Prime Mover

1. **Battery Insulation / Protection (2.4.4)**

   2.4.4 The battery shall be secured in front of the fire resistant shield. If this is not practicable, it may be carried in a metal box or secured in a metal frame as close to the cab as possible. The battery terminals shall, by means of an effective acid resisting insulation cover, be held securely in place, be prevented from accidental shorting.

2. **Battery Isolation Switch (2.4.6)**

   2.4.6 A battery master switch shall be provided to enable a means of isolating the electrical supply e.g. by means of a double pole switch. This shall be provided in a readily accessible position as close to the battery as is practicable, (it should be adjacent to the battery and preferably no further than 600 mm from it) and shall be clearly labelled as to its position. If a single pole switch is used it shall be placed in the supply lead and not in the earth lead.

   2.4.6.1 This battery master switch must be able to be manually operated externally and deactivated from inside the vehicle cab in a position readily accessible to the driver. It shall be distinctively marked and protected against inadvertent operation by the driver.

   2.4.6.2 The battery master switch shall be suitable for use in the hazardous atmosphere zone which it is required to operate in i.e. it shall;

   i. be EEx or suitable equivalent, and
   ii. have a temperature rating T4, T5 or T6
   iii. be suitable for equipment group II B or II C

   2.4.6.3 The battery master switch shall be suitable for the environment that it is required to operate in i.e. it shall have a casing with protection degree IP65. The cable connections to the switch shall also be suitable for the operating environment. It is recommended that they have a protection degree IP54. However if they are contained in a housing (which may be the battery box) or switches with protection degree IP54 are not available, it is sufficient to protect their connections against short circuits (e.g. with a secure rubber cap).

   2.4.6.4 The electrical supply may be maintained to certain vehicle accessories (e.g. operation recorder, computer, radios, clocks,) which cannot be shut off, provide the instrumentation is within the cab and each device is protected by a circuit breaker or fuse. Other electrical components maybe fitted outside the cab provided the components are rated for the hazardous atmosphere zone they may operate in.

3. **Electrical Wiring (2.4 - 2.4.10)**

The electrical wiring of tank wagons that convey substances with 3.1A, 3.1B or

3.1C hazard classifications shall comply with the following requirements and shall be suitable for the electrical loads.

2.4.1 The nominal voltage shall not exceed 48 volts.

2.4.2 The size of conductors shall be large enough to avoid overheating and shall be insulated. All circuits shall be protected by fuses or automatic circuit breakers, except for the following:
• From the battery to the cold start and stopping systems of the engine; and
• From the battery to the alternator; and
• From the alternator to the fuse or circuit breaker box; and
• From the battery to the starter motor; and
• From the battery to the power control housing of the endurance braking system (if fitted), if this system is electrical or electromagnetic; and
• From the battery to the electrical lifting mechanism for lifting the bogie axle.

2.4.3 The electrical installation beyond the rear of the driver's cab shall be designed, constructed and protected such that it cannot provoke any ignition or short-circuit under normal conditions of use of the vehicle and that these risks can be minimised in the event of an impact or deformation.

2.4.4 The battery shall be secured in front of the fire resistant shield. If this is not practicable, it may be carried in a metal box or secured in a metal frame as close to the cab as possible. The battery terminals shall, by means of an effective acid resisting insulation cover, be held securely in place, be prevented from accidental shorting.

2.4.5 The generator/alternator, switches and fuses shall be carried in front of the fire resistant shield. Other electrical components may be fitted outside the cab provided the components are rated for the hazardous atmosphere zones they may operate in. There may be other equipment necessary for the control/propulsion of the vehicle other than that used for the delivery of the substance and which may not be suitable for the hazardous atmosphere zone they operate in. This equipment is acceptable provided that it is isolated by the battery master switch when the hazardous atmosphere zones are present.

2.4.6. A battery master switch shall be provided to enable a means of isolating the electrical supply e.g. by means of a double pole switch. This shall be provided in a readily accessible position as close to the battery as is practicable, (it should be adjacent to the battery and preferably no further than 600 mm from it) and shall be clearly labelled as to its position. If a single pole switch is used it shall be placed in the supply lead and not in the earth lead.

2.4.6.1. This battery master switch must be able to be manually operated externally and deactivated from inside the vehicle cab in a position readily accessible to the driver. It shall be distinctively marked and protected against inadvertent operation by the driver.

2.4.6.2. The battery master switch shall be suitable for use in the hazardous atmosphere zone which it is required to operate in i.e. it shall;

- be EEx or suitable equivalent, and
- have a temperature rating T4, T5 or T6
- be suitable for equipment group II B or II C

2.4.6.3. The battery master switch shall be suitable for the environment that it is required to operate in i.e. it shall have a casing with protection degree IP65. The cable connections to the switch shall also be suitable for the operating environment. It is recommended that they have a protection degree IP54. However if they are contained in a housing (which may be the battery box) or switches with protection degree IP54 are not available, it is sufficient to protect their connections against short circuits (e.g. with a secure rubber cap).

2.4.6.4. The electrical supply may be maintained to certain vehicle accessories (e.g. operation recorder, computer, radios, clocks,) which cannot be shut off, provided the instrumentation is within the cab and each device is protected by a circuit breaker or fuse. Other electrical components may be fitted outside the cab provided the components are rated for the hazardous atmosphere zone they may operate in.

2.4.7 The original equipment manufacture wiring (cab chassis) is to be in sound condition and must prevent the ingress of vapours, thus removing the potential for them to be a source of ignition. This does not obviate the requirement for the original equipment manufacture wiring that is in a hazardous atmosphere zone classified as Zone 1 to meet the requirements of that zonal classification (as qualified by the Notes in clause 2.4.11).

2.4.8 Electrical wiring added to the original vehicle wiring shall be insulated from the chassis. The wiring shall be supported and protected from mechanical injury, chafing and exposure to contact with oil, grease, or petroleum substances, and shall be so located as to avoid damage to insulation from heat. Wiring outside and to the rear of the cab or on a trailer must carried in conduit or double sheathed cable.

2.4.9 Junction boxes are to be at least IP65 rated.

2.4.10 Any electrical equipment that may be required to be active during hazardous substance transfer and that is located within a hazardous atmosphere zone shall be suitable for such an area. The hazardous atmosphere zones are deemed to exist during hazardous

4. In Cab Fire extinguisher (2.5)

2.5.1 The type and number of fire extinguishers fitted to the vehicle are to be as per Table 2.1 of this Code.

2.5.2 Fire extinguishers shall be installed so they are:
(a) mounted securely by means of a quick-release attachment
(b) located so as to be readily accessible for use but remote from the hose connection points.

Note. The quick release of a fire extinguisher is deemed to be removal and ready for use within 10 seconds of commencing the release of the extinguisher from the vehicle.

2.5.3 Where two fire extinguishers are fitted to any tank wagon, one is to be located on the left hand side of the road tank wagon, with the other on the right hand side of the vehicle towards the front of the vehicle.

If it is not practicable to locate the latter extinguisher towards the front of the vehicle, it is to be located in a position that is still readily accessible by the driver.

Note: For purpose of this clause, an additional towed tank trailer, each additional B-Train tank and similar combination is treated as being an individual vehicle and thus requires an additional complement of extinguishers.

2.5.4 The fire extinguishing medium shall be compatible with the substance being transported.

Table 2.1 – Type and Number of Fire Extinguishers

Application	*Minimum Requirement*
In every vehicle cab	One 30B extinguisher
A road tank vehicle which exceeds 2,000 litres capacity and which carries Class 3.1 A-D Flammable cargo	2 x 30B or 1 x 60B extinguisher

5. Driver Door DG & EP Guide, (NZS5433)

- Ensure the Dangerous good bag is attached to the driver door
- Ensure the emergency procedure guide is enclosed
- Ensure the bag can be detached with the documents from the door

6. Roof vents, locked or screened (2.7.4)

Roof vents and rear cab air discharge vents, if capable of being opened, are to be fitted with 500 micro-metres nominal aperture gauzes or sealed closed. **Where vents are installed in the fire resistant shield that forms part of the rear** of the cab and the vents may be compromised by the action of a fire, they shall in addition to having a 500 micro-metres gauze fitted, be shielded against the action of fire or vented to the side of the vehicle.

7. Fire Resistant Sheilding (2.7.2)

2.7.2. The person operating the tank wagon (i.e. the person in the drivers cab) is to be protected for 1 minute from the heat of a fire in the load tank or a fire in the means of propulsion of the tank wagon. In this regard the person operating the tank wagon must not be subject to a level of heat that exceeds 2.56 kw/m2

2.7.2.1 Fibreglass cabs are not considered to provide this level of protection unless it can be demonstrated that the requirement is complied with.

2.7.2.2 In the case of a steel or aluminium cab this is deemed to comply with 2.7.2

2.7.2.3 Spark Ignition Engines. The engine shall be screened from the load tank by a fire resisting shield (which may be the rear wall of the cab) carried down at least to the level of the bottom of the load tank or chassis (whichever is lower) and up to at least the level of the top of the tank or, if the roof of the cab is of fire-resisting construction and without opening, to the level of the top of the cab.

2.7.2.4 Compression Ignition Engines. Where the engine is not fully covered by the cab, and the cab rear wall is the fire-resisting shield, the engine shall be protected from vertical spillage from the load tank by a fire-resisting shield situated not less than 50 mm from the engine and this must be in place at all times during operation.

8. Rear Cab Window (2.7.3)

2.7.3 Windows fitted in the rear wall of the cab shall be securely clipped with substantial stainless steel clips and fixings at 300 mm centres or fitted with fire resisting framing. The window clips are to be fixed in such a way that the window remains in place in the event of a fire. The windows, if plain glass, are to be replaced with wired glass or other recognised type of heat resisting material, and shall not be capable of being opened. Curved corner windows in vehicle cabs further than 2 m from the load tank are not considered being in the rear wall of the cab.

9. Exhaust Systems (2.7.6)

2.7.6.1 For spark ignition engines, the exhaust shall discharge horizontally in **front** of the front wheels.

2.7.6.2 For compression ignition engines, the exhaust may discharge horizontally in front of the front wheels or vertically behind the cab. If the exhaust is located behind the cab then:

(a) if it is closer than 800 mm horizontally to the load tank, it shall be shielded to prevent spillage onto the exhaust system. The shield shall be at least 50 mm away from any hot part of the exhaust system and at least 75 mm away from the load tank.

(b) Any openings or perforations for ventilation shall be located on the side remote from the load tank;

(c) if it is closer than 2 m to any opening to the load tank, it shall terminate at least 75 mm above the valance.

2.7.6.3 The exhaust system shall be free from leaks and shall be located so as to minimise the accumulation of oil or grease, and shall be so designed as to inhibit the ejection of sparks.

Note: Turbochargers under normal conditions are considered to inhibit sparks.

10. Air Intake System 2.7.6

2.7.6.4 Air intakes behind the cab of compression ignition engines shall terminate above the level of the cab. Air intakes in front of the cab are free as regards position but no part of the opening shall be lower to the ground than 1.5 m. Tilt cab flexible couplings or boots are acceptable but where these are less than 1.5 metres from the ground level they are to be sealed and clipped (or provided with an alternative mechanism that is at least equivalent). These flexible couplings or boots are to be included in the three monthly vehicle inspections. (Refer Appendix A.)

2.7.6.5 In circumstances whereby the air intake is at the front of the cab and it is not possible to get access to the tilt cab flexible coupling or boot, an engine strangler is to be provided.