4-4 Engine and drive train

Certifier categories: **HVEC** | **HMCD**

Reasons for rejection

1. Devices to protect against drive-shaft failure have not been maintained within safe tolerance of their original condition.

2. Fuels for a passenger service vehicle and the vehicle's equipment are not carried in permanent fuel tanks.

3. For a vehicle which entered service as a passenger service vehicle in New Zealand before 1 July 2000, the design and location of fuel tanks do not incorporate a device to compensate the internal pressure without fuel overflow and without fuel spillage, even in the case of roll-over of the passenger service vehicle.

4. Fuel tanks and fuel lines are not:

    a) corrosion-resistant, or

    b) designed and constructed of durable, fuel-resistant material, or

    c) securely mounted, or

    d) protected from suspension or steering component movement, or

    e) reasonably protected from collision damage.

5. Access to the fuel-tank filling inlet is not from outside the body of the passenger service vehicle.

6. A filling inlet does not have a leak-proof cap.

7. The design, construction and maintenance of the exhaust system does not ensure that:

    a) emitted heat or fumes cannot harm the occupants of the vehicle, or

    b) the outlet pipe is not shielded or located in a position where other road users, or passengers entering or exiting the vehicle, cannot be burned by the exhaust, or

    c) the outlet pipe does not discharge on the left-hand side of the vehicle at a low level

    d) the exhaust outlet may affect pedestrians.

8. The transmission on a vehicle is not of adequate strength and have appropriate performance characteristics for all conditions of loading and operation for which the vehicle was constructed.

9. The transmission on a vehicle has not been installed in accordance with the transmission manufacturer's instructions and maintained within safe tolerance of its original condition.

10. A device fitted to a vehicle to restrict the field of swing of a drive shaft in the event of a drive shaft failure has not been maintained within a safe tolerance of its original condition.

11. A modification to a vehicle has resulted in the vehicle's engine or transmission becoming unsuitable for the conditions of loading and operation for which the vehicle is modified.

12. A modification to a vehicle has adversely affected the performance of the vehicle’s engine or transmission.

13. A modification to a vehicle that affects the performance of the vehicle’s drive shaft has resulted in the drive shaft manufacturer’s specified limits being exceeded.

14. Any new mountings are not at least the same strength as the original or the movement of the accelerator linkages is impeded in any way.

15. A component has been used that is not within the manufacturer’s ratings.

16. Adequate protection from heat has not been provided for all hoses, electrical harnesses, fuel and hydraulic lines, electrical components, rubber/plastic components and any other heat sensitive components.

17. Engine mounts are not of sufficient strength to withstand the torsional and vertical loads.

18. Engine mounts are unable to restrict excessive engine movement.

19. Engine mounts have not been designed so that if they fail the engine will remain captive.

20. The engine mounts do not maintain sufficient clearance between the engine and the chassis/cab/body components.

21. The engine has not been mounted so as to maintain the correct alignment of the driveline.

22. Fuel lines have not been routed so that they are not affected by a heat source, for example the exhaust or the turbo charger.

23. Fuel lines are not adequately secured or protected from mechanical damage.

24. The exhaust system has been located under fuel tanks, or fuel or oil fillers.

25. The exhaust system does not expel the exhaust gases outside the vehicle perimeter.

26. The transmission does not have adequate capacity for the torque/power output of the engine.

27. Any openings required for the gearshift lever have not been adequately sealed to prevent exhaust gases and engine fumes entering the cabin.

28. The accuracy of the vehicle speedometer has been impaired by any modification or repair.

29. If the vehicle has an automatic transmission, the engine starter is not inoperative when the transmission lever is in a drive or reverse position.

30. The reverse lights do not operate when reverse gear is selected unless operated by an independent switch.

31. The transmission mounts are not of sufficient strength to withstand the torsional and vertical loads.

32. The transmission has not been mounted so as to maintain the correct alignment of the driveline.

33. The engine and transmission mounting method are not compatible, that is both flexible or both solid mounted.

34. The drive shaft has not been fabricated from one length of material between end fittings.

35. The drive shaft is not of sufficient strength to withstand the imposed loads.

36. The drive shaft is not correctly aligned within specifications.

37. The drive shaft has not been adequately balanced.

38. The maximum operating speed of the drive shaft is not within 65% of the critical or resonant speed of the drive shaft.

39. The drive shaft does not have sufficient clearance so that it will not come into contact with any part of the vehicle through the full suspension travel.

40. The universal joint has not been installed within the manufacturer's specifications or is not correctly phased.

41. The universal joint is not of sufficient strength to withstand the imposed loads.

42. The universal joint does not have sufficient clearance so that it will not come into contact with any part of the vehicle through the full suspension travel.

43. The length of the slip joint is not sufficiently long so that, through the full suspension travel, the joint does not bottom out or become disengaged.

44. The minimum spline engagement with the joint fully extended is less than the manufacturer's specifications or, in the absence of manufacturer's specifications 1.5 times the spline diameter.

45. The minimum spline end clearance with the joint fully contracted is less than the manufacturer's specifications or, in the absence of manufacturer's specifications, one spline diameter.

46. When road tested, the drive line has unacceptable vibrations within the design speed range.

47. When a vehicle has been repowered prior to entering the fleet the powerpack does not:

a) meet the emissions requirements of the **Emissions Rule**, or

b) have all the components such as cooling system, exhaust system and treatment, induction systems and electronic controls systems fitted as required by the manufacturer to meet the emissions requirements of the **Emissions Rule**

- See also Technical bulletin 17: Heavy vehicle power pack upgrades to meet emissions requirements.

48. When a vehicle has been repowered prior to entry onto the fleet the powerpack does not meet the emissions requirement of the **Emissions Rule** (see also Technical bulletin 17: Heavy vehicle power pack upgrades to meet emissions requirements).

49. When a vehicle has been repowered prior to entry onto the fleet the powerpack does not include all the components such as the cooling system, exhaust system including treatment, induction system and electronic control system fitted as required by the manufacturer to meet the emissions requirements of the **Emissions Rule** (see also Technical bulletin 17: Heavy vehicle power pack upgrades to meet emissions requirements).

50. 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.

51. 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.

52. 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.

53. 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).

54. 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.

Summary of legislation

Applicable legislation

- Land Transport Rule: Heavy Vehicles 2004
- Land Transport Rule: Passenger Service Vehicles 1999
- Land Transport Rule: Vehicle Exhaust Emissions 2007

Passenger Service Vehicles Rule

Suspension and drive line (section 6.7)

1. Devices to protect against drive-shaft failure must be maintained within safe tolerance of their original condition.

Fire fighting and protection against fire

2. The design and construction of a passenger service vehicle must minimise the risk of fire.

3. Materials used in the construction and fittings of a passenger service vehicle:

a) must be such that, if they are ignited, the risk of emission of harmful fumes and gases is minimised, and

b) must not be of a type which would contribute to the rapid spread of a fire.

4. The exhaust system, including any turbo-chargers and any other heat sources, must be installed, located, shielded and ventilated so that:

a) no ignitable or heat sensitive materials could fall on the exhaust system or heat source, and

b) material adjacent to any hot surface forming part of, or connected to, the exhaust system or any other heat source must not, under any operating condition, be heated sufficiently to cause degradation.

5. The design of the engine installation and engine compartment must ensure that no fuel, oil or other combustible materials could accumulate in the engine compartment or drip on to any high temperature surface.

6. The engine compartment must be lined with, or made of, fire-resistant materials in a manner that complies with the engine manufacturer's specifications for minimum clearances.

7. The engine compartment of a heavy passenger service vehicle, with an engine positioned rearward of the front axle set, must be maintained to ensure that the clearance space between the lining or compartment walls and the engine or its ancillary components is maintained within safe tolerance of the clearance that existed when the engine was installed.

8. Devices to protect against drive-shaft failure must be maintained within safe tolerance of their original condition.

Fuel tanks and protection against fumes and gases (section 6.2)

9. Fuels for a passenger service vehicle and the vehicle's equipment must be carried in permanent fuel tanks.

10. The design and location of fuel tanks must:

a) incorporate a device to compensate the internal pressure without fuel overflow and without fuel spillage, even in the case of roll-over of the passenger service vehicle, except as specified in b) below,

b) for a vehicle which entered service as a passenger service vehicle in New Zealand before 1 July 2000, ensure that any fuel overflow will not accumulate on any part of the vehicle.

11. Fuel tanks and fuel lines must be:

a) corrosion-resistant, and

b) designed and constructed of durable, fuel-resistant material, and

c) securely mounted, and

d) reasonably protected from collision damage.

12. Access to the fuel-tank filling inlet must be from outside the body of the passenger service vehicle. Each filling inlet must be provided with a leak-proof cap.

13. The design, construction and maintenance of the exhaust system must ensure that:

a) emitted heat or fumes cannot harm the occupants of the passenger service vehicle, and

b) the outlet pipe is shielded or located in a position where other road users, or passengers entering or exiting the vehicle, cannot be burned by the exhaust, and

c) the outlet pipe does not discharge on the left-hand side of the vehicle.

Heavy Vehicle Rule

Transmission (section 3.4)

14. The transmission on a vehicle must be of adequate strength and have appropriate performance characteristics for all conditions of loading and operation for which the vehicle was constructed.

15. The transmission on a vehicle must be installed in accordance with the transmission manufacturer's instructions and maintained within safe tolerance of its original condition.

19. A device fitted to a vehicle to restrict the field of swing of a drive shaft in the event of a drive shaft failure must be maintained within a safe tolerance of its original condition.

Modification affecting engine and transmission (section 6.2)

17. A modification to a vehicle must not result in the vehicle's engine or transmission becoming unsuitable for the conditions of loading and operation for which the vehicle is modified.

18. A modification to a vehicle must not adversely affect the performance of the vehicle's engine or transmission.

19. A modification to a vehicle that affects the performance of the vehicle's drive shaft must not result in the drive shaft manufacturer's specified limits being exceeded.

Priority and protection of air brakes

20. 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.

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

22. 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 *23.*

23. Despite *22(b)*, 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.

24. 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.

25. A powered vehicle with an hydraulic service brake may be fitted with an additional rear axle that has an air operated disc brake as a service brake.

Page amended **9 April 2018** (see **amendment details**)