LPG Association of New Zealand

On-site Charging of LPG cylinders

A training course for the on-site charging/filling of cylinders from a road tank wagon

Contents

Introduction

Any person on-site filling a cylinder with a gas must be an approved filler.

To become an approved filler, you need to demonstrate to a compliance certifier that you have the necessary training, knowledge and skills to fill cylinders safely.

By law you are required to have the following knowledge and skills:

1. What are the properties and behaviour of LPG;
2. What are the causes of cylinder failure;
3. The consequences of a failure of a cylinder including asphyxiation;
4. How to inspect a cylinder;
5. How to fill a cylinder safely.

In-situ filling of cylinders was covered under EPA HSNOCOP 38 and the code became obsolete when the majority of the requirements were included into regulations 15.69 to 15.74 of the HSW (Hazardous Substances) Regulations 2017.

In the HSWA Hazardous substance Regulations 2017 the term In-situ Filling was changed to On-site Charging. For the purposes of this training we have used the terms fill and filling, which are widely used in Industry.

Useful definitions

Public road

> This definition refers **to areas clearly taken for use as roads by the general public**. In common law terms, these are public roads or highways, which the public are permitted to access and use.

From The HSWA HS Regulations 2017

ignition source

(a) means any agency or agent (including any item, product, part of a facility structure, or piece of equipment) capable of igniting a flammable gas, vapour, or other form of combustible substance; and

(b) includes a fire, flame, or spark, or anything capable of producing a fire, flame, or spark.

protected place

(a) includes

(i) a dwelling, residential building, place of worship, public building, school or college, hospital, child care facility, or theatre, or any building or open area in which persons are accustomed to assemble in large numbers, whether within or outside the property boundary of a place where a hazardous substance location is situated:

(ii) any factory, workshop, office, store, warehouse, shop, or building where persons are regularly employed, whether within or outside the property boundary of a place where a hazardous substance location is situated:

(iii) a ship lying at permanent berthing facilities:

(iv) a public railway; but

(b) does not include a small office or other small building associated with a place where storage, handling, use, manufacture, or disposal of a class 2, 3, 4, 5, 6, or 8 substance is a major function

public place

(a) means a place (other than private property or a protected place) that is open to, and frequented by, the public; and

(b) includes a public road

Properties and Behaviour of LPG

Handling LPG safely requires knowledge of the properties of the product. With an understanding of these properties, an understanding of the precautions and care required when handling LPG can be established.

1. What is LPG?

LPG is the common name for liquefied petroleum gas. The product LPG is made up predominantly of the hydrocarbons propane and butane. Both propane and butane can be supplied as separate products, but most LPG in New Zealand is a mixture of about 60% propane and 40% butane. Other hydrocarbons may also be present in LPG in very small quantities.

2. Liquefying LPG

At normal ambient temperature and pressure, LPG exists as a gas. Increasing its pressure in a closed container such as a cylinder liquefies LPG. Inside the cylinder LPG exists in two states: liquid and gas. Liquid LPG will always be in the bottom area of the container and the gas will always be in the top part or the space above the liquid LPG.

LPG may also be liquefied by reducing its temperature and storing the liquid in a refrigerated system.

3. Behaviour of LPG in a cylinder

When gas is withdrawn from the cylinder the cylinder pressure drops. The liquid remaining in the cylinder then boils off to replace the gas used. When the temperature of a cylinder increase e.g. when placed in the sun, the liquid expands and the pressure in the cylinder increases. This is a normal process and only presents a problem if the cylinder is exposed to extreme heat e.g. in a fire or heat from a heater, or if the cylinder is overfilled.

4. Frosting

Like all liquids, LPG needs heat to boil. As the gas is withdrawn from the cylinder it obtains heat through the walls of the cylinder from the outside air. This can produce frost on the outside walls of the cylinder if there is a high draw-off rate of LPG. The frost formed as water frozen from the atmosphere onto the cold cylinder walls.

Leaking liquid or gas can also create frosting of equipment, which may prevent its correct operation.

5. Expansion of liquid LPG to gas

The expansion of liquid LPG to gas is approximately in the ratio of 1 to 250. This means that every 1 litres of liquid evaporated will produce 250 litres of gas. This property is a principal hazard that must be remembered, as a liquid leak will produce a very large amount of gas.

6. Release of liquid to the atmosphere

Liquid LPG is colourless, but when released to the atmosphere it may condense moisture from the air and appear as a white cloud or fog from the point of discharge. This fog is caused by the liquefied gas vaporising and expanding, and cooling so rapidly that it condenses the moisture in the air.

The outer edge of this white fog is flammable and will ignite if brought into contact with a source of ignition.

Liquid LPG will change and dissipate much faster on a hot sunny day when temperatures are warmer than in colder temperatures.

7. Release of LPG gas to the atmosphere

An LPG gas release from a cylinder to the atmosphere is often not readily visible to the eye and can spread out as an invisible gas cloud. Under certain conditions when close to discharge the gas can be detected as shimmer, in the similar manner as heat waves seen rising from a hot pavement. If the discharge is large enough it can be located by the sound of the escaping gas or smelt by its distinctive odour.

8. Odorisation

LPG is odourless. A distinct smelling odorant (ethyl mercaptan) is added to LPG as a detection agent. The detectable limit for odorised LPG in New Zealand is many times lower than the lower flammable limit, so detection occurs before a flammable mixture is formed.

9. Gas density

LPG gas is heavier than air and will settle in low places if allowed. Propane is 1.5 times heavier than air and butane is twice as heavy. Being heavier than air the gas will cling to the ground and will enter trenches, drains and other low areas.

In still atmospheres it will not disperse easily and can travel for long distances from the point of release. Dispersion of these gases will take considerably longer than would be the case with gases lighter than air. LPG gas however is readily dispersed by wind or a water spray. Extra care is required in basements and below ground cellars as LPG will displace the breathable air and death can be caused by asphyxiation.

10. Coefficient expansion of liquid LPG

LPG absorbs heat from the air through the walls of the cylinder. As the temperature of the liquid increases it expands, e.g. the rate of expansion for liquid LPG is many times greater than for water. Therefore it is essential that cylinders are never completely filled with liquid LPG and some space is allowed for the liquid to expand. This space is referred to as ullage space.

The ullage space is simply the space above the liquid LPG that is left when filling is completed. Cylinders are filled with liquid to approximately 80 per cent, leaving a 20

per cent gas space for expansion as the temperature increases. If space for expansion is not left, liquid LPG can be forced through the safety relief valve if the outside temperature increase. If the cylinder is being transported in a vehicle or is in use by the customer, this can result in fire and explosion.

11. Limits of flammability

LPG is only flammable when mixed with air in a certain concentration. LPG will only burn in air in the range of 2% to 10%. This range is known as the flammable range. The flammable range is relatively small. LPG will not burn above this limit as it will be too rich nor below the limit as it will be too lean.

12. Ignition temperature

The ignition temperature is the temperature that flammable mixture of fuel and air must be heated for it to ignite without any other external source of ignition.

The ignition temperature for LPG is about 410 to 500° centigrade. The burning temperature of a match head is 1500°C while for a cigarette approximately 700°C.

13. Toxicity

LPG is non-toxic but can cause death by asphyxiation if you breathe in large quantities.

Cylinder Failure Factors

Factors that can lead or contribute to cylinder failure are:

1. *The cylinder is not approved for LPG;*
2. *The cylinder has not been tested within the last 10 years;*
3. *The cylinder is not in good condition.*

Consequences of Cylinder Leaks or Failure

The main hazards with LPG are fires, explosion, leaks and physical effects such as cold burns, asphyxiation and injuries from the manual handling of equipment and cylinders.

1. Fires

Three elements must be present to cause a fire; fuel, air and an ignition source, such as heat and static electricity. Under the proper conditions when these three elements are present, fire can occur. However if one of these three elements is not present, fire cannot occur.

Fire prevention is essential to safe handling of LPG. To prevent fires, the controls focus on elimination of ignition sources from hazard areas and eliminating the source of fuel in the form of an LPG leak or other combustible material.

1. Prevent ignition sources from entering the hazard area.

   Know where the hazard areas are around the LPG cylinders. This is a cylinder shaped space 0.5 metres above and 0.5 metres laterally from the cylinder being filled and extending to a distance of 1.5 metres laterally from the base of the cylinder. Remember ignition sources may be power tools, hand tools, cell phones, vehicles etc.

   NOTE: This distance extends once you open a bleed valve to 0.5 metres above, 1.5 metres laterally and 3.5 metres laterally from the base of the cylinder.

2. Eliminate wherever possible the escape of LPG to the atmosphere.

   Regularly check the system for leaks.

3. Keep your fire fighting equipment handy and serviced.

   Have a service agent regularly check your equipment.

4. In the event of a fire that cannot be quickly extinguished call/have someone call, Fire and Emergency NZ on 111.

2. Explosion

An explosion is possible if a fire is playing on the cylinder particularly the vapour space. If safe to do so water can be sprayed on the cylinder to keep the vapour space cool.

3. Leaks

A leak of LPG can occur from the LPG cylinder or its valve due to failure of a joint or seal, damage from impact, or failure of equipment.

1. If the discharge creates a major hazard or if in doubt activate the emergency plan. Do not place yourself in danger.

   This is your best means of controlling the emergency to prevent harm to people and property.

2. Communicate the problem to others. Get help to manage the hazard.

   Quickly notify site staff or your supervisor.

3. Shut down the installation by closing valves.

   Remove people and sources of ignition from the area. Cordon off areas if required. Stop people entering the hazard area. Use personal protective equipment. Stay up wind of leaking LPG.

4. Control the hazard area.

   This will reduce the amount of LPG that may be able to escape to the atmosphere.

5. Isolate the equipment that is leaking by closing shut off valves. It may be necessary to thaw out frozen valves with water.

   Check for leaks with soapy water solution.

6. Seek expert assistance.

   Contact Fire and Emergency NZ on 111 for first line emergency response.

4. Cold burns

The boiling point of LPG can produce temperatures well below zero. Direct bodily contact with LPG in its liquid state must be avoided as cold burn injuries may occur. Contact temperatures are usually below -40°C and tissue contact at this temperature results in snap freezing of the affected area, causing damage similar to a heat burn. Unprotected parts of the skin which come in contact with equipment at below zero temperatures may stick fast and the flesh may be torn on removal.

1. Immediate treatment.

   Remove any clothing splashed by LPG and place injured person in warm area as soon as possible. Loosen any article of clothing that is not frozen but may restrict blood circulation or respiration.

   a. Burns to the skin or limbs.

      Rapidly re-warm the body temperature. Do not allow to thaw slowly. Bathe affected part with lukewarm water (not hot), immersing if possible.

b. Burns to small exposures such as foot, leg, or hand.

Bathe affected part with warm water (not hot) preferably 33-35°C, immersing if possible.

c. Burns to larger areas trunk or multiple areas***.***

Bathe affected part with warm water (not hot) preferably 33-35°C, immersing if possible. If tepid water unavailable, tap water will suffice, but take care as prolonged immersing may cause cooling hypothermia.

d. Burns to eyes.

Immediately hold eyes open and wash continuously with water for 15 minutes.

2. Gently cover or drape injured area with dry, sterile dressings.

Do not restrict blood circulation.

3. Give warm liquids.

Do not give alcohol.

4. Seek medical attention for all but the most superficial injuries.

Do not apply direct heat or cold such as heat lamps, hot water, snow, or ice to the affected parts. Be aware of the onset of shock as a consequence of thawing frozen skin.

5. Asphyxiation

Symptoms

1. Increased rate and depth of respiration.
2. Blueness of the skin.
3. Stertorous breathing – with a snoring sound.
4. Loss of consciousness.
5. Paralysis of respiratory centre.

Treatment

1. Remove from exposure.
2. Apply artificial respiration.
3. Apply external cardiac massage.
4. Loosen clothing.
5. Give oxygen if cyanotic or breathing laboured.
6. Give non-alcoholic drinks if desired.
7. Keep at rest.
8. Unless systems minor seek medical advice.

Visual Inspection Requirements

Check that the cylinder is approved for filling with LPG, with valve protection ring and foot ring in place and in good condition.	***Do not fill any cylinder which is an unusual design or appears to have been modified or the valve protection ring or foot ring is damaged.***
Check the valve and fittings.	***Check for any damage particularly to outlet threads; make sure everything is in good condition.***
Check the condition of the cylinder.	***Free of excessive rust and dents, if in doubt opt out.***
Check that the cylinder is approved by sighting the LAB number.	***If the cylinder does not have a LAB or LABSP number and it does not have a valid retest date, do not fill, the cylinder must be referred to a cylinder testing station.***
Check the year of manufacture.	***If more than 10 years old the cylinder must be retested.***
Check the retest date and the cylinder test station stamp.	***Be cautious of retest marks which do not appear to be valid.***
Check that the cylinder is correctly labelled.	***Flammable gas diamond and flammable information label.***

If in any doubt over the acceptability of a cylinder for filling – opt out!!

Cylinder Filling

Before filling make sure the there is a current Location Certificate issued by a Compliance Certifier, for workplaces or non-workplaces over 300kg cylinder capacity. Or a Compliance Plaque issued by the LPG suppler for non-workplaces up to 300kg cylinder capacity.

On-site filling shall be undertaken only by connecting the fill hose directly onto the fill connection of the cylinder. The cylinder must remain in its storage location; it cannot be brought to the tanker for filling.

A cylinder that is filled on-site must be fitted with a filling connection that incorporates a 1¾ inch male Acme thread, and one of the following:

1. a dual non-return valve and a fixed liquid level gauge , also commonly known as an ullage valve, that must indicate a maximum liquid level equivalent to 4 L less than the standard filling level for a cylinder of that size;
2. a non-return valve and an automatic fill limiter that stops the filling at 80% of the standard filling level (which must be appropriate for the orientation of the cylinder when being filled).

Where the filling connection of the on-site fill cylinder does not have a manual valve, then—

(a) a removable adaptor is attached to the cylinder filling connection; and

(b) the removable adaptor incorporates a non-return valve arranged to prevent the outward flow of LPG from the cylinder when the filling hose is removed; and

(c) the removable adaptor is not removed until it has been ascertained that the non-return valve of the cylinder has closed correctly after filling.

The pumping rate shall be appropriate to the size of the cylinder. To minimise the risk of overfilling, and taking into account operator reaction time, a cylinder shall not be filled in less than 60 seconds.

Cylinder filling shall not be undertaken at night time or in poor light, unless all essential gauges, connections and valves have been illuminated by fixed or temporary lighting. The lighting must comply with electrical standards for the delineated hazardous atmosphere zones.

Before an LPG delivery hose is connected, it is important to ensure that the operator and the storage cylinder are at the same electrical potential. The operator will achieve this by touching the cylinder with a bare hand while holding the nozzle of the hose delivering the LPG. This will prevent the possibility of an ignition spark by the discharge of static electricity which may have built up in the operator's body.

Supervision of Filling Activity

The cylinder filling may be carried out by one person provided:

1. The person undertaking the filling of the cylinders is an approved filler; and
2. The person can maintain surveillance of both the on-site cylinder and the tank wagon during the filling operation i.e. the cylinders and tank wagon must be in the person's direct line of sight, with no more than a deviation of 1.5 metres from the direct line of sight; and
3. There is direct unobstructed access between the tank wagon and the cylinder filling point; and
4. There is no more than 50 metres of hose length between the tank wagon and the cylinder fill point; and
5. The filler has a remote shut down device for the tank wagon.

Where these requirements are not met, there shall be at least two persons in attendance – one at the tank wagon and one at the cylinder fill point, and there shall be at least one approved filler.

Hazardous Areas during Cylinder Filling

The areas depicted are based on the cylinder location having adequate ventilation. If this is in doubt contact your company for advice. There are three hazardous areas applicable to cylinder filling and each area is dependent on the filling method being used.

1. **Cylinders fitted with automatic fill limiter (AFL) i.e. there is no bleeding of gas**

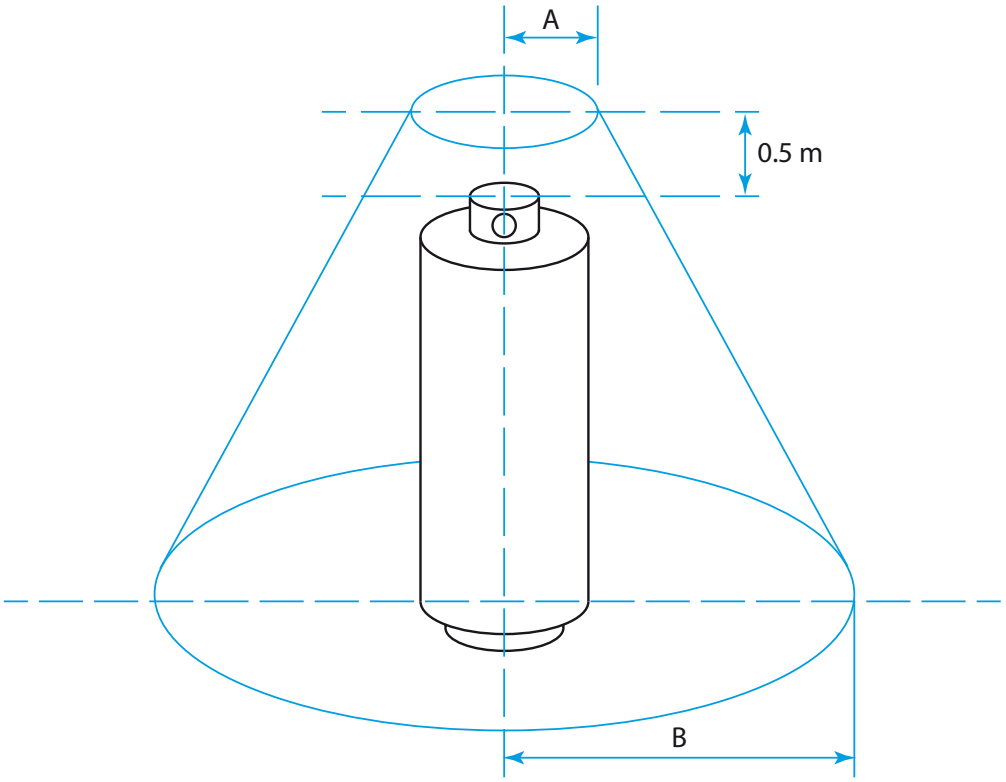
   Zone 2 within the space 0.5 m above and 0.5 m laterally from any cylinder valve, extending to a distance of 1.5 m laterally at the base of the cylinder

2. **Limited or intermittent bleeding during the filling of the cylinder**

   Zone 2 within the space 0.5 m above and 1.5 m laterally from any cylinder valve, extending to a distance of 3.5 m laterally at the base of the cylinder

3. **Continuous bleeding during the filling of the cylinder**

   Zone 1 within the space 0.5 m above and 2 m laterally from the cylinder and extending to a distance of 5 m at the base of the cylinder



Filling type	A	B	Zone
1	0.5	1.5	2
2	1.5	3.5	2
3	2	5	1

Procedure for Filling a Cylinder

Step 1: Position the tank wagon for filling the customer cylinder

The tank wagon shall be positioned for on-site filling of cylinders as follows:

1. All practical steps shall be taken to park the tank wagon off public roads; and
2. The tank wagon must not be able to move during the filling process, this can be achieved by a brake interlock system or wheel chocks; and
3. The tank wagon must be at least three metres from the cylinders; and
4. Consideration of nearby ignition sources and drains need to be considered; and
5. Warning signs shall be provided to exclude sources of ignition; and
6. The tank wagon shall be parked so that it can be readily driven or towed away in an emergency without recourse to reversing; and
7. The tank wagon shall not obstruct entrances to buildings or obstruct fire escapes and shall be located as afar as practical from open doorways; and
8. The tank wagon may park in a public place to fill cylinders providing:
    a. The public are excluded from the tank wagon during pumping by the erection of signs or barriers; and
    b. The tank wagon is to be parked such that it can be readily driven away in an emergency; and
    c. There is a means to remotely shut down the pump; and
    d. The tank wagon shall be no larger than 10,000 litres water capacity if the tank wagon has to deliver LPG to on-site filled cylinders from the roadside.

Step 2: Inspect the cylinder to be sure it is safe to fill

1. Look over the cylinder for serious corrosion, dents, digs, fire damage or other problems that may weaken the container. If the cylinder is seriously weakened or damaged, do not fill.
2. The cylinder is located outside of any building.
3. The cylinder must be installed on a stable, non-combustible base that is raised above the surrounding area that sheds water.
4. Check the cylinder is restrained (e.g. chained) against earthquake movement; this applies to 45 kg cylinders only.
5. There are no openings into a building located within 500 mm above the cylinders.
6. There are no openings into a building or pit located:
    a. Within 1 m measured horizontally from cylinders holding 100 kg or less of LPG;

b. Within 2 m measured horizontally from the cylinder installation holding more than 100 kg of LPG.

7. There are no openings into a drain located within 1 m measured horizontally from the cylinder.

Step 3: Connect the fill hose to the cylinder

1. For cylinder filling operations non-static appropriate PPE should be worn.
2. Always carry hose-end valves in the palm of your hand, with the valve outlet pointing away from your body. Never carry them by the lever or hand wheel and never drag them over the ground.
3. Be sure that the filler hose-end valve is fully closed.
4. Check and, if necessary, clean the outlet of the filler hose-end valve with a clean cloth. Inspect and, if necessary, replace the O-ring on the fill valve. NOTE: Be sure to wear safety gloves.
5. Extend the hose to the cylinder. DO NOT extend the hose through any building unless the building is an open carport or veranda.
6. Remove the dust cap from the fill valve on the cylinder, checking for any debris in the valve top and remove any debris present.
7. Carefully connect the hose to the fill valve on the cylinder. NOTE: Gently move the hose-end valve back and forth while you are tightening the ACME connector. DO NOT beat the connector with the dust cap, a wrench or any other object. Remember to hand tighten only.
8. Temporarily open and close the hose-end valve and check the connection for leaks. If the connection leaks, try to retighten the connection. If the leak continues, bleed down and disconnect the filler hose. Recheck the O-ring and, if necessary, reseat or replace it. Reconnect the hose and test the connection again. If the connection still leaks, do not fill the container.

Step 4: Fill the cylinder

There are two important facts that you must keep in mind during the transfer operation:

First, an approved filler must be present at the transfer during the entire operation to handle emergencies and monitor the condition of the transfer system. If you must leave the area, shut down the operation until you return. Also do not sit in the tank wagon cab while the fill hose is connected to the cylinder. REMEMBER, stay at the transfer point so you can handle any emergency that may arise.

Second, if a leak or fire develops at any time during the operation, close the hose-end valve and the tank wagon internal valve. Then, stop the pump and correct the problem. Also be alert throughout the operation for signs of erratic pump operation. If a problem develops, shut down the operation and correct it before continuing.

1. If applicable, insert a delivery ticket into the meter register. Reset the meter to zero and lock the ticket in place.
2. If applicable, open any manual shutoff valves upstream or downstream from the automatic by-pass valve.
3. Except for the hose-end valve, open all manual shutoff valves in the tank wagon transfer network.
4. In accordance with the correct sequence required by the operating instructions of your tank wagon, you should ensure that:
    a. The internal valve is opened
    b. The PTO is engaged
    c. The engine RPM is set to the proper speed.
5. Open the hose-end valve. Monitor the transfer system during the operation.
6. As the gauge indicates that the liquid level is approaching the standard filling level, open the bleed valve and watch this continually, when a spurt of LPG liquid emerges shut down the hose-end valve.
7. Close the bleed valve once the valve is clear of liquid.
8. Shut down the pump and valves on the tank wagon.

Step 5: Bleed down and disconnect the hose

1. Open the bleed valve on the hose-end valve or on the filler adaptor if one is installed. When the LPG stops venting from the connection close the bleed and disconnect the hose from the cylinder filling valve.
2. Once the filler hose is disconnected, check the cylinder valves with soapy water for any leaks. Replace the dust cap on the cylinder filling valve and hose-end valve.

Step 6: Prepare the tank wagon for you next delivery

1. Carry the hose back to the tank wagon; do not drag it along the ground.
2. Reset the meter register so that the delivery ticket is stamped.
3. Complete any additional paperwork.
4. Reset any safety interlocks on the tank wagon.
5. Walk around the tank wagon to ensure all transfer equipment is stored and the pathway out of the customer site is clear.
6. Move on to your next delivery.

Name	
Company	

On-site Filler Questions

1. What is one of the skills or item of knowledge must you have?
    a. The properties and behaviour of water
    b. Causes of cylinder failure
    c. Consequences of cylinder filling
    d. Inspection of cylinder installation
2. What is one of your obligations under the HSW HS Regulations?
    a. Not completing a training programme
    b. Holding an invalid approved filler certificate
    d. Filling cylinders using the correct procedures
3. What marking must be on a New Zealand approved cylinder?
    a. LAP or LAP SP number
    b. DOL or DOL SP number
    c. EPA or EPA SP number
    d. LAB or LAB SP number
4. How often must LPG cylinders tested?
    a. Every 5 years
    b. Every 7 years
    c. Every 10 years
    d. Every 15 years
5. What protective equipment must be worn when filling cylinders?
    a. Leather gloves and eye protection
    b. None
    c. Food handling gloves and sun glasses
    d. Overalls and safety shoes
6. LPG vapour is heavier than air?
    a. True
    b. False

7. Liquid propane boils at what temperature when released to the atmosphere?
    a. 42°C
    b. 20°C
    c. 0°
    d. -42°C
8. What happens to LPG liquid inside a cylinder when the cylinder is heated?
    a. It shrinks
    b. Nothing
    c. It leaks
    d. It expands
9. The three elements that must be present for a fire are fuel, air and an ignition source?
    a. True
    b. False
10. Warm water is used to treat cold burns?
    a. True
    b. False
11. You can fill a cylinder if you cannot read any of the markings?
    a. True
    b. False
12. When do you leak check a cylinder?
    a. Before filling
    b. During filling
    c. At the end of filling
    d. Never
13. What is used to leak check a cylinder?
    a. A match
    b. Nothing
    c. Your nose
    d. Soapy water
14. What is the permitted deviation from line of sight between the cylinder and tank wagon?
    a. 1 metre
    b. 1.5 metres

c. 2 metres

d. 3 metres

15. What is the minimum distance permitted between your tank wagon and cylinder?

a. As close as possible

b. 5 metres

c. 1 metre

d. 3 metres

16. Your tank wagon must be parked in a front out position?

a. True

b. False

17. You can take your delivery hose through a building?

a. True

b. False

18. What must you have with you while filling the cylinder?

a. Your mobile phone

b. Camera

c. Remote shut down device

d. Nothing

19. How far does the hazardous area extend from the centre of the cylinder during filling with intermittent operation of the bleed valve?

a. 1.5 metres

b. 2 metres

c. 2.5 metres

d. 3.5 metres

20. Where must you be during the filling process?

a. In the tank wagon cab

b. At the transfer point

c. On-site having a cup of coffee

21. At what point do you open the bleed valve on the ullage valve during the filling process?

b. When you shut down the pump

a. As the gauge indicates that the liquid level is approaching the standard filling level

c. When you open the hose end valve

Name	
Company	

On-site Filler Answers

1. What is one of the skills or item of knowledge must you have?
   a. The properties and behaviour of water
   b. *Causes of cylinder failure*
   c. Consequences of cylinder filling
   d. Inspection of cylinder installation
2. What is one of your obligations under the HSW HS Regulations?
   a. Not completing a training programme
   b. Holding an invalid approved filler certificate
   c. *Filling cylinders using the correct procedures*
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   b. DOL or DOL SP number
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4. How often must LPG cylinders tested?
   a. Every 5 years
   b. Every 7 years
   c. *Every 10 years*
   d. Every 15 years
5. What protective equipment must be worn when filling cylinders?
   a. *Leather gloves and eye protection*
   b. None
   c. Food handling gloves and sun glasses
   d. Overalls and safety shoes
6. LPG vapour is heavier than air?
   a. *True*
   b. False

7. Liquid propane boils at what temperature when released to the atmosphere?

   a. 2°C

   b. 20°C

   c. 0°

   d. *-42°C*

8. What happens to LPG liquid inside a cylinder when the cylinder is heated?

   a. It shrinks

   b. Nothing

   c. It leaks

   d. *It expands*

9. The three elements that must be present for a fire are fuel, air and an ignition source?

   a. *True*

   b. False

10. Wrm water is used to treat cold burns?

    a. *True*

    b. False

11. You can fill a cylinder if you cannot read any of the markings?

    a. True

    b. *False*

12. When do you leak check a cylinder?

    a. Before filling

    b. *During filling*

    c. *At the end of filling*

    d. Never

13. What is used to leak check a cylinder?

    a. A match

    b. Nothing

    c. Your nose

    d. *Soapy water*

14. What is the permitted deviation from line of sight between the cylinder and tank wagon?

    a. 1 metre

    b. *1.5 metres*

c. 2 metres

d. 3 metres

15. What is the minimum distance permitted between your tank wagon and cylinder?

a. As close as possible

b. 5 metres

c. 1 metre

d. *3 metres*

16. Your tank wagon must be parked in a front out position?

a. *True*

b. False

17. You can take your delivery hose through a building?

a. True

b. *False*

18. What must you have with you while filling the cylinder?

a. Your mobile phone

b. Camera

c. *Remote shut down device*

d. Nothing

19. How far does the hazardous area extend from the centre of the cylinder during filling with intermittent operation of the bleed valve?

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b. 2 metres

c. 2.5 metres

d. *3.5 metres*

20. Where must you be during the filling process?

a. In the tank wagon cab

b. *At the transfer point*

c. On-site having a cup of coffee

21. At what point do you open the bleed valve on the ullage valve during the filling process?

a. When you shut down the pump

b. As the gauge indicates that the liquid level is approaching the standard filling level

c. When you open the hose end valve

In-situ Filling – On-site Assessment

Name of person being assessed	
Company employing person	
Date of assessment	
Location of assessment	
Name of person undertaking assessment	

1. Tank wagon parking

	Item to be assessed	Competent	Non-competent
1.1	Tank wagon parked off public roads?		
1.2	Tank wagon parked 3 m from cylinders?		
1.3	Tank wagon parked in a front out position?		
1.4	Tank wagon not obstructing exits from buildings?		
1.5	Warning signs positioned correctly?		

2. LPG Cylinder

	Item to be assessed	Competent	Non-competent
2.1	Cylinder identified as in-situ filled?		
2.2	Cylinder checked for LAB number?		
2.3	Cylinder checked for test date?		
2.4	Cylinder condition checked?		

3. Cylinder filling operation

	Item to be assessed	Competent	Non-competent
3.1	Ensures unobstructed access between tank wagon and cylinder?		

	Item to be assessed	Competent	Non-competent
3.2	Ensures there is line of sight between tank wagon and cylinder? 1.5 m deviation permitted		
3.3	Delivery hose is not passing through buildings?		
3.4	Delivery hose does not cross public footpaths?		
3.5	Person confirms there adequate light?		
3.6	Person touches cylinder with bare hand?		
3.7	Person wears protective gloves for hose connection?		
3.8	Person explains if bleed valve operation is continuous or intermittent operation?		
3.9	If intermittent bleed person identifies the hazardous area zone? 3.5 m and zone 2		
3.10	If continuous bleed person identifies the hazardous area zone? 5 m and zone 1		
3.11	Person ensures all openings and drains within the hazardous area zone are closed or sealed?		
3.12	Person has remote shutdown device with them at all times?		
3.13	Contents of cylinder checked prior to filling?		
3.14	Person maintains watch of tank wagon and cylinder during filling?		
3.15	Cylinder leak checked after filling?		

4. Emergency Procedures

	Item to be assessed	Competent	Non-competent
4.1	Person aware of emergency response plan?		
4.2	Person able to explain what to do in an emergency?		

Person:	Competent	Non-competent

Any additional notes or observations:
