



Section 14

Trailers

Objective:

To ensure that all components and associated systems are in a serviceable condition and meet all legislative requirements.

Australian Design Rules relevant to this section

ADR 1	Reversing lamps
ADR 6	Direction indicators
ADR 38	Trailer brake systems
ADR 42	General safety requirements
ADR 43	Vehicle configuration and dimensions
ADR 44	Specific purpose vehicle requirements
ADR 45	Lighting and light-signalling devices not covered by ECE regulations
ADR 47	Retroreflectors
ADR 48	Devices for illumination of rear registration plates
ADR 49	Front and rear position (side) lamps, stop lamps and end-outline marker lamps
ADR 62	Mechanical connections between vehicles
ADR 63	Trailers designed for use in road trains
ADR 92	External Projection

14.1. Check brake components

Reasons for rejection

- a. Abrasions or cuts on brake hoses penetrate further than the outer protective covering
- b. Brake pipes, hoses and connections are not securely mounted, are cracked, broken, kinked, crimped, damaged by heat or have visible signs of leakage, swelling or bulging
- c. Brake control mountings, pivots, cables or links are missing, frayed, kinked, loose, broken, excessively worn or binding
- d. Brake drums or discs are not fitted, or have missing pieces, or cracks other than short heat cracks inside the drums
- e. Drums or discs are worn beyond the manufacturer's specification:
- f. Any calliper, wheel cylinder or master cylinder leaks
- g. Friction material of the linings or pads are contaminated with oil, grease, brake fluid or another substance that will reduce the friction coefficient of the friction material
- h. The thickness of the linings or pads is less than the manufacturer's recommended minimum. If this is not known or is no longer appropriate, the thickness of the linings or pads is less than the following:
 - the rivet or bolt head on riveted or bolted linings, or
 - within 3mm of the friction material mounting surface on bonded pads or linings.

Section 14 - Trailers

- i. Brake chambers (including chamber clamps) or camshaft support brackets are loose, bent, cracked or missing
- j. Brake linings or pads are missing, broken or loose on their shoes or plates
- k. Brake components such as springs, anchor pins, cam rollers or bushes, pull or push rods, clevis pins, retainers or brake chamber mounting bolts are missing, loose, damaged or broken
- l. The brake controls of the towing unit do not cause the corresponding trailer brake to work when they are operated
- m. There are any air, vacuum or hydraulic leaks
- n. Where the trailer is fitted with air or vacuum brakes it does not have at least one reservoir
- o. Any reservoir or tank for air or vacuum storage is not protected by a check valve with manual function
- p. Reservoirs are not secured or their mountings are deteriorated
- q. Air reservoir drain valves on reservoirs do not work properly cannot be readily operated by the driver/ operator or the valve is not fitted at the lowest point of the reservoir
- r. With any brake fully applied, any stroke indicator displays evidence of excessive stroke (known as over-stroking).

⚠ Not all automatic slack adjusters which travel past 90 degrees are considered over-stroked.

Further information on slack adjusters can be sought from the brake component manufacturers or industry advisory documents.

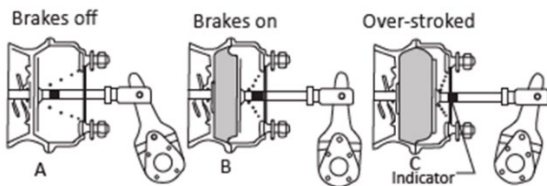


Figure 14.1 Example of excessive stroke (over-stroking)

- s. Brake chamber push rods or pull rods move more than 80% of their maximum stroke or travel over centre with the brakes fully applied

⚠ The push or pull rod may travel further on long stroke brake chambers.

Further information on long stroke brake chambers can be sought from the brake component manufacturers or industry advisory documents.

- t. Brake adjusters are not properly adjusted, are bent, damaged or excessively worn
- u. The truck/trailer interconnecting flexible hose and coupling is not properly mated or secured
- v. Any wiring for electric brakes is frayed, bared or not secure
- w. Any handle of a parking/hand brake fitted to a trailer that is not fitted with a locking device capable of holding in any position
- x. Brake components are mismatched on the same axle, i.e. booster size and volume.

14.2. Check trailer brakes and breakaway protection

The examiner should seek the assistance of another person in order to make a thorough check of the breakaway protection systems.

Reasons for rejection

- a. For trailers with a gross trailer mass (GTM) in excess of two tonnes, the trailer brakes do not operate immediately when the

trailer is disconnected from the towing vehicle and do not remain fully applied for at least 15 minutes

- b. A trailer's brakes do not apply automatically when any trailer service hose coupling or connection is disconnected or the operating pressure falls below the recommended operating level

⚠ Not all axles are required to apply brakes in this scenario.

- c. A truck trailer interconnecting flexible hose and coupling is not properly mated or secured
- d. For trailers with a GTM in excess of two tonnes, the trailer brakes are not capable of being applied and released from the normal driving position.

14.3. Advanced Braking Systems

This section covers trailers which have advanced braking systems such as anti-lock braking systems (ABS), electronic braking systems (EBS), electronic stability control (ESC), etc.

Reasons for rejection

- a. An advanced braking system warning lamp:
 - indicates a fault with the trailer's system
- b. An advanced braking system component (wheel speed sensor, etc) is missing, damaged or substituted (e.g. manual slack adjuster in lieu of auto slack adjuster) to an extent where it does not perform its intended function
- c. Advanced braking system wiring or connectors are corroded, damaged, not insulated or are not securely fastened.
- d. Electrical wiring is located where it can:
 - become exposed to excessive heat
 - come into contact with moving parts.
- e. An advanced braking system component or system has been modified outside of manufacturer's specifications.
- f. An advanced braking system does not default to the "on" position once the ignition is switch off and on
- g. A trailer, fitted with an advanced braking system, which has the capability of having another trailer coupled behind (i.e. lead trailer in a b-double) is not fitted with an ABS/EBS connector which allows to attach an ABS/EBS equipped rear trailer.

14.4. Check drawbar

Reasons for rejection

- a. Drawbar is extensively corroded, cracked, bent or insecurely mounted
- b. Where any part of the drawbar is removable the bolts, studs, nuts etc. fastening those parts do not have a locking device such as a U-clip, split pin, spring washer or nylon lock nut
- c. There is more than the manufacture's specified free movement between the sub-frame and hinged drawbar at the attachment point (compression of any flexible bush is to be excluded), or if unknown 6mm
- d. Drawbar eye is elongated by wear, cracked or worn more than 5% of the original diameter
- e. Drawbar eye bush is worn through, insecure or is attached by welding (unless manufacturer specifies welding)
- f. Drawbar eye/block has been welded contrary to manufacturer's specification or recognised welding guidelines
- g. Where ADR 62 applies, the drawbar eye does not display the manufacturer's name/trademark and the rating

Section 14 - Trailers

- h. Any mounting bolts, fasteners or weld beads have advanced corrosion
- i. Any sliding drawbar latching mechanism is inoperative
- j. One or more stops on a sliding drawbar are missing or are inoperative
- k. A sliding drawbar has movement between the slider and the housing which exceeds manufacturer's specification or 6mm where unknown
- l. Air or hydraulic cylinders, hoses or chambers on sliders leak (other than normal weeping of hydraulic seals).

14.5. Check towing attachments

Reasons for rejection

- a. Any towing attachment, mounting bolts, fasteners or weld beads are loose, cracked, broken or extensively corroded
- b. Any ball coupling locking device is broken or inoperative.
- c. For a trailer designed for use in a road train, the rear coupling overhang exceeds:
 - For a semitrailer, 30% of the distance from the point of articulation at the front of the trailer to the centre of the rear axle group; or
 - For another type of trailer, 30% of the distance from the centre of the front axle group to the centre of the rear axle group.

↘ 'Rear coupling overhang' is the distance from the centre of the rearmost axle group to the pivot point of the coupling near the rear of the vehicle.

14.6. Check skid plates

Reasons for rejection

- a. Any mounting bolts, fasteners or weld beads have advanced corrosion
- b. Skid plate is cracked or has missing or loose bolts
- c. Skid plate flatness in any direction is outside the limits of Australian/ New Zealand Standard AS/NZS 4968.3 Heavy road vehicles - Mechanical coupling between articulated vehicle combinations:
 - is bowed downwards (convex) by more than fifth wheel designated effective diameter (mm) divided by 150
 - is bowed upwards (concave) by more than fifth wheel designated effective diameter (mm) divided by 300
 - bowing exceeds limits shown in Figure 14.2.
- d. A Wedge block fitted to a trailer for use with a ballrace type coupling is excessively worn, cracked or attachment bolts are missing

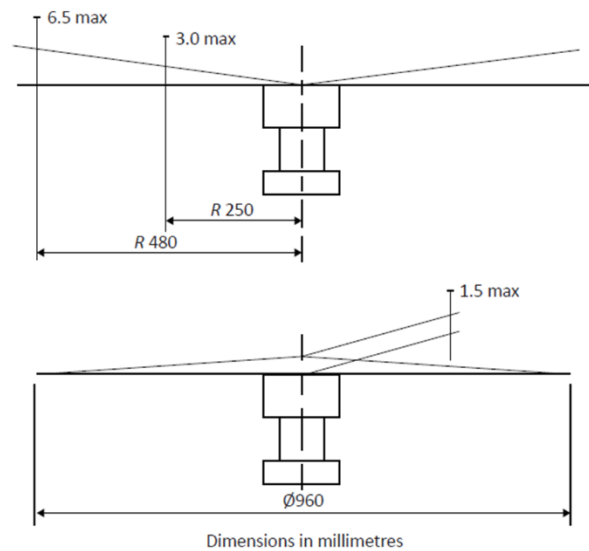


Figure 14.2 Skid plate flatness limits

↘ The above diagram has been extracted from AS/NZS 4968.3:2011. The dimension of 960 mm is indicative only and is not the design size of the skid plate.

- e. Skid plate is worn in any directions more than 20% or 2mm whichever is the lesser.

14.7. Check kingpin

Reasons for rejection

- a. The kingpin does not display the manufacturer's name/ trademark, nominal size in millimetres (e.g. 50mm) and the 'D-value' rating in kilonewtons (kN)
- b. For trailers used in a road train, the kingpin is not rated to at least 162kN
- c. The vertical or horizontal movement between the upper and lower fifth wheel halves of coupled vehicles exceeds 13mm
- d. The kingpin is worn or loose
- e. Any mounting bolts, fasteners or weld beads have advanced corrosion
- f. An adaptor is used to fit a kingpin to a fifth wheel coupling
- g. Kingpin has missing or loose bolts
- h. Any welding performed to the kingpin not carried out in accordance with the requirements of Australian Standard AS 2175
- i. A Wedge block which forms part of the kingpin for use with a ballrace type coupling is excessively worn, cracked or attachment bolts are missing
- j. The maximum wear limits for kingpins is exceeded.

Table 14.1 Kingpin maximum wear limits

Size (mm)	F (mm)	G (mm)	H (mm)
50	49	71	73
75	73	100	73.3
90	86	112	62

↘ Dimensions F, G and H are illustrated in Figure 14.3.

Section 14 - Trailers

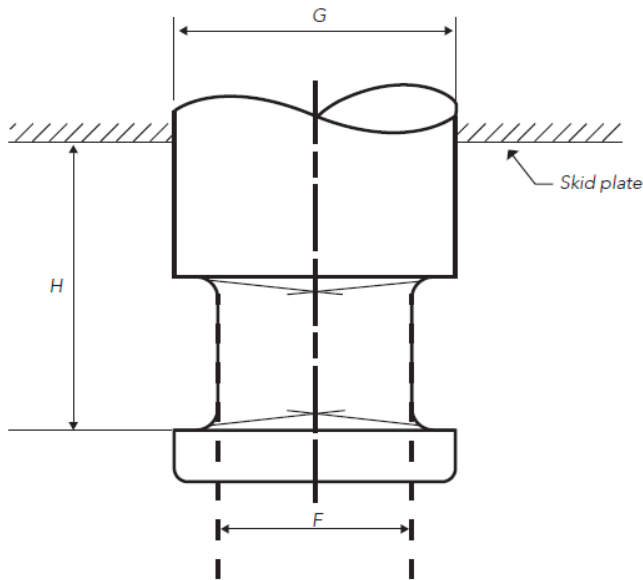


Figure 14.3 Kingpin wear dimensions

✎ The above table and diagram has been extracted from AS/NZS 4968.3:2011.

14.8. Check safety chains, cables and brake connections

Reasons for rejection

- Safety chains, cables or brake connections are stretched, nicked, frayed, worn, cracked or extensively corroded
- Any safety chain that has insecure attachment points, clamps or fasteners, and is liable to accidentally disconnect or is not readily detachable from the towing vehicle
- Safety chains attachment on a trailer exceeding 3500kg ATM involves welding or deformation of the chain
- Safety chain retaining brackets are cracked, deformed or not secure
- Safety chain retaining brackets do not meet the requirements of ADR 62 (where applicable).

✎ Safety chains should be inspected in accordance with the Australian Standards: AS1872, AS2321, AS4177.4 as in force at the time the vehicle was manufactured.

For information on safety chains and the dimensions and configurations of typical chain retention brackets, refer to Additional Information – Safety Chains.

14.9. Check suspension components

Reasons for rejection

- U-bolts or other spring to axle or spring pack clamp bolts, centre bolts, spring eyes or hangers, torque, radius or tracking component assemblies, control arms, bushes or any parts used to attach them to the vehicle frame or axle are cracked, loose, broken, missing or worn beyond manufacturer's limits
- Nuts do not fully engage U-bolts
- Any suspension component is not correctly aligned or is damaged, loose or broken
- Any nut, bolt or locking mechanism is insecure or missing
- Springs are cracked, missing or broken

✎ Superficial crazing is acceptable. This is often present on rubber suspension components even when new.

- Air bags leak or sag
- Leaves in a leaf spring are displaced sideways more than 10% of their width or so that they contact wheels, brakes or the frame
- Any walking beam type heavy vehicle suspension has signs of damage to beam
- Shock absorbers, if originally fitted, are missing, loose, inoperative or leak

✎ Shock absorber misting is not considered leaking. For further information refer to Section 4 – Steering and Suspension, Additional Information – Shock Absorber Leakage and Misting.

- Shock absorber mountings or bushes are not secure or damaged.

✎ Repairs using either heating or welding may adversely affect the strength of suspension components. Any such repairs should only be undertaken in consultation with the vehicle or component manufacturer.

14.10. Check sliding axles

Reasons for rejection

- Sliding axles do not lock securely in position or have lock pins missing or not engaging
- Secondary securing devices and locking indicators do not work properly
- Lock pins are excessively worn, cracked or damaged.

14.11. Check wheels/rims

Reasons for rejection

- 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.
- Any wheel contacts unrelated vehicle components at any point through its full range of travel
- Spiders have cracks across a spoke, hub or area
- Wheels are not compatible with hubs
- Required valve protection lugs are missing
- Wheels fail to rotate freely
- Hubs seals leaking
- Excessive end-play in hubs.

14.12. Check wheel fasteners

Reasons for rejection

- 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
- Any hub has missing, cracked, stripped or broken wheel mounting nuts, studs or bolts

Section 14 - Trailers

- c. Fasteners are not the correct type for the wheel being used or allow a rim to slip on its spider
- d. Spacer plates are used between hub and wheels, except where fitted by the vehicle manufacturer
- e. Any item that is fitted to the tyre/rim/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 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.

14.13. Check retaining rings

Reason for rejection

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

14.14. 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

📌 Tread wear indicators are built into the principal groove of 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 overall diameter of dual tyres on the same side of an axle is not matched within 25mm
- c. A tyre (including sidewalls) has deep cuts, exposed wire or cords, chunking, bumps, bulges or other signs of carcass failure
- d. A tyre has been re-grooved (except where indicated on the side wall that the tyre is suitable for re-grooving)
- e. When in the straight-ahead position, the tyres of a vehicle project beyond the extreme width of the mudguards
- f. Any tyre is not of a type constructed for unrestricted road use
- g. 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 maximum speed i.e. 125kph)
- h. The speed rating of all tyres is not of at least 100 km/h or the vehicle's top speed, whichever is the lesser, unless a lower rating has been specified by the manufacturer
- i. A tyre fitted to a heavy vehicle is not suitable for road use if:
 - it is not of sufficient size and capacity to carry the part of the vehicle's gross mass transmitted to the ground through that axle
 - tyres are not compatible with the rim to which they are fitted
 - dual tyres contact each other
 - the tyres or wheels on a vehicle contact the body, chassis, frame or braking or suspension components.

14.15. Check exterior body panels and fittings

Reasons for rejection

- a. Exterior bodywork including mudguards on a vehicle have exposed sharp edges (including corrosion or accident damage) that could injure a person who comes into contact with the vehicle
- b. Mudguards are not properly fitted to provide protection over the full width of the wheels and tyre(s) and any mudguard does not extend inboard over the full width of the tyre/s (except where part of the body of the vehicle acts as a mudguard)
- c. The bottom edge of the mudguard and/or mudflap at the rear of any vehicle is higher off the ground than 37% of the horizontal distance between the centre of the axle and the mudguard

📌 The height of the mudguard and/or mudflap from the ground need not be less than 230mm or for a vehicle built to be used off-road 300mm.

- d. Any motor vehicle which is 2.2 metres or more in width and fitted with a body which is less than 300mm in height at the rear, measured from the lowest point of the body above the ground to the highest point, does not have the rear face of any rear mudguards silver or white in colour

📌 Reasons for rejection (d) does not apply when a vehicle is correctly fitted with rear marking plates or conspicuity markings.

- e. Any after-market fittings attached to the exterior of the trailer that could cause injury to a person coming into contact with that part of the trailer.

📌 For information on mudguard or mudflap requirements, refer to Additional Information – Mudguard and Mudflap Requirements.

14.16. Check rear marking plates

Reasons for rejection

- a. Retroreflective rear marking plates or conspicuity markings are not fitted to a trailer with a GTM greater than 10 tonnes
- b. Rear marking plates or conspicuity markings are not fitted in locations specified by VSB12
- c. Rear marking plates or conspicuity markings are faded, damaged or incorrectly fitted.

📌 For more detailed information on rear marking plates refer to Vehicle Standards Bulletin 12 (VSB12) National Code of Practice: Rear Marking Plates. A copy of VSB12 may be obtained from the NHVR website at www.nhvr.gov.au/vehiclestandards

14.17. Check number plate

Reasons for rejection

- a. The number plate is obscured, for example, by a towing attachment, goose neck or tow ball
- b. Number plate covers are tinted, reflective, rounded or bubble like
- c. The number plate is not issued or approved by the state or territory road transport authority
- d. The number plate is damaged or faded to the extent that the registration number is not legible from a distance of 20 metres
- e. The number plate is fitted to a hinged plate that enables the plate to hinge whilst the vehicle is in motion

Section 14 - Trailers

- f. The number plate is not substantially parallel to the vehicle's axles
- g. The number plate is mounted more than 1300mm from the ground

↘ State or territory road transport authorities may allow a number plate to be attached more than 1300mm from the ground if the design of the vehicle does not allow it to be installed at the required height. For more information about this requirement, contact the state or territory road transport authority.

- h. Characters on the number plate are not clearly visible from a distance of 20 metres at any point within an arc of 45 degrees from the surface of the number plate above or to either side of the vehicle
- i. The number plate is positioned so that it is not illuminated by at least one number plate light.

14.18. Check electrical equipment

Reasons for rejection

- a. Any electrical wiring or connector is:
 - corroded
 - damaged
 - not insulated or securely fastened so that it could be damaged.
- b. Electrical wiring is located where it can:
 - come into contact with combustible substances
 - become exposed to excessive heat
 - come into contact with moving parts.

14.19. Check chassis

↘ Refer to Additional Information – Rust and Corrosion for a detailed explanation of checking for rust.

Reasons for rejection

- a. Any part of the chassis or sub-frame is weakened or failure of a component is likely to occur from being:
 - cracked
 - distorted
 - sagging
 - broken
 - loose
 - affected by extensive or advanced rust.
- b. Any fastenings between frame members, including welds, are loose, distorted or cracked
- c. Any chassis or sub-frame repairs on the vehicle that have not been carried out in accordance with recognised industry repair methods and standards
- d. Frame members in load areas are missing or damaged to an extent that the load area is not properly supported or the members are likely to fall out or contact moving parts
- e. Trailer chassis has been altered without certification of compliance with Section H of VSB6.

↘ For further information, refer to Appendix B – Vehicle Modifications.

14.20. Check lights and reflectors

Reasons for rejection

- a. Compulsory reflectors are damaged, obscured, deteriorated, not installed in the correct location or are not fitted
- b. Any of the following lights are inoperative, obscured, deteriorated, insecure or not fitted where required or are an incorrect colour:
 - tail lights (red)
 - brake lights (red)
 - reversing lights (where fitted) (white)
 - turn signal indicator lights (yellow)
 - clearance/end outline marker lights (white/yellow to front, red to rear)
 - number plate light (white)
 - side marker lights (yellow to front, red to rear).
- c. Any reflector on the vehicle, other than conspicuity markings:
 - show white to the side or rear
 - show red to the side or front

↘ The rearmost side reflector can be red if it is grouped with the rear position lamp, the rear end-outline marker light, the rear fog light, the stop light, the red rearmost side-marker light or the rear retro-reflector.

- show yellow to the front or rear
- show a colour other than red, yellow or white.
- d. Any rear light other than a reversing light is damaged to the extent that white light shows to the rear of the vehicle
- e. Any yellow clearance light, side marker light or turn signal indicator is damaged so that it shows white light
- f. The number plate light is not directing light onto the surface of the rear number plate
- g. Any light has a tinted cover over it that affects its intended operation
- h. Any light not clearly visible under normal conditions and of a consistent intensity, or affected by dirty lenses or poor electrical contact
- i. Lenses and light reflectors are not securely mounted, are faded or discoloured and are not free from cracks, holes, or other damage which would allow the entry of moisture or dirt to impair the efficiency of the light or reflector
- j. Lighting does not comply with the Heavy Vehicle (Vehicle Standards) National Regulation
- k. For an LED type light, more than 30% of the individual LEDs do not function.

↘ For example, if an LED light bar is made up of 10 LEDs, at least 7 of the LEDs must be working. If only 6 LEDs work, this is grounds for rejection.

14.21. Additional Information - Safety Chains

Safety chains for trailers:

- in excess of 3.5 tonnes ATM
- trailers in excess of 2.5 tonnes GTM with fixed or rigid drawbars and automatic pin type couplings.

All fixed or rigid drawbar trailers (other than a converter dolly) and any other trailers without breakaway brakes, require safety chains to be fitted.

It is strongly recommended that all other trailers be fitted with safety chains, especially vehicles used in severe conditions, e.g. quarry vehicles which are jack-knifed regularly for unloading.

Safety chains complement the safety features of the trailer's breakaway braking system, allowing the driver to maintain control of the truck and trailer combination following a coupling failure or disconnection.

Section 14 - Trailers

Safety chains **MUST** be supplied and fitted to comply with the following requirements:

Type of chain

Safety chains fitted to a trailer with an ATM over 3.5 tonnes, must be manufactured from alloy steel with a minimum breaking stress of 800MPa to conform with the mechanical properties of Grade T chain as specified in Australian Standard AS 2321 *Short-link chain for lifting purposes*.

Required number and size of chains

Two separate chains must be used.

The minimum breaking strength or size of each chain used on the trailer must meet or exceed the values listed for the maximum gross trailer mass or aggregate trailer mass as indicated in Table 14.2.

Table 14.2 Safety chain size selection

Vehicles manufactured before 1 July 1998

Gross trailer mass (tonnes)	Chain size (millimetres)	Minimum chain breaking load (tonnes)
2.5–4.27	7.1	6.4
4.27–7.5	9.5	11.6
7.5–13.5	12.7	20.4
13.5–21.5	15.9	32.0
21.5–30.0	19.0	46.4
>30.0	22.0	63.2

Additional Information Vehicles manufactured from 1 July 1998 to 31 December 2008

Aggregate trailer mass (tonnes)	Chain size (millimetres)	Minimum chain breaking load (tonnes)
Over 3.5 and up to 4.3	7.1	6.4
Over 4.3 and up to 7.5	9.5	11.6
Over 7.5 and up to 13.5	12.7	20.4
Over 13.5 and up to 21.5	15.9	32.0
Over 21.5 and up to 30.0	19.0	46.4
Over 30.0	22.0	63.2

Vehicles manufactured from 1 January 2009

Aggregate trailer mass (tonnes)	Chain size (millimetres)	Minimum chain breaking load (tonnes)
Over 3.5 and up to 5.0	6	5.1
Over 5.0 and up to 8.0	8	8.2
Over 8.0 and up to 12.5	10	12.8
Over 12.5 and up to 21.5	13	21.7
Over 21.5 and up to 32.5	16	32.8
Over 32.5	19	46.5

Arrangement of chains

Safety chains must be arranged so that:

- the chains are attached to the trailer
- the chains are crossed to support the drawbar and prevent it from dropping to the ground in the event of coupling failure or disconnection
- the points of attachment to both the towing vehicle and the trailer must be as near as practicable to the coupling and arranged so as to maintain direction of the trailer in the event of coupling failure or disconnection.

⚠ Ensure that the attachment fittings do not foul on the rear of the towing vehicle or trailer drawbar under any possible operating conditions.

Attachment of chains

Safety chains must be attached so that:

- the attachments to the towing vehicle and the trailer are capable of withstanding the specified breaking load of each chain

Shackles are not permitted.

Ramshorn type hooks are not permitted.

⚠ Chain coupling attachment bracket and dimensional recommendations appear in Table 14.3.

- the attachments to the towing vehicle and the trailer are separate from the coupling and its fasteners
- any safety chain attachment point affixing a safety chain to a drawbar must be located as near as practicable to the coupling. Where two points of attachment are required they must be mounted one on either side of the centreline of the drawbar
- the chain and coupling links are **NOT WELDED, DEFORMED OR ELECTROPLATED** subsequent to its manufacture.

Chain attachment brackets

The dimensions and configurations of typical chain retention brackets are shown in the following Table and diagram:

Table 14.3 Typical bracket dimensions

Minimum Chain (mm) of fillet weld	Minimum length	Bracket dimensions					
9.5	6 x 200	16	16	4 x M12	19	*	
12.7	6 x 360	20	20	4 x M16	25	*	
15.9	8 x 420	25	20	4 x M20	32	*	
19.0	10 x 480	25	25	4 x M20	38	*	

* Dimension 'D' to suit coupling link plus minimum clearance to prevent binding.

Section 14 - Trailers

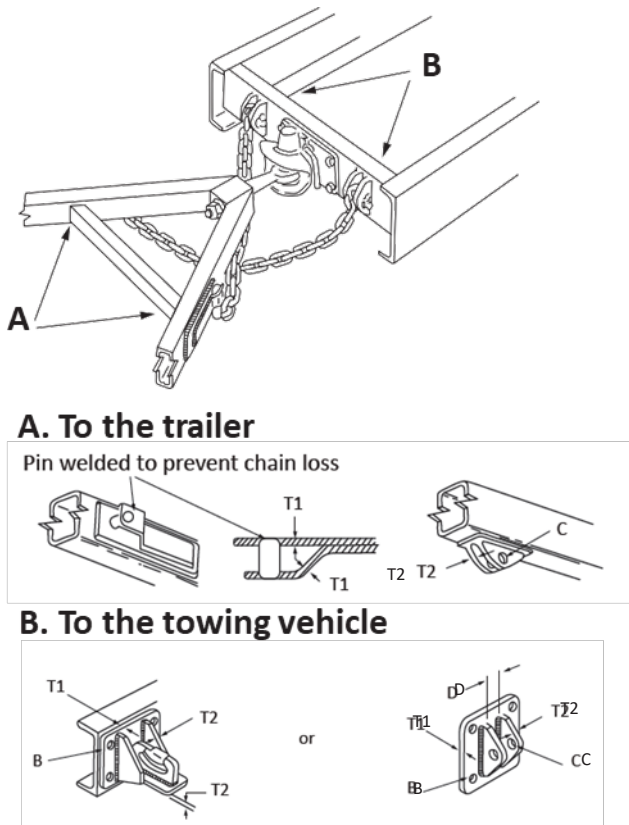


Figure 14.5 Typical attachment of chains

Attachment pins

All pins used to connect safety chains to trailers and towing vehicles must be manufactured from steel bar with a minimum specification of 4140 or 4150 grade (Ultimate tensile strength – 1040MPa) unless otherwise approved.

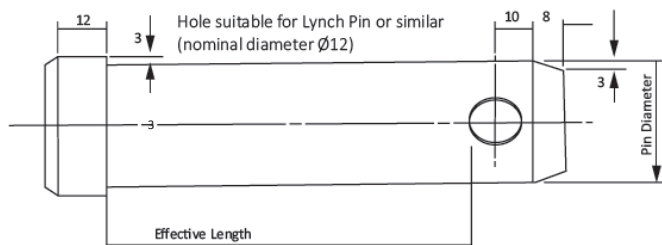


Figure 14.6 Typical pin design

Material

- Steel 4140 (Alternative 4150)
- Ultimate tensile strength – 1040MPa

Standard agricultural 3-point linkage pins are NOT suitable because they are manufactured from a lower grade of steel and will not meet the load requirements. It is acceptable to use a metric class 10.9 bolt of the correct diameter providing that the threaded portion of the bolt is clear of the brackets.

14.22. Additional Information - Mudguard and Mudflap Requirements

Effective mudguards must be fitted for all wheels on all vehicles. However, this does not apply to a vehicle if the construction or use of the vehicle makes the fitting of mudguards unnecessary or impractical.

Examples are:

- pole type trailers used to carry timber

- most road making plant
- some agricultural equipment.

Mudguards and mudflaps must be capable of deflecting downwards any mud, water, stones or any other substance thrown upward by the rotation of the wheels. As outlined in Figure 14.7, mudguards must be fitted to the vehicle in such a manner that provides continuous protection between a point in area A and a point in area B and must be provided for the overall tyre width of all tyres.

Notwithstanding the requirements specified above, the mudguard, including a mudflap (if fitted), does not need to come any lower than 230mm from the ground, or for an off-road vehicle, 300mm.

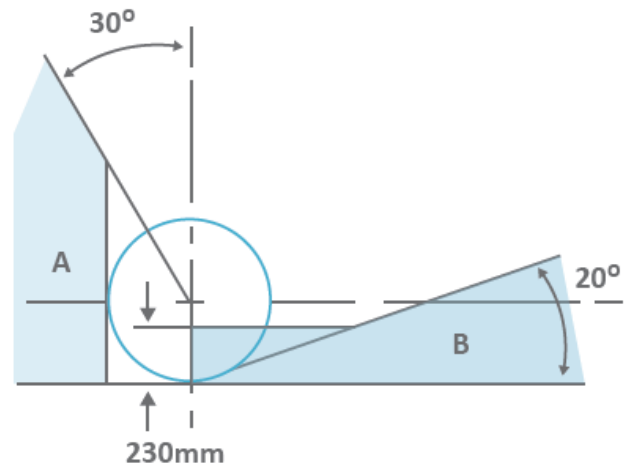


Figure 14.7 Mudguard and mudflap protection area

14.23. Additional Information - Rust and Corrosion

Classification of rust

The extent of corrosion in a trailer can range from light surface rust to the total breakdown of parent metal.

Depending on the individual trailer's design, there are many different ways in which corrosion can begin and the degree to which a material or structure is attacked can vary widely. In general, though, the formation of rust and resultant loss of metal occurs in areas which retain moisture because (for example) of a build-up of road dirt and mud.

In order to simplify identification and classification when carrying out a vehicle inspection, this publication classifies the extent of corrosion in three different stages.

Stage 1 - Surface rust

Light, powdery corrosion on the surface of a section of metal is termed surface rust and is sometimes the first indication of corrosion that can be observed; it should warn the owner of the trailer to take steps for preventing the rust from spreading. Surface rust can occur on or behind any body panel of a trailer particularly if the protective coating is scratched or damaged.

Stage 2 - Advanced rust

Surface rust, if left unattended, will develop into an advanced form of corrosion which can usually be seen as an eruption of oxidised metal, either on bare metal or under paint. This eruption occurs because the rust reaction involves an increase in volume so that pitting or bubbling of paint is the usual indication of penetration.

Section 14 - Trailers

Stage 3 - Extensive rust

The final stage of the corrosion process is the formation of heavy encrustation of oxidised metal which completely replace the parent metal. This results in a hole or series of holes in the body panel or structural member of the trailer when the rust is removed. This category of rust can usually only be rectified by replacement of the affected body panels and parts.

Classification of vehicle structures

Vehicle structural components can be categorised according to their importance to safety. For instance, sub-frames and other basic structural sections have to be absolutely free of rust because their failure could make a vehicle difficult to control and might cause it to crash. As already mentioned, such failures will also probably reduce the chances of survival in a crash.

Primary structure

This category includes any structure or component which, if it collapsed, would make the vehicle uncontrollable or would considerably reduce safety in a crash. Examples of components in this category are shown in Figure 14.8.

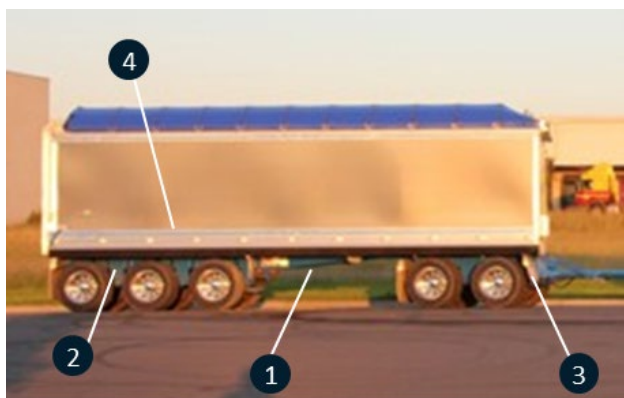


Figure 14.8 Typical Primary trailer structure components

1. Main structural members such as sub-frames and chassis rails
2. Suspension mountings and parts
3. Steering component mounting points (where applicable)
4. All floor panels.

Secondary structure

The second category includes any structure or component which, if it collapsed, would not immediately affect a vehicle's controllability or the protection provided by its built-in safety systems. Normally, surface rust or advanced rust would not be a cause for rejection in these components but extensive rust is usually either hazardous to persons in or near the vehicle because of its sharp edges. In such cases, extensive rust must therefore be rejected. Examples covered by this category are shown in Figure 14.9.

Typical secondary trailer structure components



Figure 14.9 Secondary trailer structure components

1. Mudguards or fenders
2. Roof (where applicable).

Reasons for rejection

The following table summarises the acceptability of rusted components in terms of the categories of rust and structures described so far. Remember that it is a general guide only and that in some cases it might be necessary to depart from the table.

Table 14.4 Acceptability of rusted components

Type of corrosion	Category of structure	
Surface rust	Acceptable	Acceptable
Advanced rust	Not acceptable	Acceptable (Note A)
Extensive rust	Not acceptable	Not acceptable (Note B)

➤ **A:** Areas within 100mm of hinges and locks (e.g. bonnet and doors), are considered primary structures and must be free of advanced and extensive rust.

➤ **B:** Extensive rust is not acceptable in secondary components, if it has resulted in hazardous conditions to persons in or near the vehicle e.g. sharp edges or loose panels.

Inspection method

Visual inspection is usually adequate since advanced corrosion is almost always associated with an eruption of oxidised metal and pitting or bubbling of paint.

However, this method may not be adequate in all cases. In under body areas prone to rust, such as steering and suspension mounting points and major structural components which include chassis, floor, structural sills and sub-frames presence of rust should be checked by probing with a rod. This method should also be used to check for presence of rust in other areas where cosmetic damage is not a problem, such as inside wheel arches.

In using this technique, great care must be taken to ensure that sound panels or paint work are not scratched or damaged in any way. It should be remembered that the purpose of such checks is to find out whether rust is present, not to determine its extent.

When checking for advanced rust, you should pay particular attention to seam welds and spot weld. These frequently corrode through from the interior and can result in the eventual detachment of panels. Any panel which is made insecure by such corrosion must be repaired even if it is an area of the component where rust holes are not an immediate danger.

Section 14 - Trailers

Repairs

Surface rust on a component or structure is not immediately dangerous and is not a reason for rejection of a vehicle. However, if it is observed, the owner should be advised to have it rectified before it becomes serious. Rectification is simply a matter of completely removing the deposit and applying a rust-proofing coating or oil as is appropriate (body panels should be repainted using a good quality re-finishing system).

It should be noted that repairs made to primary trailer structure components solely by using body filling compounds are not acceptable. However, plastic filler or fibreglass can be used to smooth a non-structural component. A vehicle must not pass an inspection if it is found that a repair to a primary trailer structure component is carried out by methods which do not restore the original strength of the component or part. A good way to check for continuity of structure, if a fibreglass repair is suspected, is to run a magnet over the surface.

Extensive rust in structural members can only be repaired by replacing the affected member or by completely removing all rusted material and reinforcing it so that the original strength of the affected structural member is re-established.

Where a primary trailer structure is found to be in need of repair and the repaired component would normally be coated with a bituminous coating or covered by another vehicle component, it is quite in order to ask the owner to resubmit the repaired vehicle before the repairs are obscured so that the adequacy of the repairs can be assessed. A note to this effect should be made on the inspection report if this is required.