

VSB 14 Tyre & Suspension

Modifications acceptable without certification

Full off-road 4x4
NA, NB1, MC or MD ADR category

Includes VicRoads requirements
See VSI 8 (Options 1 & 2)

Soft-roaders
All wheel drive (AWD) in MC ADR category

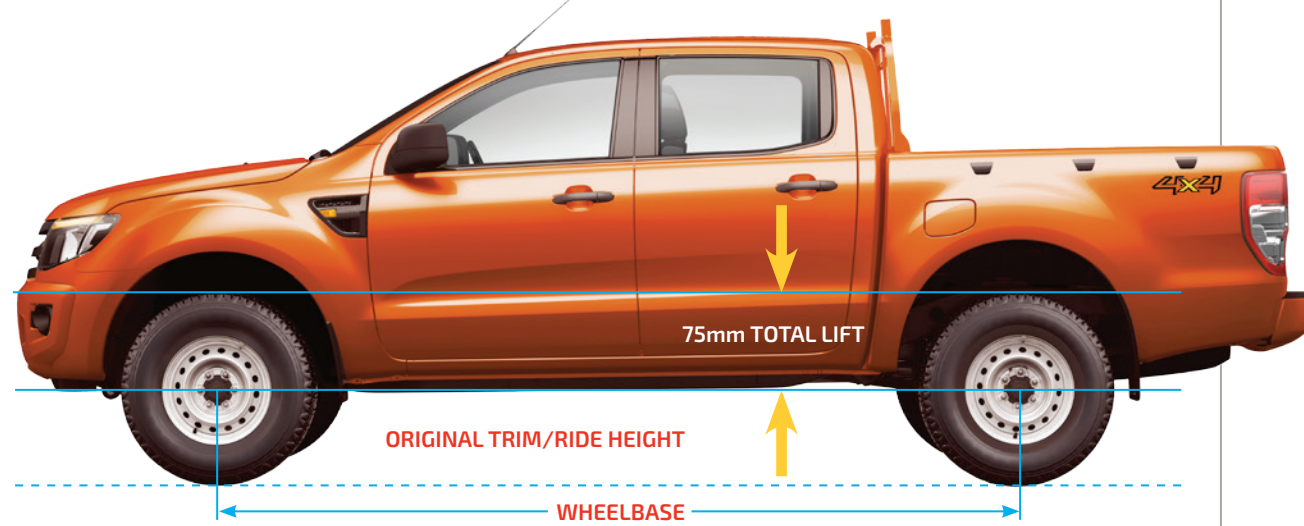


Diagram 1: Total suspension & wheel/tyre combination, lift up to 75mm



Diagram 2: Maximum wheel & tyre assembly diameter increase 50mm

Note: Increases in tyre diameter are subject to compliance with all other requirements specified under this clause (Clause 4.2 non-standard tyres and rims) and may therefore be limited by other factors, such as insufficient clearance.

Speedometer accuracy must be maintained to ADR 18 specification for the selected tyre and rim combination. It is suggested that the degree of accuracy is in accordance with the most recent version of ADR18.

Smaller diameter wheels (1" maximum) may be fitted to allow a larger wall tyre to be fitted for an off-road 4x4 vehicle. Commonly touted wheel/tyre replacement options, of 'Plus 1', 'Plus 2', 'Plus 3' do not identify specific sizes and are not recognised by VicRoads.

VicRoads Option 1 (Off-road 4x4)

Raising of four wheel drive vehicles – alternative to VSB 14 Modification Code LS

Off-road vehicles of ADR category NA, NB1, MC or MD, may have modifications in either VicRoads VSI 8, Option 1, or Option 2.

Note: A combination of the two options cannot be used on the one vehicle.

Option 1 allows for a maximum suspension lift of 50mm*, provided that at least two-thirds of original suspension travel in either direction is retained. This, with the increase in the wheel/tyre radius of 25mm, provides an acceptable total maximum lift of 75mm.

Only commercially available suspension kits, which are manufactured by a corporation and specifically designed and tested by the manufacturer for that make and model of vehicle, may be used.

Kits must be fitted according to manufacturer's instructions and include a written statement of the suitability of the suspension kit for the vehicle. This is to be retained by the vehicle owner.

Tyres

Diameter of any replacement tyre and rim assembly must not exceed 50mm greater than original spec (25mm radius). In all cases, the entire width of the tyre must be covered by the vehicle's bodywork (plan view).

Load rating of replacement tyres must be at least the minimum load rating on the placard.

Customer must be advised of any change in speedometer accuracy as a result of a wheel/tyre change, and advised to have this rectified.

All wheel drive (AWD) vehicles including those AWD vehicles that may be certified as MC ADR category, (also commonly known as soft roaders) are not included in this category; Passenger car requirements apply in this case – refer soft roaders (blue section at right).

*Increases in ride height, resulting from replacing or resetting springs that have sagged to restore the original ride height, are considered maintenance, not modification.

Table LS3: Maximum allowable tyre and rim sizes for off-road passenger and goods vehicles

OE manufacturer's widest optional tyre (mm – inch)	1.5 x OE manufacturer's widest optional tyre (mm)	Maximum allowable nominal tyre width (mm)	Maximum allowable rim size for the maximum allowable nominal tyre width (inches)	
W	1.5 times W	Actual Tyre Size	65 to 85 Series	60 Series and Below
175 (7.00)	262.5	255	9.5	10.0
185 (7.25)	277.5	275	10.0	11.0
195 (7.50)	292.5	285	10.0	11.0
205 (8.00)	307.5	295/305	10.0	11.0
215 (8.50)	322.5	315	10.0	11.0
225 (9.00)	337.5	335	n/a	13.0
235 (9.25)	352.5	345	n/a	13.5
245 (9.65)	367.5	365	n/a	n/a
255 (10.00)	382.5	375	n/a	n/a
265 (10.50)	397.5	385	n/a	n/a
275 (11.00)	412.5	405	n/a	n/a
285 (11.25)	427.5	425	n/a	n/a

Chart to be read in conjunction with VSB-14 (Jan. 2011), VSI-8, VSI-26 and Australian Tyre & Rim Association Manual (current)

Tyre placard

The tyre placard is the initial point of reference and supported by VicRoads, who also require reference to the Australian Tyre & Rim Association Manual for specifications. All cars manufactured since 1973 have a placard containing information about correct tyre use. This placard indicates recommended tyre sizes, correct inflation pressures for front and rear tyres under normal driving when released from the factory.

'Replacement' tyre placards are available from some manufacturers' to cater for different options.

TYRE SIZE	AIR PRESSURES IN TYRE kPa (bar) [p.s.i.]		FULL LOAD
	UP TO FOUR PERSONS		
235/75 R 15 109 S	FRONT	210 (2.1) [30]	210 (2.1) [30]
	REAR	210 (2.1) [30]	290 (2.9) [42]
245/70 R 16 111 S	FRONT	210 (2.1) [30]	210 (2.1) [30]
	REAR	210 (2.1) [30]	270 (2.7) [39]

TYRE INFLATION IS SAME FOR ANY SPEED
1 PERSON'S WEIGHT: ABOUT 75kg.

Where a specified tyre is no longer available, the next appropriate tyre for that wheel size in Australian Tyre & Rim Association Manual may be used i.e. 1998 Nissan had limited options available in 265/70 size replacement tyres. The cab-chassis comes standard with 265/75 tyres there is no technical reason not to replace 265/70 wagon tyre size to 265/75. It is recommended that tyres should be replaced with the same quality of tyre or better, to retain or improve the vehicle's original performance characteristics.

Load rating

The load rating of tyres must be at least the minimum rating shown on the tyre placard (109 or 111 in example above). Air pressures are as critical as load rating – the air carries the load. Refer to tyre placard for correct pressures.

Wheels

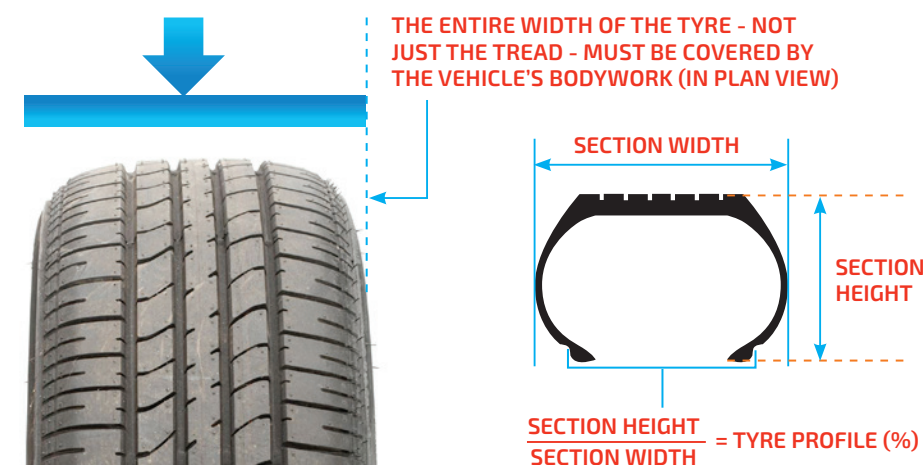
- The stud pattern of the replacement wheel must be the same as the original
- Re-drilling wheels, hubs, drums, discs or axle flanges, is not permitted
- Wheel Spacers are not permitted unless fitted as original specification equipment
- Wheels with slotted stud holes are not permitted
- Repaired or damaged alloy wheels are not acceptable
- Only one peripheral weld is allowed in a steel wheel
- Wheels up to 25mm wider than the maximum option offered by the manufacturer may be fitted.

Service requirements

Inspection of wheels and tyres should be carried out at least monthly, and wheels rotated every 10,000km. Refer to manufacturer's wheel nut tension specifications when servicing.

Code stamping – wheels

Aluminium alloy wheels (mags) and non-original steel wheels are acceptable, provided they meet requirements and are legibly and durably marked to show compliance with AS 1638 markings. Steel wheels must have two bead seats, or 'safety humps' (one on inner and one on outer rim edge) and comply with the requirements of the Australian Tyre & Rim Association Manual, current at the time of modification.



Note: The section width of a tyre is the distance between the outside of the sidewalls of an inflated tyre, excluding any markings, bands or ribs.



Wheel Track

Maximum allowable wheel track increase:

- Front axle – 25mm
- Rear axle with independent suspension – 25mm
- Other solid rear axles – 50mm

Where front wheel drive, McPherson strut front suspension and negative scrub radius geometry exists, no increase in track width is permitted unless specified by manufacturer.

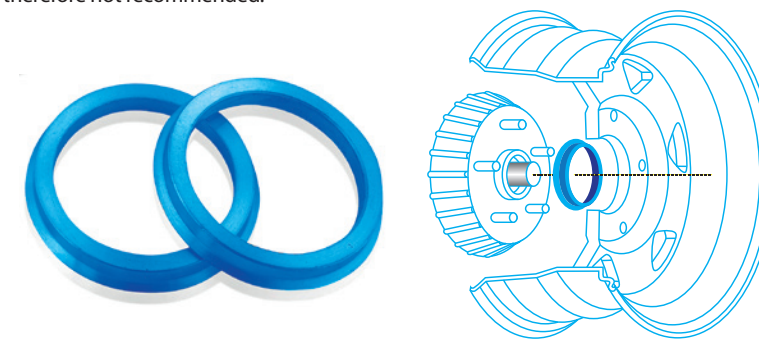
Vehicles fitted with diagonally split braking systems: **no change to wheel track is permitted in either Option 1 or Option 2.**

Centre bore locators (CBL) (sometimes referred to as 'hub rings')

Used to assist alignment when mounting the wheel and eliminate damage to the stud holes when sliding a large, heavy wheel over studs or, assist alignment of the wheel to the threaded holes when fitting studs. The neat fit provided by the hub CBLs may assist with balancing of larger diameter, wide alloy wheels.

CBLs are generally made of plastic as they do not carry load - this is the task of the wheel studs/nuts. If CBLs supplied with a set of wheels are not appropriate for an application, they should be discarded. However, greater care will be required to ensure the studs/nuts are correctly aligned and seated when fitting the wheel without a CBL, to eliminate damage and assist balancing.

Alloy CBLs are sometimes preferred for the mistaken reason they carry the load of the vehicle – this is incorrect. Alloy CBLs can create electrolysis build up, resulting in corrosion, seizing the wheel to the hub, they are therefore not recommended.



ESC

A vehicle fitted with ESC must not be modified if the operation of the ESC is affected unless the ESC system is adjusted to restore its original operational characteristics.

Similarly, vehicles equipped with ESC must not have the ESC control unit disconnected.

Wheel alignment

When lifting suspension, wheel alignment must be reset. Wheel alignment should be checked regularly. Include rear wheel alignment where adjustment is provided.

Wheel nut thread lubrication

No lubricant is allowed on the nut taper/cone or wheel chamfer. External surfaces of sleeve/parallel nuts require light lubrication to protect the alloy wheel from damage.

It is recommended that all wheel nuts/studs be started onto their threads by hand.

After starting by hand, light lubrication of the threads is necessary for wheel nuts spun on or off at high speed with an impact gun.

Lightweight alloy wheel nuts run on at high speed have a greater tendency to pick up the threads and seize, if not lubricated.

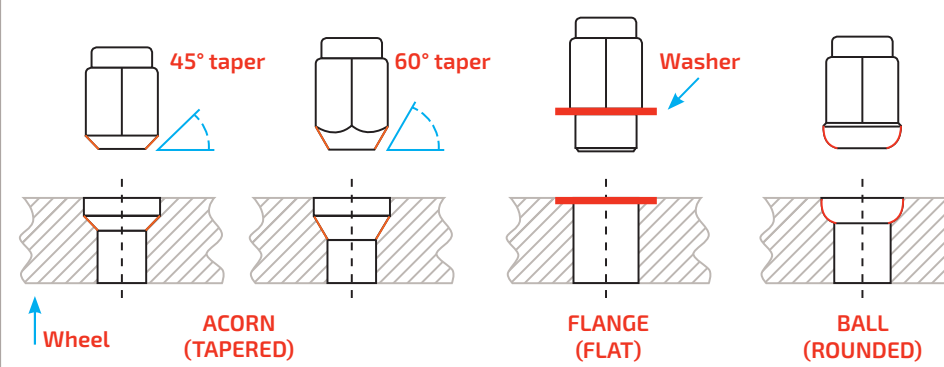
Often, this wheel nut seizure increases as it cools, causing the stud to shear off when removal of the wheel is later attempted.

Wheel nut tension

Tension must be to manufacturer's specification. See Tech-Online for more information: vacc.com.au/technical/techonline

Light lubrication of threads is required to allow correct tension to be applied.

Wheel nut tension must be rechecked after 1,000km from fitting, following every wheel change, or when vehicle is operated under severe conditions, such as off-road.



45° tapers are normally for racing applications and should not be confused with 60° tapered nuts. Wheel nuts and seats must be matched and tensioned correctly. Recheck at 1000km after fitting.

Wheel attachment (mounting)

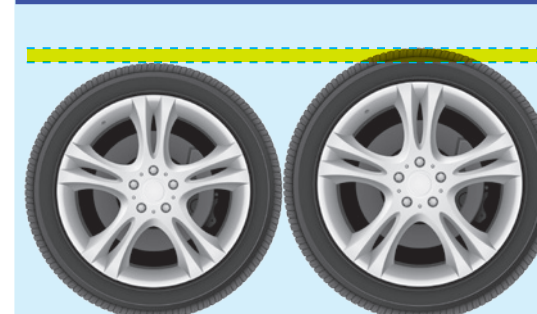
Where tapered wheel nuts are used, these alone centre the wheel. Therefore, the diameter of the hole in the wheel centre, regardless of construction type, is separate and irrelevant to load carrying capacity or roadworthiness.

Speed ratings for tyres in common use

Speed symbol	N	P	Q	R	S ²	T	U	H	V	Z/ZR	W	Y
Rating – km/h	140	150	160	170	180	190	200	210	240	Over 240	270	300



VicRoads Option 2 (Soft-roaders)



Allowable increase in soft-roader wheel/tyre assembly diameter is 15mm same as a normal passenger vehicle

This option retains the requirements of earlier versions of VSI 8 as an alternative to meeting VSB 14 or Option 1 and is appropriate for all other four wheel drive vehicles.

Most of these have limited potential for modification due to their structure, i.e. McPherson strut suspension unitary and mono construction body.

Diameters of replacement tyre and rim assembly must not exceed 15mm* greater than original specification.

Wheels and tyres must not foul any part of the body through suspension or steering travel and no part of the tyre is to extend beyond the body.

Customer must be advised of any change in speedometer accuracy as a result of a wheel/tyre change.

Note: A combination of the two options cannot be used on the one vehicle.

*Increases in ride height, resulting from replacing or resetting springs that have sagged to restore the original ride height, are considered maintenance, not modification.

Table LS2: Maximum allowable tyre and rim sizes for passenger vehicles

OE manufacturer's widest optional tyre (mm – inch)	1.3 x OE manufacturer's widest optional tyre (mm)	Maximum nominal tyre width (mm)	Maximum allowable rim size for the maximum allowable nominal tyre width (inches)	
			Aspect Ratio 65 to 85	Aspect Ratio 60 and below
W	1.3 times W	Actual Tyre Size	Aspect Ratio 65 to 85	Aspect Ratio 60 and below
135 (5.20)	175.5	175	6.0	7.0
145 (5.60)	188.5	185	6.5/7.0	7.0
155 (6.00)	201.5	195	7.0	7.5
165 (6.40)	214.5	205	7.5	8.0
175 (7.00)	227.5	215/225	7.5/8.0	8.5/9.0
185 (7.25)	240.5	235	8.5	9.0
195 (7.50)	253.5	245	9.0	9.5
205 (8.00)	266.5	255/265	9.5	10.0
215 (8.50)	279.5	275	10.0	11.0
225 (9.00)	292.5	285	10.0	11.0
235 (9.25)	305.5	295/305	10.0	11.0
245 (9.50)	318.5	315	n/a	12.5
255 (10.00)	331.5	325	n/a	13.0
265 (10.50)	344.5	335	n/a	13.0
275 (10.75)	357.5	355	n/a	13.0

Speed ratings

VicRoads RWC requirements stipulate that the minimum speed rating for a tyre must exceed the maximum speed limit within Victoria, 110km/h.

Therefore, all tyres with a casing speed rating of 180km/h² are acceptable, as well as re-treaded/remoulded/recapped tyres that are speed limited to 140km/h. Roadworthiness compliance is the usual accepted standard for insurance*.

Refer to speed rating chart below. Although 4x4 off-road vehicles may be fitted with 140km/h-rated casings (N below), manufacturers specify a particular brand, style and speed rated tyre to match the performance of their vehicle.

*Customers may wish to ensure this application is acceptable with their insurance company, particularly in the case of performance vehicles, before fitting a lower speed rated tyre to their vehicle.