Low Volume Vehicle Technical Association Incorporated

Low Volume Vehicle Standard

155-20(03)

(Door Retention Systems)

This Low Volume Vehicle Standard corresponds with: Land Transport Rule 32001/1 (Door Retention Systems)

3rd Amendment – effective from: 25 October 2016

Signed in accordance with clause 1.5 of the Low Volume Vehicle Code, on……by:	
on behalf of the New Zealand Transport Agency: ……	*on behalf on the Low Volume Vehicle Technical Association(Inc):* ……

LVV Standard 155-20 Amendment Record:

No:	Detail of amendments:	Version:	Issue date:	Effect date:
1	Initial issue – original version	155-20(00)	1 March 2000	1 March 2000
2	1st Amendment	155-20(01)	1 September 2002	1 September 2002
3	2nd Amendment	155-20(02)	1 July 2016	1 July 2016
4	3rd Amendment	155-20(03)	25 October 2016	25 October 2016
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Note that highlighted text shows amendments that have been made subsequent to the document's previous issue, and a grey vertical stroke to the left of the text denotes information that is of a technical (rather than a formatting) nature.

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Overview

Background

The Low Volume Vehicle Technical Association Incorporated (LVVTA) represents ten specialist automotive groups who are dedicated to ensuring that vehicles, when scratch-built or modified, meet the highest practicable safety standards. The information in these standards has stemmed from work undertaken by LVVTA founding member organisations that commenced prior to 1990 and has been progressively developed as an integral part of NZ Government safety rules and regulations by agreement and in consultation with the New Zealand Transport Agency. As a result, the considerable experience in applied safety engineering built up by LVVTA and the specialist automotive groups over the past twenty years can be of benefit to members of the NZ public who also wish to build or modify light motor vehicles.

Availability of low volume vehicle standards

Low volume vehicle standards are developed by the LVVTA, in consultation with the New Zealand Transport Agency, and are printed and distributed by the LVVTA. The standards are available to the public free of charge from the LVVTA website; www.lvvta.org.nz

Further information on the availability of the low volume vehicle standards may be obtained by contacting the LVVTA at info@lvvta.org.nz.

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Associated information

Other associated information relevant to the subject matter contained in this low volume vehicle standard, which in the interest of comprehensiveness, should be read in conjunction with this standard, includes:

Document	Page #/Section/Chapter
• NZ Car Construction Manual	Chapter 13 Body Modification & Construction
• LVVTA News August-December 2014 Issue 50	Page 5: 'Scope of Door Retention Exclusion Expanded to Include Vehicles with Roofs'
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Note that all documents referred to in this table, with the exception of the NZ Car Construction Manual, can be accessed from www.lvvta.org.nz free of charge. For information on obtaining the NZ Car Construction Manual, contact info@lvvta.org.nz

Note also that paper copies of documents can become out of date and as such should not be relied upon, therefore LVVTA advises users of this standard to check to ensure that the Associated Information listed here is current, by going to www.lvvta.org.nz/standards.html

Contents

Door Retention Systems (155-20[03])

Purpose of this standard

The purpose of this low volume vehicle standard is to specify requirements for door retention systems in light vehicles, in order to minimise the possibility of inadvertent door opening, and to maximise the likelihood of the door being able to be opened following a collision.

Section 1 Scope and application of this standard

1.1 Scope of this standard

1.1(1) This low volume vehicle standard applies to all light vehicles fitted with doors that are used for the entry and exit of occupants, other than those specified in *1.1(2)*, that are:

(a) modified on or after 1 January 1992 in such a way that any door retention systems may, directly or indirectly, be affected; or

(b) scratch-built on or after 1 January 1992.

1.2(2) This low volume vehicle standard does not apply to:

(a) powered bicycles of Class AB; or

(b) motorcycles of Class LA, LB, LC, or LD; or

(c) light trailers of Class TA or TB; or

(d) those vehicles specified in *section 4*.

1.2 Application of this standard

1.2(1) A light vehicle that is modified or scratch-built as in *1.1(1)*, becomes a low volume vehicle, and must:

(a) be certified in accordance with the procedures specified in *chapter 2* of the *Low Volume Vehicle Code*; and

(b) unless *section 3* applies, comply with all applicable technical requirements contained in *section 2* of this standard.

NOTE 1: Where a light vehicle is required to be certified to the *Low Volume Vehicle Code*, but the modification date precedes the date upon which this standard takes effect (1 March 2000), an LVV Certifier must ensure that the vehicle meets the general safety requirements contained in *2.1* of this standard, and should use the applicable technical requirements of *section 2* of this standard as a guideline upon which to base his judgements on the safety of the vehicle.

NOTE 2: A light vehicle that is to be operated as a Passenger Service Vehicle (PSV) must also comply with any applicable requirements of the *Land Transport Rule: Passenger Service Vehicles 1999 (Rule 31001).*

1.3 Methods of compliance with this standard

1.3(1) A low volume vehicle must comply with the technical requirements of this standard, by meeting either:

(a) all applicable requirements specified in *2.2* to *2.6*. of this standard; or

(b) all applicable requirements specified in *sections 13.8* to *13.20* inclusive of *Chapter 13* of the *New Zealand Car Construction Manual*; or

(c) alternative methods proven by practical testing as specified in *1.3(2)* of this standard; or

(d) alternative methods proven by calculation as specified in *1.3(3)* of this standard.

Alternative systems proven by practical testing

1.3(2) The technical requirements of this standard may be complied with, where a specific design solution is required as an alternative to *1.3(1)(a)* and *1.3(1)(b),* by:

(a) meeting all applicable requirements specified in *section 2*, other than those in *2.3* and *2.4*; and

(b) instead of complying with *2.3* and *2.4*, completion of a practical test process of the alternative door latch and striker plate assembly or door hinge assembly, to demonstrate that either:

(i) the applicable specific loading requirements in *2.1* have been achieved; or

(ii) results directly equivalent to those required by one of the approved standards specified in *2.3(2)* of the *Land Transport Rule: Door Retention Systems 2001(Rule 32001/1),* have been achieved;

and

(c) provision of a report of the test process to the low volume vehicle certifier to confirm that the test results required by *1.3(2)(b)* have been achieved.

Alternative systems proven by calculation

1.3(3) The technical requirements of this standard may be complied with, where a specific design solution is required as an alternative to *1.3(a)* and *1.3(1)(b)*, by:

(a) meeting all applicable requirements specified in *section 2*, other than *2.3* and *2.4*; and

(b) instead of complying with *2.3* and *2.4*, completion of engineering calculations of the alternative door latch and striker plate assembly or door hinge assembly, to confirm that the applicable specific loading requirements contained in *2.1* can be achieved; and

(c) provision of a report of the engineering calculation process to the low volume vehicle certifier to confirm that the calculation process required by *1.3(3)(b)* has been carried out.

Section 2 Technical requirements of this standard

2.1 Loading requirements for door retention systems

Specific loading requirements

2.1(1) In the case of an alternative door latch and striker plate assembly being proven by practical testing or calculation as in *1.3(3)* or *1.3(4)*, a door latch and striker plate assembly in a low volume vehicle must be designed to withstand a force that may deform the components, but not result in ultimate failure or its inability to function as intended, of:

(a) in the primary latching position, applied individually:

(i) 11 kN applied in the longitudinal direction; and

(ii) 8.9 kN applied in the lateral direction;

and

(b) in the secondary latching position, applied individually, 4.4 kN applied in both the longitudinal and lateral directions.

2.1(2) In the case of an alternative door hinge assembly being proven by practical testing or calculation as in *1.3(3)* or *1.3(4)*, a door hinge assembly in a low volume vehicle must be designed to withstand a force that may deform the components, but not result in ultimate failure or its inability to function as intended, of 11 kN, applied individually, in both the longitudinal and lateral directions.

2.2 General safety requirements

2.2(1) A low volume vehicle must:

(a) be designed and constructed using materials and components that are fit for their purpose; and

(b) be safe to be operated on the road.

NOTE: The requirements specified in *2.2(1)* are selected from *2.3* of *Part 2* of the *Low Volume Vehicle Code*, reproduced here in the interest of convenience, and are over-riding requirements which make it clear that, regardless of what technical requirements are or are not in place, every vehicle certified to the *Low Volume Vehicle Code* must be fit for its purpose, and must be safe.

2.2(2) A low volume vehicle must comply with the following general safety requirements:

(a) door retention systems and their mountings must be safe, structurally sound, and in good working order; and

(b) doors must open and close easily; and

(c) doors must remain secure in a closed position during operation of the motor vehicle; and

(d) doors must be operable at all times by any occupant seated by the door, from inside the vehicle.

NOTE: The requirements specified in *2.2(2)* are the applicable general safety requirements from *2.2* of *Land Transport Rule: Door Retention Systems 2001(Rule 32001/1)*, reproduced here in the interest of convenience.

2.3 Door latch and striker plate assembly requirements

Latch and striker assembly design

2.3(1) A door latch and striker plate assembly fitted to a low volume vehicle must be of a burst-proof design.

2.3(2) A door latch and striker plate assembly fitted to a low volume vehicle must incorporate two latching positions, comprising a primary latching position and a secondary latching position.

Latch and striker assemblies from production vehicles

2.3(3) A door latch and striker plate assembly sourced from a production motor vehicle may be fitted to a low volume vehicle, provided that the vehicle to which the assembly was originally fitted was manufactured in either:

(a) the United States of America on or after 1 January 1968; or

(b) Europe or the United Kingdom on or after 1 January 1970; or

(c) Japan on or after 1 January 1983; or

(d) Australia on or after 1 January 1988.

Latch and striker assemblies from other sources

2.3(4) If it is not practicable to apply *2.3(3)* due to the door latch and striker plate assembly type, or vehicle constructional features, the door latch and striker plate assembly must meet the appropriate best practice solutions for special applications contained within *Chapter 13* of the *New Zealand Car Construction Manual*.

2.4 Door hinge assembly requirements

Hinge assemblies from production vehicles

2.4(1) A door hinge assembly sourced from a production motor vehicle may be fitted to a low volume vehicle, provided that:

(a) the door to which the hinge assembly is fitted is of similar or lower mass than that of the door to which the hinge assembly was originally fitted; and

(b) the hinge assembly is positioned such that the loads to which it is subjected are no greater than in the original application of the hinge assembly; and

(c) the vehicle to which the assembly was originally fitted was manufactured in either:

(i) the United States of America on or after 1 January 1968; or

(ii) Europe or the United Kingdom on or after 1 January 1970; or

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

(iv) Australia on or after 1 January 1988.

Hinge assemblies from other sources

2.4(2) If it is not practicable to apply *2.4(1)* due to the hinge assembly type, or vehicle constructional features, the hinge assembly must meet the appropriate best practice solutions for special applications contained within *Chapter 13* of the *New Zealand Car Construction Manual*.

2.5 Body and door structure strength requirements

2.5(1) The door structure to which a latch and striker plate assembly, and hinge assembly is fitted must be of such a design, or be suitably reinforced, to ensure that the door is sufficiently strong to withstand the same loads required of the latch, striker, and hinge assemblies specified in *2.1*.

2.5(2) The body structure to which each end of a door is attached by the latch, striker, and hinge assembly must be of such a design, or be suitably reinforced, to ensure that the body pillars and surrounding structure are sufficiently strong to withstand the same loads required of the latch, striker, and hinge assemblies specified in *2.1*.

2.6 Door opening requirements

From inside the vehicle

2.6(1) A door fitted to a low volume vehicle must be fitted with a mechanically operated interior handle or other mechanically-operated opening device, which can be easily accessed and operated at all times from inside the vehicle.

From outside the vehicle

2.6(2) A door fitted to a low volume vehicle is not required to be able to be opened from outside the vehicle.

2.6(3) An exterior door handle or other opening device may be positioned in a hidden location on a low volume vehicle, provided that either:

(a) the location is such that the handle or opening device is shielded or protected to prevent unintentional activation by contact from road debris; or

(b) the handle or opening device is positioned in such a way so as not to be able to be unintentionally activated.

2.6(4) A door fitted to a low volume vehicle may be opened from outside the vehicle, if fitted with:

(a) a fixed electrically-operated unlatching device; or

(b) a remotely-operated and electrically-operated unlatching device.

2.6(5) A remotely-operated and electrically-operated unlatching device as specified in *2.6(4)* may only be fitted and used provided that a fail-safe inter-lock system is incorporated which enables unlatching of the doors only if:

(a) the ignition system is switched off; and

(b) either:

(i) in the case of a vehicle fitted with an automatic transmission, a gearbox inhibitor switch operating only in neutral and park is engaged; or

(ii) in the case of a vehicle fitted with a manual transmission, a park-brake switch, operating in the 'on' position is engaged.

NOTE: In the case of a low volume vehicle which is designed in such a way as to possibly make entry and exit difficult, a low volume vehicle certifier may require, at his or her discretion, proof by way of a physical demonstration that an occupant can exit the vehicle, from being seated in a restrained position with the door closed, to standing outside the vehicle, within a maximum time of seven seconds.

Section 3 Exclusions to this standard

3.1 General safety requirement exclusions

3.1(1) A low volume vehicle that is not a passenger service vehicle, is not required to comply with *2.2(2)(d)*, and may incorporate on a door to the rear of the driver's seat a safety device that can be temporarily engaged to prevent the door from being opened from inside the vehicle, provided that:

(a) the device is designed as a 'kiddie-lock'; and

(b) there is some means for a rear seat occupant to exit the vehicle in the event of an emergency.

NOTE: In the case of a low volume vehicle that is a Passenger Service Vehicle, a 'kiddie-lock' can be fitted, provided that the vehicle to which the kiddie-lock is fitted has been issued with an exemption from the New Zealand Transport Agency.

3.2 Motor vehicles for people with disabilities

3.2(1) A low volume vehicle with an electrically operated door opening and closing system principally designed to enable wheelchair access for a person with a disability, is not required to comply with *2.6(5)*, provided that the affected doors are not adjacent to any occupant seating positions.

3.3 Motor caravan exclusions

3.3(1) A door that is not adjacent to any occupant seating position, and is fitted to a low volume vehicle that is designed and operated solely as a motor caravan, is not required to comply with *2.3, 2.4,* and *2.5.*

3.4 Original equipment exclusions

Where space constraints exist

3.4(1) A modified production low volume vehicle manufactured before 1 January 1992, other than one that has had the hinging system relocated to the rear of the door, is not required to comply with *2.3, 2.4,* or *2.5* if the design and dimensions of the original vehicle structure makes it impractical to fit a burst-proof door retention system.

Where doors are non-structural

3.4(2) A modified production low volume vehicle is not required to comply with *2.3, 2.4,* or *2.5* if the vehicle was designed by the manufacturer to operate safely with readily removable lightweight flexible doors functioning as weather protection.

3.5 Design criteria exclusions

3.5(1) A scratch-built low volume vehicle is not required to comply with *2.3, 2.4,* or *2.5* if the vehicle:

(a) can be operated safely without doors fitted; and

(b) is fitted with a web-clamp retractor lap-and-diagonal seatbelt, or another type of seatbelt that exceeds the performance requirements of a web-clamp retractor lap-and-diagonal seatbelt, in the driver and outboard occupant seating positions; and

(c) has high-sided sills (between the occupant and outer side of the vehicle) which extend to a point no lower than the H-point, determined by either:

(i) an *LVVTA body frame*; or

(ii) measured from an *LVVTA H-point template*, as shown in *diagram 3.5*.

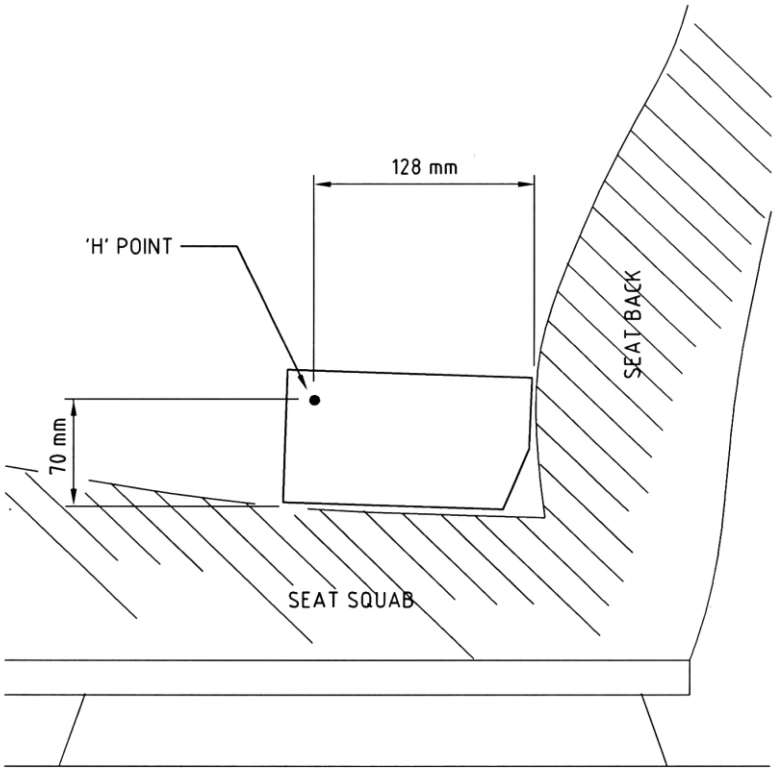

Diagram 3.5 LVVTA H-point template

Section 4 Vehicles not required to be certified to this standard

4.1 Vehicles not covered by this standard

4.1(1) A light vehicle is not required to be certified to this low volume vehicle standard, if the vehicle is modified for the purposes of law enforcement or the provision of emergency services.

4.1(2) A light vehicle is not required to be certified to this low volume vehicle standard, if the vehicle is identified as having been modified by a second-stage vehicle manufacturer, and complies with an approved overseas standard that is listed in *Annex 6* of the *Low Volume Vehicle Code*.

4.2 Vehicles that pre-date legal requirements

4.2(1) A light vehicle is not required to be certified to this low volume vehicle standard, if the vehicle was either:

(a) modified before 1 January 1992 in such a way that the door retention system may, directly or indirectly, be affected, and the door retention system fitted to the vehicle is the same as that fitted at the time of the vehicle's modification; or

(b) scratch-built before 1 January 1992, and the door retention system fitted to the vehicle is the same as that fitted at the time of the vehicle's construction.

4.3 Modifications that do not require certification

4.3(1) A modification to a door handle (on a door normally used for entry and exit of occupants) is not required to be certified to the Low Volume Vehicle Code, provided that the safe performance of the vehicle is not compromised, and:

(a) the modification is minor (eg removal of door locks); and

(b) door handles remain fitted and in serviceable condition.

NOTE: The fitting of a door opening/closing mechanism (which may include the removal of exterior door handles) that differs from original must be certified to the Low Volume Vehicle Code.

Section 5 Terms and definitions within this standard

Burst-proof means, in relation to a latch and striker assembly, a system that remains engaged when a load, less than that specified in this standard, is applied to either part of the assembly in any direction, including longitudinally, laterally, or vertically.

Cap-screws means a fastener with a circular outer head, and an inner cavity usually of a hexagonal shape, which is used for tightening and loosening.

Construction in relation to any vehicle, means the manufacture, assembly, re-assembly, or modification of the vehicle; and includes all activities related or incidental to the construction of a vehicle.

Door	means those doors designed by the vehicle manufacturer for the normal entry and exit of vehicle occupants.
Door latch	means the moving part of the latching assembly designed to hold the door in a closed position, that clasps the striker pin.
Door retention system	means any system, contrivance or mechanism that connects the doors of a motor vehicle to those doorways that are used for the entry and exit of vehicle occupants.
Double-shear	means, in relation to the attachment of a hinge assembly, that the hinge is secured on both the bottom and top sides.
Dowell-pins	means, a pin manufactured from a round solid section of material.
Hinge	means the system by which the door pivots throughout its arc, as it opens and closes.
kN	is an abbreviation for kilo-Newtons. 1 kN is the approximate force applied by gravity at sea level to a mass of 100 kilograms.
LVVTA Body frame	means a frame designed and manufactured by the Low Volume Vehicle Technical Association Incorporated to identify certain critical measurements and positions for safety-related components and systems.
Primary latch	means the part of the door latch assembly that fully secures the door against the body structure.
Retro-fitted	means the fitting of a component or system that was not originally installed during the construction of the vehicle by the manufacturer of the vehicle.
Secondary latch	means the part of the door latch assembly that provides a back-up method of securing the door in the event of the primary latch becoming disengaged.
Single-shear	means, in relation to the attachment of a hinge assembly, that the hinge is secured on either the bottom or the top side.
Striker plate assembly	means the fixed part of the door retention system used to hold the door in a closed position that the door latch assembly clasps.

NOTE: The terms and definitions found in section 5 are limited to those terms and definitions that are unique to this low volume vehicle standard, and are not necessarily contained within the terms and definitions section of the *Low Volume Vehicle Code*.