



GUIDANCE FOR MANAGING THE RISKS ASSOCIATED WITH END OF LIFE LPG VEHICLES

LET'S TALK SAFETY

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PROPERTIES AND HAZARDS OF LPG

The term 'LPG' covers a range of mixtures of propane and butane stored as liquids under pressure, but it is propane that is mostly used to fuel vehicles.

LPG and petrol have many similar properties and the good practices appropriate for work on petrol vehicles apply equally to LPG vehicles.

The main difference is that LPG vaporises more rapidly than petrol, so, as LPG is stored in the fuel tank and associated fuel lines at elevated pressure (up to 10 bar g), any leakage will immediately vaporise and disperse. LPG vapour is highly flammable and mixtures in air of between 2% and 10% will readily ignite and explode.

The rapid expansion resulting from the conversion of liquid propane into a vapour causes severe cooling of the gas. Anyone exposed to a vapour cloud or in contact with metal surfaces may receive cold burns.

The risks to persons undertaking the work of dismantling vehicles with either petroleum, LPG or natural gas systems are fire, explosion, exposure to chemicals, asphyxia, hot and cold burns, manual handling.

END OF LIFE VEHICLE RECYCLING/SCRAPPING BUSINESSES SHOULD:

- identify LPG vehicles before accepting them;
- only accept LPG vehicles if there are procedures for the safe removal and disposal of the LPG system;
- park vehicles awaiting recycling or dismantling in a safe place;
- ensure LPG tanks are removed before scrapping.
- Only allow personnel trained and competent in the use of LPG as a road vehicle fuel to work on the vehicle engine or fuel system. No one should remove any part of the system,

nor should they empty or gas-free it, unless they have received appropriate training and are competent to do the work, such as a licenced gas fitter.

- Only allow people trained in the safety aspects of LPG and LPG systems should be allowed to carry out any work on LPG vehicles where their work is adjacent to, or could otherwise affect, the LPG system on the vehicle itself.
- Anyone working on LPG vehicles must know where system components are located and be aware that some contain liquid LPG whereas others contain its vapour. In either case, the LPG will be at an elevated pressure
- Ensure that the battery has been disconnected and removed prior to removing the fuel system

PERSONAL PROTECTIVE EQUIPMENT (PPE)

The safety data sheet should always be referred to for guidance on what personal protection equipment should be used. Generally the requirements are as follows. Thermally insulated gloves and either goggles or close fitting protective glasses with side visors are recommended when handling LPG. Long sleeved shirts and long trousers made from natural materials such as cotton should be worn at all times.

If personnel are required to work in areas where the concentration of LPG MAY be above the exposure standard respiratory protection should be used. This should be a supplied air facemask self-contained breathing apparatus complying with AS1715 and AS1716.

HAZARDOUS ZONES AND IGNITION SOURCES

The extent of the hazardous zone will depend on a number of factors, how much gas is potentially present and the level of ventilation, if outdoors conditions would be considerably different on a still day as opposed to a windy day. Unless continuous gas monitoring is taking place no ignition source should be present where it is possible for there to be flammable vapours present, noting that you only require 2% of gas vapour mixed with 98% air for it to ignite.

Types of ignition sources are naked flames, smoking, electrical devices, power tools, cordless tools, mobile phones, static discharge.

Non sparking hand tools are made of metals such as brass and bronze as opposed to the more commonly manufactured hand tools that are made from steel alloys. Non-sparking tools provide protection against fires and explosions in environments where there is a concern about sparks igniting flammable vapours. It is important to assess each situation carefully and use the appropriate tools for the hazards that are present.

If power tools are used in the hazardous areas they must be rated intrinsically safe. For example the electric motor on a power drill must be rated as 'explosion proof'. Battery operated power tools must also be suitably rated for use in a hazardous area.

LPG TANK EMPTYING AND REMOVAL

LPG tank emptying for replacement, repair, revalidation, recycling, or before a vehicle is scrapped, must only be carried out in a safe place and by suitably trained and competent people using appropriate equipment.

Locate and Identify LPG Tank - There are three main types of LPG tank in use in Australia, although others may be found in privately imported vehicles. The two most common ones are cylindrical, often used on light commercial vehicles, and toroidal (doughnut shaped), which

fit either in the spare wheel well or underneath the floor where the spare wheel might be hung. Either of these shapes could also be installed in larger vehicles such as 4x4s. These vehicles may, instead, have the third type of tank, sill tanks, which are narrower cylindrical tanks mounted below the door sills.

SOME TYPICAL LPG TANKS

Toroidal Tank



Cylindrical Tank



Check for Gas Leaks - Although LPG tanks are quite robust, it is possible that the connections to the tank or pipes in an old or accident-damaged vehicle could have been fractured, allowing gas to leak into any adjacent low points. Inexpensive proprietary, approved equipment is available that can identify the presence of a leak so that it can be dealt with as a priority before proceeding with further dismantling. This is particularly important if the battery is located near the LPG tank as the battery would normally be removed as the first depollution operation and any sparks could ignite the gas.

A vehicle with a persistent or significant leak should be quarantined in the open air, in an area from which smoking, naked flames and all sources of ignition are prohibited and professional assistance from an LPG specialist should be sought to deal with it.



STORAGE OF LPG AUTOMOTIVE TANKS

Store LPG tanks that have not been emptied and gas-freed in clearly marked and secure areas. These should preferably be above ground, in the open air, away from drains and pits, and clear of combustible materials and sources of ignition.

Keep LPG tanks in their mounting orientations, chocked to prevent rotation, and with relief valves unobstructed as displayed in diagram #1

Diagram #1 correct tank orientation for storage.



Diagram #2 Incorrect tank storage and orientation.



EMERGENCY PROCEDURES

Train all staff in the emergency arrangements for events such as an uncontrolled release from an LPG system, a fire in the vicinity of an LPG vehicle, or people suffering from cold burns.

Ensure emergency equipment such as fire extinguishers are strategically located, appropriate for the task and serviced as per the manufacturers requirements.

Where an LPG leak is detected on a vehicle inside a building, close the tank isolation valve and, if it is safe to do so, move the vehicle to a safe place in the open air. Evacuate the building and don't allow anyone back until it has been declared safe. If a leak is uncontrollable or catches fire, call the emergency services.

SOURCES OF INFORMATION

SafeWork NSW

Tel 131 050 www.safework.nsw.gov.au

Fire & Rescue NSW

Tel: 02 9265 2999 Email: info@fire.nsw.gov.au

Supporting standards

AS/NZS 60079 - Explosive atmospheres

AS 4332 - The storage and handling of gases in cylinders

AS4343 - Pressure equipment Hazard levels

AS/NZS 1841 - Fire extinguishers

AS/NZS 1596 - The storage and handling of LP Gas

AS 2746 - Working areas for gas-fuelled vehicles

AS/NZS 2739 - Natural gas (NG) fuel systems for vehicle engines

AS 1210 - Pressure vessels

AS/NZS 1715 - Selection, use and maintenance of respiratory protective equipment

AS /NZS 1716 - Respiratory protective devices

