

CODE OF PRACTICE FOR HONG KONG LPG INDUSTRY

Module 9

LPG Cylinders

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Module 9 LPG Cylinders

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PREFACE

This document is the ninth in a series of modules as Code of Practice for the LPG industry in Hong Kong. The other 8 modules are:

- Module 1 LPG Compounds and Cylinder Stores
- Module 2 Underground LPG Pipework
- Module 3 Handling and Transport of LPG in Bulk by Road
- Module 4 Aboveground Distribution Pipes, Service Risers, Downers and Ring Mains
- Module 5 Domestic Installations
- Module 6 Non-Domestic Installations
- Module 7 Operating Procedures for the Emergencies for LPG Compounds and Cylinder Stores
- Module 8 Operating Procedures for Emergencies for Installations outside LPG Compound/Stores.

Module 9 lays down recommended practice for LPG cylinders in Hong Kong. This Module shall be read in conjunction with the Gas Safety Ordinance (Cap. 51) and subsidiary regulations (see Appendix A for reference).

This module has been prepared jointly by the Gas Standards Office and the LPG Safety and Technical Committee represented by registered gas supply companies in Hong Kong LPG industry.

While this module tends to be specific in important aspects affecting safety and reliability, it shall be seen as offering guidance to engineers, operators and other users who will continue to exercise judgement and skill in the fulfilment of their obligations. It shall be borne in mind that practice may need changes with emerging technology and experience and the requirements listed in this document shall not be regarded as a set of rigid rules that cannot be changed. It is expected that the document will be reviewed and updated as required.

In case there are discrepancies between the appendices and the content of this Code, the content of the Code shall prevail.

SECTION 1 INTERPRETATION OF TERMS

Competent person – A person who is competent by virtue of his/her training and substantial practical experience to perform/supervise/inspect the design, manufacturing and testing of LPG cylinders.

Cylinder – A portable receptacle for storing liquefied petroleum gas with a water capacity of not more than 150 litres.

Cylinder net weight – The weight of an unfilled LPG cylinder without cylinder valve installed.

Disposable cylinder – A cylinder which is not constructed or intended to be refilled with liquefied petroleum gas after once containing such gas, and includes an aerosol can.

Excess-flow valve – A device designed to close when the liquid or vapour passing through it exceeds a prescribed flow rate.

Gas Authority – The authority appointed under Section 5 of the Gas Safety Ordinance (Cap. 51).

Gas Standards Office (GasSO) – An office within government which is under the control of the Gas Authority to administer the Gas Safety Ordinance.

Listed competent person (Class 1) – A person who meets the acceptance criteria as listed in Appendix B and, upon application to Gas Standards Office, is assessed as fully competent to inspect, test and certify LPG cylinders.

Note: The list of competent persons is obtainable from the Gas Standards Office and any registered gas supply companies supplying liquefied petroleum gas.

LPG – Liquefied petroleum gas as defined under the Gas Safety Ordinance (Cap. 51).

Motor vehicle – A motor vehicle within the meaning of the Road Traffic Ordinance (Cap. 374).

Net weight – The weight of liquefied petroleum gas filled in a LPG cylinder.

Pressure relief valve – A valve designed for preventing a rise of internal pressure in excess of a specified value due to emergency or abnormal conditions.

Registered Gas Supply Company (RGSC) – A gas supply company registered by the Gas Authority which as a business (a) imports, (b) manufactures or (c) supplies any gas.

Tare weight – The total weight of an unfilled LPG cylinder completed with cylinder valve and other permanent attachments.

Water capacity – The amount of water in volumetric units at 15.6°C required to fill a container completely.

SECTION 2 OBJECTIVES & SCOPE

2.1 Objectives

2.1.1 This Code of Practice has been prepared as a general outline of basic safety standards to be followed by cylinder owners, registered gas supply companies and their operators so as to ensure, in carrying on their business, the health and safety at work of their employees and to conduct their operations in a safe manner so that members of the public are not exposed to undue risks from gas.

2.2 Scope

2.2.1 This Module covers the design, construction, examination, inspection and revalidation of refillable LPG cylinders with a water capacity of not more than 150 litres.

2.2.2 This Module does not cover:

- a) disposable LPG cylinders;
- b) LPG fuel tanks for motor vehicle use;
- c) manufacturing process of LPG cylinders;
- d) filling equipment, operation and process for LPG re-filling; and
- e) equipment and process for LPG cylinder revalidation

2.2.3 Section 3 (Cylinder Design), Section 4 (Inspections and Tests at Manufacturer's Place), Section 5 (Cylinder Approval), Section 6 (Cylinder Marking) and Section 7 (Cylinder Valve) shall apply to approval of new cylinder design after the publication of this Code, unless otherwise stated. Section 8 (Periodic Inspection and Revalidation) shall apply to all new and existing cylinders.

2.3 Regulations and References

All LPG cylinders shall comply with local statutory safety requirements. Particular reference shall be made to:

Gas Safety Ordinance (Cap. 51)

Gas Safety (Gas Supply) Regulations (Cap. 51)

Gas Safety (Registration of Gas Supply Companies) Regulations (Cap. 51)

Dangerous Goods Ordinance (Cap. 295)

Fire Service Ordinance (Cap. 95)

SECTION 3 CYLINDER DESIGN

- 3.1** The design of LPG cylinder shall comply with an international standard such as American Standard (DOT), British Standard (BS), Chinese Standard (GB), European Standard (EN) or equivalent.
- 3.2** The cylinder owner shall submit the design of cylinder to the Gas Authority for type approval. The details shall refer to Section 5 of this Code.
- 3.3** Partial use or mix use of design standards shall not be allowed.
- 3.4** SI units are recommended for drawings and records of new applications of cylinder design.
- 3.5** The design working pressure of LPG cylinder shall follow the requirements of cylinder design standard; otherwise 1.86MPa shall be used.
- 3.6** The hydraulic test pressure of cylinder shall follow the requirements of cylinder design standard.
- 3.7** Additional wall thickness for corrosion allowance shall follow the requirements of cylinder design standard.
- 3.8** In the application for type approval of a new cylinder design, the minimum clearance between the lowest part of the bottom hemisphere of cylinder body and the ground level shall be 9 mm when the cylinder is placed at an upright position with its foot ring rested on the ground.
- 3.9** The cylinder design shall take into consideration of the filling limit of liquefied petroleum gas in liquid form in a cylinder. In accordance with the Gas Safety (Gas Supply) Regulation 10(2), a cylinder shall not be filled with more than 95% full of liquefied petroleum gas in liquid form at a temperature of 47.5 degrees centigrade and full of liquefied petroleum gas in liquid form at a temperature of 52.5 degrees centigrade.
- 3.10** Taking into account of the requirements of the Gas Safety (Gas Supply) Regulation 47, the cylinder shall be designed with its valve connection to be in contact with the vapour space of the cylinder except for the supply of liquefied petroleum gas to a forklift truck.
- 3.11** The net weight of liquefied petroleum gas to be filled into a cylinder shall be stated in the cylinder design.

SECTION 4 INSPECTIONS AND TESTS AT MANUFACTURER'S PLACE

4.1 General

The cylinder manufacturer shall possess a quality assurance system for the cylinder manufacturing process. The system shall be certified to a recognised international or national standard, such as (i) manufacturing permit issued by a national licensing authority, or (ii) licensing permit issued by a design standard body or (iii) an equivalent valid certificate. This is to ensure the quality of components and materials supplied by sub-contractors which are critical to the integrity of a cylinder, and the quality of finished cylinder product.

4.2 Inspections, Tests and Independent Inspection Report

4.2.1 The cylinder manufacturer shall carry out all prescribed inspections and tests as required in the cylinder design standard.

4.2.2 For each batch of new cylinders, the cylinder owner shall obtain an inspection and test certificate as mentioned in section 4.2.3 and an independent certificate of inspection as mentioned in section 4.2.5 from the cylinder manufacturer.

4.2.3 The cylinder manufacturer shall issue an inspection and test certificate for each batch of new cylinders. The information shown on the certificate shall follow the requirements of cylinder design standard; otherwise, it shall state the following:

- a) certificate number;
- b) standards, heat number and mill certificate of material used;
- c) verification of chemical analysis of material used;
- d) physical inspection of material used;
- e) inspection of markings, condition of inside, tests and threads against the cylinder specifications;
- f) measured minimum cylinder wall thickness, measured outside diameter of cylinder, design (calculated) wall thickness and design pressure;

- g) hydraulic test, tensile test of material and other tests as prescribed in cylinder design standard carried out in presence of a representative of the independent inspecting body;
- h) sampling frequency of radiography;
- i) certification of cylinder in compliance with the design standard; and
- j) signature of a representative of the manufacturer.

In addition, the cylinder owner shall obtain the following documents

- i) record of physical test of material for cylinders;
- ii) record of hydraulic test of cylinders;
- iii) record of burst pressure test of cylinders;
- iv) record of steel composition of material for cylinders;
- v) mill certificate of the cylinder body material; and
- vi) serial number of cylinders covered by the certificate.

4.2.4 Prior to the shipment, each batch of new cylinders shall be inspected by an independent inspecting body that shall be an internationally recognised inspecting body or an inspecting body recognised by the national government in the area of manufacturing and testing of LPG cylinders.

4.2.5 The independent inspecting body shall issue a certificate of inspection after inspection. The information shown on the certificate shall follow the requirement of cylinder design standard; otherwise, it shall state the following:

- a) inspection certificate number;
- b) name of the independent inspecting body;
- c) serial number of cylinders covered by the certificate;
- d) name of cylinder manufacturer;
- e) size of cylinder including the outside diameter and the height of the cylinder;

- f) marks stamped on the cylinders;
- g) issuing date of the inspection certificate;
- h) verification of material used against the cylinder design standard;
- i) mill certificate number of body material used;
- j) verification of chemical analysis of cylinder body material and heat number marked on the material;
- k) physical inspection of cylinder body material used;
- l) sampling frequency of radiography;
- m) inspection of marking, condition of inside, tests and threads against the cylinder specifications;
- n) inspection of the process of manufacture and heat treatment;
- o) measured minimum cylinder wall thickness, measured outside diameter of cylinder, the design (calculated) wall thickness and design pressure;
- p) hydraulic test, tensile test of material and other tests as prescribed in cylinder design standard carried out in presence of a representative of the independent inspecting body;
- q) material standard of the spud and its chemical analysis;
- r) certification of cylinder in compliance with the design standard; and
- s) signature of a representative of the independent inspecting body.

The exact format of the certificate may be determined by the independent inspecting body but all the above basic data shall be included.

SECTION 5 CYLINDER APPROVAL

5.1 General

In accordance with the Gas Safety (Gas Supply) Regulation 7(1), the owner of a container shall not use the container to contain liquefied petroleum gas unless the container

- a) has been approved in writing, or is of a type which has been approved in writing, by the Authority for such use; or
- b) is of a type which has been approved under regulation 64 of the Dangerous Goods (General) Regulations (Cap. 295 sub. leg.) for such use and such approval was in force immediately before the commencement of the Gas Safety Ordinance.

Note: The container mentioned in the above regulation includes LPG cylinder.

5.2 Type Approval

5.2.1 In compliance with the Gas Safety (Gas Supply) Regulation 7, the cylinder owner is required to apply to the Gas Authority for type approval of a cylinder to contain liquefied petroleum gas.

5.2.2 In the application for type approval of a cylinder, fully dimensioned drawings of the cylinder including material of construction, design calculation of wall thickness, cylinder design standard and specification shall be provided. Information on the selected cylinder valve(s) shall also be provided. A sample of the application form for type approval of cylinder (Form 110) is shown in Appendix C.

5.2.3 The records of type approval application shall be kept by the cylinder owner for the entire service life of the cylinder until cylinder of this type is no longer used by the cylinder owner.

5.3 Approval To Use a Cylinder

5.3.1 In compliance with the Gas Safety (Gas Supply) Regulation 7, the cylinder owner, after obtaining the type approval of a cylinder, is required to apply to the Gas Authority for approval to use the cylinder before filling the cylinder with liquefied petroleum gas. The cylinder shall be made available for inspection by the Gas

Authority inspector. A sample of the application form for approval to use a cylinder (Form 111) is shown in Appendix D.

5.3.2 The specification and model number of selected cylinder valve(s) against the application purpose(s) of the cylinder shall be shown on the application form.

5.3.3 The records of the application for approval to use a cylinder or a batch of cylinders of the same type shall be kept by the cylinder owner for the entire service life of the cylinder or until no cylinder made to this batch of cylinders is in the market.

5.3.4 In case there are additional cylinder valve types to be included in the selected valve list after an approval to use a cylinder has been given, the cylinder owner shall provide the following information to the Gas Authority for acceptance:

- a) application purposes of cylinder type to be installed with the proposed cylinder valve, e.g. domestic/industrial/dim sum trolley/others;
- b) information of cylinder type to be installed with the proposed cylinder valve. The required information are:
 - i) cylinder approval number issued by the Gas Authority (i.e. GSO xxx); or
 - ii) reference of cylinder approval letter issued by the Gas Authority; or
 - iii) storage capacity (kg of LPG to be filled) and water capacity (litre or cu metre) of the cylinder type if the cylinder was previously approved by Fire Services Department prior to the commencement of the Gas Safety Ordinance;
- c) type of liquefied petroleum gas withdrawal, e.g. vapour/liquid, of the proposed cylinder valve;
- d) manufacturer's name and model number of the proposed cylinder valve;
- e) for valve which design approval has been previously granted in writing by the Gas Authority or Fire Service Department, reference number of the approval letter shall be provided; or
- f) for approval of a new cylinder valve design, the following information shall be provided:
 - i) design standard and specification;
 - ii) two copies of design drawing details; and
 - iii) safety provisions in accordance with Regulation 9 of Gas Safety (Gas Supply) Regulations.

5.4 Inspection of New Cylinders in Hong Kong

5.4.1 The cylinder owner of new cylinders shall take at least 3% samples from each batch of each size of new cylinders for hydraulic tests. The hydraulic tests shall be supervised by one of the following types of competent person who shall also sign the certificates of test:

- a) Listed Competent Person (Class 1b); or
- b) A person who
 - i. is nominated by a Registered Gas Supply Company; and
 - ii. supervises the hydraulic test of the respective Registered Gas Supply Company's cylinder; and
 - iii. has a diploma in mechanical or other relevant engineering discipline and at least 2 years full time LPG filling depot operational experience; or
 - iv. has a certificate in mechanical or other relevant engineering discipline and at least 4 years full time LPG filling depot operational experience.

The Registered Gas Supply Company shall submit the following information of the nominated person to the Gas Authority, including personal particulars (such as name, Hong Kong Identity Card number, contact telephone number, specimen of nominated person's signature), professional/technical/academic qualifications, present job responsibilities, organization chart of the LPG filling depot, durations and descriptions of the relevant LPG filling depot operational experience.

The Gas Authority may require the nominated person to attend an interview for verifying his/her training and experience. The Gas Authority may also require the nominated person to submit/present the original copy of all concerned certificates/documents.

5.4.2 Upon the receipt of the application for approval to use a batch of new cylinders by the Gas Authority, the cylinder owner shall make arrangement with the Gas Authority inspector to inspect the new cylinders and samples of the selected cylinder valves in Hong Kong. The construction details of the cylinders and the selected cylinder valves shall be inspected according to the approved design drawings. Hydraulic tests for an additional 1% (maximum) of cylinders randomly selected by the Gas Authority inspector from each batch of new cylinders shall be carried out in presence of the inspector

SECTION 6 CYLINDER MARKING

6.1 Every cylinder in service shall be stamped with the following information at a clearly visible location on the head ring or foot ring or other locations of the cylinder approved by the cylinder design standard:

- design standard;
- cylinder owner's name or marking;
- cylinder manufacturer's name or marking;
- independent inspecting body's official marking;
- initial test year;
- serial number of cylinder;
- design water capacity;
- tare weight or cylinder net weight;
- approval number issued by the Gas Authority (i.e. GSO xxx);
- design working pressure , i.e. service pressure of cylinder;
- test pressure; and
- other stampings as agreed by the Gas Authority.

6.2 The characters of markings shall be at least 6 mm in height.

6.3 Warning notice of "GASES POSSESSING A FIRE RISK" and "惹火氣體" shall be spray painted on the cylinder body.

6.4 For cylinder to be mounted horizontally on forklift truck, indications showing the correct mounting orientation of the cylinder during normal operation shall be shown on cylinder body.

SECTION 7 CYLINDER VALVE

- 7.1** The material and all associated components of cylinder valves shall be compatible for the use of liquefied petroleum gas. The material of valves and components shall entirely be corrosion resistant material, such as brass and stainless steel.
- 7.2** Excess flow valve shall be provided for cylinder which has a facility for withdrawing liquefied petroleum gas in liquid form. In accordance with the Gas Safety (Registration of Gas Supply Companies) Regulation 18(a), no registered gas supply company shall supply liquefied petroleum gas in any cylinder which has a facility for withdrawing such gas in liquid form unless such cylinder is equipped with an excess flow device; and where such device is not an integral part of the shut-off valve of such cylinder, such device is fitted to such cylinder in such a manner as to prevent it from being accidentally disconnected from such cylinder.
- 7.3** The design of the couplings of cylinder valves shall be clearly distinct for either liquid withdrawal use or vapour withdrawal use. In accordance with the Gas Safety (Registration of Gas Supply Companies) Regulation 18(b), with effect on and from 1 January 1992, no registered gas supply company shall supply liquefied petroleum gas in any cylinder which has a facility for withdrawing such gas in vapour form unless any coupling to be used on or with that cylinder is incapable of being connected to the cylinder which has a facility for withdrawing liquefied petroleum gas in liquid form.
- 7.4** Taking into account of the requirements of the Gas Safety (Gas Supply) Regulation 9, pressure relief valve of the spring-loaded, or equivalent, type shall be provided for:
- a) cylinder having a water capacity of not less than 40 litres, or
 - b) cylinder having a water capacity of less than 40 litres and it is used to provide liquefied petroleum gas to a dim sum trolley or such gas in liquid form.
- 7.5** Cylinder valves shall have the following information stamped on the valve bodies:
- a) Manufacturer's brand name;
 - b) Model number;
 - c) Month and year of production; and
 - d) Discharge pressure (for valves if fitted with pressure relief valves).

SECTION 8 PERIODIC INSPECTION AND REVALIDATION

8.1 All LPG cylinders shall be periodically examined and tested. The periodic inspection requirements and revalidation tests, including the revalidation period, shall follow the cylinder design standard.

8.2 The hydraulic tests carried out in Hong Kong shall be supervised by one of the following types of competent person who shall sign the certificates of tests:

- a) Listed Competent Person (Class 1b); or
- b) A person who
 - i. is nominated by a Registered Gas Supply Company; and
 - ii. supervises the hydraulic test of the respective Registered Gas Supply Company's cylinder; and
 - iii. has a diploma in mechanical or other relevant engineering discipline and at least 2 years full time LPG filling depot operational experience; or
 - iv. has a certificate in mechanical or other relevant engineering discipline and at least 4 years full time LPG filling depot operational experience.

The Registered Gas Supply Company shall submit the following information of the nominated person to the Gas Authority, including personal particulars (such as name, Hong Kong Identity Card number, contact telephone number, specimen of nominated person's signature) professional/technical/academic qualifications, present job responsibilities, organization chart of the LPG filling depot, durations and descriptions of the relevant LPG filling depot operational experience.

The Gas Authority may require the nominated person to attend an interview for verifying his/her training and experience. The Gas Authority may also require the nominated person to submit/present the original copy of all concerned certificates/documents.

8.3 In accordance with Gas Safety (Gas Supply) Regulation 8(2), the owner of a cylinder (other than a disposable cylinder) shall not use the cylinder to contain liquefied petroleum gas unless the cylinder has been tested and examined not less than once in the 5 years period immediately preceding such use to ascertain whether the cylinder is safe to be so used. This means that for a cylinder last tested in year 2001 (any day in the year) shall be re-tested and examined in or before year 2006. This type of detailed examination is also commonly known as revalidation.

- 8.4** If the revalidation period specified in the cylinder design standard is more frequent than once in five years as required by the Gas Safety (Gas Supply) Regulations 8(2), the more frequent revalidation period shall be followed.
- 8.5** The scope of revalidation shall follow the respective cylinder design standard.
- 8.6** All revalidation test records of cylinder shall be kept for ten years by the cylinder owner and the respective Registered Gas Supply Company filling the cylinder.
- 8.7** Water shall be used as a testing medium for hydraulic testing. The test pressure shall follow the requirements of the cylinder design standard.
- 8.8** All pressure gauges used for hydraulic test of revalidation shall be calibrated regularly with records.
- 8.9** During hydraulic test, cylinder shall be examined under test pressure and show no sign of defects. The test pressure shall be maintained for the specified duration as required by the cylinder design standard or at least 1 minute. The cylinder failed the test shall be classified as condemned cylinder.
- 8.10** Condemned cylinder shall be purged, cylinder valve removed and made unserviceable by one of the following methods:
- a) crushing;
 - b) cutting into two or more pieces;
 - c) drilling holes which have 10% of the total surface area of the cylinder; or
 - d) piercing
- 8.11** After satisfactory completion of each revalidation, marking showing the latest revalidation year shall be shown on the cylinder.

SECTION 9 RESPONSIBILITIES OF CYLINDER OWNER AND REGISTERED GAS SUPPLY COMPANY IN FILLING CYLINDER

9.1 Responsibilities of Cylinder Owner

9.1.1 In accordance with the Gas Safety (Gas Supply) Regulation 7(1), the owner of a container shall not use the container to contain liquefied petroleum gas unless the container

- a) has been approved in writing, or is of a type which has been approved in writing by the Authority for such use; or
- b) is of a type which has been approved under regulation 64 of the Dangerous Goods (General) Regulations (Cap. 295 sub. leg.) for such use and such approval was in force immediately before the commencement of the Gas Safety Ordinance.

Note: The container mentioned in the above Regulation includes LPG cylinder. Samples of application forms for type approval (Form 110) and approval to use a cylinder (Form 111) are shown in Appendices C & D respectively.

9.1.2 In accordance with the Gas Safety (Gas Supply) Regulation 8(2), the owner of a cylinder (other than a disposable cylinder) shall not use the cylinder to contain liquefied petroleum gas unless the cylinder has been tested and examined not less than once in the 5 years period immediately preceding such use to ascertain whether the cylinder is safe to be so used.

9.1.3 In accordance with the Gas Safety (Gas Supply) Regulation 9, the owner of a cylinder which has a water capacity of

- a) not less than 40 litres, shall not use the cylinder to contain liquefied petroleum gas unless the cylinder is fitted with a pressure relief valve
 - (i) of the spring loaded, or equivalent, type; and
 - (ii) in contact with the vapour space of the cylinder when it is positioned for normal use;
- b) less than 40 litres, shall not subject to paragraph (c), use the cylinder to contain liquefied petroleum gas if the cylinder is fitted with a pressure relief valve unless the cylinder has
 - (i) been used to contain such gas before the commencement of the Gas Safety Ordinance; and

- (ii) not been re-valved on or after that commencement; and
- c) less than 40 litres, shall not use the cylinder to provide
 - (i) liquefied petroleum gas to a dim sum trolley; or
 - (ii) such gas in liquid form,unless the cylinder is fitted with a pressure relief valve.

9.1.4 The cylinder owner shall provide all necessary information of the cylinder to the Registered Gas Supply Company for filling the cylinder.

9.1.5 The cylinder owner shall keep the design submission, approved design drawings, approval letters, inspection and test reports for the whole service life of the cylinder.

9.1.6 The cylinder owner shall obtain the inspection and test certificate and the independent certificate of inspection as mentioned in Section 4.2.2.

9.1.7 The cylinder owner shall ensure that the cylinder is safe before he leaves the LPG filling depot with the cylinder.

9.2 Responsibilities of Registered Gas Supply Company in Filling Cylinder

9.2.1 In accordance with the Gas Safety (Gas Supply) Regulation 8(1), no person shall fill any cylinder with liquefied petroleum gas unless

- a) the cylinder has, immediately prior to such filling, been externally examined for defects, including dents, gouges and corrosion; and
- b) the person who has carried out such examination is of the opinion that it is safe for that cylinder to be so filled.

9.2.2 In accordance with the Gas Safety (Gas Supply) Regulation 10(2), no person shall fill a cylinder with liquefied petroleum gas other than such that, at a temperature of

- a) 47.5 degrees centigrade, the cylinder will not be more than 95% full of liquefied petroleum gas in liquid form; and
- b) 52.5 degrees centigrade, the cylinder will not be full of liquefied petroleum gas in liquid form.

9.2.3 In accordance with the Gas Safety (Registration of Gas Supply Companies) Regulation 18, no registered gas supply companies shall supply liquefied petroleum gas

- a) in any cylinder which has a facility for withdrawing such gas in liquid form unless
 - (i) such cylinder is equipped with an excess flow device; and
 - (ii) where such device is not an integral part of the shut-off valve of such cylinder, such device is fitted to such cylinder in such a manner as to prevent it from being accidentally disconnected from such cylinder; and
- b) with effect on and from 1 January 1992, in any cylinder which has a facility for withdrawing such gas in vapour form unless any coupling to be used on or with that cylinder is incapable of being connected to the cylinder referred to paragraph (a) above.

9.2.4 The Registered Gas Supply Company shall obtain a written document of the following information from the cylinder owner before filling the cylinder with liquefied petroleum gas:

- a) type approval and drawings of the cylinder approved by the Gas Authority;
- b) approval to use the cylinder issued by the Gas Authority or the cylinder is of a type which has been approved under regulation 64 of the Dangerous Goods (General) Regulations (Cap. 295 sub. leg.) for such use and such approval was in force immediately before the commencement of the Gas Safety Ordinance;
- c) in case the cylinder has once been filled with liquefied petroleum gas before, the revalidation of the cylinder is not overdue and the last revalidation year is shown on the cylinder; and
- d) a statement which undertakes that the pressure relief valve, if fitted, is of spring loaded, or equivalent, type accepted by the Gas Authority.

9.2.5 The Registered Gas Supply Companies shall ensure that the cylinder is fitted with a pressure relief valve in the following conditions before filling liquefied petroleum gas into it:

- a) the cylinder has a water capacity of not less than 40 litres, or
- b) the cylinder has a water capacity of less than 40 litres and it is used to provide liquefied petroleum gas to a dim sum trolley or such gas in liquid form.

9.2.6 The Registered Gas Supply Company filling the cylinder shall ensure that the cylinder is safe before allowing the cylinder to leave the LPG filling depot.

APPENDIX A RELEVANT SECTIONS IN RELATION TO THE GAS SAFETY (GAS SUPPLY) REGULATIONS AND THE GAS SAFETY (REGISTRATION OF GAS SUPPLY COMPANIES) REGULATIONS

Gas Safety (Gas Supply) Regulations	Relevant Sections in Module 9	Sections Quoted in Module 9
Reg. 2: Interpretation	1	-
Reg. 7: Only approved containers may be used to contain liquefied petroleum gas	5, 9	5.1, 5.2.1 5.3.1, 9.1.1
Reg. 8: Examinations and inspections to be carried out cylinders and tanks	8, 9	8.3, 8.4, 9.1.2 9.2.1
Reg. 9: Pressure relief valves fitted to cylinders	5, 7, 9	5.3.4, 7.4 9.1.3
Reg. 10: Filling capacity of tanks and cylinders	3, 9	3.9, 9.2.2
Reg. 47: Valve connection of cylinder to be in contact with vapour space	3	3.10

Gas Safety (Registration of Gas Supply Companies) Regulations	Relevant Sections in Module 9	Sections Quoted in Module 9
Reg. 18: Couplings for cylinders	7, 9	7.2, 7.3, 9.2.3

**APPENDIX B ACCEPTANCE CRITERIA FOR ENLISTMENT
BY THE GAS AUTHORITY AS COMPETENT PERSON**

**Class 1(a) - Testing and certification of LPG tanks, vaporisers and mains OR
Class 1(b) – Testing and certification of LPG cylinders**

1. Responsibilities

(a) For testing and certification of LPG tanks, vaporisers and mains

LPG Tanks

- Visual inspections of LPG tanks prior to testing.
- Supervise pressure testing of LPG tanks.
- Ensure that non-destructive testing and examination of LPG tanks are carried out in accordance with appropriate procedures and vessel codes.
- Certify that they are suitable for LPG service.

LPG Vaporisers and Mains

- Ensure that pressure testing of LPG vaporisers/mains is carried out in accordance with appropriate procedures and codes.
- Certify that tested LPG vaporisers/mains meet the required standards.

(b) For testing and certification of LPG cylinders

LPG Cylinders

- Ensure that LPG cylinders are inspected and tested in the prescribed manner.
- Certify that tested LPG cylinders meet the required standards.

2. Qualification

Corporate Member of the Hong Kong Institution of Engineers in the Mechanical, Chemical, Gas or Marine & Naval Architecture disciplines; or equivalent professional attainment such as Corporate Member of the Institution of Mechanical Engineers, Institution of Chemical Engineers, Institution of Gas Engineers and Managers or Institution of Marine Engineering, Science & Technology.

3. Knowledge and Working Experience Required

(a) To carry out testing and certification of LPG tanks, vaporisers and mains

Have full understanding of the following subjects:

- Design codes and test standards pertaining to LPG tanks, vaporisers, mains, valves and associated equipment.
- Non-destructive testing technology applicable to LPG tanks, vaporisers and mains;
- Strength of materials and other properties of materials used on LPG tanks, vaporisers and mains;
- Properties of LPG and related Codes of practices and Guidelines; and

Possess at least 1-year relevant working experience in the testing of pressure vessels.

(b) To carry out testing and certification of LPG cylinders

Have full understanding of the following subjects:

- Design codes and test standards pertaining to LPG cylinders and associated equipment.
- Non-destructive testing technology applicable to LPG cylinders.
- Strength of materials and other properties of materials used on LPG cylinders.
- Properties of LPG and related Codes of practices and Guidelines; and

Possess at least 1-year relevant working experience in the testing of cylinders

Notes:

- (i) According to the interpretation as stated in the Gas Safety Ordinance (Cap 51),
- "Tank" means a bulk tank or mini-tank; "Bulk tank" means a receptacle which has a water capacity of more than 450 litres and used, or to be used, to contain liquefied petroleum gas;
- "Mini-tank" means a receptacle with a water capacity of more than 150 litres but not more than 450 litres and used, or to be used, to contain liquefied petroleum gas;
- "Vaporiser" means any equipment used, or to be used, to provide heat for the vaporisation of liquefied petroleum gas;
- "Gas main" means a pipe, other than a service pipe or installation pipe, used, or to be used, to supply gas;
- "Cylinder" means a receptacle which has a water capacity of not more than 150 litres; and used, or to be used, to contain liquefied petroleum gas.
- (ii) The applicant may submit, together with the application form, relevant documentary proof such as training records or employer references in respect of his/her training and experience in the testing of pressure vessels/ cylinders.
- (iii) The Gas Authority may require the applicant to attend an interview for verifying the appropriateness of his/her training and experience.
- (iv) For an applicant who is a Registered Professional Engineer in the Mechanical, Chemical, Gas or Marine & Naval Architecture Disciplines under the Engineers Registration Ordinance (Cap 409), interview may not be required if his/ her submitted application form is accompanied with adequate documentary proof in respect of his/ her training and experience in the testing of pressure vessels/ cylinders.
- (v) The performance of all competent person of Class 1(a) and Class 1(b) shall be subjected to the monitoring of a performance monitoring system of which details are listed in EMSD website http://www.emsd.gov.hk/emsd/eng/pps/gas_pms.shtml.
- (vi) When a competent person ceases to practise in the gas industry for 12 months or ceases to maintain any professional qualification in Mechanical, Chemical, Gas or Marine & Naval Architecture Disciplines, his/her name may be removed from the register.
- (vii) If a competent person changes his/her employer within the gas industry or correspondence address or ceases to maintain any professional qualification in Mechanical, Chemical, Gas or Marine & Naval Architecture Disciplines, he/she shall notify the Gas Authority of the change within 28 days.

**APPLICATION FORM 110 FOR TYPE APPROVAL OF
CONTAINER WITH RELATED ANNEX (I)**

FORM 110
表格 110

THE GOVERNMENT OF THE HONG KONG
SPECIAL ADMINISTRATIVE REGION
香港特別行政區政府
GAS SAFETY (GAS SUPPLY) REGULATIONS, CAP. 51
氣體安全(氣體供應)規例(第 51 章)
APPLICATION FOR TYPE APPROVAL OF CONTAINER
申請批准儲存器的類型設計

For Official Use Only: 只供本署填寫：
GasSO Reference 檔案編號
Date of Receipt 收件日期

Notes 注意：

- (1) This application form is to be used for applying to the Gas Authority for type approval of container, i.e. cylinder or tank, etc. (but excluding mini-tank and disposable cylinder), to contain liquefied petroleum gas (LPG) as listed in section A(1) of this form and defined in the Gas Safety Ordinance, Cap. 51.
本申請表格用作向氣體安全監督申請批准儲存器的類型設計，有關儲存器即本表格甲(1)部所列及氣體安全條例(第51章)所界定用作盛載石油氣的石油氣瓶或石油氣缸(但不包括小型石油氣缸及祇用一次的石油氣瓶)。
- (2) The owner of container shall not use the container to contain LPG unless the applicant has obtained use approval in writing from the Gas Authority using FORM EMSD/GSO/111 and has completed construction work.
除非儲存器擁有人已使用申請表格EMSD/GSO/111取得氣體安全監督以書面發出的使用批准，並已完成建造工程，否則儲存器擁有人不得使用其儲存器盛載石油氣。
- (3) Each application form should be used for an application for type approval of one type of container.
每份申請表格只可用作一種儲存器的類型設計批准申請。
- (4) The applicant should complete all sections of this application form in BLOCK letters and SIGN the form.
申請人應以正楷填寫本申請表格各欄，並在表格上簽署。

Declaration:

聲明：

*I/We hereby apply for type approval of the container and *I/We declare that all particulars, statements and documents submitted in/with this application form are true and correct.

*本人/我們現申請批准儲存器的類型設計，*本人/我們並謹此聲明，在本申請表格內填報的一切資料、所作的陳述及附上的文件全屬真實無訛。

Date:

Signature and Company Chop of Applicant:

日期：

申請人簽署及公司蓋印：_____

Authorisation (if the applicant is not the owner of the container, owner's authorisation to apply is required):

授權(若申請人並非儲存器擁有人，擁有人必須授權申請人提出申請)：

*I/We hereby authorise the above applicant to apply for type approval of the container on *my/our behalf.

*本人/我們授權以上申請人代表 *本人/我們申請批准儲存器的類型設計。

Date:

Signature and Company Chop of Owner:

日期：

擁有人簽署及公司蓋印：_____

Section A: Particulars of Container

甲部： 儲存器詳情

- (1) Type of Container:
儲存器類型：
- (i) Cylinder
 石油氣瓶
- (ii) Tank
 石油氣缸
- (2) Purposes: *Domestic / Industrial / Dim Sum Trolley / Others: _____
用途： *住宅 / 工業 / 點心手推車 / 其他：
- (3) Storage Capacity: _____ (*kg/ton)
儲存容量： (*千克 / 噸)
- (4) Water Capacity: _____ (*l/m³)
容水量： (*升 / 立方米)
- (5) Type of Withdrawal (in case of Cylinder): *Vapour/Liquid
抽取型式 (如屬石油氣瓶)： *氣態 / 液態

Section B: Particulars of Applicant

乙部： 申請人資料

- (1) Organization Name: _____
機構名稱：
- (2) Contact Person: _____
聯絡人：
- (3) Contact Address: _____
聯絡地址：
- (4) Telephone Number: _____ (5) Fax Number: _____
電話號碼： 傳真號碼：

Section C: Particulars of Owner (if different from section B)

丙部： 擁有人資料 (如與乙部不同)

- (1) Organization Name: _____
機構名稱：
- (2) Authorized Person: _____
負責人：
- (3) Contact Address: _____
聯絡地址：
- (4) Telephone Number: _____ (5) Fax Number: _____
電話號碼： 傳真號碼：

Section D: Information to be submitted with this Application

丁部： 須連同本申請表格一併附上的資料

- (1) Design standard and specification of the container;
儲存器設計標準及規格；
- (2) Name and address of the container manufacturer;
儲存器生產商名稱及地址；
- (3) Design calculations with respect to the container code used;
根據所用儲存器準則而作出的設計計算；
- (4) 2 copies of all design drawings relating to the container;
有關該儲存器的所有圖則各兩份；
- (5) A copy of the owner's I.D. card/Business Registration Certificate; and
儲存器擁有人的身份証 / 商業登記證副本；及
- (6) Other relevant information:
其他有關資料：

(a)	Cylinder 石油氣瓶	ANNEX (I) 附件 (一)
(b)	Tank 石油氣缸	ANNEX (II) 附件 (二)

NOTES ON APPLICATION

申請須知

(1) **Submission of Application**

遞交申請方法

This application form shall be submitted with the documents and details as prescribed in Section D of the form, by hand or mail, to 'The Gas Authority, Gas Standards Office, Room 616, Electrical & Mechanical Services Department, 98 Caroline Hill Road, Causeway Bay, Hong Kong.' **Photocopy or facsimile of this form will not be accepted.**

申請表格必須連同申請表格丁部所提及的有關文件及資料，送交或郵寄「香港銅鑼灣加路連山道九十八號六一六室機電工程署氣體標準事務處氣體安全監督」。申請表格如為影印本或以傳真方式遞交，概不受理。

(2) **Personal Data**

個人資料

The personal data collected by means of this form will be used by the Government to facilitate future communication between the Government and the data owner. The data will be kept at the Electrical & Mechanical Services Department and disclosed to the data users of the Department. The owner has the right of access and correction with respect to the personal data. Enquiries concerning the personal data collected, including the making of access and corrections, should be addressed to the Gas Authority.

藉本表格所收集的個人資料，將用以協助政府日後聯絡資料擁有人。一切資料將保存於機電工程署，並供機電工程署的資料使用者使用。資料擁有人有權查閱及更改其個人資料。如欲查詢有關本表格收集所得的個人資料，包括查閱及更改事宜，可與氣體安全監督聯絡。

ANNEX (I)
附件（一）

**Application for Type Approval of LPG Cylinder
as Defined in section D of Application Form EMSD/GSO/110
申請批准
申請表格EMSD/GSO/110丁部所界定的石油氣瓶的類型設計**

(I) Design drawings for cylinder shall include the following details:

石油氣瓶的圖則須包括以下細節：

- (1) Warning notices, i.e. "GASES POSSESSING A FIRE RISK", etc. in both English and Chinese characters shall be prominently displayed on the cylinder. Size and colour of the letters shall be specified; and
附有中英文字樣的警告告示，如「惹火氣體」等，須顯著地展示於石油氣瓶上。字體大小及顏色亦須註明；
及
- (2) The cylinder shall be stamped with the following information:
石油氣瓶瓶身須蓋印以下資料：
 - (a) Design standard;
設計標準；
 - (b) Design pressure in kPa;
以千帕斯卡計的設計壓力；
 - (c) Test pressure in kPa;
以千帕斯卡計的測試壓力；
 - (d) Serial number;
氣瓶編號；
 - (e) Approval number to be issued from the Gas Authority, i.e. GSOXXX;
將由氣體安全監督發給的批准編號，如GSOXXX；
 - (f) Symbol of cylinder manufacturer and inspector's official mark;
石油氣瓶生產商標記及檢查員印記；
 - (g) Water capacity in l; and
以升計的容水量；及
 - (h) Other markings as agreed by the Gas Authority.
其他氣體安全監督認可的印記。

(II) The following information for the cylinder valve shall also be provided:

以下氣瓶氣閥的資料亦須提供：

- (1) Manufacturer and model number of the valve shall be provided; and
須附上氣瓶氣閥生產商名稱及型號；及
- (2) Valve for which design approval has previously been granted in writing by the Gas Authority or Fire Service Department, the reference number of approval letter shall be provided; or
如該氣瓶氣閥已獲氣體安全監督或消防處以書面簽發的設計批准，該批准信件編號亦須附上；或
- (3) For approval of a new design, the following information for the cylinder valve shall be provided:
如屬於新設計的設計申請，以下氣瓶氣閥的資料須附上：
 - (a) Design standard and specification;
設計標準及規格；
 - (b) Two copies of design drawings showing details; and
附有細節的設計圖則各兩份；及
 - (c) Safety provisions in accordance with the regulation 9 of Gas Safety (Gas Supply) Regulations.
根據氣體安全（氣體供應）規例第9條所作出的安全措施。

APPENDIX D

**APPLICATION FORM 111 FOR APPROVAL TO USE
A CONTAINER WITH RELATED ANNEX 1**

表格 111
THE GOVERNMENT OF THE HONG KONG
SPECIAL ADMINISTRATIVE REGION
香港特別行政區政府
GAS SAFETY (GAS SUPPLY) REGULATIONS, CAP. 51
氣體安全(氣體供應)規例(第51章)
APPLICATION FOR APPROVAL TO USE A CONTAINER
申請批准使用儲存器

For Official Use Only: 只供本署填寫：
GasSO Reference 檔案編號
Date of Receipt 收件日期

Notes 注意：

- (1) This application form is to be used for applying to the Gas Authority for approval to use a container, i.e. cylinder or tank, etc. (but excluding mini-tank and disposable cylinder), to contain liquefied petroleum gas (LPG) as listed in section A(1) of this form and defined in the Gas Safety Ordinance, Cap. 51.
本申請表格用作向氣體安全監督申請批准使用儲存器，有關儲存器即表格甲(1)部所列及氣體安全條例(第51章)所界定的用作盛載石油氣的石油氣瓶或石油氣缸(但不包括小型石油氣缸及祇用一次的石油氣瓶)。
- (2) Before applying for approval to use a container, the applicant must have obtained type approval in writing from the Gas Authority using FORM EMSD/GSO/110 and where appropriate should have completed construction work.
於申請批准使用前，申請人須已使用申請表格 EMSD/GSO/110 取得氣體安全監督書面以書面發出的類型設計批准，並已完成建造工程。
- (3) Each application form should be used for an application for approval to use one batch of container with the same type.
每份申請表格只可用作申請同一批相同類型儲存器的使用批准。
- (4) The applicant should complete all sections of this application form in BLOCK letters and SIGN the form.
申請人應以正楷填寫申請表格各欄，並在表格上簽署。

Declaration:

聲明：

*I/We hereby apply for approval to use a container which has/have been constructed in accordance with the plans and statements approved in writing by the *Gas Authority/Director of Fire Services in the *approval letter ref. _____/approval number (GSO _____) dated ____/____/____, and all conditions of approval have been complied with. *I/We declare that all particulars, statements and documents submitted in/with this application form are true and correct.

*本人/我們現申請批准使用儲存器，而該儲存器是根據 *氣體安全監督/消防處處長於____年__月__日發出的 *批准信檔號_____/批准編號(GSO_____)中所批准的圖則而建造及陳述，並符合批准的條件。*本人/我們並謹此聲明，在本申請表格內填報的一切資料、所作的陳述及附上的文件全屬真實無訛。

Date: _____ Signature and Company Chop of Applicant:

日期：_____ 申請人簽署及公司蓋印：_____

Authorisation (if the applicant is not the owner of the installation, owner's authorisation to apply is required):

授權(若申請人並非裝置擁有人，擁有人必須授權申請人提出申請)：

*I/We hereby authorise the above applicant to apply for approval to use a container on *my/our behalf.

*本人/我們授權以上申請人代表 *本人/我們申請批准使用儲存器。

Date: _____ Signature and Company Chop of Owner:

日期：_____ 擁有人簽署及公司蓋印：_____

Section A: Particulars of Container

甲部： 儲存器詳情

- (1) Type of Container:
儲存器類型：
(i) Cylinder
 石油氣瓶
(ii) Tank
 石油氣缸
- (2) Serial number: _____
編號：
- (3) Purposes: *Domestic / Industrial / Dim Sum Trolley / Others: _____
用途： *住宅 / 工業 / 點心手推車 / 其他：
- (4) Location for Use (in case of Tank): _____
使用地點（如屬石油氣缸）：
- (5) Storage Capacity: _____ (*kg/ton)
儲存容量： (*千克/噸)
- (6) Water Capacity: _____ (*l/m³)
容水量： (*升/立方米)
- (7) Type of Withdrawal (in case of Cylinder): *Vapour/Liquid
抽取型式（如屬石油氣瓶）： *氣態 / 液態
- (8) Quantity of container to be put into use: _____
將使用儲存器的數量：
- (9) As-approved design drawing number: _____
已獲批准設計圖則號碼：
- (10) Name of Manufacturer: _____
生產商名稱：
- (11) Address of Manufacturer: _____
生產商地址：

Section B: Particulars of Gas Source

乙部： 氣體來源資料

Gas Supply Company: _____
氣體供應公司：

Section C: Particulars of Applicant

丙部： 申請人資料

- (1) Organization Name: _____
機構名稱：
- (2) Contact Person: _____
聯絡人：
- (3) Contact Address: _____
聯絡地址：
- (4) Telephone Number: _____ (5) Fax Number: _____
電話號碼： 傳真號碼：

Section D: Particulars of Owner (if different from section C)

丁部： 擁有人資料（如與丙部不同）

- (1) Organization Name: _____
機構名稱： _____
- (2) Authorized Person: _____
負責人： _____
- (3) Contact Address: _____
聯絡地址： _____
- (4) Telephone Number: _____ (5) Fax Number: _____
電話號碼： _____ 傳真號碼： _____

Section E: Photocopies of Documents to be submitted with this Application

戊部： 須連同本申請表格一併附上文件影印本

Type of Container 儲存器類別		Certificates/Reports 證明書 / 報告
(a)	Cylinder 石油氣瓶	ANNEX (I) 附件（一）
(b)	Tank 石油氣缸	ANNEX (II) 附件（二）

NOTES ON APPLICATION

申請須知

(1) **Submission of Application**

遞交申請方法

This application form shall be submitted with the documents as prescribed in Section E of the form, by hand or mail, to 'The Gas Authority, Gas Standards Office, Room 616, Electrical & Mechanical Services Department, 98 Caroline Hill Road, Causeway Bay, Hong Kong.' **Photocopy or facsimile of this form will not be accepted.**

申請表格必須連同申請表格內所提及的有關文件，送交或郵寄「香港銅鑼灣加路連山道九十八號六一六室機電工程署氣體標準事務處氣體安全監督」。申請表格如為影印本或以傳真方式遞交，概不受理。

(2) **Personal Data**

個人資料

The personal data collected by means of this form will be used by the Government to facilitate future communication between the Government and the data owner. The data will be kept at the Electrical & Mechanical Services Department and disclosed to the data users of the Department. The owner has the right of access and correction with respect to the personal data. Enquiries concerning the personal data collected, including the making of access and corrections, should be addressed to the Gas Authority.

藉本表格所收集的個人資料，將用以協助政府日後聯絡資料擁有人。一切資料將保存於機電工程署，並供機電工程署的資料使用者使用。資料擁有人有權查閱及更改其個人資料。如欲查詢有關本表格收集所得的個人資料，包括查閱及更改事宜，可與氣體安全監督聯絡。

ANNEX (I)
附件 (一)

**Application for Approval to Use an LPG Cylinder
as Defined in section E of Application Form EMSD/GSO/111
申請批准使用**

申請表格EMSD/GSO/111戊部所界定的石油氣瓶

(I) Information of LPG cylinder to be submitted with the Application:

須連同申請提交的石油氣瓶資料：

- (1) Serial numbers;
編號；
- (2) Mill certificate;
材料出廠證明書；
- (3) Record of hydraulic tests;
水壓測試記錄；
- (4) Certificate for chemical analysis of material;
氣瓶材料化學分析證明書；
- (5) Independent inspector's report;
獨立檢查員報告；
- (6) Record of physical tests of material;
氣瓶材料物質測試記錄；
- (7) Record of burst tests;
爆裂測試記錄；
- (8) Documents showing the arrival date and cylinder quantity, i.e. bill of lading, etc.; and
記錄有關氣瓶進口日期及數量的文件，如提貨單等；及
- (9) Record of quality assurance testing carried out by the owner.
由擁有人所進行的質量保證測試記錄。

(II) Information of cylinder valve to be submitted with the Application:

須連同申請提交的氣瓶氣閥資料：

- (1) Manufacturer;
生產商；
- (2) Model number; and
型號；及
- (3) Design standard and specification.
設計標準及規格。

Addendum No. 01/2023
增編第 01/2023 號
Addendum for Code of Practice for Hong Kong LPG Industry
Module 9 – LPG Cylinders
香港石油氣業工作守則 第9單元 石油氣瓶 的增編

(Taking effect from 1 April 2024)
2024年4月1日起生效

Clause 段落	Added clause 新增段落
7.6	<u>English Edition</u> Cylinder valves provided for cylinder for withdrawing liquefied petroleum gas in vapour form shall be equipped with self-closing feature which only enables gas to flow when a gas tight connection is made.
	<u>中文版</u> 供抽取氣態石油氣用的石油氣瓶氣閥須備有自動關閉功能，只可在氣體配件接駁穩妥後，氣體才能從氣瓶流出。
8.12	<u>English Edition</u> LPG cylinders carrying out revalidation test shall comply with the requirements stated in Clause 7.6 of this Code of Practice.
	<u>中文版</u> 接受覆檢測試的石油氣瓶須跟從本工作守則第7.6段的要求。