

Aftermarket Sports Seats – General Information

Introduction:

This information sheet is intended to provide guidance when inspecting sport seat installations for low volume certification, and contains material presented at a previous LVV Certifier training session, along with supplementary notes for additional information. Information sheet 07-2009, *Removal of front seats fitted with side airbags*, should also be referred to where applicable.



Aftermarket seat rails



Aftermarket seat brackets

Sports seat
 manufactured
 by Racetech



Sports seat strength:

To follow are the relevant requirements from the LVV Seat Standard:

2.5(3): *An after-market forward-facing unstressed seat may be retro-fitted to a low volume vehicle, provided that the seat is:*

- (a) *designed specifically for automotive use; and*
- (b) *manufactured by a company professionally engaged in the automotive seat manufacturing industry; and*
- (c) *rigidly constructed; and*
- (d) *in good condition.*

The most difficult part of this assessment is to establish whether or not the seat is 'rigidly constructed', as required by 2.5(3)(c). Note that this can be established by assessing through a physical inspection that the amount of fore/aft and twisting movement that can be achieved at the top of the seat back is minimal. A seat that meets a recognised motor-sport standard such as FIA or SFI meets this requirement.

Aftermarket seat rails:

Aftermarket seat rails are available as a custom fit for common vehicles and are a convenient way to fit sport seats to the OE anchorages. Several brands are available, including KYOUU, Bride and M&H. Most sport seats fit to the rails using universal brackets, such as those shown on page 1.

There is a misconception that these branded rails never require LVV certification. In most cases LVV certification is required, because the seatbelt anchorages are commonly removed from the OE seat and fixed to the new rails or to the floor.

For the purpose of LVV certification, the seat anchorage refers to the fixing of the complete seat assembly to the floor-pan and everything else (including the rails and brackets) is deemed to be part of the seat.

The only seat-related modifications that do not require LVV certification are the following cases:

- the modification was carried out before March 1999 and meets all other requirements, or
- the seat is an unmodified OE seat from another vehicle, or of a known and reputable aftermarket brand, and
 - the seat is fitted to unmodified OE seat anchorages, and
 - the seatbelt anchorage or operation is not affected, and
 - the seat components are all OE components from a production vehicle, or of a known and reputable aftermarket brand, and are not fitted together by welding, and
 - the relationship between seat, seat occupant, front airbag and location of the seatbelt anchorages is not affected.

Seat rail construction and rigidity:

The seat rail frame example shown below is manufactured from thin flat bar, and allows excessive vertical movement, with the potential for sagging or fatigue, especially to the welded joints. Reinforcement of this frame is required in order to be able to meet 2.5(3)(c) of the LVV Seat and Seat Anchorage Standard.



Seatbelt stalk mounting:

The seatbelt buckle is often mounted to the OE seat, and the OE rails and brackets are designed to take the buckle loads, spread across all four anchorages to a varying degree.

When a sport seat is fitted along with new rails and brackets the seatbelt buckle anchorage is affected.

The picture at right shows the buckle mounted to a non-OE bracket on the top side of the rail, so it moves with the seat. This becomes a stressed seat, and in this case the LVV Seat and Seat Anchorage Standard requires proof of strength; - this is not usually available for aftermarket rails.



This design puts the buckle loads through the rails and brackets, which in this case are weak and flexible. The seat could be displaced a significant distance when load is applied to the seatbelt. Therefore, in this case, the buckle anchorage needs to be removed from the rails. The solution is to mount the buckle to the floor or tunnel, on doubler plates as is standard for a seatbelt anchorage. Note also that if a different buckle is fitted, it must be proven to be compatible with the OE seatbelt.

Note that the minimum size for all seatbelt fasteners is 7/16". It is not acceptable to drill out an OE seat mount to accept a larger seatbelt fastener as there may not be sufficient material remaining for the increased load. The seatbelt mount can be combined with an existing seat anchorage position with suitable doubler plates.

Seat compatibility with seatbelt:

Sport seats are designed for use with a four-point harness, so when used with a lap and diagonal belt there may be issues, such as:

- the high sides prevent the seatbelt fitting snugly onto the occupant; and
- a short buckle is less accessible; and
- if the seatbelt buckle is fed through the guide holes in the seat, the seatbelt release is less accessible; and
- the seatbelt rubs on the high sides, wearing through the fabric. The main structure of sports seats is usually a glass-fibre composite which, once exposed, is likely to fray the seatbelt or cause occupant injury.



To improve fitment – and provided that there are no other issues such as accessibility - the seatbelt can be threaded through the outer belt hole in the seat. Some manufacturers such as Racetech make a sport seat with lower sides specifically for road use.

Bracket construction:

This photo shows an example of very poor attachment brackets – the side bracket should be a one-piece item that will ensure the prevention of any swivelling of the seat under an impact load. Compare the sub-standard brackets in the photograph at right with the typically used and acceptable bracket shown on page 1.



The washers used to mount a seat to brackets should be an appropriate size for the holes – larger washers are required for slotted bracket holes.

Seat compatibility with airbags and seatbelts:

The seat cushion height should be as close to original as practical for suitable airbag deployment and acceptable driver vision. The seat back should not be reclined such that the upper seatbelt anchorage is outside of the acceptable position for the average occupant. The seat position is especially important in a frontal impact compliant vehicle – it is a key factor for optimum airbag deployment and for maintaining a safe tolerance to original, as required by the Land Transport Frontal Impact Rule.

Seat fore-aft adjustment and entrance/exit:

A sport seat that replaces an original driver's seat with fore-aft adjustability must (except in the case of a legitimate motorsport vehicle) retain that adjustability.

Vehicles with rear seats that are accessed from the front row must incorporate a ready means of entry and exit, by the most direct path practical, for all rear seat passengers by having either an aisle space of a width of not less than 300 mm to a door, or one or more seats that folds or tilts forward.

Where entrance and exit to a seat within a low volume vehicle is accessed across or past a folding or tilting seat section, the control to enable the folding or tilting of the seat or seat section must be positioned on the side of the seat nearest the adjacent door, and be within easy reach, and be able to be easily operated by any person relying on the control to assist in exiting the vehicle.

Finally:

If any assistance in the use of this Information Sheet is needed, please contact an LVVTA technical team member at the LVVTA office on (04) 238-4343.