



Safety Belt Assembly Anchorage

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 safety belt assembly anchorages meet the requirements of:

- FMVSS 210
- CMVSS 210
- KMVSS Article 103
- UN R14

1.2 Applicability. For all passenger cars, multipurpose passenger vehicles, and light/medium trucks except for side facing seats.

1.3 Remarks. Demonstration of compliance with FMVSS 207, CMVSS 207, KMVSS Article 103 and UN R14 "Anchorage of Seats", when the safety belt assembly is attached to the seat structure or shares a common body anchorage with the seats, requires that the safety belt anchorage loads be applied simultaneously with the forces imposed on the seat.

2 References

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

2.1 External Standards/Specifications.

ADR 05/02	FMVSS 207	KMVSS Article 97	UN R14
CMVSS 207	FMVSS 209	KMVSS Article 103	UN R94
CMVSS 210	FMVSS 210	SAE J384	

2.2 GM Standards/Specifications.

GMW14601

2.3 Additional References.

- Subsystem Technical Specifications (SSTS)

3 Resources

3.1 Facilities. The safety belt assembly anchorage pull test requires facilities having the test equipment described in 3.2 appropriate for the test(s) being run. The Body Test Lab at the Warren Technical Center is an example of such a facility.

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.

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3.2.1 Servo-hydraulic loading apparatus capable of applying, maintaining, and proportioning the required loads to the system of body blocks for any seat position. Suitable load cells and instrumentation for measuring and recording loads applied to each body block. Additionally, load cells may be placed on the webbing so as to record belt tensile loads during test.

3.2.2 Body Test Blocks. Utilize pelvic and upper torso body blocks as described in FMVSS 210. Refer to SAE J384 "Motor Vehicle Safety Belt Anchorage Test Procedure".

Note: Per FMVSS 210, a 254 mm (10 in) wide pelvic block may be substituted at the center set of anchorages for any group of three (3) or more sets of anchorages that must be simultaneously tested per FMVSS 210 (see FMVSS 210 S4.2.4).

3.2.3 Instrumentation. All equipment must be calibrated as required and the information must be preserved in the laboratory records.

3.3 Test Vehicle/Test Piece.

3.3.1 Test Vehicle. A vehicle body or suitable partial body may be used for an anchorage pull test. When using a partial body for pull testing, be certain it is of sufficient size and structure to contain all areas of potential failure modes as well as capability to maintain the load path. The test body should represent production-intent anchorages, anchorage locations, welding, and hardware.

3.3.2 Test Piece.

3.3.2.1 Safety Belt Hardware Geometry. Test using Original Equipment Manufacturer (OEM) safety belt system geometry, including attaching locations, and points of integration (buckle junctions) to ensure proper distribution of loading between the torso and pelvic anchorages and their associated hardware.

3.3.2.2 Safety Belt Hardware. Safety belt hardware is specified in Figure 1 and Figure 2. Test using "production intent" safety belt hardware i.e., retractor, guide loops, webbing, inboard belts, attaching fasteners, etc.

Note: Substitution of a "high strength development buckle" is permissible as unrepresentative bending loads may be applied to the inboard buckle where it bears on the pelvic test block (see details below).

Note: The term "attachment hardware" is defined in FMVSS 209, (see FMVSS 209 S3) as "any or all hardware designed for securing the webbing of a safety belt assembly to a motor vehicle".

3.3.2.3 High Strength Development Buckle. Due to the interaction of the buckle/latch assembly with the test block and lack of pliability of the buckle, when using strap mount buckles, it is desired to use a development or test buckle in its place. This can be accomplished in two ways:

3.3.2.3.1 Remove the buckle cover and attach the development buckle flange to the buckle base by welding the flange to the base and/or inserting a 10 mm bolt through the flange and buckle base (See Figure 1).

3.3.2.3.2 Remove the buckle base from the strap and attach the development buckle directly to the strap (See Figure 2).

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Figure 1: High Strength Development Buckle (Option 1)

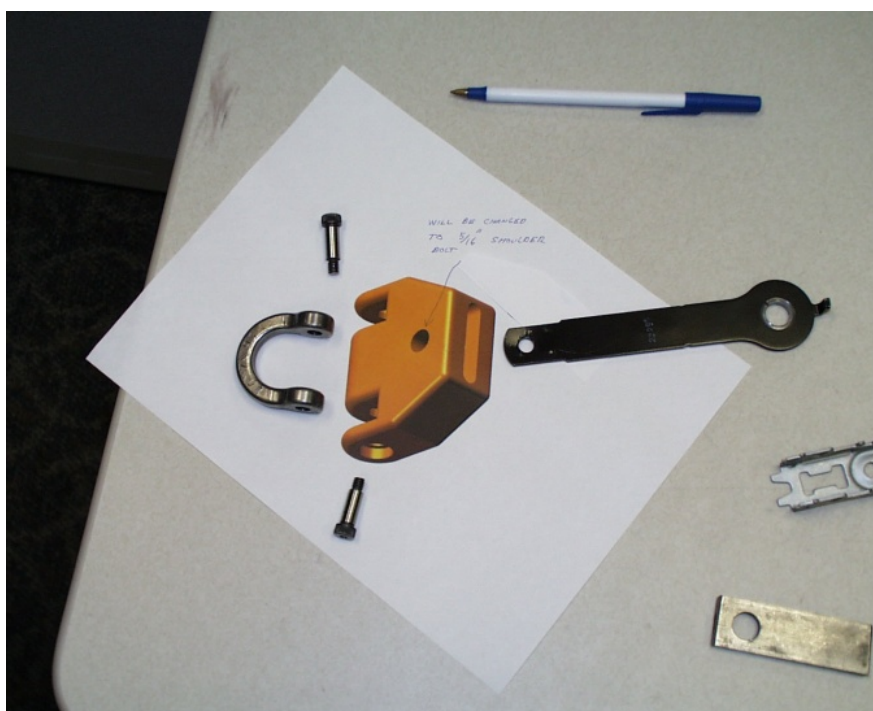


Figure 2: High Strength Development Buckle (Option 2)

3.4 Test Time.

Calendar time: 2 to 3 days

Test hours: < 1 hour

Coordination hours: 2 days

3.5 Test Required Information. Not applicable.

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3.6 Personnel/Skills. The following people are necessary to perform this test procedure:

3.6.1 Test Engineer, Test Technician.

3.6.2 GM Safety Belt Design Engineer.

3.6.3 GM Validation Engineer.

3.6.4 GM Seat Design Engineer (as required).

3.6.5 Photographer (as required).

4 Procedure

4.1 Preparation.

4.1.1 Attach the test body or partial body to its frame (if applicable) by the design mounting provisions. Securely mount the body or body frame assembly to a suitable holding fixture in such a manner so as to not influence or restrict local body distortion under test loads. Use the following guide to secure the Body for Body Frame Integral construction for all loads in fore/aft direction:

a. Front:

1. Use Rear bolt locations of the Engine Cradle (Left and Right).

b. Rear:

1. If the rear suspension has a cradle, use the front cradle bolt locations (Left and Right).
2. If the rear suspension has a trailing arm, use the bolt locations of the arm (Left and Right).

In addition to (b1) or (b2) also secure the rear shock tower locations for forward pulls or the front shock tower locations for rearward pulls. If the rear shock tower locations cannot be secured then the end of the body rails can be used. Consult with Computer Aided Engineering (CAE) personnel on body mounting locations. See example photos (Figure B1 thru Figure B3) in Appendix B. Install seats or simulations of seats in their design intent position where their presence affects belt positioning, routing, or distribution of loads.

4.1.2 Place pelvic and upper torso body blocks at each designated seating position. Only the pelvic block is required with a Type 1 safety belt assembly (i.e., center seat position in a front row of seats). Utilize safety belt hardware as specified in 3.3.2.2 of this procedure to restrain the body blocks. The safety belts should be positioned on the test blocks so as to duplicate design intent routing. If the seat is adjustable, place it in its rearmost and lowest position (for non-belt to seat configurations).

4.2 Conditions.

4.2.1 Environmental Conditions. Standard test lab conditions.

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 FMVSS 210 and CMVSS 210.

4.3.1.1 The following section describes the testing procedures for various seating configurations. All passengers in a row of seating positions will be tested simultaneously.

4.3.1.1.1 Shoulder and Lap (Type 2). Simultaneously apply 13 345 N to the pelvic and torso blocks at the seating positions with the Type 2 Belt Assemblies (see Figure 2).

4.3.1.1.2 Lap (Type 1). Apply 22 241 N to the pelvic block at the seating positions with Type 1 Belt Assemblies (see Figure 1).

Note: FMVSS 207 and CMVSS 207 tests for a belt to seat configuration require FMVSS 210 and CMVSS 210 loads to be applied simultaneously. Refer to GMW14601, "Anchorage of Seats", for proper seat test position(s). Tests may be required in full-up and full-down positions.

4.3.1.2 Loading Information.

4.3.1.2.1 Type 1 Safety Belt Assemblies of the procedure must withstand 22 242 N applied:

- a. With the seat in the rearmost and lowest position.
- b. In the direction which the seat faces.

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