



Seat Belt Evaluation

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 determine suitable safety belt routing for a six (6) year old occupant and other Anthropomorphic Test Device (ATD).

1.2 Applicability. Applies to all non-driver seating positions.

1.3 Remarks. This assessment should be completed with acceptable results prior to the onset of dynamic testing.

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.

Owner Manual

3 Resources

3.1 Facilities. A sled facility or mock-up area with ATDs.

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 Inclinator or similar device for measuring belt angles.

3.2.2 Appropriate scales for measuring distance and length of webbing.

3.2.3 ATDs ranging from a six (6) year old to a 95th percentile occupant.

3.3 Test Vehicle/Test Piece. A vehicle or vehicle buck with seats and safety belts representative of the design.

3.4 Test Time.

Calendar time: 2 days

Test hours: 8 hours

Coordination hours: 8 hours

3.5 Test Required Information. Owner's manual information for using comfort guide.

3.6 Personnel/Skills.

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3.6.1 Technician for setting the ATDs.

3.6.2 Appropriate GM Engineer to supervise and record results.

3.6.3 Design Responsible Safety Belt Engineer.

4 Procedure

4.1 Preparation. Not applicable.

4.2 Conditions.

4.2.1 Environmental Conditions. Testing is to be completed at ambient.

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 If not already marked up then mark the ATD; 6Y-4 (6 year old) as shown in Appendix A, Figure A1, if required. Other ATDs will be marked as the procedure is finalized.

4.3.2 For seats which have a recline feature, conduct belt fit studies at design seat back angle.

4.3.3 For seats that have fore/aft and vertical adjustment, it is assumed that the worst case positions for belt fit are full forward and down and full rearward and down. If this is the case, the belt fit study should be conducted for both seat positions. If there is an alternate location that places the belt in a higher location relative to the iliac, this alternate seat position should be assessed also.

4.3.4 The ATD is to be centered in the seat with the head level as follows: Position the ATD in the center of seat, with the back of the ATD making contact with the seat back. Use a level to ensure that the head is straight. Straighten and reposition the legs as necessary to allow proper positioning of the torso and head. The lower torso may need to be pulled forward, creating some gap in the lumbar region.

Note: Currently, a target pelvic angle has not been specified, however, pelvic angle data should be recorded.

4.3.5 Position the ATD hands so as not to interfere with belt or buckle location.

4.3.6 After buckling the lap belt, remove the slack by applying tension to the shoulder belt in the chest/abdomen region. Several attempts may be required to tension the webbing at the chest while routing the webbing over the abdomen in the most natural position.

4.3.7 The intent is to position the belt as the GM Owner Manual recommends their customers wear the belt and as the test would conduct a dynamic evaluation. The buckle should not be forced down or up to find best or worst case location, but oriented such in the natural direction based on laying the webbing loosely across the abdomen and removing slack by pulling webbing as it passes over the chest. After tensioning, a reinforced belt stalk (i.e., a belt stalk with a plastic sleeve) should be in the approximate location as would be maintained by the retractor tension alone.

4.3.8 Center the belt routing across the shoulder, between the neck and shoulder, using whatever adjustment or comfort guides are available. If it is not possible to reasonably center the webbing, document and continue on to study of lap belt routing.

4.3.9 Record percent coverage (estimate to nearest 10%) of iliac load cell for Left Hand (LH) and Right Hand (RH) independently in Appendix B, Data Sheet B1. Refer to Appendix A for diagram and explanation of these measurements (see Appendix A, Figure A2 and Figure A3).

4.3.10 If the belt loses contact with the abdomen prior to the inboard iliac load cell line, record the tangent point of the belt to the abdomen in terms of distance from ATD centerline.

4.3.11 Photographic coverage to be completed and retained for the final report;

4.3.11.1 One (1) frontal view of the seated ATD is to be taken, showing the overall setup from chin to knee.

4.3.11.2 One (1) close-up showing abdomen, anchor webbing, and buckle.

4.3.11.3 A side view of the buckle and anchor junction.

5 Data

5.1 Calculations. Refer to Appendix A.

5.2 Interpretation of Results. Assessing six (6) year old results.

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