5-2 Brakes (Air)

Reasons for rejection

1. A vehicle using compressed air to operate the braking system is not equipped with one or more

a) air compressors or other means of generating compressed air, or

b) air reservoirs or other means of storing compressed air, or

c) pressure gauges and pressure warning devices.

2. The compressor of a passenger service vehicle first registered in New Zealand on or after 10 February 1978 is not capable of raising, in not more than 90 seconds, the pressure in the air storage system from the pressure in 3 to the maximum operating pressure specified by the vehicle manufacturer or brake manufacturer at either:

a) the maximum governed speed of the vehicle's engine, or

b) an engine speed determined by the certifier, if the engine is not governed.

3. The compressor of the air brake does not have the capacity required if measured by starting from the pressure to which the air brake falls from the maximum specified operating pressure as a result of five full service-brake applications made in accordance with requirement 14.

4. The compressor of a vehicle, other than a passenger service vehicle, is not capable of raising the pressure in the air storage system to the maximum operating pressure specified by the vehicle manufacturer or brake manufacturer, at a speed specified in requirement 2(a) or (b), in not more than:

a) 3 minutes, starting from the pressure at which the low-pressure warning device ceases to operate, or when the emergency brake operates, or

b) 90 seconds, starting from the pressure to which the air brake falls from the maximum operating pressure, specified by the vehicle manufacturer or brake manufacturer, as a result of fully applying and releasing the service brakes five times in accordance with requirement 14.

5. A powered vehicle to which requirements 8 to 10 applies, other than a passenger service vehicle first registered in New Zealand before 10 February 1978, is not fitted with a device that provides a continuous signal that is clearly visible or audible from the driver’s normal driving position if any service brake reservoir is below the minimum safe operating pressure as defined in requirement 22.

6. A passenger service vehicle first registered in New Zealand on or after 10 February 1978 is not fitted with at least one gauge that:

a) is readily visible to the driver at all times from the driver's normal driving position

b) indicates, to the driver, the pressure in at least one service brake reservoir.

7. The compressed-air reservoir of the service brake of a passenger service vehicle that was first registered in New Zealand before 10 February 1978 is not fitted with:

a) a pressure gauge in requirement 7, or

b) a visual warning device in requirement 2.

9. A powered vehicle, other than a passenger service vehicle, is not fitted with at least one gauge that:

a) is readily visible to the driver at all times from the driver's normal driving position, or

b) indicates, to the driver, the pressure in at least one service brake reservoir.

10. A pressure gauge in requirements 7 to 9 does not indicate the pressure in pressure units, or on a coloured scale, or in an equivalent way

11 The compressed-air reservoir capacity of a passenger service vehicle first registered in New Zealand on or after 10 February 1978, and of a powered vehicle other than a passenger service vehicle, does not, when the air pressure in the brake is at its maximum operational pressure specified by the vehicle manufacturer or brake manufacturer and the compressor is stopped, enable the reserve of compressed air of the brake to provide:

a) at least five full service-brake applications with full release of the brakes after each application before the low pressure warning device operates, or

b) two full service-brake applications with full release of the brakes after each application following activation of the low pressure warning device.

Except the at least three full service brake applications before the emergency valve operates as allowed for in a combination vehicle that is equipped with:

a) both:

i. an emergency or a breakaway valve on the trailer, and

ii. a tractor protection valve on the towing vehicle, or

b) other devices that are fitted to protect the air system of the towing vehicle and to activate the brake of the trailer when the trailer becomes disconnected from the towing vehicle. or

c) meets one of the approved standards in 5.1 Summary of Legislation 23 (a) or (b)

12. A full service-brake application is not made in that all brake actuators on the vehicle do not operate to apply their associated brakes in an effective manner.

13. The compressor does not supply only the brake reservoirs with compressed air until the pressure in those reservoirs reaches the pressure specified by the vehicle manufacturer or the brake manufacturer, or, if such information is not available, two thirds of the maximum operational pressure specified by the vehicle manufacturer or brake manufacturer.

14. An air brake does not have priority of the supply of compressed air from the brake reservoir.

15. An air-operated device is connected to the air brake of a vehicle, and:

a) the brake is not protected so that the operation or failure of the device cannot lower the pressure in any service brake 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, or

b) the supply to the device is not drawn from a reservoir separate from the service brake or parking brake reservoir(s) supplying the brake, except as specified in 18.

16. Despite requirement 17(b), an air-operated device is supplied with compressed air from the service brake or parking brake reservoir(s), and the operation of the device requires a large amount of compressed air.

17. An air operated device has been fitted to a heavy vehicle and the device draws air directly from the air reservoir supplying the brakes and the external diameter of the supply hose or pipe is larger than 8mm

18. An air operated device has been fitted to a heavy vehicle and the device draws air directly from the air reservoir supplying the brakes and the device operates when the vehicle is moving

19. An air operated device has been fitted to a heavy vehicle and the device draws air directly from the air reservoir supplying the brakes and the vehicle manufacturer does not allow it

20. If a vehicle to which requirement 5 and/or 6 applies has more than one compressed-air service or parking brake circuit, a failure in any service or parking brake circuit that lowers the pressure in any service or parking brake reservoir, below the minimum safe operating pressure, reduces the pressure in any other service or parking brake reservoir below the minimum safe operating pressure.

21. The brake system does not meet the minimum safe operating pressure by meeting either:

a) the minimum safe operating pressure specified by the vehicle manufacturer or brake manufacturer, or

b) if no minimum safe operating pressure is specified by the vehicle manufacturer or brake manufacturer, 50% of the correctly adjusted cut-out pressure for the compressor-governor.

22. An air-braked vehicle that has been fitted with a towing connection to tow a vehicle of class TC or class TD or is a class TC or class TD trailer, except a vehicle that complies with the Interim Specification for Heavy Vehicle Braking in Schedule 1, or a vehicle that has an electronic control device which is capable of regulating and optimising vehicle deceleration according to an electrical signal provided by the driver's brake control, does not have a threshold pressure between 55 and 80 kPa (inclusive).

23. A vehicle that is modified by fitting an additional axle, removing an axle, replacing an axle with one that is not of the same make and model, or replacing the brake of an axle with one that is not of the same make and model has not been referred to a HV certifier with the Brakes category (HVEK).

24. A powered vehicle with an hydraulic service brake has been fitted with an additional rear axle that does not have the same type of braking system as the original axle or an air operated disc brake as a service brake.

25. 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 is not capable of being connected to the air brake of the other vehicle by means of a two-line system.

26. A two-line system does not 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.

27. For vehicles towing semi-trailers and for semi-trailers, the hoses connecting the towed and towing vehicles are not part of the towing or towed vehicle or are not detachable at both ends.

28. For vehicles other than those towing semi-trailers, the hoses not part of the trailer or securely attached to the drawbar

29. A towing vehicle or a towed vehicle in requirement 26 is not fitted with a coupling device, approved by the Transport Agency, to connect the brake to, and disconnect it from, that of the other vehicle, or that device is not:

a) robust, durable, and suitable for automotive application, or

b) able to prevent, either through the design of the coupling device or through its installation, the incorrect connection of the control and supply lines, or

c) set so that it cannot adversely affect the performance of the brake of either the towing or towed vehicle(s), or

d) able to have an effective breakaway function.

30. Subject to requirement 31, if a vehicle is fitted with a duomatic- or triomatic-type coupling device, the control line in 25 is not connected to the port of the coupling device that is closest to the opening handle.

31. Subject to requirement 31, if a vehicle is fitted with a duomatic- or triomatic-type coupling device, the supply line in 26(a) is not connected to:

a) the middle port of the triomatic coupling device, or

b) the port of the duomatic coupling device that is farthest away from the opening handle.

32 . A vehicle, other than one that complies with the Interim Performance Specification for Heavy Vehicle Braking in Schedule 1, that was fitted with a duomatic- or triomatic-type coupling device before 1 July 2008 and that was not required to comply with the requirements in 29 and 30, does not comply with these requirements by the date of its first certificate of fitness inspection on or after 1 July 2008.

33. The socket of a duomatic- or triomatic-type coupling device is not fitted:

a) to the rear of a towing vehicle, or

b) to the front of a semi-trailer.

34. The socket of a coupling device in requirement 28 is not fitted as close as practicable to:

a) the centre-line of the vehicle, or

b) the towing connection by which the towed and towing vehicles are connected.

35. The socket of a coupling device in requirement 28 that is fitted to the front of a semi-trailer is fitted with a non-return valve.

36. The fitting of a coupling device in requirement 28 has been carried out without regard to the instructions of the vehicle manufacturer

Summary of legislation

Applicable legislation

- **Land Transport Rule: Heavy Vehicle Brakes 2006**

Use of compressed air

1. A vehicle using compressed air to operate the braking system must be equipped with one or more:

a) air compressors or other means of generating compressed air, and

b) air reservoirs or other means of storing compressed air, and

c) pressure gauges and pressure warning devices.

Compressor capacity

2. The compressor of a passenger service vehicle first registered in New Zealand on or after 10 February 1978 must be capable of raising, in not more than 90 seconds, the pressure in the air storage system from the pressure in 3 to the maximum operating pressure specified by the vehicle manufacturer or brake manufacturer at either:

a) the maximum governed speed of the vehicle's engine, or

b) an engine speed determined by a vehicle inspector or inspecting organisation, if the engine is not governed.

3. For the purposes of 2, the compressor capacity of the air brake must be measured by starting from the pressure to which the air brake falls from the maximum specified operating pressure as a result of five full service-brake applications made in accordance with 13.

4. The compressor of a vehicle, other than a passenger service vehicle, must be capable of raising the pressure in the air storage system to the maximum operating pressure specified by the vehicle manufacturer or brake manufacturer, at a speed specified in 2a) or b), in not more than:

a) 3 minutes, starting from the pressure at which the low-pressure warning device ceases to operate, or when the emergency brake operates, and

b) 90 seconds, starting from the pressure to which the air brake falls from the maximum operating pressure, specified by the vehicle manufacturer or brake manufacturer, as a result of fully applying and releasing the service brakes five times in accordance with 13.

Pressure warning devices

5. A powered vehicle to which 7 to 9 applies, other than a passenger service vehicle first registered in New Zealand before 10 February 1978, must be fitted with a device that provides a continuous signal that is clearly visible or audible from the driver’s normal driving position if any service brake reservoir is below the minimum safe operating pressure as defined in 21.

6. The audible signal of the device in 5 may be rendered inoperative if the parking brake is fully applied or the vehicle is fitted with an automatic transmission and it is in the park position.

Pressure gauges

7. A passenger service vehicle first registered in New Zealand on or after 10 February 1978 must be fitted with at least one gauge that:

a) is readily visible to the driver at all times from the driver's normal driving position

b) indicates, to the driver, the pressure in at least one service brake reservoir.

8. The compressed-air reservoir of the service brake of a passenger service vehicle that was first registered in New Zealand before 10 February 1978 must be fitted with:

a) a pressure gauge in 6, or

b) a visual warning device in 2.

9. A powered vehicle, other than a passenger service vehicle, must be fitted with at least one gauge that:

a) is readily visible to the driver at all times from the driver's normal driving position, and

b) indicates, to the driver, the pressure in at least one service brake reservoir.

10. A pressure gauge in 6 to 8 must indicate the pressure in pressure units, or on a coloured scale, or in an equivalent way

Reservoir capacity

11 The compressed-air reservoir capacity of a passenger service vehicle first registered in New Zealand on or after 10 February 1978, and of a powered vehicle other than a passenger service vehicle, must, when the air pressure in the brake is at its maximum operational pressure specified by the vehicle manufacturer or brake manufacturer and the

compressor is stopped, enable the reserve of compressed air of the brake to provide:

a) at least five full service-brake applications with full release of the brakes after each application before the low pressure warning device operates, and

b) two full service-brake applications with full release of the brakes after each application following activation of the low pressure warning device.

12. The requirement for at least five full service-brake applications in 11(a) may be reduced to four for a vehicle that complies with the approved standard in 5.1 Summary of Legislation 23 (a) or (b)

13. The requirement for at least five full service-brake applications in 11(a) may be reduced to at least three before the emergency valve operates for a combination vehicle that is equipped with:

a) both:

i. an emergency or a breakaway valve on the trailer, and

ii. a tractor protection valve on the towing vehicle, or

b) other devices that are fitted to protect the air system of the towing vehicle and to activate the brake of the trailer when the trailer becomes disconnected from the towing vehicle.

14. For the purposes of 3, 4(b), 11 and 12, a full service-brake application is made when all brake actuators on the vehicle are operated to apply their associated brakes in an effective manner.

Priority and protection of air brakes

15. The compressor must supply only the brake reservoirs with compressed air until the pressure in those reservoirs reaches the pressure specified by the vehicle manufacturer or the brake manufacturer, or, if such information is not available, two thirds of the maximum operational pressure specified by the vehicle manufacturer or brake manufacturer.

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

17. An air-operated device may be connected to the air brake of a vehicle, only if:

a) the brake is protected so that the operation or failure of the device cannot lower the pressure in any service brake 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 as specified in 18.

18. Despite 17b), an air-operated device may be supplied with compressed air from the service brake or parking brake reservoir(s), if:

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.

19. If a vehicle to which 5 and/or 6 applies has more than one compressed-air service or parking brake circuit, a failure in any service or parking brake circuit that lowers the pressure in any service or parking brake reservoir, below the minimum safe operating pressure, must not reduce the pressure in any other service or parking brake reservoir below the minimum safe operating pressure.

Minimum safe operating pressure

20. **Minimum safe operating pressure** means:

a) the minimum safe operating pressure specified by the vehicle manufacturer or brake manufacturer, or

b) if no minimum safe operating pressure is specified by the vehicle manufacturer or brake manufacturer, 50% of the correctly adjusted cut-out pressure for the compressor-governor.

21. An air-braked vehicle that has been fitted with a towing connection to tow a vehicle of Class TC or Class TD or is a Class TC or Class TD trailer, except a vehicle that complies with the Interim Specification for Heavy Vehicle Braking in Schedule 1, or a vehicle that has an electronic control device which is capable of regulating and optimising vehicle deceleration according to an electrical signal provided by the driver's brake control, must have a threshold pressure between 55 and 80 kPa (inclusive).

Modifications

22. A vehicle that is modified by fitting an additional axle, removing an axle, replacing an axle with one that is not of the same make and model, or replacing the brake of an axle with one that is not of the same make and model, must either:

a) be modified so as to continue to meet the technical and performance requirements of the approved standard in the Rule with which the vehicle originally complied, or

b) comply with all other applicable requirements in this Rule.

Modifications that do not require specialist certification

23. The following modifications do not require specialist certification:

a) an adjustment of the brake system for the purpose of complying with an 80kPa threshold pressure on a prime mover or trailer

b) the replacement of an air brake coupling device on a powered vehicle for the purpose of complying with 7.3

c) the fitting of an air brake coupling device to a powered vehicle that is carried out:

i. for the purpose of complying with 7.3, and

ii. in accordance with the manufacturer's recommendations

d) the fitting of a valve to a powered vehicle to allow the parking brake of any towed trailer(s) to operate.

Requirements for the connection of the air brake of vehicles in a combination vehicle

24. 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.

25. 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.

26. For vehicles towing semi-trailers and for semi-trailers, the hoses connecting the towed and towing vehicles are to be considered as part of the towing or towed vehicle or to be detachable at both ends.

27. 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

28, A towing vehicle and a towed vehicle in 26 must be fitted with a coupling device, approved by the Agency, to connect the brake to, and disconnect it from, that of the other vehicle, and that device must:

a) be robust, durable, and suitable for automotive application, and

b) prevent, either through the design of the coupling device or through its installation, the incorrect connection of the control and supply lines, and

c) not adversely affect the performance of the brake of either the towing or towed vehicle(s), and

d) have an effective breakaway function.

29. Subject to 31, if a vehicle is fitted with a Duomatic- or Triomatic-type coupling device, the control line in 25 must be connected to the port of the coupling device that is closest to the opening handle.

30. Subject to 31, if a vehicle is fitted with a Duomatic- or Triomatic-type coupling device, the supply line in 25a)must be connected to:

a) the middle port of the Triomatic coupling device, or

b) the port of the Duomatic coupling device that is farthest away from the opening handle.

31 . A vehicle, other than one that complies with the Interim Performance Specification for Heavy Vehicle Braking in Schedule 1, that has been fitted with a Duomatic- or Triomatic-type coupling device before 1 July 2008 and that was not required to comply with the requirements in 29 and 30, must comply with these requirements by the date on which the first

Certificate of Fitness inspection is due on or after 1 July 2008.

32. The socket of a Duomatic- or Triomatic-type coupling device must be fitted:

a) to the rear of a towing vehicle, and

b) to the front of a semi-trailer.

33. The socket of a coupling device in 28 must be fitted as close as practicable to:

a) the centre-line of the vehicle, and

b) the towing connection by which the towed and towing vehicles are connected.

34. The socket of a coupling device in 28 that is fitted to the front of a semi-trailer must not be fitted with a non-return valve.

35. The fitting of a coupling device in 28 must be carried out having regard to the instructions of the vehicle manufacturer