

LPG Installations for Catering Purposes in Commercial Premises



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Gas Utilisation Code of Practice 06

Minimum Requirements for Installation
of Liquefied Petroleum Gas (LPG Vapour)
for Catering Purposes in Restaurants and
Food Preparation Establishments

The Gas Authority
Government of the Hong Kong Special Administrative Region
October 1997

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1. Foreword and Scope

- 1.1 This code has been prepared as a general outline of minimum safety standards to be followed by Restaurant Operators and Registered Gas Contractors. Guidance is given on requirements for installation of liquefied petroleum gas (LPG vapour) for catering purposes in commercial premises, such as restaurants and food preparation establishments. For Towngas installations reference must be made to Hong Kong and China Gas operating procedures.
- 1.2 All gas installation work must comply with local statutory safety requirements. Particular reference should be made to
 - The Gas Safety Ordinance (Cap 51);—
 - The Gas Safety (Gas Supply) Regulations (Cap. 51 sub-legislation);
 - The Gas Safety (Installation and Use) Regulations (Cap. 51 sub-legislation);
 - The Gas Safety (Registration of Gas Installers and Gas Contractors) Regulations (Cap. 51 sub-legislation);
 - The Gas Safety (Miscellaneous) Regulations (Cap. 51 sub-legislation);
 - The Building Regulations (Cap. 123);
 - The Electrical Ordinance (Cap. 406);
 - The Electricity (Wiring) Regulations (Cap. 406 sub-legislation);
 - The Water Works Regulations (Cap. 102).
- 1.3 Reference should also be made to relevant codes of practice, to include:—
 - LPG Industry of Hong Kong Standard Practice Manual Volume 1 “Piped Vapour Supply Systems”;
 - British Standards Code of Practice BS 476 Part 3-8;
 - British Standards Code of Practice BS 1387 and BS 21;
 - British Standards Code of Practice BS 2871 Part 1 and BS 864 Part 2;
 - British Standards Code of Practice BS 3212;
 - British Standards Code of Practice BS 4683;
 - British Standards Code of Practice BS 5440 Part 2;
 - British Standards Code of Practice BS 5482 Part 1;
 - British Standards Code of Practice BS 6644;
 - Hong Kong SAR Government Gas Utilisation Code of Practice 03;
 - Part 1 “Installation Requirements for Domestic Instantaneous Water Heaters (up to 60 kW)”;

- Hong Kong SAR Government Code of Practice for the Electricity (Wiring) Regulations.
- NFPA 58, Standard for the Storage and Handling of Liquefied Petroleum Gases.
- Hong Kong SAR Government Gas Utilisation Code of Practice 09 for LPG cylinder regulators.

- 1.4 These requirements incorporate aspects of fire safety which have been agreed with the Fire Protection Bureau (FPB) of Fire Services Department and therefore supersede all gas safety requirements previously contained in FPB documents issued for Places of Public Assembly (PPA requirements).
- 1.5 Not included within the scope of this document are the specific design requirements for bulk storage of LPG in containers exceeding 130 litres aggregate water capacity, nor liquid draw-off installations which may incorporate a separate vaporisation stage. These are "Notifiable Gas Installations" (NGIs) and must have prior approval of the Gas Authority for both construction and use, in accordance with Regulation 3 of the Gas Safety (Gas Supply) Regulations.
- 1.6 LPG cylinders* should not be installed in commercial premises to supply fixed gas appliances for catering purposes unless a central LPG, or Towngas, supply is unavailable.

For example, where service riser(s) of a piped-gas supply are already located in a building, then connecting any new gas installation, or additional gas appliances, to the piped gas supply must always be the first choice rather than using LPG cylinders.

(* as defined in Section 2 of the Gas Safety Ordinance Cap 51.)

2. LPG Supply to Commercial Kitchens and Food Preparation Establishments

2.1 General Requirements

- 2.1.1 This code applies to new gas installations, but does not include specific storage requirements for LPG containers where the aggregate quantity exceeds 130 litres water capacity (Appendix 1). If the aggregate water capacity of LPG container(s) exceeds 130 litres, irrespective of whether full of LPG or not, prior approval must be sought from the Gas Authority for construction and use of an NGI in accordance with Regulation 3 of the Gas Safety (Gas Supply) Regulations.
- 2.1.2 Similarly, liquid draw-off installations, which necessitate the addition of a separate means of vaporisation (e.g. electrical vaporiser), are deemed to be NGIs. Therefore prior approval of the Gas Authority must be sought for construction and use in accordance with Regulation 3 of the Gas Safety (Gas Supply) Regulations.
- 2.1.3 LPG shall not be supplied to basement kitchens or seating areas below ground level.
- 2.1.4 LPG cylinders should only be installed to supply fixed appliances where a piped gas supply is not available within a premises (see 1.6).
- 2.1.5 LPG cylinders shall be of a type approved by the Gas Authority in accordance with Regulation 7 of the Gas Safety (Gas Supply) Regulations.
- 2.1.6 LPG cylinders should be located in a purpose designed chamber in accordance with section (2.3) of this installation code.
- 2.1.7 LPG cylinders installed shall be capable of supplying gas at normal vaporisation rates (see Appendix 11) to meet total thermal input of kitchen gas appliances. An external heat source, such as a water bath for example, is potentially hazardous and shall not be used.

- 2.1.8 Any LPG cylinder installed to supply gas from a chamber within a premises, should not be exchanged on more than one occasion in 24 hours, unless the operator is able to demonstrate special LPG cylinder delivery/collection arrangements with a gas distributor so as to minimise risk to public safety.
- 2.1.9 The commissioning of gas installation work in commercial kitchen and restaurant premises shall only be undertaken by Registered Gas Installers qualified to at least Class 6.
- 2.1.10 Gas catering appliances (fixed and portable) should be serviced annually; flexible gas rubber tubing should be inspected regularly (exchanged at least every three years). Such work shall only be undertaken by Registered Gas Installers qualified to Class 7 level.

2.2 Piped Installations supplied from Bulk, Central LPG Supply

- 2.2.1 The bulk storage of LPG in containers exceeding 130 litres total water capacity, is an NGI and shall be approved by the Gas Authority in accordance with Regulation 3 of the Gas Safety (Gas Supply) Regulations.
- 2.2.2 Gas supply and internal installation pipework, up to individual appliance isolation valves, shall be of steel construction, conforming to an international standard such as BS 1387 (heavy/medium) as specified in the LPG Industry of Hong Kong Standard Practice Manual Volume 1. Short lengths of steel pipework inside LPG storage chambers (2.3.9.2), exposed to cylinder pressure should conform to an international standard, such as to BS 3601.
- 2.2.3 Lengths of gas pipework installed within premises shall be clearly identified; kept to a minimum; and separated from electric conduit, or cable, by at least 25mm.
- 2.2.4 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 nor in rooms accommodating air conditioning or ventilation equipment for premises.

- 2.2.5 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.

- 2.2.6 Gas supply pipework inside premises shall operate at pressures not exceeding low pressure *760mm water gauge (1 psi), however, internal installation pipework should normally operate at *300mm water gauge (0.4 psi) wherever possible. (Also see 3.2.4). A convenient pressure test point should be installed.

- 2.2.7 Internal installation pipework and appliances shall be protected against over-pressurisation in accordance with Regulation 12(b) of the Gas Safety (Installation and Use) Regulations.

- 2.2.8 Emergency Control Valve

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.

*760mm W.G. = 7.5kPa

*300mm W.G. = 3.0kPa

2.2.9 Fire Safety Valve

- 2.2.9.1 A gas isolation valve shall be located external to the kitchen area for use by Fire Service Officers in an emergency. The valve shall be located in an accessible position and be labelled (for example Appendix 2.1); or
- 2.2.9.2 Where a service riser supplies gas to a single kitchen within a building (for example Appendix 2.2), this requirement can be met by locating the "fire safety" valve external to the building on an outside wall, providing it is accessible to Fire Services (i.e. at ground or podium level for example). An external valve should be suitably protected against unauthorised interference and labelled. This valve may be additional to that required by (2.2.8), or a single valve may fulfil requirements for (2.2.8) and (2.2.9), where it is possible to do so (for example Appendix 2.3); or

2.2.9.3 If it is not possible to locate the fire safety valve external to the building, or to the kitchen itself, then a valve may be installed immediately within the kitchen entrance for this purpose (Appendix 2.4). A permanent notice, advising Fire Service Officers of the valve location, shall be placed outside the kitchen entrance.

2.2.10 Premises Having High Gas Consumption

In the case of non-domestic premises having high gas consumption, pipework shall be installed and labelled in accordance with Regulation 22 of the Gas Safety (Installation and Use) Regulations.

2.2.11 Gas Meters

2.2.11.1 Primary gas meters shall be installed as close as practical to the point of service entry into the premises and be suitably labelled in accordance with Regulation 13 of the Gas Safety (Installation and Use) Regulations.

2.2.11.2 Gas meters shall not be installed in areas designated as the only means of escape from premises. For meters installed in such locations prior to 1 April 1991, future replacements shall be in accordance with Regulation 10(1) of the Gas Safety (Installation and Use) Regulations.

2.2.12 Connection to Appliances

2.2.12.1 The final connection to appliances may be rigid, or flexible, depending upon appliance type and size.

2.2.12.2 Rigid metallic pipework shall consist of steel or copper (compression) fittings to a recognised international standard (e.g. steel fittings to BS 1387, copper to BS 2871 Part 1). Rigid copper pipework shall not be used for connecting moveable appliances to the gas supply.

2.2.12.3 All low pressure flexible tubing used for this purpose shall be of a type approved by the Gas Authority (e.g. GSO-RT-2) in accordance with Regulation 3 of the Gas Safety (Miscellaneous) Regulations. It should be noted that GSO-RT-2 tubing is suitable for gas pressures up to 50 mbar (*510mm water gauge) only. Where gas pressure exceeds 50 mbar (see 2.3.5) then tubing shall be in accord with a recognised standard e.g. BS 3212 Type 2 or equivalent.

*510mm W.G. = 5kPa

2.3 LPG Cylinder Supply (less than 130 litres WC)

2.3.1 LPG cylinders should only be installed to supply fixed appliances where a piped gas supply is not available within a premises (see 1.6).

2.3.2 LPG cylinders shall be located in a purpose designed chamber (Appendix 3). Care shall be taken to ensure that the total thermal input of kitchen gas appliances can be supplied from LPG cylinders operating at normal vaporisation rates (2.1.7) and with an aggregate water capacity not exceeding 130 litres. (Appendix 1 shows water capacities of each cylinder type; and Appendix 11 shows typical vaporisation rates of cylinders and thermal inputs of kitchen equipment.)

2.3.3 Any LPG cylinder installed to supply gas from a chamber within a premises, should not be exchanged on more than one occasion in 24 hours, unless the operator is able to demonstrate special LPG cylinder delivery/collection arrangements with a gas distributor so as to minimise risk to public safety.

2.3.4 Cylinders shall not be used at serving areas located in enclosed air-conditioned, common walkways within commercial shopping areas of two storeys or more, which are deemed to be a means of escape in the event of fire; nor indoor public swimming pools.

2.3.5 For commercial premises, the gas operating pressure for internal installation pipework shall not exceed *760mm water gauge (1 psi) outside the cylinder chamber and should be limited to *300mm (0.4psi) water gauge wherever possible.

*760mm W.G. = 7.5kPa

*300mm W.G. = 3.0kPa

2.3.6 LPG Cylinder Storage Chamber: Location and Construction

2.3.6.1 A chamber shall be designed specifically for the storage of LPG cylinders having an aggregate water capacity not exceeding 130 litres. It should be located outside, in open air where possible, or may be inside a building provided that adequate ventilation is provided (see 2.3.7).

2.3.6.2 The location of a chamber shall not impede the means of escape from a premises nor breach any structure which provides for interior fire separation.

- 2.3.6.3 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.
- 2.3.6.4 A chamber shall not be located above, or less than 1 metre, from drains.
- 2.3.6.5 A chamber shall be located such that its doors do not open directly into a restaurant seating area inside a premises; into an air-conditioned pedestrian walkway; nor on to a highway.
- 2.3.6.6 Where a chamber accommodates two or more cylinders within a commercial kitchen/food preparation area, it shall be located at least 2m away from any fixed source of naked flame.
- 2.3.6.7 A chamber shall be constructed of concrete, or a material having at least 2 hour fire resistance (e.g. BS476) and sufficient mechanical strength to afford proper protection to the LPG cylinders and related equipment.
- 2.3.6.8 Steel door(s) are preferred, particularly for chambers inside kitchen premises. However, as a minimum, chamber door(s) shall be constructed of material having at least 1 hour fire resistance (e.g. BS 476) and sufficient mechanical strength to afford proper protection to the LPG cylinders and related equipment. Doors shall normally be kept closed, and locked if the chamber is external to the premises.
- 2.3.6.9 A chamber shall 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.
- 2.3.6.10 The chamber shall not contain electrical apparatus unless flameproof to an international standard (e.g. BS 4683).

2.3.7 LPG Cylinder Storage Chamber: Ventilation

- 2.3.7.1 The ventilation openings of a chamber shall normally communicate directly with open air areas which afford adequate air movement (see 2.3.7.4). Such ventilation openings shall not be directed into adjacent buildings; designated means of escape from premises; indoor seating areas; or hazardous areas.

- 2.3.7.2 Where LPG cylinders, of aggregate water capacity exceeding 72 litres (approx. 32 kg LPG), but not exceeding 130 litres (approx. 50 kg LPG), are stored, the chamber shall be ventilated direct to open air (Appendices 4.1 and 4.2).

- 2.3.7.3 Where the aggregate water capacity of LPG cylinders stored does not exceed 72 litres:—

- (a) the chamber should still be vented directly to open air if possible, or if this is not possible, it may be vented to open air by a duct; or
- (b) only where each LPG cylinder in the chamber has an individual low pressure cylinder regulator fitted, the chamber may be vented directly into the kitchen, providing the kitchen itself is well ventilated to open air (Appendix 4.3).

- 2.3.7.4 Ventilation openings shall be provided at both high and low level. The minimum free area shall be:—

- (a) *low level*: 100 cm² or 1/100th of the chamber enclosed floor area, whichever is the greater;
- (b) *high level*: 50 cm² or 1/200th of the chamber enclosed floor area, whichever is the greater;

2.3.8 LPG Cylinder Storage Chamber: Permanent Warning Notices

- 2.3.8.1 The words "LPG CHAMBER", in English and Chinese characters shall be prominently indicated on the outside of the chamber doors.
- 2.3.8.2 Instructions concerning the safe exchange of LPG cylinders, in English and Chinese characters, shall be prominently displayed at all times within the chamber (Appendix 6.1).
- 2.3.8.3 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 characters, shall be provided at the chamber (Appendix 6.2).

2.3.9 LPG Cylinder Storage Chamber: Internal Gas Flow Controls and Internal Piping

2.3.9.1 The outlet gas supply pressure from the chamber should not exceed normal inlet pressure for low pressure appliances (i.e. *300mm water gauge (0.4psi)). However up to *760mm water gauge (1psi) is allowed providing the supply to appliances, designed to operate at 300mm water gauge, incorporates a service regulator, or each appliance is equipped with an individual regulator (note special requirements in 3.2.4). The outlet pressure may be controlled by means of individual cylinder regulators recommended by the Registered Gas Supply Company and compatible with the LPG cylinder type (Appendix 5.1); or by a properly secured manifold arrangement using a single regulator recommended by the Registered Gas Supply Company (Appendix 5.2).

*760mm W.G. = 7.5kPa

*300mm W.G. = 3.0kPa

2.3.9.2 Where a manifold is connected to two or more LPG cylinders at a pressure exceeding low pressure (Appendix 5) then:—

- (a) non-return valves shall be fitted to each LPG cylinder outlet connection; and
- (b) flexible tubing length shall not exceed 1m for each LPG cylinder installed; and
- (c) steel pipe shall be of a type approved by the Gas Authority; and
- (d) flexible tubing shall be of a type approved by the Gas Authority (high pressure BS3212 Type 2 or equivalent).

2.3.9.3 Adequate support shall be provided to pipework within the chamber to take the weight of disconnected pressure regulators during exchange of LPG cylinders.

2.3.10 LPG Cylinder Supply: Pipework and Control Valves

2.3.10.1 Gas pipework running from the LPG cylinder chamber to appliances shall be of steel construction to a standard included within the LPG Supply Industry of Hong Kong Standard Practice Manual Volume 1 (e.g. BS 1387); be suitably protected against corrosion; and securely fixed to walls.

2.3.10.2 An isolation valve, labelled in Chinese and English characters, shall be provided in the gas supply immediately outside the LPG cylinder chamber.

2.3.10.3 The LPG supply pipe shall be clearly identified.

2.3.10.4 The final connection of appliances may be rigid, or flexible, depending upon appliance type and size.

- (a) Rigid metallic pipework shall consist of steel or copper (compression) fittings to a recognised international standard (e.g. steel fittings to BS 1387, copper to BS 2871 Part 1). Rigid copper pipework shall not be used for connecting moveable appliances to the gas supply.
- (b) All low pressure flexible tubing used for this purpose shall be of a type approved by the Gas Authority (e.g. GSO-RT-2) in accordance with Regulation 3 of the Gas Safety (Miscellaneous) Regulations. It should be noted that GSO-RT-2 tubing is suitable for gas pressures up to 50mbar only (*510mm water gauge). Where gas pressure exceeds 50mbar (see 2.3.5) then tubing shall be in accord with a recognised standard (e.g. BS 3212 Type 2 or equivalent).

*510mm W.G. = 5kPa

3. Fixed Gas Appliance Installations

3.1 General Requirements

- 3.1.1 All gas appliances shall be installed in accordance with Part V (Gas Appliances) of the Gas Safety (Installation and Use) Regulations by Registered Gas Installers who have obtained at least Class 6 registration.
- 3.1.2 Installation work shall comply with all relevant statutory safety requirements. Where appliances incorporate electrical components operating at mains voltage, work shall be undertaken in accordance with provisions of the Electricity Ordinance. Reference should be made to the Code of Practice for the Electricity (Wiring) Regulations issued by Hong Kong SAR Government.
- 3.1.3 Gas appliances shall be installed so as to facilitate servicing in accordance with Regulation 25 of the Gas Safety (Installation and Use) Regulations and shall not be located so as to cause a fire hazard nor impede means of escape from a building.
- 3.1.4 Gas appliances should not be installed in contact with combustible wall or floor surfaces and a minimum separation distance of 150mm (6 inches) may be allowed. Where it is not possible to achieve this separation distance, shielding with non-combustible material is necessary if temperatures in excess of 65°C are likely to be experienced in the vicinity of the gas appliance.
- 3.1.5 The final connection of appliances may be rigid, or flexible, depending upon appliance type and size.
- 3.1.5.1 Rigid metallic pipework shall consist of steel or copper (compression) fittings to a recognised international standard (e.g. steel fittings to BS 1387, copper to BS 2871 Part 1). Rigid copper pipework shall not be used for connecting moveable appliances to the gas supply.

- 3.1.5.2 All low pressure flexible tubing used for this purpose shall be of a type approved by the Gas Authority (e.g. GSO-RT-2) in accordance with Regulation 3 of the Gas Safety (Miscellaneous) Regulations. It should be noted that GSO-RT-2 tubing is suitable for gas pressures up to 50mbar only (*510mm water gauge). Where gas pressure exceeds 50mbar (see 2.3.5) then tubing shall be in accord with a recognised standard (e.g. BS 3212 Type 2 or equivalent).

*510mm W.G. = 5kPa

3.1.6 Ventilation

- 3.1.6.1 Adequate ventilation must be available to ensure ready supply of fresh air for combustion and safe removal of combustion products in accordance with Regulation 23(1) of the Gas Safety (Installation and Use) Regulations.
- 3.1.6.2 For those kitchen installations where natural ventilation is not sufficient, or not available, mechanical ventilation shall be employed. A means shall be provided to ensure that the mechanical ventilation system is always in operation when gas appliances are in use.
- 3.1.6.3 Ventilation shall be provided in accordance with appliance manufacturer's instructions to a recognised international standard e.g. BS 6644. (see 3.1.7.4)

For mechanical ventilation systems

1m³ of LPG will require at least 30m³ of fresh air for combustion and will produce approximately 33m³ of products for removal to open air by kitchen extract systems.

- 3.1.6.4 In addition to (3.1.6.3) above, adequate ventilation (e.g. 20–40 air change per hour) must be provided to allow comfortable working conditions for occupants in kitchen areas etc. and the proper removal of cooking odours, grease and steam.

3.1.7 Water Heating Appliances

- 3.1.7.1 Flueless gas water heaters shall not be installed within premises for the purpose of providing hot water to commercial catering establishments.

- 3.1.7.2 Gas water heating appliances shall be installed in accordance with the manufacturers' instructions and should preferably be flued independently to open air. Models rated less than 60kW (input) should be installed in accordance with Gas Utilisation Code of Practice 03 issued by the Gas Standards Office.
- 3.1.7.3 Where independent flueing is not possible, the water heater flue may terminate inside the extract duct of a commercial kitchen mechanical ventilation system which discharges to open air providing there is an interlock system to isolate the gas supply to the water heater in the event of extract fan failure or blockage, in accordance with Regulation 24(4) of the Gas Safety (Installation and Use) Regulations.
- 3.1.7.4 Natural or mechanical ventilation for supplying air to a water heater shall be in accordance with the manufacturer's instructions to an international standard, such as BS 6644:—
- (a) *Natural Ventilation*
- low level:* minimum $540\text{cm}^2 + 4.5\text{cm}^2/\text{kW}$ in excess of 60kW total rated input.
- high level:* minimum $270\text{cm}^2 + 2.25\text{cm}^2/\text{kW}$ in excess of 60kW total rated input.
- (b) *Mechanical Ventilation*
- The system shall provide at least 1.1 litres/second of input/output air per kW total rated output of gas (see 3.1.6.3).
- 3.1.8 Safety Controls**
- 3.1.8.1 All gas and flow controls employed shall be designed and constructed to recognised international safety standards.
- 3.1.8.2 Gas catering appliances which have enclosed combustion chambers, or of a type which prevent burner flame(s) being easily observed by the user, shall incorporate flame protection.
- 3.1.8.3 The gas supply to catering appliances which incorporate gas/pressurised air pre-mix systems shall be protected by the installation of a non return valve in the inlet supply pipework.

3.2 Cooking/Food Warming Appliances Installed within Seating Areas

- 3.2.1 A gas isolation valve shall be provided in an easily accessible position as near as possible to the point where the piped gas supply enters the seating accommodation. The ON/OFF indication and the undernoted instructions in Chinese and English shall be prominently displayed, for the user:
- “BEFORE TURNING ON GAS SUPPLY, ALWAYS CHECK THAT ALL GAS APPLIANCE TAPS ARE CLOSED”;
 - “SHUT OFF THE GAS SUPPLY AFTER USE”.
- 3.2.2 All gas supply pipes inside the seating area, except the final connection to each appliance, shall be rigid steel with screwed joints, for example steel to BS 1387. Appropriate measures shall be taken to prevent corrosion where pipework is installed in walls or floors in accordance with Regulation 17 of the Gas Safety (Installation and Use) Regulations.
- 3.2.3 All flexible tubing, connecting the gas appliance to the gas supply valve at the table shall be of an approved type (e.g. GSO-RT-2).
- 3.2.4 The gas supply pressure to tables inside the seating area must not exceed 300mm water gauge.
- 3.2.5 Gas appliances shall be installed so as to facilitate ease of servicing and shall:
- 3.2.5.1 incorporate an automatic means of ignition e.g. piezo spark;
 - 3.2.5.2 incorporate a pilot protected by a flame failure device.
- 3.2.6 Additional ventilation must be provided within the seating area to ensure adequate supply of fresh air for combustion and safe removal of combustion products (see 3.1.6.3) in accordance with Regulation 23(1) of the Gas Safety (Installation and Use) Regulations. Means shall be provided to ensure mechanical ventilation, installed for this purpose, is always in operation when appliances are being used.

3.3 Cooking/Food Warming Appliances Installed at Serving Counters in Restaurants/Shopping Centres

- 3.3.1 All gas supply pipes at the serving counter, except the final connection to moveable appliance, shall be rigid steel with screwed joints, for example steel to BS 1387. Appropriate measures shall be taken to prevent corrosion where pipework is installed in walls or floors in accordance with Regulation 17 of the Gas Safety (Installation and Use) Regulations.
- 3.3.2 All flexible tubing, connecting a gas appliance to the gas supply valve(s) at the serving counter shall be of an approved type (e.g. GSO-RT-2).
- 3.3.3 The gas supply pressure to the serving counter area must not exceed low pressure i.e. *300mm water gauge.
- 3.3.4 Gas appliances shall be installed so as to facilitate ease of servicing and shall:—
- 3.3.4.1 incorporate an automatic means of ignition e.g. piezo spark;
- 3.3.4.2 incorporate a flame failure device.
- 3.3.5 Additional ventilation must be provided at the serving counter area to ensure adequate supply of fresh air for combustion and safe removal of combustion products (see 3.1.6.3) in accordance with Regulation 23(1) of the Gas Safety (Installation and Use) Regulations.

*300mm W.G. = 3kPa

4. Portable Gas Appliances

4.1. Dim sum trolleys

4.1.1 General

4.1.1.1 The trolley to be used for food warming, shall be fabricated in a workmanlike manner. No combustible material shall be used in the construction of the trolley nor placed inside the appliance. It shall be constructed such that it remains in a stable upright position at all times during normal use. The base of the trolley shall not be enclosed.

4.1.1.2 There shall be complete separation between the LPG cylinder storage compartment and the gas burner compartment (combustion chamber). The storage compartment shall be installed below the combustion chamber and properly sealed from it so as to provide an effective heat shield and to prevent gas or liquid entering the storage compartment (Appendix 7). The storage compartment shall incorporate an external door which can be secured in the closed position so as to protect the installed gas equipment but must allow the user to gain easy access all the times. (Typical designs are shown in Appendix 8.)

4.1.1.3 Metallic gas pipe fittings shall be manufactured to recognised international standards and be securely connected by screw threads, compression fittings, brazing or welding, but not by capillary joints relying on soft solder or adhesives. Installed gas fittings shall be sound.

4.1.1.4 For reasons of fire safety, dim sum trolleys containing LPG cylinders should not be used in restaurant areas located below ground level.

4.1.2. LPG Cylinder Storage Compartment

4.1.2.1 The cylinder storage compartment shall be open at the base to ensure provision of ventilation but must be constructed to ensure adequate support and protection for the LPG cylinder.

4.1.2.2 Compartment door(s) shall afford the user ready access for easy exchange of LPG cylinder, inspection/ repair of installed gas equipment and turning off gas supply in an emergency.

4.1.2.3 The compartment shall be designed to accommodate a 2kg LPG cylinder and regulator (section 4.1.3 and 4.1.4), flexible gas tubing (section 4.1.5) and pipework connections.

4.1.3 LPG Cylinder

The LPG cylinder shall be of a type approved by the Gas Authority, possess a current test certificate for the five year hydraulic test and be charged with LPG by a Registered Gas Supply Company in accordance with the Regulation 7 of the Gas Safety (Gas Supply) Regulations Cap. 51. The water capacity of the cylinder shall not exceed 4.8 litres (2kg LPG) and must incorporate a pressure relief valve as required by Regulation 9(c) of the Gas Safety (Gas Supply) Regulations Cap. 51. The cylinder valve shall be replaced by the Registered Gas Supply Company every two years.

4.1.4 LPG Cylinder Regulator.

4.1.4.1 The LPG regulator must be compatible with the LPG cylinder supplied by a Registered Gas Supply Company. It shall comply with Gas Utilisation Code of Practice *GU09* "Low pressure regulators for supplying gas from LPG cylinders having less than 40 litres water capacity" to include for example an integral, excess flow device. The excess flow device shall be manufactured to recognised Industry safety standards; be factory set; and non adjustable by the user. The regulator shall not incorporate an internal pressure relief valve.

4.1.4.2. The regulator shall be capable of being connected to the LPG cylinder without the use of a tool such that the replacement of a cylinder shall not require unscrewing of any gas fittings (*GU09: rapid coupling type*). Additionally a valve cap, designed to take cylinder pressure, shall be attached to the cylinder, at all times such that the user can seal-off the cylinder valve outlet in the event of leakage.

4.1.5 Gas Supply Pipes

4.1.5.1 Metallic Pipe Fittings

The metallic burner supply pipe shall terminate at a suitable location within the storage compartment to facilitate the connection of flexible gas tubing. All pipe fittings shall be manufactured to international standards. Capillary fittings utilising soft solder are prohibited, only screwed, compression, or brazed/welded fittings are permitted. The gap around the supply pipe where it passes through the wall of the storage compartment must be sealed in accordance with (4.1.1). The supply pipe shall terminate within the storage compartment in the form of a standard nozzle for GSO/RT/2 rubber tubing or a screwed connection in the case of reinforced tubing.

4.1.5.2 Flexible Tubing

All flexible gas tubing used shall be of a type approved by the Gas Authority (for example GSO-RT-2). Its length shall be kept to a minimum and it shall only be located within the cylinder storage compartment which is sealed from the combustion chamber. The tubing must be connected at each end by means of proper securing clips or screwed connections as appropriate.

4.1.6 The Burner Compartment (Combustion Chamber)

4.1.6.1 Construction

The burner compartment shall be constructed to ensure safe combustion of gas (CO/CO₂ ratio at flue outlet under normal operating conditions does not exceed 0.004) by:-

- (a) providing sufficient air for combustion from the opening at the compartment base:
- (b) minimising burner flame impingement on the under side of the water trough
- (c) providing adequate ventilation to remove combustion products, by means of an integral flue. The flue outlet (5000 mm² minimum) shall be designed to prevent blockage by dim sum containers etc or incorporate a warning label to advise the user that the opening must be kept clear.

4.1.6.2. The Gas Burner

- (a) The compartment shall only contain one burner which shall be manufactured to an international standard and be correctly adjusted to burn LPG (approx. 70% butane/ 30% propane) distributed in Hong Kong.
- (b) The burner and connections, including spark igniter and flame failure thermocouple, shall be firmly secured.
- (c) The burner shall be located in a position which minimises direct flame impingement upon the base of the water trough.
- (d) The diameter of the burner jet orifice shall not exceed 0.9 mm to operate at an inlet gas pressure not exceeding 300mm W.G.

4.1.7 User and safety controls

4.1.7.1 General.

The gas flow controls shall incorporate a flame failure device and automatic (spark) ignition. The respective flame detection and spark probe shall be securely and conveniently mounted adjacent to the burner but the control valve shall not be installed within the combustion chamber. The controls must also be protected from radiated heat and from accidental impact damage. There shall be a means to ensure the user can detect whether the water level in the trough is adequate in order to avoid overheating of the appliance.

4.1.7.2 Users control tap

The user's control tap shall incorporate a valve manufactured to an international standard (for example JIS2103) and must incorporate automatic spark ignition. It shall be located at a convenient position such that the burner flame is visible by the user during the ignition process. The tap shall be clearly marked to show *on* and *off* positions.

4.1.7.3 Users instructions

User instructions shall be left with the responsible person for the premises in accordance with regulation 26 of the Gas Safety (Installation and Use) Regulation Cap. 51.

4.1.7.4 Flame failure device

The flame failure device shall be manufactured to an international standard (for example JIS 2103) and may be an integral part of the user's control valve. It must be installed in accordance with (4.1.6.1) above.

4.1.8 Data Plate

A data plate shall be securely located on the trolley displaying the serial number, maker's name, address and date of manufacture.

4.1.9. Safety Notice

User instructions (Appendix 9), to ensure safety of staff and customers, shall be adhered to the trolley at all times so as to be easily read by the user. In particular LPG cylinders shall only be exchanged by persons properly trained for this duty in a well ventilated location without naked flames being present. Cylinders must not be exchanged within the seating area of a restaurant.

4.1.10 Commissioning

A Registered Gas Contractor shall undertake to certify:

4.1.10.1 Prior to connecting the gas supply,

- (a) all gas pipework and associated gas fittings are sound at 1.5 x normal working pressure i.e. there is no leakage.
- (b) there are adequate provisions for ventilation and safe removal of combustion products (4.1.6.1)
- (c) all gas fittings are secured and in accordance with (4.1.5)
- (d) the burner jet orifice is of the correct diameter (4.1.6.2)
- (e) all warning labels and instructions are present (4.1.7.3 and 4.1.9)

4.1.10.2 Subsequent to connecting gas supply,

- (a) normal working pressure is (280–300) mm water gauge
- (b) the igniter is functioning satisfactorily
- (c) the CO/CO₂ combustion ratio does not exceed 0.004 after 5 minutes of operation at normal gas rate (4.1.6.2(d))

(d) all gas flow controls, including flame failure device, are operating correctly

4.1.11 Annual Safety Check

Dim sum/food warming trolleys shall be checked for safe operation annually by a Registered Gas Contractor in accordance with section (4.1.10) above and proper written records must be kept for this purpose (Appendix 10). Flexible rubber tubing shall be replaced as necessary but not exceeding a period of 3 years. The cylinder valve shall be checked for compliance with (4.1.3)

4.1.12 Storage of LPG Cylinders

All LPG cylinders, when not installed, should be stored in accordance with the requirements of Sections 2.3.6, 2.3.7 and 2.3.8 of this guide.

4.2 Disposable LPG Cartridges and Cassette Cookers

4.2.1 General

4.2.1.1 Disposable LPG cartridges used in Hong Kong must be of a type approved by the Gas Authority in accordance with Regulation 7 of the Gas Safety (Gas Supply) Regulations.

4.2.1.2 Where the aggregate water capacity of LPG cartridges stored in any premises exceeds 130 litres, (Appendix 1) then prior approval of the Gas Authority for construction and use is required in accordance with Regulation 3 of the Gas Safety (Gas Supply) Regulations.

4.2.1.3 Disposable LPG cartridges shall be kept in a dry, well ventilated store when not in use, in accordance with sections 4.2.2 to 4.2.5. The operator shall ensure stock rotation of cartridges to avoid prolonged storage. For reasons of fire safety the total water capacity of containers stored should not exceed 28 litres (Appendix 1).

4.2.2 Location and Construction of Store

4.2.2.1 The store should always be located in open air wherever possible, or may be located within a building provided that adequate ventilation is available (see 4.2.3).

4.2.2.2 The store shall not be located below ground level.

4.2.2.3 The store shall not be located above, or in the immediate vicinity of, drains.

4.2.2.4 The store shall not be located within a restaurant seating area nor within a designated means of escape from a building.

4.2.2.5 The store shall not breach any fire separation structure within a building.

4.2.2.6 The store shall be located at least 2 metres away from a fixed source of naked flame.

4.2.2.7 The store shall be constructed of concrete, or any material having at least two hour fire resistance (BS 476) and sufficient mechanical strength to protect stored cartridges.

4.2.2.8 Door(s) shall be provided to the store being a material having at least one hour fire resistance (BS 476). The door(s) shall normally be locked.

4.2.3 Ventilation of Store

4.2.3.1 The ventilation openings of a store shall normally communicate with open air and shall not be directed into adjacent buildings; designated means of escape from buildings; indoor seating areas; nor any hazardous areas.

4.2.3.2 The store shall be vented (wherever possible directly to open air) by natural or mechanical means. Ventilation shall be provided at low and high level. In the case of mechanical ventilation, the extract opening shall be at low level and the fresh air intake opening shall be at high level.

low level 100 cm² free area, or 1/100th of the store floor area, whichever is the greater.

high level 50 cm² free area, or 1/200th of the store floor area, whichever is the greater.

or

Mechanical Ventilation the system shall be capable of providing 25 litres, of air per second, or 5 litres, per second per sq. meter of the store floor area, whichever is the greater. The extract duct shall be at low level and the fresh air duct at high level; all electrical equipment to be flame proof to an international standard for example BS 4683.

- 4.2.3.3 A store located within, or adjacent to a kitchen area, may be vented directly into the kitchen, or an area which does not conflict with 4.2.3.1 providing such an area is itself well ventilated directly to open air and aggregate water capacity of containers does not exceed 28 litres. High and low ventilation should be provided in accordance with 4.2.3.2.

4.2.4 Warning Notice

A permanent notice shall be prominently displayed on the door(s) of the store in Chinese and English characters:

- “LPG CARTRIDGES”;
- “NO SMOKING OR NAKED FLAMES”.

4.2.5 Cassette Cookers

- 4.2.5.1 For reasons of fire safety cassette cookers should not be used within commercial premises below ground level e.g. basement kitchens, seating areas, etc.
- 4.2.5.2 Cassette cookers should not be used within, or at serving counters forming part of enclosed air-conditioned main public walkways of commercial buildings having two or more storeys, if such areas are designated as means of escape in the event of fire.
- 4.2.5.3 Areas in which cassette cookers are permitted for use shall be well ventilated (3.1.6.3 refers) so as to ensure:—
- (a) sufficient fresh air for gas burning appliance;
 - (b) safe removal of products of combustion;
 - (c) safe dispersal of LPG in the event of leakage.
- 4.2.5.4 Cassette cookers containing LPG cartridges shall be stored in accordance with section (4.2.2) whilst not in use. Replacement of cartridge must be carried out in accordance with manufacturers' instructions.

5. Testing and Commissioning of New Installation Work

5.1 Gas Installation Pipework and Flow Controls

- 5.1.1 *Inlet service gas pipework*, upstream of a primary meter; or pipework upstream of a service regulator (primary meter not installed); shall be tested and purged in accordance with Regulations 20 and 23 of the Gas Safety (Gas Supply) Regulations.
- 5.1.2 *Internal installation gas pipework*, downstream of a primary meter (carcassing); or low pressure internal pipework downstream of a service regulator (primary meter not installed); shall be tested and purged in accordance with Regulation 20 of the Gas Safety (Installation and Use) Regulations.
- 5.1.3 *Soundness testing and purging* shall be carried out generally in accordance with the procedures outlined in Section 6 of the LPG Industry of Hong Kong Standard Practice Manual Volume 1. In the case of an LPG cylinder chamber installation incorporating a manifold arrangement, the high pressure stage shall be tested in accordance with BS 5482 : Part 1
- 5.1.4 During soundness testing procedures the undernoted shall be observed:—
- 5.1.4.1 All newly installed low pressure pipework, downstream of primary meter or service regulator (including appliance connections) shall be isolated and tested for leakage at 1.5 times normal operating pressure.
- 5.1.4.2 No pressure drop shall be observed during the soundness test, after a period has been allowed for temperature stabilisation (in the case of larger installations; 5–15 minutes).
- 5.1.4.3 Test duration, and results, shall be recorded on a job document.
- 5.1.4.4 Where sections, isolated for soundness testing, are reconnected to an existing gas supply then such joints shall be properly tested for leakage by leak detection fluid. Additionally any exposed pipework joints which may be located in corridors, etc. shall be rechecked with leak detection fluid.
- 5.1.4.5 If leakage is detected at any stage, (5.1.4.1) to (5.1.4.4), defects must be repaired and the test repeated until the installation is sound.

Appendix 1

Water Capacity of LPG Containers and permitted numbers (not exceeding 130 litres)

5.1.5 Before commencing purging procedures the undernoted shall be observed:—

5.1.5.1 *Inert Purging of New Piped Installations*

Inert gas purging, using nitrogen or carbon dioxide, shall be carried out for new installations having 100mm (4 inch) diameter pipework or above, or where the total installation volume (see Appendix 9) exceeds 0.59m³ (21 ft³). Direct purging (using LPG) is not permitted for such installations.

5.1.5.2 *Direct Purging of New Piped Installations*

For small installations, having pipework diameters not exceeding 75mm (3 inch) and a total installation volume (see Appendix 9) not exceeding 0.59m³ (21ft³), direct purging using LPG may be undertaken. However, this is only permissible when conditions allow purge burning (flaring) at the purge point, and shall be undertaken subject to precautions outlined in the LPG Supply Industry of Hong Kong Standard Practice Manual Volume 1.

5.2 Gas Appliances

5.2.1 Gas appliances shall be tested and commissioned in accordance with Regulation 30 of the Gas Safety (Installation and Use) Regulations. If gas is not available at the time of appliance installation, means shall be provided to ensure compliance with Regulation 30(3).

5.2.2 Testing and commissioning of appliances shall be carried out as directed by the appliance manufacturer to included:—

- (a) Soundness check i.e. no leakage;
- (b) Correct operating pressure;
- (c) Safe ignition;
- (d) Adequate ventilation (3.1.6 and 3.1.7 refer);
- (e) Safe removal of combustion products (3.1.6 and 3.1.7 refer);
- (f) Correct operation of all gas flow controls to include thermostats and flame failure devices, etc.

5.2.3 Users' instructions and maintenance requirements provided by the appliance manufacturer shall be left with the responsible person(s) for the premises in accordance with Regulation 26 of the Gas Safety (Installation and Use) Regulations.

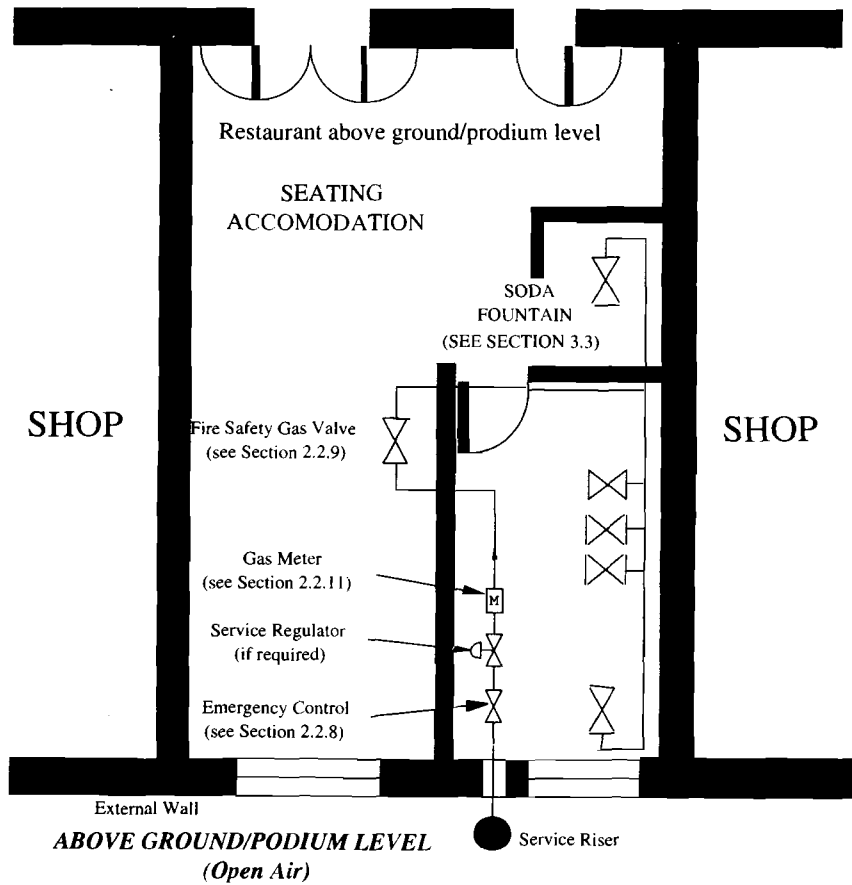
| Gas Supply Co. | Cylinder Capacity | | Permitted no. of Cylinders | | Type |
|---------------------|----------------------------|-------------------------|----------------------------|------|---------------------|
| | Nominal Water Capacity (L) | Nominal LPG Weight (kg) | | | |
| BP (SHELL) | 23.5 | 10.5 | 5 | | Domestic |
| | 35.5 | 15 | 3 | | Domestic/Industrial |
| SHELL | 4.8 | 2 | 27 | | Dim Sum Trolley |
| | 17.7 | 8 | 7 | | Domestic |
| | 23.5 | 10.5 | 5 | | Domestic |
| | 30.4 | 13.5 | 4 | | Domestic/Industrial |
| CALTEX OR PENINSULA | 4.8 | 2 | 27 | | Dim Sum Trolley |
| | 17.7 | 8 | 7 | | Domestic |
| | 23.5 | 10.5 | 5 | | Domestic |
| | 35.3 | 16 | 3 | | Domestic |
| CRC | 4.8 | 2 | 27 | | Dim Sum Trolley |
| | 23.5 | 10.5 | 5 | | Domestic |
| | 35.5 | 16 | 3 | | Domestic |
| ESSO | 4.8 | 2 | 27 | | Dim Sum Trolley |
| | 19.2 | 8 | 6 | | Domestic |
| | 26.2 | 12 | 4 | | Domestic |
| | 35.3 | 16 | 3 | | Domestic |
| | 54 | 22 | 2 | | Industrial |
| MOBIL | 4.8 | 2 | 27 | | Dim Sum Trolley |
| | 23.5 | 10.5 | 5 | | Domestic |
| | 35.5 | 16 | 3 | | Domestic/Industrial |
| | 35.5 | 15 | 3 | | Industrial |
| | 49.5 | 21 | 2 | | Industrial |
| CONCORD | 23.5 | 10.5 | 5 | | Domestic |
| | 35.3 | 16 | 3 | | Domestic/Industrial |
| LPG CARTRIDGE | 0.55 | 0.22-0.26 | 28L | 130L | Cassette Cooker |
| | | | 50 | 236 | |

Appendix 2.1

Example 1: Location of fire safety valve inside premises

(Service riser supplying more than one customer)

Shopping arcade/common corridor

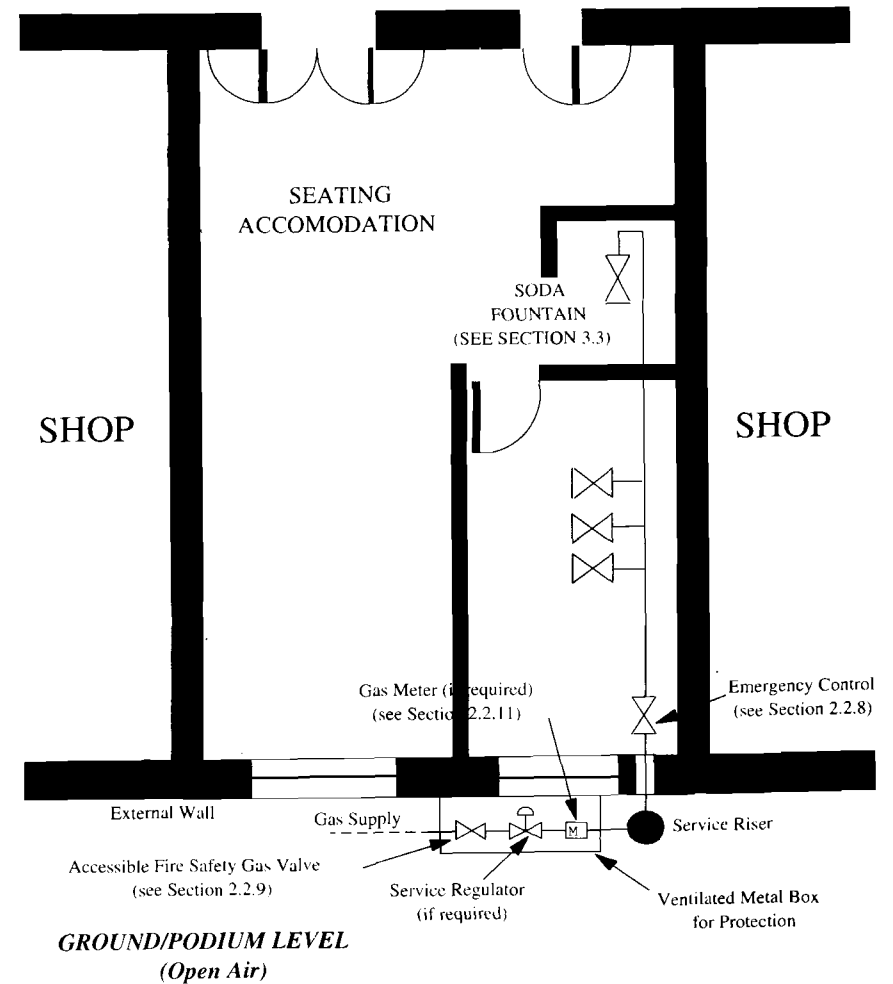


Appendix 2.2

Example 2: Location of fire safety valve external to premises. Single gas supply to restaurant (G/F level or above).

(Service riser supplying more than one customer)

Shopping arcade/common corridor

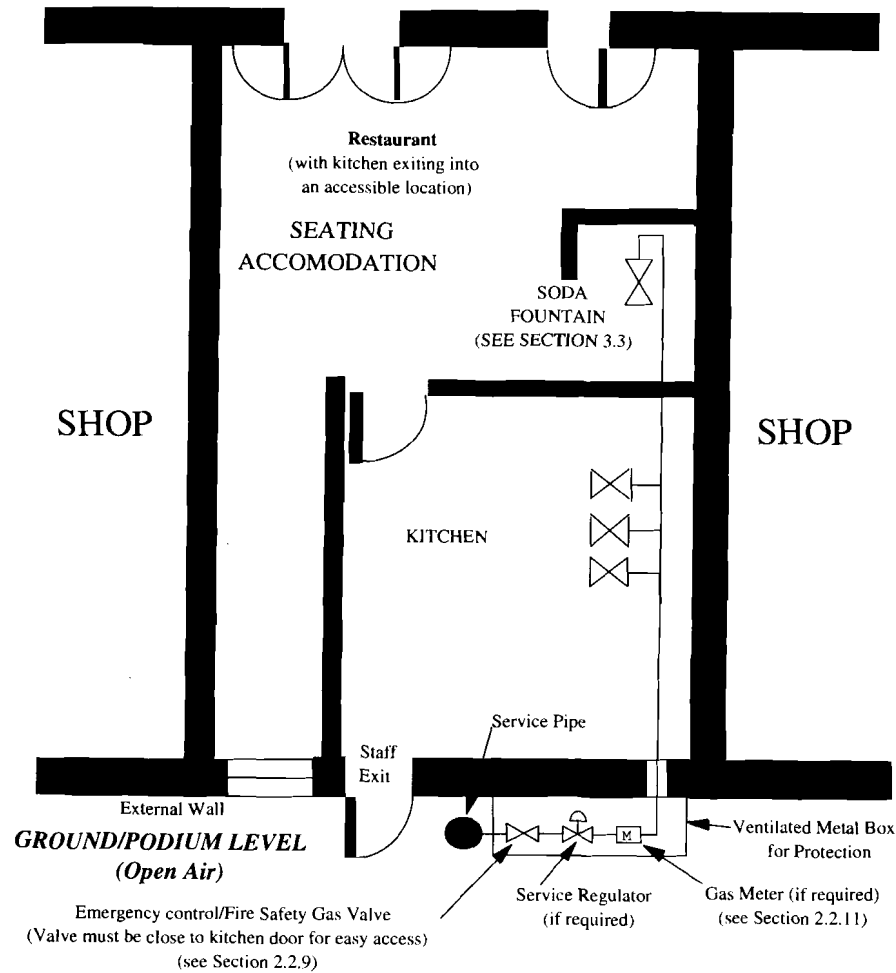


Appendix 2.3

Example 3: Location of fire safety valve external to premises. Single gas supply to restaurant on G/F or podium level.

(Fire safety and emergency control valves can be a single valve in this situation)

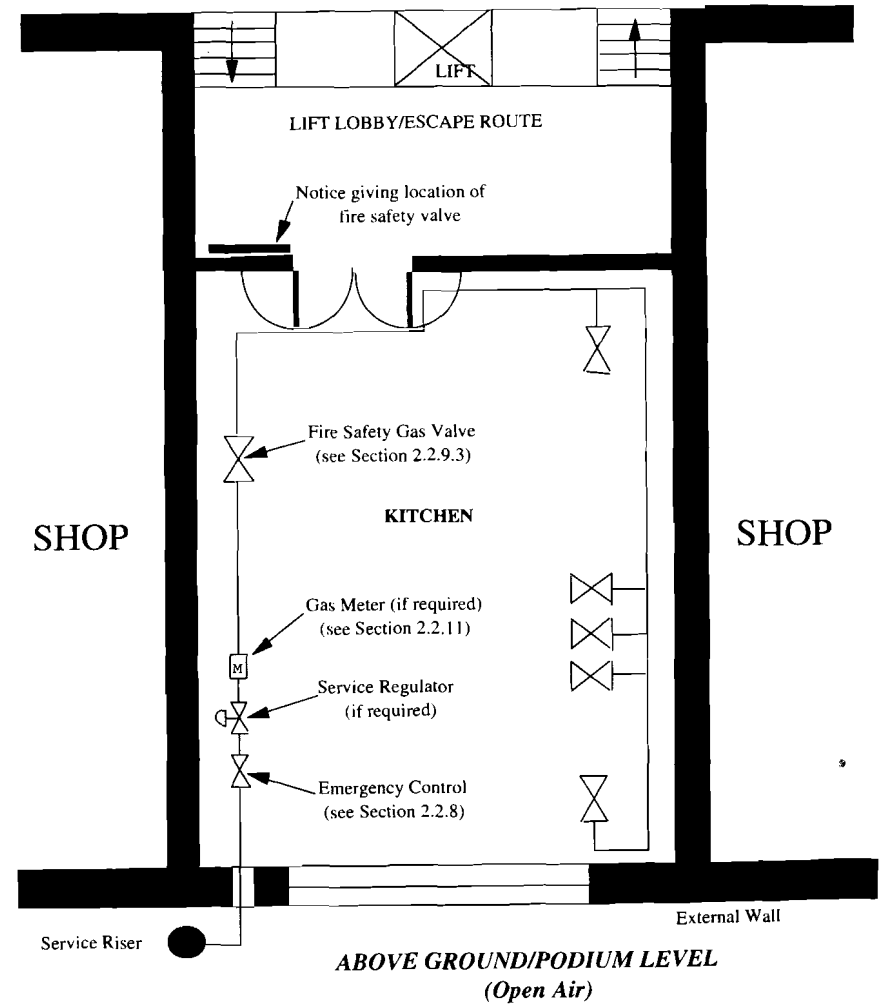
Shopping arcade/common corridor



Appendix 2.4

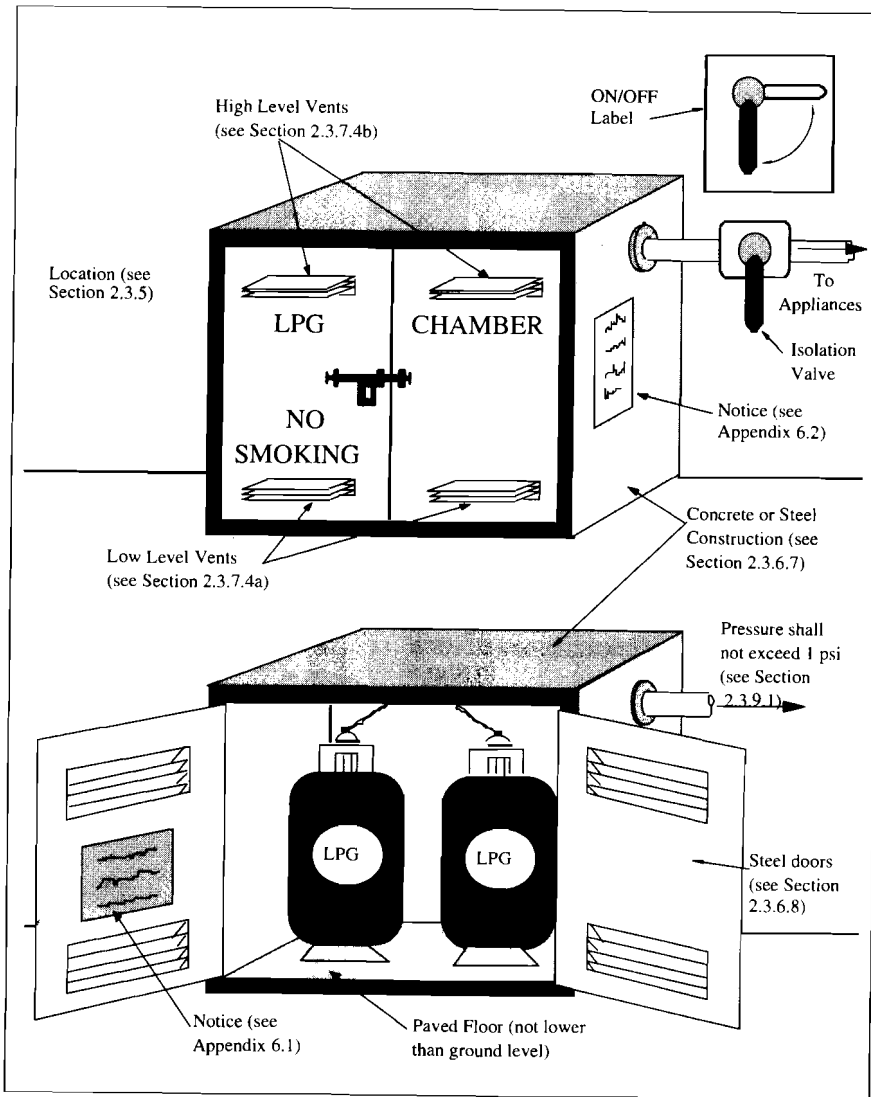
Example 4: Location of fire safety valve close to kitchen exit/entrance

(Service riser supplying more than one customer and unable to install fire safety valve outside kitchen)



Appendix 3

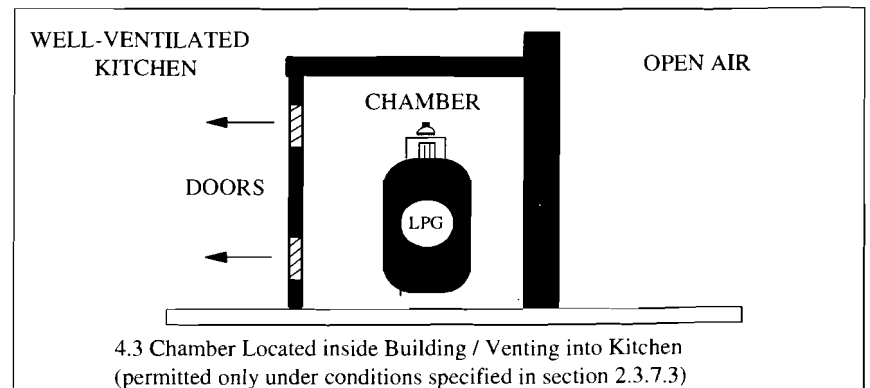
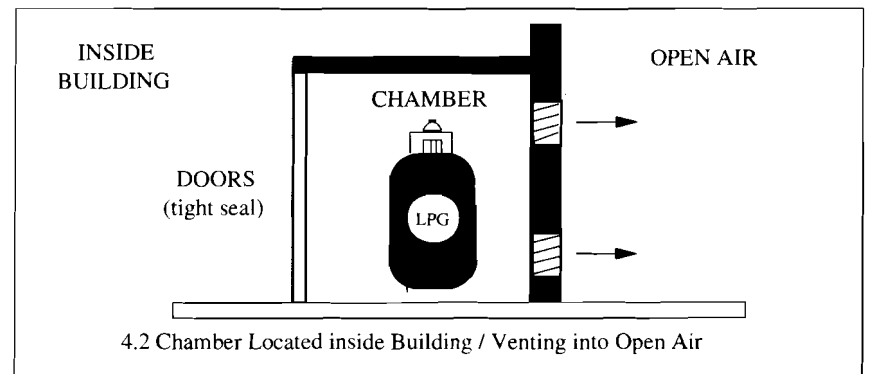
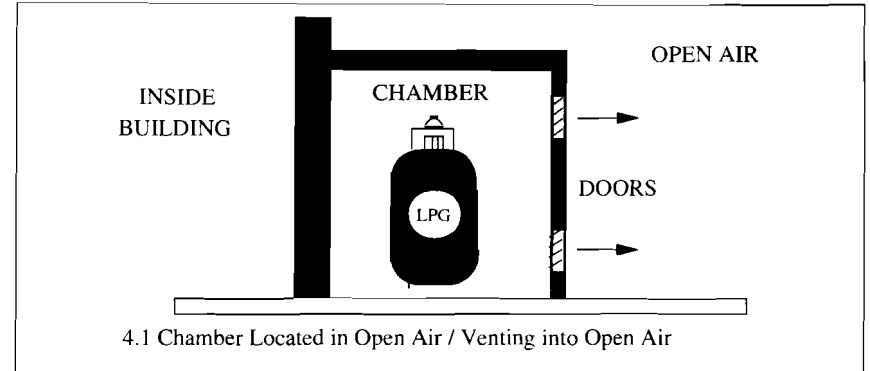
Typical LPG Cylinder Storage Chamber



* Please refer to Section 2.3

Appendix 4

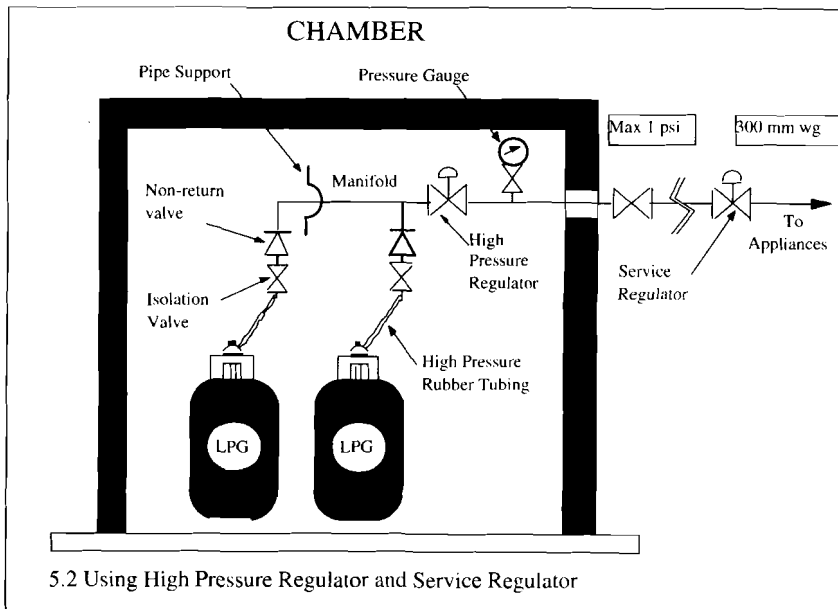
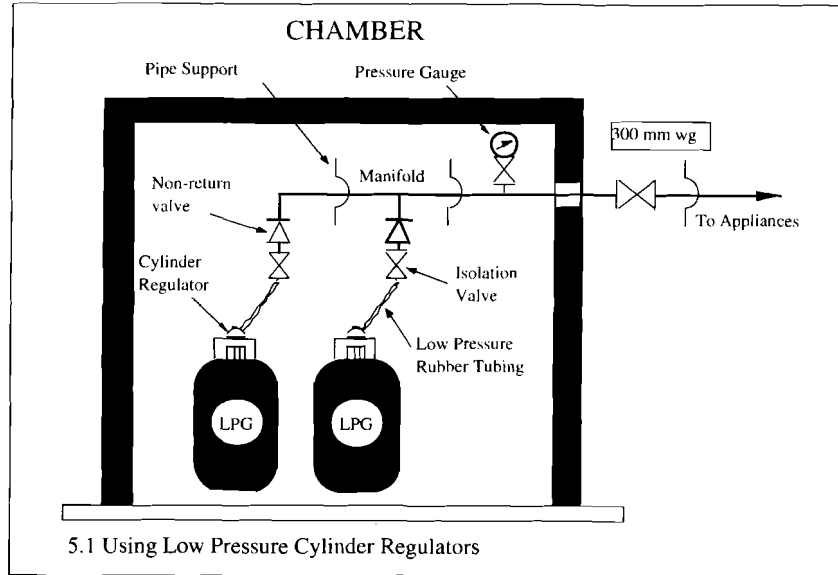
Location and Ventilation of LPG Cylinder Storage Chamber



* Please refer to Section 2.3.6 and 2.3.7

Appendix 5

Gas Flow and Pressure Controls for LPG Chamber Installation



* Please refer to Section 2.3.9

Appendix 6.1

Notices for LPG cylinder Storage Chamber

(see 2.3.8.2)

Instructions For The Safe Exchange Of LPG Cylinders

1. Extinguish all naked flames in the vicinity. Turn off gas appliances.
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. Re-connect 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 6.2

Notices for LPG cylinder Storage Chamber

(see 2.3.8.3)

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 cylinders.
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 and call the gas supply company immediately. Extinguish any naked flames but do not operate electrical switches.

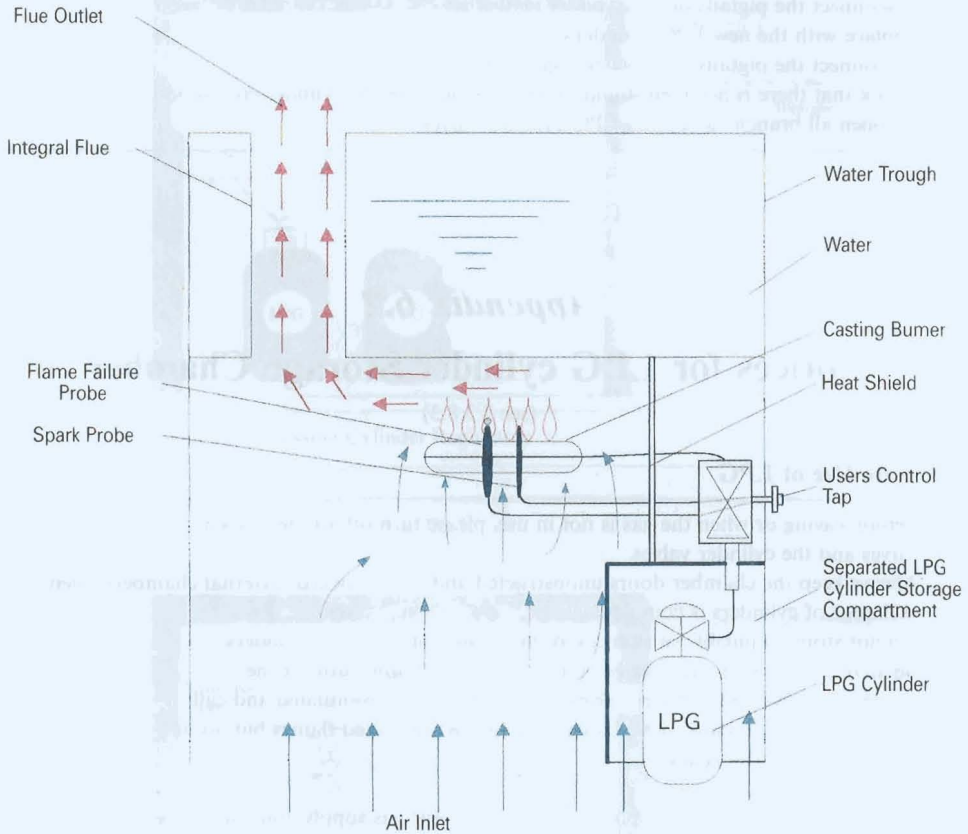
The 24-hour Emergency Telephone numbers of your gas supply company is as follows:

(Approved gas distributor to provide telephone number)

5. In case of emergency, call (999).

Appendix 7

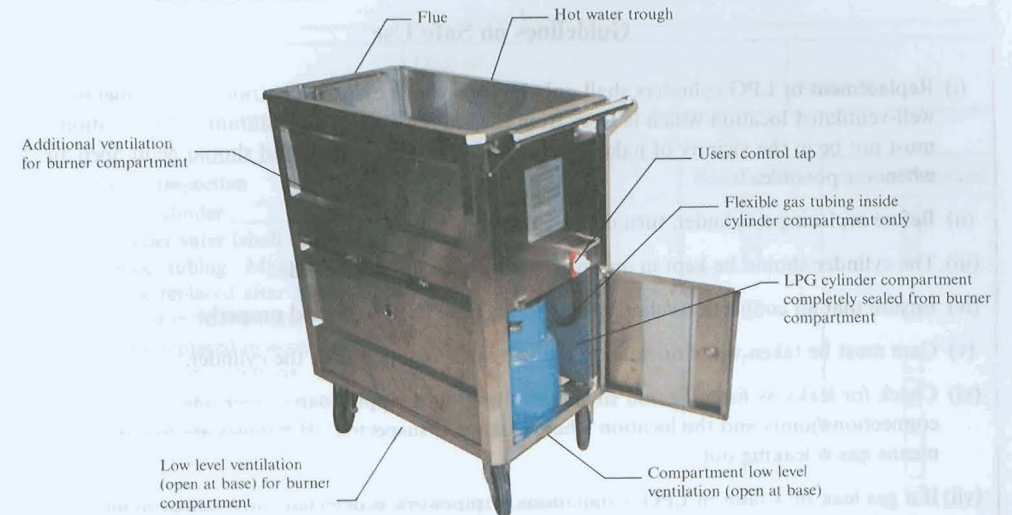
Schematic Diagram of Dim Sum Trolley



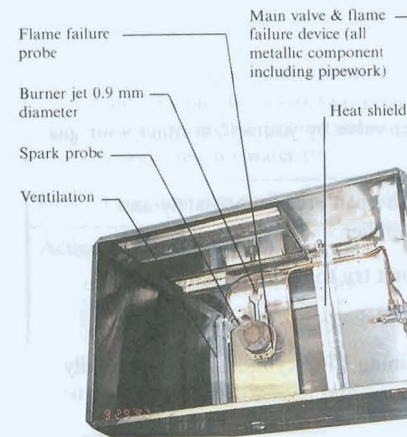
Appendix 8

Typical Examples of Dim Sum Trolley

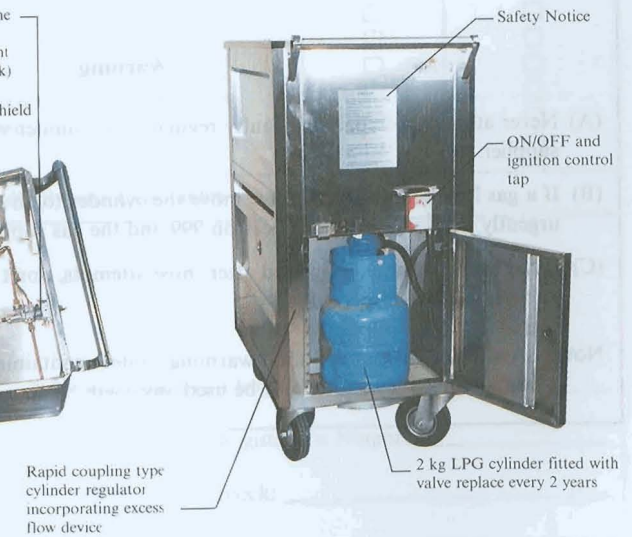
1. General View



2. Burner Compartment



3. LPG Cylinder Compartment



Appendix 9 Safety Notice

Guidelines on Safe Use

- (i) Replacement of LPG cylinders shall only be carried out by properly trained personnel in a well-ventilated location which is away from the seating area of a restaurant. This location must not be in the vicinity of naked flames and high temperature and should be in open air whenever possible.
- (ii) Before replacing a cylinder, turn off its valve/regulator.
- (iii) The cylinder should be kept in an upright position as it is installed.
- (iv) Ensure that all connections/clamps/hose joints have been tightened properly.
- (v) Care must be taken when turning on the valves, or regulators, of the cylinder.
- (vi) Check for leaks by listening and smelling. If in doubt, apply soapy water on connections/joints and the location where leakage is suspected. If bubbles are found, it means gas is leaking out.
- (vii) If a gas leak or a fault in LPG installations or pipework is detected, close the cylinder valves/regulators immediately. Do not operate any electrical switches. Keep the location well-ventilated, and call the gas supplier immediately *

(* See (B) below).

Warning

- (A) Never attempt to repair any faulty regulator or cylinder valve by yourself, contact your gas supplier.
- (B) If a gas leak cannot be stopped, move the cylinder to an open area immediately and urgently call Emergency Services on 999 and the gas supplier.
- (C) If the burner cannot be ignited after three attempts, don't try to ignite it again until unburnt LPG is dispersed.

Note: As LPG dim-sum and food warming trolleys containing LPG cylinders are potentially hazardous, they should not be used anywhere below ground level.

Appendix 10

**Table 5—Typical Example of Dim Sum Trolley Safety Inspection Record
(Section 4.1.11)**

| | | | |
|---|--|---|--------------------------|
| Registered Gas Contractor: _____ Address: _____ | | | |
| Customer: _____ Address: _____ | | | |
| Dim Sum Trolley Manufacturer : | Date of manufacture : | | |
| Serial No.: | | | |
| Location : | | | |
| | Visual Inspection | Satisfactory | Action Required |
| 1 | LPG Cylinder _____ × _____ Kg | <input type="checkbox"/> | <input type="checkbox"/> |
| 2 | Cylinder valve (shall be replaced every 2 years) | <input type="checkbox"/> | <input type="checkbox"/> |
| 3 | Rubber tubing : Manufacture date (To be replaced after 3 years at most) | <input type="checkbox"/> | <input type="checkbox"/> |
| 4 | Regulator: Manufacture Date _____ Model _____ (To be replaced in accordance with manufacturer's guidance) | <input type="checkbox"/> | <input type="checkbox"/> |
| 5 | Hose-clip connections | <input type="checkbox"/> | <input type="checkbox"/> |
| 6 | Heat shield between burner & gas control valves | <input type="checkbox"/> | <input type="checkbox"/> |
| 7 | Flame inspection opening | <input type="checkbox"/> | <input type="checkbox"/> |
| 8 | User's instructions/label | <input type="checkbox"/> | <input type="checkbox"/> |
| 9 | Data plate | <input type="checkbox"/> | <input type="checkbox"/> |
| 10 | Fire extinguisher(s) readily available in seating area | <input type="checkbox"/> | <input type="checkbox"/> |
| | Dimensional Check | | |
| 11 | Flue free exhaust area (5 000mm ² minimum) | <input type="checkbox"/> | <input type="checkbox"/> |
| 12 | Burner jet orifice diameter (shall not exceed 0.9mm) | <input type="checkbox"/> | <input type="checkbox"/> |
| 13 | User's control tap operation | <input type="checkbox"/> | <input type="checkbox"/> |
| 14 | Ignition performance and condition | <input type="checkbox"/> | <input type="checkbox"/> |
| 15 | Flame stability | <input type="checkbox"/> | <input type="checkbox"/> |
| 16 | Pilot performance and condition | <input type="checkbox"/> | <input type="checkbox"/> |
| 17 | Flame Failure Device (FFD) performance and condition | <input type="checkbox"/> | <input type="checkbox"/> |
| 18 | Soundness test on gas installation | <input type="checkbox"/> | <input type="checkbox"/> |
| 19 | Leakage test for water tray | <input type="checkbox"/> | <input type="checkbox"/> |
| Note : Only dim sum trolleys which comply with COP GU06 should be used. | | | |
| Action required (if any) | | | |
| Customer's signature: _____ | | Registered Gas Installer's signature: _____ | |
| Registration Number: _____ | | | |
| I understand the content of the above recommendations and certify that the safety check has been completed. | | Date of safety check: _____ | |

Appendix 11

LPG Cylinder Draw-off Rates

The possible vaporisation/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 will need 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:

| Cylinder Size | Full Cylinder Peak Rate | 50% full Cylinder Rate | 50% 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.)

Design Ratings of Typical Appliances

| Low Pressure Appliance | Nominal Design (full-load) LPG Consumption Rate |
|--|---|
| Hotplates (per ring) | 0.3 kg/hr |
| Cooking Range/Ring Burner (per burner) | 0.35-0.95 kg/hr |
| Stockpot Unit (per burner) | 1.8-2.9 *kg/hr |
| Food Steamer (per burner) | 2.1-3.3 *kg/hr |
| Wok Range (per burner) | 2.9-4.4 *kg/hr |
| Meat Roaster | 4-5 kg/hr* |

* Combinations of these highly-rated appliances should normally be supplied by an NGI or piped gas supply capable of sustaining the gas consumption.

(Note: Actual consumption rate will depend on manufacturer's design. Diversity factors and part-loading may be considered when calculating the required gas consumption.)

Appendix 12

Volumes of Installation Pipework

SI Units

Pipe Volume (cubic metres)

| Length (m) \ Diameter (mm) | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 200 | 300 | 400 | 500 | 1000 |
|----------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 50 | 0.01 | 0.02 | 0.04 | 0.07 | 0.09 | 0.11 | 0.13 | 0.15 | 0.18 | 0.20 | 0.22 | 0.44 | 0.66 | 0.88 | 1.10 | 2.20 |
| 80 | 0.03 | 0.05 | 0.10 | 0.15 | 0.20 | 0.25 | 0.30 | 0.35 | 0.40 | 0.45 | 0.50 | 1.00 | 1.50 | 2.00 | 2.50 | — |
| 100 | 0.04 | 0.09 | 0.17 | 0.26 | 0.35 | 0.43 | 0.52 | 0.60 | 0.69 | 0.77 | 0.86 | 1.72 | 2.58 | — | — | — |

Imperial Units

Pipe Volume (cubic feet)

| Length (ft) \ Diameter (in) | 10 | 50 | 100 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 2000 | 3000 | 4000 |
|-----------------------------|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|------|------|
| 2 | 0.2 | 1.2 | 2.4 | 4.8 | 7.2 | 9.6 | 12.0 | 14.4 | 16.8 | 19.2 | 21.6 | 24.0 | 48.0 | 72.0 | 96.0 |
| 3 | 0.6 | 2.8 | 5.5 | 11.0 | 16.5 | 22.0 | 27.5 | 33.0 | 38.5 | 44.0 | 49.5 | 55.0 | — | — | — |
| 4 | 0.9 | 4.7 | 9.3 | 18.6 | 27.9 | 37.2 | 46.5 | 55.8 | 65.1 | 74.4 | 83.7 | 93.0 | — | — | — |