

LPG Association Code of Practice
LPGA COP No 2

Installation and maintenance of twin 45kg LPG cylinder systems

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Foreword

The performance of LPG cylinder installations is a critical element in ensuring that gas is supplied to appliances reliably and safely. This Code of Practice has been compiled with advice and input from across the industry in New Zealand and from international authorities. The Code of Practice captures the latest knowledge and design features gained from operating experience and investigative work conducted by the LPG Association.

The purpose of this Code of Practice is to:

- Assist with the reduction of phthalates from LPG systems.
- Assist with the removal of condensate at the regulator.
- Assist with the selection of suitable equipment and fittings.
- Assist with recommendations on equipment maintenance.

It should be read in conjunction with AS/NZS 5601.1.

It is intended that gas fitters will use this Code as a best practice guide for the installation and maintenance of domestic and commercial twin pack installations.

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Section 1: Scope, Interpretation, Definition and General

1.1 Scope

This Code of Practice sets out the requirements for installation and servicing of domestic and commercial 45kg twin cylinder LPG installations.

1.2 Definitions

For the purposes of this code the following definitions shall apply:

Accessible:

Access can be gained without hazard or undue difficulty for inspection, repairs, testing, maintenance, renewal or operational purposes.

Breather vent:

An orifice or opening designed to permit atmospheric pressure to act on the diaphragm of a regulator.

Condensate:

The liquid that separates from the gas down stream of any regulator due to the reduction in temperature resulting from pressure reduction.

Condensate trap (also known as a drip leg or tailpipe):

A device installed in a gas line to trap the condensate liquid.

EPA: Meaning the 'Environmental Protection Authority'.

Gasfitting:

Has the same meaning as in the Plumbers, Gasfitters and Drainlayers Act 2006.

Gas load:

The total gas consumption of all downstream appliances.

Gas Pressure Regulator:

A device that automatically regulates the outlet pressure of the gas passing through it to a predetermined value.

Automatic Change-Over Regulator:

Combination valve / first stage gas pressure regulator, fitted to a LPG multiple-cylinder installation which will automatically change over from a cylinder in use to a reserve cylinder at a predetermined pressure. May be included in a one piece automatic changeover valve assembly comprised of automatic changeover valve, first and second stage regulators and may incorporate pressure relief or over pressure shut off capability.

HSNO:

Hazardous Substances and New Organisms Act 1996.

LAB number:

Number allocated by EPA when a cylinder is approved.

Lock-up pressure:

The maximum pressure in an installation when the regulator has closed and all appliances are shut down.

Non Return Valve:

A valve designed to operate automatically to prevent reversal flow in a pipe or fitting.

Phthalates:

Plasticisers mainly DOP (DiOctyl Phthalates) predominantly found in hose inner liners.

POL fitting (Prest-O-Lite):

The common name given for a standard union with left hand thread, used for connection to a 45 Kg cylinder.

Pigtail:

A short length of flexible tube or copper pipe completed with end couplings. Use for connecting the cylinder to the manifold or the changeover valve.

Pressure:

Pressure as measured above atmospheric pressure, also called gauge pressure.

Twin cylinder installation:

A cylinder installation where the cylinders are connected separately to the system. Each cylinder is connected to a change over valve that can be operated manually or automatically, to change over the cylinder which is supplying LPG to the installation. Connection may be made using flexible rubber or copper pigtails, or pipe fittings.

REFERENCED DOCUMENTS

AS/NZS 5601.1	Gas Installations
AS/NZS 1596	The storage and handling of LPG
AS/NZS 1869	Hose and hose assemblies for liquefied petroleum gases (LP Gas), natural gas and town gas
UL144	LP- Gas regulators
UL252, AGA 205	Compressed gas regulators
NF M 88-769	1977 Commercial Propane Installations In Movable Containers – Coupling And Automatic Changeover Device – Construction – Operation – Tests

Section 2: Selection criteria for LPG Cylinders, Pigtails, Change-over valves and Regulators

2.1 Cylinders

- (a) All cylinders must comply with the requirements of the EPA's Guide to Gas Cylinders.
- (b) Cylinders filled for use in LPG installations must be stamped with an LAB or LABSP number and a current test date.
- (c) Consideration should be given to ensure that the demand of the appliances to be connected to the system can be supplied by a 45kg cylinder. As a guide on NZ LPG mix, a 45kg cylinder is capable of supplying a duty cycle of 1kg/50MJ over the period of 1 hour. The instantaneous demand can exceed this rate for short periods. Table J2 of AS/NZS 5601.1 provides more guidance on withdrawal rates for propane.

2.2 Pigtails

Refer to clause 4.6 of AS/NZS 5601.1

2.3 Changeover Valves

- (a) Changeover valves can be manual or automatic, and may include a non-return valve on each pigtail connection. The valve must comply with the requirements of the Authority.
- (b) Changeover valves may be comprised of a first & second stage regulator system in a single body, or as a combination of separate component items.

2.4 Regulators

- (a) Regulators shall comply with the requirements of the EPA "Guide to Gas Cylinders".
- (b) Regulators shall comply with the requirements of section J6 of AS/NZS 5601.
- (c) Consideration must be given to the total expected gas load when sizing the regulator.
- (d) A single stage regulator or the first stage of a multi-stage regulator shall be located so that the length of the piping that is subject to cylinder pressure is as short as practicable.

2.5 Condensate Trap

Condensate traps remove condensate and prevent transfer downstream of most condensates present in the LPG. A condensate trap should be installed between the first and second stage regulator if they are separate items. If the regulator is the combined type then a condensate trap should be installed immediately after the regulator.

- (a) Condensate traps must have a vertical limb in a direct line to the first stage regulator and be of a minimum volume of $V=N \times 5.5$ where: V – The volume of the vertical limb in Milliliters (ml)
N – The number of 45kg cylinders.
- (b) The trap must have a plug or other means of removing the condensate.

Examples of length of condensate trap tube for 10 and 13 mm pipe and various numbers of cylinders.

Number of 45 kg cylinders	Length 10 mm pipe	Length 13 mm pipe
Two	140 mm	88 mm
Four	280 mm	180 mm
Six	370 mm	240 mm
Eight	560 mm	350 mm

2.6 Non-return valves

Where the regulator does not prevent LPG flowing across the changeover system, a non-return valve shall be fitted either in each pigtail connection of the changeover valve, or as part of each pigtail.

2.7 Excess flow valves

For flexible pigtails manufactured to AS/NZS 1869 an appropriately sized excess flow valve must be fitted immediately after the outlet of each cylinder valve. The excess flow valve can be an integral part of the pigtail assembly.

Section 3: Location of Cylinders

3.1 Location of Cylinders

Refer to section J3 of AS/NZS 5601.1

3.2 Requirements for cylinder deliveries

Cylinder installations should be located such that the delivery of gas can be made safely by one person without excessive manual handling or risk to customers property. In situations where the following conditions cannot be satisfied, other options such as locating the cylinders remotely and piping to the installation should be considered.

- (a) Cylinder installation must be designed to be capable of accommodating the size of cylinder intended for use, for either exchange or insitu fill applications.
- (b) A minimum distance of 600mm should be provided between front of the cylinder installation and other structures to allow adequate access for the cylinder delivery to be made.
- (c) The cylinder compound should be accessible by cylinder trolley.
- (d) Paths should have a minimum width of 600mm.
- (e) Steps should have a minimum of 2: 1 tread depth to tread rise. Maximum tread rise should be 125mm.
- (f) Steps should not exceed 1.5m total rise.
- (g) Paths should not exceed 20 deg gradients.
- (h) Total distance from cylinder delivery truck parking area and cylinder installation should not exceed 75m.
- (i) It must be possible to legally and safely park the truck while making the delivery.
- (j) Access route should be firm and compact with adequate grip even in wet conditions.
- (k) The access route should not be over delicate or decorative surfaces such as terracotta.

Section 4: Location and Installation of Cylinders

Refer to section J4 of AS/NZS 5601.1.

4.7 Clearances around Cylinder

Refer to section J5 of AS/NZS 5601.1

4.8 Cylinder Safety Valve Discharge

Refer to section J6 of AS/NZS 5601.1

4.9 Regulators

Refer to section J6 of AS/NZS 5601.1

4.10 Test Points

Refer to section J6 of AS/NZS 5601.1

Section 5: Maintenance of twin LPG Cylinder Installations

5.1 Cylinders

Cylinders should not be filled unless they have been tested and certified within the last ten years.

5.2 Flexible Pigtails manufactured to AS/NZS 1869

- (a) Pigtails should be inspected visually for cracks and deterioration every time the cylinder is exchanged or filled.
- (b) Pigtail connections should be checked with a soapy solution every time the cylinder is changed or filled.
- (c) Pigtails should be replaced six years from the date of manufacture.

5.3 Change-over Valves

Changeover valves should be checked for correct operation in accordance with manufacturers recommendations or in the absence of any recommendation, at least every ten years.

5.4 First Stage Regulators

- (a) The first stage regulator to be checked for correct operation in accordance with the manufacturers recommendations, or in the absence of any recommendation at least every ten years.
- (b) The condensate trap to be drained by removing the drain plug provided) at intervals not exceeding two years, and at every visit of the Gas fitter.

5.5 Second Stage Regulators

The second stage regulator to be checked for correct operation in accordance with the manufacturers recommendations, or in the absence of any recommendation, at least every ten years. The rubber diaphragm and rubber seat must be inspected for deterioration and replaced if necessary.

5.6 Condensate Traps

Condensate traps should be emptied whenever any work is carried out on the installation and at least every 2 years. **NOTE** For the quantities of residue expected to be found in the condensate traps, between 2 to 3 ml maximum, use disposable gloves when emptying the residue into absorbent material. The used absorbent material and the gloves can then be disposed of in general waste.