



Section 5

Wheels, Tyres and Hubs

Objective:

To ensure that road wheels and tyres are of a suitable type and condition and that they provide the necessary load carrying capacity, speed rating and control of the vehicle.

Australian Design Rules relevant to this section:

ADR 42 General safety requirements

5.1 Check wheels and rims

Reasons for rejection

- a) Any wheel or rim:
 - is loose
 - is cracked
 - is buckled
 - has pieces of casting missing
 - has elongated stud holes
 - has weld repairs not in accordance with relevant industry practice.
- b) Any wheel contacts unrelated vehicle components at any point through its full range of travel
- c) Spindle nuts and washers are missing, cracked, stripped or broken
- d) Spiders have cracks across a spoke, hub or area
- e) Wheels are not compatible with hubs
- f) Required valve protection lugs are missing

- g) Wheels fail to rotate freely
- h) Hubs seals are leaking
- i) Excessive end-play in hubs.

5.2 Check wheel/rim fasteners

Reasons for rejection

- a) Wheel nuts and bolts do not have a thread engagement length at least equal to the thread diameter (except where specified by the vehicle manufacturer), or the fitting of the wheel nut does not match the taper of the wheel stud hole
- b) Any hub has missing, cracked, stripped or broken wheel mounting nuts, studs or bolts
- c) Spacer plates are used between hub and wheels, except where fitted by the vehicle manufacturer
- d) Fasteners are not of the correct type for the wheel being used or allow a rim to slip on its spider

- e) Any item that is fitted to the tyre, rim or wheel (other than tyre pressure monitoring or inflation) which is not technically essential to the vehicle, protrudes from any part of the vehicle so that it is likely to increase the risk of bodily injury to any person
- f) Any item that is fitted to the tyre/rim/wheel (other than tyre pressure monitoring or inflation) which is technically essential to the vehicle, is not designed, constructed and affixed to the vehicle in a way that does not minimise the risk of bodily injury to any person.

5.3 Check retaining rings

Reason for rejection

- a) Lock or side rings are incorrectly seated, sprung, mismatched, bent, broken or cracked.

5.4 Check tyres

Reasons for rejection

- a) A tyre does not have at least 1.5mm tread depth in the principal groove, in a continuous band which runs around the whole circumference of the tyre and extends across at least 75% of the width of the tyre

Note: For further information on how to measure tyre tread depth see additional information – Measuring Tyre Tread.

Note: Tread wear indicators are built into most tyres to indicate when tread depth reaches about 1.5mm. The depth of the tyre tread above these indicators is not included in the assessment of tread depth around the circumference of a tyre.

In effect, these requirements allow a tyre to be worn to less than 1.5mm tread depth on its edges, provided that at least 75% of the remaining width of the tyre has a minimum tread depth of 1.5mm around the whole circumference.

- b) The tyres do not match the manufacturer's tyre placard (if fitted) or modification approval
- c) A tyre (including sidewalls) has deep cuts, chunking, bumps, bulges, exposed cords or other signs of carcass failure
- d) A tyre has been re-grooved (except where indicated on the side wall that the tyres are suitable for re-grooving)
- e) When in the straight ahead position, the sidewall of any tyre projects beyond the extreme width of the mudguards

Note: This excludes elevations due to labelling, decoration or protective bands.

- f) The vehicle has been fitted with a non-OEM front wheel (i.e. rim and tyre) that has not been approved as a modification

Note: For further information on modifications refer to Appendix B – Vehicle Modifications.

- g) Any tyre is not of a type constructed for unrestricted road use
- h) Any retreaded or remoulded tyre is not marked with the words "RETREAD" or "REMOULD", and where speed limited the words "MAX. SPEED XX KM/H" or "SPEED LIMITED TO XX KM/H" (XX means the max speed i.e. 125km/h)

Note: For more information on retreaded tyres, refer to Additional Information – Retreaded Tyres.

- i) The speed rating of all tyres is not of at least 100km/h or the vehicle's top speed, whichever is the lesser, unless a lower rating has been specified by the manufacturer
- j) Any tyre fitted to an axle is not of sufficient size and capacity to carry the part of the vehicle's gross mass transmitted to the ground through that axle
- k) Dual tyres contact each other
- l) Any tyre on a vehicle contacts the body, chassis, frame, braking, steering or suspension components at any point through its full range of travel
- m) A tyre has cleats or other gripping devices that could damage road surfaces
- n) Tyres are not compatible with the rim to which they are fitted.

Additional Information – Retreaded Tyres

The use of retreaded tyres must be in accordance with Australian Standard AS 1973 *Pneumatic tyres – Passenger car, light truck, and truck/bus – Retreading and repair processes*. The details listed below advise of the requirements listed in AS 1973 to ensure compliance.

Marking of retreaded tyres

Marking on one side:

Each retreaded tyre must bear on at least one side wall or shoulder the following marking:

- a) The nominal size of the tyre
- b) The word 'RADIAL' or 'R' in the size designation, for a radial ply tyre
- c) The word 'TUBELESS', if applicable
- d) The maximum load rating, ply rating, or service description of the tyre.

Note: In the case of a remould, the service description is to be clearly identified as the original service description applicable to the tyre when new.

Marking on both sides:

Each retreaded tyre must bear on both side walls or shoulders the following marking:

- a) The word 'RETREAD' or 'REMOULD', if applicable

Note: The maximum speed rating must be placed adjacent to 'Retread' or 'Remould', as applicable.
- b) For light truck tyres, the maximum speed rating, expressed as follows:
 - i) For tyres having an original speed category when new of 'L' (120km/h) or higher, 'MAX SPEED 120km/h', or 'MAXIMUM SPEED 120km/h', or 'SPEED LIMITED 120km/h'
 - ii) For tyres having an original speed category when new of less than 'L' (120km/h), the original speed category.

Note: The maximum speed rating must be placed adjacent to 'Retread' or 'Remould', as applicable.
- c) For truck/bus tyres:
 - i) The speed equivalent to the original speed category.

Note: Retention of the original speed category on both side walls is sufficient to satisfy this requirement.
 - ii) If structural belts have been replaced, the word 'REBELTED', and
 - iii) The word 'REGROOVABLE' if the retread is specifically designed for regrooving. Only tyres marked regroovable are permitted to be regrooved.

Note: After major repairs have been carried out in the crown area, regrooving may be performed to reinstate tread grooves.

- d) For speed limited truck or bus tyres:
 - i) The original speed symbol must be removed from the tyre
 - ii) Each speed limited tyre must bear on both side walls or shoulder of the retreaded tyre the following marking, 'max. speed 80km/h' or 'speed limited to 80km/h'.

Method and position of marking:

All new marking (except for date code) on a retreaded tyre must be in letters not less than 4mm high, be permanently and legibly marked in the shoulder or upper side wall of the tyre, and be durable for the life of the retread. Date coding must be a digit week/year code. Branding with a hot iron is not permitted on light truck tyres.

Removal of marking:

The following information must be removed from the tyre during retreading:

- a) The word 'TUBELESS' if a tyre originally designated as tubeless has been converted to tube type
- b) The word 'REGROOVABLE' if the retread is not designed for regrooving
- c) Any previous retreader's name or registered trademark
- d) Any marks of approval.

Removal or mutilation of any original tyre speed category symbol is not required on light truck tyres.

Any original speed category for truck/bus tyres must not be removed.

Marking on repaired tyres:

Repaired tyres must be marked as follows:

- a) All major repairs must be marked, in a legible and permanent manner, with the identification of the repairer and the date on which the repair was carried out

Note: Marking is not required for unreinforced repairs.

- b) The word 'TUBELESS' must be removed if the tyre, originally designed as tubeless, has been converted to tube type.

Branding with a hot iron is not permitted on light truck tyres.

Definitions

- Retreading:** is the process of reconditioning a worn tyre by topcapping, fullcapping, remoulding, or the application of a pre-cured tread.
- Remoulding:** is a retreading process in which new rubber is applied to the casing extending from bead area to bead area.
- Topcapping:** is a retreading process in which tread rubber is applied only to the tread area of the buffed casing.
- Fullcapping:** is a retreading process in which new tread rubber is applied to the area of the casing normally in contact with the road and extending over the shoulder area.
- Shoulder:** is the transitional area of a tyre between the side wall and the crown.
- Precured retreading:** is the process by which a previously cured and patterned tread is cured to the casing.

Additional Information – Measuring Tyre Tread

Tyres are constructed with both principal and secondary grooves. Most tyres are fitted with wear indicators that indicate when tread depth reaches about 1.5mm, these indicators are located in the principal grooves of the tyre.

It is important to ensure that tread depth is measured in the principal grooves of the tyre and not the secondary grooves which are the shallow grooves in the tyre tread that may disappear during the life of the tyre through normal wear.

Definitions

- Principal grooves:** in relation to a tyre, means wide grooves, other than secondary grooves —
(a) usually positioned in the central zone of the tyre tread but that may run across the tyre tread; and
(b) in which tread wear indicators are usually located.
- Secondary grooves:** in relation to a tyre, means shallow grooves in the tyre tread that may disappear during the life of the tyre through wear.
- Tread wear indicators:** in relation to a tyre, means projections within a groove of the tyre that indicate the degree of wear on the tyre's tread.