



Pin Connector – Shoulder Belt Durability and Performance

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. This procedure is to evaluate the performance of a shoulder belt pin connector, engagement and disengagement efforts, durability and ultimate strength. Each belt assembly shall be subjected to the entire test sequence.

1.2 Applicability. To all safety belt assemblies where a shoulder belt may be detached from the lap belt via a pin connector (i.e., FMVSS 209 type 2a belt).

1.3 Remarks. Not applicable.

2 References

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

2.1 External Standards/Specifications.

FMVSS 209

2.2 GM Standards/Specifications.

GMW14302

GMW14303

GMW14831

2.3 Additional References.

- American National Standard for Calibration, Calibration Laboratories and Measuring and Test Equipment – General Requirements

3 Resources

3.1 Facilities. GM certified test lab.

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. Equipment or equivalent is required.

3.2.1 Pin connectors, latch plates and buckles to be tested.

3.2.2 Force gauge, 50 N to 100 N capacity.

3.2.3 Test fixture to cycle the latch plate and pin connector.

3.2.4 Tensile test machine.

Note: All equipment must be calibrated in accordance with American National Standard for Calibration, Calibration Laboratories and Measuring and Test Equipment – General Requirements.

3.3 Test Vehicle/Test Piece. See 3.2.1.

3.4 Test Time. Time for setup and test as required.

3.5 Test Required Information. Record test data.

3.6 Personnel/Skills. Test technician/test engineer.

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November 2015

Page 1 of 3

4 Procedure

4.1 Preparation. See GMW14831.

4.2 Conditions. See GMW14831.

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.

4.3 Instructions.

4.3.1 Effort Measurements.

4.3.1.1 Pre-cycle the pin connector of each belt assembly by connecting and removing the shoulder belt plate ten (10) times.

4.3.1.2 Clamp the plate with the pin in a vise or appropriate holding fixture such that the pin is accessible.

4.3.1.3 Position the keyhole of the latch plate on the pin in the "loose position".

4.3.1.4 Using a force gauge, measure the minimum force required to push the latch plate into the "engaged position" of the key hole.

4.3.1.5 Using a force gauge, measure the minimum force required to push the latch plate out to the "loose position" of the keyhole.

4.3.2 Environmental Exposure.

4.3.2.1 Expose the latch plates and pin connectors to requirements per 4.3.2.1.1 thru 4.3.2.1.3.

4.3.2.1.1 Corrosion requirements per FMVSS 209 S 5.2 (a), Hardware – Corrosion Resistance.

4.3.2.1.2 Procedure GMW14302, Belt Assembly – Temperature Operation.

4.3.2.1.3 Procedure GMW14303, Belt Assembly – Dust Exposure.

4.3.2.2 Measure the engagement and disengagement efforts per 4.3.1.

4.3.3 Durability.

4.3.3.1 Secure the pin connector and latch plate to the cycling fixture.

4.3.3.2 Cycle the pin connector and latch plate for the specified number of cycles. A cycle shall consist of the pin moving from the loose position to the engaged position and out to the loose position.

4.3.3.3 Measure the engagement and disengagement efforts per 4.3.1.

4.3.4 Ultimate Strength.

4.3.4.1 Install the webbing grips to the upper and lower plate of the tensile test machine.

4.3.4.2 Connect the latch plate with buckle to the pin connector and attach the webbing to the webbing grips.

4.3.4.3 Load the assembly with a head separation rate of 50 mm/minute to 100 mm/minute until the specified load is reached.

4.3.4.4 Release the load and inspect for incipient damage to the hardware or webbing. Damaged webbing must be tensile tested per FMVSS 209 S 5.1 (b); Webbing Breaking Strength and meet requirements per FMVSS 209 S 4.4 (a) and (b); Assembly Performance Type 1 Seat Belt Assembly and Type 2 Seat Belt Assembly.

4.3.4.5 Reapply the tensile load until the ultimate load is reached. Record the test results and the failure mode.

Note: It is permissible to load the component to its ultimate strength without stopping to check for cuts to the webbing (skipping 4.3.4.4). After the ultimate strength test is complete, inspect the webbing for cuts and test per FMVSS 209 S 5.1 (b); Webbing Breaking Strength as required. If a sample of webbing fails to meet the stated requirements, a new set of samples must be tested for propensity to cut webbing as stated in 4.3.4.2 thru 4.3.4.4.

5 Data

5.1 Calculations. Not applicable.

5.2 Interpretation of Results. Not applicable.

5.3 Test Documentation. Not applicable.

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Page 2 of 3

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