

Code of Practice GU 21
Requirements for
Town Gas Installations
for Catering Purposes
in Restaurants
and
Food Preparation
Establishments

機電工程署
EMSD



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

Contents

- 1. Foreword and Scope..... 1
- 2. Interpretation 3
- 3. General Relevant Provisions..... 6
- 4. Gas Pipework 6
 - 4.1 Gas Pipes 6
 - 4.2 Gas Meters 8
 - 4.3 Emergency Controls 9
 - 4.4 Fire Safety Valves..... 9
- 5. Final Connection to Gas Appliances..... 9
- 6. Gas Appliances..... 10
 - 6.1 General..... 10
 - 6.2 Water Heating Appliances 12
 - 6.3 Cooking/Food Warming Appliances Installed within Seating Areas 13
 - 6.4 Cooking/Food Warming Appliances Installed at Serving Counters in Restaurants/Shopping Centres 14
- 7. Ventilation..... 14
- 8. Safety Controls..... 15
- 9. Testing and Commissioning of New Gas Installation Work 16
 - 9.1 General..... 16
 - 9.2 Gas Installation Pipework and Flow Controls 17
 - 9.3 Gas Appliances..... 19
- 10. Use and Maintenance of Gas Appliances/Fittings in Use 21
- 11. Obligation of Registered Gas Supply Companies 22
- 12. Obligation of Registered Gas Contractors/Installers 23
- 13. Obligation of Operators/Responsible Persons of Restaurants/Food Preparation Establishments and Responsible Persons of Gas Appliances/Fittings 24

Appendices

- Appendix 1.1 - Example 1: Location of fire safety valve inside premises
- Appendix 1.2 - Example 2: Location of fire safety valve external to premises. Single gas supply to restaurant (G/F level or above)
- Appendix 1.3 - Example 3: Location of fire safety valve external to premises. Single gas supply to restaurant on G/F or podium level
- Appendix 1.4 - Example 4: Location of fire safety valve close to kitchen exit/entrance
- Appendix 2- Inspection checklist for testing and commissioning of new commercial and industrial gas installations
- Appendix 3- Inspection checklist for maintenance of commercial and industrial gas installations
- Appendix 4- Volumes of installation pipework

1. Foreword and Scope

- 1.1 This code serves to set out the minimum standards of safe working practices for operators/responsible persons of restaurants/food preparation establishments, responsible persons of gas appliances/fittings, registered gas contractors and registered gas installers to follow. The practices include those for design, installation, testing, commissioning, operation and maintenance of town gas appliances/fittings for catering purposes in restaurants and food preparation establishments.
- 1.2 The practices set out in this code should not be regarded as exhaustive. The code is not intended to relieve persons of their statutory responsibilities in accordance with relevant current safety legislation and statutory requirements.
- 1.3 The gas installation work carried out in Hong Kong shall comply with all relevant current statutory provisions under the Laws of the Hong Kong Special Administrative Region, with particular reference to the Gas Safety Ordinance, Cap. 51 and its subsidiary regulations, and other related statutory provisions depicted in paragraph 1.4.
- 1.4 This code must be read in conjunction with the manufacturer's instructions unless the latter conflict with statutory provisions. Reference shall also be made to the current edition of the undernoted ordinances, regulations, codes of practice, etc.:-
- (a) The Buildings Ordinance, Cap. 123;
 - (b) The Public Health and Municipal Services Ordinance, Cap. 132;
 - (c) The Electricity Ordinance, Cap. 406;
 - (d) The Electricity (Wiring) Regulations (Cap. 406 sub-legislation);
 - (e) The Waterworks Regulations, Cap. 102A;
 - (f) Code of Practice for the Electricity (Wiring) Regulations;
 - (g) Code of Practice (GU01) – Approval of Flexible Gas Tubing for Low Pressure Applications;
 - (h) Code of Practice (GU03) – Installation Requirements for Domestic Gas Water Heaters (Rated Heat Input Up to 70 kW);
 - (i) Code of Practice (GU06) – LPG Installations for Catering Purposes in Commercial Premises;
 - (j) Code of Practice (GU12) – Installation of Mechanical Exhaust System for

- Gas Appliances (Rated Heat Input Up to 70kW);
- (k) Guidance Note GU14 – Enclosed Type of Gas-Fired Meat Roaster;
 - (l) Code of Practice (GU15) – Flexible Gas Tubing for Commercial Applications (Not Including Flexible Gas Tubing for Low Pressure Applications);
 - (m) Code of Practice on Control of Air Impurities (Chemical Substances) in the Workplace issued by the Labour Department;
 - (n) Guidance Notes on Ventilation and Maintenance of Ventilation Systems issued by the Labour Department;
 - (o) British Standard BS21 – Specification for pipe threads for tubes and fittings where pressure-tight joints are made on the threads;
 - (p) BS EN 10226-1:2004 - Pipe threads where pressure tight joints are made on the threads. Taper external threads and parallel internal threads. Dimensions, tolerances and designation;
 - (q) British Standard BS476 Part 3 – Fire tests on building materials and structures. Classification and method of test for external fire exposure to roofs;
 - (r) British Standard BS476 Part 4 – Fire tests on building materials and structures. Non-combustibility test for materials;
 - (s) British Standard BS476-12:1991 – Fire tests, Ignitability, Construction materials, Reports, Test equipment;
 - (t) British Standard BS476 Part 6 – Fire tests on building materials and structures. Methods of test for fire propagation for products;
 - (u) British Standard BS476 Part 7 – Fire tests on building materials and structures. Method of test to determine the classification of the surface spread of flame of products;
 - (v) British Standard BS4800 – Schedule of paint colours for building purposes;
 - (w) British Standard BS5440 Part 2 – Flueing and ventilation for gas appliances of rated input not exceeding 70 kW net (1st, 2nd and 3rd family gases). Specification for the installation and maintenance of ventilation provision for gas appliances;
 - (x) British Standard BS6644 – Specification for Installation of gas-fired hot water boilers of rated inputs between 70kW (net) and 1.8MW (net) (2nd and 3rd family gases);
 - (y) BS EN 1057:2006+A1:2010 – Copper and copper alloys, Seamless, round copper tubes for water and gas in sanitary and heating applications;

- (z) BS EN 10226 – Pipe threads where pressure tight joints are made on the threads;
- (aa) BS EN 10255 – Non-Alloy steel tubes suitable for welding and threading; and
- (bb) British Standard BS6173:2009 – Specification for installation and maintenance of gas-fired catering appliances for use in all types of catering establishments (2nd and 3rd family gases).

2. Interpretation

The following gives interpretations of some terms that frequently appear in this Code. The interpretations are intended for quick reference. If they are extracted from the Gas Safety Ordinance, Cap. 51, the interpretations in the Ordinance prevail.

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|-------------------------------------|---|
| 2.1 Flexible gas tubing (氣體接駁軟喉) | Tubing which is <ul style="list-style-type: none"> (a) not rigid; and (b) used for connecting gas fitting directly to a supply of gas. |
| 2.2 Gas appliance (氣體用具) | 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. |
| 2.3 Gas fitting (氣體配件) | A gas pipe, gas meter, gas appliance, gas valve or pressure-regulator which is supplied, or to be supplied, gas through a service pipe, and includes a service riser. |
| 2.4 Gas main (供氣主喉) | A pipe, other than a service pipe or installation pipe, used or to be used, to supply gas. |
| 2.5 Gas meter (氣體錶) | A primary meter or secondary meter. |
| 2.6 Gas pipe (氣體喉管) | <ul style="list-style-type: none"> (a) an installation pipe; (b) a service pipe; or (c) a gas main. |

| | |
|--|--|
| <p>2.7 Gas installation work (氣體裝置工程)</p> | <p>It includes the fabrication, connection, disconnection, testing, commissioning, decommissioning, maintenance, repair, or replacement of gas fitting, but does not include:-</p> <p>(a) the disconnection of a cylinder, or the connection of a cylinder in place of another cylinder, where such disconnection or connection is made at the pressure-regulator or adaptor directly connected to the cylinder concerned; or</p> <p>(b) the disconnection or connection of a Bunsen burner.</p> |
| <p>2.8 Installation pipe (用戶喉)</p> | <p>A pipe used, or to be used, to supply gas to a particular consumer, and includes any gas fitting used in connection with the pipe except:-</p> <p>(a) a service pipe, other than a service pipe comprised in a primary meter installation; or</p> <p>(b) a pipe comprised in a gas appliance.</p> |
| <p>2.9 Interlock (聯鎖)</p> | <p>A purpose-provided safety means to prevent the supply of gas to appliances if the mechanical exhaust system is not operating at a pre-determined level.</p> |
| <p>2.10 Mechanical exhaust system (MES) (機動排氣系統)</p> | <p>A system to remove flue, vent gases or fumes produced from gas appliance mechanically. The system shall consist of induced draft (suction) fan being operated under negative static pressure within purpose-built ducting, or mechanical ventilation system, if any.</p> |
| <p>2.11 Primary meter (主錶)</p> | <p>A meter which is connected to a service pipe for ascertaining the quantity of gas supplied through such pipe, but does not include a secondary meter.</p> |
| <p>2.12 Protected lobby (防護門廊)</p> | <p>The intercepted approach, to a staircase or an exit route, which acts as a fire and smoke check between a storey and the staircase or the exit route, and</p> |

enclosed throughout by walls and doors in accordance with the Code of Practice for Fire Resisting Construction.

2.13 Registered gas contractor
(註冊氣體工程承辦商)

A person or a company who as a business carries out gas installation work and is registered under the Gas Safety Ordinance, Cap. 51.

2.14 Registered gas installer
(註冊氣體裝置技工)

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.

2.15 Service pipe
(供氣分喉)

A pipe used, or to be used, to supply gas from a gas main to not more than one building, and includes:-
(i) any gas meter control valve; and
(ii) any service valve
to which the pipe is connected.

2.16 Service riser
(上給供氣分喉)

The vertical sections of a service pipe used, or capable of being used, to supply gas to more than one floor of a building, and includes any horizontal sections of the service pipe between such vertical sections.

2.17 Movable appliance
(可移動的用具)

An appliance fitted with purpose-provided means of mobility, e.g. wheels or castors, for cleaning and servicing.

2.18 Restraining device
(抑制裝置)

Device that prohibits movement of the appliance beyond the maximum allowable distance as related to the length of the flexible gas tubing.

3. General Relevant Provisions

- 3.1 No person shall personally carry out gas installation work unless he/she is a registered gas installer registered to the appropriate class and employed by a registered gas contractor under the Gas Safety (Registration of Gas Installers and Gas Contractors) Regulations, Cap. 51D.
- 3.2 No person other than a registered gas contractor shall carry on the business of a gas contractor under the Gas Safety (Registration of Gas Installers and Gas Contractors) Regulations, Cap. 51D.
- 3.3 No person shall employ a person other than a registered gas contractor to carry out any gas installation work under the Gas Safety (Registration of Gas Installers and Gas Contractors) Regulations, Cap. 51D.
- 3.4 The design and construction of gas appliances/fittings shall not affect adversely the safety of persons or structures in the event of failure of their control system.
- 3.5 Any areas adjacent to any gas appliance shall be kept free of combustible materials and of any obstructions which might interfere with safe maintenance and operation of the gas appliances.

4. Gas Pipework

4.1 Gas Pipes

- 4.1.1 Gas pipes shall be designed and installed in accordance with relevant national and/or international standards or specifications and the manufacturer's instructions. Such pipes shall be of a type and make suitable for their intended use. The route of the pipework should be as short as practicable but the use of diagonal routes should always be avoided. The number of joints should be kept to a minimum.
- 4.1.2 Gas pipes and fittings installed for catering purposes shall be compatible and properly protected against corrosion as well as mechanical damage so as to avoid undue risk of accidental damage.
- 4.1.3 Gas pipes or any gas appliances fitted on gas pipes shall be fitted with

convenient pressure test points and purge points at relevant locations along the pipeline so as to facilitate pressure testing and de-commissioning during operation.

- 4.1.4 Gas pipes must not be installed in an unventilated duct, void and any places without adequate ventilation to ensure that any gas leakage shall not cause any accumulation of flammable gas.
- 4.1.5 Gas pipes installed within premises shall be readily identified by attaching to the pipe a yellow tape/stripe/label indicating "Town Gas" or painting with an appropriate colour to BS 4800 where practicable.
- 4.1.6 Gas pipes within premises shall be kept to a minimum and separated from any other service such as electric conduit or cable by at least 25mm.
- 4.1.7 Gas pipes shall be of appropriate materials and construction conforming to relevant national and/or international standards. When selecting materials that are to be welded, soldered, brazed or screwed, it shall be ensured that joining pipes and fittings are compatible for the joint and for the joining process.
- 4.1.8 Gas pipes excluding installation pipes shall be installed in a safe and workmanlike manner in accordance with Regulations 17, 18 and 19 of the Gas Safety (Gas Supply) Regulations, Cap. 51B.
- 4.1.9 Installation pipes shall be installed in a safe and workmanlike manner in accordance with Regulations 16, 17, 18 and 19 of the Gas Safety (Installation and Use) Regulations, Cap. 51C.
- 4.1.10 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, Cap. 51B.
- 4.1.11 Gas supply pipework inside premises shall operate at pressures not exceeding low pressure 7.5 kPa (760 mm water gauge)^{Note 1}, while installation pipes downstream of gas meters should normally operate at pressure not greater than 2 kPa (200 mm water gauge)^{Note 2} wherever possible. A convenient pressure test point should be installed.

Notes :

1) 7.5 kPa = 760 mm (30 inches) water gauge

2) 2 kPa = 200 mm (8 inches) water gauge

4.1.12 Installation pipes shall be protected against over-pressurisation in accordance with Regulation 12(1)(b) of the Gas Safety (Installation and Use) Regulations, Cap. 51C.

4.1.13 In the event of high gas consumption, pipework shall be installed in accordance with Regulation 22 of the Gas Safety (Installation and Use) Regulations, Cap. 51C.

4.2 Gas Meters

4.2.1 Gas meters shall not be installed in any common area of any premises which has more than one occupier where that area is designated as the only means of escape from premises in case of fire or in protected lobby. 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, Cap. 51C.

4.2.2 Primary gas meters shall be installed as close as practical to the point of service entry into the premises and be suitably labeled in accordance with Regulation 13 of the Gas Safety (Installation and Use) Regulations, Cap. 51C.

4.2.3 A notice in permanent form, in English and Chinese, shall be prominently displayed on or near a gas meter which is installed in the premises at a distance of more than 2 metres from, or out of sight of, the nearest upstream emergency control in the premises indicating the position of such emergency control.

4.2.4 The number and location of secondary meters installed downstream of the primary meters (if any) shall be indicated by prominently displaying a notice in permanent form in English and Chinese on or near the primary meter.

4.3 Emergency Controls

An emergency control shall be installed as near, so far as practicable, to the point of gas service entry into the premises in an accessible location. The construction, location and labeling of the emergency control shall be in accordance with Regulation 8 of the Gas Safety (Installation and Use) Regulations, Cap. 51C.

4.4 Fire Safety Valves

4.4.1 A gas isolation valve shall be located external to the kitchen area for use by Fire Services Officers in an emergency. The valve shall be located in an accessible position and be labeled (see Appendix 1.1); or

4.4.2 Where a service riser supplies gas to a single kitchen within a building (see Appendix 1.2), the above valve location requirement can be met by locating the "fire safety" valve external to the building on an outside wall, providing it is accessible to the Fire Services (i.e. at ground or podium level for example). An external valve should be suitably protected against unauthorized interference and labeled. This valve may be additional to that required by emergency control, or a single valve may fulfill the requirements for emergency control and fire safety valve, where it is possible to do so (see Appendix 1.3); or

4.4.3 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 (see Appendix 1.4). A permanent notice, advising Fire Services Officers of the valve location, shall be placed outside the kitchen entrance in a conspicuous position.

4.4.4 The size of letters and characters used in labels or notices in respect of fire safety valves shall be legible.

5. Final Connection to Gas Appliances

5.1 The final connection of appliances may be rigid or flexible, depending upon appliance type and size. The number of joints should be kept to a minimum.

5.2 All gas pipes/tubing and their fittings for connecting to a gas appliance shall be designed and installed in accordance with relevant national and/or

international standards or specifications and the manufacturer's instructions.

- 5.3 Rigid pipes shall not be used for connecting movable appliances to the gas supply or installations subject to vibration.
- 5.4 Where flexible gas tubing is used, it should be:
- (a) of a minimum length practicable;
 - (b) protected against any accidental damage as far as practicable;
 - (c) located in an accessible position for easy inspection and replacement as necessary;
 - (d) secured;
 - (e) avoided from exposing to excessive heat;
 - (f) prevented from bending or stretching damage; and
 - (g) suitable for an operating pressure of not greater than 7.5 kPa (760mm (30 inches) water gauge) over the full ambient and operating temperature ranges of the application.
- 5.5 Each appliance shall be fitted with an isolation valve for servicing or cleaning purposes.
- 5.6 Each gas circuit system of an appliance should only be connected to one gas supply.
- 5.7 Where an appliance is disconnected, the open ends of all pipework shall be plugged or capped when they are left unattended.

6. Gas Appliances

6.1 General

- 6.1.1 Apart from complying with relevant national and/or international standards or specifications and the manufacturer's instructions, gas appliances shall be designed and installed in accordance with Part V (Gas Appliances) of the Gas Safety (Installation and Use) Regulations, Cap. 51C. The installation, testing and commissioning of gas fittings/appliances in commercial kitchens and restaurant premises shall only be undertaken by a registered gas installer who is employed by a registered gas contractor and has obtained Class 6 or 7 registration under the Gas Safety Ordinance (Registration of Gas Installers and Gas Contractors) Regulations, Cap.

51D.

- 6.1.2 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 the provisions of the Electricity Ordinance. Reference shall be made to the Code of Practice for the Electricity (Wiring) Regulations issued by the Hong Kong SAR Government.
- 6.1.3 Gas appliances shall be installed so as to facilitate operation, servicing and maintenance in accordance with Regulation 25 of the Gas Safety (Installation and Use) Regulations, Cap. 51C and shall not be located at places that cause a fire hazard nor impede means of escape from a building.
- 6.1.4 Gas appliances should not be installed in contact with any combustible wall or floor surfaces and a minimum separation distance of 150mm (6 inches) should 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.
- 6.1.5 Gas appliances shall be located at a safe and secured location where it cannot be easily damaged incidentally. The base shall be capable of withstanding the weight of a fully laden appliance.
- 6.1.6 The use of movable appliances may increase the chances of breaking the gas connection accidentally or splashing of hot liquids during movement. As such, when a movable appliance is fitted, it should be:
- (a) fitted with a flexible gas tubing coupling with a self-sealing socket or equivalent device;
 - (b) fitted with restraining device fixed to the building structure and the appliance frame;
 - (c) fitted with a locking device to hold the appliance stationary;
 - (d) affixed with a notice reminding the operator on how to disconnect and connect the restrain, gas connection and any electrical protective bonding safely.

6.2 Water Heating Appliances

- 6.2.1 No flueless gas water heaters or open-flued (natural draught) gas water heaters shall be installed.
- 6.2.2 Gas water heaters shall be installed in accordance with the manufacturers' instructions and should preferably be flued independently to open air. Models rated less than 70kW (input) should be installed in accordance with the Code of Practice (GU12) – Installation of Mechanical Exhaust System for Gas Appliances (Rated heat input up to 70kW) issued by the Gas Standards Office.
- 6.2.3 Where independent flueing is not possible, the water heater flue may terminate inside the exhaust air duct of a commercial kitchen mechanical ventilation system which discharges to open air provided there is an interlock system to ensure disabling of the gas water heater in the event of exhaust air fan failure or exhaust air duct blockage, in accordance with Regulation 24(4) of the Gas Safety (Installation and Use) Regulations, Cap. 51C.
- 6.2.4 In accordance with FSD Circular Letter No. 4/96 Part XI, any gas water heater flue extended into exhaust air plenum of a ventilation system shall be made of non-combustible material.
- 6.2.5 Natural or mechanical ventilation for supplying air to a water heater shall be in accordance with the manufacturer's instructions to a relevant national and/or international standard, such as British Standard BS 6644:-
- (a) Natural Ventilation
- (i) Vent at low level: minimum $4\text{cm}^2/\text{kW}$ of total rated net heat input
 - (ii) Vent at high level: minimum $2\text{cm}^2/\text{kW}$ of total rated net heat input
- (b) Mechanical Ventilation
- The system shall provide at least $2.8\text{m}^3/\text{h}$ for each kW of total rated net heat input of open-flued (fanned draught) appliances.

6.3 Cooking/Food Warming Appliances Installed within Seating Areas

- 6.3.1 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. An ON/OFF indication and the undernoted instructions in Chinese and English shall be prominently displayed and the size of letters and characters shall be legible:
- “BEFORE TURNING ON GAS SUPPLY, ALWAYS CHECK THAT ALL GAS APPLIANCE TAPS ARE CLOSED”;
 - “SHUT OFF THE GAS SUPPLY AFTER USE”.
- 6.3.2 All gas pipes inside the seating area, except the final connection to each appliance, shall be rigid steel with screwed joints. 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, Cap. 51C.
- 6.3.3 All flexible gas tubing shall be of an approved type and should not be expired.
- 6.3.4 The pressure of gas supply to the tables inside the seating area must not exceed 2 kPa (200mm (8 inches) water gauge).
- 6.3.5 Gas appliances shall be installed in a manner so as to facilitate ease of servicing and shall:
- (a) incorporate an automatic means of ignition e.g. piezo spark; and
 - (b) incorporate a pilot protected by a flame failure device.
- 6.3.6 Additional ventilation must be provided within the seating area to ensure adequate supply of fresh air for combustion and safe removal of combustion products in accordance with Regulation 23(1) of the Gas Safety (Installation and Use) Regulations, Cap. 51C. A reliable means shall be provided to ensure the mechanical exhaust system installed for this purpose is always in operation when gas appliances are being used as stipulated in paragraph 7.3.

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

- 6.4.1 All gas pipes at the serving counter, except the final connection to a movable appliance, shall be of rigid steel with screwed joints. 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, Cap. 51C.
- 6.4.2 All flexible gas tubing shall be of an approved type and should not be expired.
- 6.4.3 The gas supply pressure to the serving counter area must not exceed low pressure of 2 kPa (8 inches (200 mm) water gauge).
- 6.4.4 Gas appliances shall be installed in a manner so as to facilitate ease of servicing and shall:-
- a) incorporate an automatic means of ignition e.g. piezo spark; and
 - b) incorporate a flame failure device.
- 6.4.5 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 in accordance with Regulation 23(1) of the Gas Safety (Installation and Use) Regulations, Cap. 51C. A reliable means shall be provided to ensure the mechanical exhaust system installed for this purpose is always in operation when gas appliances are being used as stipulated in paragraph 7.3.

7. Ventilation

- 7.1 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, Cap. 51C.
- 7.2 Whenever a mechanical exhaust system is installed, a permanent notice to remind the user to turn on such system before any gas appliance is in use shall be displayed in a conspicuous position. The size of letters and characters used in the notices shall be legible.

- 7.3 Following the date on which this code of practice takes effect, a reliable means such as an electrical interlock or air pressure switch system or equivalent shall be provided when installing a new mechanical exhaust system to ensure that the mechanical exhaust system is always in operation when gas appliances are in use in accordance with Regulation 24(4) of the Gas Safety (Installation and Use) Regulations, Cap. 51C. It is recommended that such means should also be provided to gas appliance(s) under a mechanical exhaust system.
- 7.4 Ventilation shall be provided in accordance with the appliance manufacturer's instructions to relevant national and/or international standards. 1m³ of town gas will require at least 4m³ of air for complete combustion and will produce approximately 4.75m³ of products of combustion for removal to open air by kitchen extract systems.
- 7.5 In addition to paragraph 7.4 above, adequate ventilation should be provided to allow healthy and comfortable working conditions for occupants in kitchen areas etc. and the proper removal of cooking odours, grease and steam.
- 7.6 An exhaust air vent/duct shall terminate in a well ventilated and safe location in order to avoid any re-circulation of exhaust air.

8. Safety Controls

- 8.1 All gas and flow controls employed shall be designed and constructed to relevant national and/or international safety standards.
- 8.2 For those gas appliances which have enclosed combustion chambers, or of a type which prevents burner flame(s) from being easily observed by the user, a flame failure device shall be incorporated and mounted adjacent to the burners securely and conveniently. A flame failure device shall be manufactured to relevant national and/or international standards.
- 8.3 The gas supply to gas 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.

- 8.4 It is recommended that open burners of an appliance should be fitted with a flame failure device.
- 8.5 An interlock installed after the implementation of this code shall not be fitted with an override function.

9. Testing and Commissioning of New Gas Installation Work

9.1 General

- 9.1.1 The testing and commissioning of gas installation work in restaurants and food preparation establishments shall only be undertaken by registered gas installers with Class 6 or 7 qualification under the Gas Safety (Registration of Gas Installers and Gas Contractors) Regulations, Cap. 51D and in accordance with the manufacturer's instructions, the relevant Ordinance and Codes of Practice, etc.
- 9.1.2 All user instructions shall be left with the operators/responsible persons of restaurants/food preparation establishments in accordance with Regulation 26 of Gas Safety (Installation and Use) Regulations, Cap. 51C and, as far as is practicable, the operators/responsible persons of restaurants/food preparation establishments or users of gas appliances/fittings should be instructed of the correct and safe operation of the appliance.
- 9.1.3 Before commencing any test, all testing equipment/instruments shall be checked for functional soundness and validity.
- 9.1.4 The operators/responsible persons of restaurants/food preparation establishments shall be advised of the need for regular maintenance of his gas installations by a registered gas installer employed by a registered gas contractor.
- 9.1.5 Given that the testing and commissioning of gas appliances/fittings is part of the gas installation work, the registered gas contractor shall maintain all records including the Inspection Checklist for Testing and Commissioning of New Commercial and Industrial Gas Installations in accordance with Regulation 23 of Gas Safety (Registration of Gas Installers and Gas Contractors) Regulations, Cap. 51D. One copy of

records should be given to the operators/responsible persons of restaurants/food preparation establishments for their retention. A sample of the relevant checklist is shown in Appendix 2 for reference.

9.2 Gas Installation Pipework and Flow Controls

9.2.1 Gas pipes excluding installation pipes shall be tested and purged in accordance with Regulations 20 and 23 of the Gas Safety (Gas Supply) Regulations, Cap. 51B.

9.2.2 Installation pipes shall be tested and purged in accordance with Regulation 20 of the Gas Safety (Installation and Use) Regulations, Cap. 51C.

9.2.3 Soundness testing and purging for gas pipes shall be carried out generally in accordance with relevant national and/or international standards.

9.2.4 During soundness testing the undernoted shall be observed:-

9.2.4.1 All newly installed installation pipes including appliance connections shall be isolated and tested for leakage at 3 kPa or 1.5 times maximum operating pressure, whichever is the greater.

9.2.4.2 No pressure drop shall be observed during the soundness test, after a period has been allowed for temperature stabilization (in the case of larger installations, 5-15 minutes).

9.2.4.3 Test duration and results shall be recorded on a job document. The document should be incorporated in the records mentioned in paragraph 9.1.5.

9.2.4.4 Where sections isolated for soundness testing are reconnected to an existing gas supply, such joints shall be properly tested for leakage by gas leak detection fluid. Additionally any exposed pipework joints which are located in corridors or elsewhere, etc. shall be rechecked with gas leak detection fluid or a gas detection instrument.

9.2.4.5 If leakage is detected at any stage as set out under paragraphs 9.2.4.1 to 9.2.4.4 above, defects must be repaired and tested repeatedly until the installation is sound.

9.2.5 Before commencing purging procedures the undernoted shall be observed:-

9.2.5.1 Inert Purging of New Piped Installations

Inert gas purging, using nitrogen or carbon dioxide, shall be carried out for new installations where the total installation volume exceeds 0.59m³ (see Appendix 4 for guidance) or for any pipework where a direct purge is considered potentially hazardous. Direct purging (i.e using town gas) is not permitted for the above installations.

9.2.5.2 Direct Purging of New Piped Installations

(a) When purging small volumes of pipework and appliance control trains, purging may be carried out directly into a well ventilated internal area without the use of a purge hose, vent stack or flame arrestor, but only if all the following criteria are satisfied:

- the pressure of the gas supply shall not exceed 2 kPa,
- the total volume of the pipework to be purged shall not exceed 0.02m³ and shall not include a diaphragm meter,
- the volume of the internal area shall not be less than 30m³,
- the internal area shall be well ventilated, for example with windows and doors open and any mechanical ventilation in operation,
- the purge point(s) shall be located in a well ventilated section of the internal area,
- there shall be no potential ignition sources within 3m of any purge point,
- the valve used to control the purge shall be in the same internal area as the purge point(s), and
- the gas concentration in the area shall be monitored and, as far as is possible, it shall not be permitted to exceed

10% LFL. If it does, the purge shall be stopped immediately and the system shall be purged to outside.

- (b) If the criteria in subparagraph (a) are not satisfied and for installations where the total volume of pipework to be purged does not exceed 0.05m^3 , purging may also be carried out directly into a well-ventilated internal area but a purge hose should be used. The gas concentration in the area shall be monitored and, as far as is possible, it shall not be permitted to exceed 10% LFL. If it does, the purge shall be stopped immediately and rearranged to purge outside.
- (c) For installations where the total volume of pipework to be purged exceeds 0.05m^3 , the gas from the purge shall be vented into open air. A flame arrestor shall be fitted at the outlet of the purge hose. The vent gas shall not be ignited and shall be tested by an intrinsically safe combustible gas indicator for town gas.

9.3 Gas Appliances

9.3.1 Gas appliances shall be tested and commissioned in accordance with Regulation 30 of the Gas Safety (Installation and Use) Regulations, Cap. 51C. If town gas supply is not available at the time of appliance installation, means shall be provided to ensure compliance with Regulation 30(3) of the Gas Safety (Installation and Use) Regulations, Cap. 51C.

9.3.2 Testing and commissioning of appliances shall be carried out as directed by the appliance manufacturer and include but not be limited to the following items:-

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

- (f) Carbon monoxide/carbon dioxide (CO/CO₂) combustion ratio;
- (g) Carbon monoxide (CO) concentration; and
- (h) Correct operation of any electrical interlock or pressure switch system or equivalent between mechanical exhaust system and gas fittings.

9.3.3. Test results shall be recorded on a job document. The document should be incorporated in the records mentioned in paragraph 9.1.5.

9.3.4 Users' instructions and maintenance requirements provided by the appliance manufacturer shall be left with the responsible person for the premises in which such appliance is installed in accordance with Regulation 26 of the Gas Safety (Installation and Use) Regulations, Cap. 51C.

9.3.5 All performance tests/adjustments should only be conducted when the relevant gas appliances have reached their normal operating condition including combustion rate. In no circumstances that the CO/CO₂ combustion ratio of a gas appliance should exceed the following limits:

| CO/CO ₂ combustion ratio | Appliance installed before | Appliance installed after |
|--|--|---------------------------|
| | The date on which this code of practice takes effect | |
| Flueless gas appliances or gas appliances with flue not connecting to a mechanical exhaust system directly | ≤0.02 | ≤0.01 |
| Gas appliances with flue connecting to a mechanical exhaust system directly | | ≤0.02 |

10. Use and Maintenance of Gas Appliances/Fittings in Use

- 10.1 The operators/responsible persons of restaurants/food preparation establishments or responsible persons of gas appliances/fittings should have an obligation to ensure that any gas appliances, gas pipework or flue installed in the kitchen under their control are used and thus maintained in a safe condition so as not to constitute a danger to any person or property.
- 10.2 Apart from the routine cleaning and maintenance, gas installations including gas catering appliances (fixed and portable), gas pipework including any flexible gas tubing, gas valves, interlock systems, flame failure device, etc. in a kitchen should be serviced or inspected at an interval of not more than 12 months or in accordance with schedules provided by the manufacturer.
- 10.3 Flexible gas tubing should be inspected on a regular basis against deterioration and replaced if any irregularities are found or it is approaching the expiry of its expected service life as specified by the manufacturer.
- 10.4 Maintenance work shall only be undertaken by registered gas installers registered to Class 7 under the Gas Safety (Registration of Gas Installers and Gas Contractors) Regulations, Cap. 51D and in accordance with schedules and instructions provided by the manufacturer. A sample of the inspection checklist for maintenance of commercial and industrial gas installations is attached as shown in Appendix 3 for reference.
- 10.5 Advice on maintenance should be sought from the manufacturer or supplier if in doubt.
- 10.6 Safe access shall be provided for inspection, checking and maintenance of gas appliances.
- 10.7 When assessing whether an existing gas appliance is functioning correctly, the registered gas installers should make reference to the manufacturer's instructions for the appliance and note any special requirements. Where the manufacturer's instructions for the appliance are not available, an assessment of the installations against the commissioning records or requirements of the current versions of installation standard should be carried out. All performance tests/adjustments should only be conducted when the relevant gas installations have reached their normal operating condition including

combustion rate. In no circumstances that the CO/CO₂ combustion ratio of a gas appliance should exceed the following limits:

| CO/CO ₂ combustion ratio | Appliance installed before | Appliance installed after |
|--|--|---------------------------|
| | The date on which this code of practice takes effect | |
| Flueless gas appliances or gas appliances with flue not connecting to a mechanical exhaust system directly | ≤0.02 | ≤0.01 |
| Gas appliances with flue connecting to a mechanical exhaust system directly | | ≤0.02 |

10.8 Carbon monoxide (CO) concentration is to be measured at breathing level of the worker in front of the gas appliance (say 1500 – 1700 mm from floor and 300mm away from the gas appliance). The sampling period should be at least 5 minutes and the average carbon monoxide concentration in the period should be measured. The measured concentration shall not exceed the exposure limit as listed in the Code of Practice on Control of Air Impurities (Chemical Substances) in the Workplace issued by the Labour Department. If the measured concentration exceeds half of the exposure limit, suitable actions should be taken to reduce the carbon monoxide level. In general, the measured carbon monoxide concentration should best be controlled to less than one-tenth of the exposure limit after commissioning or maintenance of the gas appliance.

10.9 Before commencing any test, all testing equipment/instruments shall be checked for functional soundness and validity.

11. Obligation of Registered Gas Supply Companies

11.1 A registered gas supply company shall not supply gas to gas appliances unless he has caused the testing and examination and adjustment as specified in Regulation 30 of the Gas Safety (Installation and Use) Regulations, Cap. 51C.

- 11.2 It shall be the duty of a registered gas supply company to take all steps to remove gas hazard if he knows or has reason to suspect the presence of unsafe gas appliances or any gas leakage from gas fittings in the premises in accordance with Regulation 32 of Gas Safety (Installation and Use) Regulations, Cap. 51C.
- 11.3 A registered gas supply company shall not supply gas to the restaurants/food preparation establishments if he knows or has reason to suspect the presence of unsafe means of ventilation to the room or internal space in accordance with Regulation 32 of the Gas Safety (Installation and Use) Regulations, Cap 51C.

12. Obligation of Registered Gas Contractors/Installers

- 12.1 A registered gas contractor shall install and test a gas appliance in a safe manner in accordance with Regulations 23, 24, 25, 26 and 30 of the Gas Safety (Installation and Use) Regulations, Cap. 51C.
- 12.2 It shall be the duty of a registered gas contractor/installer to take all reasonable steps to remove gas hazards if he knows or has reason to suspect the presence of unsafe gas appliances or any gas leakage from gas fittings in the premises in accordance with Regulation 32 of Gas Safety (Installation and Use) Regulations, Cap. 51C.
- 12.3 After a registered gas installer has serviced a gas appliance/installation, he should provide the responsible person for the premises in which such appliance/installation is installed with a report to explain what services have been carried out. The report should bear the name and registration number of the registered gas installer concerned.
- 12.4 Upon appointed by operators/responsible persons of restaurants/food preparation establishments in accordance with paragraph 13.9, a registered gas contractor should check if all appliances are interlocked with the new mechanical exhaust system that is fitted in accordance with paragraph 7.3.

13. Obligation of Operators/Responsible Persons of Restaurants/Food Preparation Establishments and Responsible Persons of Gas Appliances/Fittings

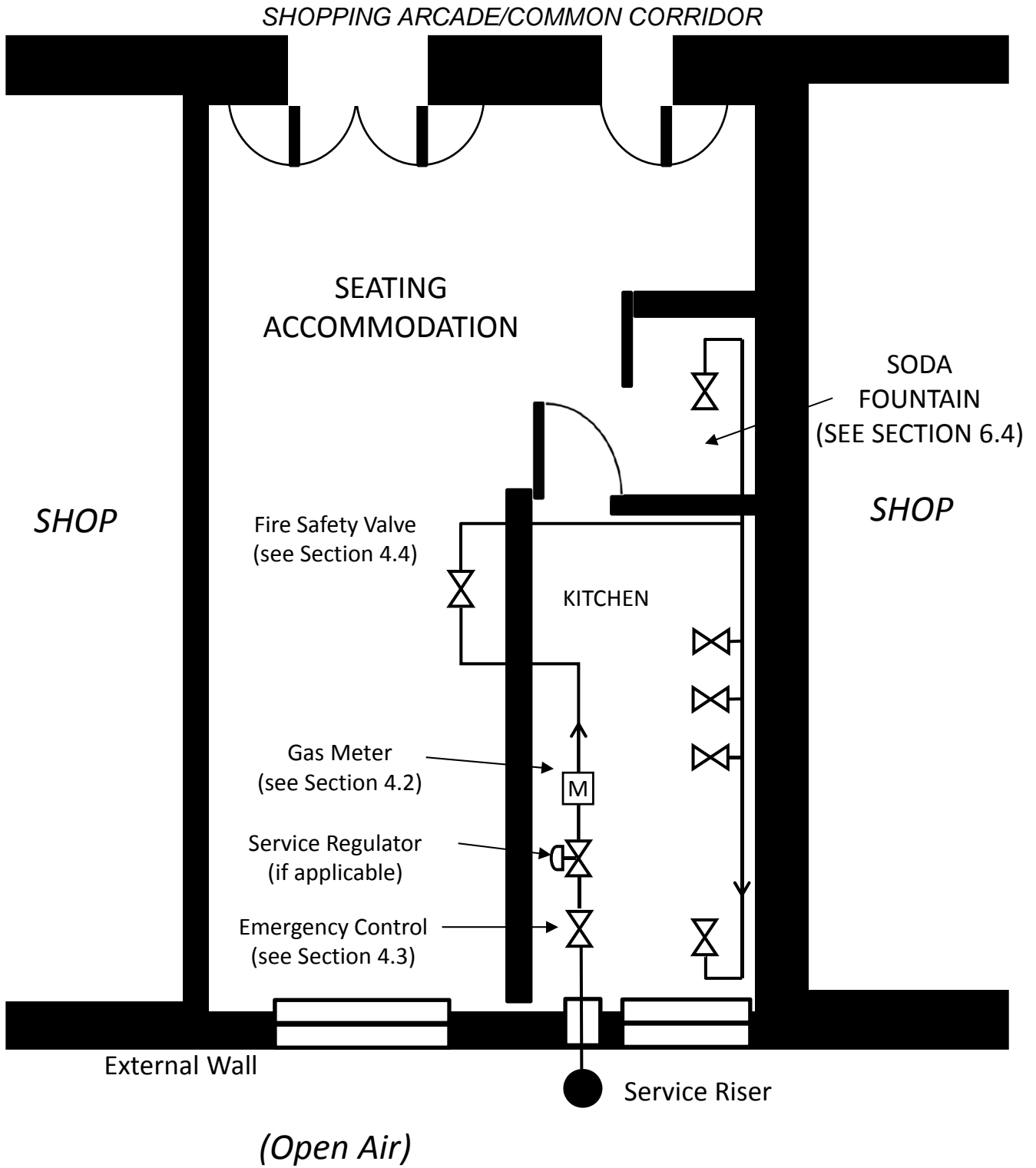
- 13.1 It shall be the duty of operators/responsible persons of restaurants/food preparation establishments and responsible persons of gas appliances/fittings to ensure that any gas appliances, installation pipes or flue installed in the kitchen under their control is used in a safe condition so as not to constitute a danger to any person or property in accordance with Regulation 31 of Gas Safety (Installation and Use) Regulations, Cap. 51C.
- 13.2 Operators/responsible persons of restaurants/food preparation establishments shall arrange for a registered gas installer of an appropriate class employed by a registered gas contractor to carry out any gas installation work.
- 13.3 Operators/responsible persons of restaurants/food preparation establishments should arrange for a registered gas contractor to carry out regular inspection of the gas installations in the premises as stipulated in paragraph 10.2.
- 13.4 Operators/responsible persons of restaurants/food preparation establishments should keep the manufacturer's instructions for the appliance and commissioning records (see sample in Appendix 2) for maintenance reference. They should also keep the maintenance records (see sample in Appendix 3) for a period of not less than two years.
- 13.5 In accordance with Regulation 34 of the Gas Safety (Installation and Use) Regulations, Cap. 51C, if operators/responsible persons of restaurants/food preparation establishments know or have reason to suspect that gas is escaping into the premises (e.g. restaurants, kitchen & etc.), he shall as far as reasonably practicable take all steps to cause the supply of gas to be shut off at such place so as to prevent further escape of gas. Where an escape of gas has been stopped by shutting off the supply of gas, he shall not reinstate such supply until all necessary steps have been taken to prevent gas from escaping again.
- 13.6 Operators/responsible persons of restaurants/food preparation establishments are recommended to arrange for training and instruction on the safe use of gas appliances/fittings to their staff prior to the use of gas installations.
- 13.7 The air impurities in a kitchen (workplace) shall be maintained below the

exposure limits of the chemicals as listed in the Code of Practice on Control of Air Impurities (Chemical Substances) in the Workplace issued by the Labour Department.

- 13.8 It is recommended that a carbon monoxide (CO) detection system or equivalent should be installed in a kitchen to alert occupants in the event carbon monoxide concentration exceeds the exposure limit as stipulated in Code of Practice on Control Air Impurities (Chemical Substances) in the Workplace. The CO detection system or equivalent should be properly maintained and calibrated. The installation of a gas detector should not be regarded as a substitute for good ventilation.
- 13.9 When a new mechanical exhaust system is installed, operators/responsible persons of restaurants/food preparation establishments should arrange for a registered gas contractor to check if all gas appliances are interlocked with the new mechanical exhaust system as stipulated in paragraph 7.3.

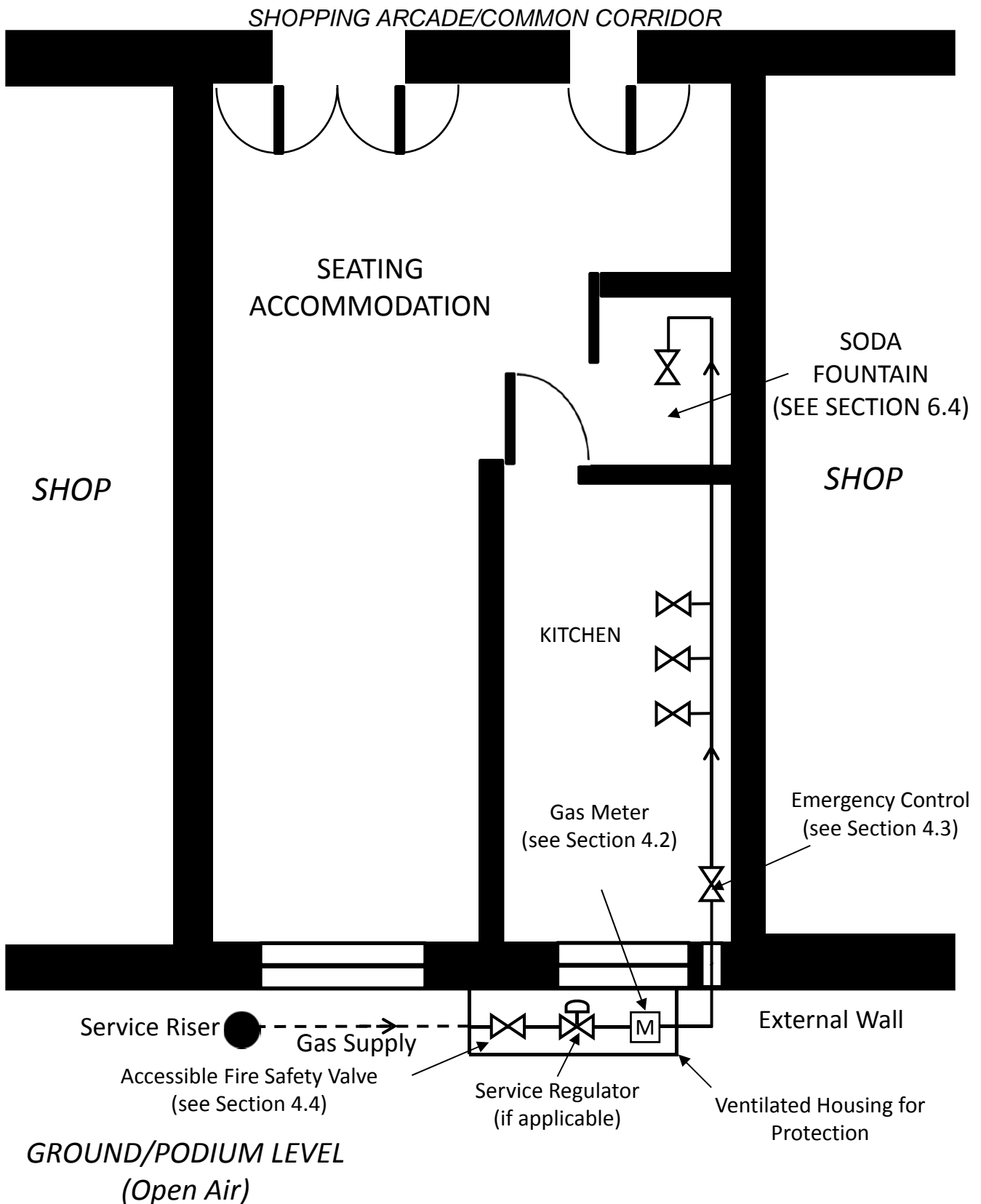
Appendix 1.1

Example 1: Location of fire safety valve inside premises



Appendix 1.2

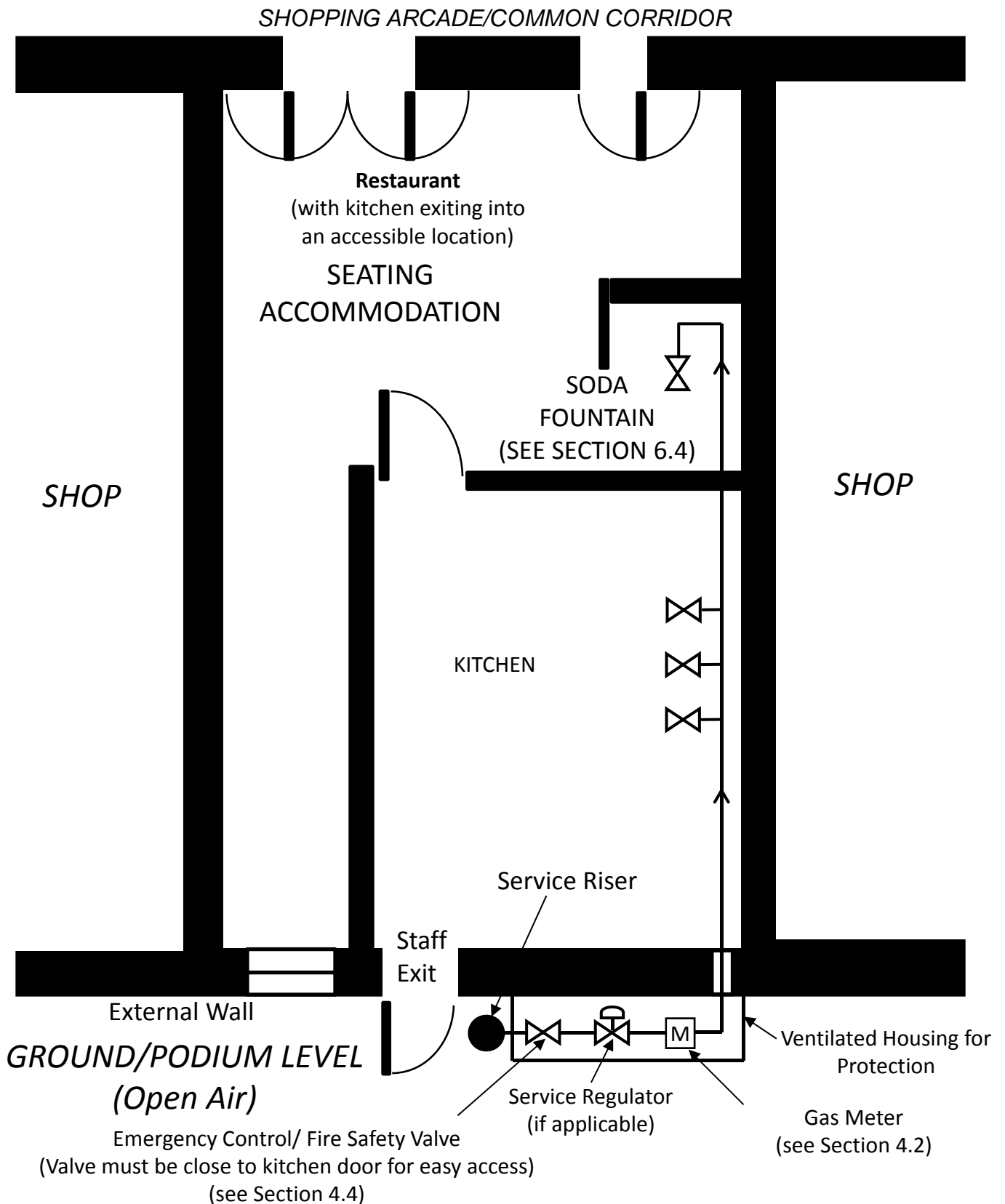
Example 2: Location of fire safety valve external to premises Single gas supply to restaurant (G/F level or above) (Service riser supplying one customer)



Appendix 1.3

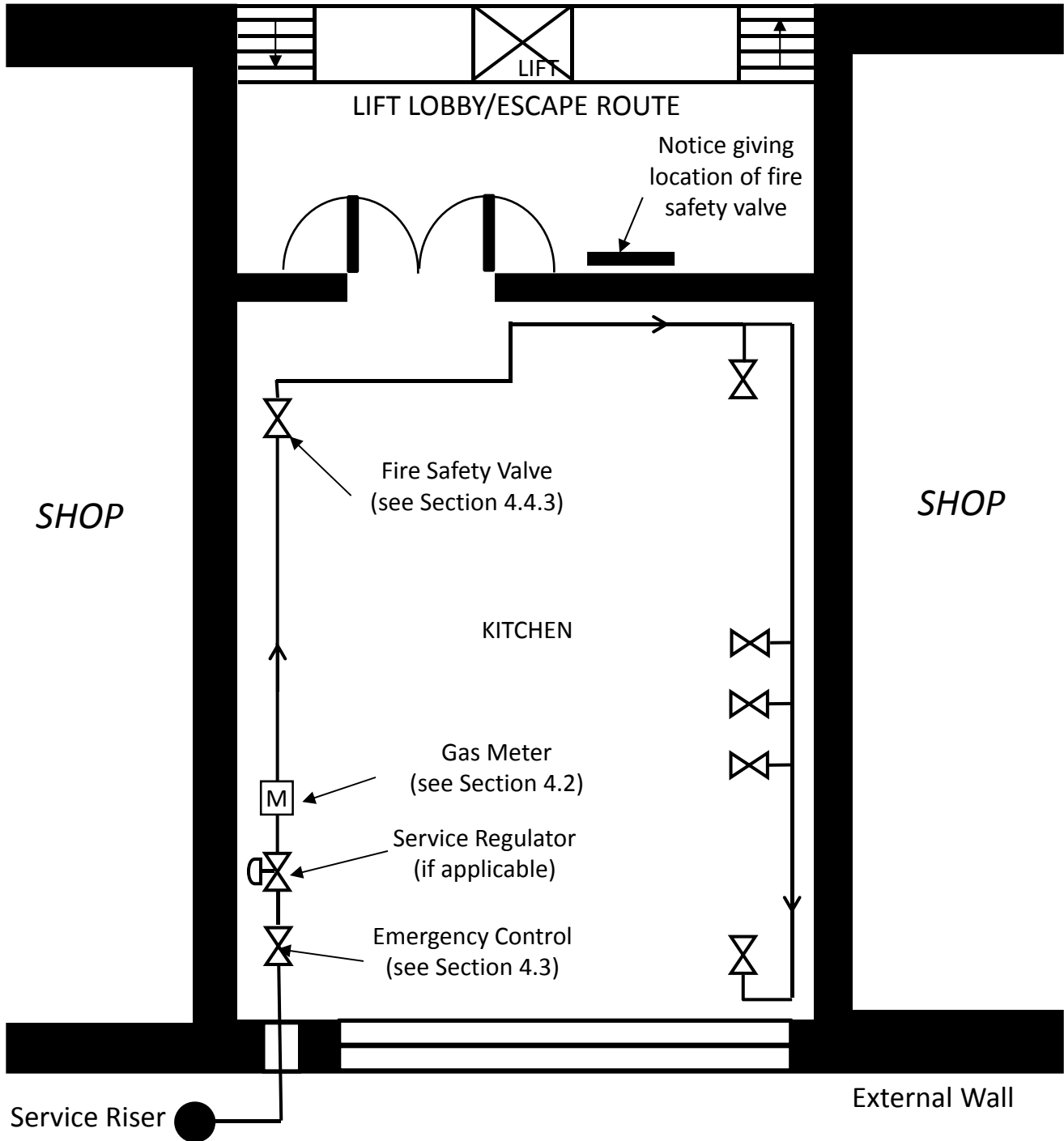
Example 3: Location of fire safety valve external to premises Single gas supply to restaurant on G/F or podium level

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



Appendix 1.4

Example 4: Location of fire safety valve close to kitchen exit/entrance (unable to install fire safety valve outside kitchen)



ABOVEGROUND/PODIUM LEVEL
(Open Air)

**Inspection Checklist for Testing and Commissioning of
New Commercial and Industrial Gas Installations**

| B2 | Testing | Item : | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|-------------|--|---------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| B2.1 | Operating Condition of Blower | Satisfied | | | | | | | | | |
| | | Unsatisfied | | | | | | | | | |
| | | N/A | | | | | | | | | |
| B2.2 | Water Supply System (if any) | Satisfied | | | | | | | | | |
| | | Unsatisfied | | | | | | | | | |
| | | N/A | | | | | | | | | |
| B2.3 | Flame Failure Device ^{*1} | Satisfied | | | | | | | | | |
| | | Unsatisfied | | | | | | | | | |
| | | N/A | | | | | | | | | |
| B2.4 | Burning Performance ^{*2} : (CO/CO ₂ < 0.01) Carbon Monoxide Content Carbon Dioxide Content Ratio of Carbon Monoxide to Carbon Dioxide | CO (ppm) | | | | | | | | | |
| | | CO ₂ (%) | | | | | | | | | |
| | | CO/CO ₂ | | | | | | | | | |
| | | Satisfied | | | | | | | | | |
| | | Unsatisfied | | | | | | | | | |
| B2.5 | Flame Stability ^{*3} : | Satisfied | | | | | | | | | |
| | | Unsatisfied | | | | | | | | | |
| | | N/A | | | | | | | | | |
| B2.6 | Surface Temperature of Gas Appliance ^{*4} : | Satisfied | | | | | | | | | |
| | | Unsatisfied | | | | | | | | | |
| | | N/A | | | | | | | | | |
| B2.7 | Combustion Products Removal Performance of Kitchen Ventilation System | | | | | | | | | | |
| B2.7.1 | Carbon Monoxide Concentration Measured in Kitchen (ppm) ^{*5} | | | | | | | | | | |
| B2.7.2 | Inform Client to adjust the kitchen's ventilation system (if required) | Yes | | | | | | | | | |
| | | No | | | | | | | | | |
| B2.8 | Operation and Maintenance Instruction/Manual of Gas Appliances | | | | | | | | | | |
| B2.81 | Provision of Operation and Maintenance Instruction/Manual to operators/responsible persons of restaurants/food preparation establishments | Yes | | | | | | | | | |
| | | No | | | | | | | | | |
| B3 | Conclusion | Item : | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| B3.1 | Overall Testing Result(s) of Gas Appliance(s) concerned | Passed | | | | | | | | | |
| | | Failed | | | | | | | | | |

Remarks:

- *1. Flame failure device: The gas valve opening and closing time shall be less than 40 seconds and 75 seconds respectively.
- *2. When a burning performance test is carried out, the sample of combustion products shall be taken at the exhaust port of an appliance and its CO and CO₂ content shall be measured. All performance tests/adjustments should only be conducted when the relevant gas appliances have reached their normal operating condition including combustion rate. In no circumstances that the CO/CO₂ combustion ratio of flueless gas appliances or gas appliances with flue not connecting to a mechanical exhaust system directly shall exceed 0.01. For gas appliances with flue connecting to a mechanical exhaust system directly, the CO/CO₂ combustion ratio shall not exceed 0.02.
- *3. Flame Stability: No lifting, flashback, yellow flame and extinguishment shall be observed under any operating conditions.
- *4. Note the surface temperature of touchable part of the gas appliances. The temperature shall be measured when gas appliances are operating at their maximum gas consumption condition. Such temperature shall not to pose any hazard to users.
- *5. When the gas appliances are in use, the carbon monoxide and carbon dioxide concentrations in a kitchen (workplace) should be maintained below the exposure limits of the chemicals as listed in the Code of Practice on Control of Air Impurities (Chemical Substances) in the Workplace issued by the Labour Department.

Comments:

Signature of Registered Gas Installer : _____ Date of Inspection : _____

**Inspection Checklist for Maintenance of
Commercial and Industrial Gas Installations**

Remarks:

- *1. Flame failure device: The gas valve opening and closing time shall be less than 40 seconds and 75 seconds respectively.
- *2. When assessing whether an existing gas appliance is functioning correctly, the registered gas installers should make reference to the manufacturer's instructions for the appliance and note any special requirements. Where the manufacturer's instructions for the appliance are not available, an assessment of the installations against the commissioning records or requirements of the current versions of installation standard should be carried out. All performance tests/adjustments should only be conducted when the relevant gas installations have reached their normal operating condition including combustion rate. In no circumstances that the CO/CO₂ combustion ratio of flueless gas appliances or gas appliances with flue not connecting to a mechanical exhaust system directly shall exceed 0.01. For gas appliances with flue connecting to a mechanical exhaust system directly, the CO/CO₂ combustion ratio shall not exceed 0.02.
- *3. Flame Stability: No lifting, flashback, yellow flame and extinguishment shall be observed under any operating conditions.
- *4. When the gas appliances are in use, the carbon monoxide and carbon dioxide concentrations in a kitchen (workplace) should be maintained below the exposure limits of the chemicals as listed in the Code of Practice on Control of Air Impurities (Chemical Substances) in the Workplace issued by the Labour Department.

Comments:

Signature of Registered Gas Installer : _____

Date of Inspection : _____

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 (m) Diameter (mm) | 10 | 50 | 100 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 2000 | 3000 | 4000 |
|-----------------------------|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|------|------|
| 50 | 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 |
| 80 | 0.6 | 2.8 | 5.5 | 11.0 | 16.5 | 22.0 | 27.5 | 33.0 | 38.5 | 44.0 | 49.5 | 55.0 | - | - | - |
| 100 | 0.9 | 4.7 | 9.3 | 18.6 | 27.9 | 37.2 | 46.5 | 55.8 | 65.1 | 74.4 | 83.7 | 93 | - | - | - |