



Detailed Guidelines on Application

for Storage of

Category 2 and Category 5 Dangerous Goods

in Construction Sites

Hong Kong Fire Services Department

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1. General

1.1 Introduction

Flammable liquids and compressed gases are commonly used in construction sites. To name a few, paint, thinner, varnish & lacquer are commonly used for decoration purpose. The demand of petrol and diesel for fuelling power tools¹ and of oxygen and acetylene for flame cutting and welding are high in civil sites. Under Section 6 of Dangerous Goods Ordinance, Chapter 295, Laws of Hong Kong, no person shall store any such substances in excess of their respective exempted quantities in any premises or place without a licence issued by the Director of Fire Services [the Authority].

1.2 Objective and Scope

The objective of this Guide is to provide general information on the application procedures and design and construction of dangerous goods [DG] stores to facilitate the trade in acquiring relevant DG licences in construction sites having regard to the dynamic nature of the industry and temporary nature of the stores. This Guide serves as a reference to main contractors, subcontractors, managements, engineers, agents and safety personnel etc. for ensuring the fire safety in construction sites. It should be noted that it is not applicable to DG stores of permanent nature. In case of doubt, advice from the Authority should be sought from the Dangerous Goods Division of the Fire Services Department.

1.3 Exempted Quantity

The exempted quantities of some of the DG commonly used in construction sites are shown in the following table.

Dangerous Goods	Category	Exempted Quantity
Acetylene gas	2	2 cylinders
Compressed oxygen gas	2	2 cylinders
Paint, Lacquer & Varnish	5	250 litres
Paint Thinner	5	20 litres
Diesel Oils	5	2500 litres
Petrol	5	20 litres

1.4 Approved Tank

Standard containers for transportation conforming to the International Maritime Dangerous Goods Code are generally acceptable for the storage of flammable liquids. Additionally, storage tanks for diesel oils require approval from the Authority in accordance with Regulation 99A of Dangerous Goods (General) Regulations, Cap 295B.

- Pursuant to Section 19(1) of Fire Services (Fire Hazard Abatement) Regulation, Chapter 95, Laws of Hong Kong, any person who, possesses any Cat 5 dangerous goods for the purpose of a business of supplying such dangerous goods for transferring to the fuel tank of a motor vehicle in any premises where there is without a valid Dangerous Goods Licence, commits an offence and shall be subject to direct prosecution.*

2. Application Procedures

2.1 Submission of Applications

2.1.1 General

Any application for a licence to store any DG in construction sites shall be made in writing to the Authority. The application shall be accompanied by 2 sets of plans, to be drawn as nearly as may be to the scale, and be accompanied by a statement in writing giving the nature and type of DG and the maximum quantities to be stored together with necessary information as explained later in this Guide. In case the submission is acceptable, one set of the endorsed plans would be returned to the applicant and the other set retained by the Authority.

2.1.2 Preparation for Applications

An applicant should decide on the siting and construction of the store and associated facilities in the planning stage. All applications shall be made to the Dangerous Goods Division of the Fire Services Department.

Address : 4/F, Fire Services Department Kwai Chung Office Building,
86 Hing Shing Road, Kwai Chung, New Territories.
Tel. : 2417 5757
Fax : 2413 0873

If an applicant is not conversant with the technical details required of a submission, he is advised to appoint an experienced agent for smooth processing. To facilitate processing, submission could be made in the form of Appendix A or by e-mail at fsdgd@hkfsd.gov.hk.

2.2 Submitted Plans

2.2.1 Site Plans

As far as practicable, site location plans should be drawn to the scale of not less than 1:1000. All dimensions should be given in metric units. The boundary of the construction site, the exact locations of the stores, safety distance together with other details such as buildings in the vicinity, temporary structures, major installations and vehicular access road within 100 metres of the store under application should be shown on the site plans. A sample plan is shown at Appendix B. For easy identification of the exact location of the site, a location plan incorporating nearby development or structures should also be submitted.

2.2.2 Layout Plans

As far as practicable, layout plans of the proposed DG store shall be drawn to the scale of not less than 1:100. All dimensions should be given in metric units. The plan and side elevations of the store shall be shown. Details of the construction material, means of ventilation, entrance door, arrangement of the storage of DG, provisions of fire service installations (FSI) and protection against lightning shall be clearly indicated. If bulk storage tank is involved, the design and construction of the bulk tank, its tankage, ancillary container, pipelines and dispensing facility or pumping equipment with relevant standards shall also be indicated. Some sample layout plans are shown in Appendix C(1) & (2).

2.3 Processing Procedures

2.3.1 Initial Inspection

An initial inspection would be conducted within 14 working days upon receipt of an application. Where necessary, minor amendments could be made to the submitted plans and be signed or sealed by the applicant or his authorized representative. A set of the endorsed plans together with comments and a set of Fire Services requirements will be returned to the applicant within 28 working days to be counted from the date of application for retention and compliance. Some sample requirements are shown in Appendix D. In case major discrepancies are noted, all the plans would be returned to the applicant unendorsed. Resubmission would be processed in the like manner as that of new submission.

2.3.2 Follow-up Inspection

Applicants are reminded that upon completion of works, they should notify the Authority in writing or by phone. Follow-up inspection would be conducted within 7 working days on receipt of notification. Applicants and their representatives attending the follow-up inspection would be advised of the outstanding requirements, if any, followed by written confirmation. Particular attention is drawn to the need for the ultimate licensee to acknowledge receipt in writing of a set of the fire safety requirements and the endorsed plans.

2.3.3 Issue of Licence

Applicant will be informed to collect the DG Store licence within 6 working days upon confirmation of full compliance with the safety requirements. The applicant has to pay the fee and collect the licence at the designated shroff office. Fees are specified in Regulation 183 of the Dangerous Goods (General) Regulations and are set in accordance with the quantity of DG licensed to store.

2.3.4 General Duty of Care

A DG licence is not transferable. It should be displayed in a conspicuous location inside the DG store for inspection by the Authority. Licensees are required to observe the licensing conditions stipulated at the back of the licence at all time.

2.3.5 Annual Renewal of Licence

Licences so issued will be renewed annually. An issued licence will only be renewed upon confirmation of full compliance with all licensing conditions.

2.3.6 Relocation of a mobile DG Store within the boundary of the same construction site

On the occasion of relocation of an approved DG store, the licensee is required to notify

the Authority of the new location of the DG store through submitting new site plans. Upon approval, the original licence shall be returned to the Authority for amendment. Fee for making alteration to a licence for storage of Category 2 and 5 DG is \$275 each.

2.3.7 Cancellation of Issued Licence

When a DG store is no longer in use, the licensee shall notify and return the licence to the Authority for cancellation.

3. General Guidelines on Safety Provisions

3.1 Ventilation

3.1.1 Ventilation Requirements

The objective of ventilation is to provide sufficient air circulation to prevent accumulation of leakage. Natural ventilation can be effected through the provision of high and low ventilators on opposite walls of a store. To ensure adequate ventilation, fixed openings with a total area not less than 1% of the total area of walls shall be provided.

3.1.2 Specifications of Ventilators

For effective ventilation, each opening shall have a minimum size of 200mmx200mm and evenly distributed. Ventilators should be of weather proof type and fitted with mesh wires. For Cat 5 DG stores, the low level ventilators shall be at least 300mm above ground level and not lower than the doorsill. For Cat 2 DG stores, the low level ventilators shall be at least 150mm above ground level. The high level ventilators shall be higher than the cylinders or drums to be stored and be as near to the roof as possible.

3.2 Electrical Equipment

Electrical equipment provided in Cat 2 & Cat 5 DG stores, if any, shall be of explosion proof type conforming to the BS EN 60079. Its wirings shall comply with the Electricity (Wiring) Regulations, Chapter 406, Laws of Hong Kong.

3.3 Containment

3.3.1 Design and Construction of Containers Requiring Approval

If a bulk tank is used for the storage of flammable liquid, it shall be tested by professionals recognized by the Director of Fire Services. A certificate of suitability is required to be submitted to the Authority after the test. The bulk tank, its tankage, ancillary container, fuel pipeline and dispensing facility or pumping equipment shall be of approved type.

3.3.2 Spillage Control

With regard to Cat 5 DG stores or bulk tanks in open area, the doorsill or bunding sill shall be at least 300mm above ground level or shall be capable of retaining 100% of the flammable liquids to be stored, whichever is the higher.

3.4 Separation

3.4.1 Design and Construction of Store Enclosure

A DG store shall be constructed of materials with not less than 2-hour fire resistance period (FRP) or of mild steel of at least 6mm thick. Doors provided shall be of self-closing type and open outwards/sliding. They should be made of material with at least 1-hour FRP or mild steel with not less than 3mm thickness.

3.4.2 Siting of the Store

No DG store shall be placed underneath a bridge or flyover. A clear distance of 6 metres from any discharge opening of a staircase shall be maintained. No naked flame, forge, heat source of substantial heat, combustible material and dry undergrowth is allowed within 6 metres perimeter of the DG store unless separated by an approved fire resisting wall. For bulk tank in open area, a clearance of not less than 4m radius shall be maintained.

3.5 Fire Service Installation

3.5.1 Fixed Sprayer Unit

DG store for storage of Cat 2 (flammable gases) or Cat 5 dangerous goods with cubic volume less than 42.5m³ should be protected by a fixed sprayer unit. The amount of extinguishing agent shall be in accordance with the scale as shown in Appendix E. The sprayer unit should be installed to the ceiling of the DG store and will actuate at 68°C. An automatic closing device in the form of fire dampers/shutters equipped operated by fusible links at 57 – 63°C shall be provided to the high and low ventilators of the dangerous goods store.

3.5.2 Portable Equipment

One 4.5 kg CO₂ fire extinguisher and two buckets of sand shall be provided outside each Cat 5 DG store. As to Cat 2 DG store, one 9-litre water type fire extinguisher shall be provided. Relevant Dangerous Goods plates, “No Smoking” signs and appropriate symbols for the fixed sprayer units shall be marked on or near the entrance door.

3.5.3 Installation and Maintenance

All fitting and maintenance of FSI such as fixed sprayer unit, fusible links and fire extinguishers shall be installed and certified by registered FSI contractors using the prescribed form FS251. The list of FSI contractors is available at any fire stations or the Dangerous Goods Division for reference. The information is also available at the FSD Website at <http://www.hkfsd.gov.hk/eng/cert.html>.

3.6 Safety Management

Security arrangement such as locking of DG stores and fencing off open storage areas shall be provided to prevent trespassing or tampering. A clearance of at least 300mm from low level ventilators and doorsill shall be maintained for effective ventilation and fire separation for stores. Similar clearance is also required if the high level ventilator is lower than the top of the DG. All gas cylinders should be stowed in upright position and chained up to prevent toppling.

To : Director of Fire Services

Application for Dangerous Goods Licence(s)/Approval(s)

I intend to apply for Dangerous Goods licence(s)/approval(s) under Section 6 of Dangerous Goods Ordinance/Regulation 99A of Dangerous Goods (General) Regulations, Chapter 295, Laws of Hong Kong.

Ultimate Licensee/User

Name of Person / Company* in English :

Name of Person / Company* in Chinese :

Hong Kong Identity Card / Passport* No.# :

Business Registration Certificate No.# :

Certificate of Incorporation No.# :

Correspondence / Registered* Address:

Contact Tel. No. :

Fax. No. :

Applicant(if not same as the ultimate licensee)

Name of Person / Company* in English :

Name of Person / Company* in Chinese :

Hong Kong Identity Card / Passport* No.# :

Correspondence Address :

Name of Contact Person :

Contact Tel. No. :

Fax. No.

Applicant's Signature

()

Date :

Legend:

* Delete as inappropriate

With photocopy

Please refer to the Statement on Collection of Personal Data in connection with the application(s) for Dangerous Goods Licence(s) or Approval(s).

Supplementary InformationConstruction Site

Address : _____

Main Contractor : _____

Location of the DG store : _____

Attached site plan(s)[2 copies] : _____

Attached layout plan(s)[2 copies] : _____

Descriptions of Dangerous GoodsCategory 2 (Compressed Gas)

<u>Name of DG</u>	<u>No. of cylinders</u>	<u>Cylinder size</u>	<u>Water capacity</u>	<u>Pipeline (Yes/No)*</u>
Oxygen	_____	_____	_____	_____
Acetylene	_____	_____	_____	_____
Others (_____)	_____	_____	_____	_____

Category 5 (Flammable Liquid)

<u>Name of DG</u>	<u>Number</u>	<u>Capacity</u>	<u>Dispensing facility (Yes/No)*</u>
Petrol (in tank/drum)*	_____	_____	_____
Diesel (in tank/drum)*	_____	_____	_____
Thinner (in tin/drum)*	_____	_____	_____
Paint/Lacquer/Vanish	_____	_____	_____
Others (_____)	_____	_____	_____

Details of the Dangerous Goods StorePre-approved type provided by HKO (Cat 2 DG): **DGW No. S/00/01/13** is attached (Yes/No)*

If no, please complete the following items a. to e.

a. Material of construction with FRP : _____

b. Total floor area of the store : _____

c. Internal volume of the store : _____

d. Means of ventilation : (Natural / Mechanical) * _____

e. Size of Ventilators : _____

Distance from the nearest building or public area : _____

Height of door curb or bunding sill (Cat 5 DG): _____

Fire service installation provided : _____

Other relevant information : _____

* Delete as inappropriate

Statement on
Collection of Personal Data in Connection with
Application for Dangerous Goods Licence(s) or Approval(s)
(In accordance with the Personal Data (Privacy) Ordinance)

The personal data provided by means of this form will be used by the Fire Services Department for carrying out activities relating to the applications for the issue/renewal of dangerous goods licence(s)/approval(s) and facilitating communication among staff of this department, other Government departments and your goodself. The provision of personal data by means of this form is voluntary. However, if you do not provide sufficient information, your application for licence(s)/approval(s) may not be processed.

The personal data that you have provided by means of this form may be disclosed to other Government departments and agencies in pursuance of the above-mentioned purposes.

You have the right to access and correct with respect to personal data as provided for in accordance with sections 18 and 22 and Principle 6 of Schedule 1 of the Personal (Privacy) Ordinance. Your right of access includes the right to obtain a copy of your personal data that you have provided by means of this form.

Enquiries concerning the personal data collected by means of this form, including the making of access and corrections, should be in writing to the Director of Fire Services via the respective licensing offices quoting the file reference of this department.

Address of Licensing Office

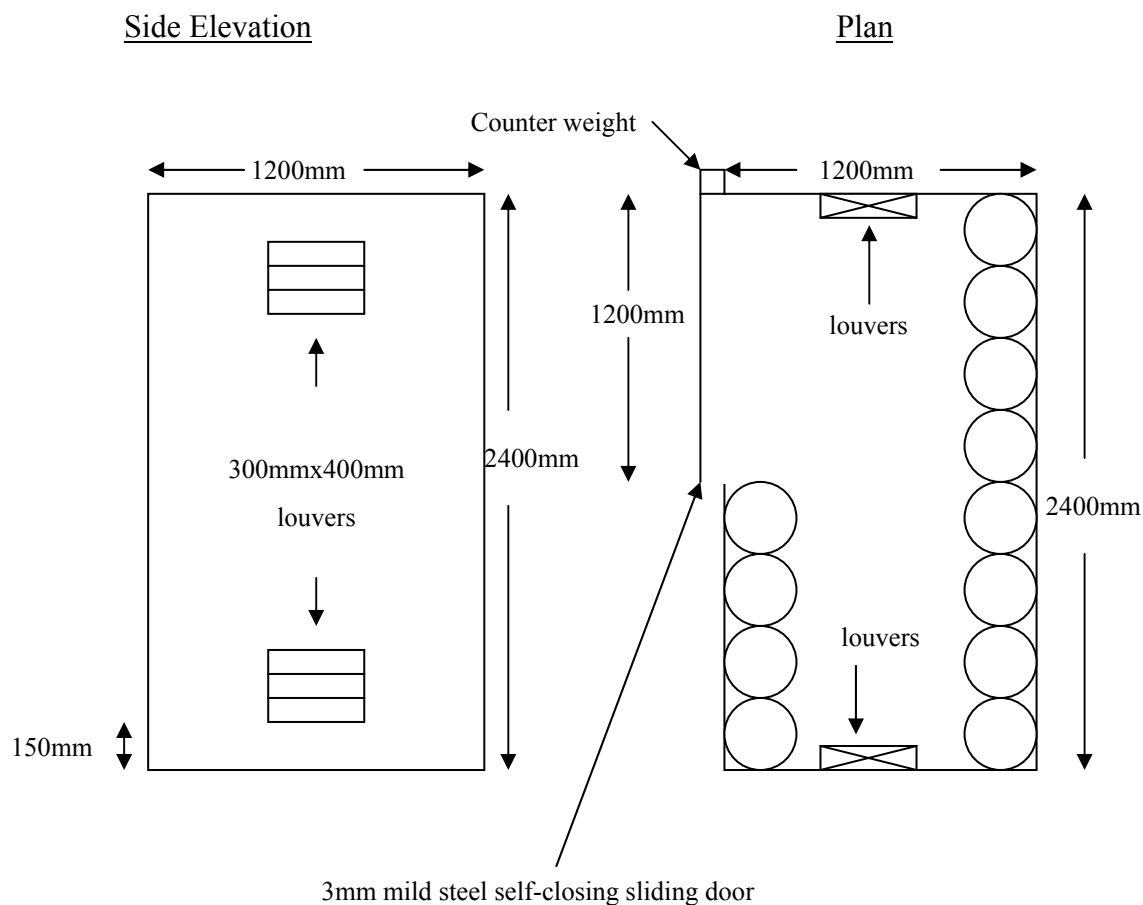
Dangerous Goods Division
Licensing & Certification Command,
4/F, Fire Services Department Kwai Chung Office Building,
86 Hing Shing Road, Kwai Chung, New Territories.

Tel. : 2417 5757

Fax : 2413 0873

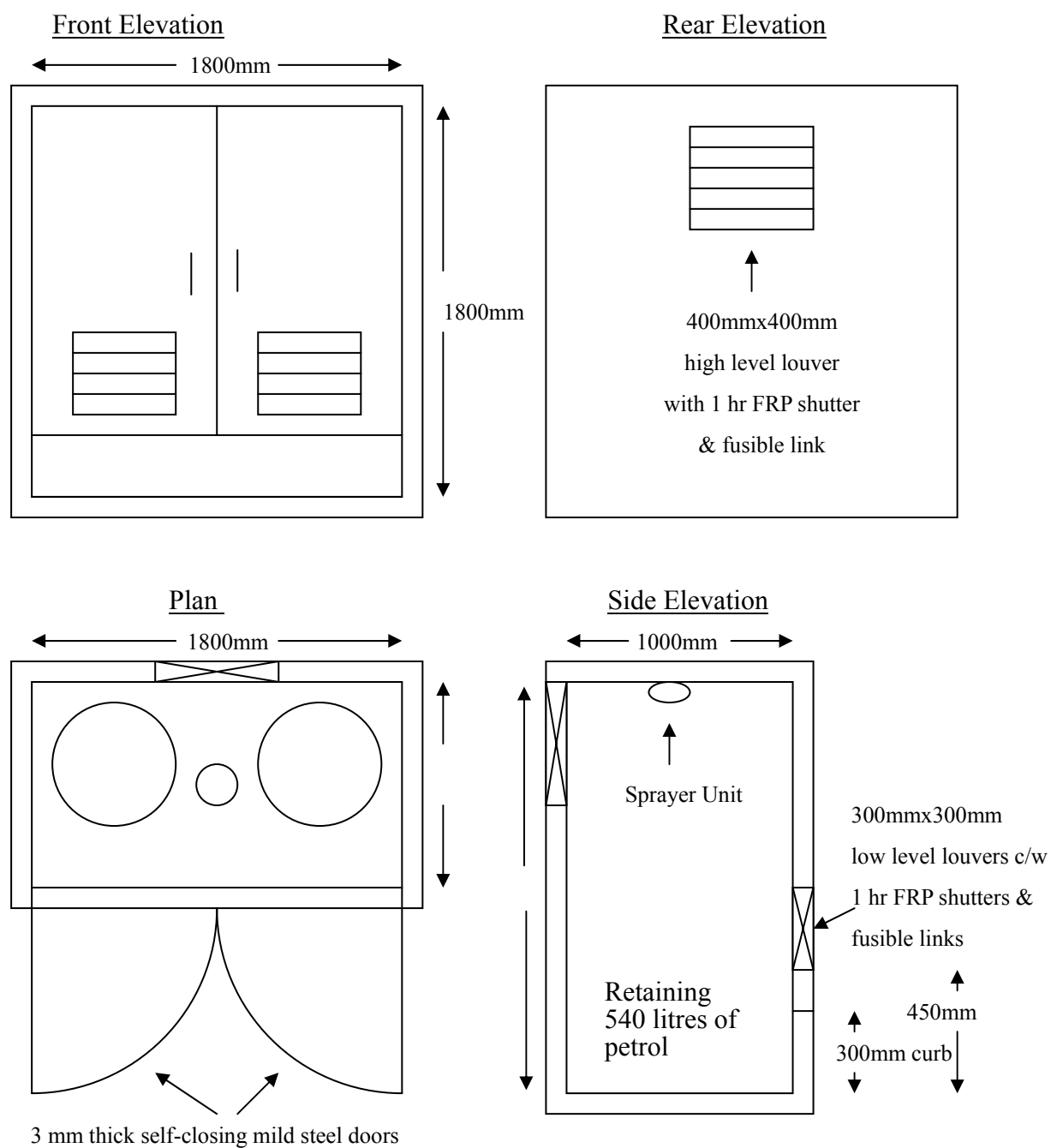
Email : fsdgd@hkfsd.gov.hk

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Typical Layout Plan for Cat 2 DG StoreNotes

1. All walls, roof and floor shall be made of 6mm mild steel plate
2. The 3mm mild steel self-closing door is operated either by counter weight and pulley system or by self-closing device
3. Storage of 12 oxygen cylinders.
4. Total area of wall and roof = $(1.2\text{m} + 2.4\text{m}) \times 2 \times 2.4\text{m} + 1.2\text{m} \times 2.4\text{m} = 20.16\text{m}^2$
5. Total ventilation area = $0.3\text{m} \times 0.4\text{m} \times 4 = 0.48\text{m}^2$.
6. Internal volume = $2.4\text{m} \times 1.2\text{m} \times 2.4\text{m} = 6.9\text{m}^3$.

Drawing No.	ABC/123/DG/02
Scale	1 : 30
DG Store.	Oxygen Store
Location of store	Open ground, outside block 11
Address	ABC Garden Construction Site, Phase 2, 123 XYZ Road, Hong Kong

Typical Layout Plan for Cat 5 DG Stores

Note : All walls, roof and floor shall be made of building materials with 2 hours FRP.

Drawing No.	ABC/123/DG/04
Scale	1 : 30
Store No.	Store No. 2 (Storage of 400 litres petrol in 2x200 litre metal drums)
Location of store	Open ground, outside block 11
Address	ABC Garden Construction Site, Phase 2, 123 XYZ Road, Hong Kong

REQUIREMENTS FOR STORAGE OF CATEGORY 2

DANGEROUS GOODS (GAS CYLINDERS)

(Oxygen in Cylinder)

1. The Dangerous Goods Store to be provided in accordance with plans approved by the Director of Fire Services.
2. High and low level ventilators covered internally with wire gauze and externally with non-corrodible metal gratings to be provided to the Store.
3. 'NO SMOKING' notices and the names of the DANGEROUS GOODS in 120mm English and Chinese characters to be painted on the door of the Store.
4. A compressed gas pictorial plate, which may be purchased from Licensing and Certification Command Headquarters, to be provided and fixed at a conspicuous position above the main entrance to the Store.
5. One 9-litre water type fire extinguisher to be provided outside the Dangerous Goods Store near the doorway.
6. The interior of the Dangerous Goods Store and around the premises to be cleared of rubbish and maintained in a clean and tidy condition.
7. The used cylinders shall be placed in the Store.
8. Any fixed installation of fire service installations, if provided in the Dangerous Goods Store (including heat/smoke detector heads and mounting bases) shall be installed in accordance with the relevant LPC Rules/NFPA Codes for hazardous areas as appropriate.
9. Any fixed electrical installation after completion shall be inspected, tested and certified by an electrical worker/contractor registered by the Director of Electrical and Mechanical Services. A copy of the 'Work Completion Certificate' shall be forwarded to the Director of Fire Services as proof of compliance. The installation shall thereafter be inspected once every 12 months and the "Periodic Test Certificate" (Form WR2) be submitted to this Department for reference. (Note:- Normally no electrical installation would be required in DG store in construction site)
10. The ultimate licensee/user must confirm in writing to the Fire Services Department the receipt of the approved plans and the set of Fire Services Requirements.
11. The store shall be kept locked when not being attended.
12. Lightning rod and earthing connections shall be provided to the store.

REQUIREMENTS FOR STORAGE OF CATEGORY 2

DANGEROUS GOODS (GAS CYLINDERS)**(Acetylene in Cylinder)**

1. The Dangerous Goods Store to be provided in accordance with plans approved by the Director of Fire Services.
2. High and low level ventilators covered internally with wire gauze and externally with non-corrodible metal gratings to be provided to the Store.
3. 'NO SMOKING' notices and the names of the DANGEROUS GOODS in 120mm English and Chinese characters to be painted on the door of the Store.
4. A compressed gas pictorial plate, which may be purchased from Licensing and Certification Command Headquarters, to be provided and fixed at a conspicuous position above the main entrance to the Store.
5. One 9-litre water type fire extinguisher to be provided outside the Dangerous Goods Store near the doorway.
6. The interior of the Dangerous Goods Store and around the premises to be cleared of rubbish and maintained in a clean and tidy condition.
7. The used cylinders shall be placed in the approved Dangerous Goods Store.
8. Any fixed installation of fire service installations, if provided in the Dangerous Goods Store (including heat/smoke detector heads and mounting bases) shall be installed in accordance with the relevant LPC Rules/NFPA Codes for hazardous areas as appropriate.
9. All other electrical installations and equipment used in the Dangerous Goods Store shall be installed in accordance with BS EN 60079 and other relevant standards acceptable to the Director of Fire Services. (Note:- Normally no electrical installation would be required in DG store in construction site)
10. Any fixed electrical installation after completion shall be inspected, tested and certified by an electrical worker/contractor registered by the Director of Electrical and Mechanical Services. A copy of the 'Work Completion Certificate' shall be forwarded to the Director of Fire Services as proof of compliance. The installation shall thereafter be inspected once every 12 months and the "Periodic Test Certificate" (Form WR2) be submitted to this Department for reference. (Note:- Normally no electrical installation would be required in DG store in construction site)
11. An automatic closing device in the form of fire dampers/shutters equipped with fusible links operated at 57 – 63°C shall be provided to the high and low ventilators of the dangerous goods store. The device shall be installed by a registered fire service installation contractor and the copy certificate issued shall be forwarded to the Director of Fire Services upon completion.

12. A fixed automatically operated appliance, i.e. a sprayer unit containing an inert extinguishing medium of a quantity adequate for the protection of the Store/Room shall be provided. Indication of the automatic protection to be provided on the door of the respective Store/Room.
13. The ultimate licensee/user must confirm in writing to the Fire Services Department the receipt of the approved plans and the set of Fire Services Requirements.
14. The store shall be kept locked when not being attended.
15. Lightning rod and earthing connections shall be provided to the store.

REQUIREMENT FOR STORAGE OF CATEGORY 5 DANGEROUS GOODS

1. The Dangerous Goods store to be provided in accordance with plans approved by the Director of Fire Services.
2. High and low ventilators covered internally with double fine brass wire gauze of nominal aperture size not greater than 0.65mm and externally with non-corrodible metal gratings to be provided to the store.
3. The low level ventilators to be situated immediately above the level of the door sill.
4. A door sill of at least 300 mm above the floor level of the storage place to be provided.
5. 'NO SMOKING' notices and the names of the Dangerous Goods in 120mm English and Chinese characters to be painted on the door of the store.
6. A 'Cat 5 DG' plate, which may be purchased from Licensing and Certification Command Headquarters, to be provided and fixed at a conspicuous position above the main entrance to the premises.
7. One 4.5 Kg CO₂ fire extinguisher and two buckets of sand to be provided outside the Dangerous Goods store near the doorway.
8. The interior of the Dangerous Goods store and around the premises to be cleared of rubbish and maintained in a clean and tidy condition.
9. Empty tins/drums shall be placed in the approved dangerous goods store.
10. Any fixed installation of FSI, if provided in the Dangerous Goods Store (including heat/smoke detector heads and mounting bases) shall be installed in accordance with the relevant LPC Rules/NFPA Codes for hazardous areas as appropriate.
11. All other electrical installations and equipment used in the Dangerous Goods Store shall be installed in accordance with BS EN 60079 and other standards acceptable to the Director of Fire Services. (Note:- Normally no electrical installation would be required in DG store in construction site)

Appendix D(3)

12. Any fixed electrical installation after completion shall be inspected, tested and certified by an electrical worker/contractor registered by the Director of Electrical and Mechanical Services. A copy of the “Work Completion Certificate” shall be forwarded to the Director of Fire Services as proof of compliance. The installation shall thereafter be inspected once every 12 months and the “Periodic Test Certificate” (Form WR2) be submitted to this Department for reference. (Note:- Normally no electrical installation would be required in DG store in construction site)
13. An automatic closing device in the form of fire dampers/shutters equipped with fusible links operated at 57 – 63°C shall be provided to the high and low ventilators of the dangerous goods store. The device shall be installed by a registered fire service installation contractor and the copy certificate issued shall be forwarded to the Director of Fire Services upon completion.
14. A fixed automatic operated appliance, i.e. a sprayer unit containing an inert extinguishing medium of a quantity adequate for the protection of the store/room shall be provided. Indication of the automatic protection shall be provided on the door of the respective store/room.
15. The ultimate licensee/user must confirm in writing to the Fire Services Department the receipt of the approved plans and the set of Fire Services Requirements.
16. Lightning rod and earthing connections shall be provided to the store.

Fixed Sprayer Units

1. NAFS-III and HCFC-124 fixed sprayer units are acceptable for use for protection of small Category 5 Dangerous Goods Stores and certain types of electrical installations with volume less than 44m³. Calculation of the amount of extinguishing agent required to protect any particular risk is made on the following basis.

NAFS-III	HCFC-124
1 Kg to cover 2.75m ³	1.1 Kg to cover 2.1m ³
2 Kg to cover 5.5m ³	1.9 Kg to cover 3.5m ³
4 Kg to cover 11m ³	3.1 Kg to cover 5.7m ³
9 Kg to cover 24.76m ³	4.1 Kg to cover 7.5m ³
12 Kg to cover 33m ³	5.7 Kg to cover 10.5m ³
16 Kg to cover 44m ³	7.2 Kg to cover 13.5m ³
	10.7 Kg to cover 19.8m ³
	13.8 Kg to cover 25.5m ³
	15.3 Kg to cover 28.3m ³
	19.5 Kg to cover 36.1m ³

2. Layout plans for fixed sprayer units are to be submitted for consideration prior to installation.
3. All premises protected by fixed sprayer units shall be marked with the appropriate symbol as specified on design, colour and size on or near the entrance door.