



AUSTRALIAN DESIGN RULE NO. 32 - SEAT BELTS FOR HEAVY VEHICLES

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**32.1**      Definitions

32.1.1      Anchorage - That part of a vehicle designed to transfer loads from a seat belt assembly to the vehicle or seat and includes bolts, spacers and other hardware designed for the attachment of a seat belt assembly.

32.1.2      Lap Anchorage - An anchorage provided to facilitate pelvic restraint.

32.1.3      Anchor Point - The point where the centreline of the strap passes into the anchor fitting or changes direction at the anchor fitting except that in the case of anchor fittings which are designed to pivot or are attached by a single bolt, the anchor point shall be regarded as the intersection of the axis of rotation, or the centreline of the bolt, with the surface of the vehicle structure.

32.1.4      Buckle Component - means each one of the two parts of the buckle assembly designed to be latched to each other to complete the buckle assembly.

32.1.5      Emergency Locking Retractor - a retractor incorporating a locking mechanism that is designed to lock under abnormal operating conditions.

32.1.6      Pelvis Reference Locus - The locus of a point fixed relative to the seat, coincident with the pelvis reference point when the seat is in the rearmost design position and extending over the design driving or riding range of seat travel.

32.1.7      Pelvis Reference Point - A point used in simulating the correct position of a lap strap or the lap strap of a lap-sash belt. It is the point which is located at a height of 95 mm above and 70mm forward of the seating reference point.

**32.1.8**      Seating Reference Plane

- (a) Driver's position - the vertical longitudinal plane through the geometric centre of the eye ellipse as specified in SAE J941b, Motor Vehicle Driver's Eye Range, February 1969, arranged opposite hand for right hand steering, except that in the case of seats designed for one seating position only, the seating reference plane may be the longitudinal plane through the geometric centre of the seat.
- (b) Front outboard passenger position on a seat which also provides for the driver's seating position - the vertical plane parallel to the seating reference plane of the driver's seating position and equidistant from the centre of the vehicle.
- (c) Seats designed for one seating position only - the vertical plane through the geometric centre of the seat, except that in the case of the front outboard passenger's position, the seating reference plane may be the vertical plane parallel to the seating reference plane of the driver's seating position and equidistant from the centre of the vehicle.

- (d) Other seating positions - the plane nominated by the manufacturer, provided that in the case of an outboard position on a transverse seat which is designed for two occupants only, the seating reference plane shall be at least 200 mm from the vertical longitudinal plane through the centre of the vehicle and at least 200 mm from the inner panel (or the line of the inner panel) when measured horizontally on a transverse line through the seating reference point.

32.1.9 Seat Belt Assembly - An arrangement of straps, anchor fittings, securing buckle and adjusting devices designed to restrain a motor vehicle occupant in the event of an impact. Devices for absorbing energy or for retracting the strap shall be considered as part of the seat belt assembly.

32.1.10 Strap - A part of a seat belt assembly designed with flexure to facilitate correct and comfortable wearing.

## 32.2 General Requirements

32.2.1 A seat belt assembly providing at least for pelvic restraint shall be fitted to the driver's seating position, and the front outboard seating position if provided.

32.2.2 Each assembly shall be attached to the vehicle by means of threaded steel bolts of diameter not less than 11 mm. The depth of engagement in the mating female threads shall be not less than 4 threads.

32.2.3 Separation of any functional components of the seat belt assembly, other than unlatching of the buckle components, shall not be possible without the use of tools.

32.2.4 Seat Belt assemblies shall comply with either

(i) (a) Australian Standard E35, Part I - 1970, Seat Belt Assemblies for Motor Vehicles up to and including amendments Nos 3, 4, 5 and 7, but excluding Clauses 9.2 & 9.3 as well as any amendments to other standards subsequent to the date when referenced in Australian Standard E35, Part I - 1970 or its amendments and except that the maximum test loads specified in Clause 11 and Appendix E of Australian Standard E35, Part I-1970 shall not be less than 9KN; or

(b) Australian Standard E35, Part II - 1970, Seat Belt Assemblies (Including Retractors) for Motor Vehicles up to and including amendment No. 1 in the case where the assembly is fitted with a retractor except that

(1) The corrosion conditioning procedure specified in Appendix B and referenced in Clauses 5.1.3, 5.2.3 and 5.3.3 of AS E35, Part II - 1970 shall be replaced by the corrosion conditioning procedure of Clause 32.3 of this Rule and

(2) all reference to AS E35, Part I - 1970 shall be in accordance with Clause 32.2.4 (i)(a) of this Rule.

\*Amended July 1980

- (ii) Federal Motor Vehicle Safety Standard No. 209; Seat Belt Assemblies current as at 1 January 1973; or
- (iii) ECE Regulation No. 16, Uniform Provision Concerning the Approval of Safety Belts for Adult Occupants of Power Driven Vehicles, current as at 1 January 1973.

32.2.5 The operation of any emergency locking retractor incorporated in a seat belt assembly shall not be dependent solely upon rate of withdrawal of strap from the retractor.

32.2.6 In the case where a seat is so designed to provide automatic vertical movement of the seat frame relative to the vehicle structure as a result of particular vehicle movements, then either:

- (i) with the seat belt assembly fitted to an occupant, the dimension measured along the centreline of the lap strap from the first point of contact of the lap strap with the seat to a corresponding point of contact on the other side of the seat, shall not vary by more than 25 mm over the total range of seat vertical movement described above, or
- (ii) the seat belt assembly shall incorporate an emergency locking retractor.

### 32.3 Corrosion Conditioning Procedure for Seat Belt Assemblies fitted in accordance with Clause 32.2.4(i) (b)

32.3.1 The seat belt assembly shall be conditioned by the procedure specified in Standard Method of Salt Spray (Fog) Testing, ASTM designation: B117-64, published by the American Society for Testing and Materials. The period of conditioning shall be not less than 50 hours.

32.3.2 At the end of the conditioning procedure specified in Clause 32.3.1 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 of not less than 48% nor more than 67% and a temperature of not less than 21°C nor more than 25°C. The webbing shall then be withdrawn manually and allowed to retract for 25 cycles.

### 32.4 Adjustment Requirements

32.4.1 With the seat belt assembly in the unlatched condition, a point on each separate portion of the seat belt shall be located by a design feature to adopt a position not more than 100 mm below the top edge of the seat cushion measured in the immediate vicinity of such a design feature.

32.4.2 Any free end of a strap shall be restrained by a design feature to adopt a position against another strap.

32.4.3 With the strap fully extended, there shall be not less than 25 mm of material extending from the adjusting device to provide a grip for adjustment purposes. The material may either be attached to or form part of the free end of the strap.

### 32.5 Anchorage Location Requirements

32.5.1 Two lap anchorages shall be provided for each seating position which is to be fitted with a seat belt.

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32.5.2 The two lap anchor points provided for a particular seating position shall:

- (i) lie on opposite sides of the seating reference plane in such a way that the sum of the distances measured normal to the seating reference plane is not less than 165 mm and;
- (ii) meet the requirements of either Clause 32.5.3 or Clause 32.5.4.

32.5.3 The lines joining the lap anchor point to the extreme points on the pelvis reference locus shall be inclined to the horizontal at angles of not less than 25 degrees nor more than 80 degrees when viewed normal to the seating reference plane.

32.5.4 When viewed in side elevation with the seat in the rearmost and lowest driving or riding position, the lap anchor points shall be located

- (i) below a horizontal line 150 mm below the rearmost, lowest top surface of the seat cushion, and
- (ii) rearward of a vertical line tangential to the rearmost point of the seat cushion.

## 32.6 Strength of Anchorages

32.6.1 Anchorages located in the vehicle structure shall meet either the test requirements of Clause 32.6.3 or the design requirements of Clause 32.6.4.

32.6.2 In cases where anchorages are located in seat structures it shall be established either by calculation or test, in accordance with the requirements of Clause 32.6.3, that the seat belt anchorages and seat anchorages will sustain the required loads.

32.6.3 If anchorages are to be proved by test, the pair of lap anchorages shall be tested simultaneously using attachments representative of the seat belt assembly provided. The attachments shall pass around an appropriate body block to which a test load of not less than 9 kN shall be applied in a forward direction at an angle of between 5 and 50 degrees above the horizontal in a vertical plane parallel with the longitudinal axis of the vehicle. The test load shall be sustained by the anchorages for a period of at least one second.

32.6.4 If anchorages are to be proved by design, the anchorages shall be provided in a substantial metal component. In cases where this metal component is less than 3 mm in thickness, the anchorage shall include a device to distribute the load. The device shall be shaped to match the contour of the mounting surface and shall have an area of not less than 3750 mm<sup>2</sup> in contact with the mounting surface. The thickness of the device shall not be less than 3 mm.



**COMMONWEALTH OF AUSTRALIA**  
AUSTRALIAN DESIGN RULE 32A  
 FOR  
SEAT BELTS FOR HEAVY VEHICLES

As Endorsed by the  
 Australian Transport Advisory Council

The intention of this Australian Design Rule is to assist the driver to remain in his seat and thus maintain control of the vehicle in an emergency situation, and to provide protection against ejection in an accident situation. This protection is extended to the front seat outboard passenger of a truck.

The Australian Transport Advisory Council has recommended to Commonwealth, State and Territory Governments that all motor vehicles specified below shall be equipped with seat belts complying with Australian Design Rule 32A.

VEHICLE CATEGORY	RULE		AMENDMENT
	MANUFACTURED ON OR AFTER		
	32A		
Passenger Cars			
Forward Control Passenger Vehicles up to 8 seats	N/A		
9 seats	N/A		
Other Passenger Cars	N/A		
Passenger Car Derivatives	N/A		
Multi-Purpose Passenger Cars	N/A		
Omnibuses up to 3.5 tonnes GVM			
up to 12 seats	N/A		
over 12 seats	N/A		
up to 4.5 tonnes GVM	1 July 87#		
over 4.5 tonnes GVM	1 July 87#		
Motorcycles	N/A		
Mopeds	N/A		
Specially Constructed Vehicles	N/A		
Other Vehicles not listed above			
up to 4.5 tonnes GVM	N/A		
over 4.5 tonnes GVM	1 July 1980		

# - Applicable only to driver's seating position in omnibuses over 3.5 tonnes GVM

N/A - Not Applicable

GROSS VEHICLE MASS - Abbreviated to 'GVM'

The Australian Transport Advisory Council has also recommended to Commonwealth, State and Territory Governments that motor vehicles which comply with the requirements of ADR 4A, ADR 4B or ADR 4C and ADR 5A or ADR 5B need not comply with the requirements of ADR 32A.

\* Amended June 1985

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Issued: July 1985

## AUSTRALIAN DESIGN RULE NO. 32A - SEAT BELTS FOR HEAVY VEHICLES

32A.1 Definitions

- 32A.1.1 Anchorage - That part of a vehicle designed to transfer loads from a seat belt assembly to the vehicle or seat and includes bolts, spacers and other hardware designed for the attachment of a seat belt assembly.
- 32A.1.2 Lap Anchorage - An anchorage provided to facilitate pelvic restraint.
- 32A.1.3 Anchor Point - The point where the centreline of the strap passes into the anchor fitting or changes direction at the anchor fitting except that in the case of anchor fittings which are designed to pivot or are attached by a single bolt, the anchor point shall be regarded as the intersection of the axis of rotation, or the centreline of the bolt, with the surface of the vehicle structure.
- 32A.1.4 Buckle Component - means each one of the two parts of the buckle assembly designed to be latched to each other to complete the buckle assembly.
- 32A.1.5 Emergency Locking Retractor - a retractor incorporating a locking mechanism that is designed to lock under abnormal operating conditions.
- 32A.1.6 Pelvis Reference Locus - The locus of a point fixed relative to the seat, coincident with the pelvis reference point when the seat is in the rearmost design position and extending over the design driving or riding range of seat travel.
- 32A.1.7 Pelvis Reference Point - A point used in simulating the correct position of a lap strap or the lap strap of a lap-sash belt. it is the point which is located at a height of 95mm above 70mm forward of the seating reference point.
- 32A.1.8 Seating Reference Plane
- (a) Driver's position - the vertical longitudinal plane through the geometric centre of the eye ellipses defined and positioned as in Recommended Practices - SAE J941b (February 1969); SAE J941c (June 1972); SAE J941d (February 1975); SAE J941e (March 1977); SAE J941 (March 1981) - Motor Vehicle Driver's Eye Range, or in ISO 4513 - 1978 (E) - Road Vehicles - Visibility - Method for establishment of eye ellipses for driver's eye location, suitably handed for right hand steering, except that in case of seats designed for one seating position only, the reference plane may be the longitudinal plane through the geometric centre of the seat. \*
  - (b) Front outboard passenger position on a seat which also provides for the driver's seating position - the vertical plane parallel to the seating reference plane of the driver's seating position and equidistant from the centre of the vehicle.

\*Amended February 1984

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- (c) Seats designed for one seating position only - the vertical plane through the geometric centre of the seat, except that in the case of the front outboard passenger's position, the seating reference plane may be the vertical plane parallel to the seating reference plane of the driver's seating position and equidistant from the centre of the vehicle.
- (d) Other seating positions - the plane nominated by the manufacturer, provided that in the case of an outboard position on a transverse seat which is designed for two occupants only, the seating reference plane shall be at least 200mm from the vertical longitudinal plane through the centre of the vehicle and at least 200mm from the inner panel (or the line of the inner panel) when measured horizontally on a transverse line through the seating reference point.

32A.1.9 Seat Belt Assembly - An arrangement of straps, anchor fittings, securing buckle and adjusting devices designed to restrain a motor vehicle occupant in the event of an impact. Devices for absorbing energy or for retracting the strap shall be considered as part of the seat belt assembly.

32A.1.10 Strap - A part of a seat belt assembly designed with flexure to facilitate correct and comfortable wearing.

32A.2 General Requirements

32A.2.1 A seat belt assembly providing at least for pelvic restraint shall be fitted to the driver's seating position, and the front outboard seating position if provided.

32A.2.2 Each assembly shall be attached to the vehicle by means of threaded steel bolts of diameter not less than 11mm. The depth of engagement in the mating female threads shall be not less than 4 threads.

32A.2.3 Separation of any functional components of the seat belt assembly, other than unlatching of the buckle components, shall not be possible without the use of tools.

32A.2.4 Seat Belt assemblies shall comply with either:

- (i) (a) Australian Standard E35, Part I - 1970, Seat Belt Assemblies for Motor Vehicles up to and including amendments Nos 3, 4, 5 and 7, but excluding Clauses 9.2 and 9.3 as well as any amendments to other standards subsequent to the date when referenced in Australian Standard E35, Part I - 1970 or its amendments and except that the maximum test loads specified in Clause 11 and Appendix E of Australian Standard E35, Part 1-1970 shall not be less than be less than 9KN; or

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(b) Australian Standard E35, Part II - 1970, Seat Belt Assemblies (Including Retractors) for Motor Vehicles up to and including amendment No. 1 in the case where the assembly is fitted with a retractor except that:

(1) The corrosion conditioning procedure specified in Appendix B and referenced in Clauses 5.1.3, 5.2.3, 5.3.3 of AS E35, Part II - 1970 shall be replaced by the corrosion conditioning procedure of Clause 32A.3 of this Rule; and

(2) all reference to AS E35, Part I - 1970 shall be in accordance with Clause 32.2.4 (i)(a) of this Rule.

(ii) Federal Motor Vehicle Safety Standard No. 209; Seat Belt Assemblies current as at 1 January 1973 except that the use of non-locking retractors as defined in that Standard shall not be allowed; or

(iii) ECE Regulation No. 16, Uniform Provision Concerning the Approval of Safety Belts for Adult Occupants of Power Driven Vehicles, current as at 1 January 1973 except that the use of non-locking retractors as defined in that Standard shall not be allowed.

32A.2.5 The operation of any emergency locking retractor incorporated in a seat belt assembly shall not be dependent solely upon rate of withdrawal of strap from the retractor.

32A.2.6 In the case where a seat is so designed to provide automatic vertical movement of the seat frame relative to the vehicle structure as a result of particular vehicle movements, then either:

(i) with the seat belt assembly fitted to an occupant, the dimension measured along the centreline of the lap strap from the first point of contact of the lap strap with the seat to a corresponding point of contact on the other side of the seat, shall not vary by more than 25mm over the total range of seat vertical movement described above; or

(ii) the seat belt assembly shall incorporate an emergency locking retractor.

## AUSTRALIAN DESIGN RULE NO. 32A - SEAT BELTS FOR HEAVY VEHICLES

- 32A.3 Corrosion Conditioning Procedure for Seat Belt Assemblies fitted in accordance with Clause 32.2.4.(i)(b)
- 32A.3.1 The seat belt assembly shall be conditioned by the procedure specified in Standard Method of Salt Spray (Fog) Testing, ASTM designation: B117-64, published by the American Society for Testing and Materials. The period of conditioning shall be not less than 50 hours.
- 32A.3.2 At the end of the conditioning procedure specified in Clause 32A.3.1 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 of not less than 48% nor more than 67% and a temperature of not less than 21°C nor more than 25°C. The webbing shall then be withdrawn manually and allowed to retract for 25 cycles.
- 32A.4 Adjustment Requirements
- 32A.4.1 With the seat belt assembly in the unlatched condition, a point on each separate portion of the seat belt shall be located by a design feature to adopt a position not more than 100mm below the top edge of the seat cushion measured in the immediate vicinity of such a design feature.
- 32A.4.2 Any free end of a strap shall be restrained by a design feature to adopt a position against another strap.
- 32A.4.3 With the strap fully extended, there shall be not less than 25mm of material extending from the adjusting device to provide a grip for adjustment purposes. The material may either be attached to or form part of the free end of the strap.
- 32A.5 Anchorage Location Requirements
- 32A.5.1 Two lap anchorages shall be provided for each seating position which is to be fitted with a seat belt.
- 32A.5.2 The two lap anchor points provided for a particular seating position shall:
- (i) lie on opposite sides of the seating reference plane in such a way that the sum of the distances measured normal to the seating reference plane is not less than 165mm; and
  - (ii) meet the requirements of either Clause 32A.5.3 or Clause 32A.5.4.
- 32A.5.3 The lines joining the lap anchor point to the extreme points on the pelvis reference locus shall be inclined to the horizontal at angles of not less than 25 degrees nor more than 80 degrees when viewed normal to the seating reference plane.

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32A.5.4 When viewed in side elevation with the seat in the rearmost and lowest driving or riding position, the lap anchor points shall be located:

- (i) below a horizontal line 150mm below the rearmost, lowest top surface of the seat cushion; and
- (ii) rearward of a vertical line tangential to the rearmost point of the seat cushion.

32A.6 Strength of Anchorages

32A.6.1 Anchorages located in the vehicle structure shall meet either the test requirements of Clause 32A.6.3 or the design requirements of Clause 32A.6.4.

32A.6.2 In cases where anchorages are located in seat structures it shall be established either by calculation or test, in accordance with the requirements of Clause 32A.6.3, that the seat belt anchorages and seat anchorages will sustain the required loads.

32A.6.3 If anchorages are to be proved by test, the pair of lap anchorages shall be tested simultaneously using attachments representative of the seat belt assembly provided. The attachments shall pass around an appropriate body block to which a test load of not less than 9 kN shall be applied in a forward direction at an angle of between 5 and 50 degrees above the horizontal in a vertical plane parallel with the longitudinal axis of the vehicle. The test load shall be sustained by the anchorages for a period of at least one second.

32A.6.4 If anchorages are to be proved by design, the anchorages shall be provided in a substantial metal component. In cases where this metal component is less than 3mm in thickness, the anchorage shall include a device to distribute the load. The device shall be shaped to match the contour of the mounting surface and shall have an area of not less than 3750mm<sup>2</sup> in contact with the mounting surface. The thickness of the device shall not be less than 3mm.