



NATIONAL CODE OF PRACTICE

VSB6

Heavy Vehicle
Modifications

Publishing information

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Version 3.0

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The following participants from government and industry contributed to the redrafting of this manual:

Government participants

- Access Canberra, ACT
- Department of Infrastructure and Regional Development
- Department of Planning, Transport and Infrastructure, SA
- Department of State Growth, TAS
- Department of Transport and Main Roads, QLD
- Department of Transport, NT
- Roads and Maritime Services, NSW
- Transport for New South Wales
- VicRoads, VIC

Industry participants

- Australian Road Transport Suppliers Association (ARTSA)
- Australian Trucking Association (ATA)
- Commercial Vehicle Industry Association of Australia (CVIAA)
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Disclaimer

Please note: While every attempt has been made to ensure the accuracy of the content of this manual, it should not be relied upon as legal advice.

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Introduction to VSB6

Purpose of Vehicle Standards Bulletin 6

Vehicle Standards Bulletin 6 (VSB6): *National Code of Practice for Heavy Vehicle Modifications* outlines minimum design, construction, installation and performance requirements for modifications to heavy motor vehicles and trailers.

VSB6 is designed for use throughout Australia by heavy vehicle regulators as well as businesses and individuals involved in the modification of heavy vehicles. It is intended to provide a single national technical standard to ensure that modified heavy vehicles are safe and that they comply with relevant Australian Design Rules (ADRs) and legislative and regulatory requirements.

VSB6 is published by the Australian Motor Vehicle Certification Board (AMVCB), comprising representatives of the federal government, National Heavy Vehicle Regulator (NHVR), state and territory governments, National Transport Commission and the New Zealand Land Transport Agency.

Scope

Subject to federal government laws, national heavy vehicle laws and the laws of the states and territories of Australia, VSB6 applies to the modification of:

- any motor vehicle with a gross vehicle mass (GVM) greater than 4.5 tonnes and
- any trailer with an aggregate trailer mass (ATM) greater than 4.5 tonnes.

For the most part, VSB6 only applies to modifications made to vehicles after their supply to the market.

However, VSB6 does apply to a vehicle before supply to the market if the vehicle:

- is a partially completed heavy vehicle, and
- where the modification(s) is not of a type that requires a second-stage-of-manufacture (SSM), as outlined in Administrator's Circular 0-4-6 *Certification of vehicles which have undergone a second-stage-of-manufacture*.

Key notes for VSB6

- VSB6 does not supersede a vehicle manufacturer's and, in most cases, a component manufacturer's modification guidelines. If a vehicle manufacturer or component manufacturer has published guidance on how a modification is to be performed it must be followed in lieu of VSB6. Where a component manufacturer's requirements do not supersede VSB6, this will be specifically stated.
- All vehicles must continue to comply with ADR's and other regulations applicable to the vehicle.
- Wherever a modification covered by VSB6 is made, it must be assessed by an accredited approved vehicle examiner (AVE), and if approved, a modification plate must be fitted to the vehicle.

Implementation

The requirements of this revision of VSB6 apply to all vehicles modified on or after 1 September 2017.

Where the modification of a heavy vehicle commenced prior to 1 September 2017, the requirements of the previous version of VSB6 may be used provided the modification is certified by 30 September 2017.

VSB6 will continue to be improved and updated in response to changes to legislation and technology. Where VSB6, or a section of VSB6, is updated or revised, an implementation date for the revised or updated version will be clearly stated.

Definitions

The terms used in VSB6 have the meanings given either by the Glossary (Appendix 2), the ADRs or the relevant act or regulation.

Previous versions and references

VSB6 is a mature industry standard that was first published in the early 1990s as a consolidation of technical standards published by industry and state and territory road transport authorities.

It has been determined that this version of VSB6 will be referenced as Version 3, as it is the third distinct iteration of the document. The NHVR considers that Version 1 was the document as originally published and was in use until 30 June 2015. Version 2 was published on 1 July 2015 and was in use until 31 August 2017.

Since originally published, VSB6 has been referenced in a number of ways. These may include:

- as published by, or available from, the Federal Office of Road Safety
- as published by, or available from, the Department of Infrastructure, Regional Development and Local Government
- as published by, or available from, the Department of Infrastructure and Regional Development
- as published by the Australian Motor Vehicle Certification Board.

To remove any doubt, a previous reference to VSB6 in whatever form, is to be taken as a reference to the version of VSB6 that was in force at the time.

Structure and format of VSB6

VSB6 consists of the following sections which address requirements for modifications to a specific vehicle component or system.

Section A	Engines
Section B	Transmissions
Section C	Tail shafts
Section D	Rear axles
Section E	Front axle steering wheels and tyres
Section F	Suspension
Section G	Brakes
Section H	Chassis
Section J	Body
Section K	Cabin
Section M	Fuel systems
Section P	Tow couplings
Section R	Vehicle mounted lifting systems
Section S	Vehicle rating
Section T	Tow trucks

Modification Sections

Each section consists of an introductory chapter followed by one or more modification codes that outline requirements for specific aspects of the system or component.

Checklists and reports

Blank checklists and modification reports have also been provided to assist AVEs perform and report on inspections. There is at least one checklist for each modification code to help ensure that the design and construction are of a satisfactory standard and relevant factors have been considered. Some modifications may require more than one checklist: one for design and another for the modification.

Availability

VSB6 is produced in electronic format only and can be downloaded from the NHVR website.

As VSB6 is a live document and may be subject to regular updates, any paper copy held will not necessarily represent the most recent version of VSB6.

Australian legislation, design rules and standards

The requirements of VSB6 are based on and subject to Australian Design Rules (ADRs), federal laws, the *Heavy Vehicle National Law* (HVNL) and the laws of the states and territories of Australia. VSB6 also adopts a number of national and international standards, such as Australian standards.

Where a requirement of VSB6 is inconsistent with an applicable ADR, Australian standard, act or regulation, the requirement of the ADR, standard, act or regulation is to be applied.

In relation to heavy vehicle standards and modifications, the following legislation may be of relevance:

Australian Design Rules (ADRs)

ADRs are national standards for vehicle safety, anti-theft and emissions and cover issues such as occupant protection, structures, lighting, emissions and braking. Development and amendment of ADRs is overseen by the Federal Department of Infrastructure and Regional Development (DIRD) in conjunction with specialist bodies such as the Strategic Vehicle Safety and Environment Group (SVSEG); Australian Motor Vehicle Certification Board (AMVCB) which includes the Technical Liaison Group (TLG); the Transport and Infrastructure Senior Officials' Committee (TISOC); and the Transport and Infrastructure Council.

Motor Vehicle Standards Act 1989 (MVSA)

ADRs are administered by the federal government under the MVSA, and apply to all road vehicles supplied to the Australian market. Vehicles must comply with the MVSA before they can be supplied to the market, used or operated as a means of transport. MVSA Section 14 makes it an offence to modify a vehicle to be non-standard before it is supplied to the market for use in transport. A new road vehicle is considered to be non-standard if:

- it does not comply with the applicable ADRs; or
- it complies with the ADRs but does not comply with the specifications provided to obtain approval to supply the vehicle to market (identification plate approval).

Once a heavy road vehicle is supplied to the market, responsibility for overseeing or administering modification standards passes to the relevant heavy vehicle regulator that handles in-service requirements such as roadworthiness and vehicle modifications.

In-service vehicle legislation

In-service vehicle legislation applies to matters relating to in-service vehicle standards, mass, dimensions, loading, fatigue management, heavy vehicle accreditation and on-road enforcement.

In participating jurisdictions

In the Australian Capital Territory, New South Wales, Queensland, South Australia, Tasmania and Victoria, the relevant in-service vehicle legislation is the *Heavy Vehicle National Law* and the National Regulations made under that Law. This includes the *Heavy Vehicle (Vehicle Standards) National Regulation* and the *Heavy Vehicle (Mass, Dimension and Loading) National Regulation*.

In Western Australia and the Northern Territory

In Western Australia and the Northern Territory local legislation applies to all in-service vehicle matters, including vehicle standards and modifications. As at 1 September 2017 the relevant legislation is the:

- *Road Traffic (Vehicles) Act 2012* (WA) and applicable regulations in Western Australia; and
- *Motor Vehicles Act* (NT) and applicable regulations in the Northern Territory.

Australian and national standards

VSB6, the ADRs and relevant vehicle standards regulations adopt a number of Australian and other standards, including Australian Standards (AS), British Standards (BS), Japanese Industrial Standards (JIS), German Institute for Standardisation (DIN) and International Organization for Standardisation (ISO).

Where an adopted standard includes a reference to a particular version (e.g. a year), that version of the standard must be applied. If the adoption of a standard does not reference a specific version, the version that was current at the time the modification was performed is to be applied.

Relevant heavy vehicle regulator

Responsibility for administering modifications of heavy vehicles lies with the *relevant heavy vehicle regulator* in the jurisdiction in which the modification is being performed.

In these jurisdictions, the *relevant heavy vehicle regulator* is as follows:

Northern Territory	Northern Territory Department of Infrastructure, Planning and Logistics
Western Australia	West Australian Department of Transport
All other states and territories	National Heavy Vehicle Regulator

Compliance with VSB6

Although VSB6 codes apply to modifications of heavy vehicles as defined above, there is no prohibition on their application to other vehicles types. For example, a state or territory road transport authority may allow certification of a light vehicle modification to the requirements set out in VSB6.

In cases where VSB6 must or should not apply to particular classes or categories of vehicles it will be stated in the specific modification code.

Relation to other Australian legislation and authorities

VSB6 has been developed to ensure modifications made to heavy vehicles comply with ADRs and Australian legislative requirements administered by the relevant heavy vehicle regulator and DIRD.

This does not however limit compliance with other legal and statutory requirements, nor does it limit the powers and duties of:

- a federal, state or territory minister
- the chief executive officer of a road transport authority
- the National Heavy Vehicle Regulator
- any agent or employee of a road transport authority or the National Heavy Vehicle Regulator.

Accordingly, the relevant heavy vehicle regulator may have different requirements and those performing modifications should seek advice from the relevant regulator if there are doubts about compliance.

Precedence of ADRs and manufacturer guidelines

VSB6 requires that those making modifications to heavy vehicles or certifying them must ensure that these comply with:

- vehicle, and in most cases, component manufacturer's recommendations, including installation or modification guidelines such as body builders manuals
- ADRs applicable at the date the vehicle was manufactured or a later version.

If a component manufacturer's recommendations do not supersede those of VSB6, it will be advised specifically.

In cases where VSB6 requirements are not consistent with either ADRs or original vehicle manufacturer's guidelines the ADRs or the manufacturer's guidelines, if available, override those of VSB6.

Manufacturer installation or modification guidelines and other engineering data is usually available by contacting the manufacturer's engineering or customer support departments.

In all cases those performing modifications are responsible for making professional engineering judgements, employing sound work practices that reflect good engineering practices and ensuring that the vehicle complies with all affected relevant ADRs and vehicle standards.

Modifications not covered by VSB6

VSB6 addresses requirements and recommendations for a range of common modifications that supplement vehicle and component manufacturer recommendations but it cannot address every type of modification or situation possible.

For modifications not covered by VSB6, the relevant heavy vehicle regulator should be contacted to determine the requirements for the modification and, if necessary, obtain approval. Normally a full engineering analysis by a suitably qualified person, supported by testing where appropriate, will be necessary before the modification can be approved.

Minor modifications, such as the fitting of accessories or other minor changes that do not result in the vehicle departing from the original equipment manufacturer's (OEM) specifications, may not require approval. For further information about the requirements for minor modification, please contact the relevant heavy vehicle regulator.

📌 Modifications that are provided for within VSB6 must be approved, regardless of whether they are within OEM specifications.

Retention of records

AVEs certifying modifications must retain all modification records relevant to the modification in accordance with the scheme under which the AVE has accreditation. Typically this is for a minimum of seven years after the modification has been certified. Throughout this time these records should be available for inspection by officers of the relevant federal, state or territory government authority or heavy vehicle regulator.

Modification records include but are not limited to, drawings, calculations, test results and copies of appropriate issues of Australian Standards and ADR's and may be produced by either:

- those involved in designing or performing the modifications
- those involved in authorising or certifying the design or work performed.

Appendix 1 — Contents of Vehicle Standards Bulletin 6 (VSB6)

Section	Modification codes	Checklists/reports
A – Engines	A1 – Engine substitution A2 – Air cleaner substitution or additional fitting A3 – Turbocharger installation A4 – Exhaust system alteration A5 – Road speed limiter installation	A1 Checklist – Engine substitution A1 Modification report – Engine installation A2 Checklist – Air cleaner substitution or additional fitting A3 Checklist – Turbocharger installation A4 Checklist – Exhaust system alteration A5 Checklist – Road speed limiter installation
B – Transmissions	B1 – Transmission substitution or additional fitting	B1 Checklist – Transmission substitution or additional fitting
C – Tail shafts	C1 – Tail shaft alterations	C1 Checklist – Tail shaft modification C1 Modification report – Tail shaft modification
D – Rear axles	D1 – Rear axle installation D2 – Differential substitution	D1 Checklist – Rear axle installation D2 Checklist – Differential substitution
E – Front axle steering wheels and tyres	E1 – Front axle installation E2 – Steering alteration E3 – Fitting of non-standard front wheel components	E1 Checklist – Front axle installation E2 Checklist – Steering alteration E2 Modification report – Front axle and steering E3 Checklist – Fitting of non-standard front wheel, i.e. tyre or rim
F – Suspension	F1 – Suspension substitution F2 – Trailer suspension modifications	F1 Checklist – Suspension substitution F2 Checklist – Trailer suspension modifications
G – Brakes	G1 – Relocation of air brake components G2 – Installation of trailer braking controls G3 – Trailer brake system upgrade G4 – Motor vehicle brake system certification G5 – Fitting of auxiliary and endurance brakes G6 – Fitting of air operated accessories G7 – Brake system substitution / wheelbase extension G8 – Trailer brake system upgrade (design)	G1 Checklist – Relocation of air brake components G2 Checklist – Installation of trailer braking controls: air brakes G3 Checklist – Trailer brake system upgrade G4 Checklist – Brake system certification G4 Modification report – Brake system: ADR certified vehicle G4 Modification report – Brake system (pre-ADR vehicle) G4 Test report – Brake torque build-up check: adjacent axles G5 Checklist – Fitting of auxiliary and endurance brakes G6 Checklist – Fitting of air operated accessories G7 Checklist – Brake system substitution / wheelbase extension G8 Checklist – Trailer brake system upgrade (design) G Modification report – Air system re-charge data sheet
H – Chassis	H1 – Wheelbase extension outside OEM options H2 – Wheelbase reduction outside OEM options H3 – Wheelbase alterations within OEM options H4 – Chassis alteration H5 – Trailer chassis modifications H6 – Install approved front underrun protection H7 – Design or manufacture aftermarket front underrun protection	H Calculation sheet – Chassis modification H1 Checklist – Wheelbase extension outside OEM options H2 Checklist – Wheelbase reduction outside OEM options H3 Checklist – Wheelbase alterations within OEM options H4 Checklist – Chassis alteration H5 Checklist – Trailer chassis modifications H6 Checklist – Install approved front underrun protection H7 Approval certificate – Front underrun protection H7 Checklist – Design or manufacture of aftermarket front underrun protection H7 Certificate of approval – FUPD and FUPS
J – Body	J1 – Body mounting J2 – Fitting of truck-bus body J3 – Fitting of roll-over or falling object protection system	J1 Checklist – Body mounting J2 Checklist – Fitting of truck-bus body J3 Checklist – Fitting of roll-over or falling object protection system
K – Cabin	K1 – Seating capacity alteration, seat, seatbelt and anchorage installation K2 – Certification of seat and of seatbelt anchorage K3 – Cabin conversion K5 – Installation of wheelchair occupant restraint system K6 – Child restraint anchorage installation	K1 Checklist – Seating capacity alteration, seat, seatbelt and anchorage installation K2 Checklist – Certification of seat and of seatbelt anchorage K3 Checklist – Cabin conversion K5 Checklist – Installation of wheelchair occupant restraint system K6 Checklist – Child restraint anchorage installation
M – Fuel systems	M1 – Fuel system alterations	M1 Checklist – Fuel system alterations
P – Tow couplings	P1 – Towbar and coupling installation other than fifth wheels and kingpins P2 – Fifth wheel and kingpin installation	P1 Checklist – Towbar and coupling installation other than fifth wheels and kingpins P2 Checklist – Fifth wheel and kingpin installation P2 Evaluation sheet – Fifth wheel and turntable evaluation report
R – Vehicle mounted lifting systems	R1 – Installation of vehicle mounted lifting systems R2 – Wheelchair loader installation	R1 Checklist – Installation of vehicle mounted lifting systems R1 Assessment report – Vehicle mounted lifting systems R2 Checklist – Wheelchair loader installation
S – Vehicle rating	S1 – GVM/GCM re-rating S2 – GVM re-rating (design) S3 – GCM re-rating (design) S7 – ATM/GTM re-rating S8 – Motor vehicle road train rating S9 – Prime mover B-double rating S11 – Road train trailer rating S12 – ATM/GTM re-rating (design)	S1 Checklist – GVM/GCM re-rating S2 Checklist – GVM re-rating (design) S3 Checklist – GCM re-rating (design) S7 Checklist – ATM/GTM re-rating S8 Checklist – Motor vehicle road train rating S9 Checklist – Prime mover B-double rating S11 Checklist – Road train trailer rating S12 Checklist – ATM/GTM re-rating (design)
T – Tow trucks	T1 – Tow trucks (construction) T2 – Tow trucks (design)	T1 Checklist – Construction of tow trucks T2 Checklist – Design of tow trucks

Appendix 2 — Glossary

ADR	Australian Design Rule	Dog trailer	A trailer with two axle groups of which the front axle group is steered by connection to the drawing vehicle.
Aggregate trailer mass (ATM)	The total mass of the laden trailer when carrying the maximum load recommended by the manufacturer. This includes any mass imposed onto the drawing vehicle when the combination vehicle is resting on a horizontal supporting plane.	Drawbar	Portion of a trailer that connects the trailer body to the coupling for towing purposes.
Approved vehicle examiner (AVE)	The person authorised by the relevant national, state or territory authority to evaluate and certify a particular type of modification and certify that the modified vehicle continues to conform to the applicable ADR's and other requirements for registration.	Dual steer system	A steering system by means of which a vehicle may be steered from one of two alternative driving positions.
Articulated vehicle	A combination of <i>prime mover</i> and <i>semitrailer</i> .	ERC (established retardation coefficient)	The average braking deceleration calculated when the energy level in the least favoured brakes actuator reaches 65% of average operating pressure (AOP) to when the vehicle becomes stationary, expressed as a proportion of the acceleration due to gravity.
Australian Design Rule	A national standard under section 7 of the <i>Motor Vehicle Standards Act 1989</i> of the Commonwealth.	Falling object protection system (FOPS)	A system or structure intended to protect the cabin of a vehicle from falling objects in an off-road environment, such as a construction or mining site.
Coupling-hook type	A device comprising an inverted hook, provided with a coupling lock mechanism, which is attached to the drawing vehicle. The hook accepts the bore of a towing eye that is attached to the drawbar on the towed vehicle. Generally, greater clearances are provided between these coupling components, and the assembly allows for significant vertical angular oscillation between the vehicle and trailer.	Fifth wheel	A device used with either prime mover or converter dolly to permit quick coupling and uncoupling of a semitrailer and provide for articulation.
Coupling-pin type	A device that uses insertion of a vertical pin through the hole of a drawbar towing eye. The pin is located and retained above and below the towing eye by the coupling fork of the towbar.	Fifth wheel fixed base	An assembly where the transverse pivot axis of the fifth wheel is always fixed relative to the prime mover.
Critical speed of propeller shaft	The propeller shaft rotational speed (self-destruct speed) at which the rotational speed is equal to the natural bending frequency of the shaft.	Fifth wheel lead	The distance in side elevation of the articulation point of the fifth wheel assembly ahead of the centre line of the drive axle group.
Axle	One or more shafts positioned in a line across a vehicle, on which one or more wheels are intended to support the vehicle turn.	Fifth wheel sliding	A fifth wheel that is readily adjustable in regard to fore and aft position on the vehicle chassis.
Axle group	Either a single axle, tandem axle group, tri-axle group, quad axle group, or close coupled axle group.	Fifth wheel turntable based (stabilised)	A fifth wheel assembly where the transverse pivot axis is always fixed relative to the semitrailer. All relative rotation between the prime mover and the semitrailer occurs in the slewing base (turntable).
Axle load	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.	Gradeability gradient	The maximum road gradient on which the vehicle loaded to its GCM, or GVM where the vehicle does not have a GCM, with the vehicle already in motion can continue to climb up the gradient.
Body	The structure added to a chassis or a chassis and cab for containing the load or other special purpose.	Gross combination mass (GCM)	The value specified for the vehicle by the manufacturer as being the maximum of the sum of the GVM of the drawing vehicle plus the sum of the axle loads of any vehicle capable of being drawn as a trailer.
Close coupled axle group	May be: two axles with centres not more than one metre apart and equivalent to a single axle; three axles with centres not more than two metres apart and equivalent to a tandem axle group; four or more axles with centres not more than 3.2 metres apart and equivalent to a triaxle group.	Gross trailer mass (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.
Combination vehicle	Either a combination of a rigid goods vehicle and one trailer (other than a semitrailer); or an articulated vehicle.	Gross vehicle mass (GVM)	The maximum laden mass of a motor vehicle as specified by the manufacturer.
Converter dolly	A pig trailer with a fifth wheel coupling, designed to convert a semitrailer to a dog trailer.	Guideline	A document that establishes a minimum standard for assessment of modified vehicles.
Coupling	A mechanical assembly that provides connection between a drawing vehicle and a trailer.	Heavy vehicle	A motor vehicle with a GVM greater than 4.5 tonnes, or a trailer with an ATM greater than 4.5 tonnes.
Coupling-ball type	A device that uses a spherically machined cantilevered ball to which is attached and locked a hemispherical receptacle, forming a coupling between the two. The ball is generally attached to the towbar of the drawing vehicle while the hemispherical receptacle is attached to the drawbar of the drawn vehicle. The spherical shape allows unrestricted articulation in the horizontal plane and restricted articulation in the vertical plane.	Lightly loaded test mass	The mass of the unladen vehicle with a full capacity of lubricating oil and coolant not less than 75% of full fuel capacity, but without goods, occupants or options except those essential for the test procedure specified, plus additional loading distributed in the seating position adjacent to the driver's seating position so that the mass of such loading plus the mass of the driver and instrumentation mounted in the vehicle is 155 +/- 30kg. In the case of a cab and chassis condition, an additional loading not exceeding 7.5% of the GVM must be located with its centre of mass within 200mm of the designated load centre measured in a horizontal plane.
D-value	The theoretical horizontal reference force between towing vehicle and trailer.	Load sharing suspension	An axle group suspension system that utilises hydraulic, pneumatic or other means to effect equal sharing, by all axle group ground contact surfaces and by the axle group total load, and apply effective damping characteristics on all group axles. Acceptable load sharing suspensions are described in publications prepared by the Commonwealth Department of Infrastructure and Regional Development.
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 arc and touching the underside of the vehicle rearward of the rear tyre.		

Manufacturer	The person or company who accepts responsibility for compliance with the ADRs and to whom a compliance plate approval certificate is issued.
Modification code	A particular type, style or class of modification within a vehicle system for which a separate set of detail requirements and checklist have been devised and included in VSB6.
Partially completed heavy vehicle	A heavy 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).
Pig trailer	A trailer having one axle group near the middle of the length of the goods-carrying surface.
Platform loader	A platform type of goods lift permanently fixed to the vehicle to assist loading and unloading of the vehicle, and which is either hydraulically or mechanically operated. Typical platform loaders include: <ul style="list-style-type: none"> • underbody stow • folding tailgate • folding post.
Power steering — integral	A power steering system in which a force generated by a secondary power source is applied to the active parts within the steering gear housing.
Power steering — ram type	A power steering system in which a force generated by a secondary power source is applied to the steering linkage between the steering gear and the road wheels.
Pre-ADR	A vehicle built prior to the date on which an ADR applicable to vehicles of that category came into force.
Prime mover	A rigid motor vehicle designed to tow a semitrailer.
Rear overhang line	For a vehicle with an axle group at the rear comprising only one axle, the rear overhang line is a line running along the centre-line of the axle. For a vehicle with an axle group at the rear comprising two axles, one of which is fitted with twice the number of tyres as the other, the rear overhang line is a line running parallel to the axles that is: (a) closer to the axle carrying the greater number of tyres than it is to the other axle; and (b) located at one-third of the distance between the two axles. For a vehicle with an axle group at the rear that is not an axle group mentioned above, the rear overhang line is a line running parallel to the axles down the centre of the axle group. For the purposes of determining the rear overhang line, if an axle group includes at least one steerable axle, that axle is to be disregarded unless: (a) the group comprises only one axle and that axle is a steerable axle; or (b) all the axles in the group are steerable axles.
Retractable axle	An axle that has means of adjustment to enable it to be raised or lowered relative to the vehicle's horizontal datum to substantially vary the axle load distribution between the axles of any axle group.
Roadworthy componentry	Roadworthy in accordance with the manufacturer's specifications, the Australian Vehicle Standards Rules or the Roadworthiness Guidelines.
Roll-over protection system (ROPS)	A system or structure intended to protect the cabin of a vehicle during a vehicle roll-over.
Safe working load (SWL)	The maximum mass which may be, that is, is permitted to be, safely handled.
Safety chain	A chain fitted to a substantial portion on a trailer that will hold the trailer in tow in the event of failure of, or accidental detachment of the coupling.
Safety lock	A mechanical device for securely locking a component or assembly.
Section	Individual chapter of VSB6 that deals with a particular administrative or vehicle system.

Semitrailer	A trailer having one axle or axle group towards the rear and having means of attachment to a prime mover whereby some of the load is imposed on the prime mover.
Single axle	Either one axle, or two axles with centres between transverse, parallel, vertical planes spaced less than one metre apart.
Steering linkage components	Links and arms of the steering linkage are provided in VSB6 Section E — Front axle steering wheels and tyres.
Startability gradient	Maximum road gradient on which the vehicle, loaded to its GCM, or GVM where the vehicle does not have a GCM, can be set in motion and accelerated up the gradient.
Tail shaft	Any driveshaft connection between the power/transmission unit and drive axles.
Tandem axle group	A combination of two axles whose centres are not less than one metre and not more than two metres apart.
Towbar	A device attached to the drawing vehicle provided for connection of the drawing vehicle to the trailer coupling for the towing of the trailer.
Tractor protected air supply	A system of supply of breakaway protected power and signal air from a tractor mounted source to the brakes of both the tractor and trailer.
Tri-axle group	A combination of three axles in which the centre of the front and rear axles are not less than two metres and not more than 3.2 metres apart.
Twin steer axle group	A combination of two axles, with single tyres, fitted to a motor vehicle sharing a steering mechanism and are more than one metre and less than two metres apart.
Unladen mass	The mass of the vehicle in running order unoccupied and unladen with all fluid reservoirs filled to nominal capacity (including fuel and all standard equipment).
Wheelbase	The distance from the centre line of the vehicle's foremost axle to the rear overhang line.

Units of measurement

%	percent
"	inch
°	degree (angle)
cm	centimetre
E	Fractions of control air brake signal strength 1E=650kPa
ERC	Established retardation coefficient (as fraction of gravity)
ft.lbs	foot pounds
g	gravity (9.81m/s/s)
g/min	grams per minute
kg	kilogram
km	kilometre
km/h	kilometres per hour
kN	kilonewton
kPa	kilopascal
L	litre
L/min	litres per minute
m	metre
mm	millimetre
MPa	megapascal
mph	miles per hour
mt	metre tonne
N	newton
Nm	newton meters
RPM	revolutions per minute
s	second
t	tonnes (1000kg)

Appendix 3 — Referenced documents

These documents are referred to throughout VSB6 and persons modifying or certifying vehicles must have access to, and use the current versions of these when modifying or certifying vehicles.

Australian Design Rules — Third Edition

The Third Edition ADRs were developed under the auspices of the Australian Transport Advisory Council (ATAC) between February 1983 and December 1986 and became effective from 1 July 1988 as national standards for the purposes of the *Motor Vehicle Standards Act 1989* on 2 August 1989. Initially the Third Edition ADRs were a combination of active Second Edition ADRs and existing essential design and construction requirements of the Consolidated Draft Regulations. They have since been added to and amended, to reflect the further needs of the community.

For Third Edition ADRs a reference to ADR xx/.., where xx is the ADR number, means the latest version of the ADR that was in force at the date of modification. For example, for a modification to a heavy vehicle on 1 July 2017, a reference to ADR62/.. is a reference to ADR62/02 as the current and most recent version in effect at that time.

The Third Edition ADRs are available from the DIRD website at https://infrastructure.gov.au/roads/motor/design/adr_online.aspx

Repealed Australian Design Rules

The following Third Edition ADRs have been repealed.

Australian Design Rule	Repealed date
7/00 Hydraulic Brake Hose	9 December 2003
12/00 Glare Reduction in Field of View	9 December 2003
15/01 Demisting of Windscreen	9 December 2003
16/01 Windscreen Wipers and Washers	9 December 2003
17/00 Fuel System	21 July 2005
24/02 Tyre and Rim Selection	9 December 2003
36/00 Exhaust Emission Control for Heavy Duty Vehicles	1 October 2006
70/00 Exhaust Emission Control for Diesel Engine Vehicles	1 October 2006

Second Edition Australian Design Rules

The Second Edition ADRs first came into effect on 1 January 1969 and were applied selectively under state/territory law. They were then made part of the national standards by Determination No 2 of 1989 published in the Commonwealth Government Gazette.

Reference to a Second Edition ADR as ADR xx, where xx is the ADR number, is to be interpreted to mean all individual versions of the relevant Second Edition ADR at the date of modification. For example, ADR 4 refers to ADR's 4, 4A, 4B, 4C and 4D.

The Second Edition ADRs are available from the DIRD website at https://infrastructure.gov.au/roads/motor/design/second_edition_adrs.aspx

First Edition Australian Design Rules

The First Edition ADRs were distributed for discussion purposes. However, they were not adopted as a legally binding set of standards under either national or state/territory law.

Australian Standards

Where a modification requires compliance with an Australian Standard, the version used must be the version current at the time of modification, unless the ADRs or the modification code applies a specific version.

Australian Standard AS D8–1971 Hose couplings for use with vacuum and air pressure braking systems on prime movers, trailers and semitrailers.

Australian Standard AS 1110 - 2000 ISO Metric Hexagon Precision Bolts and Screws.

Australian Standard AS 1418 - Cranes (Including Hoists and Winches)
Part 1 (1994 and Amendment 1997) - General Requirements
Part 2 (1997) - Serial Hoists and Winches
Part 5 (1995) - Mobile and Vehicle Loading Cranes
Part 20 (2015) - Cranes Hoists and Winches (when released).

Australian Standard AS 1554.1 - 2011 Welding of Steel Structures.

Australian Standard AS 4968.2:2003 Mechanical coupling between articulated vehicle combinations – Testing and installation of fifth wheel and associated equipment.

Australian Standard AS 2174 - Articulated Vehicles— Mechanical coupling between prime movers and semitrailers – Interchangeability requirements.

Part 1 - 2006 Non-dedicated vehicle combinations
Part 2 - 2006 Dedicated vehicle combinations.

Australian Standard AS 2177 2006 & Amdt 1 2014 Non-destructive testing - Radiography of Welded Butt Joints in Metal.

Australian Standard AS 2213.2: 2008 - 50 mm Pin-type Couplings and Drawbar Eyes for Trailers.

Australian Standard AS 2739:2009 Natural gas (NG) fuel systems for vehicle engines.

Australian Standard AS 2809 - Road Tank Vehicles for Dangerous Goods
Part 1 - 2008
Part 2 - 2008
Part 3 - 2008
Part 4 - 2001
Part 5 - 2001.

Australian Standard AS 3856 – 1998 Hoists and ramps for people with disabilities - Vehicle mounted – Parts 1 and 2.

Australian Standard AS 4945-2000 Commercial road vehicles - Interchangeable quick connect/release couplings for use with air-pressure braking systems.

Australian Standard AS 5400:2015 – Tow trucks – Tilt, slide and underlift vehicles.

Tyre and Rim Association of Australia Standards Manual (Current Edition).

International Standards

British Standard BS AU 217: Part 1 1987 Maximum Road Speed Limiters for Motor Vehicles.

Society of Automotive Engineers Standard J726 - 2002 Air Cleaner Test Code.

Society of Automotive Engineers Standard J844 2012 Non-Metallic Air Brake System Tubing.

Society of Automotive Engineers Standard J1402 2010 Automotive Air Brake Hose and Hose Assemblies.

Society of Automotive Engineers Standard J1403A 2005 Vacuum Brake Hose.