

COMMERCIAL GAS DRYER FUELLED BY LIQUEFIED PETROLEUM GAS

CODE OF PRACTICE GU13 (MODULE TWO)



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Issue 2

Table of Contents

1. Foreword and Scope	1
2. Terminology	3
3. Liquefied Petroleum Gas (LPG) Supply for Commercial Gas Dryer	5
3.1. General	5
4. Piped LPG Supply for Commercial Gas Dryer.....	7
4.1. Piped LPG Supply	7
4.2. Gas Meter	7
4.3. Gas Connection to Gas Dryer	8
5. Cylinder LPG Supply (with Aggregate Storage Quantity within 130 litres Water Capacity).....	11
5.1. General Requirement	11
5.2. LPG Cylinder Storage Chamber: Location and Construction	11
5.3. LPG Cylinder Storage Chamber: Safety Notices	12
5.4. LPG Cylinder Storage Chamber: Internal Gas Flow Controls and Internal Piping	13
5.5. LPG Cylinder Supply: Pipework and Control Valves	13
5.6. Safety Issues on LPG Cylinder Storage and LPG Cylinder Exchange	14
6. Requirements on Gas Dryer Exhaust System.....	16
6.1. Installation Requirements.....	16
6.2. Maintenance Requirements.....	19
7. Miscellaneous.....	21
7.1. Training	21
7.2. Housekeeping	21
7.3. Fire Safety Precaution	21
7.4. Safety Notice	21

Appendix 1 – Typical LPG Cylinder Storage Chamber

Appendix 2 – Location and Ventilation of LPG Cylinder Storage Chamber

Appendix 3 – LPG Cylinder Draw-off Rates

Appendix 4 - Water Capacity of LPG Cylinders and permissible number of cylinders (within 130 litres)

Appendix 5 - Notices for LPG Cylinder Storage Chamber

Appendix 6 - Safety Checklist on Gas Dryer Installation

1. Foreword and Scope

- 1.1. This code outlines the minimum safety standards on gas supply and exhaust system of gas dryers to be followed by Registered Gas Contractors (hereafter abbreviated as RGC) and owners/operators of gas dryers installed in commercial premises or for commercial purpose up to 55 kW. The code, however, is not applicable to domestic or industrial type laundries.
- 1.2. In general, commercial gas dryers are fuelled by 2 types of gas supply system, i.e. (a) Town gas and (b) Liquefied petroleum gas summarized in Figure 1. This code contains two modules: Module 1 specifies the gas safety requirement on gas dryers fuelled by town gas; and Module 2 specifies the gas safety requirement on gas dryers fuelled by liquefied petroleum gas.

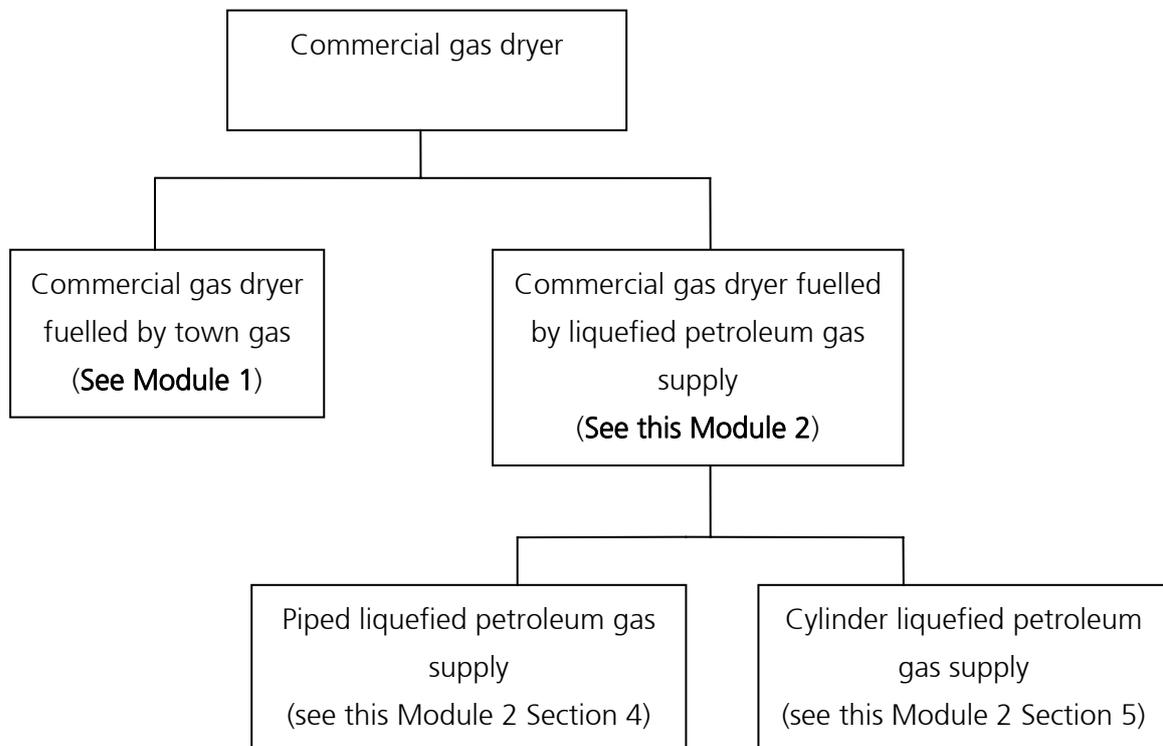


Figure 1 – Outline on Gas Supply to Commercial Gas Dryer

- 1.3. This code should not be regarded as exhaustive. It is the responsibility of the personnel in the gas industry and trade owners/operators to conduct safety and health risks assessment for protecting their workers and public safety. They should also establish the appropriate safety and health practices prior to the use of the code.

- 1.4.** All the gas installations shall comply with the Gas Safety Ordinance (Chapter 51). The code should be read in conjunction with the relevant manufacturer's instructions and shall not supersede such instructions unless the latter conflict with statutory provisions. Attention is also drawn to the current edition of the relevant regulations of the Laws of Hong Kong, for example:
- a. The Buildings Ordinance (Cap. 123);
 - b. The Electricity Ordinance (Cap. 406);
 - c. The Fire Services Ordinance (Cap. 95).
 - d. The Factory and Industrial Undertakings Ordinance (Cap. 59).
- 1.5** The RGC shall make reference to the following standards, codes of practice or guidelines in relation to gas installations:
- a. Code of Practice GU01: Approval of Flexible Gas Tubing for Low Pressure Applications;
 - b. Code of Practice GU09: Low Pressure Regulators for Supplying Gas from LPG Cylinders Having less than 40 Litres Water Capacity;
 - c. Code of Practice GU12: Installation of Mechanical Exhaust System for Gas Appliances (Rated Heat Input up to 70 kW);
 - d. Operating Procedures issued by the Hong Kong & China Gas Company Limited;
 - e. Codes of Practice for Hong Kong LPG Industry;
 - f. Codes of Practice for Minimum Fire Services Installations and Equipment and Inspection;
 - g. Hong Kong SAR Government Code of Practice for the Electricity (Wiring) Regulations;
 - h. NFPA 58, Standard for the Storage and Handling of Liquefied Petroleum Gases published by the National Fire Protection Association, USA; and
 - i. NFPA 54, National Fuel Gas Code published by the National Fire Protection Association, USA.

2. Terminology

2.1.

“gas appliance”	an appliance which uses gas to provide lighting, heating, or cooling, but does not include a boiler within the meaning of the Boilers and Pressure Vessels Ordinance, Cap. 56.
“gas distributor”	distributor of LPG as defined regulation 2 of the Gas Safety (Registration of Gas Supply Companies) Regulations Cap. 51.
“gas dryer”	a type of gas appliance which uses gas to provide heating for clothes drying.
“Gas Authority”	the authority appointed under Section 5 of the Gas Safety Ordinance, Cap. 51.
“flue”	a passage for conveying the products of combustion from a gas appliance to the outside air, and includes any part of the passage in a gas appliance ventilation duct which serves the purpose of a flue.
“interlock”	a device or function that ensures that the operation of item(s) of equipment is dependent upon the fulfillment of predetermined condition(s) by other item(s) of equipment.
“lockout”	a safety shutdown condition of the control system that requires a manual reset in order to restart the normal operation of the installation being controlled.
“manufacturer”	the original designer and producer of a gas dryer.

<p>“mechanical exhaust system (MES)”</p>	<p>a system to remove flue, vent gases or fumes produced from gas dryer mechanically. The system shall consist of an induced draft (suction) fan being operated under negative static pressure within purpose-built ducting, or mechanical ventilation system, if any.</p>
<p>“non-domestic gas appliance”</p>	<p>gas appliance which falls outside the meaning of domestic gas appliance as defined in the Gas Safety Ordinance, Cap. 51.</p>
<p>“outside air”</p>	<p>open and unobstructed atmospheric air, having open space on at least any one side, unless requirements specified in paragraphs 6 and 7 of the Building Department’s Practice Notes for Authorized Persons and Registered Structural Engineers 82 are satisfied.</p>
<p>“Registered Gas Contractor” or “Contractor”</p>	<p>means a person or a company who as a business carries out gas installation work, engaged to conduct the gas installation and / or maintenance work, and is registered under the Gas Safety Ordinance, Cap. 51.</p>
<p>“Registered Gas Installer”</p>	<p>means an individual, employed by a Registered Gas Contractor, who personally carries out gas installation work within specified class(es) and is registered under the Gas Safety Ordinance, Cap. 51.</p>
<p>“Registered Professional Engineer”</p>	<p>means a person registered under the Engineers Registration Ordinance (Cap. 409) within the disciplines of gas, mechanical, building services or another relevant discipline specified by the Gas Authority.</p>

3. Liquefied Petroleum Gas (LPG) Supply for Commercial Gas Dryer

3.1. General

In general, LPG type commercial gas dryer are fuelled by 2 types of gas supply system, i.e. (1) piped LPG supply and (2) cylinder type LPG supply.

(1) Piped Liquefied Petroleum Gas Supply

LP gas is supplied from a bulk container storage of LPG in a dedicated site through a series of service riser, installation pipe, isolating valve, service regulator, gas meter, emergency control valve and finally to an individual gas shut off valve of the gas dryer for its drying operation. A typical piped LPG supply system for gas dryer (with optional pressure gauge fitted) is shown in Figure 1 below. The operating pressure of the system is less than 7.5 kPa.

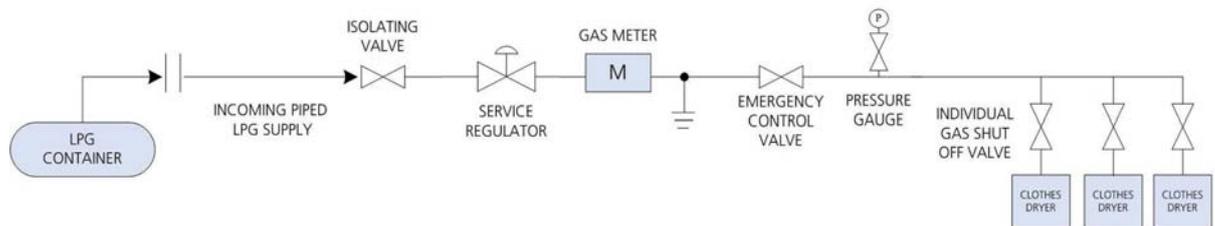


Figure 1 - A Typical Piped LPG Supply System For Gas Dryer

(2) Cylinder Type LPG Supply (With an aggregate storage quantity within 130 litres water capacity)

LPG cylinder(s) is/are located in a purpose-designed storage chamber equipped with either (a) a low pressure cylinder regulator; or (b) a high pressure regulator and a service regulator. A typical LPG cylinder gas supply for gas dryer (with optional pressure gauge fitted) is shown in Figure 2(a) using low pressure cylinder regulators; and Figure 2(b) using a high pressure regulator and a service regulator as follows.

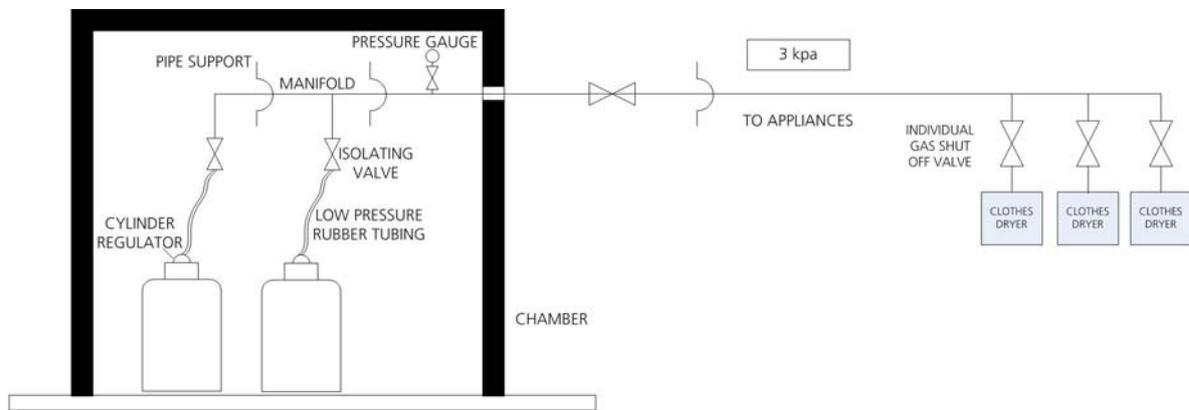


Figure 2(a). A Typical LPG Chamber Supply System (using Low Pressure Cylinder Regulators) For Gas Dryer

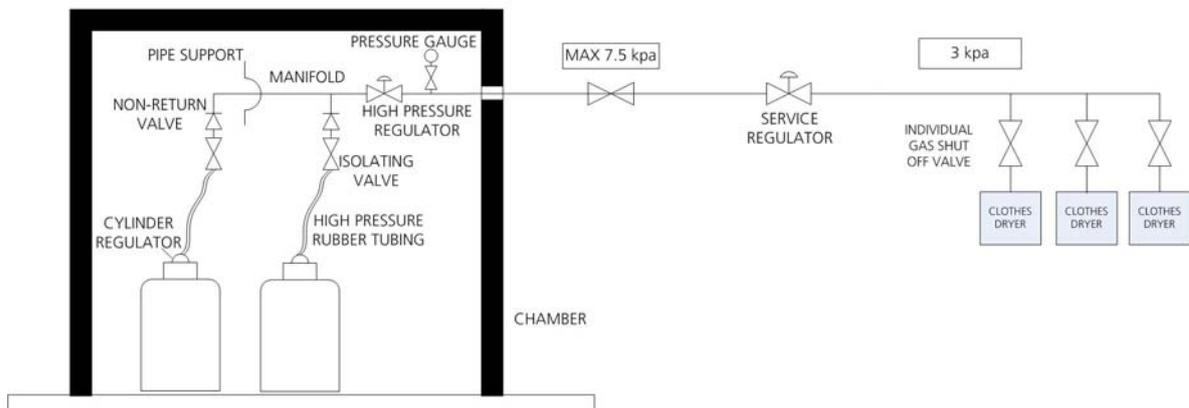


Figure 2(b). A Typical LPG Chamber Supply System (using High Pressure Regulator and Service Regulator) For Gas Dryer

4. Piped LPG Supply for Commercial Gas Dryer

4.1. Piped LPG Supply

- 4.1.1.** All LPG installation should be carried out in accordance with the current edition of Codes of Practice for Hong Kong LPG Industry.
- 4.1.2.** The installation and commissioning requirements of gas dryer should follow those of the technical manuals provided by the manufacturer of the gas dryer.
- 4.1.3.** Connection of gas supply to gas dryer shall only be undertaken by a Registered Gas Installer (hereafter abbreviated as RGI) employed by a RGC.
- 4.1.4.** The commissioning of all non-domestic gas installation work including the gas dryer shall only be undertaken by a RGI having a Class 6 or 7. The RGI shall be employed by a RGC or he/she shall be a RGC. The maintenance of the gas installation work shall be carried out by RGI having a Class 7.
- 4.1.5.** Gas dryer should be checked and serviced in accordance with the recommendations of the gas dryer manufacturer. Flexible gas rubber tubing should be inspected regularly (replaced at least every three years or at the expiry date). Such work shall only be undertaken by RGIs qualified to Class 7 level.
- 4.1.6.** Gas dryer should be checked and serviced in accordance with the recommendations of the gas dryer manufacturer.
- 4.1.7.** Gas dryer and its connections should be tested for soundness after installation and they should be fully commissioned following successful completion of soundness test based on the technical manual.

4.2. Gas Meter

- 4.2.1.** Primary gas meter shall be installed as close as practical to the point of service entry into the premises and be suitable labelled in accordance with Regulation 13 of the Gas Safety (Installation and Use) Regulations.
- 4.2.2.** Gas meter shall not be installed in an area designated as the only means of escape from the premises. For meter installed in such a location prior to 1 April 1991, future replacements shall be in accordance with Regulation 10(1) of the Gas Safety (Installation and Use) Regulations

4.3 Pipe Connection to Gas Dryer

- 4.3.1. LPG in containers exceeding 130 litres total water capacity (equivalent to 5 nos. of 10.5 kg cylinders) should only be bulk stored in a notifiable gas installation approved by the Gas Authority in accordance with Regulation 3 of the Gas Safety (Gas Supply) Regulations. A typical piped LP gas supply system for gas dryer is shown in Figure 1 in Section 3.1.
- 4.3.2. Gas supply and internal installation pipework, up to individual dryer isolation valves, should be of steel construction, conforming to an international or national standard as specified in the current edition of Codes of Practice for Hong Kong LPG Industry.
- 4.3.3. Lengths of gas pipework installed within premises should be kept to a minimum; and separated from electric conduit, or cable, by at least 25mm.
- 4.3.4. Gas supply pipework shall be installed in a safe and workmanlike manner in accordance with Regulations 17, 18 and 19 of the Gas Safety (Gas Supply) Regulations. Specific attention shall be given to means of protecting pipework against corrosion, mechanical damage; and provision of ventilation for service ducts. Gas pipework shall not be installed in unventilated voids.
- 4.3.5. Pressure regulating installations for the inlet gas supply shall comply with requirements for general safety and location specified in Regulations 21 and 22 of the Gas Safety (Gas Supply) Regulations.
- 4.3.6. Gas supply pipework inside premises shall operate at pressures not exceeding the design pressure of the gas dryer as per manufacturer's instruction. For gas dryers without manufacturer's instruction on designed working pressure, the supply pressure shall not higher than 7.5 kPa, however, internal installation pipework should normally operate at 3 kPa wherever possible. A convenient pressure test point could be installed for testing purpose.
- 4.3.7. All low pressure flexible tubing used for this purpose shall be of a type approved by the Gas Authority in accordance with the Code of Practice GU01 "Approval of Flexible Gas Tubing for Low Pressure Applications" to satisfy Regulation 3 of the Gas Safety (Miscellaneous) Regulations. Approved flexible gas tubing bears an approved mark of the format "EMSD Approval GTxxxx" and an expiry date of service life. Flexible gas rubber tubing for connection of gas dryer should be inspected regularly (replaced at least every three years or at the expiry date). Such work shall only be undertaken by a RGC qualified to Class 7.
- 4.3.8. Connection of gas supply to gas dryer shall only be undertaken by RGI employed by a RGC.

- 4.3.9.** A gas isolation valve should be located external to the laundry area for use by the personnel of Fire Services Department in an emergency. The valve should be located in an accessible position and be suitably labelled.
- 4.3.10.** Where a service riser supplies gas to a single laundry within a building, a “fire safety” valve external to the building should be located on an outside wall, providing it is accessible to Fire Services (i.e. at ground or podium level for example). The external “fire safety” valve should be suitably protected against unauthorized interference and labelled.
- 4.3.11.** If it is not possible to locate the fire safety valve external to the building, or to the laundry itself, then a valve may be installed immediately within the laundry entrance for this purpose. A permanent notice, advising the personnel of Fire Services Department of the valve location, should be placed near the laundry entrance.
- 4.3.12.** The gas dryer shall conform to the manufacturer’s specifications and the requirements of Gas Safety (Installation and Use) Regulations.
- 4.3.13.** Gas pipes and fittings should comply with the relevant national or international standards. The gas dryer, which can be either an internationally-approved type or a customer-built type, shall be safe for use with the type of LPG supplied complete with supporting documents such as certificates.
- 4.3.14.** The pressure in an installation pipe should be controlled to the appropriate downstream pressure suitable for the gas dryer.
- 4.3.15.** An isolation valve should be installed to the inlet gas supply for every gas dryer.
- 4.3.16.** In any premises which piped gas is to be supplied, a readily accessible and suitably labelled emergency control valve should be provided, as near as practicable, to the point where the gas pipe enters the premises. The location and labelling of the valve shall be in accordance with Regulation 8 of the Gas Safety (Installation and Use) Regulations.
- 4.3.17.** When LPG is supplied with an installation pipe of internal diameter greater than 50mm to a non-domestic premises with two or more floors or a floor having areas with a separate supply of gas, a readily accessible isolation valve should be installed and a line diagram in permanent form should be attached in a position as near, so far as is practicable, to the gas meter. The line diagram should indicate the position of all installation pipes, gas meter, emergency controls, isolation valves, pressure test points and electrical cross-bonding of the gas supply system.

- 4.3.18.** Gas dryer should incorporate manually operated valves, automatic control valves and pressure regulators/governors where necessary, so as to facilitate both pressure and gas flow controls. They should also be fitted with sound ignition systems which can ignite the combustion properly.
- 4.3.19.** Flame failure device should be fitted in every gas dryer where appropriate to prevent any hazards that might arise from the escape of unignited gas from burners.
- 4.3.20.** Safety devices other than flame protection comprising such as low-pressure cut-off valves, air and gas pressure switches should also be fitted when necessary to provide additional safeguard to customers.

5. Cylinder LPG Supply (with Aggregate Storage Quantity within 130 litres Water Capacity)

5.1. General Requirement

- 5.1.1. LPG cylinder should only be installed to supply a gas dryer where a piped gas supply is not available within a premises.
- 5.1.2. The gas supply company shall ensure LPG cylinder that shall be of a type approved by the Gas Authority in accordance with Regulation 7 of the Gas Safety (Gas Supply) Regulations.
- 5.1.3. LPG cylinder should be located in a purposely designed and built chamber facing open space or well-ventilated space. The requirements of the LPG cylinder storage chamber are stated in Appendix 1 and Appendix 2 of this Code of Practice.
- 5.1.4. LPG cylinders installed should be capable of supplying gas at normal vaporization rates (see Appendix 3) to meet total thermal input of gas dryer. Heat source other than from the ambient, such as a water bath, shall not be used because it is potentially hazardous.
- 5.1.5. Care shall be taken to ensure that the aggregate water capacity of all LPG cylinders is not exceeding 130 litres. (Appendix 4 shows water capacities of each cylinder type)
- 5.1.6. Cylinder shall not be used in the common walkway within commercial shopping areas, which is deemed to be a means of escape in the event of fire.
- 5.1.7. Gas supply pipework inside premises should operate at a pressure not exceeding the design pressure of the gas dryer as per manufacturer's instruction. For gas dryer without manufacturer's instruction on designed working pressure, the supply pressure shall not higher than 7.5 kPa. However, internal installation pipework should normally operate at 3 kPa wherever possible. A convenient pressure test point should also be provided.

5.2. Location and Construction of LPG Cylinder Storage Chamber:

- 5.2.1. A fixed chamber should be designed specifically for the storage of LPG cylinders having an aggregate water capacity not exceeding 130 litres. It should be located outdoor in open air where possible, or may be inside a building provided that adequate ventilation is provided.
- 5.2.2. The location of a chamber shall not impede the means of escape from premises nor breach any structure which provides for interior fire separation.

- 5.2.3. A chamber shall not be located in any area where natural, low level ventilation cannot be provided. This precludes locations in basement areas for example.
- 5.2.4. A chamber should not be located above any drain, or within 1 metre from drain.
- 5.2.5. A chamber should be located such that its openings facing directly into an open area with well ventilation (see Appendix 1 and Appendix 2).
- 5.2.6. A chamber should be located at least 2 metre away from the back of the gas dryer.
- 5.2.7. A chamber should be constructed of concrete, or a material having at least 2 hour fire resistance period and sufficient mechanical strength to afford proper protection to the LPG cylinders and related equipment.
- 5.2.8. Doors of the chamber should be fabricated from non-combustible metallic material such as zinc hot-dipped galvanised steel or stainless steel. Proper primer, under-coat and over-coat should be applied to hot-dipped galvanised steel. The doors should have sufficient mechanical strength to afford proper protection to the LPG cylinders and related equipment. Doors should normally be kept closed, and locked if the chamber is external to the premises.
- 5.2.9. A chamber should be suitably sized to allow for storage of all required LPG cylinders in an upright position; easy exchange of LPG cylinders; and safe operation of LPG control valves.
- 5.2.10. The chamber should not contain electrical apparatus unless flameproof to an international or national standard.
- 5.2.11. The ventilation openings of a chamber should normally communicate directly with open air areas which afford adequate air movement. Such ventilation openings should not be directed into adjacent buildings; designated means of escape from premises; indoor seating areas; or hazardous areas. Ventilation openings shall be provided at both high and low level. The minimum free area should be: -
- *low level*: 100 cm² or 1/100th of the chamber enclosed floor area, whichever is the greater;
 - *high level*: 50 cm² or 1/200th of the chamber enclosed floor area, whichever is the greater.

5.3. LPG Cylinder Storage Chamber: Safety Notices

- 5.3.1. The signs of "LPG Cylinder Storage Chamber" and "No Smoking", in English and Chinese should be prominently shown on the outside of the chamber doors.
- 5.3.2. Instructions concerning the safe exchange and safe use of LPG cylinders, in English and

Chinese, should be prominently displayed at all times on the inside of the chamber doors (see Appendix 5).

- 5.3.3.** A label advising the users that the gas supply should be turned off at the cylinders whenever the premises is closed for business, in English and Chinese, shall be provided at the chamber.

5.4. LPG Cylinder Storage Chamber: Internal Gas Flow Controls and Internal Piping

- 5.4.1.** The outlet gas supply pressure from the chamber should not exceed normal inlet pressure for low pressure gas application (i.e. 3 kPa). However up to 7.5 kPa is allowed providing the supply to gas dryer, designed to operate at 3 kPa, incorporates a service regulator, or each appliance is equipped with an individual regulator. The outlet pressure from the LPG cylinder inside the chamber may be controlled by means of an individual cylinder regulator recommended by the Registered Gas Supply Company. The arrangement is shown in Figure 2(a) in Section 3.1. Alternatively, the LPG cylinder pressure can be regulated by a properly secured manifold arrangement using a single regulator recommended by the Registered Gas Supply Company as shown in Figure 2(b) in Section 3.1.

- 5.4.2.** Where a manifold is connected to two or more LPG cylinders then:

- a. a non-return valve (for POL connection only) and an excess flow valve should be fitted to each LPG cylinder outlet connection;
- b. the flexible tubing length should not exceed 1 metre for each LPG cylinder installed;
- c. steel pipe should be of a type conforming to national or international standard, such as BS 1387, recognised by the Gas Authority; and
- d. the flexible tubing shall be of a type approved by the Gas Authority (high pressure BS3212 Type 2 or equivalent).

- 5.4.3.** Adequate support should be provided to pipework within the chamber to take the weight of disconnected pressure regulators during exchange of LPG cylinders.

5.5 LPG Cylinder Supply: Pipework and Control Valves

- 5.5.1** Gas pipework running from the LPG cylinder chamber to appliances should be of steel construction to a standard included within the current edition of Codes of Practice for Hong Kong LPG Industry; be suitably protected against corrosion; and securely fixed to walls.

- 5.5.2 An isolation valve, labelled in English and Chinese characters, should be provided in the gas supply immediately outside the LPG cylinder chamber.
- 5.5.3 The LPG supply pipe should be clearly identified by suitable marking, painting or label as "LPG" pipe, preferably within an interval of less than 1 meter as far as practicable.
- 5.5.4 Rigid metallic pipework should consist of steel or copper (compression) fittings to a recognized international or national standard should be used for connecting gas dryer to the gas supply.
- 5.5.5 All low pressure flexible tubing used for this purpose shall be of a type approved by the Gas Authority in accordance with the Code of Practice GU01 "Approval of Flexible Gas Tubings for Low Pressure Applications" to satisfy Regulation 3 of the Gas Safety (Miscellaneous) Regulations.
- 5.5.6 An emergency gas control valve shall be installed as close as possible to the point of service entry into the premises in an accessible location. The location and labelling of the valve shall be in accordance with Regulation 8 of the Gas Safety (Installation and Use) Regulations.
- 5.5.7 The final connection to gas dryer may be rigid, or flexible, depending upon dryer type, size and manufacturer's requirements.
- 5.5.8 Connection of gas supply to gas dryer shall only be undertaken by RGI employed by a RGC.

5.6 Safety Issues on LPG Cylinder Storage and LPG Cylinder Exchange

- 5.6.1 To ensure safe use of LPG cylinder, the following safety issues should be referred and followed by the owner / operator:-
 - a. Before leaving or when the gas is not in use, please turn off all the branch valves and the cylinder valves.
 - b. Always keep the chamber doors unobstructed.
 - c. Close and lock the external chamber when exchange of cylinders is completed.
 - d. Do not store flammable substances in the vicinity of the LPG cylinders.
 - e. Be alert to deal with gas leakage at any time. If in doubt, turn off the emergency valve and cylinder valves. Keep the area well-ventilated. Find a gas safe location and call the gas supply company or the gas distributor immediately. Extinguish any naked flames and do not operate electrical switches.
 - f. The 24-hour emergency telephone number of gas supply company should be displayed at a proper location.
 - g. In case of emergency, please call 999.

5.6.2. When exchange of LPG cylinder, the following safety procedure should be followed and posted at a conspicuously location on the chamber:-

- a. Extinguish all naked flames in the vicinity. Switch off the gas dryer.
- b. Turn off the branch valve and the LPG cylinder valve.
- c. Disconnect the pigtail or the cylinder regulator.
- d. Replace with the new LPG cylinder.
- e. Check that there is any smell/sound of gas leaking from the cylinder connections.
- f. Turn on the branch valve and the LPG cylinder valve.

6. Requirements on Gas Dryer Exhaust System

6.1 Installation Requirements

- 6.1.1. The installation requirements and procedures of the gas dryer exhaust system should follow the technical manuals as recommended by the gas dryer manufacturer. The owner/operator should properly store and keep the technical manuals for future reference.
- 6.1.2. Installation work of a gas dryer and associated exhaust flue system shall be carried out by a RGI (having class 6 registration) employed by a RGC. The exhaust system can be installed by a ventilation subcontractor who is engaged by the RGC. The RGC shall be responsible to test, commission, verify and declare the installed exhaust system which has fully complied with the manufacturer's requirements such as flowrate, pressure drop, etc.
- 6.1.3. Exhaust ductwork dimensions, straight run length and number of elbows should be properly sized and calculated based on recommendations and formula given by the manufacturer. The designed maximum static back pressure of the exhaust system must not exceed the maximum allowable pressure drop specified by the manufacturer.
- 6.1.4. Exhaust gas of a gas dryer should be exhausted to outside air by the shortest possible route with minimum number of elbows, bents and lengths as far as practicable in accordance with the manufacturer's instruction. A typical exhaust pipe arrangement is shown below:

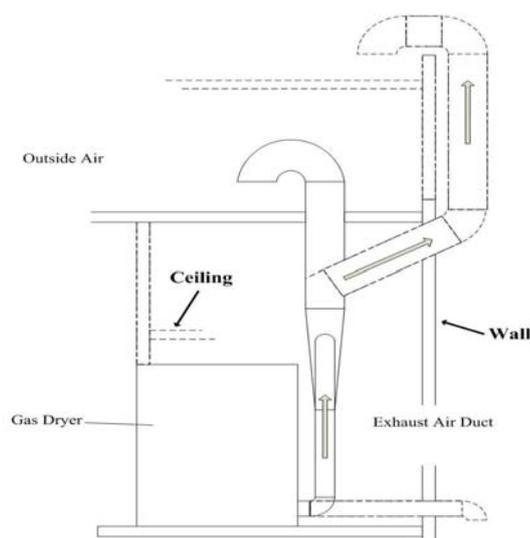


Figure 1. Typical Sectional View on Exhaust Duct Arrangement for Gas Dryer

- 6.1.5. Static back pressure of the exhaust system should not exceed the designed maximum static back pressure as recommended by dryer manufacturer.
- 6.1.6. Exhaust ductwork should not be plastic or thin foil flexible ducts. All exhaust ductwork installed should be made of galvanized sheet metal of minimum 0.5mm thickness or other non-combustible material which must be equivalent in strength and corrosion resistance to ducts made of galvanized sheet metal of 0.5mm thickness.
- 6.1.7. Ductwork inside air-conditioned area or close to combustible material / human access shall be suitably insulated to having the ductwork external surface temperature not exceeding 45 degree Celsius.
- 6.1.8. Interior surfaces of exhaust ducts should be smooth and free of any obstacles. All ductwork should be joined by riveted or flanged joint in order to avoid any protrusions where may permit the accumulation of lint. Sheet metal screws should not be used to join sections of metal ductwork. 90 degree connection in ducting should be avoided in the exhaust system.
- 6.1.9. Inspection doors should be installed at the beginning and ending of air ductwork for periodic inspection and cleaning purposes. Intermediate openings or other locations recommended by the manufacturer in the exhaust ductwork should also be provided to facilitate inspection and easy cleaning.
- 6.1.10. Screens, louvers, caps or wire mesh is not recommended to be installed at the opening of the exhaust ductwork. Detailed installation requirement should refer to the manufacturer's recommendation, or endorsed either by the manufacturer or a Registered Professional Engineer for special applications.
- 6.1.11. The flue terminal of the exhaust duct should not directly point to the air inlet or outlet of other utilities or appliances, such as kitchen exhaust, air conditioning system, etc.
- 6.1.12. Exhaust ductwork of gas dryer should preferably not be connected to exhaust system of other kinds of application, such as kitchen exhaust system, central air conditioning system for general indoor air conditioning purpose, etc. Where unavoidable, an interlock shall be provided to ensure the gas dryer is not operated unless the mechanical exhaust system of other kinds of application is in normal safe working order. The requirements on the interlock are specified in our Code of Practice: GU12.
- 6.1.13. Separate exhaust ductwork should be installed for each individual gas dryer as far as reasonably practicable in order to eliminate the chance of leaking flue gas from an idle dryer. If this is not feasible, the air ductwork of multiple gas dryer should be sized and enlarged in accordance with requirements specified by the manufacturer. Besides, the RGC should design and install the multiple exhaust air ductwork so that

flue gas from anyone of the operating gas dryer should not flow back into other operating or non-operating gas dryer(s). A typical layout of multiple gas exhaust system is shown below:

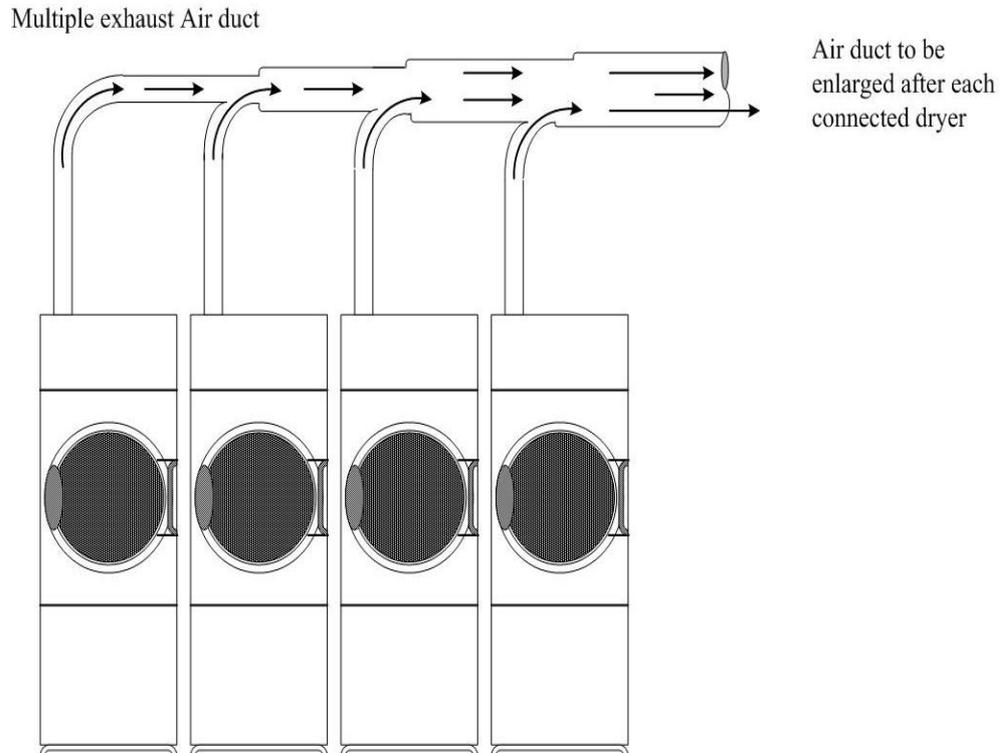


Figure 2. Typical Layout of Multiple Exhaust System

6.1.14. In multiple dryer exhaust system, individual ducts should enter the bottom or side of the main exhaust duct at an angle not more than 45 degree in the direction of airflow or other maximum allowable angle as specified by the manufacturer. 90 degree connection or sharp elbow should be avoided in the exhaust ductwork as indicated in Figure 3.

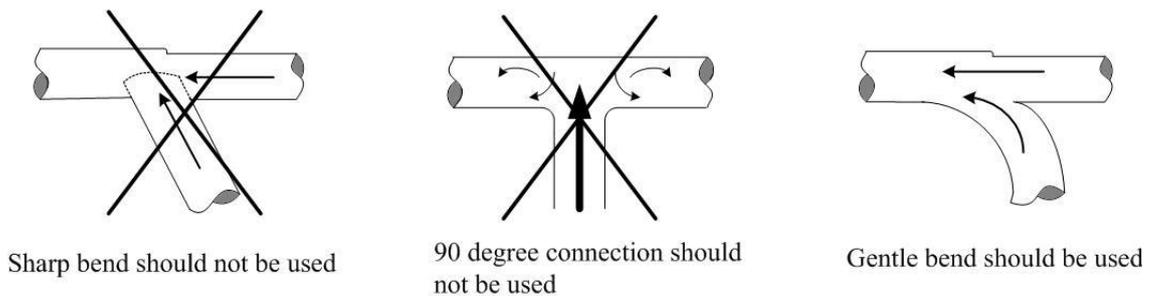


Figure 3. Typical Bends and Connections

- 6.1.15.** Exhaust fan or booster fan is not recommended to be used in the exhaust ductwork system. If it is unavoidable, exhaust/booster fans should be installed closed to the outlet of the exhaust ductwork. Besides, selection and installation of the exhaust/booster fans should comply with the technical specification and instruction as recommended by the manufacturer, or endorsed either by the manufacturer or a Registered Professional Engineer for special applications. An interlocking device should be installed between the gas supply system and the ventilation system in order to avoid danger arising from accumulation of exhaust gas. Relevant technical requirements on interlocking device for gas appliances should comply with the Code of Practice No. 12 – Installation of Mechanical Exhaust System for Gas Appliances.
- 6.1.16.** The exhaust ductwork of the gas dryer should not be connected with an exhaust ductwork of kitchen exhaust system.
- 6.1.17.** Sufficient fresh air should be provided for air consumption of gas dryer. The fresh air requirement shall follow the technical manual given by the gas dryer manufacturer.

6.2. Maintenance Requirements

- 6.2.1.** Exhaust system of a gas dryer should be maintained and serviced in accordance with the maintenance requirements given by the gas dryer manufacturer. A typical inspection safety checklist is attached in Appendix 6.
- 6.2.2.** Owner/operator should clean and remove lint and debris inside exhaust ductwork regularly based on the manufacturer's recommendation and in any case the frequency should preferably not be less than once per month. In case there is air leakage from exhaust ductwork, it should be properly repaired or replaced the whole section if considered necessary.
- 6.2.3.** Lint from thermistor, thermostat, filter elements and dryer cabinet should be cleaned or replaced periodically based on the prescribed manufacturer's instructions.
- 6.2.4.** The integrity of the exhaust ducting should also be subject to annual inspection by a contractor as part of the regular maintenance required to be arranged by the owner/user. Records of such inspection shall be kept by the owner/user and the maintenance party.
- 6.2.5.** For exhaust system with exhaust or booster fans, the owner / user should arrange to employ a RGC to conduct regular maintenance, including servicing, cleaning and testing of the installation, including the gas dryer(s), the associated control, the interlock with the operation of the mechanical exhaust system (MES), and the temperature sensing device at the exhaust duct, if fitted, at least once annually. The

owner and RGC should keep the following documentary records for a period of at least two years after the owner/user commences operation of the MES:

- manufacturer's instructions and associated contractor's manuals and maintenance agreement;
- testing and commissioning reports on new installation;
- testing / servicing reports and any follow-up work completed or in progress; and
- maintenance log including date of previous inspections, fault reports, if any, and the next schedule of inspection.

6.2.6. The interlock, if fitted, being an integral part of the gas installation in connection with the operation of the MES, should be subjected to functional check and technical inspection. The owner / user should arrange to employ a RGC at regular intervals to check and to ensure that the operation of the MES is in proper, reliable and safe working order.

7. Miscellaneous

7.1. Training

7.1.1. The owner should provide necessary information, operation, cleaning and safety precaution trainings of the gas dryer to their operators who involve in the operation of the dryer. For gas dryer fuelled by cylinder type LPG, the owner should provide adequate training to their operators regarding safety procedures on exchange of LPG cylinders.

7.2. Housekeeping

7.2.1. The owner/operator should maintain at least 1 metre clearance of combustible materials such as clothes and plastic bags, etc. from gas dryer.

7.3. Fire Safety Precaution

7.3.1. The owner/operator should provide adequate fire fighting equipment such as fire extinguisher next to the gas dryer for extinguishing fire in case of emergency.

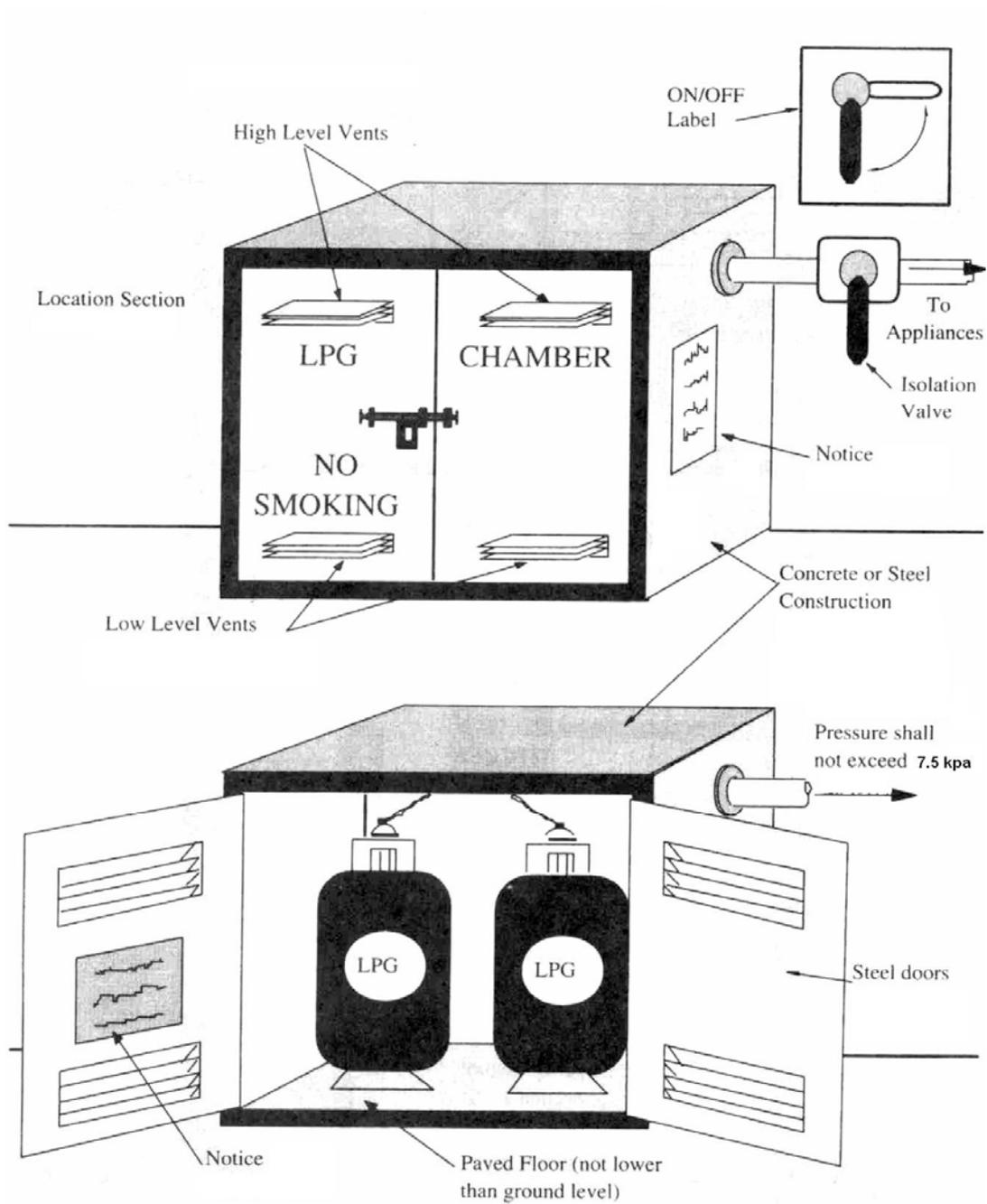
7.3.2. Fire drill is recommended to be carried out by the owner/operator under a regular basis.

7.4. Safety Notice

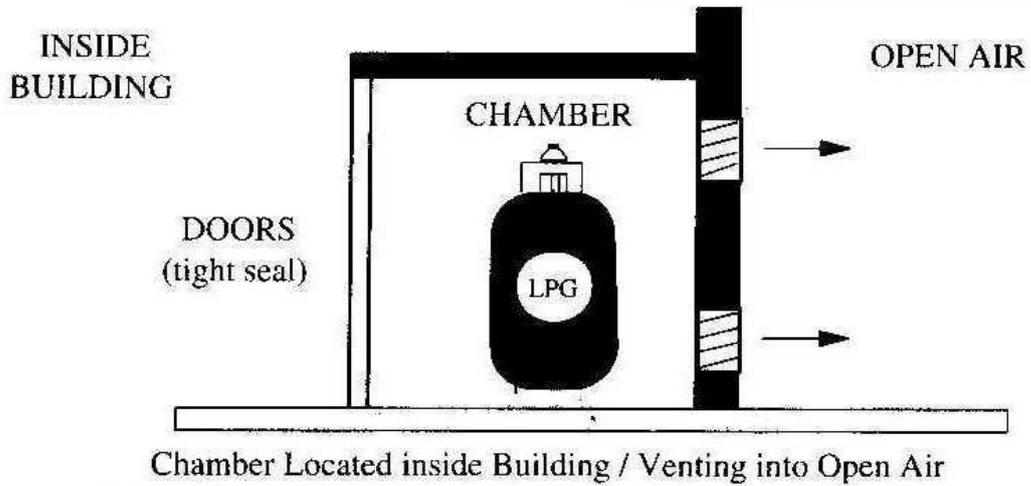
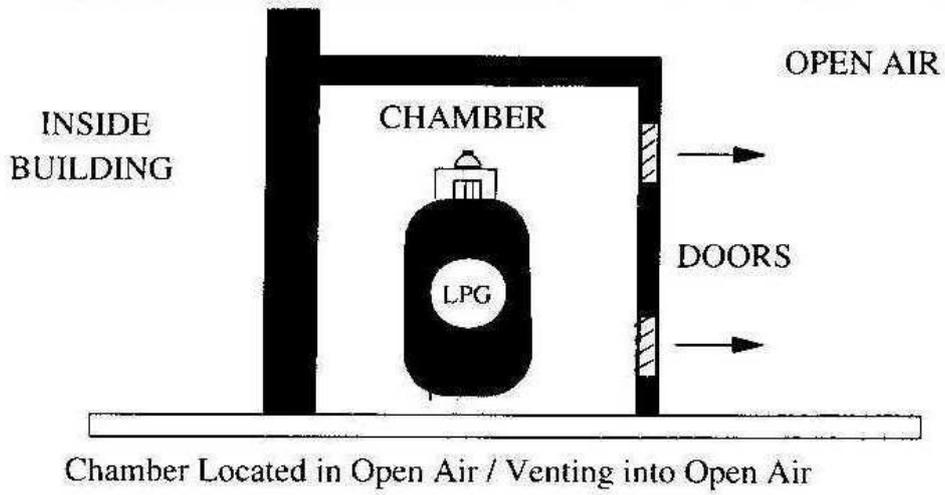
7.4.1. A safety notice with wording "Keep well ventilation when dryer in operation" should be fixed permanently at a conspicuous location on the gas dryer.

7.4.2. The owner / operator should observe the safety issues stated in Section 5.3; Section 5.6.1 and Section 5.6.2 of this Code of Practice.

Typical LPG Cylinder Storage Chamber



Location and Ventilation of LPG Cylinder Storage Chamber



LPG Cylinder Draw-off Rates

The possible vaporization/draw-off rate from a cylinder depends on many factors, such as air temperature, amount of LPG remaining in the cylinder, pattern of usage, and regulator capacity. The designer to ensure that a safe continuous supply of gas to the appliances can be maintained at all times.

As a rough guide, the following figures, which will vary according to conditions, may be referred to when designing an installation:

	Full Cylinder Peak Rate	50% full Cylinder Rate	25% full Cylinder Rate
10 -16 kg	3.0 kg/hr	1.6 kg/hr	1.2 kg/hr

(Note: Reduced draw-off rates will be encountered in the winter months because of lower air temperatures.)

Water Capacity of LPG Cylinders and permitted numbers (within 130 litres)

Cylinder Brand	Cylinder Capacity		Permissible number of Cylinders
	Nominal Water Capacity (L)	Nominal LPG Weight (kg)	
SHELL	17.7	8	7
	23.5	10.5	5
	30.4	13.5	4
CALTEX OR PENINSULA	17.7	8	7
	23.5	10.5	5
	35.3	16	3
CRC	23.5	10.5	5
	35.5	16	3
ESSO	19.2	8	6
	26.2	12	4
	35.3	16	3
	54	22	2
MOBIL	23.5	10.5	5
	35.5	16	3
	35.5	15	3
	49.5	21	2
CONCORD	23.5	10.5	5
	35.3	16	3

Appendix 5.1
Notices for LPG cylinder Storage Chamber

Instructions For The Safe Exchange Of LPG Cylinders

1. Extinguish all naked flames in the vicinity. Turn off gas dryer.
2. Turn off all branch valves and LPG cylinder valves.
3. Disconnect the pigtails or the cylinder regulators.
4. Replace with the new LPG cylinders.
5. Reconnect the pigtails or cylinder regulators.
6. Check that there is no smell/sound of gas leaking from the cylinder connection.
7. Re-open all branch valves and LPG cylinder valves.

Appendix 5.2
Notices for LPG cylinder Storage Chamber

The Safe Use of LPG

1. Before leaving or when the gas is not in use, please turn off all the branch valves and the cylinder valves.
2. Always keep the chamber doors unobstructed and closed/locked (external chamber) when exchange of cylinders is completed.
3. Do not store flammable substances in the vicinity of the LPG cylinder.
4. Be alert to deal with gas leakage at any time. If in doubt, turn off the emergency valve and cylinder valves. Keep the area well-ventilated. Find a gas safe location and call the gas supply company or the gas distributor immediately. Extinguish any naked flames but do not operate electrical switches.

The 24-hour Emergency Telephone Numbers of your gas supply company should be displayed at a proper location.
5. In case of emergency, call 999.

Registered Gas Contractor Telephone :		Registered Gas Contractor Number & Company Seal		
Laundry Customer Safety Check Record				
Customer's A/C No :		Customer's Name :	Customer's Telephone No :	
Installation Address :				
Gas Supply System (A)	1. LPG Cylinder (if applicable) _____ Kg _____ nos _____ Kg _____ nos		Normal	Improvement required
	2. Regulator (if applicable) Manufacture Date _____ Model _____ (Recommended to be replaced in accordance with manufacturer's guidance)		<input type="checkbox"/>	<input type="checkbox"/>
	3. Flexible gas tubing (Recommended to be replaced in accordance with manufacturer's guidance)		<input type="checkbox"/>	<input type="checkbox"/>
	4. Gas tubing clip		<input type="checkbox"/>	<input type="checkbox"/>
	5. Location of the LPG Cylinder(s) (if applicable)		<input type="checkbox"/>	<input type="checkbox"/>
	6. Gas Soundness Test		<input type="checkbox"/>	<input type="checkbox"/>
Gas Clothes Dryer (B)	Brand _____ Model _____ (Recommended to be installed in accordance with manufacturer's guidance*)			
	1. Vent openings are not blocked 2. Isolation from miscellaneous objects and combustible *Delete where not applicable		<input type="checkbox"/>	<input type="checkbox"/>
Suggestion				
Exhaust System (C)	1. Direct exhaust to open space		<input type="checkbox"/>	<input type="checkbox"/>
	2. Exhaust pipe made of galvanized sheet metal (Except other material recommended by manufacturer)		<input type="checkbox"/>	<input type="checkbox"/>
	3. Inner wall of exhaust pipe is clean, smooth and without blockage		<input type="checkbox"/>	<input type="checkbox"/>
	4. Interlock device installed & running normally (Only applicable in mechanical exhaust system)		<input type="checkbox"/>	<input type="checkbox"/>
	5. The installed exhaust system is tested and verified that its performance can comply with the technical requirements stipulated in the manufacturer's instruction. (only applicable for newly installed system)		<input type="checkbox"/>	<input type="checkbox"/>
Suggestion				
Other Suggestion (D)	1. The regulator should be turned off after use each time. If the appliance is not use for a prolong time, the regulator should be disconnected and the LPG cylinder should be removed. (if applicable)			
	2. LPG cylinders should be kept in an upright position with good ventilation, far away from heat & fire source. (if applicable)			
	3. Instruction notice for replacement of LPG cylinders & valve on/off warning labels shall be displayed at prominent places. (if applicable)			
	4. The shop owner should keep this record for 2 years & submit copy to the LPG distributor.			
	5. The shop owner should purchase LPG cylinders from the distributors approved by the registered gas supply companies. (if applicable)			
	6. The shop should be equipped with appropriate fire fighting facilities.			
Overall system Safe <input type="checkbox"/> Unsafe <input type="checkbox"/> Improvement required <input type="checkbox"/>				
I understand the content of the above recommendations and certify that the safety check has been completed.		RGI signature _____		
		RGI No _____		
Customer's signature _____		Class _____		
		Date of check _____		