



FORKLIFT CYLINDER FILLING BY DISPENSER PUMP

LPG guidelines

Issued May 2015

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AS/NZS:	Australia and New Zealand Standard
AFL:	Automatic fill limiter
Cl:	Clause

Introduction

A leading Australian energy provider

Origin is Australia's only truly national LPG supplier, with significant operations in all states and territories. More than 300,000 homes and businesses throughout Australia, New Zealand and the Pacific are supplied with Origin LPG.

Our network of LPG import facilities and seaboard terminals is unequalled by any other LPG supplier in Australia. Located from Cairns to Hobart, these facilities provide strategic points of supply to our customers.

Safety is our first priority

These guidelines have been produced by Origin to provide you with an overview of the common methods and procedures used for filling forklift cylinders by dispenser pump.

The information in these guidelines can help protect the health and safety of yourself, your employees and your customers.

While this information is based on Origin's extensive experience in the LPG business it does not take precedence over any statutory requirement or company health, safety and environmental procedures. Although every care has been taken in compiling these guidelines, it is reliant on the information available to Origin at the date of this release. While Origin believes the information to be correct, it is not in a position to warrant its accuracy or to anticipate every circumstance in which the information might be used. In addition, the law and standards may have changed since the date of this release. Accordingly, you are cautioned to make your own determination of the veracity and suitability of these guidelines to your own circumstances and to obtain independent advice relevant to those circumstances.

These guidelines may be amended by Origin from time to time. They are not to be copied or modified without Origin's prior written consent. For additional details or clarification please contact your Origin Account Manager or call 134 GAS (134 427).

About these guidelines

The task of filling LPG cylinders for forklifts may be performed only by persons who have received appropriate instruction.

These guidelines should be used in conjunction with AS/NZS 1596 and any other relevant instruction issued by regulatory authorities.

The task of filling forklift cylinders by pump may be performed only by persons who have received appropriate training and assessment.

There are two types of cylinders fitted to forklifts, one is the permanently mounted type and the other and more common is the removable cylinder type.

Filling cylinders by volume by dispenser pump is the method outlined in this procedure. (AS/NZS 1596: Cl 8.2.2(b))

Pump filling by volume may be used for forklift cylinders where :

- (a) the cylinder is fitted with an appropriate automatic fill limiting (AFL) device; or
- (b) the cylinder is for automotive purposes (e.g. forklift trucks) and is fitted with a fixed liquid level gauge (bleeder valve).

LPG Dispensing is the process of filling a cylinder by using a mechanical pump to transfer liquid LPG from a storage vessel to a receiving vessel.

Note: This guideline does not apply to automotive refuelling systems which can be used by the general public. Such systems shall comply with all relevant requirements for dispensing systems in service stations.

1.0 Safety precautions

1.1 General safety precautions for filling cylinders by dispenser pump and hose

- 1.1.1 No smoking or flame within 6 metres of vehicle being filled.
- 1.1.2 Turn off all electrical equipment (mobile phones, pagers, radios, etc.).
- 1.1.3 Vehicle ignition to be turned off and handbrake applied.
- 1.1.4 No person to remain on vehicles during filling operation.
- 1.1.5 Personnel handling LPG must wear:
 - approved thermal protective gloves;
 - long sleeved shirts and long trousers made from natural materials (non synthetic);
 - safety eye wear; and
 - appropriate closed-in footwear.

Note: All staff supplied with protective clothing and safety equipment have a responsibility to themselves and their fellow workers to use this equipment correctly and to keep it in an operative condition.



- 1.1.6 A competent operator must remain in attendance at the filling point during the dispensing operation.
- 1.1.7 A clear means of egress in more than one direction and not less than one metre wide shall be maintained from the filling point clear of the area where cylinders are being filled or stored.
- 1.1.8 A dry powder fire extinguisher having a rating of at least 2A 60B(E) (9kg) shall be located in a prominent and readily accessible position during filling operation.
- 1.1.9 The cylinder being filled must be inspected before filling to ensure it complies with Section 5 of these guidelines.
- 1.1.10 Cylinders must never be filled above their safe fill level as per Sections 5.2 or 5.3 of these guidelines.
- 1.1.11 When forklift cylinders are stored in the horizontal position or fitted to a vehicle the safety relief valve must be in the uppermost position so as to be in the vapour space of the cylinder.
- 1.1.12 When removing a forklift cylinder from, or fitting a forklift cylinder to a vehicle, ensure the cylinder service valve is turned off before disconnecting or reconnecting the service line.
- 1.1.13 Spare cylinders must be stored outdoors or in a well-ventilated enclosure. If stored indoors, cylinder storing must comply with the requirements of section 4.5 in AS1596.
- 1.1.14 Filling of a portable LPG cylinder at an automotive refueling station through the filler valve or through the Acme check connector valve using an adapter is dangerous and prohibited (AS1596 CL11.12.5)

1.2 Information relating to LPG hose , “hose end valve” / dispensing nozzle

- 1.2.1 LPG hoses shall be approved for use with LPG and comply with the requirements of AS1869.
- 1.2.2 It is important that the hose and dispensing nozzle are inspected thoroughly at the beginning of the day to identify any wear or faults which could lead to an incident through leakage or total failure.

1.2.3 Inspection of LPG hoses should look for:

- Cuts through the outer rubber casing;
- Abrasion which exposes the woven material matrix beneath the rubber outer casing;
- Indication that the hose is separating from the end coupling / fitting;
- Degradation due to prolonged exposure to sunlight (UV).

Note: Significant UV degradation shortens hose life and may lead to failure.

1.2.4 Examine the ACME thread on the dispensing nozzle for excessive wear or damage which could prevent a leak free seal being achieved when the nozzle is connected to the cylinder filling valve connection. If this is evident, or any other faults are identified on the dispensing nozzle do not use the nozzle, “Tag” it out of service and contact Origin LPG for repair or replacement.

1.3 Safety Data Sheets

1.3.1 Safety Data Sheets (SDS) provide the information needed for the safe handling of hazardous substances. These may be obtained from the Origin website at originlpg.com.au.

1.3.2 The SDS provides:

- information needed for the safe handling of a hazardous substance;
- the physical description of the product;
- health hazard information;
- precautions for use;
- personal protection information;
- actions in the event of an LPG emergency including first aid information; and
- contact information.

2.0 Product knowledge

2.1 Liquefied Petroleum Gas

LPG is derived principally from two sources. It is separated from crude oil or natural gas as it leaves the wells, or it is produced from crude oil distillation in the normal refining process. In Australia, LPG is usually propane or butane or a mixture of both. Propane is used for residential and commercial burners. Butane is also mixed with propane to produce Autogas. Butane is sometimes used for commercial/industrial purposes.

It is important not to use butane or Autogas on appliances designed to burn propane and vice versa, without obtaining expert advice on such items as jet sizes and regulator pressures, which may require replacement or adjustment.

2.2 Characteristics of LPG

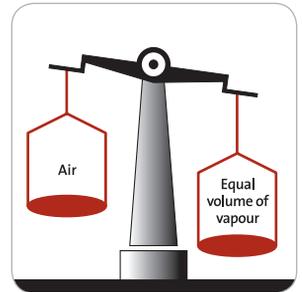
2.2.1 Physical properties

LPG is a colourless liquid when stored under pressure. It is odourless in its natural state. Odourant is added as a safety measure to give the liquid and vapour the characteristic gas smell to aid in the quick detection of leaks. Other physical properties are printed in the LPG Material Safety Data Sheet (MSDS). Refer to Section 1.2.

2.2.2 Vapour density of LPG

Propane has a vapour density of 1.5 compared to air which has a vapour density of 1.0. LPG vapour is heavier than air and, therefore, any LPG escape will flow downwards and may accumulate in low-lying areas and be slow to dissipate without ample ventilation and air movement.

If an LPG vapour or liquid leak occurs, the greatest danger is at or near ground level. The vapour will gravitate to all the lower levels, particularly downwind of the leak. LPG liquid is approximately half the density of water and, therefore, any escape may flow across water before vaporising.



2.2.3 Toxicity

LPG is not poisonous or toxic but vaporised LPG when released into confined spaces can cause mild anaesthesia, headaches, nausea or dizziness. Avoid breathing vapours and mists. It can cause asphyxiation due to the exclusion of oxygen. Deliberate misuse can adversely affect the central nervous system, including confusion and a lack of coordination. All LPG filling installations are required to be well ventilated by being open on at least two sides.

2.2.4 Freeze burns

Propane or butane liquid in contact with the skin can cause serious freeze burns (see Section 3 – First aid). Approved thermal protective gloves, safety eye wear, non synthetic long sleeved shirt, trousers and appropriate closed-in footwear must be worn when handling LPG to protect against freeze burns.

2.3 Pressure and temperature influences on LPG

LPG vapour, when compressed sufficiently, will change from a vapour to a liquid. Similarly, when vapour is cooled at atmospheric pressure to below its boiling point of -42 Degrees Celsius it will also liquefy.

As the temperature of the LPG in the cylinder varies in line with changes in ambient temperature the pressure inside the cylinder also varies. Temperature increases will cause the pressure to increase, decreases in temperature will cause the pressure to decrease. As vapour is drawn from the cylinder, the resultant lowering of the pressure in the cylinder causes any remaining liquid to give off more vapour to restore the pressure in the cylinder.

The expansion ratio of LPG is 1:270. This means that one litre of liquid, if vaporised, will occupy a volume 270 times greater than one litre of its liquid state.

Note: Leaking liquid is extremely hazardous due to its large and sudden expansion to vapour.

2.4 Equipment freeze

As LPG liquid expands to vapour it can cause surrounding temperatures to drop rapidly. This temperature drop can cause water vapour present in the air to form ice on an open valve, causing it to freeze over and may even close off the valve opening, thus giving a false impression of the state of the system.

2.5 LPG vapour cloud

On vaporisation, LPG itself is invisible. However, the escape of LPG liquid promotes condensation of water vapour from the air, and this makes the resulting vapour cloud adjacent to the discharge point visible. Consequently, on very hot dry days the vapour cloud from a liquid escape might not be so readily visible.

2.6 LPG flammability

LPG vapour, which is heavier than air, can combine with up to 50 times its own volume of air to form a flammable mixture.

LPG vapour / air mixtures ranging between 2 and 10% concentration of LPG are flammable. If such a mixture of LPG and air is ignited, it will flash back to the source of escape; and if ignited in a confined space it will explode.

2.7 Characteristics of LPG storage cylinders (vessels)

LPG is stored as a liquid under pressure in specially designed cylinders.

An important characteristic of all LPG cylinders is that they are designed to never be completely full of liquid. They must never be over-filled (see 2.8). An adequate vapour space must always be maintained above the liquid. This vapour space allows for expansion of liquid caused by temperature change, such as occurs when the cylinder is exposed to strong sunlight. The pressure is not affected by the amount of liquid in the cylinder, as long as there is adequate vapour space, but is affected by the temperature of the liquid within the cylinder. The maximum standard filling level for propane cylinders is 80%.

All LPG cylinders filled by pump are fitted with a liquid level/bleeder valve or an automatic fill limiter (AFL) valve. The liquid level/bleeder valve:

- indicates when the liquid level in the cylinder reaches 80%; and
- releases the vapour from the cylinder to allow the flow of liquid when filling by decanting.

The liquid level/bleeder valve is also known as:

- ullage gauge or valve;
- bleeder valve or screw; or
- fixed liquid level gauge.

Note also, AS4983 “Gas Fuel Systems for Forklifts and Industrial Engines” clauses 3.3 and 3.4 state the valving requirements for forklift cylinders.

AS1596 and AS4983 require that where cylinders are intended to be filled whilst attached to the forklift, an Automatic Fill Limiting (AFL) valve shall be fitted to the cylinder.

Most of the LPG storage cylinders used are designed for propane. Whilst butane can be stored in propane cylinders, propane must not be stored in cylinders designed for butane.

2.8 Dangers of over-filled LPG cylinders

When an LPG forklift cylinder is over-filled any rise in ambient temperature will cause the pressure in the cylinder to increase as the liquid expands. This increase could cause the cylinder pressure relief valve to discharge LPG if excessive pressure has developed in the container.

The relief valve will continue to discharge LPG until the pressure inside the cylinder drops to below the relief valve setting. This opening and closing action may occur many times before the liquid level falls sufficiently to provide adequate vapour space inside the cylinder for the existing temperature conditions. Ignition of the gas being discharged could cause a serious fire emergency or explosion.

3.0 First aid

This section outlines the actions to follow whenever someone comes into contact with liquid LPG.

Contact temperatures are usually below -30 Degrees Celsius and tissue contact at this temperature results in snap freezing of the affected area causing damage similar to a heat burn.

Contact with equipment at below zero temperatures can cause the skin to stick fast and the flesh may be torn. Direct bodily contact with LPG liquid must be avoided.

3.1 Immediate treatment

- 3.1.1 If possible, remove any affected clothing contaminated or splashed with liquid LPG not adhering to the skin, and place the injured person in a warm area.
- 3.1.2 Immediately bathe the affected area with large quantities of warm water for at least 15 minutes to bring the affected areas back to normal body temperature.
- 3.1.3 If possible have the injured person gradually move the injured area to re-establish / maintain circulation to assist in the re-warming process..
- 3.1.4 Seek immediate medical attention for all but superficial injuries, Advise the hospital / doctor of the injury (e.g. freeze burn, inhalation, etc.).

Note: If the affected area re-warms too rapidly, further damage may be caused to the tissue. Do not apply direct heat or cold such as heat lamps, hot water, or ice to affected parts. If warm water is not available, tap water will suffice, but be careful not to cause cooling.

- 3.1.5 In cases involving inhalation, remove the contamination source and move the injured person to fresh air. Ensure airways are clear. A qualified person should give oxygen through a face mask if breathing is difficult
- 3.1.6 Eyes: Immediately wash with clean luke warm water for 15 minutes.

Note: Record the incident in line with your internal company incident reporting system. For other advice, the Poisons Information Centre may be contacted on 13 11 26 (in Australia).

4.0 Installation requirements (ref AS/NZS1596 section 10)

4.1 Dispenser pump installation

The dispensing installation is designed solely for fleet refuelling purposes, i.e. where the general public is excluded.

The vessel shall be installed as per requirements of AS/NZS 1596. Distances from protected and public places will vary depending on the vessel capacity. (Origin should be contacted regarding any changes in site conditions that may impact on the compliance of the installation.)

Any tank or other part of the installation susceptible to impact from moving vehicles shall be protected from such impact.

The vessel is protected against over pressurisation by the fitting of pressure relief valves suitable to the size of vessel.

Every opening through the vessel shall be provided with a means of preventing and/or minimising accidental or uncontrolled outward flow of LPG.

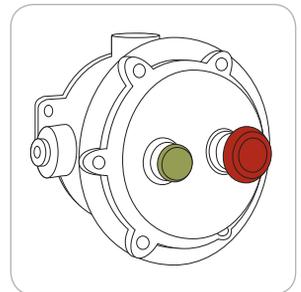
Control valves in the installation shall comply with all relevant requirements of AS/NZS1596.

4.1.1 Dispensing equipment

4.1.1.1 Control valves

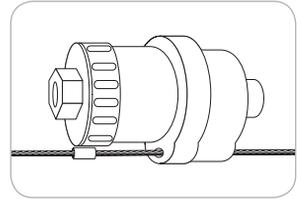
The following shall be provided at or adjacent to the dispensing point:

- an ON / OFF control for the pump ; and
- an activation point for the Emergency Shut-Down System.



4.1.1.2 Transfer hose and Hose End Valve

The transfer hose and hose assembly shall comply and shall be assembly tested in accordance with AS/NZS 1869, and subsequently inspected in accordance with AS1596 clause 11.5.5. A self sealing hose break coupling shall be installed in the hose assembly, and shall comply with the following requirements:



- the coupling shall disconnect in the event of undue force being applied to the hose; and
- the coupling shall retain the liquid within each section of the hose after separation. The volume of liquid lost after parting shall not exceed 15ml, and the coupling shall not leak after disconnection.

In addition, the hose end valve shall be suitable for the particular application. Note that where on vehicle refuelling occurs, and self service (including with supervision) occurs, the hose end valve shall have a self sealing nozzle.

4.1.2 Road tanker unloading position

The tanker unloading position shall be such that:

- the tanker must be a minimum of 10 metres from any ignition source;
- the delivery hose shall be protected from damage, and not run through any building or across any carriageway; and
- * the unloading of a tanker shall only proceed when the exit is not obstructed and the tanker is positioned in such a manner that it can be driven or towed straight out without recourse to reversing.

4.1.3 Emergency Shut-Down System

An emergency shut-down system shall be installed that in the event of it being activated the following occurs:

- the liquid outlet valve in the tank closes;
- the motor on the LPG pump stops; and
- any other actuated valves in the installation close.

4.2 Security

Dispenser pump installation

- 4.2.1 A tank which is accessible to the public shall be provided with a means of locking to prevent tampering with any tank fitting which could lead to an escape of gas.
- 4.2.2 A dispenser that could be accessed by the public shall have a provision for locking the nozzle to the dispenser when the unit is not available for operation, or to prevent unauthorised access.
- 4.2.3 The dispenser cabinet shall be locked when it is not intended to be available for operation.

4.3 Notices

- 4.3.1 Dispenser notices, signs and instructions shall be provided at the vehicle filling area as required by AS/NZS 1596 Appendix DE – sections D2 and D5.

In particular:

4.3.1.1 Precautionary sign (D5.1)

Standard symbols of at least 100mm diameter for 'stop engine – no smoking' shall be displayed at the filling area or adjacent to it and readable from the filling area. Alternatively a prominent sign reading "STOP ENGINE – NO SMOKING" in red or dark lettering not less than 50mm high on a white background may be substituted.

4.3.1.2 Driver instructions (D5.2)

Driver filling instruction and warning signs, each of a minimum size of 125mm wide by 270mm high and printed on a white background, shall be displayed in a readily visible location on LPG dispensers.

origin

Instructions for filling LP Gas forklift cylinders by pump on forklift AFL fitted

FILLING PROCEDURE

CAUTIONS

- Liquid LP Gas causes severe frost bite. Gloves must be worn at all times when filling.
- No person is to remain on the forklift during filling operations.
- Check cylinder valves for leaks using soapy water before and after filling.
- No smoking within 6 metres of vehicle.

- 1 Switch off forklift ignition and apply handbrake.
- 2 Turn off all electrical equipment.
- 3 Check the condition of the cylinder and that the test date stamped on the cylinder is within the required 10 year period.
- 4 Remove dust cap and check that the rubber joint washer in the fill connection is present and in good condition.
- 5 Wear thermal protective gloves when filling.
- 6 Connect hose end valve to cylinder fill valve.
- 7 Slowly open supply vessel valve/s where relevant.
- 8 Open hose end valve / dispenser nozzle slowly.
- 9 Start the transfer pump.
- 10 Observe contents gauge and DO NOT fill beyond 80%.
Note: the AFL should close with a slight clunk at 80% and if you can hear the LP Gas pump you will hear a change in sound.
- 11 Close hose end valve / dispenser nozzle immediately.
- 12 Stop transfer pump.
- 13 Slowly unscrew and disconnect hose end valve.
Note: there will be a small release of LP Gas.
- 14 Refit dust cap on filler valve.
- 15 Close any valves previously opened on the LP Gas supply vessel.

Operator must remain in attendance at cylinder during filling operation

DO NOT OVER FILL

4.3.2 Emergency signs (D 2.1 and D5.3)

4.3.2.1 Every emergency shut down actuation point shall be provided with a sign stating:

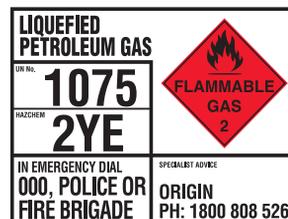
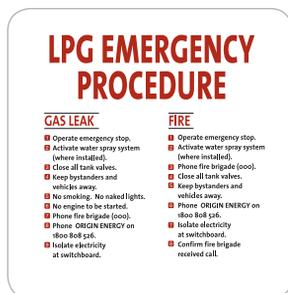
- “LP GAS EMERGENCY STOP” in red letters not less than 40mm high on a white background; and instructions on how to activate the system, in red or dark lettering not less than 20mm high on a white or light contrasting background.



4.3.2.2 An above-ground tank or tank storage area shall be provided with a placard displaying the following information:

- phone number of the organisation having ownership of the equipment. The nominated phone number shall provide contact with 24 hour specialist advice via the supply company or a contractor; and
- standard symbols of at least 100mm diameter for “FLAMMABLE GAS” and “NO SMOKING” or a warning notice in letters not less than 50mm high prohibiting smoking and ignition sources. Where the area is isolated by a fence, the sign shall be visible from outside the fence and also from points of access.

4.3.2.3 An emergency information notice should be prominently displayed in an appropriate location for the installation. The notice shall have a white background; the heading “LPG Emergency Procedure” shall be in red letters not less than 40mm high; subheadings ‘Gas Leak’ and ‘Fire’ shall be in red or dark lettering not less than 10mm high; and the text shall be in red or dark lettering not less than 7mm high.



5.0 Filling by dispenser pump

Note: Filling of a portable LPG cylinder at an automotive refuelling station through the filler valve or through the Acme check connector valve using an adapter is dangerous and prohibited (AS1596 CL11.12.5)

From 190 or 210kg cylinders or bulk storage tanks

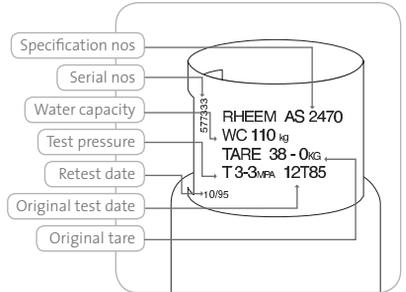
When filling from a 190 or 210kg cylinder or bulk storage tank, the pumping rate must be appropriate to the cylinder size, in order to reduce the likelihood of over-filling.

A dry powder fire extinguisher with a rating not less than 2A 60B(E) (9kg) is to be provided adjacent to the cylinder filling area.

5.1 Inspection of cylinder before filling

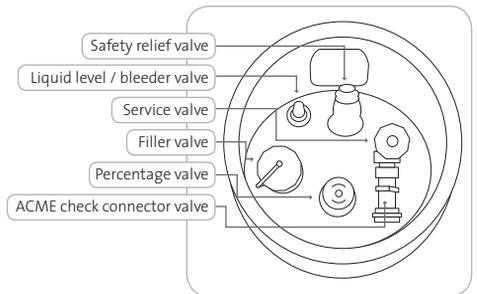
5.1.1 Forklift cylinders must comply with the following requirements or they must not be filled:

- the period from the last test date must not be more than 10 years;
- the cylinder must appear to be in good condition and not have dents, gouges or be badly corroded (if in doubt, leave segregated from other cylinders and request the supplier to pick up on next visit);
- cylinder valves must be in good condition;
- safety relief valve (SRV) must not be damaged, corroded or blocked by foreign material and discharge path must not impinge on valve protection ring; and
- cylinders must have a liquid level/bleeder valve or AFL fitted.



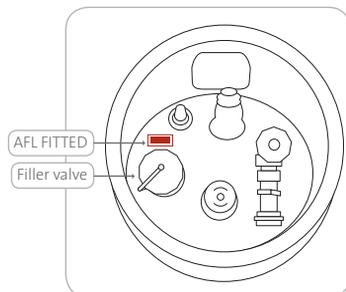
5.1.2 Cylinders must comply with AS 2030.1, AS 2470 & AS 2764 and have the following markings:

- manufacturer's mark/serial number;
- specification number;
- water capacity (WC);
- original tare mass;
- original and any subsequent test dates; and
- test pressure, not less than 3.3MPa (480 psi).

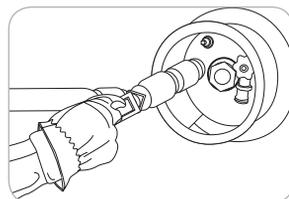
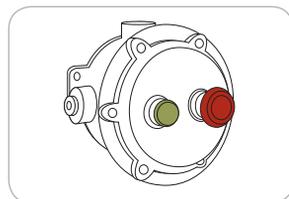


5.2 Procedure (AFL fitted) – cylinders to be filled on the forklift

Cylinders fitted with automatic fill limiters will carry a marking 'AFL FITTED'. Bleeding of liquid level/bleeder valve is not required. These cylinders may be filled whilst fitted to the vehicle provided that the transfer hose is fitted with an appropriate approved break away coupling and the hose end valve incorporates a self sealing nozzle, as stated in Clause 4.1.1.2 of these guidelines.



- 5.2.1 No smoking, or any ignition sources within 6 metres of the hose reach zone.
- 5.2.2 Switch off forklift or vehicle ignition, apply handbrake and turn off all electrical equipment (mobile phones, pagers, radios, etc.).
- 5.2.3 No person to remain on forklift or vehicle during filling operation.
- 5.2.4 Inspect the cylinder for corrosion and dents and check that the test date stamped on the cylinder is within the required 10 year period (if in doubt, leave segregated from other cylinders and request the supplier to pick up on next visit).
- 5.2.5 Ensure that the Safety Relief Valve is in the uppermost position. Note the word "TOP" stamped on the cylinder "valve protection ring" will also be in the uppermost position.
- 5.2.6 Check that the cylinder is not full (observe contents gauge).
- 5.2.7 Remove dust cap – from the filler valve.
- 5.2.8 Check that the washer in the fill connection is present and in good condition and there is no foreign matter in the fill connection. Inspect the hose and dispensing nozzle for any wear, fault or damaged ACME thread.
- 5.2.9 Put on thermal protective gloves.
- 5.2.10 Check all cylinder valves for leaks.
- 5.2.11 If necessary for the particular site, open the supply vessel valves. Note: open the valves slowly to prevent the internal excess flow valve slamming shut. At the dispensing control point activate any other necessary controls for the filling process.
- 5.2.12 Start the transfer pump.

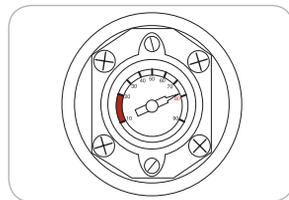


5.2.13 Connect the hose end valve to the cylinder fill valve.

5.2.14 Open the hose end valve slowly. Remain in attendance throughout the entire filling operation. Do not use any devices to keep the nozzle open. If a leak occurs, immediately close the nozzle and disconnect, check that sealing faces and seals are in good condition, and retry. If the problem persists, do not continue with the filling process, "Tag" the equipment out of service and report the fault to your supervisor.

5.2.15 Observe percentage gauge and do not fill beyond 80%.

Note: The AFL valve should close at 80%. This will be noticed by a closing sound within cylinder coinciding with change of sound from LPG pump.
Do not overfill the cylinder.



5.2.16 Once the AFL valve has closed, or the contents gauge has reached 80 %, immediately close the dispensing nozzle.

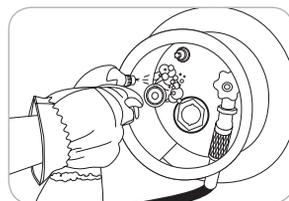
5.2.17 Disconnect and stow the nozzle. Note that a small amount of liquid LPG will be released as the nozzle is disconnected.

5.2.18 Stop the transfer pump.

5.2.19 Close supply vessel valve/s.

5.2.20 Check the forklift cylinder fittings for leaks by liberally applying a leak detection solution, with a brush or spray bottle, to the following:

- service valve threads and spindle;
- ACME check connector valve;
- liquid level/bleeder valve;
- safety relief valve outlet and thread;
- ACME filler valve and thread; and
- percentage gauge.



CAUTION: The ammonia present in some soaps and detergents can react with brass fittings and cause such fittings to crack after a short period of time. Caution should therefore be exercised when using soap solutions on brass fittings, and all connections should be rinsed thoroughly with fresh water as soon as possible after the application of the soap solution.

5.2.21 Refit dust cap to the filler valve.

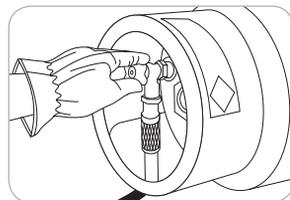
5.3 Procedure (AFL not fitted)

The filling of cylinders using the liquid level/bleeder valve (to prevent over-filling) shall be performed with the cylinder removed from the forklift.

This operation may be performed with the cylinder in the horizontal position in a rack, with the pressure relief valve in uppermost position, or vertical position standing upright on the ground (note this is the preferred position). No smoking or flame within 6 metres of vehicle.

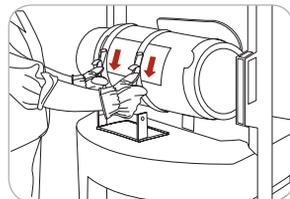
- 5.3.1 No smoking or ignition sources within 6 metres of the hose reach zone.
- 5.3.2 Switch off forklift or vehicle ignition, apply handbrake and turn off all electrical equipment (mobile phones, pagers, radios, etc.).
- 5.3.3 No person to remain on forklift or vehicle during filling operation.
- 5.3.4 Put on thermal protective gloves.

- 5.3.5 Turn off service valve and loosen the female ACME from the service valve and carefully disconnect the forklift service hose from the cylinder. A small amount of vapour trapped between the two check valves will escape.



- 5.3.6 Unclip and remove the cylinder from the forklift or vehicle using correct manual handling techniques.

- 5.3.7 Inspect the cylinder for corrosion and dents and check that the test date stamped on the cylinder is within the required 10 year period (if in doubt, leave segregated from other cylinders and request the supplier to pick up on the next visit).



- 5.3.8 Check cylinder is not full by checking the contents gauge; and also briefly open the bleeder valve to ensure that no liquid is emitted from the bleeder. If only vapour is emitted then proceed with the filling process. If no vapour is emitted, the cylinder may be empty, or the bleeder blocked. Continue with caution, checking for correct operation of the bleeder at a later stage.

Note: If liquid is emitted from bleeder valve, do not commence filling the cylinder. Do not rely on the contents gauge to indicate when the cylinder is filled to the correct level. Follow the procedure for an over-filled cylinder.

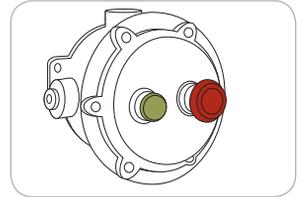
- 5.3.9 Remove the dust cap from the filler valve.
- 5.3.10 Check that the washer in the fill connection is present and in good condition and that there is no foreign matter in the fill connection. Check the condition of the ACME thread.

- 5.3.11 Check all cylinder valves for leaks.
- 5.3.12 If necessary for the particular site, open the supply vessel valves. Note: Open valves slowly to prevent the internal excess flow valve slamming shut. At the dispensing control point activate any other necessary controls for the filling process.

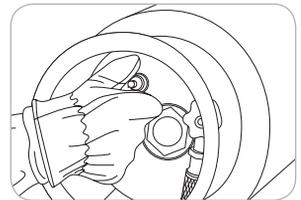
5.3.13 Start the transfer pump.

5.3.14 Inspect the hose and dispensing nozzle for any wear, fault or damaged ACME thread.

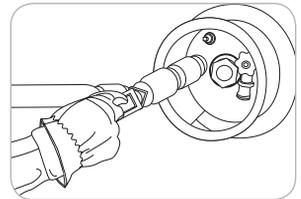
5.3.15 Connect the dispensing nozzle to the forklift cylinder fill valve.



5.3.16 Open liquid level/bleeder valve 1/2 to 1 turn only. (If more than 1 turn is required, the liquid level/bleeder valve seat may be damaged and requires repair.)



5.3.17 Open the dispensing nozzle valve slowly. Remain in attendance throughout the entire filling operation. Do not use any devices to keep the nozzle open. Check the bleeder valve.



Note: If neither vapour nor liquid is emitted from the bleeder, then the bleeder is blocked and the cylinder shall not be filled. Place an out of service tag on the cylinder and move the cylinder to a segregated area. Notify your supervisor so that the cylinder can be repaired.

5.3.18 Allow filling to continue until a white cloud mist discharges from the liquid level/bleeder valve. This indicates that the cylinder maximum fill level has been reached. Immediately close the dispensing nozzle to stop the liquid LPG transfer.

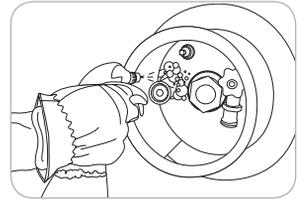
5.3.19 Close the liquid level/bleeder valve.

5.3.20 Stop the transfer pump.

5.3.21 Vent, disconnect and stow the dispensing nozzle.

5.3.22 Check the forklift cylinder fittings for leaks by liberally applying a leak detection solution, with brush or spray bottle, to the following:

- service valve threads and spindle;
- ACME check connector valve;
- liquid level/bleeder valve;
- pressure relief valve;
- ACME filler valve and thread; and
- percentage gauge.



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5.3.23 Refit dust caps.

5.3.24 Close supply vessel valve/s.

5.3.25 Refit cylinder into brackets on forklift, using correct manual handling techniques, and secure bracket clips. Ensure the cylinder is in the correct alignment with the pressure relief valve in the uppermost position.

5.3.26 Reconnect the forklift service hose by connecting it to the ACME check connector on the cylinder service valve.

5.3.27 Open the service valve and check for leaks.

Never over-fill a cylinder.

5.4 Manual handling of forklift cylinders

It is recommended that the following steps be used to handle forklift cylinders, however, a site manual handling risk assessment should first be carried out on the task on site to assess suitability (and a record is to be kept).

Steps

Release the clamps holding the cylinder. Do not tilt the cylinder towards you before unlocking the clamps as the cylinder can fall out.

Position your body close to and facing the forklift to eliminate the need for twisting.

Unload the cylinder using safe manual handling techniques such as squatting or lowering the empty cylinder to the ground (one or two person lift, as appropriate) with one hand, while resting your free hand on your forward knee.

Keep your back straight.

To load a full cylinder on the forklift, it is recommended that two persons lift the cylinder into place or use mechanical assistance, if available.



6.0 Emergency procedures

6.1 Leak on valve thread or ACME check connector valve

- 6.1.1 Stop the LPG supply at the forklift cylinder connection and turn off forklift service valve.
- 6.1.2 Close the liquid level/bleeder valve (if AFL not fitted) on the forklift cylinder. Loosen the dispensing hose connection from the forklift cylinder service valve and carefully disconnect the hose from the forklift cylinder. A small amount of liquid trapped between the two check valves will escape.
- 6.1.3 Turn off the transfer pump.
- 6.1.4 Close the supply vessel valves.
- 6.1.5 Keep bystanders and vehicles away.
- 6.1.6 Isolate ignition sources. Do not start any engines.
- 6.1.7 Check sealing washer and 'O' ring in male ACME check connector on service valve.
- 6.1.8 If a fault is found, rectify it and recommence dispensing. If the leak continues, cease dispensing, disconnect the hose, and carefully move the forklift cylinder to a safe area. Keep upwind of the leak.
- 6.1.9 If a leak occurs on the cylinder AFC ACME fill valve which cannot be stopped, screw a brass ACME cap onto the ACME fill valve to stop the leak.
- 6.1.10 Attach a defect tag to the faulty forklift cylinder valve and advise a responsible person on site that the cylinder is faulty and requires repair.

6.2 Leaking pump seal or leak on LPG supply tank or cylinder

- 6.2.1 Activate the emergency shut-down system / emergency stop.
- 6.2.2 Shut all valves of supply vessel; if safe to do so.
- 6.2.3 Keep bystanders and vehicles away.
- 6.2.4 Isolate ignition sources. Do not start any engines.
- 6.2.5 Keep upwind of leak.
- 6.2.6 Call emergency services on 000.
- 6.2.7 Telephone Origin on 1800 808 526.
- 6.2.8 Isolate electricity supply.

6.3 Over-filled cylinder

- 6.3.1 Remove the cylinder from the forklift (if it is attached).
- 6.3.2 Attach a defect tag.
- 6.3.3 Move the over-filled cylinder to a safe area.
- 6.3.4 Advise a supervisor that the cylinder has been over-filled.
- 6.3.5 Keep bystanders and vehicles away.
- 6.3.6 Isolate ignition sources. Do not start any engines.

- 6.3.7 Slowly vent (using the liquid level/bleeder valve) the cylinder contents, until it reaches its safe fill level.

Note: Under no circumstances should an over-filled cylinder be used before its contents are reduced to the safe fill level.

6.4 Burst dispensing hose

- 6.4.1 Stop the LPG supply at the forklift cylinder connection.
- 6.4.2 Activate the emergency shut-down system / emergency stop.
- 6.4.3 Close the supply vessel valve and forklift service valve if safe to do so.
- 6.4.4 Keep bystanders and vehicles away.
- 6.4.5 Isolate ignition sources. Do not start any engines.
- 6.4.6 Allow the dispensing hose to vent, and then disconnect it from both the forklift cylinder and supply vessel.
- 6.4.7 Attach a defect tag to the hose and advise a responsible person on site that the hose is unserviceable.

6.5 LPG fire

Note: Do not extinguish the flames if the valves cannot be safely closed. If fire cannot be quickly and safely extinguished, evacuate the local area and call the emergency services on 000.

- 6.5.1 Stop LPG supply at the forklift cylinder connection if safe to do so.
- 6.5.2 Shut emergency stop and activate the water spray system (if installed).
- 6.5.3 Raise the alarm and keep bystanders and vehicles away.
- 6.5.4 Close all valves, if possible, and hose with water spray to keep tank or cylinders cool. Approach the cylinder/tank from the upwind side.
- 6.5.5 **Do not** extinguish the fire unless by doing so you can shut valves to shut off fuel supply to the fire.

The basic rule for LPG fires, therefore, is to control the leak before putting out the fire.

The only time you would break this rule would be if putting out the fire first enabled you to control the leak. This would be done by using a dry chemical extinguisher and only if immediate access to isolating valves can be gained to stop the LPG flow.

When sufficient water is not available to keep the cylinder/tank cool, some warning of increased pressure may be noted from an increase in the volume of the fire or from an increase in the noise level of the discharge from the safety relief valve.

This should be a signal to consider withdrawal of all personnel to a safe area, i.e., at a distance of at least 70 to 200 metres from the site of the fire.

- 6.5.6 Telephone Origin on 1800 808 526

7.0 How to contact Origin

Customer service e-mail Postal address

**134 GAS (134 427) or call your account manager
enquiry@originenergy.com.au
GPO Box 1199, Adelaide SA 5001**



LPG orders Telephone Website

**133 LPG (133 574)
originlpg.com.au**

Emergencies or leaking gas 1800 808 526

Your Origin Representative: _____

Origin Representative phone number: _____

Date: _____

Origin Energy Retail Ltd ABN 22 078 868 425
Sun Retail Pty Ltd ABN 97 078 848 549

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¹Forklift Cylinder Filling By Dispenser Pump - LPG Guideline' LPG-BUS-HSE-GUI-0028 v3 05/15

LPG874.1 v3 05/15