

### Safe Working Practices:

#### SWP- 05 Working with LPG Engines

Before doing any type of work you must carry out an assessment of the task to be undertaken. This will include the equipment to be worked on, the task itself, Personal Protective Equipment requirements, the work area and environment, plus the tools and equipment required to carry out the job safely. Consult your team leader if you are not satisfied the job can be carried out in a safe manner.

#### GENERAL

- 1.0 Liquefied Petroleum Gas, commonly referred to as LPG, consists of Propane and or Butane.
- 1.1 Is stored under pressure and is **definitely not Low-Pressure Gas** as is sometimes believed.
- 1.2 Gas driven machines can, if poorly handled or maintained be dangerous, as is the case with most work equipment. The training received by technicians working on this kind of truck will provide the knowledge necessary to avoid accidents and at the same time maintain the machine in good working order.
- 1.3 However to ensure continued safe working with LPG machines the following general advice and instructions will be helpful.

#### **LPG:**

- **is highly flammable.**
- **is heavier than air and will collect in pits and drainage areas.**
- **is stored as a liquid, expands over 250 times when vaporised.**
- **will cause freeze burns when it comes into contact with the skin.**

#### SAFETY

- 2.0 Before starting repairs that do not require battery power, switch off at the ignition lock and disconnect the battery.
- 2.1 When carrying out tasks that require battery power, the likelihood of stray sparks should be considered. Particularly where the presence of fuel gas is likely e.g. compression tests, where the ignition coil should be isolated to prevent short circuiting and the creation of sparks.
- 2.2 Avoid contact with hot exhaust components and radiators. Never remove the radiator cap whilst the engine is hot.
- 2.3 Keep yourself, loose clothing, and long hair away from moving parts when the engine is running.
- 2.4 Avoid skin contact with LPG. If burnt, apply continuous cold water and seek medical advice.
- 2.5 Before working on gas driven equipment turn off the cylinder tap and run the engine until it stops, this will effectively purge the system.
- 2.6 Use only P.T.F.E. tape on gas joints. Gas vapour will attack most other jointing compounds.
- 2.7 Gloves and Goggles must be worn if there is a risk of contact with the gas

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- 2.7 If leaking is suspected, the suspect area may be checked by the application of liquid soap, or leak detection spray.
- 2.8 Be aware that on many machines the gas tap on the cylinder is relatively exposed and protected only by a shroud attached to the cylinder. It is not unknown for this shroud and tap to be knocked off when involved in an accident. The uncontrolled escape of gas (it vaporises instantly at normal atmospheric pressure) needs only a source of ignition and the resulting fire is extremely dangerous. Cylinders damaged in this way will usually be empty, having fully discharged however care must be taken until this has been fully ascertained. If the equipment will not start and the system opened a controlled release of gas is required.
- 2.9 Take care when working on ignition systems, the ignition coil can produce voltages in excess of 20,000V.
- 2.10 Do not park trucks near any heat source e.g. furnaces, ovens, radiators, or the exhaust of idling engines.
- 2.11 Where possible and available LEVs should be attached to the exhaust to reduce exposure to fumes. Where there is no LEV, the area must be well ventilated when the engine is running. All running of equipment to be kept to a minimum.
- 2.12 Avoid working in Maintenance pits, the gas is heavier than air and will settle in these areas increasing the risk of inhalation / asphyxiation.

#### **CYLINDER CHANGING**

- 3.0 LPG cylinders should be changed in specifically designated areas sited out of doors. Avoid open pits, drains, underground entrances, lift shafts and similar areas.
- 3.1 There should be no smoking, naked lights, or other heat sources in the vicinity.
- 3.2 The engine should be stopped, brakes applied, ignition switched off and the operator off the truck before disconnecting the cylinder.
- 3.3 Examine the replacement cylinder and valve before fitting. Do not install cylinders with obvious defects e.g. damaged valve threads or any sign of impact damage.
- 3.4 If necessary, use assistance to lift and position the replacement cylinder. Full cylinders are heavy and positioning them onto a truck will require 2 persons.
- 3.5 Make sure that the cylinder is located in its cradle correctly and that the valve is in the right position.
- 3.6 Inspect the threads and sealing washers, to valve and truck fittings, before reconnecting.
- 3.7 Any cylinder suspected of leaking (strong odour of LPG or frost on the container, valve or fittings) should be removed to a safe area and all sources of ignition removed. Prevent any discharge from entering sewers, basements and work pits, or any place an accumulation may be dangerous.

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#### **BULK STORAGE**

- 4.0 Where bulk storage/refilling facilities exist, and our technicians are expected to operate them. A local, site specific, risk assessment must be carried out by a service manager. He must ensure that: -
- a. the site operator has suitable and adequate safety arrangements in place.
  - b. technicians using the facility have received suitable and adequate training.
  - c. technicians using the facility have demonstrated competence in the use of such equipment.
  - d. appropriate written instructions and warning notices are prominently and permanently displayed in the refilling area.
- 4.1 Risk assessments should be conducted using the Safety & Environmental Manual procedure "Work Process Risk Assessment" as general guidance. The form Q072 must be used to record the assessment.
- 4.2 Retention of records (Q072) will also be in accordance with the procedure "Work Process Risk Assessment".

#### **CHILDREN AND YOUNG PERSONS**

- 5.0 See Safety & Environmental Manual procedure "Employment of Young Persons" for precise definitions on children and young persons.
- 5.1 "Children" will not be involved with tasks directly involving LPG. They may be allowed to observe such operations and work practices, but must take no active part, be kept at a safe distance and under the constant supervision of a competent person.
- 5.2 "Young Persons" may be allowed work involving LPG subject to the conditions imposed above and only when under the constant supervision of a competent person.