

SEAT AND SEATBELT INSTALLATION / REMOVAL

CODE LK1

SCOPE

Code LK1 provides for the installation of seats and seatbelts that have already been certified as complying with the applicable ADRs to seat anchorages and seatbelt anchorage points that have already been certified as complying with the applicable ADRs.

Code LK1 also provides for the removal of seats and seatbelts to reduce seating capacity.

Code LK1 does not apply to ADR Category L-Group vehicles and motor cycles.

MODIFICATIONS COVERED UNDER CODE LK1

The following is a summary of the modifications that may be performed under Code LK1.

- Installation of complying seats to complying anchorage points;
- Installation of complying seatbelts to complying anchorage points;
- Installation of complying seat and seatbelt anchorages; and
- Removal of seats and seatbelts to reduce seating capacity.

A *complying seat* means a seat that already complies with the appropriate clauses of ADR 3/..., VSB 5A or VSB 5B. e.g. an original seat taken from a production vehicle that complies with the ADRs is a *complying seat*, providing the seat is in good condition and unmodified.

A *complying seatbelt* is a seatbelt that:

- has been designed to comply with the ADRs applicable to the vehicle to which it will be fitted (e.g. a spare part), or
- has been taken from a production vehicle that complies with the ADRs, or
- for pre-ADR vehicles complies with AS/NZS 2596.

A *complying anchorage point* means an anchorage point that already exists in a vehicle that was designed to comply with the ADRs or is an anchor point kit supplied with a *complying seat* or a *complying seatbelt*.

MODIFICATIONS NOT COVERED UNDER CODE LK1

The following modifications may not be carried out under code LK1:

- Installation of non-complying seats to vehicles that were built to comply with the ADRs;
- Installation of seatbelts that do not comply with AS/NZS 2596 or ADR 4/...; and
- Installation of replacement front seats to vehicles manufactured to comply with ADR 69 or ADR 73, unless the seat is a manufacturer's option.

COMPLIANCE WITH APPLICABLE VEHICLE STANDARDS

Modified vehicles must continue to comply with the ADRs to which they were originally constructed, except as allowed for in the AVSR. These modified vehicles must also comply with the applicable in-service requirements of the AVSR.

Modified pre-ADR vehicles must continue to comply with the AVSR.

Compliance with the AVSR also means compliance with the equivalent regulations of a State or Territory of Australia.

Outlined below in Table LK3 are areas of the vehicle that may be affected by the modifications and that may require re-certification, testing and/or data to show compliance for the modified vehicle. This is not an exhaustive list and other modifications may also affect ADR compliance.

Table LK3 Summary of items that if modified, may detrimentally affect compliance with applicable ADRs

DETAIL	REQUIREMENTS
Seats and seat anchorages	ADR 3x, 3/..., VSB 5A or VSB 5B
Seatbelts	ADR 4x, 4/..., AS/NZS 2596
Seatbelt anchorages	ADR 5x, 5/...
Child restraint anchorages	ADR 5/..., 34x, 34/...
Impact/occupant protection	ADR 69/..., 72/..., 73/...

To determine the ADRs that apply to the vehicle in question, refer to the applicability tables in Section LO. Vehicles manufactured on or after 1 January 1969 and prior to 1 July 1988 need to comply with the Second Edition ADRs whilst vehicles manufactured after this date need to comply with the Third Edition ADRs. Section LO has separate applicability tables for each edition.

Alternatively, ADR applicability tables for individual vehicle categories may be referenced on the Department of Infrastructure and Transport *RVCS* website at the following address and under the section titled *ADR Applicability Tables*:

<http://rvcs.dotars.gov.au/>

The ADRs apply according to the vehicle's category and date of manufacture. It is the responsibility of the signatory to refer to the appropriate ADR applicable to the vehicle.

SPECIFIC REQUIREMENTS

The following are specific requirements for complying seat replacements under Code LK1.

The approval must also comply with the general guidelines contained in sub-section 2 *General Requirements*.

1. SEAT REQUIREMENTS

Additional or replacement seats must be installed in accordance with the current issue of Standards Bulletin VSB 5A, *Commercial Manufacture and Installation of Additional Seats* or Standards Bulletin VSB 5B *Construction and Installation of Additional Seats by Individuals*.

Code LK1 also allows bench seats to be replaced with bucket seats and bucket seats to be replaced with bench seats in vehicles that were not built to comply with ADR 69 or ADR 73. However, where the latter modification is performed an additional seatbelt must be provided for the centre seating position except where:

- The design of the transmission tunnel is such that it is impractical for a person to sit in the centre of the seat, or
- There is insufficient space for a third seating position when calculated in complete multiples of 410mm for each seating position – in other words, when the width of the bench seat is less than 1230mm.

1.1 Seat Anchorage Construction

Single seats may be adequately anchored to sheet steel floors by using not less than four 8mm ISO Grade 8.8 (5/16 inch UNF SAE Grade 5) bolts, with a mild steel reinforcement backing plate of an area not less than 3750mm² in contact with the mounting surface and a thickness not less than 3mm at each anchorage point. For double and triple seats, the number/size of anchorage points should be increased accordingly.

The shape of the backing plates must match the contour of the floor material. The corners of the reinforcement plates must have a minimum radius of 5mm and the edges adjacent to the floor material must be chamfered.

The anchor bolts must be tightened to the correct tension and fully engage all the thread of the nut.

In cases where seatbelt anchorages are fixed to the seat assembly, the seat anchorages must be certified in accordance with the requirements of Code LK2.

Anchorage must not be fitted through wood, fibreglass, sheet aluminium or plastic or where wood or other non-metal material is sandwiched between steel unless certified in accordance with the requirements of Code LK2.

Unless supported by engineering evidence, seats located over wooden floors must be anchored to the vehicle structure via steel members (e.g. C - section, channel section or rectangular hollow section) of adequate strength to meet the strength requirements specified in VSB 5A or VSB 5B.

1.2 Seat Anchorage Location

Replacement seats must be located so that the occupant's seating reference point is as close as possible to that of the original seat.

Front seats must face forward and be parallel to the longitudinal centreline of the vehicle.

Seats should be located so as to allow freedom of adjustment throughout the complete range of travel.

Care should be taken when fitting replacement seats in utilities or other vehicles where windows are close to the back of the seat. Seat back or head restraints should not press against the window panel in the most rearward position of the seat.

2 SEATBELT REQUIREMENTS

Where additional seats are to be fitted (e.g. into a van or station wagon) the Vehicle Standards Bulletin VSB 5A, *Commercial Manufacture and Installation of Additional Seats* or Vehicle Standards Bulletin VSB 5B *Construction and Installation of Additional Seats by Individuals* apply.

Note: This will generally mean that *Retractor Belts* will need to be fitted. Installation of retractor assemblies require careful attention to detail and therefore must be installed as directed by the seatbelt assembly manufacturer. Incorrect installation may result in the assembly not operating as intended.

When replacing a vehicle's front bench seat with bucket seats or vice-versa, seatbelts must be fitted in accordance with the ADRs applicable for that particular vehicle's ADR category and the date of its original manufacture.

Any replacement or additional seatbelt should be new and comply with Australian Standard 2596 (*Seatbelt Assemblies for Motor Vehicles*). For vehicles originally built to comply with the ADRs, replacement belts must comply with ADR 4 or with Australian Standard 2596 (*Seatbelt Assemblies for Motor Vehicles*), and must:

- carry the manufacturer's identification, date of manufacture, part number or other identification, such as an E or SAA marking;
- have the fixed part of the buckle either on a stalk, properly adjusted strap or fixed length strap, be located against the occupant's hip when buckled up and restrained from falling on the floor when unbuckled;
- have webbing and stalk installations such that no obstruction results in a significant change of direction between anchorage and occupant. If such an obstruction exists, a complete analysis of the belt/set installation system must be carried out;
- pass through all sash guides smoothly without any edge loading or twisting which might cause premature wear; and
- provide neat, obstruction free stowage with accessibility and excess length meeting ADR 4 requirements.

2.1 Seatbelt Anchorage Strength

Seatbelt anchorages must be able to meet the applicable strength requirements given in VSB 5A or VSB 5B.

2.2 Seatbelt Anchorage Construction

Seatbelts must be adequately anchored to a steel floorpan, upper body or pillar by using bolts designed specifically for anchoring seatbelts. Seatbelts are usually supplied in kit form with the appropriate anchor bolts and backing plates. If not, they may be purchased separately.

Lower and upper anchoring systems employ different mountings as shown in Figure LK1 below.

If the backing plate supplied with the seatbelt is not suitable because of its shape or dimensions, an alternative backing plate may be used. It must have an area not less than 3750mm² in contact with the mounting surface and a thickness of 3 - 4.5mm (1/8 - 3/16 inch).

The reinforcement backing plate and anchor bolt should be positioned so that the backing plate is loaded approximately centrally. Edge loading should be avoided.

The shape of the backing plates must match the contour of the floorpan/pillar material in the region of the anchorage. The corners of the reinforcement plates must have a minimum radius of 5mm and the edges adjacent to the body must be chamfered. The anchor bolts must be tightened to the correct tension and fully engage all the thread of the nut.

The ductility of low carbon steel is beneficial in allowing redistribution and sharing of loads, and plastic deformation helps to absorb impact energy.

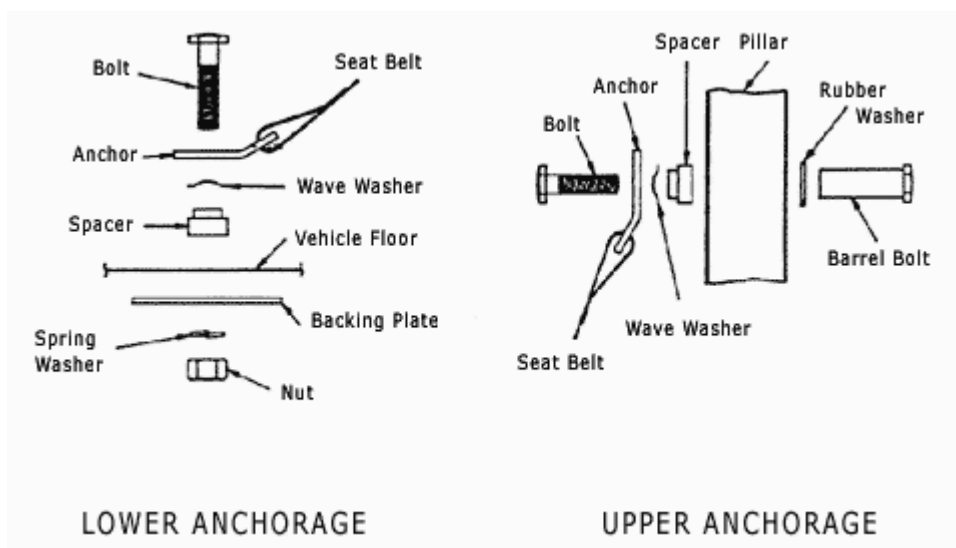


Figure LK1 Typical Lower Anchorage and Upper Anchorage Installations

Anchorage must not be fitted through wood or where wood or other non-metallic material is sandwiched between steel. Anchorage must not be fitted to any part of the vehicle which is affected by rust or impact damage.

Anchorage must not be fitted to wooden, aluminium, plastic or fibreglass panels unless the anchorage has been physically tested and certified in accordance with Code LK2.

2.3 Locations of Anchorages

Only seatbelt anchorages of a type determined by ADR 5 *Anchorage for Seatbelts and Child Restraints* may be installed.

2.3.1 Lap Anchorages

The two lap anchor points for a particular seating position must be located on opposite sides of the Seating Reference Plane (longitudinal centreline of the seat) a minimum distance of 165mm apart. A distance of 250mm to 350mm between the anchorages is desirable. See Figure LK2.

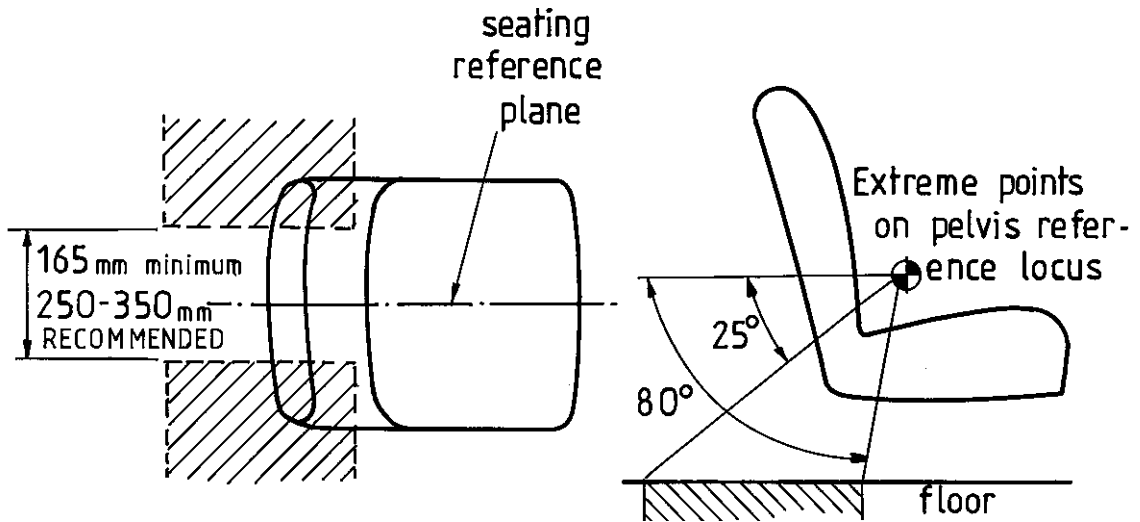


Figure LK2 Lap anchorages must be located within shaded areas

Unless supported by engineering evidence, the lower seatbelt anchorages must not be superimposed, i.e. each seatbelt must be anchored by separate bolts. The anchorages provided for different seating positions must be separated by at least 200mm.

In cases where the lap strap is not in a straight line when viewed from the side, the positioning of the anchorage points should be such that the requirements of Clause 5 of ADR 5 are met.

Since most seatbelts are made to a standard length, it is not good practice to have the anchorage points too far behind the seat. The buckle strap should be of such length that the buckle is accessible and at the side of the hip of the seat occupant, but not so long that the buckle rests on the seated person's abdomen.

Where a seatbelt is mounted on a seat, the two pelvic restraint anchorages must be mounted on the seat to maintain the positional relationship between the retractor assembly and the Seating Reference Point. Care should be taken to ensure that the seat, seat anchorages and seatbelt anchorages are of sufficient strength.

2.3.2 Sash Location Point

A sash guide must be fitted for each seating position fitted with a lap sash belt.

Lap sash and harness belts must not be used on side facing seats. These seats may be fitted with lap belts only.

The sash location point must lie in *Area A* and must be at least 140mm from the Seating Reference Plane (see Figure LK3).

Where the distance of the sash location point to the seating reference plane(s) is less than 200mm, *Area A* is extended to include the area contained within KPQT.

$$CR = 315 + 1.6 s \quad MJ = 1.3s$$

$$RB = 260 + s \quad MP = 250$$

All Dimensions are in mm

s = the shortest transverse distance in mm from the seating reference plane to the sash location point under consideration.

When s is less than 200mm, *Area A* is extended to include the area contained within KPQT.

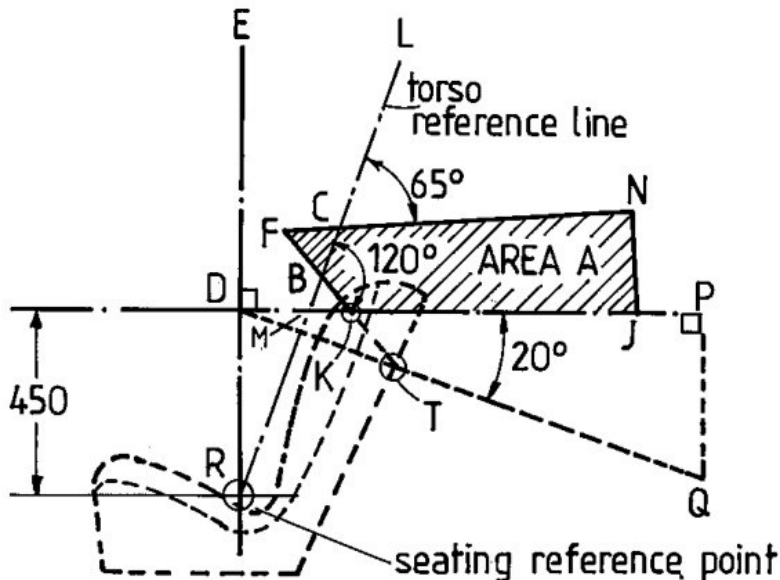


Figure LK3 Location of Area A Construction Detail

2.3.3 Harness Anchor Point

In cases where only one harness anchorage is provided, the anchor point must be located:

- rearward of a transverse plane inclined at the same angle as the Torso Reference Line and 500mm horizontally rearward of the Seating Reference Point (see Figure LK3);
- not more than 50mm from the seating reference plane; and
- within Area B (see Figure LK4).

In cases where two harness anchorages are provided for a particular seating location, the anchor points must be located:

- rearward of a transverse plane inclined at the same angle as the Torso Reference Line and 75mm horizontally rearward of the Seating Reference Point;
- either side of the Seating Reference Plane in such a way that the distance from the Seating Reference Plane does not differ by more than 100mm;
- such that the transverse separation is either 250-300mm or less than 250mm by not more than half the horizontal distance from either anchor point to the transverse plane through the Torso Reference Line; and
- within Area B (see Figure LK4).

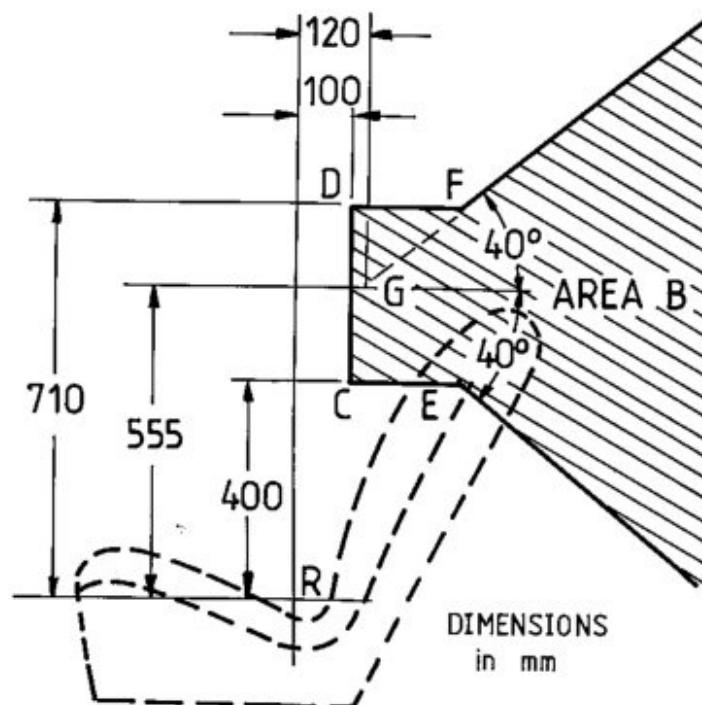


Figure LK4 Location of Area B

3 DEFINITIONS

The following terms are defined in the ADRs which contain more detailed explanations of the requirements for locations of seatbelt anchorage points.

ADR 5 *Anchorage for Seatbelts and Child Restraints.*

ADR 34 *Child Restraint Anchorages and Child Restraint Anchor Fittings*

Seating Reference Plane: the vertical longitudinal plane through the geometric centre of the seat.

Seating Reference Point: simulates the position of the pivot centre of human torso and thigh in the rearmost normal seating position of the centre of a 100mm diameter disc placed in the Seating Reference Plane at the join of the seat and backrest. See Figure LK3.

Pelvis Reference Point: simulates the correct position of a lap strap when worn by the seat occupant. It is located at a height of 95mm above and 70mm forward of the *Seating Reference Point*.

Torso Reference Line: a line passing through the *Seating Reference Point* and parallel to the backrest. For seats with an adjustable backrest, it is a line passing through the *Seating Reference Point* at an angle of 30° from the vertical. See Figure LK3.

Harness Belt: a seatbelt assembly consisting of at least one strap designed to provide pelvic restraint and two or more torso straps designed to provide upper torso restraint.

4 REMOVAL OF SEAT(S) AND SEATBELT(S) TO REDUCE SEATING CAPACITY

Seats and seatbelts may be permanently removed to reduce seating capacity of the vehicle. The vehicle must be certified to represent the new seating capacity. All holes in the bodywork must be blanked off.

Any removal of seats and/or seatbelts to achieve a reduction in seating capacity must not interfere with the vehicle's *Supplementary Restraint System* (SRS). For example removing a front seat and seatbelts with pre-tensioners may disarm the entire vehicle SRS and therefore would not be able to be certified.

If the reduction in seating capacity results in a change of vehicle category the signatory must show that the vehicle complies with all additional ADRs that may now apply to that vehicle.