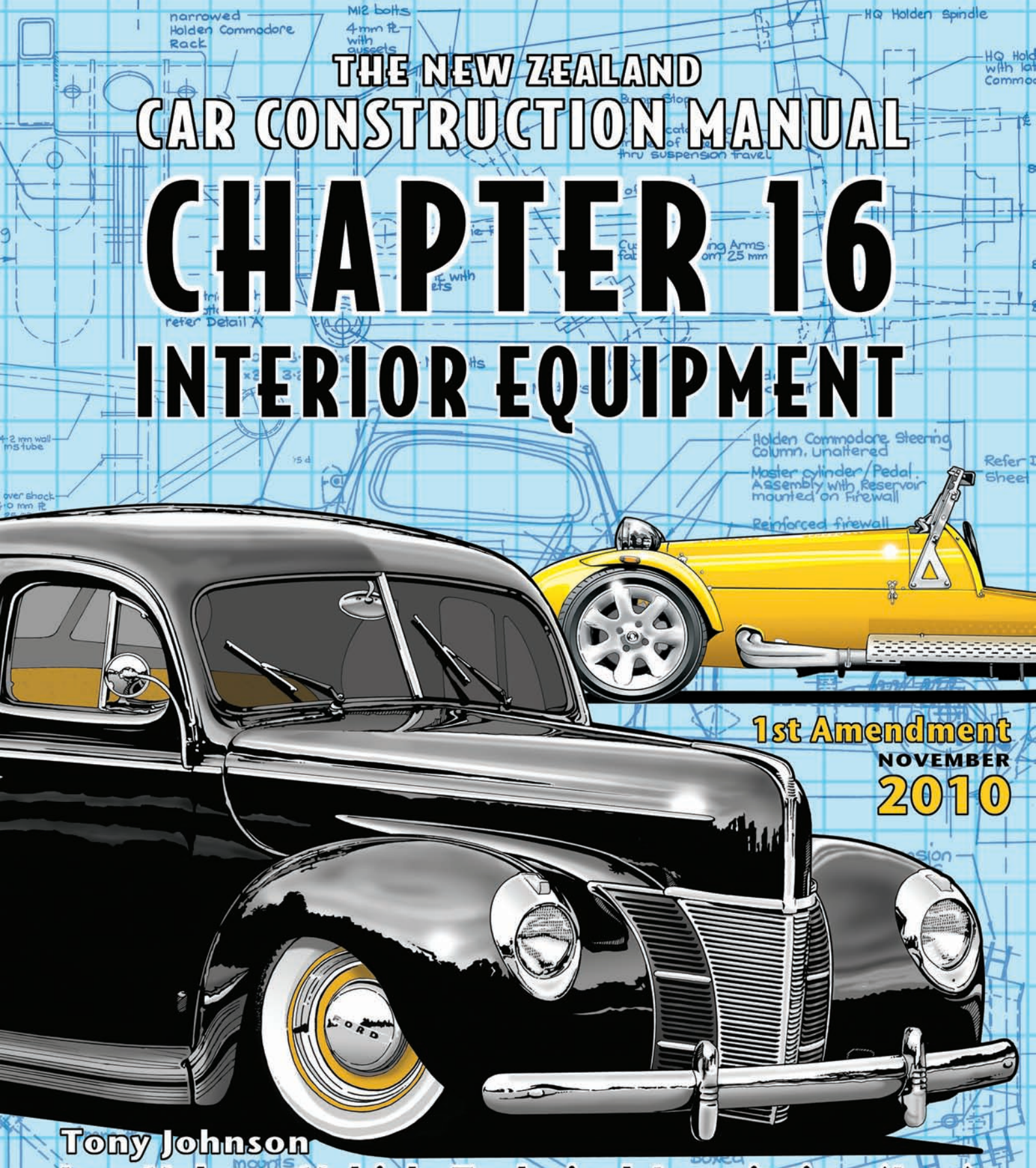
THE NEW ZEALAND

CAR CONSTRUCTION MANUAL

CHAPTER 16

INTERIOR EQUIPMENT



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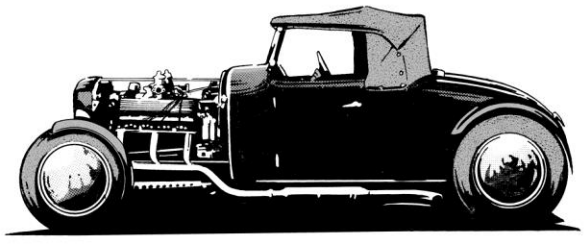

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The New Zealand Car Construction Manual is published and owned by the Low Volume Vehicle Technical Association Incorporated (LVVTA). LVVTA is an incorporated society and was established in 1992, and represents approximately 50,000 motor vehicle enthusiasts throughout New Zealand.

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NZHRA, and its key personnel, have, and continue to since the inception of LVV certification, form the back-bone of the LVV certification system in New Zealand. LVVTA is very appreciative of NZHRA's on-going commitment and integrity.

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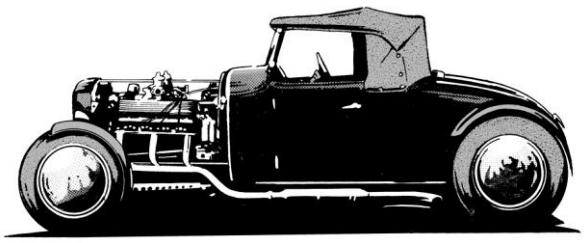

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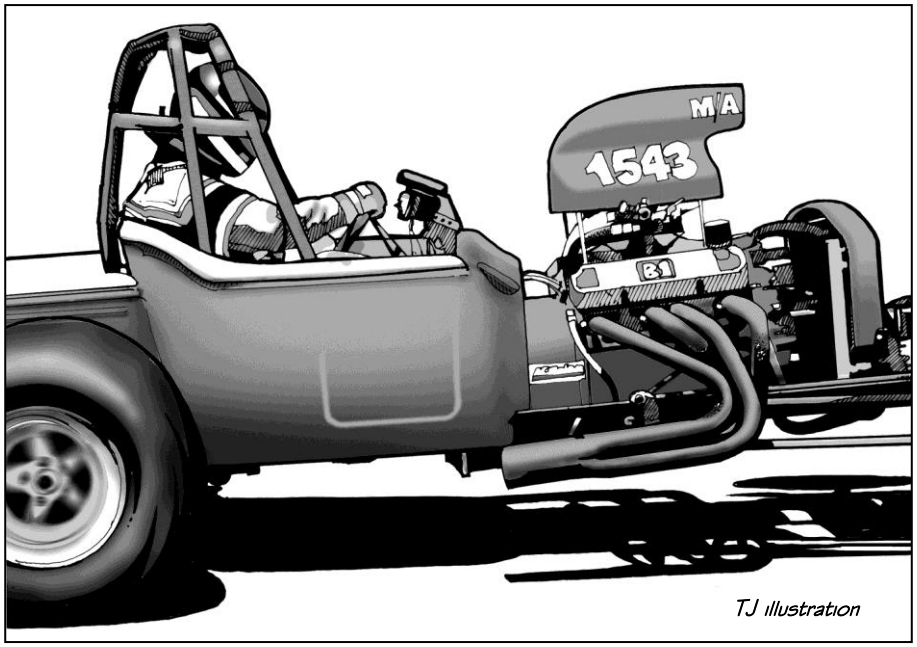
Chapter 16:

INTERIOR EQUIPMENT



Chapter 16 Contents

Key: (for full key details, refer to 'Chapter 2 – About this Manual')
Normal type: Provisions of the NZ Car Construction Manual for all vehicles
Normal type in shaded box: Special provisions of the NZ Car Construction Manual for vehicles built or modified before specified dates
***Italic type**: Extracts from any relevant LVVTA Low Volume Vehicle Standards*
Script type: Helpful hints, tips, explanations, clarifications, and interpretations
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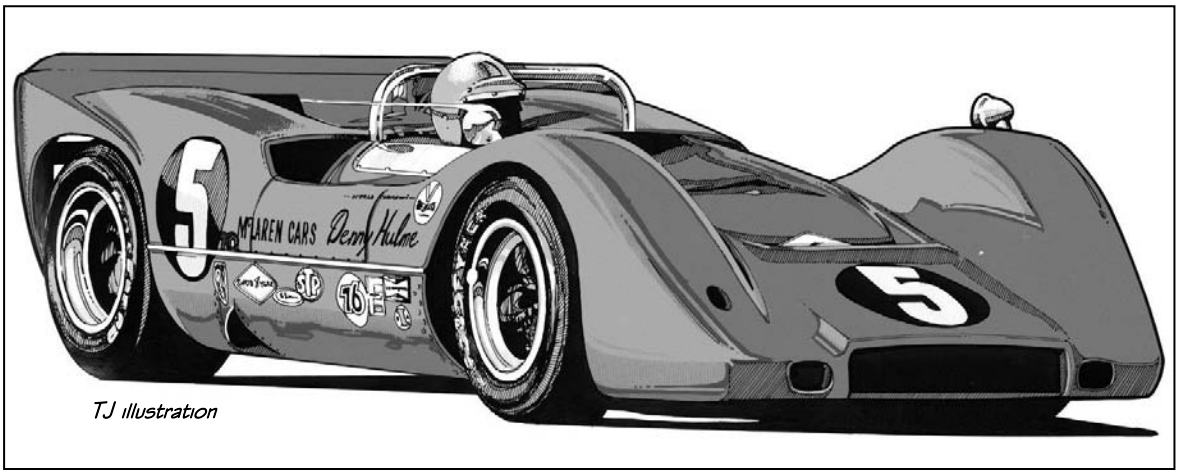


TJ illustration

CHAPTER 16: INTERIOR EQUIPMENT

Introduction:

As well as safety standards aimed at making a motor vehicle less likely to become involved in an accident, such as those for braking, steering, and suspension systems, many safety standards are directly associated with how a vehicle performs in terms of protecting its occupants in the event of an accident. Interior impact performance is one of the most important occupant protection standards there is.

This chapter is aimed at providing simple design features that, if incorporated during the construction of a hobby car, can result in a reduction of the severity of occupants' injuries during contact with the vehicle's interior surfaces, fittings, and controls in the event of an accident.

Note that where a production vehicle retains its original surfaces, fittings, and controls, the requirements in this chapter do not apply.

Defining passenger compartment zones:

16.1 Defining 'A-Zone' areas

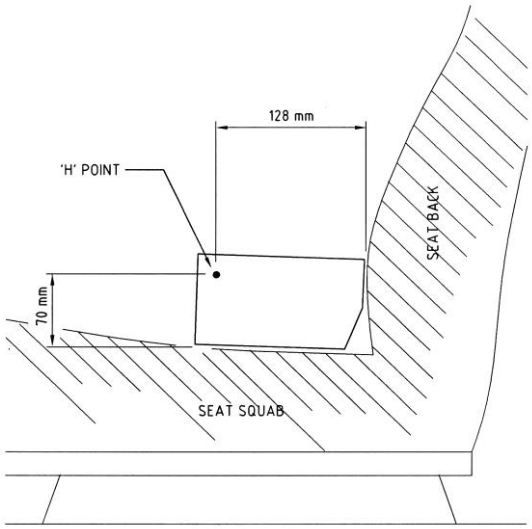
16.1.1

The 'A-Zone' of a low volume vehicle passenger compartment is the area inside:

(a) *an arc swung in a forward direction from the h-point using either a LVVTA H-frame, or a LVVTA H-point Template as shown in Diagram 16.1, with the seat in its mid-point position if adjustable, from the seatback in a normal driving position, to the seat base (see Diagram 16.1), of:*

16.1.1

'Passenger compartment' means the area within the inside of a vehicle, in which the driver and the passengers sit.

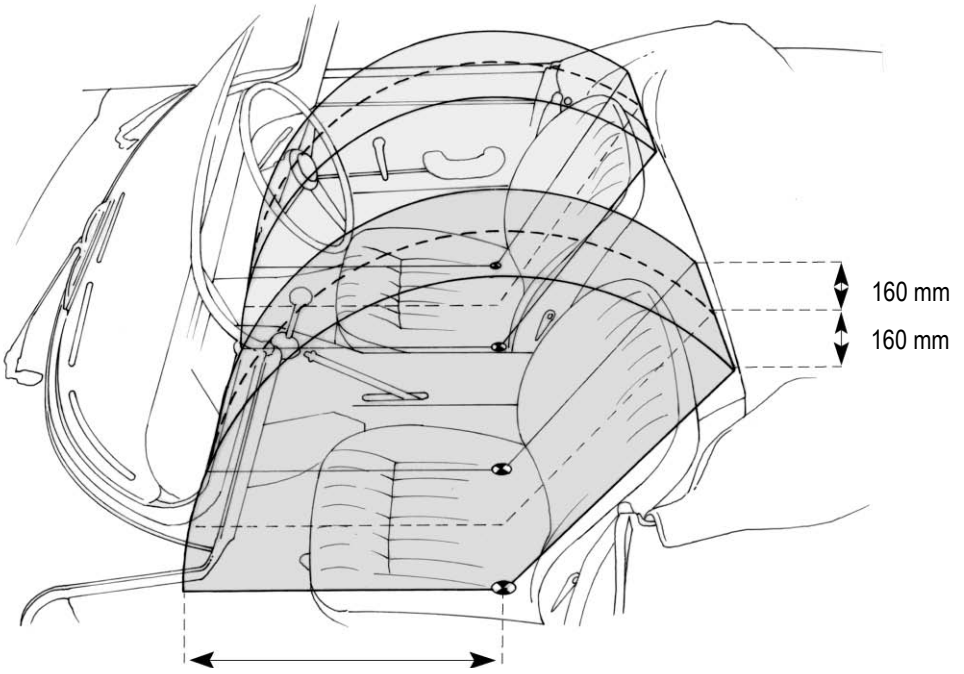


GW diagram

Diagram 16.1 LVVTA H-point template

(i) *where web-clamp retractor lap and diagonal or four-point harness seatbelts are fitted, a 700 mm (28") radius (see Diagram 16.2); or*

(ii) *where seatbelts of types other than those specified in 16.1.1(a)(i) are fitted, a 900 mm radius (37") (see Diagram 16.2); and*



700mm WITH WEB CLAMP RETRACTOR & FULL HARNESS BELTS
900mm WITH OTHER TYPES OF BELTS

'A-ZONE' AREAS ARE SHOWN IN SHADING

TJ diagram

Diagram 16.2 Passenger compartment 'A-zone' areas

(b) *160 mm (6 ½") on either side of the longitudinal centre-line of each seating position (see Diagram 16.2).*

16.2 Defining 'B-Zone' areas

16.2.1

The 'B-Zone' of a low volume vehicle passenger compartment is the remaining area within the passenger compartment surrounding the A-Zone specified in 16.1.1, but does not include the 'C-Zone' of a low volume vehicle passenger compartment specified in 16.3.1.

16.3 Defining 'C-Zone' areas

16.3.1

The 'C-Zone' of a low volume vehicle passenger compartment is:

(a) *the area:*

(i) *below the horizontal plane measured at the lowest point of the front seat cushion (see Diagram 16.3); and*

(ii) *behind, and following a plane extending upward, parallel to the back of the backrest on the rear-most seat (see diagram 16.3); and*

Diagram 16.3 Below and behind seat-line 'C-zone' areas

(b) *provided that no front centre seating position exists, the width of the dashboard and centre console surface area, which may not exceed 140 mm (5 ¾") on either side of the longitudinal centre-line of the vehicle (see Diagram 16.4) and:*

16.1, 16.2, and 16.3

The basic principle behind the three zones is this;

- the 'A-zone ' is where an occupant head-strike is likely to occur in an impact, so safety requirements in this area are critical;
- the 'B-zone' is less critical but never-the-less important as a lot of occupant arm and leg strike could occur in this area in an impact;
- the 'C-zone' is unlikely to be contacted by occupants in the event of an impact, so much less importance is placed on the safety requirements in this area.

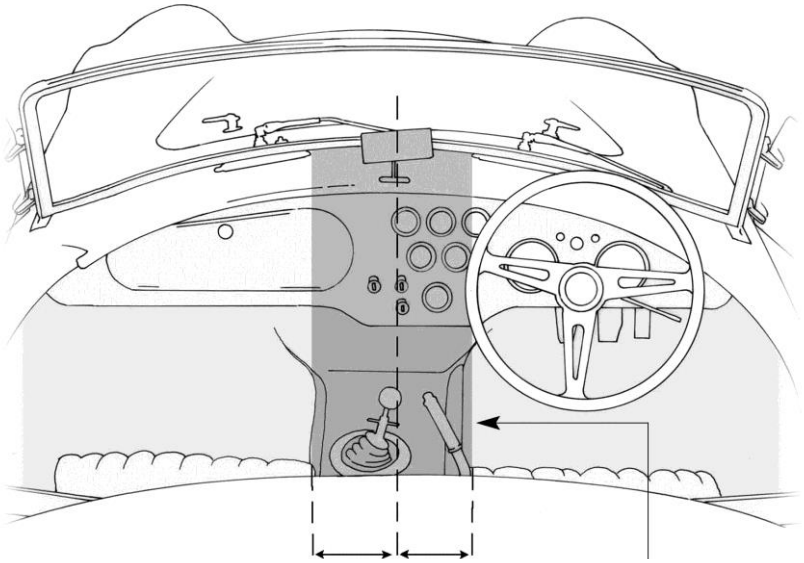


Diagram 16.4 Dashboard and centre console 'C-zone' area

(c) *the area forward of the steering wheel, defined as a forward horizontal projection of an area 400 mm (16") across, circumscribing the upper-most end of the steering column, (see Diagram 16.5); and*

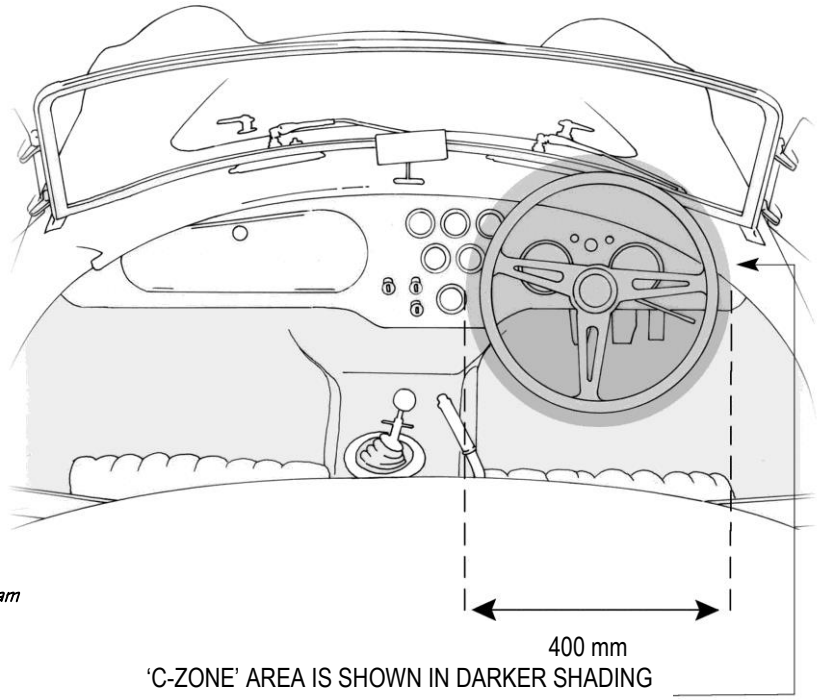


Diagram 16.5 Steering wheel 'C-zone' area

(d) *any part of the dashboard and instrument panel between the edge of the area specified in 16.3.1(c) and the nearest inner pillar or sidewall area (see Diagram 16.6); and*

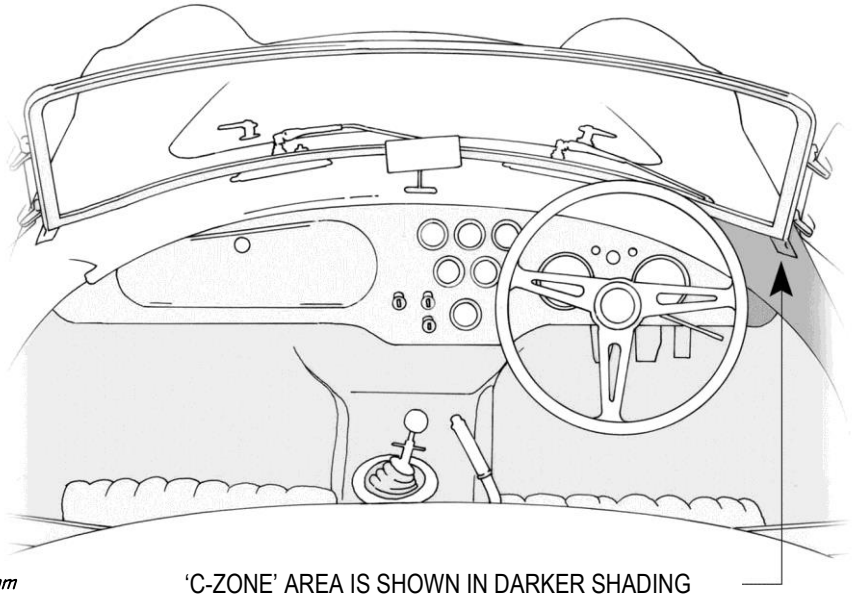


Diagram 16.6 Steering wheel to nearest pillar or sidewall 'C-zone' area

(e) *any window glass or window glass framing; and*

(f) *roof bows and related components within a hood frame of a convertible vehicle; and*

(g) *any area which is unable to be contacted by a 165 mm (6 ¾") diameter head-sphere; and*

(h) *any other areas which could not reasonably be expected to be contacted by an occupant in the event of a front, rear, or side impact, or a roll-over.*

The general intent of this chapter is to ensure that the areas of the passenger compartment that any occupants may contact in the event of an impact or roll-over, do not incorporate any sharp points, edges, or protrusions that could increase the likelihood or degree of injury to those occupants.

'A-zone' interior equipment requirements

16.4 Dashboard surfaces

16.4.1

All surfaces of custom-built dashboard fascias fitted within the 'A-Zone' of a low volume vehicle passenger compartment must be designed and constructed so that any surfaces that face the occupants:

(a) *have all corners and edges with a radius of no less than 5 mm (3/16"); and*

(b) *either:*

(i) *absorb impact energy by collapsing, deforming, or displacing in the event of an impact, leaving no sharp projections in doing so; or*

(ii) are covered in a high-density energy-absorbing material of no less than 10 mm (13/32") thickness.

16.5 Dashboard supporting structures

16.5.1

Any sections of solid structure supporting any custom-built dashboard fascia surfaces within the 'A-Zone' of a low volume vehicle passenger compartment, must, if directly exposed to the passenger compartment:

(a) be provided with a radius on all corners and edges of no less than 5 mm (3/16"); and

(b) be covered in a high-density energy-absorbing material of no less than 10 mm (13/32") thickness.

16.4.1

Any OE dashboard and OE supporting structure is deemed to comply with the requirements of Chapter 16. The intent of this section is to ensure that custom-built dashboards and support structures are not too rigidly constructed.

16.4.1(b)(i)

Typical fibreglass dashboards, or light-gauge aluminium or panel steel dashboards, will meet this requirement.

16.5.2

In addition to 16.5.1, any sections of solid structure that are within the 'A-Zone' of a low volume vehicle passenger compartment, that are supporting any custom-built dashboard fascia surfaces, and are positioned within 50 mm (2") behind any dashboard fascia surfaces that face the passenger compartment, must:

(a) be provided with a radius on all corners and edges of no less than 5 mm (3/16"); and

(b) be covered in a high-density energy-absorbing material of no less than 10 mm (13/32") thickness.

16.5.2

Any rigid and sharp objects (such as an angle-iron dash support) positioned behind the dashboard in the 'A-zone' areas can be a safety hazard in an impact, especially when the dashboard itself is made from a light deformable material. Any rigid and sharp solid structure facing the passenger compartment must be protected as much as possible in case of contact from occupants.

16.6 Steering column and wheel

16.6.1

A steering column and wheel fitted within the 'A-Zone' of a low volume vehicle passenger compartment must meet any applicable requirements specified in 'Chapter 7 - Steering Systems'.

16.7 Switches, knobs, and instruments

16.7.1

All dashboard equipment, including switches, knobs, instruments, accessory equipment, and other fittings and controls positioned within the 'A-Zone' of a low volume vehicle passenger compartment, must be mounted in such a way that upon contact by an occupant in the event of an impact, the equipment will collapse through the panel or surface to which it is attached, leaving no sharp edges in doing so.

16.7.1

Generally, these items are fitted in a 'B-zone' or a 'C-zone'. By keeping all switches and other equipment in the 'C-zone', selection and installation is much easier.

16.7.2

A glove-box compartment door fitted within the 'A-Zone' of a low volume vehicle passenger compartment must incorporate a latching mechanism that minimises the likelihood of the door opening in the event of an impact.

16.8 Seats

16.8.1

Any part of a seat-back positioned within a rear seat 'A-Zone' of a passenger compartment in a low volume vehicle must:

(a) incorporate no exposed rigid frame or fittings, or sharp edges; and

(b) *either:*

(i) *be padded and upholstered; or*

(ii) *have the seat-back manufactured from a smooth deformable material.*

16.8.2

A head restraint fitted to a seat within the 'A-Zone' of a low volume vehicle passenger compartment must meet any applicable requirements specified in 'Chapter 14 - Seats, Seatbelts, & Anchorages'.

16.9 Roll-bars and roll-cages

16.9.1

Unless the vehicle has been issued with a valid and current LVV Authority Card that records 'Competition Occupant Protection System' on the Authority Card, no part of any roll-bar or roll-cage may be positioned within the 'A-Zone' of a passenger compartment in a low volume vehicle.

16.9.1

See 'Useful Information' section for more information on LVV Authority Cards for fenders, roll-cages, and other items.

'B-zone' interior equipment requirements

16.10 Dashboard surfaces

16.10.1

All surfaces of dashboard fascias fitted within the 'B-Zone' of a low volume vehicle passenger compartment must be designed and constructed so that any corners and edges of any surfaces that face the occupants either:

(a) are provided with a radius of no less than 5 mm (3/16"); or

(b) are covered in a high-density energy-absorbing material of no less than 10 mm (13/32") thickness.

16.11 Steering column and wheel

16.11.1

A steering column and wheel fitted within the 'B-Zone' of a low volume vehicle passenger compartment must meet any applicable requirements specified in 'Chapter 7 - Steering Systems'.

16.12 Switches, knobs, and instruments

16.12.1

All dashboard equipment, including switches, knobs, instruments, accessory equipment, and other fittings and controls positioned within the 'B-Zone' of a low volume vehicle passenger compartment, either:

(a) if protruding from the dashboard surface by between 5 mm (3/16") and 10 mm (13/32") from the panel surface, must have a face area of no less than approximately 2 square cm (3/8 square "); or

(b) if protruding from the dashboard surface by 10 mm (13/32") or further from the panel surface, must have a face area of no less than approximately 6 square cm (1 square ").

16.12.2

In addition to 16.12.1, all dashboard equipment, including switches, knobs, instruments, accessory equipment, and other fittings and controls positioned within the 'B-Zone' of a low volume vehicle passenger compartment, must either:

(a) *have all contactable edges and corners provided with a radius of no less than 3 mm (1/8"); or*

(b) *be designed so that in the event of an impact, the items will collapse through the panel surface, or break off or bend, leaving no sharp edges or protrusions facing towards the passenger compartment in doing so.*

16.13 Seats

16.13.1

Any part of a seat-back positioned within a rear seat 'B-Zone' of a passenger compartment in a low volume vehicle must:

(a) incorporate no exposed rigid frame or fittings, or sharp edges; and

(b) either:

(i) be padded and upholstered; or

(ii) have the seat-back manufactured from a smooth deformable material.

16.14 Roll-bars and roll-cages

16.14.1

A roll-bar may be positioned within the 'B-Zone' of a low volume vehicle passenger compartment, providing that the requirements of 16.14.3 are met.

16.14.2

A roll-cage may be positioned within the 'B-Zone' of a low volume vehicle passenger compartment, provided that:

(a) *the vehicle is not a modified production Class MA, with unitary body construction, with a permanent roof structure; and*

(b) *the requirements of 16.14.3 are met.*

16.14.3

A low volume vehicle fitted with a roll-bar or a roll-cage within the 'B-zone', must have:

(a) *a head restraint fitted to provide protection for each occupant where a roll-bar or roll-cage section exists immediately behind a seat, positioned between the occupant seating position and the roll-bar or roll-cage section; and*

16.14

A roll-bar is defined as a main hoop behind the front row of seats, with any supporting bars going rearward, although can include 'hip-bars'. (These are bars that run longitudinally from mid-way up the hoop to the bottom of the A-pillar).

A roll-cage is a roll-bar with additional bars running forward around the top of the vehicle's interior.

16.14.2

This means that fixed-roof unitary constructed passenger cars can't have a roll-cage without an LVV Authority Card. See 'Useful Information' section at the back of this chapter for more information on Authority Cards.

In the hobby car world, this means that you can have a roll-cage in open or convertible vehicles; or vehicles with a roof structure not designed for roll-over protection such as those with a fibreglass body. Also, off-road-type 4WD vehicles, and any vehicles with a separate body/chassis can all have a roll-cage.

Don't forget though, the 'A-zone' clear space requirements still apply in all cases.

(b) *no unprotected hard or sharp bracketry including a roll-bar or roll-cage mount, seatbelt mount, or fastener positioned where it would be likely to be contacted by an occupant in the event of an impact or roll-over; and*

(c) *all sections of a roll-bar or a roll-cage positioned adjacent to any A-Zone covered in a high-density energy-absorbing material which:*

(i) *meets SFI specification 45.1 or another equivalent motor-sporting specification; and*

(ii) *is not less than 15 mm (5/8") in thickness in the area facing the occupant cell.*

'C-zone' interior equipment requirements

16.15 'C-zone' interior equipment design

16.15.1

All interior fittings, controls, and surfaces within the 'C-Zone' of a low volume vehicle passenger compartment must be designed so that the likelihood of injury to occupants is minimised.

Additional requirements for other interior equipment

16.16 Roof and pillar sections

16.16.1

Surfaces within the roof and side pillar area of a low volume vehicle including roof bows, pillars, cant rails, and header rails which face the passenger compartment must:

(a) *have any exposed edges or corners of any solid sections provided with a radius of not less than 3 mm (1/8"); and*

(b) *have any exposed handles, support brackets, or other protrusions attached to the pillars or header rails:*

(i) *constructed of, or covered by, a high-density energy-absorbing material; and*

(ii) *provided with a radius of not less than 3 mm (1/8") on all corners and edges.*

16.17 Sun-visors

16.17.1

A low volume vehicle must be fitted with an effective and adjustable sun-visor for the use of the driver, unless:

(a) *due to the design of the vehicle, a sun-visor cannot be practicably fitted; or*

(b) *there is insufficient available interior space or windscreen height for a sun-visor to operate effectively and safely.*

16.17.2

A sun-visor assembly, complete with its attachment structure, sourced from a production vehicle may be fitted to a low volume vehicle, provided that:

(a) *the vehicle to which the sun-visor assembly was originally fitted was manufactured in:*

(i) *the United States of America on or after 1 January 1981; or*

(ii) *Europe or the United Kingdom on or after 1 January 1974; or*

(iii) *Japan on or after 1 January 1983; or*

(iv) *Australia on or after 1 January 1988;*

and

(b) *the sun-visor assembly is mounted so as to replicate the location and installation method employed by the donor vehicle manufacturer; and*

(c) *the sun-visor assembly is unmodified.*

16.17.3

A sun-visor assembly fitted to a low volume vehicle may be sourced elsewhere provided that:

(a) the surface of the sun-visor is made from a deformable material and has all corners and edges provided with a radius of no less than 3 mm (1/8”); and

(b) any mounting brackets and fittings which incorporate hard edges or protrusions have a radius of no less than 3 mm (1/8”).

16.18 Door panels and armrests

16.18.1

No door panels or other interior trim may be removed from the interior of a low volume vehicle, in doing so exposing any surfaces or fittings that could increase the risk of injury to occupants in the event of contact, unless the substitution of other protective paneling occurs.

16.18.2

An armrest fitted to the interior of a low volume vehicle must:

(a) *have corners and edges provided with a radius of no less than 3 mm (1/8"); or*

(b) *be covered with a high-density energy-absorbing material of no less than 5 mm (3/16") thickness.*

16.19 Door and window handles

16.19.1

A handle fitted to the interior of a low volume vehicle, such as a door opener or window winder, must:

(a) *be of a design that will deflect contact; and*

(b) *have a radius provided on all edges; and*

(c) *not protrude from the door panel surface by any more than 35 mm (1 3/8").*

16.20 Rear View Mirrors

16.20.1

A rear view mirror fitted within the passenger compartment of a low volume vehicle must meet any applicable requirements for rear view mirrors specified in 'Chapter 15 - Glazing and Vision'.

16.21 Park brake levers and gear levers

16.21.1

A gear lever or park brake lever fitted to a low volume vehicle, whilst in the fully released position, must:

(a) *be designed and constructed so as to minimise the risk of injury to occupants in the event of contact; and*

(b) *not have associated linkages, flanges, mounting brackets, or shafts, protruding in such a way as to increase the risk of injury to occupants in the event of contact.*

16.22 Dry-sump systems

16.22.1

A dry-sump oiling system tank and associated fittings and lines, if fitted in the passenger compartment of a low volume vehicle, must comply with the applicable safety requirements of Schedule A of the current MotorSport New Zealand Manual.

Exclusions:

16.23 Period equipment exclusions

16.23.1

Standard or optional equipment that was available at the time of a mass-produced vehicle's manufacture, when fitted to a modified production low volume vehicle for which that equipment is designed, is not required to comply with 16.7 and 16.12.

16.23.1

This means that genuine period manufacturer or aftermarket accessories such as tissue dispensers, record players, and spot lamp handles do not have to comply with 16.7 and 16.12.

16.24 LVV Authority Card exclusions

16.24.1

A low volume vehicle, for which a valid Low Volume Vehicle LVV Authority Card is issued by an LVVTA-approved organisation, that specifies 'Competition Occupant Protection System' is issued, is not required to comply with 16.4 to 16.21.

16.24.1

See 'Useful Information' section for more information on LVV Authority Cards for fenders, roll-cages, and other items.

16.25 Build or modification date exclusions

16.25.1

A low volume vehicle that was built or modified prior to 1992 is not required to comply with 16.4 to 16.14, or 16.16 to 16.21.

16.25.1

A low volume vehicle built or modified before January 1992 is only required to comply with 16.15.

Useful Information:

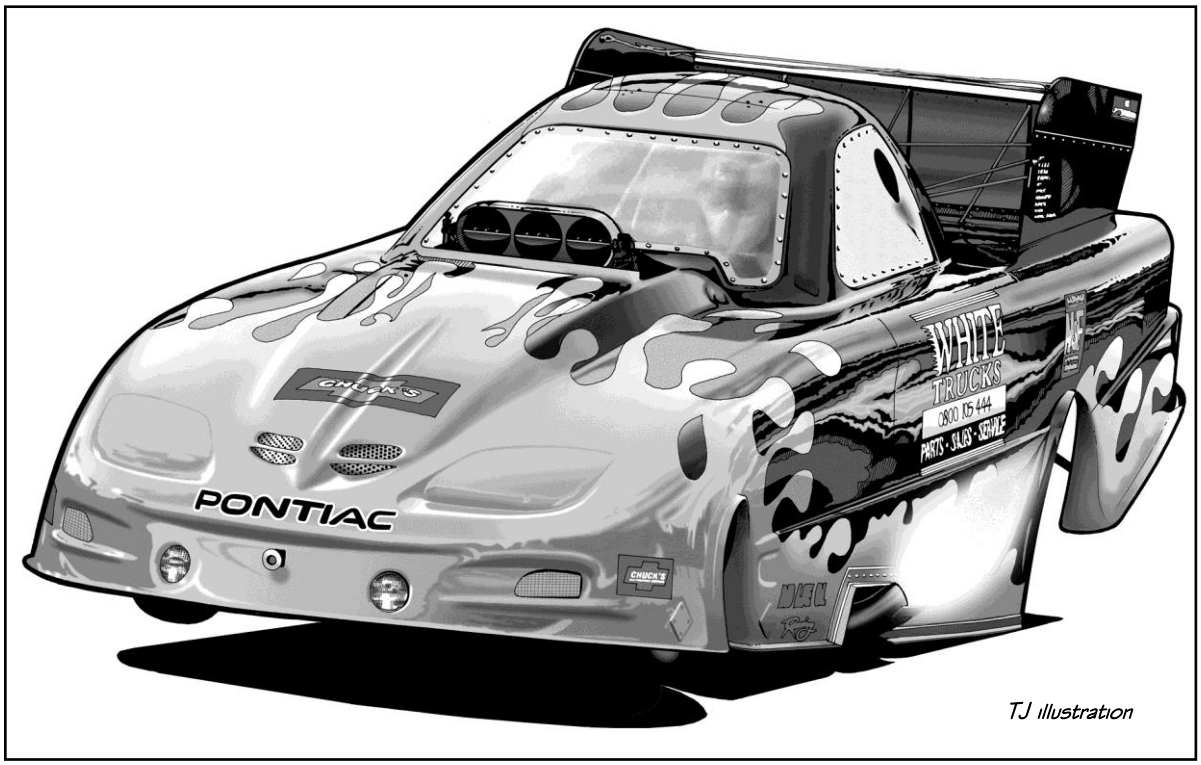
LVV Authority cards

A Low Volume Vehicle Authority Card is only available for a vehicle that is modified for a particular purpose, in order to meet the specific needs of the person nominated on the Authority Card. LVV Authority Cards can be issued only by the New Zealand Hot Rod Association, and by MotorSport New Zealand.

New Zealand Hot Rod Association's Authority Card covers fenderless vehicles, and vehicles that are required by NZHRA's and the New Zealand Drag Racing Association's safety requirements to have a roll-cage.

MotorSport New Zealand can issue LVV Authority Cards for various types of equipment that are applicable to their competition vehicles, such as roll-cages, navigational equipment, and hydraulic park brakes.

See 'Chapter 3 – Authority Card Process' for all of the details on the NZHRA LVV Authority Card system. The operator of a vehicle for which an LVVTA-approved Authority Card is issued, must, when requested by an enforcement officer or LVV certifier, produce the Authority Card for that vehicle.



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