

SECTION 19

LP GAS INSTALLATIONS IN RAILWAY ROLLING STOCK

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19.1 SCOPE

19.1.1 The Australian LP - Gas Installation Code AG 601 published by the Australian Liquefied Petroleum Gas Association Ltd. (ALPGA) has been used as basis for the installation and use of LP - Gas in railway vehicles and shall be read in conjunction with this Section. The Caravan Section of the ALPGA Installation Code has been used as a guideline with specific requirements and exclusions included for railway vehicles. The provisions of the Code shall apply except where modified by the requirements of this Section.

19.1.2 This Section prescribes minimum requirements for the layout and location of cylinders, installers qualifications, inspection, testing, cautionary notices, and operating instructions. Nothing in this Section precludes an individual System from imposing more stringent internal procedures and practices.

19.1.3 The requirements of this section shall apply only to LP Gas installations in railway vehicles.

19.1.4 DEFINITIONS

For the purpose of this Section the following definitions shall apply:

Approved:

In this Section, Approved means that appliances, fittings and equipment shall be approved by the Australian Liquefied Petroleum Gas Association, hereinafter called A.L.P.G.A., or in accordance with the relevant code or specification.

Authorised Person:

Any person who has been instructed by a competent officer, and suitably authorised, in the processes of disconnecting and connecting of gas cylinders, testing for leaks, and the replacement of appliances, which do not require the qualifications of an L.P. Gas Installer but are beyond the capacity of an untrained user of the appliances.

Carcass:

The gas distribution pipelines from the regulator outlet to the isolating cocks at the appliances.

Excess Flow Valve:

A valve normally in the open position which closes automatically in the direction of flow for which it is designed when a predetermined limit is exceeded, this limit being certified by the manufacturer.

High Pressure Stage:

That part of the installation between the valve of the gas cylinder and the inlet of the pressure regulator.

Low Pressure Stage:

That part of the installation between the outlet of the pressure regulator and the inlet of the appliance, subject to working pressure not exceeding 7 kPa.

L.P. Gas Installer:

Any person qualified in accordance with Sections 19.2.1 and 19.4.1 to carry out L.P. Gas installation work, except that the actual disconnecting and connecting of gas cylinders and the replacement of appliances by similar appliances does not have to be carried out by an L.P. Gas Installer.

Railway Vehicle:

Any vehicle operating on rails, or standing permanently or temporarily in a railway siding. This definition

includes all classes of passenger cars, railmotors, brakevans, buffet cars, dining cars, work vans, and mobile workshops, canteens, kitchens, clinics, libraries, offices and showrooms.

Safety Relief Valve:

A device which shall have direct communication with the vapour space in the cylinder at all times. It shall comply with the requirements of AS.2030.

Supervisor:

Shall mean, in respect of any railway System, the officer(s) specified by that System for the purpose of performing the functions required of the Supervisor pursuant to this Section. Individual Systems may require the Supervisor to be a Professional Engineer for compliance with relevant State legislation or Statutory Authority regulations.

Statutory Authority:

An authority with statutory power to control the design and installation of L.P. Gas Cylinders for the Commonwealth of Australia or relevant State or Territory.

19.2 INSTALLATION GUIDE-LINES

19.2.1 L.P. GAS INSTALLATION WORK

All L.P. Gas Installations shall be carried out by persons:

(a) Holding an L.P. Gas Installer's License, or its equivalent where issued by a Statutory Authority

or

(b) Under the direct and personal supervision of a person holding such a license, or its equivalent.

Where the Statutory Authority does not issue L.P. Gas Licenses the installer shall be authorised by the Supervisor of the System concerned

19.2.2 CONTROL OF L.P. GAS INSTALLATIONS

All installations shall comply with this Section and any matter relative to the interpretation or proposed alteration, or any requirement which may be considered contrary to Statutory Regulations shall be referred to the Supervisor.

19.2.3 RESPONSIBILITY FOR L.P. GAS INSTALLATION WORK

The controlling officer of the workshop, depot or area concerned shall be responsible for ensuring that:

(a) L.P. Gas installations, maintenance and servicing are carried out in accordance with these rules

(b) L.P. Gas Installers are qualified as specified in Rule 19.2.1 and that persons who are authorised to change cylinders, test for leaks or replace appliances have been thoroughly instructed and are competent to perform such duties

19.2.4 RECORDS ASSOCIATED WITH L.P. GAS INSTALLATION

The following records shall be kept:

(a) A record of all vehicles in which L.P. Gas equipment is installed and the appliances installed therein, retained by an officer authorised by the Supervisor

(b) A record of all licensed Gas Installers and their departmental classification, retained by an officer authorised by the Supervisor

(c) A record of all authorised persons, retained by an officer in charge of the workshop, depot or area concerned

In addition to the above, a Master Record of all equipment, installations, modifications, cylinder changes etc. may be kept if required by the System.

19.3 MATERIALS, EQUIPMENT AND APPLIANCES

19.3.1 MATERIALS

Piping, tubing and fittings shall meet the requirements specified in this section.

19.3.1.1 High Pressure Stage

Refer to the ALPGA Code AG 601 Section 6.7 Caravans for cylinder location, cylinder compartments and pipework. The high pressure connection shall be an approved L.P. Gas resistant, flexible tubing complying with AS 1869 type C, permanently marked on the outer surface with the words 'for L.P.G. use'.

An excess Flow Valve shall be connected directly to the cylinder or to the bullnose coupling of the hose connection.

19.3.1.2 Low Pressure Stage

Refer to Australian L.P. Gas Installation Code AG 601 Section 6.7 Caravans for cylinder location, cylinder compartments and pipework.

Galvanised steel pipe is preferred for main supply lines which should run under the floor, outside the vehicle. They shall have tapered screwed joints which comply to AS 1722 Part 1.

Copper tube shall be used for the carcass pipework inside vehicles. Only solid drawn copper tubing having an outside diameter of not less than 4.75 mm and a wall thickness of not less than 0.91 mm to AS 1432 Table III shall be used for such service lines.

An approved isolating cock may be fitted between galvanised steel and copper pipe sections. The preferred position for this isolating cock shall be immediately inside the vehicle at the entry point of the galvanised pipework.

19.3.1.3 Joints

Fitting for copper tubing shall be of the flared type (with the flare on the tube formed by a screwed type flaring tool) or of the capillary type. The fittings shall be manufactured from drawn stock or by hot pressing. Capillary fittings pre-filled with soft solder are prohibited.

NOTE: When capillary type fittings are used they shall be joined to copper tubing by brazing or silver soldering with material having a melting point of *not less* than 540°C.

Elbows, tees and branches may be fabricated by brazing copper pipe to copper pipe provided a branch jointing tool is used to form a socket and spigot, and the form of the joint between the two pipes has a maximum possible lap.

Olive fittings shall not be used, except on pipes up to 6.5 mm outside diameter used on the appliance after the control cock.

19.3.2 APPLIANCES

All L.P. Gas appliances falling within the scope of this Section shall be approved and shall be tested for leaks in accordance with 19.4.3 before installation. All room heaters, gas rings and burners, fitted with pilots, and automatic water heaters, shall be equipped with a device designed to shut off the flow of gas to the main burner and to the pilot, in the event of the pilot flame being extinguished.

19.3.3 INSTALLATION OF APPLIANCES

The following criteria shall apply:

- (a) Radiant type room heaters shall be fitted with guards to prevent ignition of combustible clothing or other combustible material which could otherwise come into contact with the radiant surface.

If a wire guard is used it shall be hinged at the top, the maximum spacing of the wires forming the guard shall not exceed 38 mm in at least one direction and they shall not be less than 75 mm from the radiant surface,

- (b) Appliances shall be located inside a vehicle so that a fire at an appliance will not restrict the exit of persons from the vehicle.
- (c) When an outlet has been provided for an appliance which is not to be connected at the time, or which has been disconnected and is not to be reconnected immediately, it shall be securely closed gas-tight with a positive plug or cap. In no case shall the outlet be closed with a tin cap, wooden plug, cork, uncapped gas cock, or the like. This clause does not apply to approved bayonet connections.

19.3.4 COMPONENTS

This clause covers Valves, Cocks, Pressure Regulators, Cylinder Changeover Devices and other items not specifically covered elsewhere in these rules.

Regulators supplying the low pressure stage shall be fitted with a safety relief device set to discharge at a pressure not less than 1.7 or more than three times the set discharge pressure of the regulator (AG 205).

19.3.5 CYLINDER SPECIFICATION

Cylinders shall comply with the requirements of Table 1903 AS 2030, AS 2470, and the specific requirements of the Railway System concerned.

19.3.6 CYLINDER LOCATION

Cylinders may be located inside or outside the vehicle. Unless special provision is made with regard to valves and connections located to withdraw gas from the vapour space only, cylinders shall be retained in the vertical position whether full or empty.

The approval of the Statutory Authority must be obtained for all installations where cylinders are required in other than the vertical position.

All cylinders, including spares, above 5.5 kg water capacity and associated high pressure equipment, located inside the vehicle shall be contained in a cupboard which conforms to the requirements of 19.3.7.

A maximum of 100 kg of L.P. Gas stored in any one occupied vehicle is recommended but additional storage capacity may be provided if permitted by the relevant statutory authority.

Cylinders shall be located as near as practicable to both the transverse and longitudinal centres of the vehicle having due regard to the access of cylinders and safety.

Cylinders shall not be located in any sleeping compartment unless the cupboard access doors are external to such a compartment.

19.3.7 CYLINDER CUPBOARDS

Cylinder cupboards shall be of sufficient size to permit the ready placement and removal of the requisite number of cylinders to be stored therein.

A typical cylinder cupboard containing two cylinders and associated equipment is shown in Figure 19.1.

The cupboard shall be of rigid and robust construction and vapour tight so that any leakage of gas within it shall not enter the interior of the vehicle.

The cupboard, other than the floor area, shall be constructed of, or completely lined with non-combustible material.

NOTE: The definition of combustibility in this determination shall conform to that given in AS 1520, Methods for Fire Test on Building Materials and Structures.

A maximum free area of the cupboard floor shall be open to the atmosphere in cupboards accessible from inside the vehicle, but not less than 130 square centimetres per 65 kg water capacity cylinder contained therein, to permit a ready release of any escaping gas. The opening for cylinders other than 65 kg water capacity shall have a proportionate minimum opening.

The opening shall be provided with a suitable metal mesh grating.

For cupboards with doors opening to the outside of the vehicle a space of at least 50 mm high, at floor level, and full width of the cupboard doors may be provided in lieu of the grating.

In such cases consideration should be given to providing louvres, or other means, to prevent rain and other foreign matter from entering the cupboard.

Cylinders shall be located in the cupboard so that there is, at least, 25 mm air space between the lowest point of the cylinder base ring and the grating.

Cylinders shall be secured in place by fastenings or straps designed to withstand a force equal to four times the mass of the cylinder when full and so fix the cylinders firmly in position. The fastenings or straps shall be located in a position at approximately two thirds the overall height of the cylinder from its base.

Safety Relief Valves shall not face one another. When two cylinders are located in the cylinder cupboard, the valves may face the rear wall of the cupboard or outwards towards the cupboard sides.

The pressure regulator shall be mounted on the cylinder valves or firmly affixed to the rear wall of the cupboard as close as practical (with a maximum distance of 600 mm) to the cylinder valves.

A cylinder cap when not affixed to a cylinder or other equipment associated with the cylinder and high pressure stage installation may be stored in the cylinder cupboard if secured on a suitable rack or bracket, below the level of any control equipment.

All doors of interior located cupboards shall be provided with suitable seals and be securely fastened when closed to prevent the escape of any leaking gas to the interior of the vehicle.

In brakevans, passenger cars and other vehicles not solely occupied, or used, by an authorised person, or under the direct personal supervision of an authorised person, the cylinder cupboard doors shall be locked to prevent unauthorised access to the cylinders and high pressure stage equipment.

Only authorised persons shall be provided with a key for opening such doors.

When internal cupboard doors are provided with locks a heat resistant glass panel, 150 mm, shall be fitted to at least one door for the purpose of gaining access to the interior of the cupboard in an emergency.

19.3.8 SERVICE AND RESERVE INDICATOR

Installations of two or more cylinders shall be fitted with an automatic changeover device. A service and reserve indicator shall be provided. This indicator shall be located adjacent to the cylinders in such a position as to be readily observed by a person changing cylinders.

Where cylinders are located within a cupboard the indicator may be either inside or outside the cupboard.

The provision of an additional indicator remote to the cylinders is optional. Where provided it shall be located within the vehicle where it can be readily observed. Service and reserve indicators shall be suitably guarded to prevent damage to the equipment.

That part of the copper tube outside the cylinder cupboard connecting the regulator to the remote indicator shall be protected by a suitable cover mould or guard.

19.3.9 FLUES

The flue shall be installed so as to avoid sharp turns or other construction features which would create excessive resistance to the flow of gases. When changing direction of a metal flue, use only crimped or lobsterback solderless bends.

The terminal of the flue shall be located not less than 50 mm beyond the outside surface of the vehicle, except that for vehicles with an outer skin of non-combustible material flues passing from the side of the vehicles may be terminated 13 mm beyond the outside surface. Every pipe shall be terminated with a cowl which prevents rain entering the flue. This cowl shall not reduce or obstruct the effective cross-sectional area of the flue pipe.

19.3.10 DRAUGHT DIVERTERS

Every flued appliance shall have a draught diverter.

If the draught diverter is not a part of the appliance or supplied by the appliance manufacturer it shall be of the same size as the appliance flue connector.

19.3.11 INTER-RELATION WITH OTHER SERVICES

Electrical Services:

Pipework shall not be run adjacent to electrical services but where crossovers involving close proximity are unavoidable, the two services shall be installed so that contact between the two cannot occur.

Separation shall be achieved preferably by fixed spacing not less than 50 mm clear; where this cannot be achieved the use of non-flammable insulation firmly fixed in place, and at least 6 mm thick, is permitted.

Drainage:

Pipework shall not be run adjacent to drainage services, nor be exposed to drip or leakage or any effluent from such services.

19.3.12 TRANSPORTATION AND STORAGE OF CYLINDERS NOT IN USE

The transportation and storage of cylinders associated with L.P. Gas installations, but not installed as part of the system or its reserve cylinder supply, shall conform to AS 1596, L.P. Gas Code.

19.4 TESTING AND RECORDS

19.4.1 AUTHORISED INSTALLATION TESTER

The testing of L.P. Gas installations shall only be carried out by an LP Gas Installer or by a person authorised by the Supervisor where permitted by Statutory Regulations.

19.4.2 LINE TESTING DURING INSTALLATION

Plug or seal openings in section, connect hand pump and pressurise to 150 kPa minimum. Check for pressure drop after 10 minutes. Correct any leaks.

19.4.3 TESTING COMPLETED INSTALLATIONS

'Refer ALPGA L.P. Gas Installation Code - Appendix 1'.

As an alternative to the above procedures approved electronic gas leak detectors may be used and employed in accordance with manufacturers specifications.

19.4.4 TESTING SUBSEQUENT TO CYLINDER CHANGE

At Cylinder Change: Before reconnecting replacement cylinders ensure that the connections have been cleaned thoroughly, are undamaged and that excess flow valves are located in accordance with 19.3.1.1.

All joints broken and remade shall be tested with the soap and water solution or an electronic gas leak detector each time a cylinder is changed or an appliance removed or replaced.

19.4.5 REGULAR PERIODIC TESTING

Installations shall be retested, using bubble test apparatus, or other approved test apparatus at periods not exceeding one year, except that the L.P.Gas installation of each vehicle shall be tested in accordance with 19.4.3 before it is released from any workshop regardless of the time elapsed since any previous test. It is not necessary to carry out L.P. Gas installation testing every time a vehicle is undergoing tests for radio, battery or similar minor attentions.

If a leak is evident as per 19.4.3 it shall be located and made good by an L.P. Gas Installer.

19.4.6 HIGH PRESSURE CONNECTIONS IN MULTI-CYLINDER INSTALLATIONS

Under normal conditions of operation in multi-cylinder installations the regulator and cylinders removed, flexible hoses not connected to a cylinder shall be fitted with an approved plugging cap and the connection tested to ensure there is no gas leak.

19.4.7 RECORD OF EQUIPMENT, CYLINDER CHANGES AND TESTS

A record of equipment, and tests together with replacement of appliances or parts and other work performed on the system shall be maintained.

Records of cylinder changes shall be maintained.

Suggested samples of cards for this purpose are shown in Figure 19.2 and shall be retained in the cylinder cupboard.

Alternative methods of maintaining these records (for example in book form) may be developed by the System concerned.

Each entry shall be accompanied by the signature of the authorised person who performed the work.

In addition, the office of the railway System or the Branch concerned, shall be notified, in writing, of all tests and other work, other than cylinder changes and associated work, in order that a Master Record can be kept up to date.

19.5 INSTRUCTIONS

19.5.1 OPERATING INSTRUCTIONS

The following notices shall be provided in all vehicles in which L.P.Gas installations are provided.

19.5.1.1 On Exterior of Cylinder Cupboards:

'CAUTION

- (a) Except in an emergency, the equipment in this cupboard shall not be interfered with by other than an authorised person who has been instructed in correct procedures.
- (b) In an emergency close the cylinder valves by rotating the hand wheels in a clockwise direction.'

In the case of permanently locked cupboards fitted with a glass panel the caution notice shall read 'In an emergency break glass and close the cylinder valves by rotating the hand wheels in a clockwise direction.'

19.5.1.2 At Appliance:

Specific instructions relative to the operation of any particular appliance shall be located in a prominent position, adjacent to the appliance concerned.

19.5.1.3 General Safety Notice:

A general safety notice, based on the following, should be displayed near the entrance in all vehicles fitted with L.P. Gas equipment.

LP GAS SAFETY

- (a) On entering a closed vehicle provide cross ventilation by opening doors and windows for a period of not less than five minutes
- (b) If, after the vehicle has been ventilated, there is a suspected leak, which will be apparent by the distinctive odour of the gas, report as follows:
 - At depots, or other locations, where cylinders are changed advise the officer in charge of staff responsible for changing cylinders.
 - If the vehicle is in transit arrange for advice to be sent forward to the next location, in direction of travel, where cylinders are changed.
 - If the vehicle is permanently, or temporarily located in a depot, siding or other location, advise the office in charge of the location.
- (c) Check isolating cocks to ensure that they are open before attempting to light an appliance.
- (d) Special instructions apply to the operation of certain appliances. Observe the instructions which are located adjacent to these appliances.
- (e) Check ventilators and flues, where provided, after lighting to ensure that they are operating effectively.
- (f) When appliances are not in use the isolating cock adjacent to the appliance operating cock shall be closed at all times.
- (g) Appliances *shall not* be used for purposes other than that for which they are designed. Serious injury may occur from improper use.
- (h) Additions or alterations to L.P. Gas appliances or installations *shall not* be carried out by unauthorised persons.
- (i) *Never*, under any circumstance, use a flame to check for gas leaks in any part of the installation.

- (j) If an appliance does not operate correctly report the matter to the appropriate authority.

19.5.2 SPECIAL INSTRUCTIONS

Special instructions to cover particular circumstances relative to the installation, maintenance and use of L.P. Gas equipment may be necessary from time to time. These should be covered by detailed instructions and all staff likely to be affected should be notified accordingly.

19.5.3 ADDITIONAL INFORMATION REGARDING L.P. GAS INSTALLATIONS

- (a) Distinctive Odour of L.P. Gas:

Liquefied petroleum gas (L.P.G.) contains a distinctive odourant which is added to the fuel. This odour is apparent even when the gas mixture is at one fifth of its lower flammable limit.

- (b) Vehicles Damaged by Fire:

Should a fire occur in any vehicle equipped with L.P. Gas the matter shall be reported as a matter of urgency, to the Supervisor, or an equivalent officer, as referred to in 19.2.2.

- (c) Vehicles Subject to Damage, Other Than by Fire:

In the event of vehicles sustaining damage as a result of heavy impact, collision or derailment, all cylinder valves shall be closed and the equipment left inoperative until checked for serviceability by an authorised person. Any repair work found necessary shall be carried out by an L.P. Gas Installer.

- (e) Indication of Empty Cylinders:

Installations in which two or more cylinders are provided shall be fitted with an automatic changeover regulator which carries out two functions.

Firstly, it allows fuel to flow from one cylinder only at any one time. This cylinder is called the service cylinder.

Secondly, when one cylinder is emptied the changeover regulator automatically permits the fuel to flow from the reserve cylinder or cylinders. When this occurs a red 'tell tale' will appear on the indicator gauge, which is fitted either to the regulator or outside the cylinder cupboard.

When the red 'tell tale' is visible early action should be taken to notify the appropriate authority in order that the cylinder may be replaced before the gas in the reserve cylinder or cylinders has exhausted.

TABLE 19-1

Reference Standards and Codes of Practice.

Australian L.P. Gas Association

Australian L.P. Gas Installation Code (Incorporating Marine and Caravan L.P. Gas Systems)

Australian L.P. Gas Safety Handbook

Standards Association of Australia

AS 1432 Copper Tubes for Plumbing, Gasfitting and Drainage Applications
AS 1869 Hose and Hose Assemblies for Liquefied Petroleum Gases (LPG), Natural Gas and Town Gas
AS 2030.1 SAA Gas Cylinders Code
Part 1: Cylinders for Compressed Gasses other than Acetylene
AS 2473 Valves for compressed gas cylinders (threaded outlet)

Australian Gas Association

AG 601 Installation code
AG 205

TABLE 19-2

CHECKLIST FOR LIQUEFIED PETROLEUM GAS INSTALLATIONS

This checklist is a guideline only for work which shall comply with the current Australian L.P. Gas Installation Code and Section 19.

**A.L.P.G.A.
Installation
Code 1989**

**A.G.
601
1990**

PIPEWORK

Gasfitting shall be done only by a licensed installer	A.3.1	6.7.11.1.10
A Gas Record Card shall be completed		
Pipework shall be continuous from regulator to branch	B.5.5 (b) (iv)	6.7.5.2.4
Pipework shall be flexible and not too rigid	B.5.5 (b) (vii)	6.7.5.2.7
Gas pipes under rail vehicle shall be firmly mounted and protected and clipped with same material as the pipe B.5.6 (b)		6.7.6.1.2
Grommets shall be fitted where pipe passes through floor or structure	B.5.5 (b) (iii) 6.7.5.2.3	
Pipework shall be separated from electrical services	B.5.7 (a)	6.7.7.1
Branch tees must be outside the rail vehicle	B.5.5 (b) (viii)	6.7.5.2.8
Minimum wall thickness of copper tube between cylinder and regulator 1.22 mm	B.5.5 (a)	6.7.5.1
Fittings shall be flared or brazed, soft solder not allowed	B.5.5 (a)	6.7.5.1
Fittings shall be copper or brass. Tees may be made with approved forming tools	E.2.2 (b)	
No fittings shall be used in wall linings	B.5.5 (a)	6.7.5.1
All joints and cocks shall be accessible	B.5.5 (b) (x) 6.7.5.1	
Flexible hoses shall be as specified	B.5.5 (b) (x) 6.7.5.2.1	
Flexible hoses shall have screwed connections	C.7.6	2.9
Flexible hose may be used on outlet side of regulator, minimum length 0.3 m, maximum 0.6 m	C.7.2	2.9
Maximum pressure drop allowed with all appliances in operation - 250 Pa	B.5.2 (b)	6.7.2.7
Jointing compound shall not be used on flare joints or P.O.L. fittings	App.1	App.A
Approved permanent durable instruction plate shall be mounted	E.7.4	2.5.4
	B.5.11	6.7.11.1

CYLINDERS

Cylinders shall be within test period of 10 years	B.5.1 (c)	6.7.1.2
Cylinders shall be corrosion protected by an approved coating	B.5.1	6.7.1.1
Cylinders shall be secured to prevent movement	B.5.2 (c)	6.7.2.3
Cylinders shall always stand upright	B.2.1	6.7.2.4
Cylinders shall be at least 1 m from opening into rail vehicle	B.3.4 (a)	6.7.3.1.5
Cylinders shall be installed 150 mm below window or opening	B.3.4 (a)	6.7.3.1.5
Cylinders pressure relief valve shall face away from rail vehicle	B.2.3	6.3.3
Cylinders shall be mounted externally or in a vapour tight compartment lined with fire resistant material accessible only from outside and vented to outside of rail vehicle	B.5.2 (d)	6.7.3
Cylinders shall be protected from damage	B.3.8	
Cylinders shall be readily accessible	B.5.3 (j)	6.7.3.1.9
Cylinder compartment where fitted shall have drainage	B.5.3 (d)	6.7.3.1.4
The vent from the cylinder compartment shall terminate not less than 1 m from any opening to the inside of the rail vehicle		
	B.5.3 (e)	6.7.3.1.5
The vent from a cylinder compartment shall terminate not less than 2 m from a source of ignition	B.5.3 (f)	6.7.3.1.6

TABLE 19-3

This checklist is a guideline only for work which shall comply with the current Australian L.P. Gas Installation Code and Section 19.

	A.L.P.G.A. Installation Code 1989	A.G. 601
No electric connections allowed in cylinder compartment	B.5.3 (k)	6.7.3.1.10
Cylinder compartment shall not be used for other storage	B.3.2	6.7.3.1
Safety relief valves shall not impinge cylinders	B.2.3	6.3.3
Minimum 2 m cylinder valve to source of ignition	B.3.15	6.7.3.1.6
Regulators to be securely attached to valves or structures	B.5.2 (b)	6.7.3.1.11
In situ fill type cylinders shall not be installed on a rail vehicle	B.3.4 (b)	6.4.4.2
Maximum Length of Pipe between cylinder and Regulator 1 m	B.3.14	6.4.14

APPLIANCES

All appliances shall be approved by AGA	B.5.8 (a)	6.7.8.1
All appliances shall be firmly mounted	B.5.8 (b)	6.7.8.2
No alteration to be made to construction of appliances unless authorised by manufacturer	C.3.1	6.7.11.1.11
Ovens, hot water heaters and room heaters shall be fitted with complete failsafe equipment	B.6.8 (b)	5.4.10
Multi-point water heaters shall not be installed in a bathroom or enclosed sleeping areas	D.3.3 + D.3.4	6.7.8.6
Room heaters and water heaters shall be flued to outside; unflued water heater and space heaters shall not be installed	B.5.8 (e)	6.7.8.6
Built-in refrigerator shall have ventilation to exterior of rail vehicle	D.10.3	6.7.9.2
Refrigerators shall be accessible for lighting and servicing	C.4.3	5.5.1
Refrigerators shall have 300 mm clearance from flue outlet unless otherwise specified	D.10.3	6.7.9.1 (v)
Permanent ventilation shall be of at least two openings at opposite ends, opposite sides or top and bottom on rail vehicle	B.5.9 (a)	6.7.9.1 (i)
Ventilation openings on one side or end shall not exceed 300 mm from roof and other side or end 150 mm from floor	B.5.9 (a)	6.7.9.1 (ii)
Ventilation openings on any one side or end shall be of at least half the total requirement	B.5.9 (a)	6.7.9.1 (ii)
Floor ventilation shall be unable to be covered	B.5.9 (a)	6.7.9.1 (iii)
All appliances shall have sufficient air combustion	C.5.1	
Isolating valve shall be fitted at inlet to all appliances and shall clearly indicate on and off position	B.5.5 (b) (ix)	6.7.5.2.9
A union joint shall be fitted between isolating valve and appliance	B.5.5 (b) (ix)	6.7.5.2.9
Curtains and other flammable material shall be kept clear of gas appliances	C.4.2	6.7.8.3
All combustible material within 200 mm horizontally to a height of 600 mm above stove burners shall be fire protected	D.1.2	6.7.8.3

NOTE: This checklist is based on the caravan checklist for L.P. Gas of the Department of Resource Industries - Gas Operations Division (Queensland).

SPECIFICATION FOR LIQUEFIED PETROLEUM GAS CYLINDERS USED IN RAILWAY VEHICLES

This specification provides for the manufacture, supply and delivery of storage cylinders for Liquefied Petroleum Gas to the following sizes and types:

22 kg water capacity by 311 mm external diameter	Protecting Ring Type
44 kg water capacity by 308 mm external diameter	Protecting Ring Type
65 kg water capacity by 375 mm external diameter	Protecting Ring Type
108 kg water capacity by 375 mm external diameter	Protecting Ring Type

The Protecting Ring shall not envelop the top of the cylinder by more than 270° and the outlet of the valve, when in the final tightening position, shall face the centre of the space not enveloped by the Protecting Ring. The cylinders shall be constructed to conform to AS 2470 Welded Steel Cylinders for compressed gases.

CYLINDERS AND VALVE THREADS

Each cylinder is to be fitted with a valve conforming to the requirements of AS 2473 Valve Fittings for Compressed Gas Cylinders and have 3/4" American National Gas Taper (NGT) thread in accordance with ANSI B57.1, Compressed Gas Cylinder Valve Outlet and Inlet Connections on the stem, an AS 2473 Type 21 valve outlet connection, a pressure relief valve and a permanently attached headwheel.

FINISH

All cylinders shall be hot dipped galvanised externally

MATERIAL

Cylinders shall be constructed of Steel as specified in Table 1 of AS 2470

MARKING

In addition to the marking required by AS 2030 cylinders shall be stamped with owner's initials.

INSPECTION

The acceptance of the cylinders shall be authorised by the Supervisor of the relative Railway System, when the following conditions have been met:

- (a) The supplier has forwarded to the purchaser, a 'Record of Tests' Certificate made out in accordance with the provisions of the relevant portion of AS 2470 in respect of each cylinder.
- (b) The Supervisor is satisfied that the cylinders conform with the relevant codes.

QUANTITIES

The variation of quantity without reference, to be limited to 2% in a downward direction only.

DRAWINGS

Quotations shall include a drawing of the cylinder showing form of construction, dimensions, tare weight and metal thickness.

FIGURE 19.1
ARRANGEMENT OF CYLINDER CUPBOARD CONTAINING TWO CYLINDERS
AND ASSOCIATED EQUIPMENT



