

Submitted for recognition as an American National Standard

(R) SEAT BELT HARDWARE PERFORMANCE REQUIREMENTS

Foreword—This Document has not changed other than to put it into the new SAE Technical Standards Board Format.

1. **Scope**—This SAE Recommended Practice describes performance requirements for hardware used in motor vehicle seat belt assemblies when tested in accordance with the test procedures specified in SAE J140.

Test procedures and performance requirements for retractors will be covered in separate SAE Recommended Practices to be issued later.

2. References

- 2.1 **Applicable Publications**—The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply.

- 2.1.1 SAE PUBLICATIONS—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J140—Seat Belt Hardware Test Procedure

SAE J114—Seat Belt Assembly Webbing Abrasion Performance Requirements

SAE J339—Seat Belt Assembly Webbing Abrasion Test Procedure

3. Definitions

- 3.1 **Seat Belt Assembly**—Any strap, webbing, or similar device designed to secure a person in a motor vehicle with the intention of minimizing the risk of bodily harm in a collision (other than a system designed solely to accommodate children), including all buckles, adjusting mechanisms, fasteners, and related hardware.

- 3.2 **Pelvic Restraint**—A seat belt assembly or portion thereof intended to restrain movement of the lower torso by directing forces to the pelvic girdle.

- 3.3 **Upper Torso Restraint**—A portion of a seat belt assembly intended to restrain forward movement of the upper torso.

- 3.4 **Type 1 Seat Belt Assembly**—A seat belt assembly which provides pelvic restraint.

- 3.5 **Type 2 Seat Belt Assembly**—A seat belt assembly which provides both pelvic and upper torso restraint.

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3.6 Type 2A Seat Belt Assembly—A seat belt assembly consisting of either a separate upper torso restraint intended for use only with a Type 1 seat belt assembly or knee bolster or an upper torso restraint which may be connected to a Type 1 seat belt assembly for use as a Type 2 seat belt assembly.

3.7 Type 4 Seat Belt Assembly—An automatic seat belt system.

3.8 Hardware—Any metal or rigid plastic part of the seat belt assembly.

3.8.1 BUCKLE—A quick release connector between two parts of a seat belt assembly.

3.8.2 ATTACHMENT HARDWARE—All load-bearing hardware designed for securing the webbing portion of a seat belt assembly to a motor vehicle structure or intermediate structural component including but not limited to retractors, end fittings, bolts, studs, nuts, or other attachment means but not including those components permanently fixed to the vehicle.

NOTE—If the seat belt is attached to a seat, the seat is not attachment hardware.

3.8.3 ADJUSTABLE HARDWARE—The hardware designed for adjusting the size of a seat belt assembly to fit the user, including hardware that may be integral with a buckle, attachment hardware, or retractor.

4. Requirements for Hardware

4.1 General

4.1.1 HARDWARE—All hardware which contacts, under normal usage, an occupant, his or her clothing, or his or her seat belt assembly, webbing shall be free from burrs and sharp edges, and shall be designed and located in the assembly that the possibility of injury to the occupant shall be minimized.

4.1.2 BUCKLE RELEASE MECHANISM—The buckle release mechanism shall be designed to minimize the possibility of accidental release. A buckle, with the release mechanism in the normal position, shall have only one opening into which the latch plate can be inserted on the end of the buckle which is designed to receive and latch the latch plate.

4.1.3 ATTACHMENT HARDWARE

4.1.3.1 The attachment hardware shall be designed to prevent attaching bolts and other parts from becoming inadvertently disengaged from the vehicle.

4.1.3.2 Reinforcing plates or washers furnished for universal floor installations shall be of steel, free from burrs and sharp edges on the peripheral edges adjacent to the vehicle, not less than 1.5 mm (0.06 in) in thickness, nor less than 2850 mm² (4.0 in²) in projected area. The distance between any edge of the plate and the edge of the attachment hole shall be at least 15 mm (0.6 in), and any corner shall be rounded to a radius of not less than 6 mm (0.25 in), or cut at a 45 degree angle along a hypotenuse not less than 6 mm (0.25 in) in length.

4.1.3.3 Attaching bolts for Type 1 assemblies or the pelvic portion of a Type 2 assembly shall have threads, when installed, having a fit equivalent to or tighter than 7/16-20 UNF-2A or 1/2-13 UNC-2A, or the metric equivalent, M12.

4.2 Corrosion Resistance

- 4.2.1 Attachment hardware of a seat belt assembly after being subjected to the conditions specified in 4.2 of SAE J140, shall be free of ferrous corrosion on significant surfaces, except for permissible ferrous corrosion at peripheral edges or edges of holes on underfloor reinforcing plates and washers. The test for corrosion resistance shall not be required for attachment hardware made from corrosion-resistant steel containing at least 11.5% chromium.
- 4.2.2 Surfaces of buckles and metallic parts, other than attachment hardware, of a seat belt assembly, after being subjected to the conditions specified in 4.2 of SAE J140, shall be free of ferrous or nonferrous corrosion which can be transferred either directly or by means of webbing to the occupant or his or her clothing when the assembly is worn.

4.3 Temperature Resistance—Plastic or other nonmetallic hardware parts of a seat belt assembly, when subjected to the conditions specified in 4.3 of SAE J140, shall not deteriorate in any manner to cause the assembly to operate improperly or fail to comply with applicable requirements of Section 4.

4.4 Attachment Hardware Strength—Applicable test procedures of SAE J140 shall be used to determine attachment hardware strength. When more than one attachment bolt is used to secure a single piece of hardware to the vehicle, they shall be tested as a system and shall withstand the following applicable specified forces.

4.4.1 Attachment hardware other than the attaching bolts shall withstand the following tensile forces:

4.4.1.1 One end of the pelvic portion of a seat belt assembly, 11.1 kN (2500 lbf).

4.4.1.2 Common attachment for pelvic and upper torso portions of a seat belt, 13.3 kN (3000 lbf).

4.4.1.3 Upper torso portion of a seat belt assembly, 8.8 kN (2000 lbf).

4.4.1.4 Ends of two seat belt assemblies, 26.7 kN (6000 lbf).

4.4.2 Bolts used to secure the ends of seat belts to motor vehicles shall withstand the following forces:

4.4.2.1 One end of the pelvic portion of a seat belt assembly, 22.2 kN (5000 lbf).

4.4.2.2 Common attachment for pelvic and upper torso portions of a seat belt assembly, 26.7 kN (6000 lbf).

4.4.2.3 Upper torso portion of a seat belt assembly, 17.8 kN (4000 lbf).

4.4.2.4 Ends of more than one seat belt assembly, 40 kN (9000 lbf).

4.5 Single Attachment Hook—Retention—A seat belt assembly, having single attachment hooks of the quick disconnect type for connecting webbing to an eye bolt, shall be provided with a retaining latch or keeper which shall not move more than 2 mm (0.08 in) in either the vertical or horizontal direction when tested by the procedure specified in 4.5 of SAE J140.

4.6 Buckle Release

4.6.1 The buckle of a Type 1 or Type 2 seat belt assembly shall release when a force of not more than 133 N (30.0 lbf) is applied as prescribed in 4.6 of SAE J140.

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4.6.2 A buckle designed for push button application of buckle release force shall have a minimum area of 45 mm² (0.7 in²) with no linear dimension less than 10 mm (0.4 in) for applying the release force. A buckle designed for lift cover application of buckle release force shall permit the insertion of a cylinder 10 mm (0.4 in) in diameter and 58 mm (1.5 in) in length to at least the midpoint of the cylinder along the cylinder's entire length in the actuation portion of the buckle release. A buckle having other designs for release shall have adequate access for two or more fingers to actuate release.

4.7 Buckle Compression—A buckle shall withstand a compressive force of 1.88 kN (400 lbf) applied as prescribed in 4.7 of SAE J140, and shall be operable and shall meet the applicable requirements of 4.8 of this document, and the requirements for release effort after tensile force in 4.6 of SAE J140, upon removal of the compressive force.

4.8 Buckle Latch Operation

4.8.1 The buckle-latch plate assembly of a seat belt assembly when tested by the procedure specified in 4.8 of SAE J140 shall not fail, gall, nor wear to an extent that normal latching and unlatching is impaired.

4.8.2 The buckle-latch plate assembly shall be separable by a force of not more than 22 N (5 lbf) when tested according to the procedures in 4.8.2 of SAE J140.

5. System Requirements Related to Hardware

5.1 Adjustment Force—The buckle or other manual adjusting device normally used to adjust the length of the assembly shall be subjected to the adjustment force test. This force shall not exceed 50 N (11 lbf) when measured by the procedure specified in 5.1 of SAE J140.

5.2 Tilt Lock Adjustment—Buckles or other manual adjustment devices having tilt lock adjustment normally used to adjust the length of the assembly shall lock the webbing when tested by the procedure specified in 5.2 of SAE J140 at an angle of not less than 30 degrees between the buckle and the anchor webbing.

5.3 Webbing Abrasion—Buckles or other adjustment hardware frequently used to adjust the length of a seat belt assembly other than retractors must meet the requirements described in SAE J114 when tested with the webbing intended for use in the assembly.

5.4 General—Attachment hardware, adjustment hardware, buckles, and other parts of a seat belt assembly must comply with all applicable requirements of the assembly performance as described in Section 7 of this document.

6. Requirements for Webbing

6.1 Webbing Breaking Strength—The webbing in a seat belt assembly shall have not less than the following breaking strengths when tested by the procedure specified in Section 6 of SAE J140:

- a. Type 1 seat belt assembly—26.7 kN (6000 lbf)
- b. Type 2 seat belt assembly—22.2 kN (5000 lbf) for pelvic restraint webbing, and 17.8 kN (4000 lbf) for upper torso restraint webbing.

7. Requirements for Assembly Performance

7.1 Type 1 Seat Belt Assembly—The complete seat belt assembly, including webbing, straps, buckles, adjustment and attachment hardware, and retractors, shall comply with the following requirements when tested by the procedures specified in Section 7 of SAE J140.