

AUSTRALIAN DESIGN RULE NO. 4A - SEAT BELTS

4.1 Definitions

4.1.1 General - Unless otherwise specified, any definitions in Australian Design Rule No. 5B shall be appropriate to this Design Rule.

4.1.2 Lap Sash Point means the point representing the intersection of the lap and torso straps of a lap sash belt.

4.1.3 Test Seat Datum Point means a point in relation to the seat described in Figure 1 of Clause 4.5. It is located 120mm above and 115mm forward of the intersection of the planes of the seat base and the seat back.

4.1.4 Seating Reference Plane. In the case of the seat described in Figure 1 of Clause 4.5, the seating reference plane is the vertical plane passing through the geometric centre of the seat. In the case of a seat intended for the vehicle, the seating reference plane shall be as established in Australian Design Rule No. 5B.

4.2 Requirements

4.2.1 Seat belts shall be fitted to each seating position for which anchorage points are required in accordance with the Design Rule for seat belt anchorages as appropriate at the date of manufacture of the vehicle.

4.2.2 The type of seat belt assembly to be fitted shall be consistent with the anchorage system provided.

4.2.3 Seat belt assemblies not fitted with retractors shall comply with Australian Standard E35 Pt. 1 - 1970, Seat Belt Assemblies for Motor Vehicles, up to and including amendment No. 5 but excluding Clauses 7 (vi), 9.2, 9.3, Note 2 of 11.2, E3(ii)(b), E3(ii)(c), E3(iv) and E3(v). All standards referred to in E35 Pt. 1 shall include only those amendments current as at 1 January 1973.

4.2.4 Seat belt assemblies fitted with retractors shall comply with Australian Standard E35 Pt. 2 - 1970, up to and including amendment 1, Seat Belt Assemblies (including retractors) for Motor Vehicles, except that

- (i) all reference to corrosion conditioning and Appendix B in AS E35 Pt. 2 shall be ignored,
- (ii) the durability test specified in Clauses 5.1.3, 5.2.3 and 5.3.3 of AS E35 Pt. 2 shall be preceded by the corrosion conditioning requirements set out in Clause 4.4 of this Design Rule and
- (iii) all reference to AS E35 Pt. 1 will be in accordance with Clause 4.2.3.

All Standards referred to in AS E35 Pt. 2 shall include only those amendments current at 1 January 1973.

4.2.5 When seat belts for forward facing seats are tested in accordance with the dynamic testing procedure of Clause 4.3, there shall be no separation of components comprising the seat belt assembly or of anchor fittings from their anchorages.

4.2.6 The seat belt assembly shall be designed to meet the lap sash point location requirements of Clause 4.2.6.1 or Clause 4.2.6.2 with the seat in the rearmost and lowest driving or riding position and with the seat back set at the manufacturer's designated design seat back angle.

4.2.6.1 When a dummy or body block having a mass not less than 46 kg and a circumference, when seated of not more than 940 mm (when measured around the pelvic region either horizontally or in a transverse plane inclined downwards at the rear), is placed in a seating position fitted with a lap sash belt so that the centre line of the dummy lies in the seating reference plane, it shall not be possible to adjust the assembly so that the lap sash point is less than 150 mm in the case of seats with forward and rearward adjustment or 200 mm for other seats, from the seating reference plane when measured along the centre line of the pelvic restraint section of the belt.

4.2.6.2 It shall not be possible to adjust a lap sash belt so that, when fitted around a person or dummy representative of a 5th percentile adult female of dimensions listed in the following table, the lap sash point is less than 125 mm in the case of seats with forward and rearward adjustments, or 175 mm in the case of fixed seats, from the seating reference plane when measured along the centre line of the pelvic restraint section of the belt.

Dummy Dimensions

Weight	46 ± 5 kg	
Erect sitting height	785 mm	
Hip breadth (sitting)	325 mm	
Hip circumference #	925 mm	
Waist circumference (sitting)	600 mm	Tolerance on
Chest depth	190 mm	all length
" circumference	775 mm (nipple)	dimensions ± 5%
	755 mm (upper)	
	675 mm (lower)	
Shoulder Height	520 mm	

The hip circumference is the circumference measured around the dummy on a transverse plane which, when viewed in side elevation, passes rearwards and downwards through the foremost point of intersection of the thighs and the abdomen, inclined to give the maximum circumference.

* Amended February 1974

4.2.7 Any free end of a strap shall be designed so as to prevent it from passing through the adjuster under normal adjustment operations and, with the strap fully extended, the strap/adjuster combination shall be capable of withstanding a static tensile load of 9 kN for not less than 30 seconds. Further, with the strap fully extended, there shall be not less than 25 mm of material, either attached to or part of the free end of the strap to provide a grip for adjustment purposes.

4.3 Dynamic Testing Procedure

4.3.1 The test shall be conducted using the test rig as operated and set up to meet the provisions of Clause 4.6.2 except that a dummy located and restrained as specified in Clause 4.3.2 shall replace the inert mass. The dummy shall meet the requirements of Clause 4.5. The test rig shall comprise either

- (i) a trolley and the seat specified in Clauses 4.5.2 and 4.5.3. In this case each anchorage and sash guide device shall be within 100 mm of the design position of the device it represents when the test seat datum point coincides with the seating reference point of the seating position it represents; or
- (ii) a trolley and a vehicle body shell complete with its appropriate seat adjusted to the rearmost and lowest driving or riding position.

4.3.2 The dummy shall be placed in the appropriate seating position so that its centre line lies in the seating reference plane and such that it is restrained by the seat belt assembly as follows:

- (i) in the case of seat belt assemblies incorporating automatic length adjusting retractors, the belt shall be manually adjusted around the dummy;
- (ii) in the case of other seat belt assemblies, a spacer of flexible but substantially incompressible material not less than 25 mm thick and at least as wide and as long as the dummy's back shall be placed behind the back of the dummy. The assembly shall be adjusted and the spacer then removed. The dummy shall be re-positioned so that its back is in contact with the seat back.

4.4 Corrosion Test for Retractors

4.4.1 The seat belt assembly shall be tested by the Standard Method of Salt Spray (Fog) Testing, ASTM designation: B117-64, published by the American Society for Testing and Materials. The period of test shall be 50 hours consisting of two periods of 24 hours exposure to salt spray followed by 1 hour drying in each case.

4.4.2 At the end of the test, the seat belt assembly may be washed thoroughly with water to remove the salt. If washed, the webbing shall be fully extended and allowed to dry for at least 24 hours in an atmosphere having a relative humidity 48-67% and a temperature 21-25°C. The webbing shall then be withdrawn manually and allowed to retract for 25 cycles.

4.5 Test Dummy Requirements

4.5.1 The test dummy shall have a mass of 74 ± 2 kg and, when mounted and restrained as specified in Clause 4.5 on a test rig as operated and set up to meet the provisions of Clause 4.6.3 (except that the dummy shall replace the inert mass), shall result in seat belt loads such that for each the lap and the sash belt the sum of the peak restraining forces measured in the free lengths of strap between the dummy and the lap and the sash belts is not less than 10kN.

4.5.2 The test seat, foot rest and seat belt anchorages shall meet the dimensional requirements specified in Figure 1 with the dummy located so that the thighs are given maximum contact with the seat base.

4.5.3 The seat base surface, AB, shall not be designed with energy absorbing characteristics and shall present a smooth surface for the dummy.

4.5.4 The dummy shall be restrained by separate lap and sash belts, each of which comprises load bearing material having an elongation of not less than 15% when subjected to a load of 11kN.

4.5.5 The lap and sash belts shall be adjusted so that there is no slack in either belt.

4.6 Test Rig Requirements

4.6.1 Test rigs for testing seat belts or proving test dummies shall have a mass of not less than 380 kg.

4.6.2 In the case of calibration prior to seat belt testing, the test rig, to which a mass of 74 ± 2 kg is rigidly attached, when subjected to a velocity change of not less than 49 km/h, shall achieve within 30 milliseconds a forward deceleration measured in the vicinity of a lap anchorage of at least 235 m/s^2 and shall maintain this deceleration, except for periods of less than 1 millisecond, for not less than 20 milliseconds.

4.6.3 In the case of calibration prior to proving the dummy, the test rig, to which a mass of 74 ± 2 kg is rigidly attached, when subjected to a velocity change of not less than 49 km/h, shall achieve within 30 milliseconds a forward deceleration measured in the vicinity of a lap anchorage within the range 235 m/s^2 to 335 m/s^2 and shall maintain this deceleration, except for periods of less than 1 millisecond, for not less than 20 milliseconds.

FIG.1
TEST SEAT & ANCHORAGES



