

Vehicle Standards Bulletin 14

**NATIONAL CODE OF PRACTICE
for
LIGHT VEHICLE CONSTRUCTION
and
MODIFICATION**

SECTION LZ

APPENDICES

Version 2.0 December 2009

Vehicle Standards Bulletin 14

National Code of Practice for Light Vehicle Construction and Modification (VSB 14)

Important Information for Users

Users of VSB 14 need to be aware that this document needs to be used in conjunction with the appropriate administrative requirements of the jurisdiction in which they wish to either register a vehicle or to obtain approval for a modification for an already registered vehicle. *Administrative requirements* include, amongst other things, processes for vehicle registration, obtaining exemptions, obtaining modification approvals, vehicle inspections, preparation and submission of reports and the payment of appropriate fees and charges.

If unsure of any of the requirements specified in VSB 14, or if more information is needed for any other issues concerning the administrative requirements, users should contact their relevant Registration Authority **prior** to commencing any work.

While VSB 14 provides advice on the construction of Individually Constructed Vehicle (ICVs) and the execution of modifications, it is not to be taken to be a design manual. Determination of component strength, performance, suitability and functionality must be either calculated or determined on a case by case basis by suitably qualified personnel experienced in each matter under consideration.

Users of VSB 14 also need to ensure that they refer to the most recent version of the relevant Section/s when working on a project. The version is identified by the version number and date on the face page of each Section. The version and date is also located in the footer of each page in each Section. On the website the version number is specified in the Section file name for easy identification.

If a project is taking a long time to complete, check the currency of the version you are using.

Users must be familiar with the provisions stated in the Preface and Introduction. These two Sections provide the necessary background information to assist users in understanding how VSB 14 is administered by Registration Authorities across Australia, on how it is structured, and the meaning of the types of modification codes specified in VSB 14. If not already done so, users should download them for study and reference.

Understanding these requirements is important to ensure that the correct processes are followed thereby reducing the likelihood of having work rejected by Registration Authorities.

Many of the Sections refer to other Sections within VSB 14 for further information or additional requirements. Users must read and apply all relevant Sections.

If in doubt about any issue concerning or contained in VSB 14, users should seek clarification from the appropriate State or Territory Registration Authority.

Please do not contact Vehicle Safety Standards (VSS) of the Federal Department of Infrastructure, Transport, Regional Development and Local Government in Canberra about VSB 14. VSS provides the website as a service only.

National Code of Practice for the Construction and Modification of Light Vehicles

APPENDICES

CONTENTS

SCOPE	5
DOCUMENT FORMAT.....	5
REVISION HISTORY	5
APPENDIX A FASTENERS	6
1 SCOPE	6
2 INTRODUCTION.....	6
3 SAFETY ISSUES	6
4 SAFETY DESIGN ISSUES.....	8
APPENDIX B FOAM PADDING FOR OCCUPANT PROTECTION.....	9
1 SCOPE	9
2 INTRODUCTION.....	9
3 PADDING SPECIFICATIONS	9
APPENDIX C HEATING AND WELDING OF STEERING COMPONENTS	10
1 SCOPE	10
2 GENERAL REQUIREMENTS	10
3 DESIGN	10
4 MANDATORY REQUIREMENTS FOR HEATING OR WELDING OF STEERING OR SUSPENSION COMPONENTS.....	11
5 AUSTRALIAN/NEW ZEALAND WELDING STANDARDS.....	12
APPENDIX D ELECTROPLATING	13
1 SCOPE	13
2 CHROME PLATING of CRITICAL COMPONENTS NOT ALLOWED.....	13
3 CHROME PLATING of OTHER COMPONENTS	13
APPENDIX E PROOF OF COMPLIANCE UTILISING RAWS GUIDELINES AND PROCEDURES	15
1 SCOPE	15
2 GENERAL.....	15
3 TEST RESULTS	15
4 DETAILS OF CALCULATIONS	15
5 DRAWINGS AND PHOTOGRAPHS.....	16
6 DETAILS OF COMPARATOR VEHICLE	16
7 METALLURGICAL DETAILS	16
APPENDIX F SUMMARY OF EMISSION REQUIREMENTS FOR NEW LIGHT VEHICLES IN AUSTRALIA.....	17
APPENDIX G SAFETY GLAZING MATERIAL AND APPLIED WINDOW TINTING	21

1	SCOPE	21
2	GENERAL	21
3	COMPLIANCE WITH REGULATIONS.	21
4	PRE-ADR VEHICLES - COMPLIANCE WITH ADRS	21
5	APPROVED MATERIAL FOR WINDSCREENS, WINDOWS AND OTHER GLAZING 22	
6	LUMINANCE TRANSMITTANCE OF WINDSCREENS.....	24
7	LUMINANCE TRANSMITTANCE OF WINDOWS OR INTERNAL PARTITIONS ...	24
8	MEASURING AND CALCULATING LUMINOUS TRANSMITTANCE	26
APPENDIX Z GLOSSARY		27
1	SCOPE	27
2	ABBREVIATIONS.....	27
3	NATIONAL or ADOPTED STANDARDS	28
4	FUEL TYPES (Gas).....	28
5	EMISSIONS.....	28
6	VEHICLE MASS RATINGS.....	28
7	ACRONYMS, DEFINITIONS AND TERMS	29

**Vehicle Standards Bulletin 14
National Code of Practice for Light Vehicle
Construction and Modification**

APPENDICES

SCOPE

The requirements contained in the appendices of this Section apply to all other Sections and Guidelines of VSB 14.

DOCUMENT FORMAT

This document is available in electronic format and is available for download from the Department of Infrastructure, Transport, Regional Development and Local Government website located at: <www.infrastructure.gov.au>

While each Section of VSB 14 may be downloaded in individual Sections for the convenience of persons who may have a specific issue to address, it is vital that any other referenced Sections applicable to the specific work being undertaken are downloaded and followed also.

REVISION HISTORY

Revision	Comments
First Published	This Appendix was approved in principle at the Australian Motor Vehicle Certification Board Working Party meeting held on the XXX

APPENDIX A FASTENERS

1 SCOPE

These requirements apply to all Sections and Guidelines of VSB 14.

Registration Authorities are particularly concerned about the safety of vehicles and as a consequence will not accept inadequate or badly designed fasteners in any structural or critical component, nor in any other component or assembly that is likely to cause harm or injury to any person.

The information provided in this appendix is general in nature and is intended to highlight the minimum requirements expected by Registration Authorities for the majority of common modifications. This appendix is not a substitute for a design manual and professional advice from appropriately qualified and experienced personnel must be sought for more complex applications.

2 INTRODUCTION

The safety and the overall performance of any vehicle depends, to a very large extent, on the performance of the multitude of fasteners that hold the various parts of the vehicle together. Modern vehicles incorporate a large number of mechanical, electrical and electronic parts, each of which is held together by specifically designed fasteners.

It is therefore not surprising that the automobile industry is one of the largest single consumers of fasteners. In addition to safety considerations, many automotive fasteners must be highly resistant to corrosion and are often required to have *aesthetic* value if they are located in full view of the driver and other occupants.

Registration Authorities are principally concerned with safety and as a consequence the requirements specified in the sections titled *Safety Issues* and *Safety Design Issues* are mandatory for all work carried out in VSB 14.

3 SAFETY ISSUES

3.1 General

Unless supported by specific engineering design, all fasteners in highly stressed locations must be either high tensile ISO Grade 8.8 (metric sizes), SAE Grade 5 (imperial sizes) or of an equivalent standard, as a minimum specification.

All replacement fasteners must be of equivalent or higher strength and quality than the original fasteners they replace.

All fasteners must be of sufficient size, strength and number to perform their allocated task.

Each bolt or fastener must be long enough to ensure that at least **one clear turn** of thread is visible. This applies to all nuts, including nyloc and locking nuts.

Self-locking nuts should be used in preference to spring washers.

3.2 Locking Devices

Locking devices **must** be fitted to all fasteners used in critical or structural components. These devices include:

- Spring and shake proof washers.
- Nyloc nuts.
- Deformed thread locknuts or Huck nuts.
- Castellated nuts with split or roll pins.
- Lock wire.
- Split pins.
- Locking tabs, and staking.

Nyloc nuts are only to be reused once, and only if the nylon locking area is in good condition.

3.3 Stainless Steel Bolts

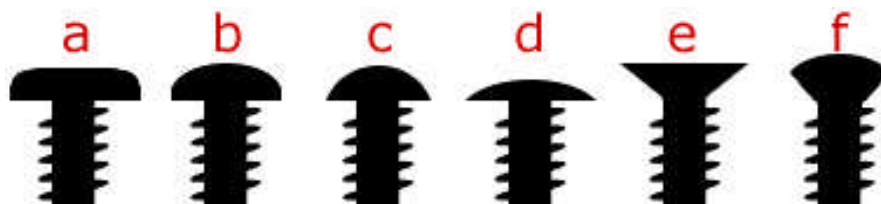
Stainless steel bolts must **not** be used in high load or stressed situations as they do not possess high tensile strength. These bolts must only be used in locations where the use of graded bolts is not specified within the Sections of VSB 14 or recommended by the component manufacturer.

3.4 Protection of Occupants and Other Road Users

Additionally, fasteners must not be likely to cause injury to either the driver, passengers and/or anyone in close vicinity of the vehicle's exterior. To this end, screws, bolts, nails etc. must always face away from exterior surfaces that may be contacted by any person. Preferable head shapes are shown in Figure A1 below. In terms of occupant protection, the flatter the head shape, the better.

Fasteners located in head impact areas must be countersunk so they are level with, or below the surface of the component they are holding in place. In keeping with modern designs it is preferable that components located in head strike areas are attached by hidden attachment methods wherever possible.

Screw or bolt heads located inside the vehicle should be covered with trim or padding wherever possible.



(a) Pan, (b) Button, (c) Round, (d) Truss, (e) Flat, (f) Oval

Figure A1 Preferable Head Shapes

4 SAFETY DESIGN ISSUES

The choice of fasteners is currently huge and diverse. The design and selection of the correct fasteners for highly stressed areas can be a complicated task and to this end advice should be sought from a suitably qualified and experienced person to ensure both the configuration of joints and the subsequent fastener selection are adequate.

4.1 Allowances for Dynamic Loading

Unless supported by specific engineering analysis, including physical testing, all joints that are subject to dynamic loads must have an additional safety factor of at least 1.8 in terms of strength to accommodate the dynamic loading. Dynamically loaded joints must also have sufficiently high clamping forces or other mechanical means such as spigots, to ensure the joint does not move during use thereby accelerating wear which may in turn cause the joint to become *unstable, and in critical components, dangerous.*

4.2 Stress Corrosion

Extreme care needs to be taken in the design of fasteners that in addition to being dynamically loaded are located in corrosive environments, or in locations where corrosion is likely to occur. Stress corrosion can be very dangerous and as a consequence care needs to be taken in the choice of materials in contact with each other and in the design of joints to minimise the risk of corrosion.

APPENDIX B FOAM PADDING FOR OCCUPANT PROTECTION

1 SCOPE

These requirements apply to wherever padding is specified in all Sections and Guidelines of VSB 14.

2 INTRODUCTION

The purpose of this appendix is to provide guidance to modifiers to ensure padding used is of sufficient density to provide an appropriate level of occupant protection.

3 PADDING SPECIFICATIONS

Where padding is specified in VSB 14 (e.g. on windscreen headers or roll cages) a suitable high density energy absorbing material must be used.

Acceptable padding materials are those that, when mounted on a structure of at least the same stiffness as the structure on which they are to be installed, have been shown to achieve either:

- a headform deceleration of not more than 80 times the acceleration due to gravity for more than 3 milliseconds, when tested according to the requirements of clause 6.4 of ADR 3/02 Seats and Seat Anchorages; or
- a *Head Injury Criterion* (HIC) of less than 1000, when tested according to the relevant clauses of ADR 68/00 Occupant Protection in Buses.

Both of these tests require impacting the padded structure with a spherical headform, diameter 165mm and mass $6.8 + 0.1$ kg, moving at not less than 6.69 m/s (24 km/h).

The following materials and thicknesses may be used as they have been shown to meet the performance requirement:

- semi-rigid moulded polyurethane (approximate density 300 kg/m^3), 25mm thick;
- self-skinning rigid moulded polyurethane (approximate density 300 kg/m^3), 25mm thick;
- closed-cell polyethylene foam (approximate density 300 kg/m^3), 25mm thick;
- closed-cell EVA foam (approximate density 300 kg/m^3), 25mm thick.

Alternatively, flexible cellular materials with compression deflection specifications within the range 250 to 500 kPa, when tested to Suffix D of ASTM D 3575 *Standard Test Methods for Flexible Cellular Materials Made from Olefin Polymers* may be used.

APPENDIX C HEATING AND WELDING OF STEERING COMPONENTS

1 SCOPE

These requirements apply to all Sections and Guidelines of VSB 14.

Registration Authorities are particularly concerned about the safety of vehicles and as a consequence will not accept inferior welds in any structural or critical component, nor in any other component or assembly that is likely to cause harm or injury to any person.

The information provided in this appendix is general in nature and is intended to highlight the minimum requirements expected by jurisdictions. This appendix is not a substitute for a design manual and professional advice from appropriately qualified and experienced personnel must be sought for more complex applications.

Manufacturers and modifiers who either produce welded components in commercial quantities or who repair vehicles using a variety of welding techniques need to have their welders, welding processes and techniques qualified. To this end professional advice should be sought.

2 GENERAL REQUIREMENTS

The complex nature of motor vehicles, by necessity demands a wide variety of automotive welding techniques and procedures. Welding a cracked aluminium head for example, requires very different procedures and skill to fabricating a tow bar or joining light gauge panels together.

As a minimum, the following is applicable:

- Ensure surfaces to be welded are carefully prepared and clean of dirt, moisture or chemicals;
- Ensure the appropriate welding consumables are used;
- Ensure the welding technique and procedures are appropriate for the task;
- Follow carefully instructions provided by:
 - the original equipment manufacturer of the vehicle or part to be welded;
 - the provider of the welding tools and consumables; and
 - the parent material manufacturer; and
- Employ skilled personnel.

If unsure about the nature of the material to be welded seek professional advice. This is particularly important in recently manufactured vehicles as high tensile steels are now being increasingly used in many structural panels and components. Incorrect welding techniques can lead to premature failures which can be dangerous if they occur in structural components.

3 DESIGN

The selection of the best method of welding and the design of highly stressed areas can be a complicated task and to this end advice should be sought from a suitably qualified person such as an engineer or metallurgist to ensure both the design of joints and the chosen welding techniques are adequate and suitable for the task in question.

3.1 Allowances for Dynamic Loading

Unless supported by specific engineering analysis including physical testing, all joints that are subject to dynamic loads must have an additional safety factor of at least 1.8 in terms of strength to accommodate the dynamic loading. Dynamically loaded joints must also have sufficiently high clamping forces or other mechanical means such as spigots, to ensure the joint does not move during use thereby accelerating wear which may in turn cause the joint to become unstable, and in critical components, dangerous.

3.2 Stress Corrosion

Extreme care needs to be taken in the design of welds and weldments that in addition to being dynamically loaded, are exposed to corrosive environments. Stress corrosion can be very dangerous and as a consequence care needs to be taken in the choice of materials, including welding materials, that are in contact with each other and in the design of joints to minimise the risk of corrosion.

3.3 Allowance for Fatigue:

The dynamic forces that are applied to a vehicle during normal operation subject many components to the risk of failure due to fatigue. Designing components to reduce fatigue is not always intuitive; many modifiers, for example, will increase the risk of fatigue by making a joint too stiff.

Fatigue can be reduced by ensuring components have:

- adequate design safety factors in the first instance;
- no stress concentrations;
- no sudden changes in member or assembly dimensions; and
- combined stresses eliminated or kept to a minimum.

Careful design of joints and brackets can reduce fatigue of welds by ensuring the welds are located in low stress areas. Welds in fatigue prone areas must be of high quality – i.e. they must be deposited in a very uniform manner, have good penetration and be free of occlusions and foreign matter.

Designing for fatigue is complex and professional assistance should be sought to minimise the risk of fatigue failures.

4 MANDATORY REQUIREMENTS FOR HEATING OR WELDING OF STEERING OR SUSPENSION COMPONENTS

The heating or welding of steering or suspension components must be accompanied by a satisfactory report from a suitably qualified person such as an engineer or metallurgist¹. The report must confirm that the modified parts are at least as strong as the original and contain no latent defects. Every modified part must be given a unique permanent identity number, which must be recorded by the modifier.

¹ **Note:** The *Engineer* or *Metallurgist* specified in this section must be appropriately experienced and qualified in the assessment of welded or heat-treated metal components.

The accompanying report, must include comments on:

- material specifications of the component to be modified;
- a specification of weld material and compatibility with the parent material if welding is involved;
- description and/or diagrams of the preparation of the component if welding is involved;
- details of weld procedure used including method of weld procedure qualification if welding is involved;
- details of welder qualifications and method of qualification if welding is involved;
- details of preheating used if required prior to the modification;
- details of heat treatment procedure after modification;
- hardness testing before and after modification of the modified zone; and
- results of non destructive testing.

In cases where a component is to be mass produced, Registration Authorities may allow a *Letter of Conformity* to be used as a means of demonstrating the acceptability of the product in question, providing that each component being modified or manufactured is modified or manufactured to the identical specifications. The *Letter of Conformity* must make reference to the report that provided the original certification for the work in question. Registration Authorities may also request evidence of procedures and practices that ensure conformity of production.

5 AUSTRALIAN/NEW ZEALAND WELDING STANDARDS

While the following standards are not specifically intended for use by the automotive industry, they nonetheless contain a great deal of useful information that can be successfully utilised by the industry. These standards refer to other standards for specific functions or activities and these should also be consulted.

It is essential, particularly for commercially executed work, that all weld procedures considered for use be appropriately qualified. In addition, welders should be qualified to weld using those procedures. Welding procedures may be developed using the following standards as a guide:

- Australian Standard/New Zealand 1554 Part 1 - Welding of steel structures;
- Australian/New Zealand Standard 1554 Part 4 - Welding of high strength quenched and tempered steel;
- Australian Standard/New Zealand 1554 Part 5 - Welding of steel structures subject to high levels of fatigue;
- Australian/New Zealand Standard 1554 Part 7 - Welding of sheet steel structures; and
- Australian New Zealand Standard 1665 - Welding of aluminium structures.

APPENDIX D ELECTROPLATING

1 SCOPE

These requirements apply to all Sections and Guidelines of VSB 14.

2 CHROME PLATING of CRITICAL COMPONENTS NOT ALLOWED

Critical steering and suspension components are **not** to be chrome plated.

3 CHROME PLATING of OTHER COMPONENTS

3.1 Introduction

A side effect of chrome plating in some instances is a phenomenon known as *hydrogen embrittlement*. The hydrogen produced as a result of the plating process causes weak spots in the base metal and is difficult to detect as embrittlement occurs under the surface of the chrome plating.

The process of embrittlement can develop into cracks that result in components failing catastrophically under relatively low forces.

Hydrogen embrittlement is more likely to occur if the component is:

- made of high grade alloy,
- cast or is heat treated,
- subjected to reversing stresses.

Failure of a component through hydrogen embrittlement can be catastrophic and failures can occur without warning. This is compounded by the fact that chrome plating may hide other defects. A component may appear to be in good order without visible cracks on the surface, but can fracture easily from a shock load such as driving over a pothole.

Chromium plating should be in accordance with the applicable sections of Australian Standard 2453 – 1981 *Electroplated Coatings of Chromium for Engineering Applications* and Australian Standard 1192 - 1982 *Electroplated Coatings - Nickel and Chromium*.

All types of electroplating and some chemical or electrical stripping methods can lead to hydrogen embrittlement. In all cases, expert advice should be obtained and full details of the plating or stripping process or heat treatment etc. must be included in the vehicle's records.

3.2 Hydrogen Embrittlement Minimisation by Baking

Certain alloys can have the effects of hydrogen embrittlement reduced by *embrittlement relief baking*. This procedure, if carried out within 24 hours of plating, may result in the dissipation of the hydrogen atoms and hence reduce the likelihood of embrittlement.

The baking process may however, in certain circumstances, cause a reduction in the physical properties of the parent material.

In order to maintain a high order of certainty as to the strength of critical components Registration Authorities may not accept *relief baked* components unless:

- the components are both plated and then baked in a prescribed manner that ensures a high level of conformity of production.
- the processes thus carried out must be supported by physical test data that confirms the material strength of the finished part is adequate for the function of the part in question.
- a report must accompany the finished part that is signed by an engineer or metallurgist who is appropriately qualified in the assessment of welded or heat-treated metal components. The report must confirm that conformity of production processes were used in the plating and baking process and that the necessary physical testing was carried out to confirm the strength of the final product.

APPENDIX E PROOF OF COMPLIANCE UTILISING RAWs GUIDELINES AND PROCEDURES

1 SCOPE

The Registered Automotive Workshop Scheme (RAWs) allows for the importation and supply of used *specialist and enthusiast vehicles* (SEVS) to the market in Australia. The RAWs is administered by the Department of Infrastructure, Transport, Regional Development and Local Government (DITRD LG).

Under this scheme only a RAW can import a used vehicle into Australia. RAWs arrangements do not apply for vehicles manufactured before 1 January 1989 or vehicles that are to be imported under the Personal Import Scheme. For more detailed information about these vehicle categories and the definition of SEVS, refer to Vehicle Standards Bulletin N^o 10 *Importing Vehicles to Australia* (VSB10). This document may be downloaded free of charge from the following website:

www.infrastructure.gov.au

A workshop approved as a RAW needs to have information to have shown that after modification, its vehicles will meet all applicable ADRs in accordance with the *Motor Vehicle Standards Act 1989*, its Regulations and Determinations and this information may be considered to be a complete evidence package.

Where VSB 14 requires assurance that a modification meets the ADRs, proof of compliance may be submitted utilising the RAWs guidelines and procedures providing the guidelines listed below are followed.

2 GENERAL

As a general rule the level of evidence required for proof of compliance with an ADR is that specified in the RAWs Guidelines as published by the DITRD LG. The RAWs Guidelines may be downloaded from the following website.

http://raws.infrastructure.gov.au/raws_online_guide.htm

3 TEST RESULTS

If a test is performed according to the requirements of a particular Standard, the results supplied must be in the form prescribed in that Standard or relevant test method etc. Tests that are not covered by any Standards must be described and results provided in a legible form using a consistent system of units and defined terminology.

Tests conducted on the basis of procedures provided in the guidelines must be conducted and reported accordingly.

4 DETAILS OF CALCULATIONS

Details of all calculations must be retained for auditing purposes. Formulae used in calculations need to be referenced. Where any assumptions have been made, the basis for such assumptions must be recorded together with any available evidence that supports these assumptions.

5 DRAWINGS AND PHOTOGRAPHS

Drawings and photographs assist greatly in assessment of reports. Where an evaluation is made by comparison with an identical vehicle or components, photographs and/or drawings must be retained for auditing purposes.

6 DETAILS OF COMPARATOR VEHICLE

Where comparison has been made with an *identical vehicle* (IV) in support of any claim for compliance, the IV must be described clearly in respect of model or variant, year of manufacture, and the registration number (if registered). If the IV has a VIN or chassis number, this must be recorded also.

7 METALLURGICAL DETAILS

In cases where substantial welding has been used to fabricate structures and components, it is the responsibility of the assessing Signatory to determine the acceptability of the welds.

All details concerning the heat-treatment of components, including any laboratory reports, must be retained for auditing purposes.

Please refer to the following Appendices for further information:-

- *Appendix C* *Heating and Welding of Steering Components; and*
- *Appendix D* *Electroplating*

APPENDIX F SUMMARY OF EMISSION REQUIREMENTS FOR NEW LIGHT VEHICLES IN AUSTRALIA

Australia has had new vehicle emission standards in place since the early 1970s and these have been progressively tightened over the past 30 years. [Table F1](#) summarises the emission standards which have applied to petrol engine cars from 1972 through to 2010.

Controls on emissions from light duty diesel engines have also applied from 1995, with the latest Euro 4 standards applying from 2006. [Table F2](#) sets out the emission limits which apply under the *United Nations Economic Commission for Europe* (UN ECE) light vehicle emission regulations together with the timetable for adoption in the ADRs, beginning from 1 January 2003.

The ADRs dealing with emissions are performance standards which specify the maximum levels of emissions permitted under a specified test. These ADRs do not mandate the use of particular technology, although it has been necessary for vehicle manufacturers to fit catalytic converters to light petrol vehicles in order to meet the emission limits introduced by ADR 37/00 and later standards.

Table F1: Summary of Emission Requirements for New Petrol Passenger Cars in Australia 1972 - 2010

Standard	Date Introduced #	Exhaust Emission Limits (petrol vehicles)			Source Standard / Test Method
		HC	CO	NOx	
ADR26	1/1/72	NA	4.5% by vol	NA	Idle CO test
ADR27	1/1/74	8.0 - 12.8 g/test	100 - 220 g/test and 4.5% by vol	NA	ECE <i>Big Bag</i>
ADR27A	1/7/76	2.1 g/km	24.2 g/km	1.9 g/km	US '72 FTP
ADR27B	1/1/82	2.1 g/km	24.2 g/km	1.9 g/km	US '72 FTP
ADR27C +	1/1/83	2.1 g/km	24.2 g/km	1.9 g/km	US '72 FTP
ADR37/00	1/2/86	0.93 g/km	9.3 g/km	1.93 g/km	US '75 FTP
ADR37/01	1/1/97 - 1/1/99	0.26 g/km	2.1 g/km	0.63 g/km	US '75 FTP
ADR79/00	1/1/03 - 1/1/04	0.25* g/km	2.2 g/km	0.25* g/km	UN ECE R83/04 (Euro 2)
ADR79/01	1/1/05 - 1/1/06	0.2 g/km	2.3 g/km	0.15 g/km	UN ECE R83/05 (Euro 3)
ADR79/02	1/7/08 - 1/7/10	0.1 g/km	1.0 g/km	0.08 g/km	UN ECE R83/05 (Euro 4)

where 2 dates specified, first date applies to vehicle models first produced on or after that date, with all new vehicles required to comply by the second date.

+ ADR27C introduced a number of administrative changes, based on procedures of ADR37/00.

* ADR 79/00 has a combined HC+NOx limit of 0.5, so the HC:NOx split is indicative only.

NA means no limit applies.

Table F2: Emission Limits for Light Vehicles (≤ 3.5 tonnes GVM) Under UN ECE Regulation 83/.. at Euro 2, Euro 3 and Euro 4 Levels

Category	Class	Reference mass (RW) (kg)	Limit Values									
			Mass of carbon monoxide (CO)		Mass of hydrocarbons (HC)		Mass of oxides of nitrogen (NOx)		Combined mass of hydrocarbons and oxides of nitrogen (NOx)		Mass of particulates (1) (PM)	
			L1 (g/km)	L2 (g/km)	L3 (g/km)	L2+L3 (g/km)	L4 (g/km)					
			Petrol	Diesel	Petrol	Diesel	Petrol	Diesel	Petrol	Diesel	Diesel	
Euro 2	M(2)	All	2.2	1.0	-	-	-	-	0.5	0.7	0.08	
	N₁(3)	I	RW \leq 1250	2.2	1.0	-	-	-	-	0.5	0.7	0.08
		II	1250 < RW \leq 1700	4.0	1.25	-	-	-	-	0.6	1.0	0.12
		III	1700 < RW	5.0	1.5	-	-	-	-	0.7	1.2	0.17
Euro 3	M(2)	All	2.3	0.64	0.20	-	0.15	0.50	-	0.56	0.05	
	N₁(3)	I	RW \leq 1305	2.3	0.64	0.20	-	0.15	0.50	-	0.56	0.05
		II	1305 < RW \leq 1760	4.17	0.80	0.25	-	0.18	0.65	-	0.72	0.07
		III	1760 < RW	5.22	0.95	0.29	-	0.21	0.78	-	0.86	0.10
Euro 4	M(2)	All	1.0	0.50	0.10	-	0.08	0.25	-	0.30	0.025	
	N₁(3)	I	RW \leq 1305	1.0	0.50	0.10	-	0.08	0.25	-	0.30	0.025
		II	1305 < RW \leq 1760	1.81	0.63	0.13	-	0.10	0.33	-	0.39	0.04
		III	1760 < RW	2.27	0.74	0.16	-	0.11	0.39	-	0.46	0.06

- (1) For compression ignition (diesel) engines only.
 (2) Except Category M vehicles of which the maximum mass exceeds 2,500 kg. For ADR79/00 (Euro 2) only, category M vehicles with more than 6 seats are also covered by the N category
 (3) And those Category M vehicles which are specified in note (2).

Timetable for adoption of ECE Regulation 83/... standards in ADR79/..#:

Light Petrol, LPG and NG Vehicles

Euro 2 adopted in ADR79/00 from 1/1/03 to 1/1/04

Euro 3 adopted in ADR79/01 from 1/1/05 to 1/1/06

Euro 4 adopted in ADR79/02 from 1/7/08 to 1/7/10

Light Diesel Vehicles

Euro 2 adopted in ADR79/00 from 1/1/02 to 1/1/03

Euro 4 adopted in ADR79/01 from 1/1/06 to 1/1/07

- # in each case, the first date applies to vehicle models first produced on or after that date, with all new vehicles required to comply by the second date.

APPENDIX G SAFETY GLAZING MATERIAL AND APPLIED WINDOW TINTING

1 SCOPE

These requirements apply to all Sections and Guidelines of VSB 14.

2 GENERAL

The windscreen of a vehicle is a particularly important safety feature that in addition to providing protection to vehicle occupants, permits the driver to maintain a clear view of the road and other traffic. The clarity of vision through the windscreen will deteriorate over time. This becomes more apparent when driving towards the sun near sunrise/sunset or from headlight glare when driving at night.

Windscreens that have minor cracks, or are otherwise deteriorated, should be replaced. Windscreens that are cracked or otherwise damaged within the driver's field of view, that have major damage or are badly cracked, must be replaced.

Some vehicle manufacturers incorporate the windscreen and rear window into the structural design of the vehicle and if damaged or improperly secured, may reduce the structural integrity and crash-worthiness of the vehicle.

3 COMPLIANCE WITH REGULATIONS.

New vehicles, including Individually Constructed Vehicles (ICVs), must be fitted with glazing that meets the requirements specified in the Australian Design Rules (ADRs). The current design rule for glazing is ADR 8/01 Safety Glazing Material.

In-service vehicles must comply with the Australian Vehicle Standards Rules (AVSR). The AVSR requires vehicles that were built to comply with the ADRs to continue to comply with the ADRs that applied to the vehicle according to its ADR category and date of manufacture.

The AVSR is the national model legislation from which all States and Territories (jurisdictions) have adopted their individual vehicle standards regulations.

The ADRs do not cover window tinting that is applied as a surface film - these provisions are contained in the AVSR.

The AVSR provides for jurisdictions to set their own limits for window tinting that is applied to the front side windows provided the luminous transmittance through the glazing and window tinting material together is not less than 35%.

4 PRE-ADR VEHICLES - COMPLIANCE WITH ADRS

Glazing that complies with ADR 8/... may be fitted to vehicles that were manufactured prior to the implementation date of ADR 8/....

5 APPROVED MATERIAL FOR WINDSCREENS, WINDOWS AND OTHER GLAZING

For vehicles manufactured after June 1953 transparent material used in the windscreen, window, or interior partition of a motor vehicle must be of an approved material. Replacement *transparent material* must also be of an approved material.

Approved material means material with the same characteristics as material mentioned in any of the following standards:

- Australian Standard AS R1-1965 Safety Glass for Land Transport;
- Australian Standard AS R1-1968 Safety Glass for Land Transport;
- Australian Standard AS 2080-1977 Safety Glass for Vehicles;
- British Standard BS 857:1967 Specification for Safety Glass for Land Transport;
- British Standard BS 5282:1975 Road Vehicle Safety Glass;
- British Standard BS AU178:1980 Road Vehicle Safety Glass;
- Japanese Industrial Standard JIS R 3211-1979 Safety Glasses for Road Vehicles; and
- American National Standard ANSI Z26.1-1980 Safety Code for Safety Glazing Materials for Glazing Motor Vehicles Operating on Land Highway.

Transparent material does not include any coating added to the windscreen, window or partition after its manufacture.

For vehicles manufactured to comply with ADR 8/... vehicle glazing must comply with the following requirements.

Any new or replacement glass fitted to any windscreen or window or interior partition must be safety glass marked as complying with at least one of the following standards:

- Australian and New Zealand Standard AS/NZS 2080 Safety Glass for Land Vehicles;
- British Standard BS AU178: Road Vehicle Safety Glass;
- Japanese Industrial Standard JIS R 3211 Safety Glazing Materials for Road Vehicles;
- American National Standard ANSI Z26.1 Safety Code for Safety Glazing Materials for Glazing Motor Vehicles Operating on Land Highway;
- UNECE R43/00 Uniform Provisions Concerning Approval of Safety Glazing and Glazing Materials; and
- NZS 5443.

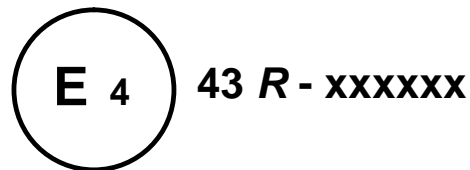
All glass used in the passenger compartment of the vehicle must comply with at least one of the standards specified above. The glass must bear an identification mark indicating the standard to which the glass has been manufactured, for example *AS 2080*, *BS AU 178*, *JIS R 3211* etc. Typical marking is illustrated in Figure LZ-G1 below.



or alternatively,



Australian Standards Marking



Typical UNECE Marking

Figure LZ-G1 Typical Identification Marks for Glazing

Original glass (or genuine replacement glass) must always have a mark etched or indelibly printed on the glass.

There are two types of glass available for motor vehicles. These are classified as *tempered* or *laminated*.

- **Tempered glass** is specially treated so that when it is broken it forms tiny square fragments rather than jagged shards or splinters.

When a tempered windscreen is broken, it crazes and is sometimes difficult to see through. Tempered windscreens now incorporate a toughened safety zone that remains relatively clear in the event of breakage allowing the driver to maintain control of the vehicle; and

- **Laminated glass** comprises a clear plastic film sandwiched between glass layers. Laminated glass is more resistant to breakage than tempered glass and even when penetrated by an object, such as a stone, it will remain substantially clear. In most cases the plastic film will also hold the broken pieces together thus avoiding the potential danger of glass shrapnel.

Windscreens fitted to vehicles manufactured after 1 January 1994 are required to be made from laminated glass. Vehicles built prior to this date do not need to meet this requirement but it is strongly recommended that when a replacement windscreen is required, laminated glass is used.

For any windscreen glass having a zone of modified heat treatment, the marking must indicate the position of the zone.

All replacement transparent material must be of a type that will not shatter.

The section of the windscreen directly in front of the driver (primary vision area) must be free of scratches or chips.

6 LUMINANCE TRANSMITTANCE OF WINDSCREENS

The windscreen of a motor vehicle must have a luminous transmittance of at least:

- for a motor vehicle built after 1971 – 75%; or
- for another motor vehicle – 70%.

The windscreen must not be coated in a manner that reduces its luminance transmittance. This prohibition does not apply to the greater of the following two areas;

- the area above the highest point swept by the windscreen wipers, or
- the upper 10% of the windscreen.

7 LUMINANCE TRANSMITTANCE OF WINDOWS OR INTERNAL PARTITIONS

7.1 Internal Glazing

Internal glazing for windows or partitions must have a luminous transmittance of at least 70%.

7.2 Surface Films (Window Tinting)

These requirements apply to all vehicles irrespective of their date of manufacture and are controlled by the Australian Vehicle Standards Rules (AVSR).

Surface films reduce light transmission through windscreens and windows. This can significantly reduce a driver's vision, particularly at night and during periods of low visibility.

If windows, other than the windscreen, of a motor vehicle are coated to reduce light transmittance, the following requirements apply:

- For the windows forward of the rear of the driver's seat luminous transmittance must not be less than 70% when measured through glass and film together unless the laws of a State or Territory allow a lesser luminous transmittance. The lesser transmittance must be above 35%. (Figure LZ-G2 illustrates the window tinting requirements in terms of luminous transmittance for passenger vehicles. It also specifies the different requirements currently in force in the Northern Territory);
- For windows behind the rear of the driver's seat the luminous transmittance must not be less than 35%;
- Reflectance in the visible light range must not exceed 10%; and
- The coating must not be wrinkled, blistered, bubbled or discoloured such that visibility through the glass and film is impaired.

The prohibition for coating the windscreen does not apply to the greater of the following areas of the windscreen:

- the area above the highest point of the windscreen that is swept by the windscreen wiper; and
- the upper 10% of the windscreen.

Vehicles fitted with surface film must be equipped with an external rear vision mirror on both sides of the vehicle.

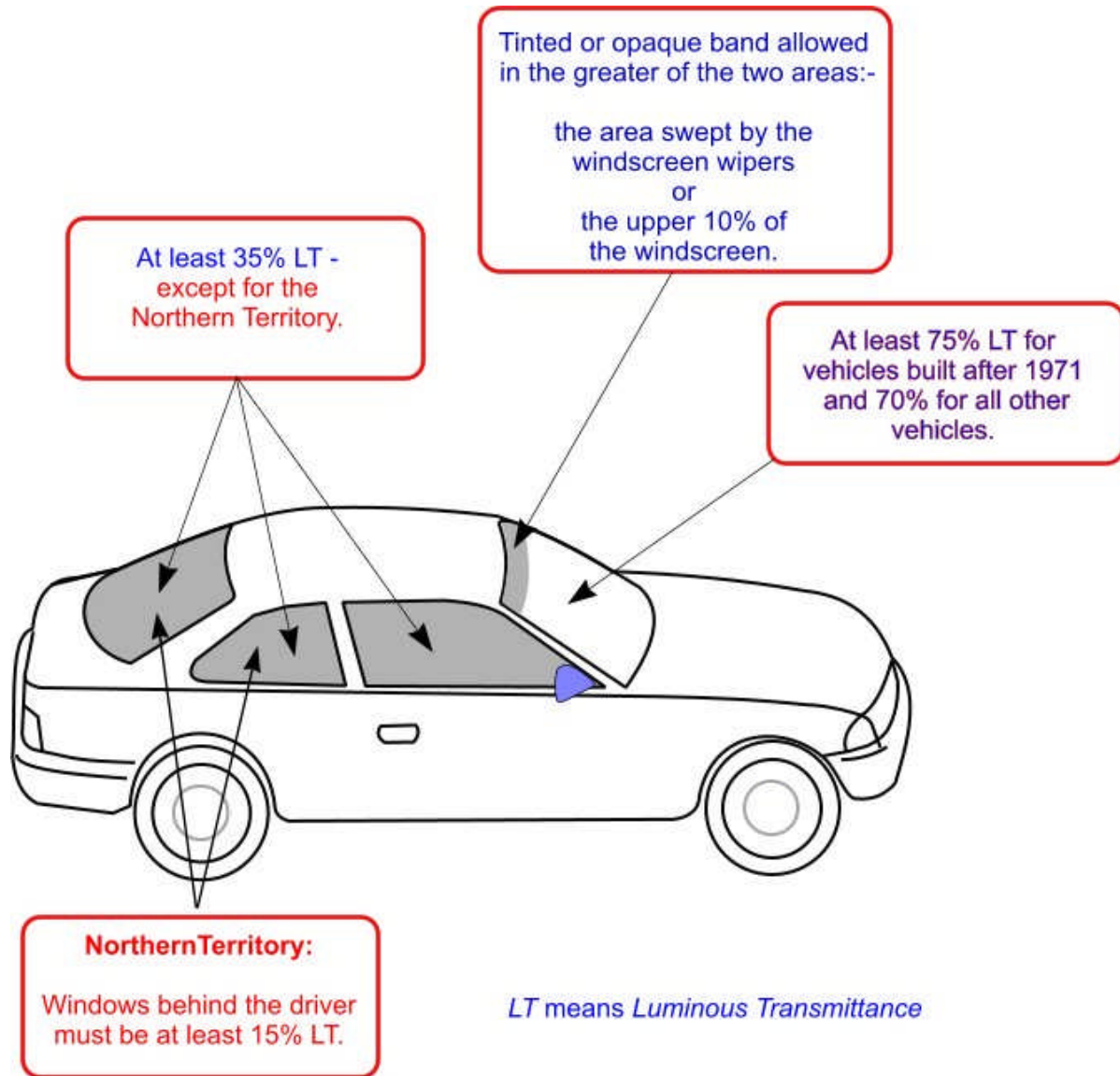


Figure LZ-G2 Window Tinting – Luminous Transmittance Requirements for Passenger Vehicles

Note: Since the AVSR allows jurisdictions to set alternative limits for window tinting, it is important that the jurisdiction in which the vehicle is to be either registered or used, be contacted for that jurisdiction's specific requirements.

Many jurisdictions also have alternative requirements for tinting on commercial vehicle windows that do not affect the safe operation of the vehicle.

8 MEASURING AND CALCULATING LUMINOUS TRANSMITTANCE

Luminous transmittance on glazing that is coated must always be measured through the glazing and film together. This is because the glazing has its own luminous transmittance value - usually around 70%. In this case, any film applied must have a luminous transmittance of at least 50%.

To calculate the estimated luminous transmittance the two percentage values, expressed as decimals, must be multiplied together, i.e.:

$$0.7 \text{ (glass LT)} * 0.5 \text{ (film LT)} = 0.35 \text{ (LT for the glass and film in combination).}$$

APPENDIX Z GLOSSARY

1 SCOPE

The following abbreviations and terms may be found throughout the Sections of VSB 14 and are provided for the general convenience of users. They relate to the particular usage within the context of VSB 14.

Many of the definitions and terms may vary within the various acts and regulations of each State or Territory and may also change as a result of amendments to legislation. As a consequence the definitions contained within the legislation in question must be referenced if a strictly legal interpretation is required.

2 ABBREVIATIONS

ADR	Australian Design Rule
ADR/...	<i>short title</i> , a generic reference to a specific ADR, irrespective of the version
ADR/00	Indicator of an ADR's version number (e.g. ADR 1/00, 1/01). For example /00 refers to the original version of the ADR, /01 refers to the first amended version
AMVCB	The Australian Motor Vehicle Certification Board (<i>the Board</i>)
AVSRs	Australian Vehicle Standards Rules
DITRDLG	(Commonwealth) Department of Infrastructure, Transport, Regional Development and Local Government, previously (Commonwealth) Department of Transport and Regional Services (DOTARS)
DoM	Date of Manufacture
ICV	Individually Constructed Vehicle
MVSA	(Commonwealth) Motor Vehicle Standards Act, 1989
MVSRs	(Commonwealth) Motor Vehicle Standards Regulations, 1989
OAL	Overall Length
OAW	Overall Width
SRP	Seating Reference Point
TRL	Torso Reference Line
VIN	Vehicle Identification Number
VSB	Vehicle Standard's Bulletin
VSS	Vehicle Safety Standards. Vehicle Safety Standards is the branch of the Department of Infrastructure, Transport, Regional Development and Local Government responsible for administering, under the <i>Motor Vehicle Standards Act 1989</i> , the importation of vehicles, the ADRs and the vehicle certification system in Australia
WOVR	Written-Off Vehicle Register

3 NATIONAL or ADOPTED STANDARDS

AS	Australian Standard
AS/NZS	Australian/New Zealand Standard
ASTM	American Society for Testing and Materials
BS	British Standard
BSS	British Standard Specification
ECE R	Economic Commission for Europe Regulation
FMVSS	Federal Motor Vehicle Safety Standard (of the USA)
IEC	International Electrotechnical Commission
ISO	International Standards Organisation
JIS	Japanese Industrial Standard
UN ECE	United Nations Economic Commission for Europe

4 FUEL TYPES (Gas)

LP Gas	Liquefied Petroleum Gas
NG	Compressed Natural Gas (now referred to as <i>CN Gas</i>)
NGV	Natural Gas Vehicle (now referred to as a <i>CN Gas vehicle</i>)

5 EMISSIONS

CO	Carbon Monoxide
HC	Hydrocarbons
THC	Total Hydrocarbons
NOx	Oxides of Nitrogen

6 VEHICLE MASS RATINGS

ATM	Aggregate Trailer Mass
GTM	Gross Trailer Mass
GCM	Gross Combination Mass
GVM	Gross Vehicle Mass
GALR	Gross Axle Load Rating

7 ACRONYMS, DEFINITIONS AND TERMS

Many of the definitions and terms that are contained in this sub-section may vary within the various acts and regulations of each State or Territory and may also change as a result of amendments to legislation. As a consequence the definitions contained within the legislation in question must be referenced if a strictly legal interpretation is required.

Most of the definitions within this sub-section have been sourced from the Third Edition ADRs as these are now the commonly used definitions with respect to ADR compliance.

Terms in italics in the text below indicate that they are defined.

ADRs The Australian Design Rules are the construction and performance standards prescribed for all new vehicles under the *Motor Vehicle Standards Act 1989*.

Aggregate Weight

See *Vehicle Mass Limits*.

ATM See *Vehicle Mass Limits*.

Approved Compliance Plate

An *Identification Plate* issued in accordance with the MVSA to certify that the vehicle it describes complies with the relevant applicable *ADRs*.

Articulated Vehicle

A combination of *Prime Mover* and *Semi-trailer*.

AMVCB Committee that advises the Administrator of the MVSA on vehicle certification matters. It comprises representatives of all State and Territory Registration Authorities.

AMVCB WP A Working Party of the AMVCB that deals mainly with in-service, road vehicle standards issues that are relevant to Registration Authorities in Australia.

AVSR Australian Vehicle Standards Rules.

Axles

Axle

One or more shafts positioned in a line across a vehicle, on which one or more wheels intended to support the vehicle turn.

Axle Load

The total load transmitted to the road by all the tyres of all the wheels whose centres may be included between two transverse parallel vertical planes less than one metre apart.

GALR

The *Manufacturer's* specified maximum *Axle Load* for each *Axle* for which compliance with applicable Australian Design Rules has been or can be established.

Axle Group

Either a *Single Axle*, *Tandem Axle Group*, *Tri-axle Group*, or *Close Coupled Axle Group*.

Close Coupled Axle Group

Two *Axles* with centres not more than 1.0m apart, shall be regarded as equivalent to a *Single Axle*; three *Axles* with centres not more than 2.0m apart, shall be regarded as equivalent to a *Tandem Axle Group*; four or more *Axles* with centres not more than 3.2m apart, shall be regarded as equivalent to a *Tri-Axle Group*.

Single Axle

Either one *Axle* or two *Axles* with centres between transverse, parallel, vertical planes spaced less than 1.0m apart.

Tandem Axle Group

A group of at least two *Axles* in which the horizontal distance between the centre lines of the outermost *Axles* is at least 1.0m, but not more than 2.0m.

Tri-axle Group

A combination of three *Axles* in which the front and rear *Axles* are not less than 2.0m and not more than 3.2m apart.

Body

The structure attached to a vehicle's chassis or floorpan to carry passengers or a load. In the case of a vehicle without a separate chassis or floorpan (i.e. a unitised or monocoque design) it is the vehicle.

Brakes

Manually Operated Brakes

Those systems in which all of the braking effort is provided by the driver of the vehicle through the brake control (e.g. pedal or lever).

Power Assisted Brakes

Those braking systems in which an energy source is used to provide part of the braking effort. The energy source used is usually vacuum obtained from the vehicle's engine induction system or a vacuum pump.

Power Operated Brakes

Those systems in which the total braking effort is supplied directly by the power source. Normally used on heavy commercial vehicles, the driver operates these systems by regulating the application of the energy source (usually compressed air).

Bus (or Omnibus)

A passenger vehicle having more than nine seating positions, including that of the driver. An omnibus comprising two or more non-separable but articulated units shall be considered as a single vehicle.

Caravan Any enclosed trailer designed primarily for human occupation while stationary.

Chassis The basic operating motor vehicle including engine frame and other essential structural and mechanical parts, but exclusive of body and all appurtenances for

the accommodation of driver, property and passengers appliances, or equipment related to other than control.

Compliance Plate

Refer to section 10 of the *Motor Vehicle Standards Act 1989*.

DoM The date the vehicle is available in Australia in a condition which will enable an *Identification Plate (Compliance Plate)* to be lawfully affixed to the vehicle.

Drawbar The portion of a trailer that connects the trailer body to the *Coupling* for towing purposes.

Dimensions (all measured with vehicle resting on level ground):

Approach Angle

The smallest angle, in a side view of a vehicle formed by the level surface on which the vehicle is standing and a line tangent to the front tyre *Static Loaded Tyre Radius* arc and touching the underside of the vehicle forward of the front tyre.

Departure Angle

The smallest angle, in a side view of a vehicle formed by the level surface on which the vehicle is standing and a line tangent to the rear tyre *Static Loaded Tyre Radius* arc and touching the underside of the vehicle rearward of the rear tyre.

Breakover Angle

The supplement of the largest angle, in the side view of a vehicle, that can be formed by two lines tangent to the front and rear *Static Loaded Tyre Radius* arcs and intersecting at a point on the underside of the vehicle.

Ground Clearance

The minimum distance to the ground from the underside of a vehicle, excluding its tyres, wheels, wheel hubs, brake backing plates and flexible mudguards or mudflaps.

Overall Height

The maximum distance from the ground to the highest point of the vehicle.

OAL

The maximum distance from the foremost part of the vehicle to its rearmost point, but excluding any rear mounted dock or bumper rubbers.

OAW

The maximum distance measured across the body including wheel guards, but excluding rear vision mirrors, signalling devices and side-mounted lamps.

Wheelbase

The dimension measured horizontally and parallel to the longitudinal axis of the vehicle between the front and rear wheel centrelines at *Unladen Mass*. In the case of the rear *Axle Group* the dimension must be to the *Centre of an Axle Group*. For a steerable front *Axle* or *Axle Group*, the dimension shall be to the centreline of the foremost *Axle*.

Wheel Track

The distance measured horizontally across and parallel to the *Axle* of the vehicle between the centre of its wheels.

Heavy Vehicle

Any *motor vehicle* with a *GVM* exceeding 4.5 tonnes and any *trailer* with an *ATM* exceeding 4.5 tonnes.

ICV

An *Individually Constructed Vehicle* is a vehicle that is not a *Production Vehicle* or a *Modified Production Vehicle*. An *ICV* is a unique, *one-off* homemade *vehicle*, specially designed and constructed by a person for his/her use. The term *ICV* may also be used to describe a *vehicle* that has been modified beyond the category of *Modified Production Vehicle*.

Identification Plate

Previously known as a *Compliance Plate*.

Impressed Stamped, embossed, etched or machined when used for vehicle identifiers.

Imported Vehicle

A vehicle that has been brought into Australia with the written approval of the **DITRD LG**, or the Minister administering the MVSA.

(For more information, see **VS B.10** *Importing Vehicles to Australia*).

Light Vehicle

Any motor vehicle with a *GVM* of 4.5 tonnes or less and any trailer with an *ATM* of 4.5 tonnes or less.

Load Sharing Suspension

An *Axle Group* suspension system that utilises hydraulic, pneumatic, mechanical or other means, to effect substantially equal sharing by all the ground contact surfaces of the *Axle Group*, of the total load carried by the *Axle Group* and has effective damping characteristics on all *Axles* of the *Axle Group*.

Load Space

A clearly defined surface, deck, rack or compartment on a *vehicle* that is designed to support a load.

Manufacturer

The name of the person or company who accepts responsibility for compliance with the Australian Design Rules and to whom the *Compliance Plate* approval certificate is issued.

Mass Limits

ATM

The total mass of a laden trailer when carrying the maximum load recommended by the *manufacturer*. This will include any mass imposed onto the drawing vehicle when the *combination vehicle* is resting on a horizontal supporting plane.

GTM

The mass transmitted to the ground by the *Axle* or *Axles* of the *trailer* when coupled to a drawing vehicle and carrying its maximum load approximately uniformly distributed over the load bearing area, and at which compliance with the appropriate ADRs has been or can be established.

GCM

The value specified for the vehicle by the *manufacturer* as being the maximum of the sum of the *Gross Vehicle Mass* of the drawing vehicle plus the sum of the *Axle Loads* of any vehicle capable of being drawn as a trailer.

GVM

The maximum *laden mass* of a motor vehicle as specified by the *manufacturer*.

Laden or Loaded Mass

The mass of a *vehicle* and its load borne on the surface on which it is standing or running.

Load capacity

The difference between the *GVM* of a vehicle and its *tare mass*.

Mass Limit

The vehicle's *GVM* or *aggregate weight* in the case of an *existing vehicle*.

Maximum Loaded Vehicle Mass (of a passenger vehicle)

The sum of: the *Unladen Mass* together with the heaviest regular production options, if such individual options have a mass of 2.3kg or more, with a fuel capacity of lubricating oil, cool, coolant and fuel; plus additional loading equivalent to 68kg at each seating position; plus the number of seating positions times 13.6 kg for luggage in the appropriate luggage space, with the centre of gravity of the luggage load at the centre of the luggage space).

Maximum Loaded Vehicle Mass (of a vehicle other than a passenger vehicle)

The *Gross Vehicle Mass* or *Gross Trailer Mass*.

Tare Mass

Mass of a vehicle other than an L-group vehicle ready for service, unoccupied and unladen, with all fluid reservoirs filled to nominal capacity, except for fuel, which shall be 10 litres only, and with all standard equipment and any options fitted.

Unladen Mass

The mass of a *vehicle* in running order, unoccupied and unladen, with all fluid reservoirs filled to nominal capacity, including fuel, and with all standard equipment.

Minor Modifications to Production Vehicles

These are alterations carried out on *Production Vehicles* and are accepted by jurisdictions without certification.

Typical Minor Modifications include the fitting of radios, CD players, wheel trims etc..

Basic Modifications to Production Vehicles

These modifications do not require certification provided they have been carried out in accordance with the relevant sub-sections of VSB 14 titled *General Requirements* and *Basic Modifications Without Certification*.

Significant Modifications to Production Vehicles

These modifications have the potential to seriously affect the safety of the *Completed Vehicle* and may affect the *Completed Vehicle's* strength, structural integrity and road handling characteristics.

The modifications involve major alterations to the vehicle body, engine, drive train or chassis but the vehicle retains its original identity and VIN. The *Production Vehicle* body, monocoque or chassis may be modified but each major component, whether modified or not, remains recognisable. These modifications require certification.

Extensive Modifications to Production Vehicles

These modifications have the potential to seriously affect the safety of the *Completed Vehicle* and may affect the *Completed Vehicle's* strength, structural integrity and road handling characteristics.

The modifications involve major alterations such as the combination of one or more major sections/components of various *Production Vehicles*. It may be difficult to determine the *Completed Vehicle's* original identity and VIN or a choice of vehicle identities may result, e.g. in the case of vehicle made up of two vehicles – some jurisdictions will retain the VIN of the chassis while others will retain the VIN of the body. These modifications require certification.

Modified Vehicle or Modified Production Vehicle

A *production vehicle* that has been modified from its original form and specification. The modification may or may not require certification depending on the type and extent of the modification.

Motor Cycle or Motor Bike

Means a motor vehicle with two wheels, and includes a 2 wheeled motor vehicle with a sidecar attached to it that is supported by a third wheel. (AVSR).

Motor Vehicle

Means a vehicle built to be propelled by a motor that forms part of the vehicle. (AVSR).

Motorhomes and Caravans

Vehicles that are used as living quarters and have no load space other than what is necessary to carry food, water, clothing, cooking/eating utensils, etc..

Motorhome (or Campervan)

A **motorhome or a campervan** is a motor vehicle manufactured to include accommodation space, which contains at least the following equipment:

- seats, and table;
- sleeping accommodation, which may be by converting seats;
- cooking facilities; and
- storage facilities.

Partially Completed Vehicle

A vehicle which has been manufactured to a stage where, although it is registrable, additional work will be necessary to be able to put it into service (e.g. a *cab-chassis* without a tray).

Passenger Car or Motor Car

A passenger vehicle, not being an off-road passenger vehicle or a forward control passenger vehicle, having up to nine seating positions, including that of the driver.

Passenger Car Derivative

A motor vehicle known as a utility, station wagon or panel van in which the body that is forward of the windscreen and most of the mechanical components are the same or substantially the same as those of a passenger car of that make/model.

Personally Imported Vehicle

A vehicle that was owned and used overseas for at least twelve calendar months by the person who applied to import it into Australia (refer to VSB10).

Prime Mover A motor vehicle built to tow a *semi-trailer*.

Production Vehicle

A *vehicle* manufactured and marketed in volume for normal road use. Production vehicles manufactured after January 1969 for use in Australia will normally be fitted with an *Identification Plate* or *Personal Import Plate*.

Rebodied Vehicle

A *motor vehicle* with a chassis or floorpan, capable of supporting its drive train, suspension and steering components, that has been fitted with a replacement *body*.

Retractable Axle

An *Axle* with a means of adjustment enabling it to be raised or lowered relative to the other *Axles* in the *Axle Group*.

Seats and Seating

Designated Seating Position

The *seating position* included in the vehicle manufacturer's nominated *seating capacity*.

Effective Cushion Width

The width of the seat measured horizontally across the seat cushion where it intersects the *TRL*. A seat with an *Effective Cushion Width* that is:

- less than 820mm, is considered a single seating position; and
- exceeding 820mm, is considered to be two seats if the seat back is contoured to only provide two identifiable seating positions.

Folding Seat

An auxiliary *seat* intended for occasional use and normally folded.

Seating Position

A passenger seat that has an effective cushion width of 410mm.

Seating Capacity

The number of seated adult persons which the vehicle is designed to carry and for which seating positions (established in accordance with clause 5.7 of ADR 5/... *Anchorage for Seatbelts and Child Restraints* and clause 10 of ADR 5/... *Anchorage for Seatbelts*) are provided.

Types of Seatbelts, Restraints and Fittings

Child Restraint

A device to restrain a child passenger of a motor vehicle in the event of a vehicle impact and thus minimise the risk of bodily injury.

Child Restraint Anchor Fitting

The fitting which allows the attachment of the *Attaching Clip* to the vehicle, usually attached to the *Child Restraint Anchorage* using components in the *Child Restraint Anchor Fitting Package*. Details of the profile within which the *Child Restraint Anchor Fitting* must be contained are shown in figure 2 of ADR 34/...

Child Restraint Anchor Fitting Package

A standard package of components to enable the installation of the *Child Restraint Anchor Fitting* onto the *Child Restraint Anchorage*. The package consists of: one *Attachment Bolt*, one *Child Restraint Anchor Fitting*, one *Lock Washer* of 2.21mm thickness max., one *Spacer* of 5mm thickness, and one *Spacer* of 10mm thickness.

Child Restraint Anchorage

The part of the vehicle designed to transfer loads from the upper part of the *Child Restraint* to the vehicle structure.

Emergency Locking Retractor

A retractor incorporating a locking mechanism that is designed to lock under abnormal operating conditions.

Note: *Both lap and lap-sash type seatbelts may incorporate an Emergency Locking Retractor.*

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.

Lap type Seatbelt

A seatbelt assembly designed to provide pelvic restraint only.

Pelvic Restraint

The process of transmitting restraint forces to the body through the bones of the pelvis to prevent compression of the abdomen between the restraint and the spine.

Lap-Sash Type Seatbelt

A seatbelt assembly combining a lap strap designed to provide pelvic restraint, and a torso strap designed to provide upper torso restraint.

SRP

The pivot point of the torso and thigh in the rearmost represented by the centre of a 100mm diameter disc placed at the join of the seat cushion and backrest.

TRL

A line parallel to the small of the two-dimensional manikin's back and extending through the *SRP* when the seat back is adjusted to a required seat back angle. The two-dimensional manikin is as specified in SAE J826 *Manikins for Use in Defining Vehicle Seating Accommodation*, November 1962, SAE J826a, August 1970, SAE J826b, January 1978, or, J826 APR80- *Devices for Use in Defining and Measuring Vehicle Seating Accommodation*.

Pelvis Reference Point

A point used in simulating the correct position of a lap-strap, or the lap-strap of a lap-sash belt. It is the point which is located at a height of 95mm above and 70mm forward of the *SRP*.

Signatory Is a person who is accredited to, or registered with a Registration Authority for assessing and certifying modified vehicles for the purposes of registration.

(For the purposes of VSB 14 and its Guidelines, the term *Signatory* applies to engineers and tradespersons involved in the approval process. Wherever the term *Signatory* is used, it implies that the *Signatory* referred to is one who has the

necessary qualifications and experience to assess and sign-off the matter under consideration).

Three Wheeled Vehicles

These are motor vehicles that have three wheels, (as defined below with either one or two wheels at the front) and do not include motor cycles fitted with sidecars.

Motor Tricycle or Trike

A motor vehicle with three wheels symmetrically arranged in relation to the longitudinal median axis, with a *Gross Vehicle Mass* not exceeding 1.0 tonnes and either an engine cylinder capacity exceeding 50mL or a *Maximum Motorcycle Speed* exceeding 50km/h.

Three Wheeled Vehicle

A three-wheeled motor vehicle that has body work to enclose its driver and passengers and normally has bench or bucket-type seats and has a firewall, side structure and passenger compartment floor (it may also have a roof).

Truck A *motor vehicle* constructed principally for the conveyance of goods or merchandise or for the conveyance of materials used in a trade, business or industry, or for use in any work other than the conveyance of persons but does not include a motorcycle or tractor.

Unladen mass (tare mass)

See *Vehicle Mass Limits*.

Vehicle Any *motor vehicle* or *trailer*.

Vehicle Identifiers

Engine Number

A *vehicle identifier* that is issued by a vehicle manufacturer in a specific format and style to uniquely identify a particular engine.

Chassis or Frame Number

A *vehicle identifier* that is issued by a vehicle manufacturer in a specific format and style to uniquely identify a particular vehicle, chassis or frame.

VIN

The number quoted on the *Identification Plate (Compliance Plate)* that uniquely identifies the vehicle and sets it apart from similar vehicles. This number shall correspond to the identification number of the vehicle which is permanently recorded elsewhere on it.

Vehicle Standards

The vehicle construction and performance requirements that reflect the *AVSRs* and *ADRs* and that are prescribed under the various State and Territory transport legislation.

WOVR A national register of *written-off vehicles* that provides damage and repair status information on those vehicles to all Australian States and Territories. (This information is compiled from advice provided by insurers, wreckers, vehicle owners and Registration Authorities in accordance with national legislative requirements).

Written-off or Wrecked Vehicle

A vehicle that has been damaged by fire, water, storm or collision or that has been stolen and stripped and had this damage listed on the *WOVR*.

Repairable Write-off

A *vehicle* that has been damaged and reported to the *WOVR* but which can be readily repaired (these vehicles are normally re-registrable).

Statutory Write-off

A *vehicle* that has been stolen and stripped or damaged (either in a crash or storm or by fire or by immersion in fresh or salt water) to such an extent that it cannot be repaired.

(Note: *These vehicles cannot be registered under any circumstances*).