

Tyres, wheels and hubs

7-1 Tyres and wheels

7-2 Hubs and axles

7-3 Mudguards

Tyres, wheels and hubs

7-1 Tyres and wheels

Summary of legislation

Applicable legislation

- Land Transport Rule: Tyres and Wheels 2001

Mandatory equipment

Tyres

1. Tyres must be compatible with the vehicle to which they are fitted.
2. Tyres on the same axle must be of the same size designation and construction, and of the same tread pattern type.
3. Asymmetric tyres must be fitted in axle sets in accordance with manufacturer's instructions.
4. A unidirectional tyre must be fitted to a wheel position corresponding to its direction of rotation.
5. The speed category of a tyre must be compatible with the maximum legal speed limit for the vehicle, or the vehicle's maximum speed (**Notes 2 and 3**).
6. A vehicle must not be fitted with a metal tyre or other non-pneumatic tyre, or with a tyre with studs, cleats, lugs or other gripping devices.

Wheels

7. A wheel must be:
 - a) sufficiently strong for the type of vehicle to which it is fitted, and
 - b) compatible with the vehicle to which it is fitted, and
 - c) compatible with the tyre rim profile, flange height and valve fitment.
8. There must be adequate clearance for the brake, hub, suspension and steering mechanism and body parts.

Permitted equipment

9. A vehicle may be fitted with retreaded tyres.

Condition

Tyres (excluding spare tyres and space-saver tyres)

10. A tyre must be of good quality and construction, fit for its purpose, and maintained in a safe condition.
11. A tyre must not have worn, damaged or visible cords apparent by external examination.
12. A tyre must have a tread pattern depth of not less than 1.5 mm (excluding any tie-bar or tread-depth indicator strip) around the whole circumference of the tyre:
 - a) within all principal grooves that contain tread-depth indicators, or
 - b) if the tyre does not normally have tread-depth indicators, across at least three-quarters of the tyre tread width.

Reasons for rejection

Mandatory equipment

Tyres

1. Tyres on the same axle are not of the same:
 - a) size designation, or
 - b) carcass type (ie mixed steel ply, fabric radial ply, bias/cross ply, run-flat), or
 - c) same tread pattern type (mixed asymmetric, directional, normal highway, traction, winter tyre tread (**Figure 10-1-2**)).
2. The tyres on an axle of a light trailer do not meet at least one of the following:
 - a) the tyre ply ratings are the same, or
 - b) the tyre load indices differ by no more than 2 (**Note 2**).
3. An asymmetric tyre is fitted to a vehicle with the 'inside' tyre wall facing outwards.
4. A unidirectional tyre is fitted contrary to its correct direction of rotation.
5. A tyre has a speed category that is less than the speed limit for the vehicle or less than the vehicle's maximum speed if this is less than the speed limit (**Notes 2 and 3**).
6. The vehicle has one or more of the following types of tyre fitted:
 - a) a space-saver tyre, or
 - b) a non-pneumatic tyre, or
 - c) a tyre with studs, cleats, lugs or other gripping devices, or
 - d) a tyre that is not compatible with the vehicle to which it is fitted, eg a tyre is marked with any of the following:
 - i. 'NOT FOR HIGHWAY USE'
 - ii. 'NHS' (Not for Highway Service)
 - iii. 'ADV' (Agricultural Drawn Vehicle)
 - iv. 'RACING PURPOSES ONLY'.
 - e) a tyre that has had all its manufacturer / brand / model information removed so that the tyre can no longer be identified (**Figure 10-1-3**).

Tyres, wheels and hubs

7-1 Tyres and wheels (cont.)

13. The regrooving of a tyre is permitted only if the tyre is identified as having been specifically designed for regrooving after manufacture.
14. A tyre that is fitted to a vehicle must be maintained at a safe inflation pressure.

Spare tyre

15. If the vehicle carries a spare tyre, the tyre must be securely attached on or in the vehicle.

Reasons for rejection

Wheels

7. A wheel is not compatible with the tyre fitted to it for rim profile, flange height or valve fitment.
8. A wheel is:
 - a) not compatible with the vehicle to which it is fitted, or
 - b) not correctly attached to the vehicle.

Condition

Tyres (excluding spare tyres and space-saver tyres)

9. There are signs that a tyre is fouling on another part of the vehicle.
10. A tyre shows damage that is likely to compromise its ability to operate in a safe manner or lead to premature tyre failure, such as:
 - a) a lump or bulge that is likely to be caused by separation or partial failure of the tyre structure, or
 - b) a cut or crack in a sidewall or tread more than 25 mm long that reaches the cords, or
 - c) exposed or cut cords, or
 - d) the tread of a retreaded tyre shows signs of separation, or
 - e) nails or other sharp objects embedded in the tyre, or
 - f) significant perishing, eg due to age, moisture or exposure.
11. A tyre has a string-type repair visible from the outside.
12. A tyre, other than a winter tyre (**Note 1**), does not have a tread pattern depth (**Technical bulletin 7**) of at least 1.5 mm (excluding any tie-bar or tread-depth indicator strip) around the whole circumference of the tyre:
 - a) within all the principal grooves that normally contain moulded tread depth indicators, or
 - b) if the tyre does not normally have moulded tread-depth indicators (such as some retreaded or vintage tyres), across at least three-quarters of the tread width.
13. A winter tyre (**Note 1**) does not have a tread depth of at least 4 mm (excluding any tie-bar or tread-depth indicator strip) within all principal grooves that normally contain moulded tread-depth indicators and around the whole circumference of the tyre.

Reasons for rejection

14. A tyre not identified as designed for regrooving has had its tread depth increased by regrooving.

15. A tyre is noticeably under- or over-inflated.

Spare tyres

16. A spare tyre, if carried, is not:

- a) securely attached by a device that is in good condition and correctly applied, or
- b) stowed in a closed compartment separate from the occupant space (eg if the manufacturer's attachment device is missing or faulty) .

Wheels

17. There are signs that a wheel is fouling on another part of the vehicle.

18. A wheel is:

- a) cracked, or
- b) significantly damaged, distorted or has deteriorated, or
- c) not securely attached to the hub.

19. An alloy wheel has poor visible repairs.

20. A wheel nut is:

- a) missing, or
- b) loose, or
- c) deteriorated, or
- d) the incorrect type, or
- e) has insufficient thread engagement to the wheel stud.

Table 7-1-1. Tyre speed symbol categories

Speed symbol - speed category (km/h)							
A1 - 5	A5 - 25	B - 50	F - 80	L - 120	Q - 160	U - 200	Y - 300
A2 - 10	A6 - 30	C - 60	G - 90	M - 130	R - 170	H - 210	ZR - over 240
A3 - 15	A7 - 35	D - 65	J - 100	N - 140	S - 180	V - 240	
A4 - 20	A8 - 40	E - 70	K - 110	P - 150	T - 190	W - 270	

Tyres, wheels and hubs

7-1 Tyres and wheels (cont.)

Table 7-1-2. Tyre interchangeability - imperial and metric

Imperial sizing	Metric sizing
10/70R22.5	255/70R22.5
11/70R22.5	275/70R22.5
12/70R22.5	305/70R22.5
15R22.5	385/65R22.5
16.5R22.5	425/65R22.5

Note 1 Asymmetric tyre means a tyre which, through tread pattern, is required to be fitted to a vehicle so that one particular sidewall faces outwards.

Construction in relation to a tyre:

- a) for a pneumatic tyre, the type of tyre carcass (including ply orientation and ply rating or load index) [does not include tyre tread], or
- b) for any other tyre, characteristics relating to size, shape and material.

Cross ply means a pneumatic tyre structure in which the ply cords in the tyre carcass extend to the beads and are laid at alternate angles, which are substantially less than 90 degrees, to the centreline of the tread. This tyre structure is also referred to as 'bias ply' or 'diagonal ply'.

Load index is an assigned number ranging from 0 to 279 that corresponds with the maximum load-carrying capacity of the tyre. Most passenger car tyre load indices range from 62 (= 265 kg) to 126 (= 1700 kg).

Modify means to change a vehicle from its original state by altering, substituting, adding or removing a structure, system, component or equipment, but does not include repair.

Pneumatic tyre means a tyre that, when in use, is inflated by air or gas introduced from time to time under pressure so as to enclose, under normal inflation, a cushion of air or gas forming altogether at least half of the total area of an average cross-section of a tyre so inflated.

Ply rating is an index of tyre strength used to identify a given tyre with its recommended maximum permitted load when used for a specific service. It does not necessarily represent the actual number of plies in a tyre. Common ply ratings are 2, 4, 6, 8, 10 and 12. Commercial (eg truck) tyres often have a ply rating rather than a load index.

Principal grooves means the wide grooves in the tyre tread which have the tread wear indicators located inside them. Any other grooves are secondary grooves which may wear out during the service life of the tyre.

Radial ply means a pneumatic tyre structure in which the ply cords, which extend from bead to bead, are laid at approximately 90 degrees to the centreline of the tread, the carcass being stabilised by an essentially inextensible circumferential belt.

Repair means to restore a damaged or worn vehicle, its structure, systems, components or equipment to within safe tolerance of its condition when manufactured, including replacement with undamaged or new structures, systems, components or equipment.

Rim means that part of the wheel on which the tyre is mounted and supported.

Run-flat tyre (also known as self-supporting tyre) means a tyre that is so constructed that in case of a puncture the basic tyre functions are still provided for a short distance (at least 80km) and at a reduced speed (usually 80km/h), allowing the vehicle to be safely driven to a place of repair. Some run-flat tyres are identified by an 'F' within the size designation.

Space saver tyre (temporary-use spare tyre) means a combination tyre and wheel designed and constructed solely for temporary use under restricted driving conditions, and not intended for use under normal driving conditions.

Speed category means a code allocated to a tyre by a tyre manufacturer that indicates the maximum vehicle speed for which the use of the tyre is rated.



Tread means that part of a pneumatic tyre which comes into contact with the ground.

Tread depth indicator means (or **tread wear indicator**) the projections within the principal grooves designed to give a visual indication of the degree of wear of the tread. To help locate these on a tyre, inspectors should look for a 'Δ' or 'TWI' mark on the outer edge of the tyre sidewall (most tyres have these marks).

Tube means an inflatable elastic liner, in the form of a hollow ring fitted with an inflation valve assembly, designed for insertion into certain tyre assemblies to provide a cushion of air or gas that, when inflated, supports the wheel (also known as an 'inner tube').

Tyre carcass means that structural part of a pneumatic tyre other than the tread and outermost rubber of the sidewalls that, when inflated, contains the gas that supports the load.

Tyre load rating means the maximum load a tyre can carry at the corresponding cold inflation pressure prescribed by the tyre manufacturer and the speed indicated by its speed category symbol. It is usually indicated by the load index or ply rating.

Wheel means a rotating load-carrying member between the tyre and the hub, which usually consists of two major parts, the rim and the wheel disc, and which may be manufactured as one part, or permanently attached to each other or detachable from each other.

Wheel centre-disc means that part of the wheel that is the supporting member between the hub and the rim.

Wheel spacer means an additional component used for the purpose of positioning the wheel centre-disc relative to the hub, or in multiple wheel sets, for the purpose of positioning the wheel centre-disc relative to another wheel.

Winter tyre means a tyre which is principally designed to be operated at temperatures of less than 7°C. A winter tyre can be identified by its distinctive tyre tread pattern consisting of deep tread blocks with wavy sipes and is always marked with the word 'STUDLESS' and/or a symbol of a snowflake and mountain on the sidewall (see **Figure 7-1-2**).

Note 2 The tyre load index and speed category are usually marked on the tyre. Where the tyre is not marked, the load and speed rating information must be obtained from the tyre manufacturer or a reference guide of tyre ratings before the tyre can be passed.

Note 3 Sometimes a retreaded or repaired tyre has had its speed rating removed. Where a tyre has been repaired or retreaded in accordance with standard NZS 5423 (Repairing and retreading car, truck and bus tyres), the tyre must be marked with NZS 5423 and, if a car tyre, have the speed rating removed. In such a case, a missing speed rating is acceptable for WoF/CoF (unless the inspector believes on reasonable grounds that the tyre would not have had the required minimum speed rating for the vehicle in the first place).

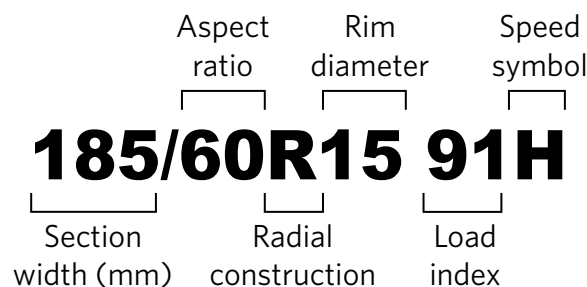


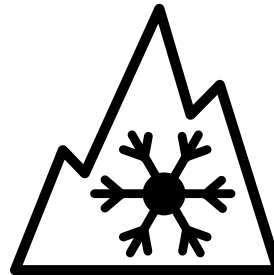
Figure 7-1-1. Tyre markings

Tyres, wheels and hubs

7-1 Tyres and wheels (cont.)



Sample winter tyre tread



Mountain and snowflake symbol



Example of 'Studless' on a tyre sidewall

Figure 7-1-2. How to identify a winter tyre

Note For WoF purposes, a tyre is considered to be a winter tyre only if it has **BOTH** a winter tyre tread **AND** a studless marking and/or mountain/snowflake symbol.

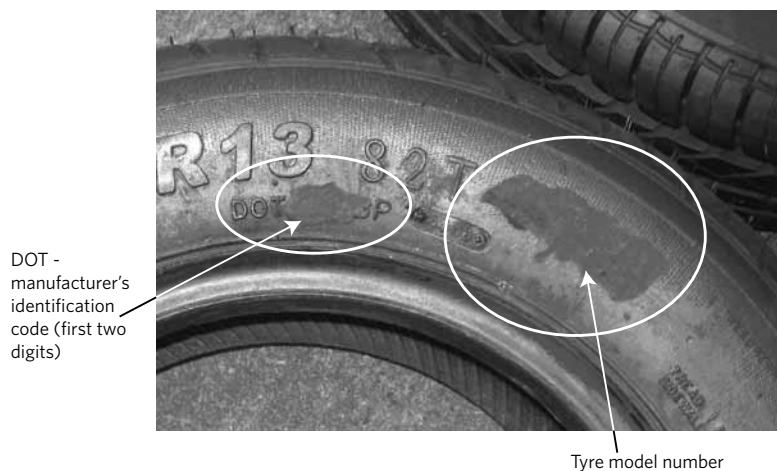


Figure 7-1-3. Example of tyre with manufacturer/brand/model information removed

The circled areas show where information has been removed so that the tyre can no longer be identified.

Tyres, wheels and hubs

7-1 Tyres and wheels

Summary of legislation

Applicable legislation

- Land Transport Rule: Tyres and Wheels 2001

Mandatory and permitted equipment

1. Refer to general trailer pages.
2. Individual tyres of multiple tyre sets on groundspreader or dedicated groundsprayer may be of different sizes or construction in the same set, but each multiple tyre set must be the same as the other multiple tyre set on the same axle.

Condition

3. Refer to general trailer pages.
4. A heavy vehicle radial-ply tyre may have visible cords in the tyre-tread area provided the tyre is in safe condition. To assess whether such a tyre is in safe condition, the vehicle inspector may take into account written evidence from a person who has current specialist tyre knowledge and experience, particularly in heavy vehicle tyre inspection.

Performance

5. Refer to general trailer pages.

Modification and repair

6. A modification or repair that affects the tyres or wheels must be inspected and certified by an HVS certifier of category HVEC, HVMC or HVIC, unless the vehicle:
 - a) is excluded from the requirement for HVS certification (**Table 7-1-3**), and
 - b) has been inspected in accordance with the requirements in this manual, including those for equipment, condition and performance.

Reasons for rejection

Mandatory and permitted equipment

1. Refer to general trailer pages.
2. On a groundspreader or dedicated groundsprayer fitted with multiple tyre sets that are made up of tyres of different size or construction:
 - a) the tyre sets are not fitted so that those fitted at one end of the axle mirror those fitted at the other end of the axle.
3. The tyres on an axle do not meet at least one of the following:
 - a) the tyre ply ratings differ by no more than 2
 - b) the tyre load indices differ by no more than 6
 - c) where no load index is indicated, the tyre load ratings (kg) on an axle differ by no more than 21% of the lowest rating.

Condition

4. Refer to general trailer pages.
5. A tyre shows damage that is likely to compromise its ability to operate in a safe manner or lead to premature tyre failure, such as :
 - a) a lump or bulge that is likely to be caused by separation of the tyre structure, or
 - b) a cut or crack in a side wall or tread more than 25 mm long that reaches the cords (see **Note 2** for visible cords in the tread area of heavy vehicle radial-ply tyres), or
 - c) exposed or cut cords (see **Note 2** for visible cords in the tread area of heavy vehicle radial-ply tyres), or
 - d) the tread of a retreaded tyre shows signs of separation, or
 - e) nails or other sharp objects embedded in the tyre, or
 - f) significant perishing, eg due to age, moisture or exposure.

Performance

5. Refer to general trailer pages.

Tyres, wheels and hubs

7-1 Tyres and wheels (cont.)

Reasons for rejection

Modification and repair

- 6. A modification or repair affects the steering and suspension system and:
 - a) is not excluded from the requirements for HVS certification (**Table 7-1-3**), or
 - b) is not for the purpose of law enforcement or the provision of emergency services, or
 - c) is missing proof of HVS certification, ie:
 - i. the vehicle was modified or repaired before the last CoF inspection and no LANDATA record has been entered, or
 - ii. the vehicle was modified or repaired since the last CoF inspection and no valid LT400 form from an HVS certifier of category HVEC, HVMC or HVIC has been presented.

Table 7-1-3. Requirements for HVS certification

HVS certification is required	HVS certification is not required
<ul style="list-style-type: none"> 1. Increase of track width beyond vehicle manufacturer’s specified limits 2. Fitting of tyres additional to the limit specified by the vehicle manufacturer 3. Modified wheels 	<ul style="list-style-type: none"> 1. Modified wheels with written evidence from the vehicle manufacturer that the complete assembly of tyre, hub and axle is within the vehicle manufacturer’s operating limits. Such approval is likely to contain the approved tyre and wheel sizes and the maximum track, separately for all axles, together with the maximum number of wheels fitted to one axle, and may also include a few restrictions such as reduced axle load and so on. 2. Retrofitting a tyre pressure control system in accordance with the equipment manufacturer’s instructions. 3. Fitting a regrooved tyre identified as specifically designed and constructed for the process of regrooving after manufacture. 4. Fitting a single large tyre (‘super-single’) to a front axle when this is permitted by the vehicle manufacturer. 5. Any modification or repair likely to have been carried out before 1 January 1997. (Modifications and repairs before this date generally required certification but for inspection purposes no evidence of this is required.) 6. Any repair or modification not listed in the left-hand column unless the vehicle inspector considers that certification is required because the modification or repair has affected the vehicle’s safety performance (a second opinion from an expert may be needed, eg the manufacturer’s representative, reputable workshop).

Note 1 Central tyre inflation system means a type of tyre pressure control system that adjusts tyre pressure for the purpose of inflating and deflating tyres to improve tyre adhesion and reduce road surface damage and is under the central control of the driver or an automated system, or a combination of both the driver and an automated system (commonly known as ‘CTI’).

Dedicated groundsprayer means a self-propelled or trailing machine whose sole function is the application of chemicals or liquid fertiliser to crops or to the ground.

Groundspreader means a vehicle designed specifically for the carriage of powder or particulate artificial fertilisers on the road, and for the distribution of those fertilisers directly from the vehicle onto the land by means of a mechanical or pneumatic distributor that forms part of the vehicle.

Protective belt, sometimes called a protective ply or breaker, means an optional layer of ply material (cords) located immediately under the tread to minimise damage to the structural belts beneath.

Note 2 Where a heavy vehicle radial-ply tyre has visible cords in the tread area, the vehicle inspector may pass such a tyre for CoF provided the tyre is in a safe condition, eg only the protective cord layer (protective belt, see **Figure 7-1-3**) is visible. When determining whether such a tyre is in a safe condition, the vehicle inspector may take into account written evidence from a person who has current specialist tyre knowledge and experience, particularly in heavy vehicle tyre inspection.

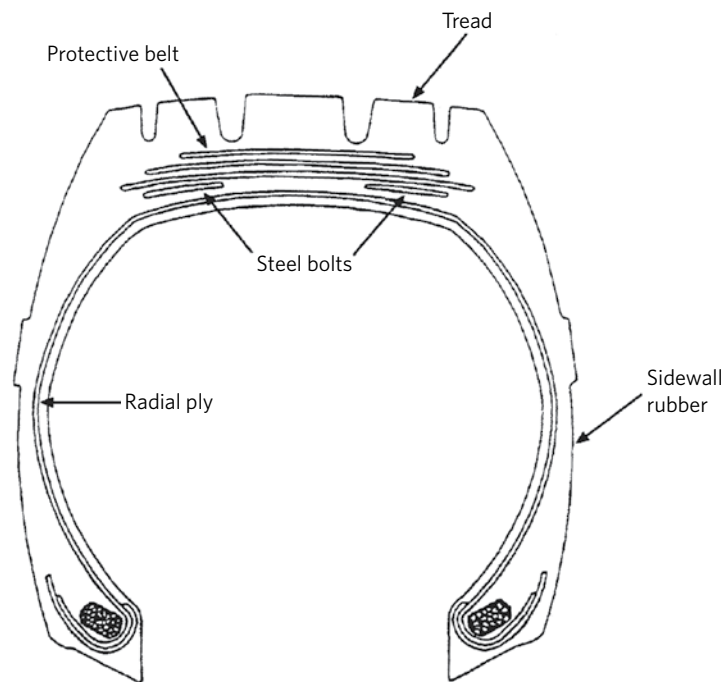


Figure 7-1-3. Cross-sectional representation of a heavy vehicle radial-ply tyre

Tyres, wheels and hubs

7-2 Hubs and axles

Summary of legislation

Condition

1. The components of the assembly must be in good condition.
2. The hub and axle must be sufficiently strong for the type of vehicle to which they are fitted.
3. The hub and axle must have suitable and correctly adjusted geometry.

Reasons for rejection

Condition

1. A hub (**Note 1**):
 - a) is not securely attached to the vehicle, or
 - b) has a visible crack, or
 - c) is significantly damaged, distorted or has deteriorated, or
 - d) has a broken or missing wheel stud.
2. A wheel bearing:
 - a) has play beyond the manufacturer's specifications, or
 - b) is over-tight or sounds rough.
3. An axle:
 - a) is insecure, eg has loose U-bolts, or
 - b) is visibly cracked, or
 - c) is significantly damaged, distorted or has deteriorated, or
 - d) shows signs of welding or heating after original manufacture, or
 - e) shows signs of fouling the vehicle structure or a brake, suspension or steering component.

Performance

4. The geometry of a hub or axle causes the vehicle to veer significantly to one side.

Note 1 Hub means that part of a vehicle that is attached to the axle and rotates on, or with, the axle, and to which the wheel is attached, and includes any bearings.

Tyres, wheels and hubs

7-2 Hubs and axles

Summary of legislation

Applicable legislation

- Land Transport Rule: Vehicle Dimensions and Mass 2002
- Land Transport Rule: Heavy Vehicles 2004

Mandatory requirement (Note 2)

1. A semi-trailer with a quad-axle set containing a steering axle must be certified by a HVS certifier.

Mandatory and permitted equipment (Note 2)

2. A heavy trailer must not have any rear-steering axles, unless the trailer is a semi-trailer that is not part of an A-train or B-train, provided no more than half the axles within the rear-axle set steer at any time.
3. A semi-trailer with a quad-axle set must have one or two steering axles capable of turning on both directions, being:
 - a) the rearmost axle, or
 - b) the two rearmost axles, or
 - c) the foremost and the rearmost axles.
4. A heavy trailer must be fitted with a permitted axle set as listed in **Table 7-2-1**.
5. A heavy trailer not part of an A-train or B-train may be fitted with a retractable axle in its rear-axle set.
6. A sliding axle set must have:
 - a) an effective locking device to prevent inadvertent separation or extension, and
 - b) endstops at the end of the slideway to prevent the separation of the sliding parts if the primary locking device fails.

Condition

7. Refer to general trailer pages.
8. An axle fitted to a vehicle must have adequate strength and performance characteristics for all conditions of loading and operation for which the vehicle was constructed.

Performance

9. Refer to general trailer pages.
10. The locking of a sliding axle locking device must be readily verifiable by visual inspection.
11. If the sliding axle set locking device incorporates a system that provides energy for its operation, the device must remain fully engaged in the locking position, or the locking action must be initiated immediately, if the energising system fails.

Modification and repair

12. A modification or repair that affects the hubs or axles must be inspected and certified by an HVS certifier of category HVEC, HVMC or HVIC, unless the vehicle:

Reasons for rejection

Mandatory requirement (Note 2)

1. A semi-trailer with a quad-axle set containing a steering axle does not have evidence of certification, ie:
 - a) the steering axle was fitted before the last CoF inspection and there is no LANDATA record of the certification, or
 - b) the steering axle was fitted after the last CoF inspection and:
 - i. a valid LT400 form is not presented, or
 - ii. the HVS certifier was not of category HVEC, HVIC or HVMC.

Mandatory and permitted equipment (Note 2)

2. A heavy trailer, other than a semi-trailer that is not part of an A-train or B-train, is fitted with a steering axle in its rear-axle set.
3. On a semi-trailer that is not part of an A-train or B-train more than half the axles steer at any time.
4. A semi-trailer with a quad-axle set does not have one or two steering axles that are capable of turning in both directions, being:
 - a) the rearmost axle, or
 - b) the two rearmost axles, or
 - c) the foremost and the rearmost axles.
5. A heavy trailer is fitted with an axle set other than one permitted in **Table 7-2-1**.
6. An axle set, other than a twin-steer axle set, is not load sharing.
7. The manufacturer's plate for a tandem axle set with a twin-tyred axle and a large single-tyred axle (where these were fitted from 1 July 2002):
 - a) is missing, or
 - b) is not legible, or
 - c) does not show:
 - i. the load-share ratio of the axle set, or
 - ii. a ratio that is either 60:40 or 55:45, or
 - iii. the tyre size on each axle, or

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7-2 Hubs and axles (cont.)

- a) is excluded from the requirement for HVS certification (**Table 7-2-2**), and
- b) has been inspected in accordance with the requirements in this manual, including those for equipment, condition and performance.

Reasons for rejection

- iv. the maximum individual axle ratings, or
 - d) has details that do not match the vehicle.
8. A heavy trailer is presented as part of an A-train or B-train and is fitted with a retractable axle in its rear-axle set.
9. A sliding axle set is not fitted with both:
- a) an effective locking device to prevent inadvertent extension or separation, and
 - b) endstops at the end of the slideway to prevent the separation of the sliding parts if the primary locking device fails.

Condition

10. Refer to general trailer pages.
11. A sliding axle assembly has deteriorated, eg:
- a) a chassis rail/guide, locking pin or other component is missing, deformed, cracked or otherwise worn or damaged, or
 - b) a locking pin is too small or too short, or
 - c) there is an air leak from the lock pin air ram.

Performance

12. Refer to general trailer pages.
13. The locking of a sliding axle locking device is not readily verifiable by visual inspection.
14. A sliding axle locking device has wear or damage, such as a worn or bent pin, so that it is not effective.
15. A sliding axle locking device does not operate correctly.
16. A sliding axle endstop is:
- a) missing, or
 - b) insecure, or
 - c) damaged.

Modification and repair

17. A modification or repair affects the hubs and axles and:
- a) is not excluded from the requirements for HVS certification (**Table 7-2-2**), or

Reasons for rejection

- b) is not for the purpose of law enforcement or the provision of emergency services, or
- c) is missing proof of HVS certification, ie:
 - i. the vehicle was modified or repaired before the last CoF inspection and no LANDATA record has been entered, or
 - ii. the vehicle was modified or repaired since the last CoF inspection and no valid LT400 form from an HVS certifier of category HVEC, HVMC or HVIC has been presented.

Table 7-2-1. Permitted axle sets for heavy trailers (see Figure 7-2-1)

Trailer type		Permitted axle sets	
Semi-trailer		Single axle; tandem axle set; tri-axle set; quad-axle set (not in A-train or B-train)	
Full trailer		Front Single axle; tandem axle set Must be connected to the drawbar steering system	Rear Single axle; tandem axle set; tri-axle set (only with front tandem axle set)
Simple trailer		Single axle; tandem axle set; tri-axle set	
Pole trailer	One axle set	Single axle; tandem axle set; tri-axle set	
	Two axle sets	Front Single axle; tandem axle set Must be connected to the drawbar steering system	Rear Single axle; tandem axle set; tri-axle set (only with front tandem axle set)

Table 7-2-2. Requirements for HVS certification

HVS certification is required	HVS certification is not required
<ol style="list-style-type: none"> 1. An axle that is modified, including a replacement axle that is not identical to the one fitted by the vehicle manufacturer 2. Fitting of an additional axle 3. Steering axles in a quad-axle set of a semi-trailer (unless the vehicle is a specialist overdimension vehicle) 4. A retractable axle 	<ol style="list-style-type: none"> 1. Steering axles in a quad-axle set of a specialist overdimension vehicle 2. Any modification or repair likely to have been carried out before 1 January 1997 (modifications and repairs before this date generally required certification but for inspection purposes no evidence of this is required). 3. Any repair or modification not listed in the left-hand column unless the vehicle inspector considers that certification is required because the modification or repair has affected the vehicle's safety performance (a second opinion from an expert may be needed, eg the manufacturer's representative, or a reputable workshop).

Tyres, wheels and hubs

7-2 Hubs and axles (cont.)

Note 1 Definitions

Retractable axle means an axle that has a convenient adjustment to allow the axle load distribution of the axle set to be varied substantially. An axle that is retracted is not considered to be part of the axle set.

Load-sharing axle set means an axle set suspension system that has effective damping characteristics on all axles of the set and is built to divide the load between the tyres on the set so that no tyre carries a mass more than 10% greater than the mass it would carry if:

- a) the load were divided in the axle set so that each tyre carries an equal load, or
- b) the axle set is a tandem-axle set comprising a twin-tyred axle and a large single-tyred axle and is built to divide the load between the tyres on the set so that:
 - i. 60% of the load is borne by the twin-tyred axle and 40% of the load is borne by the large single-tyred axle, or
 - ii. 55% of the load is borne by the twin tyred axle and 45% of the load is borne by the large single-tyred axle.

Specialist overdimension vehicle means

- a) a vehicle designed primarily to transport overdimension or overweight loads, or
- b) a vehicle whose primary purpose is to carry out a specialist function that requires overdimension equipment, and:
 - i. dismantling of the vehicle's equipment would make the equipment unusable for its intended purpose, or
 - ii. it would take more than four hours to dismantle the vehicle's equipment.

Note 2 For specialist overdimension vehicles, none of the 'Mandatory requirement' or 'Mandatory permitted equipment' Reasons for rejection apply except number 6, ie axle sets must be load sharing.

Pole trailer		Simple trailer	Full trailer	Semi-trailer
1 axle set	2 axle set			

Figure 7-2-1. Permitted axle configurations

Tyres, wheels and hubs

7-3 Mudguards

Summary of legislation

Applicable legislation

- Land Transport Rule: Vehicle Equipment 2004

Mandatory equipment

1. A trailer must be fitted with a mudguard (**Note 1**) over each road wheel if it is reasonable and practicable to do so.
2. A mudguard must cover no less than the width of the tyre tread on each road wheel (**Figure 7-3-1**).
3. A trailer fitted with twin tyres or close-spaced multiple tyres must be fitted with a mudguard over each wheel on the rear axle that provides continuous protection from a horizontal line tangent to the top of the tyre tread (**Note 1**) to a line with a slope of 1 in 3 rising rearward from the tyre's contact point on the road (**Figure 7-3-2**).
4. A trailer designed for industrial purposes may be fitted with partial mudguards if the vehicle's construction makes it impracticable to fit full mudguards.
5. A trailer used for transporting round timber that cannot be fitted with mudguards over each road wheel must have at least partial mudguards mounted behind its rearmost axle that comply with the following (**Figure 7-3-2**):
 - a) the mudguard must provide continuous protection from a horizontal line tangent to the top of the tyre tread to a line with a slope of 1 in 3 rising rearward from the tyre's contact point on the road, and
 - b) the distance between the tyre and the mudguard must not be more than twice the tyre rolling radius.
6. The following trailers are not required to be fitted with mudguards:
 - a) a vehicle in an unfinished condition used under the authority of trade plates and operated in accordance with the Compliance Rule
 - b) a trailer towed by a vehicle that is not capable of exceeding a speed of 30 km/h.

Mudguard condition

7. A mudguard must be securely fixed to the vehicle and must be constructed so that it does not present a hazard to road users.

Reasons for rejection

Mandatory equipment

1. A mudguard (**Note 1**) over a road wheel is missing where it is reasonable and practicable to fit a mudguard, unless the trailer is:
 - a) in an unfinished condition legally used under the authority of trade plates, or
 - b) is towed by a vehicle that is not capable of exceeding a speed of 30 km/h.
2. A mudguard does not cover the full tread (**Note 1**) width of a tyre or tyres fitted to a road wheel (**Figure 7-3-1**), except on a trailer designed for industrial purposes where it is not practicable to fit a full mudguard due to the vehicle's construction.
3. A trailer used for transporting round timber is not fitted with at least partial mudguards mounted behind the rearmost axle that meet the following requirements (**Figure 7-3-2**):
 - the mudguard must provide continuous protection from a horizontal at the top of the tyre to a line rising rearward with a slope of 1 in 3 from the tyres contact point on the road, and
 - the distance between the tyre and the mudguard must not be more than twice the distance from the centre of the wheel to the road.
4. On a vehicle with twin or close-spaced multiple tyres a mudguard fitted over a wheel on the rear axle is more than one-third higher than the horizontal distance between the vertical lines of the lowest point of the mudguard and the centre of the wheel (**Figure 7-3-2**), except when the mudguard is fitted to a vehicle designed for industrial purposes and it is not practicable to fit a full mudguard due to the vehicle's construction.

Mudguard condition

5. A mudguard is not securely fixed to the vehicle.
6. A mudguard is so constructed or damaged that it is likely to present a hazard to road users.

Tyres, wheels and hubs

7-3 Mudguards (cont.)

Note 1 Mudguard means a fitting, inclusive of any portion of the vehicle and of any mudflaps attached, that serves to intercept material thrown up by a wheel more or less on the plane of the wheel.

Tyre tread means the portion of a tyre that contacts the road.

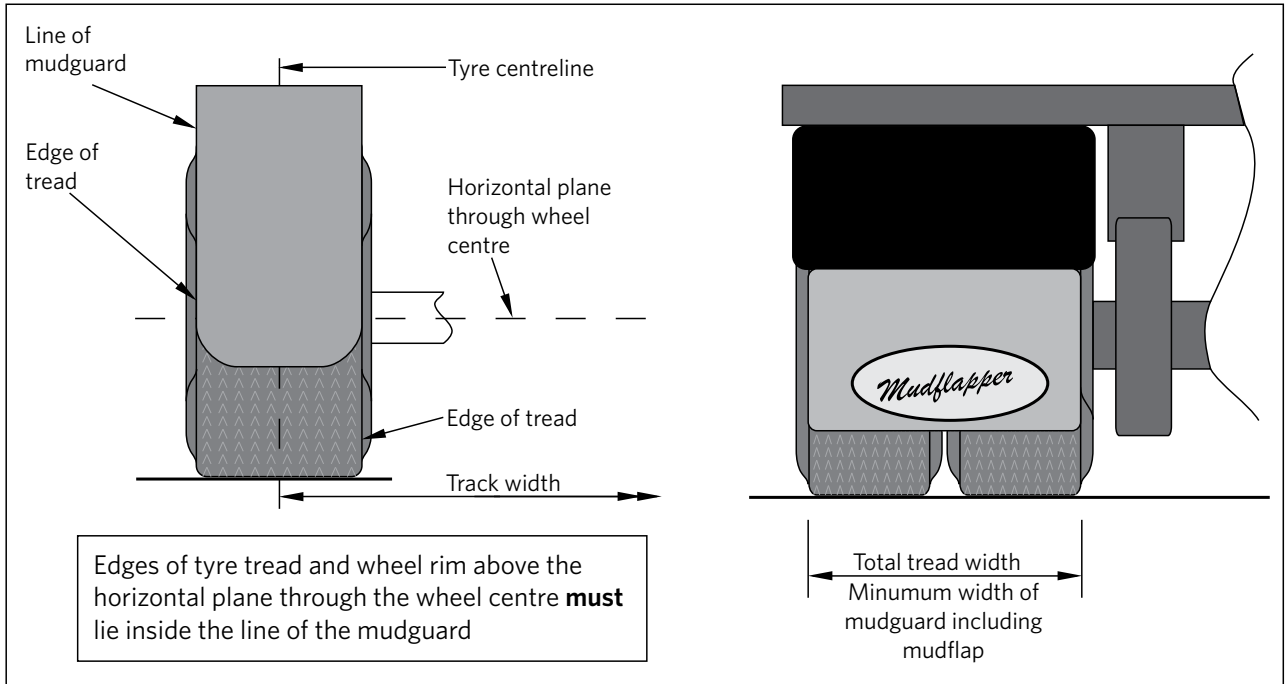


Figure 7-3-1. Position of mudguard in relation to tyre tread

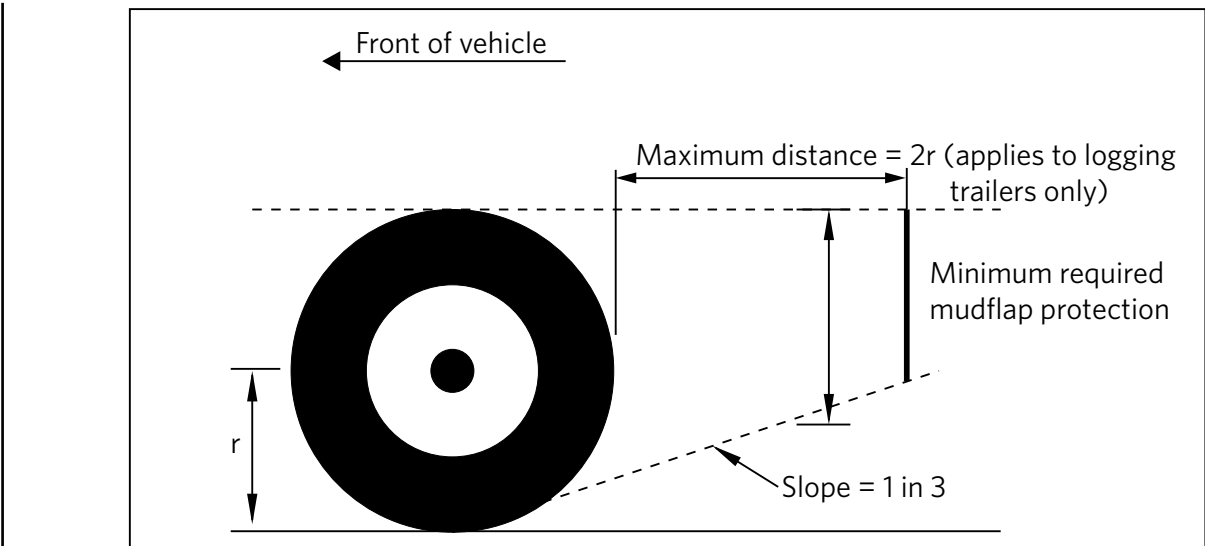


Figure 7-3-2. Size and position of mudguards for the rear wheels of a trailer fitted with dual wheels or close-spaced multiple wheels and logging trailers