



Low Volume Vehicle Technical Association (inc)

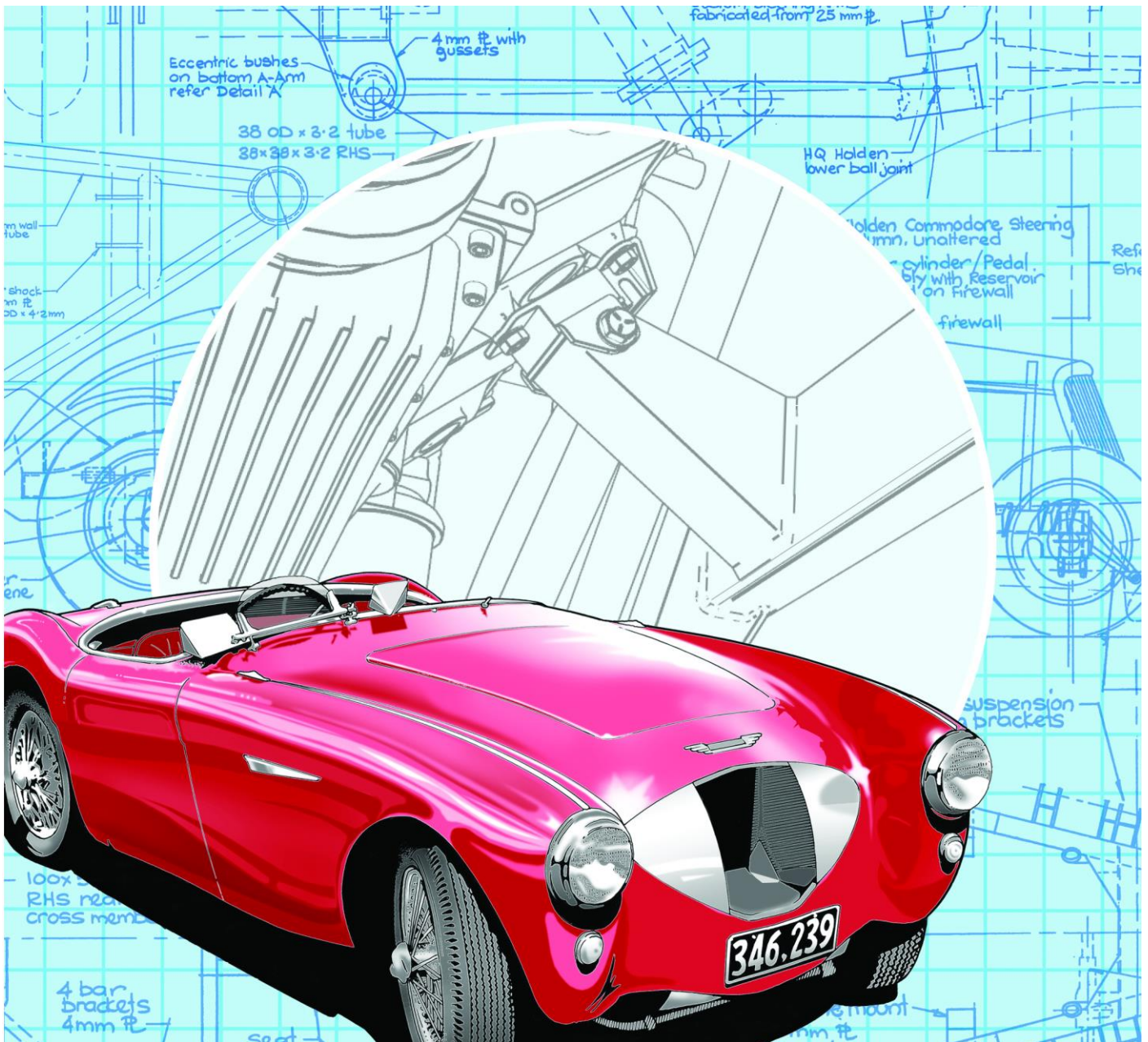
Helping New Zealanders Build & Modify Safe Vehicles

Low Volume Vehicle Standard

85-40(04)

Engine & Drive-train

4th Amendment | Effective from 1 July 2021



Low Volume Vehicle Technical Association (inc)

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Approval

LVV Standard 85-40 Approval:	
Signed in accordance with clause 1.3(5) of the Low Volume Vehicle Code, on.....by:	
on behalf of New Zealand Transport Agency:	on behalf of Low Volume Vehicle Technical Association:

Amendments

LVV Standard 85-40 Amendment Record:			
Detail of amendments:	Amendment #:	Issue date:	Effect date:
• Initial issue – original version	85-40(00)	1 September 2002	1 September 2002
• 1 st Amendment	85-40(01)	1 July 2016	1 July 2016
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• 3 rd Amendment	85-40(03)	5 February 2021	1 March 2021
• 4 th Amendment	85-40(04)	1 June 2021	1 July 2021
NOTE 1: Text which is high-lit in grey shows amendments that have been made subsequent to the document’s previous version, and a grey vertical stroke to the left of the text denotes new or changed information which is important and needs to be understood.			
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Associated information

Publisher & Owner:

This Low Volume Vehicle Standard is published and owned by the Low Volume Vehicle Technical Association Incorporated (LVVTA). LVVTA is an incorporated society which was established in 1992, that represents a group of specialist automotive organisations (in turn representing approximately 150,000 members) 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 New Zealand 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 several decades can be of benefit to members of the New Zealand public who also wish to build or modify light motor vehicles.

LVVTA's contact details are below:

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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.lvvt.org.nz

Disclaimer:

The author and publisher have made all reasonable efforts to provide sound and correct advice, based on the historical knowledge and best practice experiences of all parties involved in the development and production of this manual. However, no responsibility or liability is accepted by the author or the publisher for any error or omission, or any loss suffered by any person relying directly or indirectly on this manual. Any person who builds or modifies a motor vehicle accepts that there may be some associated risks, and does so in the full knowledge of this, and accepts full responsibility for their own actions.

Legal status:

This Low Volume Vehicle Standard is incorporated by reference within *Land Transport Compliance Rule 35001*, and technically corresponds with *Land Transport Rule 32017 (Vehicle Equipment)*.

Copyright:

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Credits:

The LVVTA acknowledges the following persons and organisations for their significant contribution toward the development of this low volume vehicle standard:

- Technical content: LVVTA Technical Staff
- Document development, cover artwork: Tony Johnson
- Cover CAD diagram: Graham Walls

Engine & Drive-train

(85-40[04])

Purpose of this standard

The purpose of this low volume vehicle standard (the standard) is to provide the legal framework for the low volume vehicle certification of a vehicle which has undergone an engine or drive-train modification, conversion, or installation, resulting in a change which may have affected the vehicle's braking or steering system, general safe operation, or durability. Such a vehicle is required by the *Land Transport Rule (Vehicle Standards Compliance) 2002* to comply with the *Low Volume Vehicle Code*, which in turn, requires compliance with this standard.

This standard sets out:

- which vehicles are required to meet this standard; and
- how this standard is applied to those vehicles; and
- the technical requirements which must be met by vehicles required to comply with this standard.

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 other than those specified in 1.1(2), that:

(a) are modified either:

- (i) on or after 1 January 1992 in such a way that any braking or steering systems may, directly or indirectly, be affected as a result of an engine or drive-train conversion or modification; or
- (ii) before 1 January 1992 in such a way that any braking or steering systems may, directly or indirectly, be affected as a result of an engine or drive-train conversion or modification, and have not been continuously registered since that date;

or

(b) are scratch-built either:

- (i) on or after 1 January 1992; or
- (ii) before 1 January 1992 and have not been continuously registered since that date.

NOTE: For the avoidance of doubt, 1.1(1) specifies that a low volume vehicle (which has been scratch-built, or modified in such a way that any braking or steering systems may, directly or indirectly, be affected as a result of an engine or drive-train conversion or modification) is not required to be certified to this standard only if the vehicle:

- was scratch-built or modified prior to 1 January 1992; and
- has been issued with a valid Modification Declaration Certificate; and
- has been continuously registered since 1 January 1992; and
- has not been subsequently modified.

1.1(2) This low volume vehicle standard does not apply to:

- (a) powered bicycles of Class AB; or
- (b) motorcycles and mopeds of Class LA, LB, LC, LD, or LE; or
- (c) light trailers of Class TA or TB; or
- (d) those vehicles specified in section 3.

1.2 Application of this standard

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

- (a) in the case of a vehicle which was scratch-built or modified before 1 January 1992 and has not been continuously registered, or a vehicle which was scratch-built or modified between 1 January 1992 and 1 September 2002:
 - (i) be certified in accordance with the procedures specified in *chapter 2* of the *Low Volume Vehicle Code*; and
 - (ii) comply with the *General Safety Requirements* contained in 2.1 of this standard; and
 - (iii) comply with those technical requirements referred to in 2.2 and 2.3 of this standard, as determined to be appropriate by a Low Volume Vehicle Certifier;

or

- (b) in the case of a vehicle which was scratch-built or modified after 1 September 2002:
 - (i) be certified in accordance with the procedures specified in *chapter 2* of the *Low Volume Vehicle Code*; and
 - (ii) comply with the *General Safety Requirements* contained in 2.1 of this standard, and all applicable technical requirements referred to in 2.2 and 2.3 of this standard.

NOTE 1: The date of 1 September 2002 specified in 1.2(1)(a) and 1.2(1)(b) is the implementation date of *LVV Standard 85-40 (Engine & Drive-train Conversions) (original version)*, which introduced specific technical requirements which must be met.

NOTE 2: In the case of a low volume vehicle specified in 1.2(1)(a), an LVV Certifier must apply the applicable technical requirements referred to in 2.2 and 2.3 of this standard as a guideline upon which to base their discretionary judgement on the safety of the vehicle, taking into account the modification or construction date of the vehicle.

Section 2 Technical requirements of this standard

2.1 General safety requirements

2.1(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 2.1(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.

- 2.1(2) A steering system on a motor vehicle, and associated systems and components that could directly or indirectly affect the directional control of the vehicle, must:
- (a) be sound and in good condition and must provide the vehicle with safe, efficient, convenient, and sensitive control; and
 - (b) be strong, durable and fit for its purpose, taking into account whether adverse effects have resulted from a loss of integrity of any protective system used by a relevant component.

NOTE: The requirements specified in 2.1(2) are the applicable general safety requirements from *Land Transport Rule 32003/1 Steering Systems 2001*, which are required as part of this low volume vehicle standard and are reproduced here in the interest of convenience.

2.2 Overarching technical requirements

- 2.2(1) An engine-mounting system in a low volume vehicle must be of good design and construction, must position and support the engine correctly, and must be securely attached.
- 2.2(2) All ancillary systems potentially affected by an engine conversion or modification in a low volume vehicle, including accelerator, electrical, fuel, vacuum, oiling, braking, steering, or exhaust, must not cause the vehicle to be unsafe.
- 2.2(3) An engine conversion or modification in a low volume vehicle must not cause the driver's vision to be impaired.
- 2.2(4) A gearbox-mounting system in a low volume vehicle must be of good design and construction, must position and support the gearbox correctly, and must be securely attached.
- 2.2(5) All ancillary systems potentially affected by a gearbox conversion in a low volume vehicle, including gear selection and inhibitor switch operation, must not cause the vehicle to be unsafe.
- 2.2(6) A drive-shaft in a low volume vehicle must be of good design and appropriate strength, must be fitted with suitable drive-shaft universals that operate correctly and safely, and must be securely attached.
- 2.2(7) A drive-shaft in a low volume vehicle must, where applicable, be contained by a drive-shaft safety-loop which is of good design and appropriate strength, and must be securely attached.

- 2.2(8) An axle housing in a low volume vehicle must be securely attached, and must not incorporate any modifications that may cause the low volume vehicle to which it is fitted to be unsafe.
- 2.2(9) A change to a driving-wheel configuration in a low volume vehicle must not cause the vehicle to be unsafe.
- 2.2(10) In order to demonstrate compliance with paragraphs 2.2(1) to 2.2(9), a low volume vehicle must comply with all relevant requirements specified in *Chapter 9 Engine & Drive-train* of the *LVVTA New Zealand Car Construction Manual*.

NOTE 1: For the avoidance of duplication, all of the relevant technical requirements for engine and drive-train conversions and modifications are contained in *Chapter 9 Engine & Drive-train* of the *New Zealand Car Construction Manual*.

NOTE 2: An electronic version of *Chapter 9 Engine & Drive-train*, and all other chapters of the *NZ Car Construction Manual*, can be accessed from www.lvvta.org.nz either individually or as a complete Manual, free of charge.

2.3 Associated technical requirements

- 2.3(1) A low volume vehicle that is required to comply with this standard must, where applicable, also comply with:
- (a) *LVVTA Low Volume Vehicle Standard 35-00 (Braking Systems)*; and
 - (b) *LVVTA Low Volume Vehicle Standard 90-10 (Exhaust Gas Emissions)*; and
 - (c) *LVVTA Low Volume Vehicle Standard 90-20 (Exhaust Noise Emissions)*.
- 2.3(2) A low volume vehicle that has been converted to electric or hybrid power and is required to comply with this standard, must also comply with *Low Volume Vehicle Standard 75-00 (Electric & Hybrid Vehicles)*.

NOTE 1: All documents referred to in 2.3(1) can be accessed from www.lvvta.org.nz and are free of charge.

NOTE 2: Printed copies of LVV documents may become out of date, and should not be relied upon without ensuring that the version is current – visit www.lvvta.org.nz to check that the associated technical requirements referred to above are contained in the latest versions of the documents.

Section 3 Vehicles not required to be certified to this standard

3.1 Vehicles that do not require certification

- 3.1(1) A light vehicle is not required to be certified to this low volume vehicle standard, if the vehicle is either:
- (a) modified for the purposes of law enforcement or the provision of emergency services; or
 - (b) 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*, and has not been subsequently modified further.

3.2 Modifications that do not require certification

3.2(1) A modification to a light vehicle is not required to be certified to the *Low Volume Vehicle Code* if the modification:

- (a) has not compromised the safe performance of the vehicle; and
 - (b) is listed as a modification which does not require low volume vehicle certification, within either:
 - (i) the *LVVTA Modification Threshold Schedule*; or
 - (ii) a relevant *Modification Table* in the *Vehicle Inspection Requirements Manual* of the New Zealand Transport Agency.
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