Environmental Protection Authority
Te Mana Rauhī Taiao

Flammable Gases and Oxygen Tank Wagons

A code of practice for the design and construction of vehicles for bulk transport of flammable gases and oxygen by road

HSNOCOP 29

Version 2.0 JUNE 2013

APPROVED CODE OF PRACTICE

UNDER THE HAZARDOUS SUBSTANCES AND NEW ORGANISMS (HSNO) ACT 1996

New Zealand Government

Preface

This code of practice HSNO COP 29 version 2.0 Flammable Gases and Oxygen Tank Wagons is approved pursuant to Sections 78 and 79 of the Hazardous Substances and New Organisms Act 1996 (HSNO Act). It is confirmed that the requirements of Sections 78 and 79 have been met.

Approval of this code is limited to those matters that relate to the HSNO Act and the regulations made under this act.

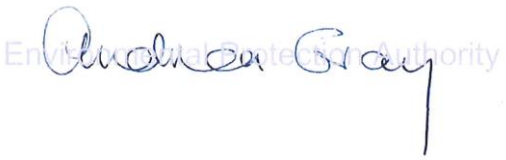
This code of practice has been developed by the Environmental Protection Authority in association with the LPG industry and sets out a means of compliance with the requirements of the Hazardous Substances (Tank Wagons and Transportable Containers) Regulations 2004 in respect of tank wagons that are used for the bulk transport of gases with a 2.1.1 hazard classification or oxygen.

The intended publication date in the Gazette for the notice of approval of this code of practice is 11 July 2013.

Pursuant to Section 80 (1) (a) of the Act, a copy of the code may be inspected at the Wellington office of the EPA, 215 Lambton Quay, Wellington.

Pursuant to Section 80 (1) (b) of the Act, a copy of the code is available to download from the EPA website www.epa.govt.nz.

Approved 27th June 2013.



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1. Purpose, scope and general

1.1. Purpose

1.1.1. The purpose of this Code of Practice for Flammable Gases and Oxygen Tank Wagons (the Code) is to provide an acceptable solution for the design and construction of Tank Wagons for the conveyance of Flammable Gases and oxygen by road.
This Code is approved by the EPA under the Hazardous Substances and New Organisms (HSNO) Act 1996 as a means of compliance with the Hazardous Substances (Tank Wagons and Transportable Containers) Regulations 2004 (as amended), Regulations 3-29, 32-37 and 42, in respect of Tank Wagons that are used for the bulk transport of Flammable Gases and oxygen.

1.2. Scope of This Code of Practice

1.2.1. Improper handling of hazardous substances may cause injury, death or ill health to a person and damage to property or the environment. Hazardous substances may pose a risk to drivers, cargo handlers, emergency services and the general public during their transportation. These risks are compounded when hazardous substances are transported in bulk.

1.2.2. The aim of this Code is to ensure that bulk flammable gases and oxygen are securely contained and safely transported, thereby reducing the risks and helping to prevent accidental damage or injury to people, property and the environment.

1.2.3. The Tanks, tank fittings and attachments shall be designed and constructed in accordance with this Code, which also includes requirements for the design, construction and operation of the vehicle carrying such Tanks, tank fittings and attachments.

1.2.4. This Code applies to substances with hazard classifications 2.1.1A, 2.1.1B and 5.1.2A as determined by the HSNO Act.

1.2.5. This Code does not detail the requirements of other legislation. Compliance with this Code does not obviate the requirement to comply with other sections of the HSNO Act or regulations made under that act, or other legislation such as the Health and Safety in Employment Act 1992, the Heavy Motor Vehicle Regulations 1974, Land Transport Rule: Dangerous Goods 2005 (Rule 45001/1) and other Land Transport Rules applying to vehicles and drivers.

1.3. The HSNO Act and the Place of Codes of Practice

1.3.1. The HSNO Act and regulations made under that act are largely performance based, that is they specify a desired outcome without prescribing how to achieve it. They do not require that a single specific means be used to comply with any regulation and this allows for variations in method.

1.3.2. The HSNO Act, as well as the regulations and transfer notices made under that act, provide for codes of practice approved by the EPA to identify acceptable solutions which comply with the regulatory requirements. An approved code of practice provides users with a method of meeting the control requirements with a degree of prescription and assistance.

1.3.3. The Hazardous Substances (Tank Wagons and Transportable Containers) Regulations 2004 (as amended) specified requirements for the design and construction of Tank Wagons. This Code provides a practical means to meet these requirements.

1.4. Limits of this Code of Practice

1.4.1. This Code applies to the design, construction and operation of vehicles which:

- have commenced construction after the date of approval of this code, and
- are used for the transportation of flammable gases or oxygen with hazard classifications 2.1.1A, 2.1.1B or 5.1.2A, and
- are used to convey these substances in bulk by road, and
- have tanks with an aggregate capacity greater than 500 litres.

This Code applies to tank trucks, tank semi–trailers and prime movers but does not apply to tank trailers.

1.5. Definitions

Where any term used is not defined in this section, the meaning of that term shall be as defined by the Hazardous Substances (Tank Wagon and Transportable Container) Regulations 2004 (as amended). Where there is a conflict in a term, the definition in the Hazardous Substances (Tank Wagon and Transportable Container) Regulations 2004 (as amended) shall prevail.

1.5.1. Approved fabricator

A fabricator who is approved by the EPA after written application. The fabricator is approved for the fabrication of one or more tank wagon designs.

1.5.2. EPA

The Environmental Protection Authority of New Zealand

1.5.3. HSNO

The Hazardous Substances and New Organisms Act 1996

1.5.4. Flammable Gas

Gases or gas mixtures with Class 2.1.1 A or 2.1.1B hazard classification as defined in the Hazardous Substances (Classification) Regulations 2001. A few examples of such gases are liquefied petroleum gas, hydrogen, and natural gas.

1.5.5. Liquefied Gas

Gases or gas mixtures as defined in regulation 3 of the Hazardous Substances (Compressed Gases Regulations) 2001.

1.5.6. Tank

An enclosed pressure vessel exceeding 500 litres water capacity permanently fixed to the chassis of a Tank Wagon and used for the transport or storage of a Flammable Gas or oxygen, and includes:

- any compartments and all components or materials (including coatings) necessary for the Tank to perform its containment function, and
- all parts affecting the structural integrity of the Tank and the means of closing the Tank.

1.5.7. Tank Wagon

A vehicle with aggregate tank capacity greater than 500 litres, including (but not limited to):

- A tank truck, that
  a. has its own means of propulsion, and
  b. contains a Tank, and
  c. is constructed for the primary purpose of the bulk transport of hazardous substances as a liquid or gas by road; or
- a tank semi-trailer, that
  a. contains a Tank: and
  b. is constructed for the primary purpose of the bulk transport of hazardous substances as a liquid or gas by road.

A tank semi-trailer is a trailer that is drawn by a prime mover through a fifth wheel or turntable connection.

A vehicle comprising a semi-trailer and prime mover is a tank truck (as defined above) that has its own means of propulsion (the semi-trailer cannot be used for transportation in isolation), such that the prime mover is considered part of the tank truck.

A vehicle which includes a tank that is removable, and which is filled whilst mounted on the vehicle or used to deliver from whilst mounted on the vehicle is included as a Tank Wagon. This removable Tank may be a transportable container.

1.5.8. Ullage

The Ullage of a container is the vapour space left when the container is filled with liquid to its liquid carrying capacity so that any expansion of the liquid will not cause overflow or excessive hydraulic pressure. The Ullage space is to be measured at 15 degrees Celsius.

1.6. References

AS 2809.3-2008 Road tank vehicles for dangerous goods – Road tank vehicles for compressed liquefied gases

AS 2809.6-2001 Road tank vehicles for dangerous goods –Tankers for cryogenic liquids

AS 3990:1993 Mechanical equipment - Steelwork

AS/NZS 1554: 2010 Structural Steel Welding Parts 1, 4 and 5

AS/NZS 1664 Part 1 Aluminium structures - Limit state design

AS/ NZS 1664 Part 2 Aluminium structures - Allowable stress design

AS/NZ 1665: 2004 Welding of aluminium structures

AS/NZS 2430.3.4: 2004 Classification of hazardous areas Part 3.4 Examples of area classification – Flammable gases

AS/NZS 60079.10.1: 2009 Explosive atmospheres – Classification of areas – Explosive gas atmospheres.

CGA 341-2007 Specification for Insulated Cargo Tank for Non-flammable Cryogenic Liquids

NZS 3404:1997 Steel Structures Standard Parts 1 and 2

NZS 5444: 2005: Part 2 Load Anchorage Points for Vehicles.

IEC 60529: 2004 Degrees of Protection Provided by Enclosures

Electricity Regulations 1997

Hazardous Substances and New Organisms Act 1996

Hazardous Substances (Tank Wagons and Transportable Containers) Regulations 2004 (as amended)

Hazardous Substances (Compressed Gases) Regulations 2004

Hazardous Substances (Classification) Regulations 2001

Health and Safety in Employment Act 1992

Health and Safety in Employment (Pressure Equipment, Cranes and Passenger Ropeways) Regulations 1999

ISO 20421-1:2006 Cryogenic vessels - Large transportable vacuum-insulated vessels, Parts 1and 2

Land Transport Rule: Vehicle Dimensions and Mass 2002 (Rule 41001) (as amended)

Land Transport Rule: Dangerous Goods 2005 (Rule 45001/1) (as amended)

1.7. Tank Wagons Carrying Permanent Flammable Gases

1.7.1. Tank Wagons that are limited to carrying substances with permanent Flammable Gases e.g. hydrogen, may be constructed in accordance with the requirements of Section 6 of this Code.

1.8. Antecedents

1.8.1. HSNOCOP 29-1 was approved in September 2008

2. Vehicle design and equipment requirements

2.1. General

2.1.1. The vehicle shall be strongly constructed, as far as practicable of fire resisting materials. The Tank, fittings and any part of the Tank Wagon that could under normal course of operation come into contact with the substance being carried must be constructed with materials that are compatible with that substance. The design of the vehicle shall provide an integration of the Tank supporting members and the vehicle chassis. The means of securing the Tank to the chassis, and in the case of tank semi-trailers the means of attaching the prime mover to the semi-trailer shall be designed to withstand the design loads of this Code. The vehicle shall, in addition, comply with all current NZ land transport rules and regulations.

2.1.2. The tank wagon shall be certified by a test certifier approved by the EPA to certify the design of the tank wagon.

2.2. Road Clearance

2.2.1. Tank components and protection devices located between any two adjacent axles of a vehicle or vehicle combination shall have not less than 40 mm ground clearance for each metre between such axle centres. The ground clearance shall be not less than 350 mm when unladen.

2.2.2. Tank filling and discharge connections which are rigidly attached to the Tank shall not extend lower than 40 mm below the plane through the centre line of the axles.

2.3. Rear Bumper Requirements

2.3.1. Every Tank Wagon shall be provided with a collision bumper to protect the Tank and vehicle from rear impact in accordance with the following requirements:

2.3.1.1. The collision bumper shall be located at least 400 mm behind the rear of the Tank and at least 150 mm behind any vehicle component which is used for loading or unloading purposes or which may contain fluid whilst in transit. The width of the bumper shall be not less than the maximum width of the Tank – refer to clause 2.3.1.6 of this Code.

2.3.1.2. The collision bumper shall be attached to the sub frame of the Tank Wagon or the chassis of the vehicle. It shall not be attached directly to the Tank.

2.3.1.3. The height of the collision bumper measured from the ground to the lowest surface of the collision bumper shall be not less than 500 mm and not more than 1000 mm.

2.3.1.4. The collision bumper shall be designed to withstand a horizontal load equal to 40 tonnes or a force equivalent to twice the weight of the fully loaded Tank Wagon, whichever is the

lesser, and uniformly distributed over the central 1500 mm section of the collision bumper. A limit state or alternative method of design can be used in accordance with NZS 3404:1997.

2.3.1.5. The outer section of the bumper i.e. that which extends outside the 1500 mm collision bumper, and which may be used to carry lights, does not have to comply with the strength requirements in 2.3.1.4.
Notwithstanding this, within the practical limits of the tank wagon configuration, the outer section of the bumpers on tank wagons should be designed to withstand impacts that may be expected to occur in daily service.

2.3.1.6. If the width of the Tank is less than 1500 mm, the width of the collision bumper must be not less than the maximum width of the Tank. If the width of the Tank is 1500 mm or greater, the width of the collision bumper shall not be less than 1500 mm.

2.3.2. An energy absorbing collision bumper may be used provided it is suitable for the vehicle involved and provided that its deformation under full deflection would not result in any damage to the Tank or its fittings.

2.3.3. Side under run protection is recommended. It is to be attached to the sub frame of the Tank Wagon or the chassis of the vehicle. It shall not be attached directly to the Tank.

2.3.4. Rear under run protection shall be fitted and must comply with the following requirements:

2.3.4.1. The rear under run protection shall have an elevation, measured from the ground to the lowest surface of the bumper, of not less than 300 mm and not greater than 500 mm.

2.3.4.2. The impact surface of the under run bumper shall be vertically in line (i.e. within 100 mm forward or backward) with the impact surface of the collision bumper.

2.3.4.3. The under-run protection shall be designed to withstand a horizontal load, uniformly distributed over the central 1500 mm section of:

- 10 tonnes (98.1 kN), if the weight of the laden Tank is less than 10 tonnes, or
- a force equivalent to the weight of the laden Tank , if that weight is not less than 10 tonnes and not more than 20 tonnes, or
- 20 tonnes (196.2 kN), if the weight of the laden Tank is more than 20 tonnes.

2.3.4.4. A limit state or alternative method of design shall be used in accordance with NZS 3404:1997.

2.3.5. All bumper dimensions are to be taken in the unladen state.

2.4. Electrical Wiring

The electrical wiring of Tank Wagons shall be suitable for the electrical loads and shall comply with the following requirements:

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 this system is fitted and 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 shall be fitted with an acid resistant cover. The battery terminals shall be held securely in place and shall be prevented from 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 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 must be able to be operated in the isolation mode from inside the vehicle cab in a position readily accessible to the driver. It shall be distinctively marked and shall be 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 in which it is required to operate 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. have a casing with protection degree IP65 (refer IEC 60529:2005). 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 or equivalent).

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.

2.4.6.5. If the vehicle engine is required to operate whilst discharging a gas with a flammable hazard class, e.g. the engine is used to power pumping equipment, it must be fitted with a brushless alternator or be similarly equipped to ensure compatibility with the zonal classification (e.g. have the field circuit of the alternator isolated).

2.4.7. The original equipment manufacturer wiring (i.e. wiring that is installed at time of manufacture) (for a cab and 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 manufacturer wiring that is in a hazardous atmosphere zone classified as Zone 1 to meet the requirements of that zonal classification.

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 located so as to avoid damage to insulation from heat. Wiring outside and to the rear of the cab or on a trailer must be carried in conduit or be double sheathed cable. Junction boxes are to be at least IP65 rated.

2.4.9. Any electrical equipment that may be required to be active during hazardous substance transfer and which is located within a hazardous atmosphere zone shall be suitable for such zones. The hazardous atmosphere zones are deemed to exist during hazardous substance transfer and for 5 minutes thereafter.

2.4.10. Hazardous atmosphere zones shall be determined in accordance with the principles of the area classifications of AS/NZS 2430.3.4:2004 or AS/NZS 60079.10.1:2009. These zones exist for the

period of the transfer plus a further five minutes.
AS/NZS 2430.3.4:2004 provides examples of area classifications. An acceptable alternative is to derive the area classification from first principles.

2.4.11. The electrical resistance between the Tank, the trailer chassis the prime mover chassis, or trailer under carriage and between the Tank and connection of Tank Wagon pipe work to the delivery hose shall not exceed 10 ohms. The resistance between all other conductive parts of the vehicle and the Tank shall not exceed 1 Megohm.

2.4.12. At least one means of bonding the load Tank or vehicle to any container, to or from which transfer of gas is made, shall be provided. It shall be located as far from flammable vapour emergence points as practicable, and in a convenient location for the operator. Additional connection points are permissible.

2.5. Fire Extinguishing Equipment

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

2.5.2. Fire extinguishers shall be installed so they are:

- mounted securely by means of a quick-release attachment, and
- 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 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 the purpose of this clause, each additional towed tank semi-trailer, each additional B-train[1] trailer 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.

[1] Two trailers linked together by a 5th wheel.

Table 2.1 Type and number of fire extinguishers

Application	Minimum Requirement
In every vehicle cab	One 30B extinguisher
A road Tank Wagon which exceeds 2,000 litres capacity	2 x 30B or 1 x 60B extinguisher on each Tank

2.6. Vehicle Inspection

2.6.1. Regular inspections of Tank Wagons shall be carried out in accordance with clause 2.2 of Appendix A. Records of the inspection and any necessary rectifications shall be kept by the vehicle operator and the owner for inspection. Alternative inspection procedures and frequencies may be used provided they cover the requirements of this Code.

2.7. Tank Truck or Prime Mover Equipment

2.7.1. Mode of power

The vehicle shall be powered by a compression ignition (diesel) engine.

2.7.2. Fire Resisting Shields

The person operating the Tank Wagon (i.e. the person in the driver's 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/m^2.

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.

2.7.3. Cab Rear Windows

If fitted, windows fitted in the rear wall of the cab shall be securely clipped to the cab 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 as being in the rear wall of the cab.

2.7.4. Vents

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.

2.7.5. Fuel Tanks

2.7.5.1. The fuel tank of the vehicle shall be located so as to minimise mechanical damage and the spread of fire. All piping shall enter through the top of the tank. In the case of vehicles fitted with dual fuel tanks, the manufacturer's interconnecting piping will be acceptable.

2.7.5.2. If mounted in a vulnerable position, the fuel tank shall be protected from mechanical damage. If the tank is constructed of aluminium with shell thickness less than 5 mm thick or constructed of steel with shell thickness less than 3 mm thick, then a guard shall be fitted unless the tank has an equivalent level of protection as specified in Appendix C of this Code. The guard shall take the form of a metal plate of above minimum thickness covering vulnerable surfaces of the tank. The protection provided to the fuel tank shall be attached securely to the vehicle (and not the fuel tank) unless it is impracticable to do so (e.g. the fuel tank would be located over width).

2.7.5.3. The tank shall have its filling hole fitted with a secure closure and shall not leak.

2.7.5.4. A fuel feed apparatus placed in front of the rear wall of the cab shall be used to lift the contents from the fuel tank. Fuel lines shall give a measure of fire resistance and shall be protected if outside the cab shield.

2.7.6. Exhaust and Intake

The exhaust may discharge horizontally in front of the front wheels or vertically behind the cab. It 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.

2.8. Tank Semi-Trailer Requirements

2.8.1. Fifth wheel couplings for tank semi-trailers shall be of a type which transmit a portion of the roll motion of the semi-trailer to the prime mover (under normal operations). In particular, tank semi-trailers should not be fitted with unrestricted double oscillating fifth wheels.

2.8.2. The fifth wheel shall have a maximum towed rating of at least 1.25 times the weight of the fully laden semi-trailer, and a vertical rating of at least 1.25 times the vertical load imposed on the coupling.

2.8.3. Brake equipment is to comply with all land transport rules. As a minimum it shall be at least a dual system of airline brakes, which under all conditions of use will immediately and automatically operate to stop and hold the trailer should it become disconnected from the vehicle to which it is attached.

2.8.4. The driver shall not be provided with a means of altering the intrinsic brake system balance.

2.8.5. Tank semi-trailer brake systems shall be provided with a remote air-operated emergency release system, having an independent air system.

2.8.6. No person shall attach a tank semi- trailer containing a Flammable Gas or oxygen to any vehicle unless that vehicle is a Tank Wagon, prime mover (tractor unit) or other vehicle that is designed for use in transporting Flammable Gases or oxygen.

2.8.7. An anti-tow away system (e.g. brake interlocks) is to be fitted.

2.9. Tank Mounting Requirements

2.9.1. A clearance of not less than 150 mm shall be provided between the back of the cabin and the Tank. For articulated vehicles, the clearance shall be achieved at all angular positions.

2.9.2. The mountings on the Tank Wagon chassis shall be designed and constructed in accordance with:

2.9.2.1. Forces able to be resisted by attachment of Tank to chassis

- Vertically up 1 g x M
- Vertically down 2 g x M
- Laterally 1 g x M
- Longitudinally 2 g x M

Where:
g = acceleration constant due to gravity (9.81 m/s^2)
M = mass of Tank, contents, and fittings (but excluding chassis)

2.9.3. If mountings of Tanks are provided by twist locks and the twist locks are used to provide vertical restraint, then they shall be selected to meet a vertically up strength requirement that is twice the strength requirement in clause 2.9.2.1. This rating of the twist lock is to be certificated. The twist locks are to be examined at 12 monthly intervals for mechanical defects and replaced if a defect is noted. The design number of twist locks must be in use. Twist locks are to be of a type where the twist lock can be mechanically held in the locked position. Non-retractable twist locks should be used.

2.9.4. The tank, its supports and connections shall be designed in accordance with:

- AS/NZS 1664.1:1997 Aluminium structures - Limit state design, or
- AS/NZS 1664.2:1997 Aluminium structures - Allowable stress design, or
- AS 3990:1993 Mechanical equipment – Steelwork, or
- NZS 3404: 1997 Part 1 Steel Structures Standard

taking into account the loadings below.

The applicability of each of these standards is limited to the tank wagon parts for which the standard is valid. The parts of the tank wagon that are to be designed by reference to Table 3.1 shall be

excluded from the provisions of these standards. Where applicable a vector sum of these loads shall be taken.

2.9.4.1. The tank and its attachments shall be designed to withstand a minimum design action of twice that due to the tank and maximum cargo. The density of the cargo or a value of 1000 kg/m^3, whichever is the greater, shall be used for calculations.

2.9.4.2. Stresses due to internal pressures caused by liquid head, plus vapour pressures of 20 kPa, shall be added to the static loading stresses.

2.9.4.3. Loadings caused by the weight of equipment, the reaction at supports and thermal gradients shall be taken into account.

2.9.4.4. Local loadings shall be taken into account as relevant. If applicable, a vector summation of any combination must also be considered. These can include:

- dynamic loading of the tank wagon in motion under all configurations of product load, and
- superimposed loads such as operating equipment, insulation, linings, hose tubes, cabinets and piping, and
- effect of supporting lugs and saddles or other supports, and
- effect of thermal gradients resulting from product and ambient temperature.

2.9.5. Unless fatigue resistance has been demonstrated by field experience or supervised tests, fatigue of the Tank Wagon (i.e. by reducing areas of stress concentration) shall be determined. Fatigue stresses shall be calculated and added to the stress calculated for the stationary vehicle. The calculation shall be based on the following load ranges at constant amplitude for $5x10^6$ cycles:

a.	vertical	0.6 g M
b.	longitudinal	0.4 g M
c.	lateral	0.4 g M

Explanation: This has the effect of providing an oscillating vertical load case of ±0.3 g M about an all up vertical load case of 1.0 g M (gross).

The calculation must be applied to all load cases including:

- at the maximum load configuration, the sum of the mass of the empty tank plus the mass of the contents (assuming the tank is 100% full using the density of the contents or a density of 1000 kg/m, whichever is the greater), and
- at the minimum load configuration, the mass of the empty tank only, and
- in the load configuration of some full compartments and some empty compartments, the full compartments are to include, the sum of the mass of the empty tank plus the mass of the

contents (assuming the tank is 100% full using the density of the contents or a density of 1000 kg/m^3, whichever is the greater).

2.10. Tank Wagon Welding

2.10.1. All welding of components for structural purposes in any new vehicle or in modifying any existing vehicle for use as a Tank Wagon shall be carried out in accordance with recognised good practice as determined in 2.10.2 to 2.10.6 below:

2.10.2. Welding of steel shall be in accordance with AS/NZS 1554:2010 Structural Steel Welding parts 1, 4 and 5 (or equivalent) as appropriate. This includes all requirements for qualification of welding personnel.

2.10.3. All welding of aluminium components shall comply with AS/NZ 1665:2004 Welding of aluminium structures (or equivalent). This includes all requirements for qualification of welding personnel.

2.10.4. Inspection of the welding shall be carried out in accordance with the welding specification (AS/NZS 1554:2010 or AS/NZS 1665:2004 as relevant) including:

- verification of material
- verification of filler material
- qualification of welding procedures
- qualification of welders to the above procedures
- inspection of production welds.

2.10.5. Review of the x-rays is to be carried out by properly qualified personnel. In particular, testing laboratory registration under the IANZ (or equivalent) with personnel holding currently recognised qualifications in the appropriate material category.

2.10.6. As part of the approval of each unit, certification that this testing has been carried out and passed is to be made available to a test certifier approved by the EPA.

- The documents from the above inspections are to be available for inspection at any time.
- An independent inspector or inspection agency may be required at the cost of the vehicle owner to check the welding or construction if the test certifier considers that some aspects do not conform to the requirements as specified in this Code.

2.11. Stability of Tank Wagons

2.11.1. A road Tank Wagon must be designed and constructed so that it will not roll over when subjected to any of the following:

2.11.1.1. A static roll threshold of at least 0.45g, and

2.11.1.2. A maximum dynamic load transfer ratio of 0.6, and

2.11.1.3. A high speed transient off-tracking of 0.8 m.

2.11.2. For the purposes of this clause, a static roll threshold means the maximum level of steady turning lateral acceleration a vehicle can tolerate without rollover, which is calculated as a proportion of g.

2.11.3. The requirements of sub clause 2.11.1 are met if the static roll threshold, calculated in accordance with the Land Transport Rule: Vehicle Dimensions and Mass 2002 is at least 0.45g.

2.11.4. Despite 2.11.1, a Tank Wagon must have a static roll threshold of at least 0.35g in any state of loading to comply with Land Transport Rule: Vehicle Dimensions and Mass 2002.

2.12. Overseas Designs

2.12.1. If the use of Tank Wagons designed and built overseas is contemplated, or if the building of overseas designs in New Zealand is contemplated, details of the proposal are to be submitted to an EPA approved test certifier to obtain a design test certificate.

2.13. Illumination

2.13.1. A flame-proof battery-operated torch shall be carried in the cab.

2.14. Other Requirements

2.14.1. In addition to this Code, Tank Wagons must conform fully to Land Transport Rules and carry a valid certificate of fitness.

2.14.2. Tank Wagons that transport hazardous substances by sea (e.g. across Cook Strait) shall comply with the applicable New Zealand Marine Transport Regulations and in particular with the ships' vehicle deck securing requirements specified in NZS 5444:2005: Part 2.

2.15. Valves

2.15.1. Any valve for Flammable Gas duty must be of a fire safe type.

3. Liquefied petroleum gases, tank, accessories and transfer systems

3.1. Tanks

3.1.1. Tanks shall comply with the requirements of the Health and Safety (Pressure Equipment, Cranes and Passenger Ropeways) Regulations 1999.

3.1.2. The materials of construction shall be steel alloy or other material as approved under the Health and Safety (Pressure Equipment, Cranes and Passenger Ropeways) Regulations 1999.

3.1.3. 0.5 kg of LPG is to be regarded as equivalent to 1 litre.

3.1.4. The maximum filling ratio shall be such that:

3.1.4.1. the container does not become liquid full at a temperature of less than:

- For Tanks 5,000 litre and below: 47.5^{o} C, or
- For Tanks exceeding 5,000 litres: 45^{o} C.

3.1.4.2. The liquid will not exceed 97% of total liquid capacity under normal conditions of storage.

3.1.5. The maximum filling ratios as given in the table below will comply with the above requirements:

	For Tanks 5,000 litres and below	**For Tanks exceeding 5,000 litres**
n-butane	0.533	0.535
Iso-butane	0.512	0.515
propane	0.449	0.454

3.1.6. The maximum pressure attained by LPG at a temperature of 45^{o} C (for containers over 5,000 litre but not exceeding 26,000 litres) or 40^{o} C (for containers exceeding 26,000 litres) shall be used for the maximum allowable working pressure of the container.

3.1.7. Unless otherwise stated in this Code, tanks and tank fittings shall comply with the requirements of AS 2809.3-2008 clauses 2.1, 2.2, 2.3, 2.4, 2.5, 2.8 and 2.9 with the following amendments:

3.1.7.1. Tanks and fittings shall be painted predominantly white, and

3.1.7.2. Every delivery connection of the Tank shall be fitted with a quick closing internal valve, designed to close automatically on the operation of a fusible link and manually by release from either of two remote points, and

3.1.7.3. Each Tank shall be fitted with a liquid drain incorporating an excess flow valve plus a shut-off valve or alternately a check lock valve and a means of attaching a hose.

3.1.8. The Tank shall be designed and constructed to withstand the fatigue forces specified in clause 2.9.5.1. In addition to these it shall be designed to withstand a fatigue load case for pressure of -7 kPa (i.e. from -7 Pa to the recommended operating pressure).

3.2. Transfer Pumps, Compressors and Hoses

3.2.1. Unless otherwise specified in this Code, pumps and compressors shall comply with the requirements of clauses 2.10 and 2.11 of AS 2809.3-2008.

3.2.2. Liquid transfer pumps and compressors shall be designed for the substances they are intended to be used for.

3.2.3. Compressors shall take suction from the vapour space of the Tank. Pumps with a self-priming bypass shall have a check valve fitted where the bypass enters the Tank and a manually operated shut-off valve as close as possible to the Tank (this valve shall be fitted with an extension spindle for ease of operation from the side or end of the Tank).

3.2.4. Pumps shall be powered by one of the following:

3.2.4.1. A flameproof electric motor complying with the Electricity Regulations, or

3.2.4.2. Power take off from the main diesel engine fitted as follows:

- Air intake terminating either above the level of the top of the cabin if situated at the rear of the cab, or at least 1.5 m above ground level if situated at the front of the cab, and
- Strangler (i.e. device to shut the intake air) fitted on the air intake with dual controls operable from inside the cab and at a point remote from the cab; strangler to be clearly identified by label and easily accessible, and
- An alternator constructed in accordance with the provisions of clause 2.4.6.5 of this Code, and
- Exhaust pipe terminating above the level of the cabin roof, or

3.2.4.3. Separate diesel engine for pumping fitted as follows:

- All electrical equipment removed, and
- Air intake terminating above the level of the Tank, and
- Air intake strangler with dual controls, one situated near the engine and the other remote; strangler to be clearly identified by a label and easily accessible, and
- Exhaust pipe terminating above the Tank or remote from the pump and control valves, and
- Engine fuel lines, including contents sight glasses to be of fire resisting material.

3.3. Pipework and Transfer Systems

3.3.1. Unless otherwise specified in this Code, pipework and transfer systems shall comply with the requirements of clauses 2.7 and 2.11 of AS 2809.3-2008.

3.4. Loading Gantry Interconnection

3.4.1. The Tank Wagon is to be connected to the loading gantry shut down system such that if the loading gantry shuts down, the Tank Wagon transfer connections are also shut down.

4. Transport of unodourised liquefied petroleum gas

4.1. In addition to the requirements of this Code, the following are conditions for the transport of Liquefied Petroleum Gas without an odorant added to specifically indicate the presence of Liquefied Petroleum Gas at all concentrations above 20% of the lower flammability limit.

4.2. Each case of transport of unodorised gas must comply with the following requirements:

- Conspicuous signs are required on at least two sides of the Tank, warning that the contents are unodorised. The sign is to be of a different colour to the Class 2.1 transport placards (i.e. red) or otherwise highlighted.
- The Tank Wagon shall not be parked in a built up or residential area or within 8 m of a source of ignition.
- The Tank Wagon route is to be the most direct and suitable.
- The Tank Wagon is to carry a gas detector in the cab. Prior to movement of the Tank Wagon, the fittings of components containing the liquefied petroleum gas are to be verified as being gas tight.
- A risk assessment is to be undertaken to identify further conditions as warranted by the operation.

5. Multiple containers

5.1. In addition to the applicable requirements of this code, the following are required for the transport of gases in multiple containers (e.g. cylinders or larger vessels) which are permanently fixed.

- The containers must be individually restrained in such a manner that they cannot contact each other. The design must prevent water pooling and corrosion of the containers and the supporting structure.
- Valves and pipework must be protected from roll over damage.
- Any enclosed spaces must be adequately ventilated.
- Cylinders (up to 500 litre each) shall be certified under the Hazardous Substances (Compressed Gases) Regulations 2004.
- Containers greater than 500 litre are to be approved under the Health and Safety in Employment (Pressure Vessels, Cranes, and Passenger Ropeway) Regulations 1999.

6. Permanent flammable gases

6.1. This section applies to the transport of permanent Flammable Gases e.g. hydrogen and natural gas, in bulk transported under pressure.

6.2. In addition to the requirements specified elsewhere in this code the following are to be complied with.

6.2.1. Cylinders with individual capacity no greater than 500 litres shall be certified under the Hazardous Substances (Compressed Gases) Regulations 2004.

6.2.2. Containers greater than 500 litre shall comply with the Health and Safety (Pressure Equipment, Cranes and Passenger Ropeway) Regulations 1999.

6.2.3. Containers shall comply as follows:

6.2.3.1. Maximum permissible pressure is that attainable at 65^{o} C (reference temperature);

6.2.3.2. Filling pressure is at 15^{o} C;

6.2.3.3. The vessel shall be fitted such that if it reaches 65^{o} C, the pressure shall not exceed 85% of the hydrostatic test pressure.

6.2.4. Valves and pipework shall be protected from roll over damage.

6.2.5. A breakaway coupling, non-return valve or similar is required in the discharge line to prevent unacceptable gas loss if the line breaks. A brake interlock shall be installed such that the vehicle cannot be moved if connected to static storage or pipework.

7. Transport of cryogenic liquids

7.1. This section applies to the transport of hazardous substances at cryogenic temperatures, that is, the gas is cooled sufficiently to be in the liquid state.

7.2. Every Tank Wagon shall be equipped and maintained as follows:

7.2.1.Tank Wagon:

- for Flammable Gases, the Tank Wagon shall comply with Section 2 of this Code, or
- for oxygen, the Tank Wagon shall be of fire resistant construction where practicable.

7.2.2. Tank:

- if the maximum working pressure is greater than 50 kPa, the Tank shall comply with the requirements of the Health and Safety in Employment (Pressure Equipment, Cranes and Passenger Ropeways) Regulations 1999, and
- if the maximum working pressure is up to 50 kPa the Tanks shall be designed in accordance with the requirements of either AS 2809.6-2001, CGA 341-2007 or ISO 20421:2006, and
- the product filling ratio shall be as determined in the standard to which the Tank is constructed to i.e. either AS 2809.6-2001, CGA 341-2007 or ISO 20421:2006, and
- the thermal insulation shall be incombustible and compatible with the substance carried.

7.2.3. Pipework, valves, fittings and equipment:

- shall comply with the requirements of the standard which the Tank is constructed to i.e. either AS 2809.6-2001, CGA 341-2007 or ISO 20421:2006, and
- shall be compatible with the substance transported, and
- shall be suitable for the temperatures and pressures, and
- shall be protected from roll-over damage, and
- safety relief valves shall be fitted to relieve pressure between the valves.

7.2.4. Tank mountings, both inner and outer, shall withstand the greater of the loads as per clause 2.9.4 of this Code or the standard which the Tank is designed to.

7.2.5. Fire extinguishers are to be carried on Tank Wagons transporting flammable or oxidising substances in accordance with clause 2.5 of this Code.

7.2.6. Labels shall be fitted on the Tank Wagon in accordance with the requirements of the land transport rules.

8. Anhydrous ammonia

8.1. Tank Wagons designed and constructed for transporting anhydrous ammonia shall, in addition to the requirements of this Code, comply with the requirements of Section 4 of AS 2809.3-2008.

9. Repairs

9.1. Major Repairs to Tank Wagons

9.1.1. Major modifications or repairs affecting the structural integrity of any Tank used for conveying Flammable Gases or Oxygen in bulk shall be carried out only after a design test certificate has been issued by an EPA approved test certifier.

9.1.2. A major repair or modification is defined as altering the sub-frame and or Tank, and includes remounting of Tanks (where the structural integrity of the Tank is changed).

9.1.3. Repairs shall be carried out as above only when the Tank has been rendered free of flammable gas.

9.1.4. The completed Tank Wagon is to undergo a pre-commissioning inspection prior to returning to service.

9.2. Repairs and Servicing of Tank Wagons

9.2.1. Tank Wagons that are gas-freed (i.e. free of any hazardous liquid or vapour) may be serviced at any location or in any building, subject only to Clause 9.1 above.

9.2.2. Tank Wagons that are not gas-freed may be taken into a building for repairs or servicing, including maintenance, but not hot work, provided that:

9.2.2.1. the pressure in the Tank is reduced to atmospheric pressure or low pressure (i.e. 35 kPa) and valves closed or sealed, and

9.2.2.2. no hot work is undertaken on the Tank Wagon, and

9.2.2.3. the room is well vented to the outside of the building, and

9.2.2.4. there is no source of ignition within 8 metres (electrical wiring and fittings to be in accordance with requirements for use in hazardous areas or disconnected), and

9.2.2.5. the building is fire resistant or there is a sprinkler system installed, and

9.2.2.6. the person in charge of the work is instructed not to interfere with the load Tank or its fittings.

9.2.3. Tank Wagons may be serviced outside a building provided that:

9.2.3.1. the Tank valves are closed or sealed, and

9.2.3.2. no hot work is undertaken on the Tank Wagon, and

9.2.3.3. there is no source of ignition within 8 metres (electrical wiring and fittings to be in accordance with requirements for use in hazardous areas or disconnected).

9.3. Emergency Repairs

9.3.1. Emergency repairs not involving the load Tank may be carried out in a building if:

9.3.1.1. it is impractical to do work otherwise, and

9.3.1.2. the vehicle remains in the building for the minimum period of time, and

9.3.1.3. the vehicle does not remain in building overnight, and

9.3.1.4. the person in charge of the building is given written notice of the presence of Flammable Gases or Oxygen in the building, and

9.3.1.5. the driver or other responsible person (who is authorised and able to drive the Tank Wagon) remains with the vehicle until the repair is completed, and

9.3.1.6. the vehicle is located where it is not subject to heating.

9.3.2. Emergency repairs or operations (where the Tank Wagon cannot be moved) may be carried out at other locations provided no source of ignition is permitted within 8 m.

9.4. Re-testing

9.4.1. See clause 2.5 of Appendix A.

9.5. Accidents and Incidents

9.5.1. Accidents and incidents that involve injury, the integrity of the Tank or potentially could involve the integrity of the Tank must be reported to the Police. All repairs are to be approved by an EPA approved test certifier.

10. Markings

10.1. A specification plate must be permanently attached to each Tank or Tank sub-frame and be marked with the following information:

10.1.1. the recommended operating pressure for each part of the Tank and fittings that are intended to operate at different pressures, and

10.1.2. the maximum gross filling level of each Tank compartment, and

10.1.3. the maximum density of any liquids to be carried, and

10.1.4. the material used to construct the Tank, and

10.1.5. the date of manufacture, and

10.1.6. the manufacturer of the Tank, and

10.1.7. the serial number of the Tank, and

10.1.8. any limitations on substances that can be transported e.g. Liquefied Petroleum Gas only.

10.2. This plate shall be affixed in a place readily accessible for inspection, preferably on the true left hand side near the front of the Tank. The information shall be stamped, embossed, or applied by suitable means, into the material of the plate in characters at least 5 mm high. The plate shall not be painted so as to obscure the marking thereon. The Tank serial number shall also be stamped on a substantial part of the Tank structure.

10.3. Separately from the above, the following are also to be permanently attached:

10.3.1. the name and contact details of the test certifier who certified the last in service test certificate for the Tank Wagon is to be permanently attached to each Tank or sub-frame. This can be a plate or label, and

10.3.2. the design registration number issued by the Authority (or LAB number issued by the Department of Labour if the Tank was constructed prior to 1st April 2004), is to be permanently fixed on the Tank in letters and numerals 75 mm high, preferably on the front right hand side of the Tank, and

10.3.3. all Tank outlets are to be labelled with the function of the outlet.

10.4. The Tank Wagon shall be marked in accordance with the placarding requirements of Land Transport Rule: Dangerous Goods 2005 and subsequent amendments as shown in Appendix B.

Appendix A - means of compliance with this code

The following are the actions are to be undertaken by a vehicle owner or the owner's agent to comply with this Code.

1. Design

1.1. The design of any new Tank Wagon or the assessment of any existing vehicle which is undergoing major modification, for use under this Code is to be carried out by a competent[2] person with relevant experience in the road transport industry. Completed designs and assessments are to be forwarded to the EPA approved test certifier to obtain a design test certificate. This certificate may be issued with conditions of approval.

1.2. The person seeking the approval of the test certifier will be expected to provide the following information:

1.2.1. Two copies of the general assembly drawing of the Tank Wagon for which approval is sought INCLUDING, for semi-trailers, the anticipated prime mover to be used. This drawing shall show all major dimensions.

1.2.2. In the case of new designs, two copies of the working drawings to be used in the construction of the Tank Wagon. In the case of assessments of existing designs, a copy of the assessment report and two copies of any drawing showing any modifications to be made before the Tank Wagon enters service.

1.2.3. The design calculations for the rear bumper and rear under-run bumper.

1.2.4. The design calculations for the Tank mounting arrangements.

1.2.5. The static roll threshold criteria assessment (static roll threshold certificate (LT400)).

1.2.6. If available the registration number and fleet number of the vehicle concerned.

1.2.7. The identification of the qualified person responsible for the design or assessments.

1.2.8. The identification of the qualified person to be responsible for the supervision of construction of the Tank Wagon.

1.2.9. Flow diagram or pipework schematic of layout of Tank, pipework, valves etc.

1.3. Once the Test Certificate for the design is issued, a copy of this Test Certificate and the design information (including the drawings) is to be forwarded to the EPA who will issue a register number in

[2] In this context a competent person means a chartered professional engineer or similarly qualified person familiar with the design and construction of road transport vehicles

the form “TAN XXX”. If this design is to be used for other vehicles that have Tanks 2000 litres or larger, these shall be designated by separate numbers.

1.4. Before the Tank Wagon enters service, it must undergo a pre-commissioning inspection by a test certifier for compliance with the requirements of this Code. This inspection will include:

1.4.1. Obtaining a written declaration from the manufacturer responsible for the supervision and construction of the Tank Wagon stating that the Tank Wagon has been constructed according to the approved design and drawings and is in accordance with this Code (refer to the Manufacturer’s Declaration included with this Appendix).

1.4.2. A check for compliance with this Code.

2. Pre-commissioning

2.1. Before the tank wagon enters service a pre-commissioning test certificate issued by a test certifier approved by the EPA must be obtained. The tank wagon must undergo an inspection which will include:

2.1.1. the obtaining of a written declaration from the manufacturer responsible for the supervision and construction of the tank wagon stating that the tank wagon has been constructed according to the approved design and drawings and is in accordance with this Code (refer to the Manufacturer’s Declaration included with this Appendix).

2.1.2. a check for compliance with this Code.

2.2. A pre-commissioning test certificate is not required for a tank wagon with a tank capacity of less than 2000 litres and which is manufactured by an approved fabricator in accordance with the terms and conditions of the fabricator’s approval.

3. Inspection

3.1. The vehicle shall be operated and inspected in accordance with the requirements of this Code, and all records of inspection required by this Code shall be kept by the vehicle owner or owner’s agent. These inspection requirements include:

3.2. All Tank Wagons shall be inspected and maintained as determined by their usage patterns and shall include the following:

- inspection in accordance with the requirements of the Health and Safety in Employment (Pressure equipment, cranes and passenger ropeways) Regulations, and
- a visual inspection of the hoses monthly, and
- a hydrostatic test of the hoses and flexible connections at a pressure not less than the design pressure annually, and

- regular leak testing of gas containing components.
- A written record of every test shall be kept by the operator.

Every 3 months - an inspection carried out by a suitably experienced serviceman. This shall include

- inspection of any flexible hoses used in the transfer system for damage and wear and for electrical conductivity (if applicable), and
- inspection of any earthing straps for continuity and serviceability, and
- inspection of the intake flexible coupling (where applicable).

3.3. Every six months - present the vehicle to a vehicle testing station for a certificate of fitness inspection.

3.4. Every two years - an In Service Test Certificate issued by a test certifier approved by the EPA is to be obtained.

3.5. If there is any reason to suspect a leak or the vehicle is involved in an accident that affects the Tank or pipework, or if repairs are carried out to the Tank or pipework, the Tank or pipework shall be repaired and tested in accordance with the requirements of Health and Safety in Employment (Pressure Equipment, Cranes and Passenger Ropeways) Regulations 1999. Reference should also be made to Clause 9.5 of this Code.

3.6. The pipework shall be tested in accordance with the requirements of the Health and Safety in Employment (Pressure Equipment, Cranes and Passenger Ropeways) Regulations 1999 at least once every 5 years. This is to include a hydrostatic test and a leak test (e.g. soap bubble) pressurised to 2350 kPa.

3.7. Tanks and pipework failing the above tests shall be suitably repaired, and the tests shall be continued until no leaks are discovered, before any Tank is put into service.

3.8. If repairs are undertaken on items other than the Tank and pipework, these are to be carried out in accordance with the provisions of this Code.

3.9. Following repairs, the Tank Wagon is to be recertified by a test certifier approved by the EPA.

3.10. In circumstances whereby these inspection procedures are unable to be used, alternative inspection procedures may be used provided that they approved by the test certifier issuing the test certificate for the tank wagon.

Manufacturers Declaration – Flammable gases tank wagons

I . . . . . certify that I have design checked /inspected the following:

Vehicle:	Reg No:
Owner:	Fleet No:
Type of Vehicle:	Tank No:
Hazardous substances:	Capacity:
	Drawings:

I declare that I have made such detailed examinations and checks as I considered necessary and it is my opinion that:

1. The design is in accordance with HSNOCOP 29 *Code of Practice for Flammable Gases and Oxygen Tank Wagons (the Code)* and has been issued the registration number …….
2. The construction is in accordance with good and widely accepted engineering practice and the design as shown on the drawing list attached.
3. An inspection has been carried out and the requirements of the Code have been met.
4. I have witnessed and/or verified non-destructive testing/hydro testing in accordance with the requirements of the Code.
5. This Tank Wagon is subject to additional conditions as follows:

Therefore I recommend that this Tank Wagon be approved for transport of ……..Flammable Gases/Oxygen (strike out whichever is not applicable) under the Hazardous Substances (Tank Wagons and Transportable Containers) Regulations 2004.

Signed . . . . . .

for and on behalf of . . . . . .

Appendix B - Signage

1. Tank Wagons transporting Flammable Gas or Oxygen must display hazard class placards, emergency information panels and other markings as set out in Land Transport Rule: Dangerous Goods 2005. These requirements are summarised in this appendix, but you must refer to the Rule for full details.
2. Placards must be clean, visible, unobscured and positioned on a contrasting background on the vehicle or Tank so that the nature of the load can be readily identified from a distance of 25 metres in daylight.
3. Tank Wagons must display for all dangerous goods in the load:
   - 3.1. the hazard class placards that identify the risks of the hazardous substances being transported; and
   - 3.2. the emergency information panel, which specifies the UN Number, the Hazchem code and the emergency telephone number; and
   - 3.3. the proper shipping name, which must be legible from a distance of 10 metres (when transporting LPG the marking “FLAMMABLE LP GAS” is to be used in letters at least 125 mm high). The proper shipping name may be included in the emergency information panel; and
   - 3.4. the words “NO SMOKING OR NAKED LIGHTS WITHIN 8 METRES”, which must be legible from a distance of 10 metres. This warning may be included in the lower half of the class placard.
4. Tank Wagons must display:
   - 4.1. the hazard class placard at the front of the vehicle or vehicle combination; and
   - 4.2. all the information in 3 above, on the rear and on both sides.
5. Placards on the front of a vehicle or vehicle combination must be at least 250 mm measured along any edge.
6. Placards and emergency information panels on the rear or sides of a Tank Wagon must be at least 400 mm measured along any edge.
7. When a tank semi-trailer is disconnected from a towing vehicle, 250 mm class placards must be displayed on the front of the tank semi-trailer.

Note: To ensure adequate legibility distance of markings on a Tank Wagon, all letters and numerals should be at least 40 mm high.

Appendix C – Vehicle fuel tank construction and testing

This Appendix outlines the conditions under which a vehicle fuel tank may be tested as alternative to providing a protection guard (see Clause 2.7.5.2). These requirements are based on those of the USA Federal Highway Administration (Section 393.67) and only apply to side-mounted vehicle fuel tanks containing vehicle fuel (diesel and petrol) at normal atmospheric pressure and temperature.

1. Construction Requirements

1.1. All joints are to be closed by welding such that they are sealed.

1.2. Drains and bottom fittings shall not project more than 25 mm from the bottom of the tank.

1.3. All fittings are to be installed via flanges, nozzles or spuds welded into the tank.

1.4. A fuel tank with a capacity greater than 100 litres shall have a vent to prevent over pressurisation during a fire. The vent must activate before the internal pressure in the tank exceeds 340 kPa.

1.5. The tank is to be equipped with a non-spill air vent.

1.6. The tank is to be marked with liquid capacity, date of manufacture and indication of acceptance under this Code.

2. Testing Requirements

2.1. Pressure test — the tank and fittings are to be capable of withstanding an internal pressure of at least 150% of the pressure reached during venting or 500 kPa without leakage.

2.2. Leak test — the tank is to be filled, with feed outlet sealed, and rotated about any axis without any leakage.

2.3. Drop test — fill tank with quantity of water having a weight equal to the weight of the fuel load.

2.3.1. Drop the tank from a minimum height of 9 m onto an unyielding surface such that it lands squarely on one corner. Tank and fittings to be leak free.

2.3.2. Drop the tank from a minimum height of 3 m onto an unyielding surface such that it lands squarely on its fill pipe. Tank and fittings to be leak free.

Environmental Protection Authority
Te Mana Rauhī Taiao

215 Lambton Quay, Wellington 6011, New Zealand

New Zealand Government