

Brakes

- 5-1 Service brake, parking brake, emergency brake and breakaway brake
- 5-2 Heavy trailer brake code
- 5-3 Interim heavy trailer braking specification

Brakes

5-1 Service brake, parking brake, emergency brake and breakaway brake

Summary of legislation

Applicable legislation

- Land Transport Rule: Light-Vehicle Brakes 2002

Mandatory equipment

- A trailer must be fitted with a service brake, parking brake, or breakaway brake depending on the laden weight of the trailer, as listed in **Table 5-1-1**.
- An agricultural trailer with a laden weight of more than 2000 kg that does not comply with brake requirements must be fitted with two safety chains that cross each other when the trailer is connected (refer to section 8, Towing connections).

Permitted equipment

- A trailer may be fitted with a type of brake that is not required to be fitted to the trailer.

Condition

- A brake must be in good condition.
- The brake friction surfaces must be within safe tolerance of their state when manufactured, and must not be scored, weakened or damaged to the extent that the safety performance of the brake is adversely affected.

Reasons for rejection

Mandatory equipment

- If fitted to a trailer:
 - a service brake does not act on each road wheel of at least one axle, or
 - a parking brake does not act on each wheel of at least one axle.
- Where the vehicle inspector is able to identify the laden weight of the trailer and its load, the trailer is not fitted with a service brake, parking brake, or breakaway brake, as required by **Table 5-1-1**.
- An agricultural trailer with a laden weight of more than 2000 kg that does not comply with braking requirements is not fitted with two safety chains that cross each other when the trailer is connected (refer to section 8, Towing connections).

Condition

Service brake

- There is corrosion damage within 150 mm of a brake component mounting point.
- A vacuum hose or pipe (including connections) is:
 - insecure, or
 - leaking, or
 - damaged (cracked, chafed, twisted, stretched or corroded, eg showing signs of pitting or a noticeable decrease in the pipe's outside diameter)

Table 5-1-1. Trailer brake requirements

Type of brake required	Laden weight of the trailer		
	2000 kg or less	2001-2500 kg	2501 kg or more
Service brake	Not required but, if fitted, must act on each wheel of at least one axle	Required; either direct or indirect service brake must act on each wheel of at least one axle	Required; direct service brake must act on each wheel of at least one axle
Parking brake	Not required	Not required	Required; must act on at least one complete axle
Breakaway brake (Notes 1 and 4)	Required unless fitted with an appropriate coupling and safety chain	Required, unless fitted with an appropriate coupling and two safety chains	Required

Brakes

5-1 Service brake, parking brake, emergency brake and breakaway brake (cont.)

Performance

6. The service brake must be able to be applied in a controlled and progressive manner.
7. When a vehicle's brake is applied:
 - a) the vehicle or its controls must not vibrate to the extent that control of the vehicle is adversely affected, and
 - b) the braking effort on each wheel must provide stable and efficient braking without adverse effect on the directional control of the vehicle, and
 - c) if the vehicle is equipped with an anti-lock braking system (ABS), the wheels must not lock, other than when the speed of the vehicle falls below the ABS activation parameters set by the vehicle manufacturer.
8. The trailer's and towing vehicle's service brakes must together stop the vehicle combination within a distance of 7 m from a speed of 30 km/h without damage to, or permanent deformation of, either the coupling system or the structure of either vehicle, and without assistance from the compression of the towing vehicle's engine or other retarders.
9. A trailer parking brake must stop the trailer within a distance of 18 m from a speed of 30 km/h, or hold the trailer at rest on a slope of 1 in 5.
10. A breakaway brake must automatically and immediately apply when the trailer unintentionally disconnects from the towing vehicle, and must remain applied for at least 15 minutes.

Reasons for rejection

6. The brake vacuum servo (brake booster) is:
 - a) not functioning fully or adequately, or
 - b) leaking, or
 - c) insecure.
7. The brake master cylinder is:
 - a) leaking brake fluid, or
 - b) insecure, or
 - c) excessively corroded.
8. A brake valve is:
 - a) not operating (eg has a seized load sensing valve), or
 - b) leaking brake fluid, or
 - c) insecure, or
 - d) excessively corroded.
9. A brake pipe (including connections) is:
 - a) leaking brake fluid, or
 - b) insecure, or
 - c) deformed from its original shape, or
 - d) chafed, or
 - e) corrosion damaged, eg there are signs of pitting or a noticeable increase in the pipe's outside diameter.
10. A flexible hydraulic brake hose (including connections):
 - a) is leaking brake fluid, or
 - b) is insecure, or
 - c) bulges under pressure, or
 - d) is twisted, stretched or chafed, or
 - e) external sheathing is cracked to the extent that the reinforcing cords are exposed, or
 - f) has metal connections that are excessively corroded, or
 - g) has an end fitting that is not attached to the hose by means of swaging, machine crimping or a similar process (**Note 2**).

Reasons for rejection

11. The service brake cable:
 - a) is knotted, frayed or excessively corroded, or
 - b) has an auxiliary tensioner fitted, or
 - c) has otherwise deteriorated so that it may affect the parking brake performance.
12. A service brake actuating rod or guide:
 - a) is excessively corroded, or
 - b) is excessively worn, or
 - c) has otherwise deteriorated so that it may affect the parking brake performance.
13. A brake calliper:
 - a) shows visible signs of leaking, or
 - b) is insecure, or
 - c) is seized.
14. A brake backing plate is:
 - a) insecure, or
 - b) severely corroded, or
 - c) deformed from its original shape, or
 - d) cracked, or
 - e) contaminated by brake fluid, oil or grease.
15. A wheel cylinder:
 - a) shows visible signs of leaking, or
 - b) is insecure, or
 - c) is seized.
16. An ABS system component is damaged, insecure or missing.
17. A brake disc or drum is:
 - a) worn beyond manufacturer's specifications (where visible without removing vehicle components) (**Note 3**), or
 - b) fractured or otherwise damaged (where visible without removing vehicle components) (**Note 3**), or
 - c) contaminated by brake fluid, oil or grease.

Brakes

5-1 Service brake, parking brake, emergency brake and breakaway brake (cont.)

Reasons for rejection

18. A brake friction material (where visible without removing vehicle components) (**Note 3**) is:
- a) worn below manufacturer's specifications, or
 - b) is separating from the brake pad backing plate or brake shoe, or
 - c) is contaminated by brake fluid, oil or grease.
19. A service brake component shows signs of heating or welding after original manufacture.

Parking brake

20. The parking brake lever:
- a) travels excessively, or
 - b) is insecure, or
 - c) mounting is damaged, corroded, distorted or fractured within 150 mm of the lever mounting, or
 - d) mechanism or lever pivot bearing is worn or damaged so that the parking brake could be easily released by accident.
21. The parking brake cable:
- a) is knotted, frayed or excessively corroded, or
 - b) has an auxiliary tensioner fitted, or
 - c) has otherwise deteriorated so that it may affect the parking brake performance.
22. A parking brake actuating rod or guide:
- a) is excessively corroded, or
 - b) is excessively worn, or
 - c) has otherwise deteriorated so that it may affect the parking brake performance.
23. A parking brake component shows signs of heating or welding after original manufacture.

Performance

Service brake

24. The service brake is not able to be applied in a controlled and progressive manner.

Reasons for rejection

25. When the service brake is applied and without assistance from the towing vehicle's engine:
- a) the combined effort of the trailer and towing vehicle brakes does not stop the vehicle combination within 7 m from a speed of 30 km/h (average brake efficiency of 50%), or
 - b) the vehicle vibrates under braking to the extent that control of the vehicle is adversely affected, or
 - c) (direct trailer brake) the brake fails to release immediately after the towing vehicle's brakes are released, or
 - d) (indirect trailer brake) the brake fails to release when the towing vehicle stops decelerating, or the directional control is affected, eg swerving to one side, or the brakes on one side apply more slowly than on the other side, or
 - e) the brake balance, during the entire brake application, varies by more than 20% between wheels on a common axle.
26. The ABS or brake system warning lamp or self-check system, if fitted, indicates a defect in the ABS or brake system (this does not apply to brake pad wear warning systems).

Parking brake

27. When the park brake is applied:
- a) the vehicle does not stop within 18 m from a speed of 30 km/h (average brake efficiency of 20%), or
 - b) it does not hold the vehicle at rest on a slope of 1 in 5, or
 - c) it does not hold all the wheels on a common axle stationary against attempts to drive the vehicle away.

Breakaway brake

28. The breakaway brake does not automatically and immediately apply when the trailer is disconnected from the towing vehicle (**Note 4**).

Brakes

5-1 Service brake, parking brake, emergency brake and breakaway brake (cont.)

Note 1 **Agricultural trailer** means a trailer that is used exclusively for agricultural or land management purposes, and that is operated on the road only for the following purposes:

- a) during delivery from a manufacturer to the manufacturer's representative, or
- b) while being delivered to or from an agricultural show for display or demonstration purposes, or
- c) while being taken to or from a farm, or from one part of a farm to another part of that farm.

Axle means a transverse shaft or housing on which a vehicle's wheels are mounted.

Brake friction material means a brake component having a friction surface that is designed to be preferentially sacrificed.

Breakaway brake means a service brake or parking brake fitted to a trailer that ensures, under all conditions of use, that, if the trailer is unintentionally disconnected from its towing vehicle, the brake will automatically and immediately apply and will remain applied for at least 15 minutes.

Corrosion damage is where the metal has been eaten away, which is evident by pitting. The outward signs of such corrosion damage is typically displayed by the lifting or bubbling of paint. In extreme cases, the area affected by the corrosion damage will fall out and leave a hole.

Direct trailer service brake means a service brake fitted to a trailer that allows the driver of a towing vehicle, by operating the service brake of the towing vehicle, to directly and progressively regulate the trailer brake effort.

Engine brake is a modification to a diesel engine used to increase the retardation force provided by the engine on deceleration.

Friction surface means any surface of a brake component that is designed to convert kinetic energy to heat.

Indirect trailer service brake means a service brake fitted to a trailer where the action of the driver of a towing vehicle applying the brakes of that vehicle results in a reaction by the trailer that is used to progressively regulate the trailer brake effort.

Laden weight means the weight of the vehicle and its load for the time being carried.

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.

Parking brake means a brake readily applicable and capable of remaining applied for an indefinite period without further attention.

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.

Service brake means a brake for intermittent use that is normally used to slow down and stop a vehicle.

Note 2 Hose end fittings that can be undone using hand tools are unacceptable.

Note 3 If a brake is fitted with an inspection port plug, this must be removed for inspection of the brake components.

Note 4 A breakaway brake on a trailer with a laden weight of 2500 kg or less is not required to be functional provided the trailer is fitted with one or two safety chains as required in **Table 5-1-1**. However, if a trailer **does** have a functional brakeaway brake, then it **must not** be fitted with safety chains.

Brakes

5-1 Service brake, parking brake, emergency brake and breakaway brake

Summary of legislation

Applicable legislation

- Land Transport Rule: Heavy-vehicle Brakes 2006

Mandatory equipment

Service brake

1. A heavy trailer must have a service brake that acts on each wheel, except for a vehicle first registered in New Zealand **before 1 November 1990** which may have a service brake that is designed to act on those wheels as determined by the vehicle manufacturer.

Parking brake

2. A heavy trailer, other than a semi-trailer first registered **before 1 November 1990**, must have a parking brake.
3. A parking brake of a heavy trailer first registered in New Zealand **on or after 1 November 1990** must act on at least 40% of the wheels.
4. The parking brake of a heavy trailer must be able to be applied by the driver from the normal driving position using one control only, except for a class TC trailer which may have the parking control fitted to the vehicle if:
 - a) the vehicle is part of a dedicated combination and does not have an air brake or a brake that is operated with the assistance of compressed air, and
 - b) the vehicle is fitted with a device that can be operated by the driver of the towing vehicle from the driver's normal driving position to keep the trailer stationary temporarily, and
 - c) the parking control of the trailer is fitted in a readily accessible position, and
 - d) the operating control of the device in (b) fitted to the towing vehicle has a label permanently attached displaying the words 'NOT FOR PARKING'.

Emergency brake

5. A heavy trailer, other than a semi-trailer first registered **before 1 November 1990**, must have an emergency brake.
6. The emergency brake of a heavy trailer first registered in New Zealand **on or after 1 November 1990** must act on at least one-third of the wheels.
7. The emergency brake may be combined with the parking brake or the service brake.
8. The emergency brake of a heavy trailer must operate immediately and automatically to stop and hold the trailer stationary if it becomes disconnected from the towing vehicle.

Hoses and other flexible tubing

9. A hose or other flexible tubing forming part of the compressed air or vacuum lines of a heavy trailer must comply with one or more of the approved vehicle standards in **Table 5-1-2**.

Reasons for rejection

Mandatory requirements

Service brake

1. A heavy trailer does not have a service brake.
2. A heavy trailer first registered in New Zealand **on or after 1 November 1990** does not have a service brake that is designed to act on each wheel.

Parking brake

3. A heavy trailer, other than a semi-trailer first registered before 1 November 1990, does not have a parking brake.
4. A parking brake of a vehicle first registered in New Zealand **on or after 1 November 1990** acts on less than 40% of the wheels.
5. A required parking brake of a heavy trailer cannot be applied by the driver from the normal driving position using one control only (ie there is a separate control on the trailer such as a mechanical wind-on parking brake) (see **Note 2** for non-air braked class TC trailers)

Emergency brake

6. A heavy trailer, other than a semi-trailer first registered **before 1 November 1990**, does not have an emergency brake.
7. A required emergency brake does not act on at least one-third of the wheels.
8. A required emergency brake fails to automatically apply when the brake coupling is separated.

Hoses and other flexible tubing

11. A hose or other flexible tubing forming part of a compressed air or vacuum line does not comply with at least one of the standards in **Table 5-1-2 (Note 3)**.

Compressed air brake systems

12. The air brake of a vehicle first registered in New Zealand **on or after 1 March 2007** that has a towing connection to tow an air braked trailer (or a tow connection fitted **on or after 1 March 2007**) is not capable of being connected to the air brake of the trailer by means of a two-line system.

Brakes

5-1 Service brake, parking brake, emergency brake and breakaway brake (cont.)

Compressed air brake systems

10. A heavy trailer that is fitted with an air brake or a brake that is operated with the use of compressed air must be equipped with air receivers or other means of storing compressed air.
11. The air brake of a vehicle first registered in New Zealand **on or after 1 March 2007** or modified on or after that date that can be operated in a combination vehicle must be capable of being connected to the air brake of the other vehicle by means of a two-line system.
12. A two-line system must consist of:
 - a) a supply line that supplies compressed air from the towing to the towed vehicle; and
 - b) a control line that supplies a control signal, in the form of modulated air pressure, to regulate the intensity of the brake application on the towed vehicle or vehicles.
13. For vehicles other than those towing semi-trailers, the hoses are to be treated as part of the trailer and must be securely attached to the drawbar.
14. A vehicle that is certified to the New Zealand Heavy-vehicle Brake Specification (HVBNZ) must:
 - a) have a drain valve fitted to the lowest point of each brake reservoir, specifically, the reservoirs of the service brake and park brake, and including the so-called 'wet tank', and
 - b) a drain valve fitted to an air-brake reservoir or to the reservoir of auxiliary equipment must be capable of being operated by a person standing beside the vehicle, without the need for a pit or hoist, and
 - c) an automatic drain valve must have a means of manual operation.

Permitted equipment

15. An air-operated device may be connected to the air brake only if:
 - a) the brake is protected so that the operation or failure of the device cannot lower the pressure in any service or parking brake reservoir(s) below the pressure specified by the vehicle manufacturer or brake manufacturer, or, if such information is not available, two-thirds of its maximum operational pressure specified by the vehicle manufacturer or brake manufacturer, and
 - b) the supply to the device is drawn from a reservoir separate from the service brake or parking brake reservoir(s) supplying the brake, except that an air-operated device may be supplied with compressed air from the service brake or parking brake reservoir(s) if:
 - i. the operation of the device requires only a small amount of compressed air and it is supplied with compressed air by a hose or pipe with an external diameter not exceeding 8 mm, or
 - ii. the device is operated only when the vehicle is stationary, or
 - iii. the vehicle manufacturer allows it.

Reasons for rejection

13. A required two-line system connecting a heavy vehicle to a heavy trailer, other than a semi-trailer, is not attached to the drawbar by a means that would prevent damage to the hoses or flexible tubing.
14. A vehicle that is certified to the New Zealand Heavy-vehicle Brake Specification (HVBNZ) does not have:
 - a) a drain valve fitted to the lowest point of each brake reservoir, specifically, the reservoirs of the service brake and park brake, and including the so-called 'wet tank', or
 - b) a drain valve fitted to an air-brake reservoir or to the reservoir of auxiliary equipment is not capable of being operated by a person standing beside the vehicle, without the need for a pit or hoist, or
 - c) an automatic drain valve does not have a means of manual operation.

Note Operation of drain valves must not require the use of tools.

Permitted equipment

15. An air-operated device is supplied air from a service brake reservoir (ie not from a separate reservoir) unless:
 - a) the operation of the device requires only a small amount of compressed air and it is supplied with compressed air by a hose or pipe with an external diameter not exceeding 8 mm, or
 - b) the device is operated only when the vehicle is stationary, or
 - c) the vehicle manufacturer allows it.
16. An air-operated device is connected to the air brake system without a protection valve.
17. A trailer-brake hand control applies brakes other than the service brakes of the trailer(s).

Prohibited equipment

18. A heavy trailer, other than a heavy haulage trailer or military trailer, has a device fitted that allows the driver to adjust the service brake force distribution between the axles or between the vehicles that are used in combination.

16. A heavy trailer may be fitted with brakes when they are not required.

Prohibited equipment

17. A heavy trailer, other than a heavy haulage trailer or military trailer, must not have a device fitted by which the driver would be able to adjust the service brake force distribution between the axles or between the vehicles that are used in combination.

Condition

18. A brake must be easily adjustable to compensate for wear or have a means of automatic adjustment and be in good condition.
19. The brake friction material of a brake must be:
- secure, and
 - in good condition, and
 - free of defects that could noticeably and adversely affect the performance of the brake.
20. When a brake lining or a brake pad on an axle is replaced:
- all the brake linings or brake pads on that axle must be replaced, and
 - all replacement brake linings and brake pads on that axle must be of the same make, type and grade.
21. A towing vehicle and a towed vehicle first registered in New Zealand **on or after 1 March 2007** or modified on or after that date must be fitted with a coupling device to connect the air brake to, and disconnect it from, that of the other vehicle, and that device must:
- be robust, durable, and suitable for automotive application, and
 - prevent, either through the design of the coupling device or through its installation, the incorrect connection of the control and supply lines, and
 - not adversely affect the performance of the brake of either the towing or towed vehicle(s), and
 - have an effective break-away function.
22. The socket of a coupling device must be fitted as close as practicable to:
- the centre-line of the vehicle, and
 - the rear of the towing vehicle, and
 - the towing connection by which the towed and towing vehicles are connected, and
 - the front of a semi-trailer.

Performance

23. A brake test that verifies that a vehicle complies with performance requirements must be carried out, and the test results evaluated, in accordance with methods and conditions approved by the NZTA by notice in the *New Zealand gazette*.

Reasons for rejection

Condition

19. Refer to General vehicle pages.
20. A brake is not capable of being easily adjusted.
21. An adjustment indicator rod is:
- missing, or
 - seized.
22. A brake component has excessive travel or stroke (eg as shown by an adjustment indicator rod or similar device).
23. A brake actuator (including a slack adjuster and associated components):
- is insecure, or
 - is leaking air, or
 - is cracked, or
 - does not operate, or
 - is excessively worn or corroded, or
 - is not seated correctly.
24. A brake valve or reservoir:
- is missing, or
 - is insecure, or
 - is cracked, or
 - is leaking air, or
 - does not operate or operates incorrectly (eg due to corrosion, damage, incorrect fitment or excessive travel), or
 - contains excessive amounts of foreign fluids (eg water or oil).
25. A brake lining or brake pad:
- has obviously been replaced **on or after 1 March 2007** without all the linings or pads on the axle being replaced at the same time, or
 - is obviously of a different make, type or grade from another on the same axle.
26. An air brake coupling device fitted to a heavy vehicle first registered in New Zealand **on or after**

Brakes

5-1 Service brake, parking brake, emergency brake and breakaway brake (cont.)

24. The service brake on a heavy vehicle must be able to be applied in a controlled and progressive manner.
25. Every brake which simultaneously applies the braking pressure on two wheels with a common axis must be adjusted or fitted so that the braking effect is approximately the same on both wheels when the brake is applied by the driver, except if the braking effect is modulated by a device to prevent the wheels locking or to improve stability (eg ABS or EBS).
26. When the brake on a heavy vehicle is applied:
- the vehicle or its controls must not vibrate to the extent that control of the vehicle is adversely affected, and
 - the braking effort on each wheel must provide stable and efficient braking without adverse effect on the directional control of the vehicle, and
 - if the vehicle is equipped with an anti-lock braking system (ABS), the vehicle's rotationally-sensed wheels must not lock, when the speed of the vehicle is above the ABS-activation parameters set by the vehicle manufacturer.
27. A brake warning system, if fitted, must function correctly (this does not apply to a brake pad wear system).

Service brake

28. The service brake of a vehicle or vehicle combination that is operated on a hard, dry, level surface that is free of loose material, and without assistance from the compression of the engine or other retarders must operate in the following manner:
- A service brake that is designed to act on four or more wheels must stop the vehicle within a distance of 7 m from a speed of 30 km/h (average brake efficiency of 50%).
 - A service brake that is designed to act on fewer than four wheels on a vehicle first registered in New Zealand **before 1 February 1977** must stop the vehicle within a distance of 9 m from a speed of 30 km/h (average brake efficiency of 40%).
 - A service brake on a heavy vehicle manufactured **before 31 December 1918** not capable of exceeding a speed of 30 km/h must stop the vehicle within a distance of 20 m from a speed of 30 km/h (average brake efficiency 18%) or equivalent brake efficiency at its maximum speed.

Parking brake

29. A parking brake of a vehicle or vehicle combination that is operated on a hard, dry, level surface that is free of loose material, and without assistance from the compression of the engine or other retarders must operate in the following manner:
- stop the vehicle within 18 m from a speed of 30 km/h (average brake efficiency of 20%)

Compressed air brake systems

30. An air brake must have priority of supply of compressed air from the brake reservoir.

Reasons for rejection

1 March 2007 or fitted to a vehicle on or after that date:

- is not robust, durable, or suitable for automotive application, or
 - is unable to prevent the incorrect connection of the control and supply lines, or
 - adversely affects the performance of the brake of either the towing or towed vehicle(s), or
 - does not have an effective break-away function, or
 - the coupling is not fitted as close as practicable to:
 - the centre-line of the vehicle, or
 - the rear of the towing vehicle, or
 - the towing connection by which the towed and towing vehicles are connected, or
 - the front if the vehicle is a semi-trailer.
27. A brake pipe (including connections) is:
- leaking, or
 - insecure, or
 - deformed from its original shape, or
 - chafed, or
 - corrosion damaged, eg there are signs of pitting or a noticeable increase in the pipe's diameter, or
 - damaged so the cross-sectional area is reduced, or
 - fouled by moving parts
28. A hose or plastic brake pipe (including connections):
- is leaking, or
 - is insecure, or
 - bulges under pressure, or
 - is twisted or stretched, or
 - is cracked or chafed, eg the reinforcement cords are exposed, or
 - has metal components that are excessively corroded, or
 - is fouled by moving parts

31. A vehicle that is certified to the New Zealand Heavy-vehicle Brake Specification (HVBNZ) and fitted with a spring-operated parking brake that is normally released by compressed air, the simultaneous application of the service brake and parking brake must not result in a compounded brake force on the axle or axles on which the parking brake acts. This may be referred to as an 'anti-compounding' requirement.

Modification and certification

32. The brakes fitted to a heavy trailer must comply with the certification requirements in **Table 5-1-3**.
33. A modification that may affect the brake system must be inspected and certified by a heavy vehicle specialist certifier of category HVEK, HVMK or HVIK, unless the vehicle:
- Is exempted from the requirement for heavy vehicle specialist certification (**Table 5-1-4**), and
 - Has been inspected in accordance with the requirements in this manual, including those for equipment, condition and performance.

Reasons for rejection

29. A coiled nylon brake hose (suzie coil) does not have:

- a straight hose section at the connector that is at least 50 mm long, or
- a spring guard adjacent to the end fittings capable of supporting and protecting the brake hose.

Note While spring guards can vary in design and length they must remain in good condition, ie not have broken or looped coils.

30. A full-trailer that uses a coiled nylon brake hose (suzie coil):

- does not have a cable of sufficient strength to disconnect/disengage the brake supply and control hoses from the towing vehicle, or
- the cable length will allow separation of the trailer towing coupling by more than 400 mm before it disconnects/disengages the brake hoses to activate the emergency braking, or
- the suzie coiled hose is not suitably attached to the trailer drawbar so that it cannot be damaged by dragging on the road surface or pinched by any vehicle components.

Performance

Service brake (Note: 4)

31. The service brake is not able to be applied in a controlled and progressive manner.
32. When the service brake is applied and without assistance from the engine or other retarders:
- the vehicle does not stop within 7 m from a speed of 30 km/h (average brake efficiency of 50%) for a vehicle which has a service brake designed to act on at least four wheels, or
 - the vehicle does not stop within 9 m from a speed of 30 km/h (average brake efficiency of 40%) for a vehicle first registered in New Zealand **before 1 February 1977** which has a service brake designed to act on fewer than four wheels, or
 - the vehicle does not stop within 20 m from a speed

Brakes

5-1 Service brake, parking brake, emergency brake and breakaway brake (cont.)

Reasons for rejection

of 30 km/h (average braking efficiency of 18%) or equivalent efficiency at its maximum speed for a vehicle manufactured **before 31 December 1918** and not capable of exceeding a speed of 30 km/h.

33. When the service brake is applied:

- a) the vehicle vibrates under braking to the extent that control of the vehicle is adversely affected, or
- b) the brake fails to release immediately after the towing vehicle's brakes are released, or
- c) the directional control is affected (eg swerving to one side, or the brakes on one side apply more slowly than on the other side), or
- d) the brake balance, at anytime above the threshold value, varies by more than 30% between wheels on a common axle.

34. The ABS or brake system warning lamp or self-check system, if fitted, indicates a defect in the ABS or brake system (this does not apply to brake pad wear warning systems).

Parking brake (Note: 4)

35. When the parking brake is applied:

- a) the vehicle does not stop within 18 m from a speed of 30 km/h (average brake efficiency of 20%), or
- b) it does not hold all the wheels on a common axle stationary against attempts to drive the vehicle away.

Compressed air brake systems

36. A required drain valve cannot be operated manually.

Note Operation of drain valves must not require the use of tools.

37. On a vehicle that is certified to the New Zealand Heavy-vehicle Brake Specification (HVBNZ) the simultaneous application of the service brake and the spring parking brake results in the compounding of the two individual brake forces on that axle.

Reasons for rejection

Modification and certification.

38. A vehicle in **Table 5-1-3**:

- a) has not been certified as required by that table, or
- b) has been modified so that recertification is required.

39. A modification that affects the brake system has not been inspected and certified by a heavy vehicle specialist certifier, unless the vehicle:

- a) is excepted from the requirement for heavy vehicle specialist certification (**Table 5-1-4**), and
- b) has been inspected in accordance with the requirements in this manual, including those for equipment, condition and performance.

Table 5-1-2. Approved vehicle standards for brake hoses and flexible tubing¹

All vehicles
SAE J844: Nonmetallic Air Brake System Tubing
SAE J1394: Metric Nonmetallic Air Brake System Tubing
SAE J1402: Automotive Air Brake Hose and Hose Assemblies
SAE J1403: Vacuum Brake Hose (supersedes SAE 40 R3)
British Standard AU 110: 1965, Specification for rubber hoses and hose assemblies for automotive air pressure brakes systems (withdrawn, revised)
British Standard AU 109: 1965, Specification for vacuum brake hose (heavy duty) of oil-resistant rubber (withdrawn)
Japan Industrial Standard D2606-80: Rubber hose for automotive air brake system
DIN 74324-1: 1996, Air braking systems - Thermoplastic tubing - Requirements and tests
DIN 73378: 1996, Polyamide tubing for motor vehicles
Federal Motor Vehicle Safety Standard No. 106: Brake hoses
SAE 40 R2 (A-E)
SAE 70 R3H
SAE 40 R3 L
SAE 40 R3 H
SAE R3 M
Nylon tubing of approved makes: Anson Plastics, Nylex, TWL

¹ Hoses and tubing may comply with a more recent version of these standards if the safety performance of the vehicle is not adversely affected.

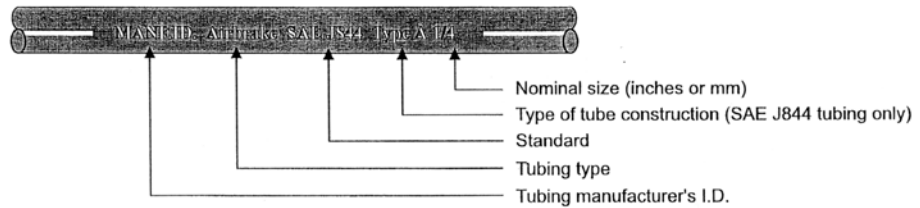
Brakes

5-1 Service brake, parking brake, emergency brake and breakaway brake (cont.)

SAE

APPROVED STANDARDS: AIR BRAKE - SAE 40 R2 (A to E) Note: this standard was replaced by SAE J 1402 in 1985.
 SAE 70 R3H
 SAE J844
 SAE J1402
 VACUUM - SAE 40 R3 L (light duty)
 SAE 40 R3 H (heavy duty)
 SAE R3 M (heavy duty, oil resistant)
 SAE J1403

PIPE MARKING:



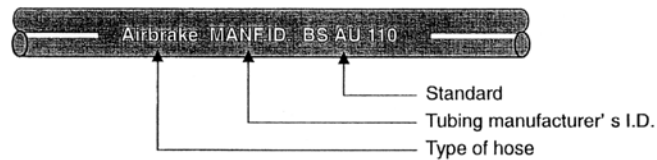
NOTES:

- SAE J844 tubing must not be used;
 - for flexible connections, except as specifically approved
 - for compressor discharge pipes,
 - above 93°C, or
 - in any any area subject to attack by acid.
- SAE J844 Type A tubing - has a single layer of nylon.
 SAE J844 Type B tubing - has two layers of nylon with an interlayer of braid.

SMMT (Society of Motor Manufacturer's and Traders) British Standards

APPROVED STANDARDS: AIR BRAKE - BS AU 110
 VACUUM - BS VSAU 109

PIPE MARKING:



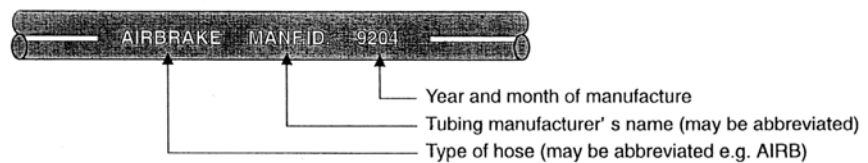
NOTES:

Marking colour	Hose type	
Red	1 & 2	For use between compressor and reservoir. Max temperature 135°C.
White	3 & 4	Synthetic rubber hose for use in other parts of brake system.
Blue	5 & 6	Natural rubber hose for use in other parts of brake system.

Japanese Industrial Standards

APPROVED STANDARD: AIR BRAKE - JIS D2606
 VACUUM -

PIPE MARKING:

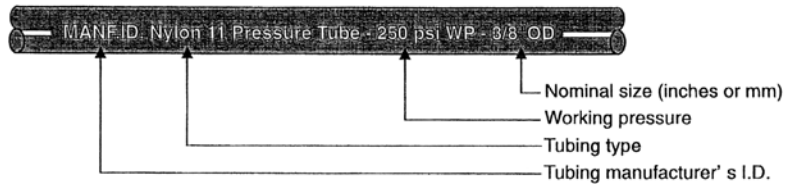


Brake hoses and flexible tubing information. Refer Table 5-1-2.

Nylon 11

APPROVED MAKES: AIR BRAKE - Anson Plastics
Nylex
TWL

PIPE MARKING:

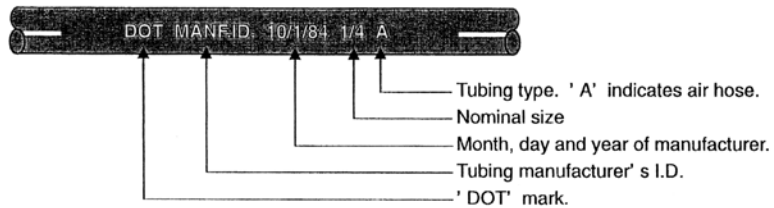


- NOTES:
- Nylon 11 tubing may only be used in fail-safe applications such that:
 - its failure does not prevent the application of the brakes by the driver, or
 - its failure will cause the brakes to apply.

DOT (Department of Transportation, USA)

APPROVED STANDARDS: AIR BRAKE - FVMSS 106

PIPE MARKING:



- NOTES:
- All lettering must be in capitals.
 - The nominal size may be shown in fractions of an inch or millimetres:
 - if the size is shown in millimetres then the abbreviation 'mm' must follow.
 - if the nominal outside diameter is shown it must be followed by 'OD'.

Brake hoses and flexible tubing information. Refer Table 5-1-2.

Brakes

5-1 Service brake, parking brake, emergency brake and breakaway brake (cont.)

Table 5-1-3. Heavy vehicle brakes: certification requirements for class TC and TD vehicles

Conditions applying	Requirements
Operated in a combination with a GM ¹ >39 ≤44 t, and <ul style="list-style-type: none"> first registered in New Zealand before 1 March 2007, and not modified on or after 1 March 2007 (includes vehicles modified before 1 March 2007) 	Existing applicable certification: <ul style="list-style-type: none"> IHVBS(1) Interim Performance Specification for Heavy Vehicle Braking IHVBS(2) Heavy vehicle braking specification of 6 December 1998 HVBC(1) Heavy Vehicle Brake Code, First Edition 1991 HVBC(2) Heavy vehicle brake code, second edition
Operated in a combination with a GM ¹ >39 ≤44 t, and <ul style="list-style-type: none"> first registered or modified² in NZ 1 March 2007-30 June 2008 	Applicable certification: <ul style="list-style-type: none"> IHVBS(2) Heavy vehicle braking specification of 6 December 1998, or HVBC(2) Heavy vehicle brake code, second edition, or HVBNZ New Zealand heavy vehicle brake specification
Modified ² in NZ 1 March 2007-30 June 2008	Heavy vehicle specialist certification
First registered or modified ² on or after 1 July 2008	Applicable certification: <ul style="list-style-type: none"> HVBNZ New Zealand heavy vehicle brake specification

¹ **GM** means gross mass (see definitions in the Introduction)

² **Modified** in this case means to change the vehicle or its braking system from its original state by altering, substituting, adding or removing any structure, system, component or equipment that may affect the brakes and includes, but is not limited to:

- altering a vehicle's wheelbase outside the range specified by the vehicle manufacturer, or if no range is specified, altering the wheelbase by more than 500 mm
- fitting a tow connection to tow a heavy vehicle

Table 5-1-4. Modifications that do not require HVS certification

Fitting of or modification to:	HVS certification is not required provided that:
Air fittings (e.g. a connector, T-piece or an air reservoir drain valve)	<ul style="list-style-type: none"> the air fitting: <ul style="list-style-type: none"> does not affect the performance of the braking system, and is suitable for the intended purpose, and is unmodified (ie not welded, drilled or tapped), and installed correctly to unmodified components.
Vehicle's wheelbase	<ul style="list-style-type: none"> the altered wheelbase is not outside the range specified by the vehicle manufacturer, or if no range is specified, is not altered by more than 500 mm.
Any modifications for the purposes of law enforcement or the provision of emergency services	

Note 1 Definitions

Air brake means a brake, the operation of which requires the use of compressed air.

Anti-lock braking system (ABS) means a device that senses that one or more of the wheels is starting to lock-up during braking and regulates the braking forces automatically and effectively to prevent it.

Auxiliary brake means a device, other than a service brake or parking brake, fitted to a vehicle to enable the driver to control its speed, whether or not it is suitable to stop the vehicle.

Dedicated combination means a combination of vehicles certified for use in combination where both vehicles are affixed with a plate clearly and indelibly marked with the VIN or chassis number of the other vehicle.

Emergency brake in relation to any vehicle, or combination of vehicles, means the system that makes it possible to undertake a controlled stop of the vehicle or combination in the event of the failure of the service brake. (Emergency brakes must act as directly as practicable without any interposition of any differential gearing.)

Foundation brake means the basic brake assembly fitted to each axle or road wheel which produces the braking force necessary to bring a vehicle to a stop; and includes the complete drum or disc brake.

Hydraulic brake means a brake that utilises hydraulic pressure to activate the foundation brake, whether its operation is assisted by compressed air, vacuum or any other means.

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

Parking brake means a brake that is designed for keeping the vehicle stationary, and that is readily applicable and capable of remaining applied for an indefinite period without further attention. (Hydraulic locking devices are not acceptable as parking brakes. The parking brake must be applied by solely mechanical means.)

Repair means to restore a damaged or worn vehicle, its structure, systems, components or equipment; and includes the replacement of damaged or worn structures, systems, components or equipment with equivalent undamaged or new structures, systems, components or equipment.

Reservoir for the purpose of the Heavy-vehicle Brakes Rule, means a device designed and constructed to store fluid, compressed air, compressed gas, or vacuum; and does not include pipes, valves, hoses, or booster cylinders operated by vacuum or compressed air.

Service brake means a brake for intermittent use that is designed for the purpose of slowing down and stopping the vehicle.

Trailer brake hand control means a hand-operated control capable of applying the service brake of the trailer or trailers.

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, which may be manufactured as one part, or permanently attached to each other, or detachable from each other; and includes the tyre fitted to the rim.

Note 2 The requirement for a parking brake of a heavy trailer to be applied by the driver from the normal driving position using one control only does not apply to a class TC trailer which has the parking control fitted to the trailer provided:

- a) it is part of a dedicated combination, and
- b) it does not have an air brake or a brake that is operated with the assistance of compressed air, and
- c) it is fitted with a device that can be operated by the driver of the towing vehicle from the driver's normal driving position to keep the trailer stationary temporarily, and
- d) the parking control of the trailer is fitted in a readily accessible position, and
- e) the operating control of the device in c. above fitted to the towing vehicle has a label permanently attached displaying the words 'NOT FOR PARKING'.

Note 3 For in-service inspections standards compliance must be verified when there is reason to believe a hose or flexible tubing does not comply or when it forms part of a brake modification or repair.

Note 4 For the purpose of testing the brakes, the vehicle shall be presented with a load at least 60 per cent of the road legal limit, or be subject to equivalent load simulation (refer to *CoF and entry certification brake test protocol and procedure* for specific requirements at www.ltsa.govt.nz/commercial/hvbr/protocol-and-procedures/index.html)

Brakes

5-2 Heavy trailer brake code

Summary of legislation

Applicable legislation

- Land Transport Rule: Heavy-vehicle Brakes 2006, including:
- Heavy Vehicle Brake Code, first edition (1991)
- Heavy Vehicle Brake Code, second edition (June 1997)

Mandatory requirements

1. A vehicle that has been certified to the Heavy Vehicle Brake Code (first edition) **prior to 31/8/1997** must have a label affixed to the vehicle, adjacent to the vehicle manufacturer's identification plate stating that the vehicle complies with "NZHVBC, dated 1991".
2. A vehicle that has been certified to the Heavy Vehicle Brake Code (second edition) **on or after 31 August 1997** and **before 1 July 2008** must have a label of permanent material affixed to the vehicle, as close as practicable to the vehicle manufacturer's identification plate. The label must include the words "NZHVBC Edition No. 2".

Mandatory equipment

Service brake

3. Refer to Refer to Heavy trailers, section 5-1.

Parking brake

4. A heavy trailer, other than a semi-trailer first registered in New Zealand **before 1 November 1990**, must have a parking brake.
5. A heavy trailer that was first registered in New Zealand **on or after 1 November 1990** must have a parking brake that acts on at least half of the wheels. (Note: spring brakes are the preferred type of park brake.)
6. A parking brake must be able to be applied by the driver from the normal driving position.
7. A parking brake must be able to be released by means of an auxiliary parking brake release control (the so called 'yard valve') after the trailer has been uncoupled.

Emergency brake

8. The heavy trailer, other than a semi-trailer first registered in New Zealand **before 1 November 1990**, must have an emergency brake.
9. A heavy trailer that was first registered in New Zealand **on or after 1 November 1990** must have an emergency brake that acts on at least half of the wheels.
10. The emergency brake may be combined with the parking brake or the service brake.
11. The emergency brake must operate automatically to stop and hold the trailer stationary if it becomes disconnected from the towing vehicle during operation.

Hoses or other flexible tubing

12. Refer to Heavy trailers, section 5-1.

Reasons for rejection

Mandatory requirements

1. A vehicle that has been certified to the Heavy Vehicle Brake Code does not have a label stating that the vehicle complies with either NZHVBC first or second edition.
2. An NZHVBC label:
 - a) is missing, or
 - b) is not valid, or
 - c) does not match the vehicle, or
 - d) has obvious signs of tampering, or
 - e) is not affixed as close as practicable to the vehicle manufacturer's identification plate.

Mandatory equipment

Service brake

3. Refer to Heavy trailers, section 5-1.

Parking brake

4. A heavy trailer, other than a semi-trailer first registered in New Zealand **before 1 November 1990**, does not have a parking brake.
5. A parking brake on a heavy trailer first registered in New Zealand **on or after 1 November 1990** does not act on at least half of the wheels.

Emergency brake

6. A heavy trailer, other than a semi-trailer first registered in New Zealand **before 1 November 1990**, does not have an emergency brake.
7. A required emergency brake on a heavy trailer first registered in New Zealand **on or after 1 November 1990** does not act on at least half of the wheels.

Hoses or other flexible tubing

8. Refer to Heavy trailers, section 5-1.

Compressed air brake systems

9. Refer to Heavy trailers, section 5-1.
10. Air connections between all towing vehicles and trailers are not of the two line system using a one piece

Brakes**5-2 Heavy trailer brake code (cont.)****Compressed air brake systems**

13. Refer to Heavy trailers, section 5-1.
14. Air connections between all towing vehicles and trailers must be of the two line system using a one piece coupling, eg a duomatic coupling, or when an auxiliary air supply (separate from the braking system) is required for a trailer, a Triomatic coupling .
15. The coupling housing (eg duomatic or triomatic) must be situated close to the centre line, preferably to the right hand side (ie driver's side) of centre.
16. The control (service) and supply (emergency) air lines must be installed so that when facing the cover of the female section of the coupling housing:
 - a) the control (service) line must be on the left side of the housing, and coloured blue or black within 150 mm of the coupling or junction, and
 - b) the supply (emergency) line must be on the right side of the housing, and coloured red or yellow within 150 mm of the coupling or junction.
17. Each reservoir in an air brake system must be fitted with a condensate drain valve at the lowest point.
18. Where an automatic condensate valve is fitted, it must have a provision for manual operation.

Permitted equipment

19. Refer to Heavy trailers, section 5-1.

Prohibited equipment

20. Refer to Heavy trailers, section 5-1.

Condition

20. Refer to Heavy trailers, section 5-1.
21. Brake linings or brake pads must be replaced as axle sets.

Performance

22. Refer to Heavy trailers, section 5-1.

Service brake

23. Refer to Heavy trailers, section 5-1.

Parking brake

24. Refer to Heavy trailers, section 5-1.
25. The auxiliary park brake release device must be able to be restored automatically to its normal operating state when normal air supply is restored.

Compressed air brake systems

27. Refer to Heavy trailers, section 5-1.
28. The brake system must not compound their individual brake forces.

Modification and certification

29. Refer to Heavy trailers, section 5-1.

Reasons for rejection

coupling, eg:

- a) a duomatic coupling, or
 - b) a triomatic coupling.
11. The coupling housing (eg duomatic or triomatic) is not situated close to the centre line (preferably to the right hand side of the centre, ie. driver's side).
 12. The control (service) and supply (emergency) air lines are not installed so that when facing the cover of the female section of the coupling housing:
 - a) the control (service) line is not on the left side of the housing, and coloured blue or black within 150 mm of the coupling or junction, and
 - b) the supply (emergency) line is not on the right side of the housing, and coloured red or yellow within 150 mm of the coupling or junction.
 13. A service brake or parking brake reservoir, including any wet tank in an air brake system:
 - a) is not fitted with a condensate drain valve at the lowest point, or
 - b) is fitted with an automatic condensate valve that does not have provision for manual operation.

Note Operation of drain valves must not require the use of tools.

Permitted equipment

14. Refer to Heavy trailers, section 5-1.

Prohibited equipment

15. Refer to Heavy trailers, section 5-1.

Condition

17. Refer to Heavy trailers, section 5-1.
18. A brake lining or brake pad:
 - a) has been replaced without all the linings or pads on the axle being replaced at the same time, or
 - b) does not comply with the NZHVBC (**Note 1**)

Reasons for rejection

Performance

Service brake

19. Refer to Heavy trailers, section 5-1.

Parking brake

20. Refer to Heavy trailers, section 5-1.

21. The auxiliary park brake release device (yard valve) does not return automatically to its normal operating state when trailer air supply is restored.

Compressed air brake systems

22. Refer to Heavy trailers, section 5-1.

23. A drain valve is not able to be operated manually.

Note Operation of drain valves must not require the use of tools.

24. The individual brake forces of the service and spring parking brake are able to be compounded.

Modification and certification (Note 1)

25. Refer to Heavy trailers, section 5-1.

Note 1 If there is reason to believe that a component does not meet the requirements of the NZHVBC then the vehicle inspector must require the brake maintenance records to be produced.

Brakes

5-3 Interim heavy vehicle braking specification

Summary of legislation

Applicable legislation

- Land Transport Rule: Heavy-vehicle Brakes 2006
- Heavy Motor Vehicle Regulations 1974, Reg. 16A.
- Interim Heavy Vehicle Braking Specification (6 December 1988).

Mandatory equipment

Service brake

1. Refer to Heavy trailers, section 5-1.
2. The service brake must operate on each axle.

Parking brake

3. Refer to Heavy trailers, section 5-1.
4. The parking brake must act on at least half of the axles on each vehicle.

Emergency brake

5. The vehicle must have an emergency brake system, which is substantially independent of the service braking system.
6. The emergency brake must:
 - a) act on at least half of the axles on each vehicle, and
 - b) be operable from one control within easy reach of the driver in his normal seating position.

Hoses and other flexible tubing

7. Refer to Heavy trailers, section 5-1.

Compressed air brake systems

8. Refer to Heavy trailers, section 5-1.
9. Air connections between the towing and towed vehicles must be of the two-line type (excluding auxiliaries).
10. Air connections between the towing and towed vehicles that are physically capable of being incorrectly connected shall be colour-coded as follows:
 - a) the control (service) line must be coloured yellow, green or blue, and
 - b) the supply (emergency) line must be coloured red.
11. The couplings used for the air connections between the towing and towed vehicles must:
 - a) be mounted on the longitudinal centre-line of the vehicle, or as close to it on the right-hand side, and
 - b) have the control (service) line to the left of the vehicle, ie the curb side, and
 - c) have the supply (emergency) line to the right of the vehicle, ie the driver's side.

Reasons for rejection

Mandatory requirements

Service brake

1. Refer to Heavy trailers, section 5-1.
2. The service brake does not act on each axle.

Parking brake

3. Refer to Heavy trailers, section 5-1.
4. The parking brake does not act on at least half of the vehicle's axles.

Emergency brake

5. The vehicle does not have an emergency brake.
6. The emergency brake does not act on at least half of the vehicle's axles.

Hoses and other flexible tubing

7. Refer to Heavy trailers, section 5-1.

Compressed air brake systems

8. Refer to Heavy trailers, section 5-1.
9. Air connections between the towing and towed vehicles are not of the two-line type (excluding auxiliaries).
10. Air connections between the towing and towed vehicles that are physically capable of being incorrectly connected are not colour-coded, ie:
 - a) the control (service) line is not coloured yellow, green or blue, or
 - b) the supply (emergency) line is not coloured red.
11. The couplings used for the air connections between the towing and towed vehicles:
 - a) are not mounted on the longitudinal centre-line of the vehicle, or as close to it on the right-hand side, or
 - b) do not have the control (service) line to the left of the vehicle, ie the curb side, or
 - c) do not have the supply (emergency) line to the right of the vehicle, ie the driver's side.

Brakes

5-3 Interim heavy vehicle braking specification (cont.)

Permitted equipment

12. Refer to Heavy trailers, section 5-1.

Prohibited equipment

13. Refer to Heavy trailers, section 5-1.

Condition

14. Refer to Heavy trailers, section 5-1.

Performance

Service brake

15. Refer to Heavy trailers, section 5-1.

Parking brake

16. Refer to Heavy trailers, section 5-1.

Emergency brake

17. Refer to Heavy trailers, section 5-1.

Compressed air brake systems

18. Refer to Heavy trailers, section 5-1.

Modification and certification

19. Refer to Heavy trailers, section 5-1.

Reasons for rejection

Permitted equipment

12. Refer to Heavy trailers, section 5-1.

Prohibited equipment

13. Refer to Heavy trailers, section 5-1.

Condition

14. Refer to Heavy trailers, section 5-1.

Performance

Service brake

15. Refer to Heavy trailers, section 5-1.

Parking brake

16. Refer to Heavy trailers, section 5-1.

Compressed air brake systems

17. Refer to Heavy trailers, section 5-1.

Modification and certification (Note 1)

18. Refer to Heavy trailers, section 5-1.

Note 1 If there is reason to believe that the vehicle has been modified since it was certified to the Interim Heavy Vehicle Braking Specification then the vehicle inspector must refer to the details shown on the vehicle's data sheet (form 4067A) issued at the time of certification.