrests may be placed in their stowed positions if the armrests must be in this position to allow an occupant to exit the vehicle.

4.3.6.6 Assess if the torso and lap belt webbing automatically retract to a normal stowed position. Record the results on Data Sheet A9 (Appendix A).

4.3.6.7 Close the adjacent door.

4.3.6.8 Assess if the webbing or any hardware is pinched by closing the door. Record the results on Data Sheet A9 (Appendix A).

4.3.6.9 Repeat 4.3.6.3 through 4.3.6.8 for a total of three (3) times.

4.3.6.10 Repeat 4.3.6.1 through 4.3.6.9 for the other front outboard seating position.

4.3.7 Seat Belt Adjustment.

Note: The Single Control Drawing (CD) Process is an acceptable alternate method for demonstrating compliance to this section (4.3.7.1 through 4.3.7.7).

4.3.7.1 Conduct 4.3.7.2 through 4.3.7.4 for each seat/dummy/belt combination shown in Table A1 (Appendix A).

4.3.7.2 Position the test dummy as specified in Appendix A.

4.3.7.3 Adjust the seat for the dummy being used as shown in Table A2 (Appendix A). With the dummy and seat adjusted appropriately, place and adjust the seat belt as specified in 4.3.7.3.1 through 4.3.7.3.1:

4.3.7.3.1 Active Seat Belt. Place the belt around the test dummy and fasten the latchplate. Adjust the belt as specified in the available Vehicle Owner's Manual.

4.3.7.3.2 Active Belt with Tension Relieving Device. Place the belt around the test dummy and fasten the latchplate. Then introduce the maximum amount of slack into the upper torso belt that is recommended by the available Vehicle Owner's Manual.

4.3.7.3.3 Passive Seat Belt. Same as 4.3.7.3.1 and 4.3.7.3.2, except belt is already buckled.

4.3.7.4 Assess if there is sufficient webbing to place and fasten the seat belt around the dummy. Measure the length of webbing remaining on the retractor spool, if applicable. Record the results on Data Sheet A10 (Appendix A).

4.3.7.5 Measure the amount of webbing remaining on the spool after the seat belt is fastened around the dummy per all of the test positions outlined in Table A7. Record the results on Data Sheet A11 (Appendix A).

4.3.7.6 Fasten the seat belt over an unoccupied seat. Adjust the seat to the full rear and full down position. Adjustable anchorages are to be positioned in their lowest setting. These adjustments are to ensure that the maximum amount of webbing is on the spool. With the seat belt fastened, extract all webbing off of the spool to engage the Automatic Locking Retractor (ALR) mechanism. Allow the webbing to fully retract, but remain fastened. Apply a force of 20 N in the direction of retraction to remove slack from the system. Assess if the ALR mechanism remains engaged when the seat belt is fully retracted. Record the results on Data Sheet A11 (Appendix A).

4.3.7.7 Release the fastened seat belt from 4.3.7.6, and allow the webbing to slowly retract until such time the ALR mechanism deactivates. Measure the amount of webbing on the spool at the point which the ALR mechanism deactivates. Record the results on Data Sheet A11 (Appendix A).

4.3.8 Latch Mechanism or Buckle (Active Systems Only).

4.3.8.1 Cycle the driver's seat with the seat belt unlatched. In the following sequence of movements (this is not required for non-adjustable seats, i.e., some rear seats);

- a. Seat full rear, lowest position.
- b. Seat back folded as far forward as possible.
- c. Seat full forward, front down, rear up.
- d. Seatback to nominal design position.

4.3.8.2 Have a test subject (or equivalent) representing a 5th Percentile adult female sit in the seat.

4.3.8.3 Adjust the seat and anchorages as specified in Table A2.

4.3.8.4 Assess if the test subject (or equivalent) is able to grasp the latchplate in order to fasten the belt. Assess if the buckle becomes lodged between the seat cushions. Record the results on Data Sheet A12 (Appendix A).

4.3.8.5 Have the test subject (or equivalent) place and adjust the seat belt as specified in 4.3.8.5.1 or 4.3.8.5.2.

4.3.8.5.1 Active Seat Belt. Have subject (or equivalent) place the belt around their body and fasten the latchplate. Adjust the belt as specified in the available Vehicle Owner's Manual.

4.3.8.5.2 Active Belt with Tension Relieving Device. Have subject (or equivalent) place the belt around their body and fasten the latchplate. Then introduce the maximum amount of slack into the upper torso belt that is recommended by the available Vehicle Owner's Manual.

4.3.8.6 Release the seat belt. Assess if the test subject (or equivalent) can obtain access to the buckle in order to release the belt system. Record the information on Data Sheet A12 (Appendix A).

4.3.8.7 Determine if the seat belt releases at a single point by a push-button action. Record the results on Data Sheet A12 (Appendix A).

4.3.8.8 Determine if, on all Type 2 seat belt assemblies, both the upper torso restraint and pelvic restraint release simultaneously. Record the results on Data Sheet A12 (Appendix A).

4.3.8.9 Repeat 4.3.8.1 through 4.3.8.8 for each designated seating position.

4.3.8.10 Repeat 4.3.8.1 through 4.3.8.9 with a test subject (or equivalent) representing a 95th Percentile adult male.

4.3.9 Seat Belt Guides and Hardware (Active Systems Only). This applies only to seat belt assemblies whose webbing is designed to pass through the seat cushion or between the seat cushion and seat back. For seats which are excluded, refer to FMVSS 208 Section 7.

4.3.9.1 No test subject or test dummy is required for this portion of the test.

4.3.9.2 Completely retract the belt, or if the belt is non-retractable, unlatch the belt and cycle the seat in the following sequence of movements. (This is not required for non-adjustable seats, i.e., some rear seats.)

- a. Seat full rear, lowest position.
- b. Seatback folded as far forward as possible.

c. Seat full forward, front down rear up.

d. Seat back to nominal design position.

4.3.9.3 Determine at least one of the following components (buckle, latchplate or webbing) remains on top of, or above, the seat cushion. In addition, assess if the other two (2) components are accessible to a seated occupant. Record the results on Data Sheet A13 (Appendix A).

4.3.9.4 If the buckle and latchplate passes through any guides provided for maintaining seat belt components on top of, or above, the seat cushion, determine if the buckle and latchplate fell behind the seat. Record the results on Data Sheet A14 (Appendix A).

4.3.9.5 Repeat 4.3.9.2 through 4.3.9.4 for all applicable seats.

4.3.10 Convenience Hooks (Passive Systems Only). Record the results on Data Sheet A15 (Appendix A).

4.3.10.1 Determine if the vehicle has any manual convenience hooks or other device that is provided to stow seat belt webbing to facilitate entering and exiting the vehicle.

4.3.10.2 Does the hook automatically release the webbing and remain in the released mode for as long as (a) exists simultaneously with (b) or (a) exists simultaneously with (c)?

a. The vehicle ignition switch is moved to the "on" or "start" position.

b. The vehicle's drive-train is engaged.

c. In the case of manual transmission vehicles, the vehicle's parking brake is in the released mode (not engaged).

4.3.11 Child Restraint Lockability. See FMVSS 208 Section 7 for applicability and exclusions. This test is performed on the vehicle seat belt system only. It does not apply to or require any separate child/infant seat.

4.3.11.1 Webbing Pull Test.

4.3.11.1.1 Set the seat to any adjustment position and buckle the seat belt assembly.

4.3.11.1.2 Locate and mark a reference point as A on the seat belt latchplate. Locate and mark a reference point as B on the attachment hardware or retractor assembly at the other end of the lap belt portion of the belt assembly. See Figure A6, (Appendix A).

4.3.11.1.3 Adjust the lap belt portion of the belt assembly so that the webbing between point A and B is at a maximum. Measure the length of webbing, along its longitudinal centerline, between points A and B. Record the length on Data Sheet A16 (Appendix A) as measurement; maximum A to B.

4.3.11.1.4 Readjust the belt system so that the length of webbing between points A and B is at least 12.7 cm (5 in) shorter than the measurement; maximum A to B, see 4.3.11.1.3.

4.3.11.1.5 Activate any locking feature for the seat belt assembly using procedures recommended in the available Vehicle Owner's Manual, if required.

4.3.11.1.6 Attach the webbing tension pull device (see 3.2.8) to the lap belt or lap belt portion of the seat belt assembly.

4.3.11.1.7 Apply a pre-load of 45 N (10 lbf) using the webbing tension pull device and force gage. Apply pre-load in a vertical plane parallel to the longitudinal axis of the vehicle and passing through the seating reference point of the seat. Apply the pre-load toward the front of the vehicle at an angle not < 5 degrees and no more than 15 degrees above the horizon.

4.3.11.1.8 Measure the length of webbing between points A and B with the pre-load applied. Take measurements along the longitudinal centerline of the webbing. Record this measurement on Data Sheet A16 (Appendix A) as 45 N (10 lbf) A to B.

4.3.11.1.9 From the 45 N (10 lbf) pre-load continue to apply load to 222 N (50 lbf) using the webbing tension pull device. The onset rate shall be no more than 222 N/s (50 lbf/s). In addition, the load shall be attained in not more than 5 s. Maintain the load for at least 5 s and hold through measurement in 4.3.11.1.10. The webbing tension pull device's location and load direction are the same as that used in the pre-load.

Note: For webbing sensitive emergency locking retractors installed as part of the lap belt assembly or the lap belt portion of the seat belt assembly only, apply the load at a rate less than the threshold value for lock-up.

4.3.11.1.10 With the 222 N (50 lbf) load still applied, measure the length of belt between points A and B. Take measurements along the longitudinal centerline of the webbing. Record measurements on

Data Sheet A16 (Appendix A) as 222 N (50 lbf) A to B. Calculate and record on data sheets the differences between the recorded values.

4.3.11.1.11 Repeat 4.3.11.1.1 through 4.3.11.1.10 for each designated seating position not subject to exclusions.

4.3.11.2 Other Evaluations. (Data Sheet A17, Appendix A).

4.3.11.2.1 Attached Devices and Webbing Deformation. Review the means to lock the lap belt portion of the seat belt system and answer the questions on the data sheet.

4.3.11.2.2 Vehicle Owner's Manual Information. Obtain the available version of the vehicle Owner's Manual and answer the questions on the data sheet.

4.3.12 Adjustability of Type 2 Seat Belt Assemblies. (Vehicles built September 1, 1997 or after).

Note: The Single Control Drawing (CD) Process is an acceptable alternate method for demonstrating compliance to this 4.3.12.

Select Alternative: 1 or 2.

4.3.12.1 Alternative 1: Movable Component Systems. This section (4.3.12.1) applies to applicable Type 2 belt systems when:

- The upper anchorage or
- The lower anchorage nearest the intersection of the torso belt and the lap belt includes a movable component which has a minimum of two adjustment positions

Do the following for each applicable seating position:

4.3.12.1.1 Measure, for each applicable seating position, the linear distance between the geometric centers of the movable component at the two extreme adjustment positions. Record the measurement on Data Sheet A18 (Appendix A) and document if this measurement is 5 cm or greater.

4.3.12.1.2 If the movable component must be manually adjusted between positions record on Data Sheet A18 (Appendix A) if information is provided in the available vehicle Owner's Manual that:

- Explains how to adjust the seat belt and
- Warns that misadjustment could reduce the effectiveness of the seat belt in a crash

4.3.12.2 Alternative 2, Automatic Moving of Webbing. This section (4.3.12.2) applies if the applicable Type 2 belt system(s) provides a means of automatically moving (usually by action of moving the seat) the webbing in relation to either:

- The upper anchorage or
- The lower anchorage nearest the intersection of the torso belt and the lap belt

Note: This can be accomplished by semi-integrated seat belt assembly designs that have a:

- Shoulder anchorage on the seat, or
- Shoulder belt guide loop or
- Through-the-seat routing

That is considered an anchorage that meets the requirements of FMVSS 210 and moves (usually by action of moving the seat) at least 5 cm linearly.

Do the following for each applicable seating position:

4.3.12.2.1 Locate the midpoint of the webbing at the contact point of the webbing in one extreme adjustment position (usually by moving the seat).

4.3.12.2.2 Locate the midpoint of the webbing at the contact point of the webbing in the other extreme adjustment position (usually by moving the seat).

4.3.12.2.3 Measure the linear distance between the two midpoints.

4.3.12.2.4 Record measurement on Data Sheet A18 (Appendix A) and document if this measurement is 5 cm or greater.

5 Data

5.1 Calculations. Not applicable.

5.2 Interpretation of Results. Reference the Vehicle or Subsystem Technical Specifications.

5.3 Test Documentation. See Data Sheets A1 through A18 in Appendix A.

6 Safety

This Engineering Standard may involve safety requirements for hazardous materials, the method of operations and equipment. This standard does not propose to address all the safety issues associated with its use. It is the responsibility of the user of this standard to ensure compliance with all appropriate safety and health practices. This would include any specific training that may be required. The safety and health standards include site specific rules and procedures, company rules and procedures, and Government Standards. Contact shall be made with the appropriate site Safety and Health personnel for further direction and guidance in these matters.

7 Notes

7.1 Glossary.

Active Seat Belt Assembly: A seat belt assembly requiring action by vehicle occupants to be in use.

Automatic Locking Retractor: A retractor with a positive self-locking mechanism.

Bucket Seat: A seat which may be individually adjustable and/or styled and trimmed to give the appearance of a single occupant seat so that, by all reasonable and proper determination, the seat would be perceived as accommodating not more than a single occupant.

Buckle: A quick-release connector which fastens a person in a seat belt assembly.

Dual-Mode Retractor: A retractor that can be changed from emergency locking to automatic locking after the webbing is pulled out or by some other method.

Latchplate: Hardware which connects the belt assembly buckle to the belt assembly webbing.

Passive Seat belt Assembly: This is also referred to as an Automatic Seat belt Assembly. (A seat belt assembly that requires no forced action by vehicle occupants to be in use), for example, one with retractors located in the door so that seat belts are automatically in position when occupant enters and closes the door. **Note:** A passive system may have a design feature that allows occupants to unlatch portions of the belts in emergency situations and still be called a passive system.

Tension Relief Device: A device which allows the occupant to put a desired amount of slack into the shoulder belt.

Type 1 Seat belt Assembly: An active lap belt for pelvic restraint.

Type 2 Seat belt Assembly: A combination of lap (pelvic) and shoulder (upper torso) active restraints.

Type 2A Seat Belt Assembly: Type 2a shoulder belt is an upper torso restraint for use only in conjunction with a lap belt as a Type 2 seat belt assembly.

7.2 Acronyms, Abbreviations, and Symbols.

5% F	5 th Percentile Adult Female
50% M	50 th Percentile Adult Male
6YO	50 th Percentile 6 Year Old Child
95% M	95 th Percentile Adult Male
ALR	Automatic Locking Retractor
ATD	Anthropomorphic Test Device
CD	Control Drawing
DMR	Dual-Mode Retractor
E	Emergency Locking Retractor on Data Sheets
ELR	Emergency Locking Retractor
g	Gram
GVR	Gross Vehicle Weight Rating
lb	Pound of Mass
lbf	Pound of Force
M	Manual Adjusting Device
N	Newton

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Documents
Document Sharing Hub

N/A	Not Applicable
oz	Ounce
s	Second
Type 1	Lap Belt Only
Type 2	Lap-Shoulder Belt Only

8 Coding System

This standard shall be referenced in other documents, drawings, etc., as follows:

Test to GMW14617

9 Release and Revisions

This standard was originated in October 2005. It was first approved by the Global Safety Belt Team in March 2006. It was first published in October 2006.

Issue	Publication Date	Description (Organization)
1	OCT 2006	Initial publication.
2	DEC 2012	5 year refresh. (Interiors -Airbags/Steering Wheels/Safety Belts)
3	JAN 2018	5 year refresh. Removed Figure A3 (Dummy Hybrid II), Rewrote and reordered procedure, Tables, Sections, Figures and Data Sheets for the benefit of the user. (Interior - Safety, Lighting, Decorative Trim, Labels/Literature/VIN)

Appendix A

Table A1: Seat Belt/ATD (Dummy) Combinations

Seat Row 1		Driver	Front Center Passenger	Front Right Passenger	
	Lap Shoulder	5% F, 95% M 5% F, 95% M	6YO, 95% M 5% F, 95% M	6YO, 95% M 5% F, 95% M	
Seat Row 2 to 5		Left Passenger	Center Passenger	Right Passenger	Optional Seat
	Lap Shoulder	5% F, 95% M 5% F, 95% M	6YO, 95% M 5% F, 95% M	6YO, 95% M 5% F, 95% M	6YO, 95% M 5% F, 95% M

Note Key: 6YO = 50th Percentile 6 Year Old Child, F = Female, M = Male

Table A2: Adjustments (Seat Belt, Latch Mechanism, Buckle (Active Systems))

	Seat Travel ^{Note 1}	Seat Height	Seat Back	Lumbar
6YO	Full Rear	Lowest Position	Nominal Design Position	Lowest Position
5% F	Full Rear	Lowest Position	Nominal Design Position	Lowest Position
95% M	Full Forward	Front Down, Right Rear Up	Nominal Design Position	Highest Position
	Adjustable Anchorages	Head Restraint	Tilt Wheel	Telescopic Column
6YO	Lowest Position	Lowest Position	N/A	N/A
5% F	Lowest Position	Lowest Position	Mid-Position	Lowest Position
95% M	Highest Position	Highest Position	Mid-Position	Lowest Position

Note 1: These settings are selected to account for extreme ranges of belt extraction and are not the most likely position, i.e., 5% F at full rear instead of full forward.

Note Key: 6YO = 50th Percentile 6 Year Old Child, F = Female, M = Male

N/A Not applicable.

Table A3: Adjustments (Belt Contact Force, Retraction, Web Tension Relieving Devices)

Head Restraint	Adjustable Anchorages	Seat Travel	Seat Height	Seat Back	Lumbar
Highest Position	Nominal Design Position for 50 th Percentile Male	Mid-Position	Lowest Position	Nominal Design Position for 50 th Percentile Male	Lowest Position

Table A4: Adjustments (Upper Torso/Lap Belt Intersection Point)

Head Restraint	Adjustable Anchorages	Seat Travel	Seat Height	Seat Back	Lumbar
Highest Position	Nominal Design Position for 50 th Percentile Male or Worst Case Position(s) Per Test Engineer	Full Rearward Note 1	Lowest Position	Nominal Design Position for 50 th Percentile Male	Lowest Position

Note 1: Directly specified in CMVSS 208 and FMVSS 208.

Table A5: Adjustments (Latchplate Access)

Head Restraint	Adjustable Anchorages	Seat Travel	Seat Height	Seat Back	Lumbar
Highest Position	Nominal Design Position for 50 th Percentile Male or Worst Case Position(s) Per Test Engineer	Full Forward Note 1	Lowest Position or Worst Case Position(s) per Test Engineer	Nominal Design Position for 50 th Percentile Male	Lowest Position

Note 1: Directly specified in CMVSS 208 and FMVSS 208.

Table A6: Occupant Reference Measurements

	50 th Percentile 6 Year Old Child	5 th Percentile Adult Female	50 th Percentile Adult Male	95 th Percentile Adult Male
Weight	21.5 kg (47.3 lb)	46.3 kg (102 lb)	(74.4 ± 1.4) kg (164 ± 3 lb)	97.5 kg (215 lb)
Erect Sitting Height	645 mm (25.4 in)	785 mm (30.9 in)	(907 ± 3) mm (35.7 ± 0.1 in)	965 mm (38 in)
Hip Breath (sitting)	214 mm (8.4 in)	325 mm (12.8 in)	(373 ± 18) mm (14.7 ± 0.7 in)	419 mm (16.5 in)
Hip Circumference (sitting)	607 mm (23.9 in)	925 mm (36.4 in)	1067 mm (42.0 in)	1199 mm (47.2 in)
Waist Circumference (sitting)	528 mm (20.8 in)	599 mm (23.6 in)	(812 ± 15) mm (32.0 ± 0.6 in)	1080 mm (42.5 in)
Chest Depth	-	190 mm (7.5 in)	(236 ± 5) mm (9.3 ± 0.2 in)	267 mm (10.5 in)
Chest Circumference:	-	-	-	-
Nipple	-	775 mm (30.5 in)	-	-
Upper	-	757 mm (29.8 in)	(950 ± 15) mm (37.4 ± 0.6 in)	1130 mm (44.5 in)
Lower	-	676 mm (26.6 in)	-	-

Table A7: Seat Belt/ATD (Dummy) Combinations for Data Sheet A11

ATD	Seat Lap Belt Anchorage Locations	Seat Position	Seat Height	Seat Back	AGL
N/A	Fully Stowed (Seat mounted Lap PT)	Full Forward Mid Full Rear	Full Up Mid Full Down	N/A	Full Up Mid Full Down
N/A	Fully Stowed (Rocker Mounted)	N/A	N/A	N/A	Full Up Mid Full Down
5th Percentile Female	N/A	Full Forward	Full Up	Nominal Design Position	Full Up
	N/A	Mid	Mid	Nominal Design Position	Full Up
	N/A	Full Rear	Full Down	Nominal Design Position	Full Up
50th Percentile Male	N/A	Full Forward	Full Up	Nominal Design Position for 50th Percentile Male	Nominal Design Position for 50th Percentile Male
	N/A	Mid	Mid	Nominal Design Position for 50th Percentile Male	Nominal Design Position for 50th Percentile Male
	N/A	Full Rear	Full Down	Nominal Design Position for 50th Percentile Male	Nominal Design Position for 50th Percentile Male
	N/A	Mid ^{Note 1}	Lowest ^{Note 1}	Nominal Design Position for 50th Percentile Male ^{Note 1}	Nominal Design Position for 50th Percentile Male ^{Note 1}
95th Percentile Male	N/A	Full Forward	Full Up	Nominal Design Position	Full Down
	N/A	Mid	Mid	Nominal Design Position	Full Down
	N/A	Full Rear	Full Down	Nominal Design Position	Full Down

Note 1: 50th Percentile Male ATD in this seating configuration supports CMVSS 209 and FMVSS 209 stowed webbing guidelines.

A1 Test Dummy Positioning Procedure

A1.1 Front Seating.

A1.1.1 Bucket Seats. Place test device torso against seat back. Center dummy on seat cushion of bucket seat with its midsagittal plane vertical and longitudinal. Settle the test dummy as described in A2 following (Test Dummy Settling), following.

A1.1.2 Bench Seats. Any bench seat with hip room larger than 1050 mm (41.3 in) is to be considered a three passenger, unless:

- The center of the seat cushion is occupied by components such as seat separators (consoles, storage compartments, etc.), parking brake levers, and non-folding armrests
- A space is provided in the seat cushion from which the padding has been removed and which is designated by trim and depth to appear as two seat cushions to deter accommodation of three passengers

A1.1.3 Driver Position Placement. Place dummy so that its midsagittal plane is vertical and longitudinal and passes through the center point of the plane described by the steering wheel rim. Place test dummy torso against seat back. Settle the rest dummy as described in A2 following (Test Dummy Settling), following.

A1.1.4 Front Passenger Position Placement. Place dummy so that the midsagittal plane of the dummy is vertical, longitudinal, and at the same distance from longitudinal centerline as midsagittal plane of dummy at the driver's position. Place test dummy torso against seat back. Settle dummy as described in A2 following (Test Dummy Settling), following.

A1.1.5 Center Front Passenger Position Placement. Place dummy so that its midsagittal plane is vertical and longitudinal, and passes through the center point of the plane described by the occupant H-point.

A1.2 Rear Seating.

A1.2.1 Center Rear Position Placement. Place dummy as specified in Center Front Passenger Position Placement.

A1.2.2 Right and Left Rear Passenger Position Placement. Place dummy as specified in Right and Left Rear Passenger Position Placement.

A2 Test Dummy Settling

A2.1 Hybrid III Dummy.

A2.1.1 Test Dummy Vertical Upward Displacement. Slowly lift the test dummy parallel to seat back plane until the test dummy's buttocks no longer contact the seat cushion or until there is no test dummy contact with the vehicle's roof.

A2.1.2 Lower Torso Force Application. Apply a rearward force of 222 N (50 lbf) against the center of the test dummy's lower torso in a horizontal direction. The line of force application shall be 16.5 cm (6.5 in) above the bottom surface of the test dummy's buttocks. Remove lifting force.

A2.1.3 Test Dummy Vertical Downward Displacement. Remove as much of the 222 N (50 lbf) force as necessary to allow the test dummy to return downward to the seat cushion by its own weight. Remove horizontal force.

A2.1.4 Test Dummy Upper Torso Rocking. Apply a (45 to 67) N (10 to 15) lbf horizontal rearward force to the test dummy's lower torso. Then apply a horizontal forward force to the test dummy's shoulders sufficient to flex the upper torso forward until its back no longer contacts the seat back. Rock the test dummy from side to side three or four times so that the test dummy's spine is at any angle from the vertical in the (14 to 16) degree range at the extremes of each rocking movement.

A2.1.5 Test Dummy Upper Torso Force Application. While maintaining the (45 to 67) N (10 to 15) lbf horizontal rearward force applied in A2.1.4, and with the test dummy's midsagittal plane vertical, push the upper torso back against the seat back with a force of so pounds applied in a horizontal rearward direction along a line that is coincident with the test dummy's midsagittal plane and 46.0 cm (18 in) above the bottom surface of the test dummy's buttocks. Slowly remove all forces.