

## **GAS UTILISATION GUIDANCE NOTE : GU08**

### **MINIMUM REQUIREMENTS FOR THE STORAGE AND DISPLAY OF LPG DISPOSABLE CYLINDERS (CARTRIDGES) AT RETAIL OUTLETS**

The Gas Authority  
Electrical and Mechanical Services Department  
The Government of the Hong Kong Special Administration Region  
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## **1. SCOPE**

- 1.1 This Guidance Note is prepared as a general guideline for the Operators of Retail Outlets on the minimum requirements to store and/or display liquefied petroleum gas (LPG) disposable cylinders, where the total aggregate quantity of the containers at any one time within a premises is less than 130 litres water capacity (approximately 200 pieces for reference only).
- 1.2 LPG disposable cylinder is a container which is not constructed or intended to be refilled with LPG after once containing such gas. The word 'cartridge' is commonly used to mean this type of disposable cylinder, with capacity less than 1 litre.
- 1.3 The definition of LPG should be referred to the Gas Safety Ordinance, Cap.51.

## **2. LEGISLATIVE REQUIREMENTS**

- 2.1 The placing of LPG containers in any premises or part of any premises, in aggregate quantities more than 130 litres water capacity, constitutes the construction of a notifiable gas installation (NGI). Under Regulation 3 of the Gas Safety (Gas Supply) Regulations, Cap. 51, construction and use approval of an NGI from the Gas Authority is required.
- 2.2 When the total aggregate water capacity of the LPG containers is less than 130 litres, the placing/storage of containers is exempted from the approval requirements.
- 2.3 All disposable cylinders shall not be used to contain LPG unless it is of a type approved by the Gas Authority as prescribed by Regulation 7 of the Gas Safety (Gas Supply) Regulations, Cap. 51. It is necessary for the retailer to check with their suppliers to verify that any LPG disposable cylinder is of a type approved by the Gas Authority before the transfer of ownership.

### **3. TECHNICAL REQUIREMENTS**

#### **3.1 GENERAL REQUIREMENTS - STORAGE AND DISPLAY**

- 3.1.1 The exempted quantity applies to the complete premises and the aggregate quantity is for all LPG disposable cylinders including stock, display and use. Where quantities in excess of the exempted amount of 130 litres are required at any one time to meet demand, then it is necessary to construct a notifiable gas installation (NGI) and approval should be sought accordingly.
- 3.1.2 A total of not more than 15 kg (about 60 pieces) of LPG in disposable cylinders may be displayed for sale purposes in an area where the general public have access. The minimum requirements for storage and display of LPG disposable cylinders as outlined in section 3.2 and 3.3 should be complied with.
- 3.1.3 At least one fire extinguisher suitable for extinguishing an LPG fire should be readily accessible near the display area and the stock area. These should be dry powder extinguishers conforming to BS 5423 or equivalent of capacity of at least 2 kg.
- 3.1.4 Combustible wastes of straw paper and cardboard are a potential risk and should be removed immediately from stock areas. Never store LPG disposable cylinders near corrosive products which may adversely affect their safety. Good housekeeping cannot be over emphasised as a means of avoiding costly and damaging events.
- 3.1.5 The LPG disposable cylinders should be removed from their main packaging before being placed in the chamber. The LPG disposable cylinders should only be stored in an upright position and no other combustible material should be stored in the chamber.

#### **3.2 STOCK AREA**

##### **3.2.1 GENERAL**

- 3.2.1.1 The stock area shall be a chamber designed specifically for storing LPG disposable cylinders with a maximum total quantity of 130 litres water capacity. It should be located outside of the building. If not possible, it can be situated inside the building but with effective seal to prevent the leaked gas being penetrated into the building. It shall also has sufficient

permanent ventilation direct to open air. The chamber shall not be located below ground level and the general arrangement is indicated in Annex 1.

- 3.2.1.2 The chamber shall not be located directly above, or within 1 metre from any drains.
- 3.2.1.3 The chamber doors shall not be located within a designated means of escape from a building nor breach any part of the premises which provides for interior fire separation. The chamber should be readily accessible to facilitate quick removal of disposable cylinders in case of emergency.
- 3.2.1.4 The chamber doors or ventilation openings shall be located not less than 2 metres away from any fixed source of ignition.
- 3.2.1.5 The chamber shall be constructed of concrete, or other material having at least two hour fire resistance according to BS 476 or equivalent. In addition, the chamber shall be constructed of sufficient mechanical strength to protect the stored disposable cylinders.
- 3.2.1.6 Door(s) provided to the chamber shall be of a material having at least one hours fire resistance according to BS 476 or equivalent. The door(s) shall normally be locked when not in use.
- 3.2.1.7 The chamber should not normally be accessible to the general public or other unauthorised persons. Access of vehicles and mechanical handling equipment in the vicinity of the chamber shall be strictly controlled.

### **3.2.2 VENTILATION OF CHAMBER**

- 3.2.2.1 Ventilation openings of the chamber shall communicate with open air areas which afford adequate air movement (see Fig. 1.1, 1.2 and 1.3 of Annex 1). Such ventilation openings shall not be directed into adjacent buildings; designated means of escape from buildings; or any other hazardous areas.
- 3.2.2.2 Low and high level ventilation openings shall be provided. The minimum free area shall be:-
  - low level 100 cm<sup>2</sup> free area, or 1/100th of the chamber floor area, whichever is the greater.
  - high level 50 cm<sup>2</sup> free area, or 1/200th of the chamber floor area, whichever is the greater.

### **3.2.3 WARNING NOTICE**

Smoking and naked flames must be prohibited in and around chamber. A permanent notice shall be prominently displayed on the door(s) of the chamber in Chinese and English characters:

“LPG DISPOSABLE CYINDERS CHAMBER”;

「祇用一次的石油氣瓶儲存室」

“NO SMOKING OR NAKED FLAMES”.

「不准吸煙或點火」

### **3.3 DISPLAY AND POINT OF SALES AREAS**

- 3.3.1 A total of not more than 60 pieces (about 15kg) of LPG disposable cylinders may be displayed in packs of 4 (maximum) provided that they are in an upright position in a dry and well ventilated area clear of any other readily combustible materials for a minimum of 4.5m.
- 3.3.2 Shelves used for the storage of LPG disposable cylinders shall be of non-combustible materials and designed to support the weight of the disposable cylinders stored.
- 3.3.3 There should be provision for good means of access and escape to and from the display areas. Adequate access gangways should be provided and maintained to ensure unimpeded and rapid means of escape in the case of incident involving LPG disposable cylinders.
- 3.3.4 Care should be exercised to ensure that LPG disposable cylinders in window displays or lighted cabinets are not subject to direct sunlight, concentrated artificial light or placed close to lighted bulbs, heaters, hot pipes, hot air vents, or other heat sources. Suppliers are able to supply dummy packs for display purposes and these should be used wherever there is a possibility of disposable cylinders being overheated.
- 3.3.5 Container which has never been charged with LPG would not be considered as being an LPG cylinder.

## **4. SAFE PRACTICES**

### **4.1 CHARACTERISTICS AND HAZARDS OF LPG**

- 4.1.1 At normal atmospheric temperature and pressure, LPG exists as a gas, however, it is normally stored as a liquid inside pressurised containers. The liquid LPG is colourless and odourless.
- 4.1.2 At normal temperature, the LPG inside the disposable cylinder will have a pressure of approximately 300 kPa (about 43 psig). However, if the disposable cylinder is stored at an elevated temperature, near a heat source or under direct sunlight, the pressure of the LPG could increase considerably. If the LPG in the disposable cylinder is allowed to rise above 50<sup>0</sup>C, the increase in pressure could cause the LPG disposable cylinder to burst and release all of the contents. In a fire situation the disposable cylinder would burst and a fireball would be formed.
- 4.1.3 When liquid LPG escapes from a container it will expand rapidly to form LPG vapour approximately 250 times the equivalent volume of liquid released. If brought into contact with the skin, liquid LPG will cause severe frost burns due to the rapid vaporisation.
- 4.1.4 When LPG is mixed with air in a proportion between approximately 2% and 10%, an flammable LPG-air mixture is formed. If the proportion is outside this range, the mixture is either too weak or too rich to be ignited. In view of this small quantities of LPG, particularly in liquid form, escaping from a container can give rise to large volumes of LPG-air mixture and thus produce considerable hazard especially indoors.
- 4.1.5 If an LPG-air mixture within the flammable range is ignited, a flash fire will occur. If the mixture is ignited within a confined space with insufficient ventilation, an explosion will result.
- 4.1.6 LPG is heavier than air and because of this LPG will tend to fall to low level and flow along the ground into drains, cellars and basements and other low lying places. In still air with little or no ventilation at low level the vapour will persist for a very long time. Any LPG-air mixture arising from leakage may be ignited some distance from the point of leakage and the resulting flame may travel back to the point of leakage. Ignition could also occur later if the LPG is not diluted below its flammability limit.

- 4.1.7 The LPG stored in containers for use with normal gas appliance is odorised to enable detection of escaping gas by smell, well before the vapour/air mixture reaches the lower flammability limit. However, for cigarette lighter refill and aerosol disposable containers, the LPG is not odorised and therefore leakage may go by undetected.
- 4.1.8 In some circumstances, leakage of LPG (especially as liquid) may be noticed by sight. At the point of leakage, the cooling effect on the air surrounding causes condensation and even freezing of the water vapour.
- 4.1.9 A lighted match or other naked flames should not be used to trace a point of leakage. Not only is this extremely dangerous but it is also an offence under the Gas Safety Ordinance.
- 4.1.10 Used containers still retain flammable LPG vapour. Do not cut, grind, drill, weld, or re-use containers for any other use.

## **4.2 SAFETY AT WORK**

- 4.2.1 The following paragraphs give a general guidance on the safe handling of LPG disposable cylinder for the operatives working in store, retail, display, demonstration areas, point of sale, and etc.
- 4.2.2 All staff employed in the retail premises should be trained in emergency procedures, use of fire extinguishers and means of escape. Particular attention should be paid to ensure that staff and members of the public are evacuated as quickly as possible in the event of an incident.
- 4.2.3 Careful and safe handling of LPG disposable cylinders in the distribution chain makes a significant contribution to safety. High standard of cleanliness and tidiness should be maintained in stock, display, demonstration and point of sale areas.
- 4.2.4 It is essential to ensure that an adequate system of stock rotation is in use when retailing LPG disposable cylinders and that they are stocked in dry cool conditions and always on ground level only. A constant change of stock should be undertaken to ensure that old or out-dated disposable cylinders are not held in store for long periods of time. Such packs are potentially of greater hazard because of leakage due to corrosion. It is recommended that each consignment received should have a sign indicating the date of receipt, when stored.

- 4.2.5 Display of LPG disposable cylinders shall not be located on staircase, in passageways, near exit doors, next to flammable materials, or in any other place where they are likely to hinder or endanger a means of escape. In addition, smoking and naked lights must be prohibited from around the display area. When LPG disposable cylinders are used for demonstration purposes, no more than two shall be used at any one time i.e. connected to appliances.
- 4.2.6 Damaged or leaking disposable cylinders should be removed immediately to a well-ventilated, safe place preferably outdoors where there is no ignition source. The Emergency Services should be contacted as necessary in order to arrange a safe disposal method for leaking LPG disposable cylinders. Defective or dented LPG disposable cylinders should be returned to the supplier.
- 4.2.7 For retail premises with residential property adjacent or above, all the LPG disposable containers display should be returned into the stock area after business hours.
- 4.2.8 Particular care should be exercised when handling LPG disposable cylinders. They must not be dropped or allowed to come into violent contact with one another or any adjacent object.

*Annex 1*

**Location and Ventilation of  
LPG Disposable Cylinder Stock Area**

# Annex 1

## Location and Ventilation of LPG Disposable Cylinder Stock Area

