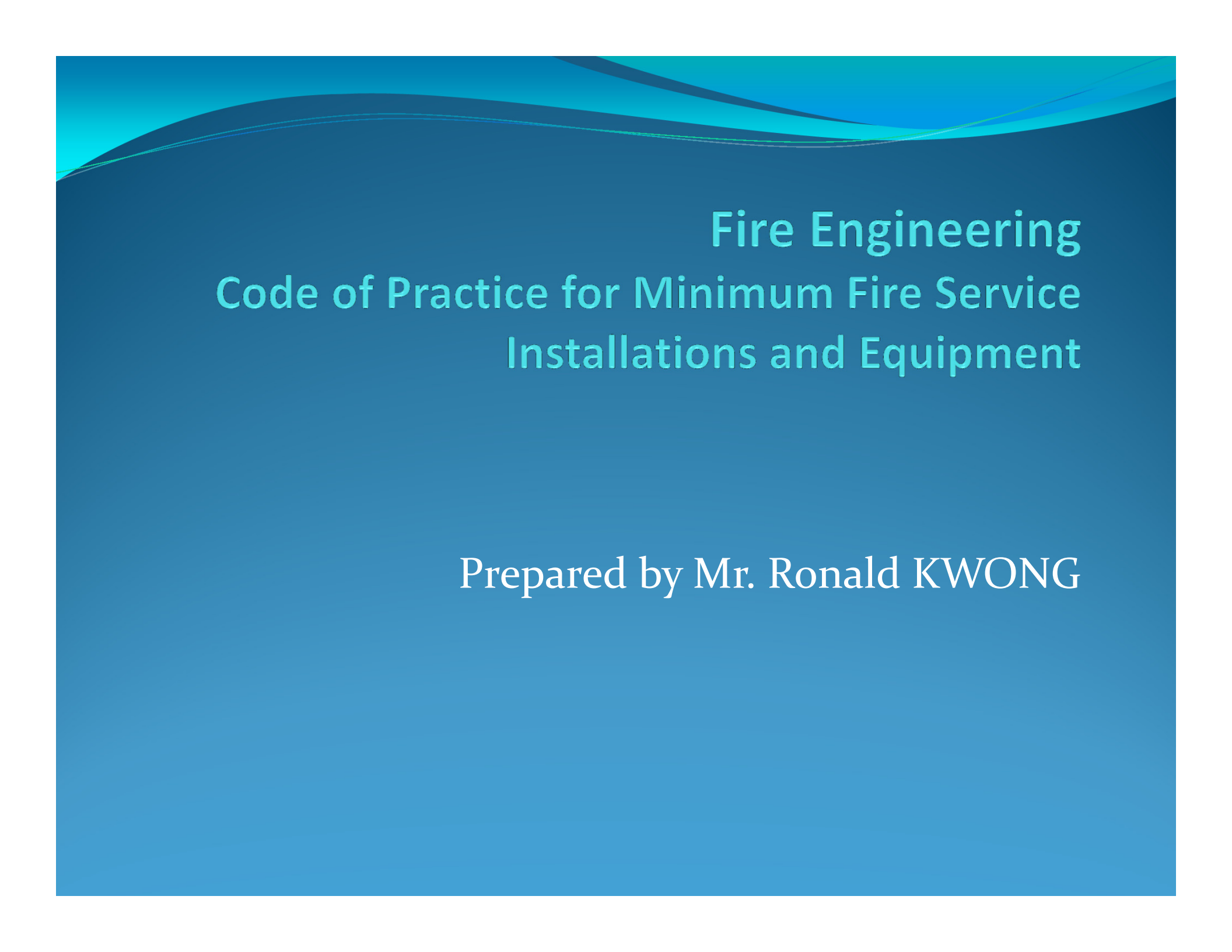




# Fire Engineering Code of Practice for Minimum Fire Service Installations and Equipment

Prepared by Mr. Ronald KWONG

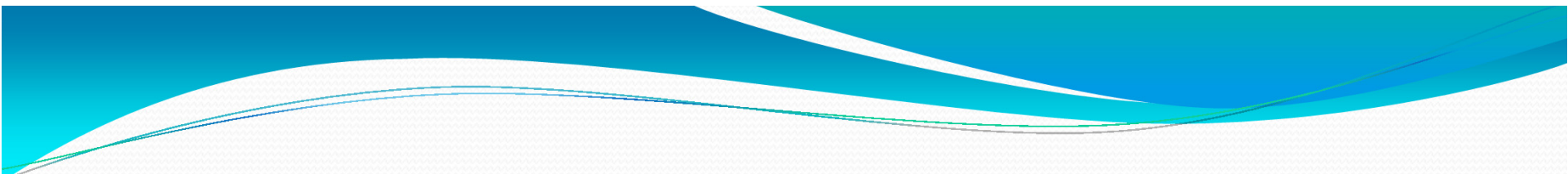


# Code of Practice for Minimum Fire Service Installations and Equipment

Fire and Fire Fighting Installation

Passive Fire Fighting Installations

Active Fire Fighting Installations



# Code of Practice for Minimum Fire Service Installations and Equipment

## Active Fire Fighting Installations

E.g.

- Street fire hydrant;
- External fire hydrant;
- Hydrant and hose reel system;
- Automatic sprinkler system; Drencher System, Water Spray system
- Gas Flooding System(FM 200 / CO<sub>2</sub>)
- Alarm Fire alarm system and Manual Fire Alarm;
- Smoke Extraction system and Pressurization System;
- Electrical power supply;
- Emergency lighting and Exit Sign



# Code of Practice for Minimum Fire Service Installations and Equipment

## Passive Fire Fighting Installations

E.g.

- Fire Rated Enclosure / Partition;
- Mean of Escape ;
- Fire Door

# Code of Practice for Minimum Fire Service Installations and Equipment

**What is/are the Rule(s) for Design of Fire hydrant and hose reel Installation in Hong Kong?**

## History

- Code of Practice for Minimum Fire Service Installations and Equipment
- Fire Service Department's Circular Letters
- International Standard (eg BS and LPC rules)
- Particular attention shall be made to Clause 1.3 of the Codes of Practice stipulating that the Director of Fire Services (i.e. his delegated representative officer also) may vary any requirement of the code in particular cases. This gives the F.S.D. the final power to specify F.S. provisions to buildings.

# Code of Practice for Minimum Fire Service Installations and Equipment

**What is/are the Rule(s) for Design of Fire Services Installation in Hong Kong? How do we do?**

Purpose of the premises (Building)

- Commercial Building
- Residential Building
- Industrial Building
- Composite Building
- Other Buildings (E.g. School, Hospital or Station)

# Code of Practice for Minimum Fire Service Installations and Equipment

## Fire Hydrant / Hosereel System

Part 1

# Fire Hydrant / Hose Reel Installation

## Design of Fire Hydrant and Hose reel (FH/HR) Installation

**What is/are the Rule(s) for Design of Fire hydrant and hose reel Installation in Hong Kong?**

- Code of Practice for Minimum Fire Service Installations and Equipment**
- Fire Service Department's Circular Letters**

# Fire Hydrant / Hose Reel Installation

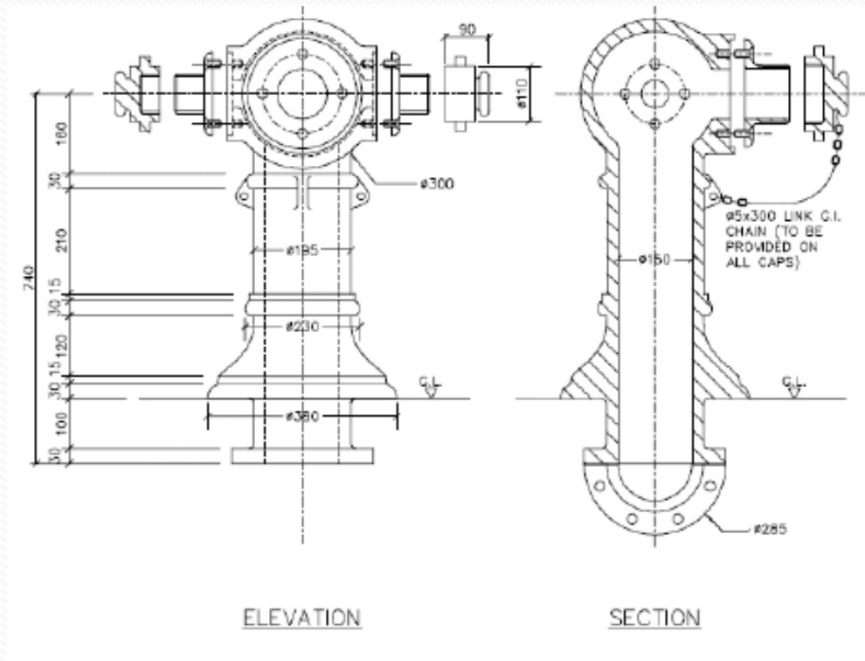
## Design of Fire Hydrant and Hose reel (FH/HR) Installation

### Equipment of Fire Hydrant/Hose Reel in Hong Kong

- a. Fixed Fire Pump (F S Pump)
- b. Intermediate Booster Pump
- c. Transfer Pump (Sump Pump)
- d. Fire Hydrant
- e. Hose Reel
- f. Fire Service Inlet
- g. Fire Service Tank
- h. Fire Service Transfer Tank

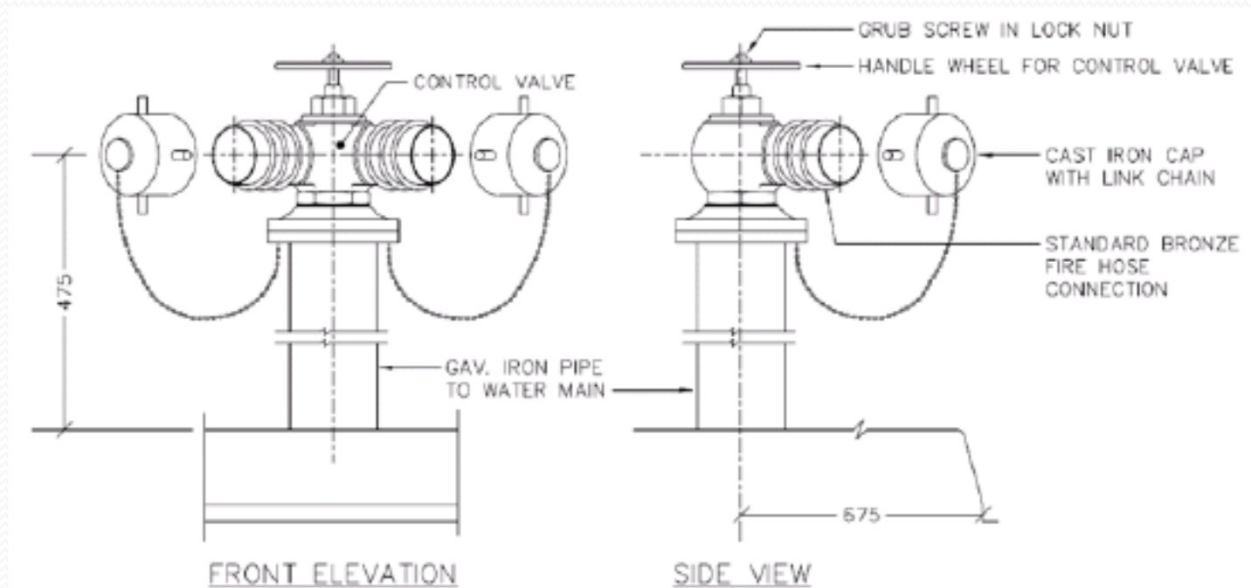
# Fire hydrant and hosereel system

- Type of Fire Hydrants
  - Street Fire Hydrant System
    - Use as a water well to supply water for fire brigade
    -
  - External Fire Hydrant System
    - For Fireman to extinguish the fire in open area e.g. Railway station, Building development where fire brigade cannot arrive
  - Internal Fire Hydrant System
    - For Fireman to extinguish the fire inside building
    -

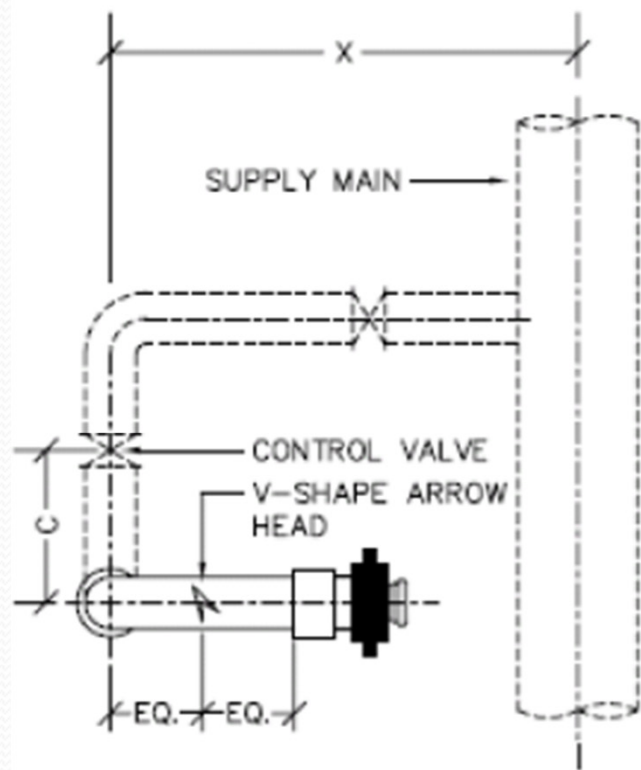


Details for Street Fire Hydrant

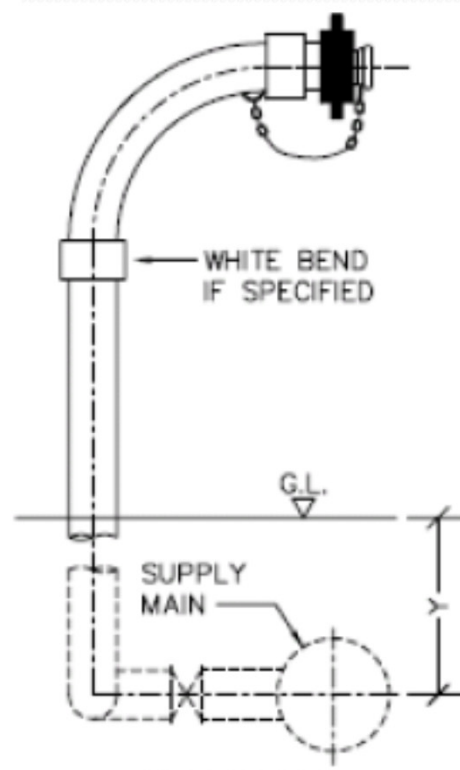
# Details of External Fire Hydrant



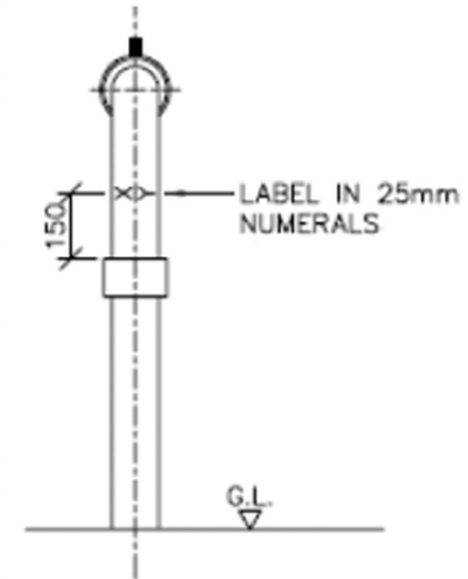
# Swan Neck Hydrant



PLAN

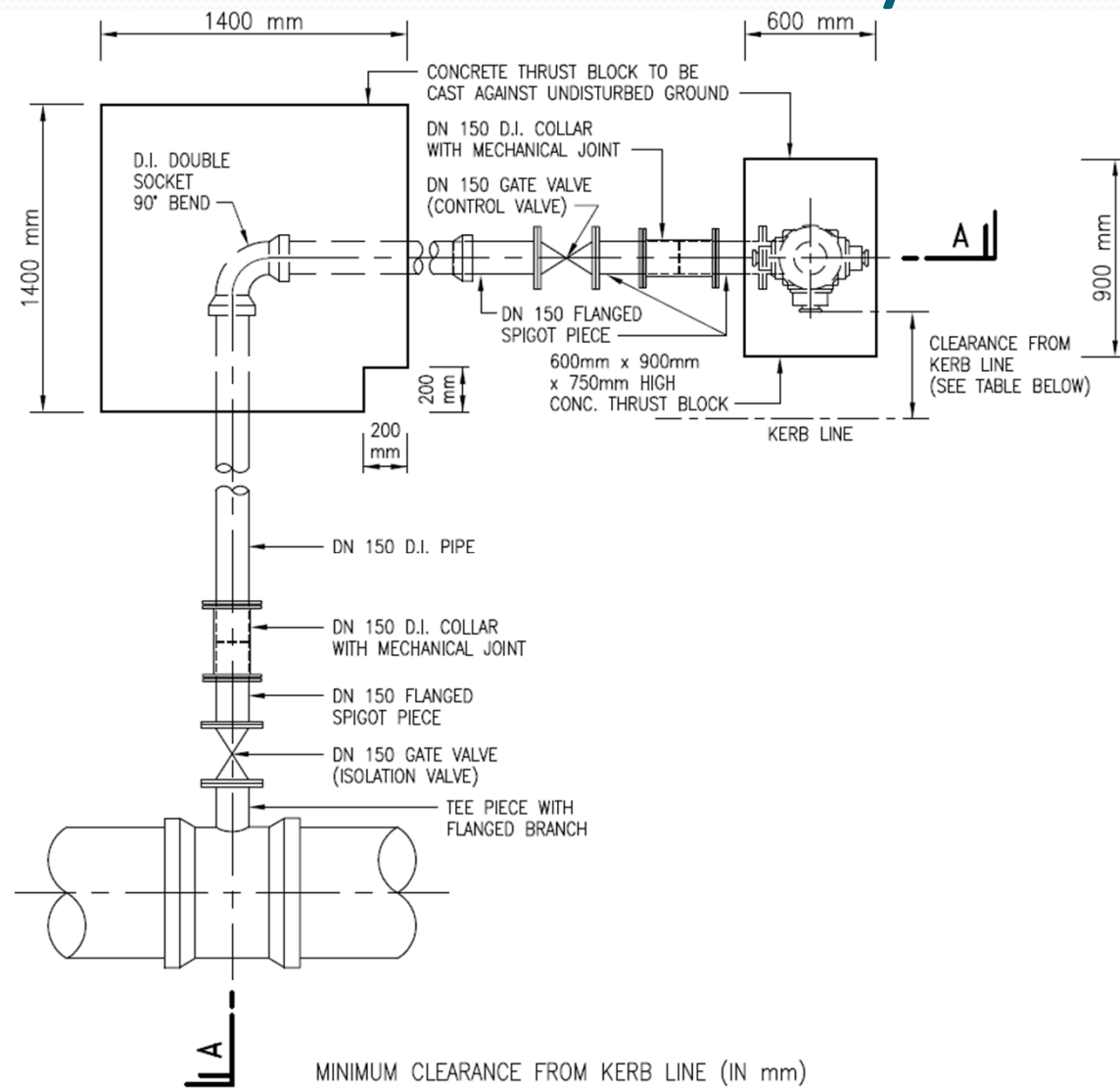


ELEVATION

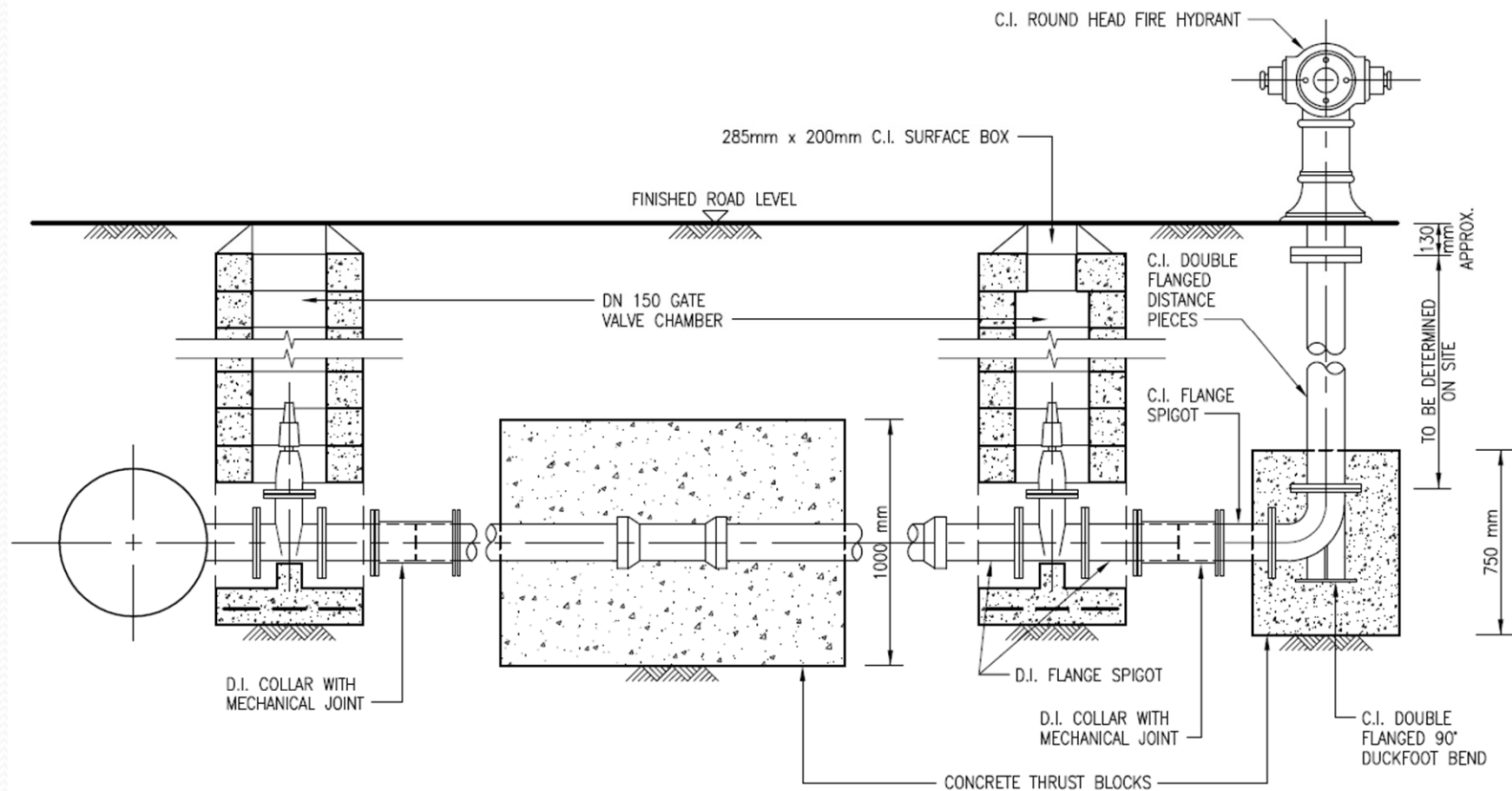


SIDE VIEW

# Installation of Street Fire Hydrant



# Installation of Street Fire Hvdrant



**SECTION A - A**

**NOTES :**

1. THE CAP OF THE CONTROL VALVE SPINDLE SHOULD BE AT 250mm APPROX. BELOW THE VALVE COVER AND IN NO CASE SHOULD THE DISTANCE BE MORE THAN 500mm.

**SECTION OF THE TYPICAL INSTALLATION OF DN 150 STREET FIRE HYDRANT**



## Fire Hydrant / Hose Reel Installation

### **Street Fire Hydrant**

Spacing between fire hydrants should be 100 metres staggered on alternative sides of the roadway wherever practicable.

The hydrant shall be of an accepted standard pattern and, when tested in accordance with provision of BS 1042 with one 65mm outlet working, shall be capable of delivering not less than 2,000 litres per minute (33.3 l/sec.) with a minimum running pressure of 170 kPa at the outlet.

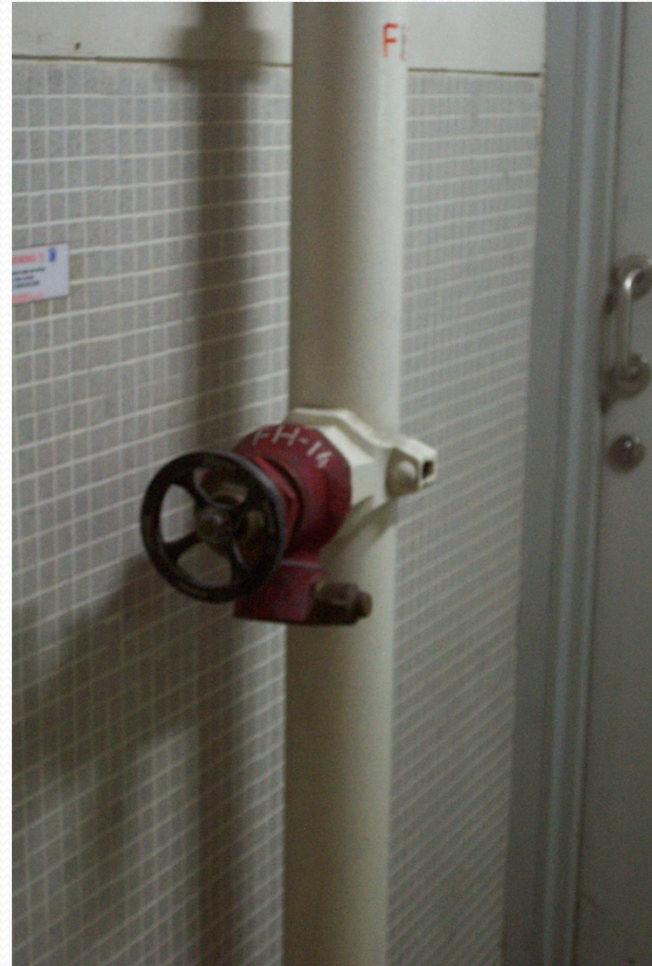
The minimum output at para. 3.3 above should where possible be made available from two 65mm outlets of a system delivering at the same time, i.e. a total output of not less than 4,000 litres per minute (66.7 l/sec.).

**(HKFSD Circular letter no.4 / 96 Part X, item3)**

# Fire hydrant and hosereel system

- (Internal) Fire Hydrant System
- For Fireman to extinguish the fire inside building
- Hose reel

# Details of Fire Hydrant



# Fire Hydrant / Hose Reel Installation

## Design of FH/HR Installation

### **Fire Hydrant and Hose reel system (FS system)**

#### **When Fire Hydrant is required?**

**The hydrant shall be prominently sited in an approach lobby to a staircase or in the staircase enclosure**

**The hydrant shall be of non-corrosive metal. Each outlet of all hydrants shall be of male round thread or female instantaneous type conforming to British Standard 336 and be individually controlled by a wheel-operated screw valve designed to open by counterclockwise rotation. The direction of opening of the valve shall be clearly engraved in both English and Chinese on the wheel of the valve.**

**(Please refer to COP page 55)**



## **Fire Hydrant / Hose Reel Installation**

### **Design of FH/HR Installation**

**Fire Hydrant and Hose reel system (FS system)**

**industrial/godown buildings**

**other types of Buildings**



## **Fire Hydrant / Hose Reel Installation**

### **Design of FH/HR Installation**

#### **Fire Hydrant and Hose reel system (FS system)**

**The nominal bore of the rising main, in industrial/godown buildings shall be not less than 100 mm. Each rising main shall supply 2 hydrant outlets per floor.**

**The nominal bore of the rising main in other types of buildings shall be not less than 80 mm. Each rising main shall supply one hydrant outlet per floor.**

**Each rising main shall be provided with a standard Fire Service Inlet at ground floor level. Where the intermediate booster pump is interposed between the Fire Service Inlet and the hydrant outlets, provision must be made for the water supplied to the Inlet to by-pass this pump in the event of failure of the pump.**

**(Please refer to COP page 59)**



## **Fire Hydrant / Hose Reel Installation**

### **Design of FH/HR Installation**

#### **Fire Hydrant and Hose reel system (FS system)**

**All rising and down coming mains shall be permanently primed with water and fitted with air relief valves at suitable locations to prevent air lock in the installation.**

**The header pipe shall be positioned close to Fire Service Inlet(s) wherever practicable, with a maximum height of 30 m above ground level. The diameter of the header pipe shall be not less than 150 mm nominal bore for industrial/godown buildings and 100 mm nominal bore for other buildings.**

**(Please refer to COP page 59)**



## **Fire Hydrant / Hose Reel Installation**

### **Design of FH/HR Installation**

#### **Fire Hydrant and Hose reel system (FS system)**

**The hydrant outlet shall be not less than 800 mm nor more than 1 200 mm above finished floor level. (Please refer to COP page 55)**

#### **When Intermediate Booster pump is required?**

**In all buildings where the height between the topmost hydrant and the lowest Fire Service Inlet is in excess 60 m, shall be maintained by intermediate booster pump incorporated in the rising main system  
(Please refer to COP page 57)**

#### **Fire Service Inlet**

**Installation level of the inlet coupling shall be not less than 600mm nor more than 1000mm above finished floor level**

**(Please refer to COP page 58)**

# Design Requirements in Fire Hydrant System

| Building Type                 | System                 | Fixed Fire Pump                                |                  | Intermediate Booster Pump                      |                  |
|-------------------------------|------------------------|------------------------------------------------|------------------|------------------------------------------------|------------------|
|                               |                        | Flow                                           | Running Pressure | Flow                                           | Running Pressure |
| Industrial / Godwin Buildings | 1 Rising Main          | 450 l/min. x 3 Outlet<br>1350 l/min x 1 Outlet | 350kPa – 850kPa  | 1350l/min. x 1 Outlet<br>450l/min. x 3 Outlet  | 350kPa – 850kPa  |
|                               | 2 Or More Rising Mains |                                                |                  | 2700l/min. x 1 Outlet<br>450 l/min. x 6 Outlet |                  |
| Domestic Buildings            | NA                     | 450 l/min. x 2 Outlet<br>900 l/min. x1 Outlet  |                  | 900l/min. x 1 Outlet<br>450l/min. x 2 Outlet   |                  |
| Other Buildings               | 1 Rising Main          |                                                |                  | 900l/min. x 1 Outlet<br>450l/min. x 2 Outlet   |                  |
|                               | 2 Or More Rising Mains |                                                |                  | 1800l/min. x 1 Outlet<br>450l/min. x 4 Outlet  |                  |

# Fire Hydrant / Hose Reel Installation

## Design of FH/HR Installation

### Fire Service Tank

The minimum effective quantity of water required to be available, having regard to the floor area factor of the largest floor is as follows:

#### Water storage

##### Floor area (gross) required

|                                            |                  |
|--------------------------------------------|------------------|
| Not exceeding 230 m2 .....                 | 9 000 l (9 m3)   |
| Over 230 m2 but not exceeding 460 m2 ..... | 18 000 l (18 m3) |
| Over 460 m2 but not exceeding 920 m2 ..... | 27 000 l (27 m3) |
| Over 920 m2 .....                          | 36 000 l (36 m3) |

(Please refer to COP page 72)



## Fire Hydrant / Hose Reel Installation

### Design of FH/HR Installation

#### **Indirect Water Supply**

**Water supply via the Town Main to Fire Service Transfer Tank (Sump Tank) and then refill to Fire Service Tank by FS Transfer pump**

**If the tank is situated at upper level of building and a transfer pump is required to relay water to the tank, the pump capacity shall be able to refill the tank to its full capacity within 6 hours. The transfer pump shall be powered by essential power supply.**

**(Please refer to COP page 58)**

# Fire hydrant and hosereel system

- Calculation for the 36m<sup>3</sup> FS water tank is filled within 6 hours

$$\therefore \text{Flow rate} = \frac{\text{Tank Volume}}{\text{Time}} = \frac{36\text{m}^3 \times 1000\text{litres/m}^3}{6\text{ hours} \times 3600\text{s/hr.}}$$

$$\text{Flow rate} = 1.67\text{l/s}$$



## **Fire Hydrant / Hose Reel Installation**

### **Design of FH/HR Installation**

**Hose reel system (FS system)**

**When Hose Reel is required?**

**The hose reel should normally be located in occupied units/areas to enable the occupants of the building to attack a fire. However, in case of a building having a number of small units, hose reels may be located in common areas immediately outside the occupied units/areas on that floor to provide coverage**

**(Please refer to COP page 56)**

# Hose Reel System

消防用水

嚴禁作其他用途

USE OF WATER FROM FIRE SERVICES  
FOR PURPOSES OTHER THAN FIRE  
FIGHTING IS STRICTLY PROHIBITED

水務監督辦事處

Office of the Water Authority

WSD Instruction Plate



FSD Instruction Plate



Typical Installation



## **Fire Hydrant / Hose Reel Installation**

### **Design of FH/HR Installation**

#### **Hose reel system (FS system)**

- Control valve and nozzle are at a position above and not more than 1 350 mm from the finished floor level.**
- Rising mains and associated pipework used for the hose reels shall be not less than 40 mm nominal bore and pipes feeding individual hose reel shall not be less than 25 mm nominal bore.**
- The doors shall bear the words “FIRE HOSE REEL” (消防喉轆), lettering of which shall be of at least 50 mm high.**
- Notice shall be affixed immediately below the words “FIRE HOSE REEL” on the outer surface of the door.**
- Standard wordings in English and Chinese characters of at least 5 mm high in red lettering on white background**  
**(Please refer to COP page 60 )**



## **Fire Hydrant / Hose Reel Installation**

### **Design of FH/HR Installation**

#### **Hose reel system (FS system)**

**– The tubing of every hose reel shall not exceed 30 metres in length and be capable of being wound round a drum of not less than 150 mm in diameter and led around sharp obstructions without kinking. When fitted with hose reel nozzle, the tubing shall be capable of projecting a jet not less than 6 metres in length.**

**(Please refer to COP page 60 )**

# **Fire Hydrant / Hose Reel Installation**

## **Design of FH/HR Installation**

### **Fire Hydrant and Hose reel system (FS system)**

#### **Fixed Fire Pump**

- The fixed fire pump shall be duplicated for duty and standby use.**
- The motor/engine driving the fixed fire pump shall be rated to give 20% more power in addition to the hydraulic power required for the rated flow of the system.**
- The fire pump starting control shall be wired through a selector switch for duty and standby pump selection.**
- Should the duty pump electrically or mechanically fail to operate within 15 seconds the standby pump shall be energized to become the duty pump.**
- The status of each fixed fire pump comprising “Power Supply On”, “Pump Running” and “Pump Failed” shall be monitored and displayed at the pump control panel.**

**(Please refer to COP page 62)**

# Manual Fire Alarm – Breakglass Unit



Breakglass Unit

# Manual Fire Alarm –Fire Alarm Bell



Fire Alarm Bell



# Fire Hydrant / Hose Reel Installation

## Design of FH/HR Installation

### Manual Fire Alarm (MFA)

**– Manual fire alarm system shall comply with relevant sections of British Standard 5839: Part 1.**

**Pure manual systems such as hand bells, whistles, rotary gongs, etc. are not within the scope of this Code, however, subject to the approval of the Director of Fire Services, an existing sound signal system within a premises may be utilized as a manual fire alarm system (e.g. school premises)**

**(Please refer to COP page 58 )**

# Manual Fire Alarm – Visual Fire Alarm

Visual Fire Alarm



**Visual alarm signals in addition to audio warning devices shall be provided to form part of the fire alarm system in accordance with the current Design Manual: Barrier Free Access. The visual alarm signals shall be in the form of flashing red lights, labelled —FIRE ALARM (火警) (height of English letters and Chinese characters shall not be less than 10 mm & 15 mm respectively.**

**(Please refer to COP page 59 )**

# Manual Fire Alarm – Visual Fire Alarm

- Design of the visual alarm signals shall conform to NFPA 72 with red flashing lights or British Standard 5839: Part 1.
- In addition to DC supply and back-up power from battery, all visual fire alarm (VFA) systems may alternatively be powered by AC supply with secondary supply from emergency generator or electricity obtained before the main switch.
- ,The visual alarm signal shall be in form of red flashing light and the minimum rating of a VFA shall be 15 cd. For spacing, the basic requirement is that the flashing light should be visible to normal eyesight in all areas required to be protected. A broad guideline for the installation is that one VFA point shall be located near every hose reel and alarm point. Each compartment shall be provided with at least one VFA point and the maximum distance between two VFA points shall not exceed 60 m.

(Please refer to COP page 59 )



## **Fire Hydrant / Hose Reel Installation**

### **Design of FH/HR Installation**

#### **Manual Fire Alarm (MFA)**

- manual actuating points shall be provided at each hose reel point and, in particular, adjacent to all storey exits (or the entrance lobby in lieu if such lobby leads only to the storey exits) within a distance of not more than 2 m and adjacent to all staircase exits to open air on ground storey or place of ultimate safety. Where the building is provided with a caretaker's or management office, one actuating point and the repeater panel for showing a common fire alarm signal and a common fault signal of the main panel shall be provided therein.**
- The manual fire alarm system shall be linked to the fire detection system and the Fire Services Communication Centre by direct line where a fire detection system is provided for the building.**

**(Please refer to COP page 59 )**



## **Fire Hydrant / Hose Reel Installation**

### **Design of FH/HR Installation**

#### **Manual Fire Alarm (MFA)**

- The centre of manual fire alarm call points shall be positioned at prominent and accessible locations near the hose reels at a level of not more than 1 200 mm above finished floor level.**
- Upon actuation of any manual fire call point in the building, the fixed fire pump(s) shall come into operation regardless of the zoning of the manual fire alarm call point.**
- Upon actuation of any manual fire call point in the building, the fixed fire pump(s) shall come into operation regardless of the zoning of the manual fire alarm call point.**

**(Please refer to COP page 59 )**



## **Fire Hydrant / Hose Reel Installation**

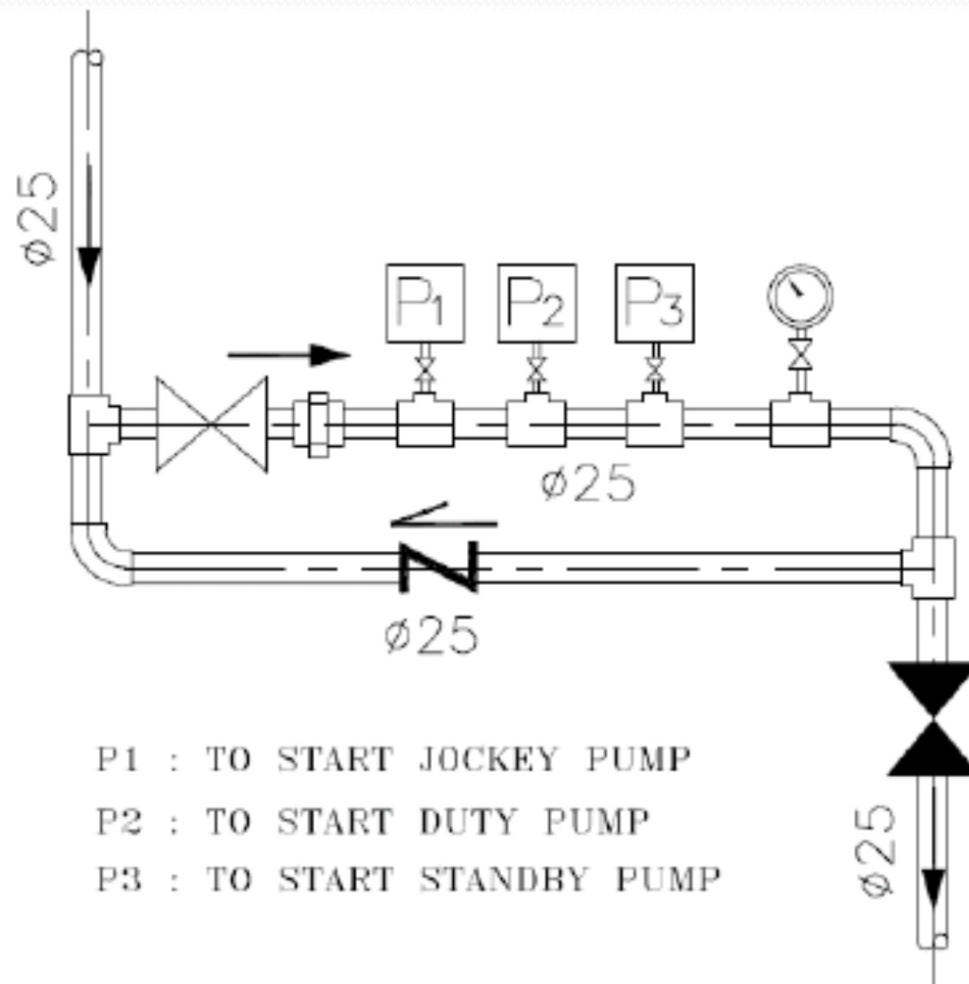
### **Design of FH/HR Installation**

#### **Manual Fire Alarm (MFA)**

- For podium having shared staircase(s) linking one or more building blocks above, upon actuation of any manual fire call point in any of such building block, both the fixed fire pump serving the corresponding building block and the fire pump serving the podium shall come into operation. Upon actuation of any manual fire call point in the podium, the fixed fire pump serving the podium shall come into operation.**
- An independent indication shall be provided at the fire control centre or at the main entrance of the building to indicate the floor upon which the manual fire alarm call point has been actuated.**

**(Please refer to COP page 61 &62 )**

# FS Pump Control Assembly



## Fire Hydrant / Hose Reel Installation

### Example

**The height from the top of the fire hydrant to fire services inlet is 100m.**

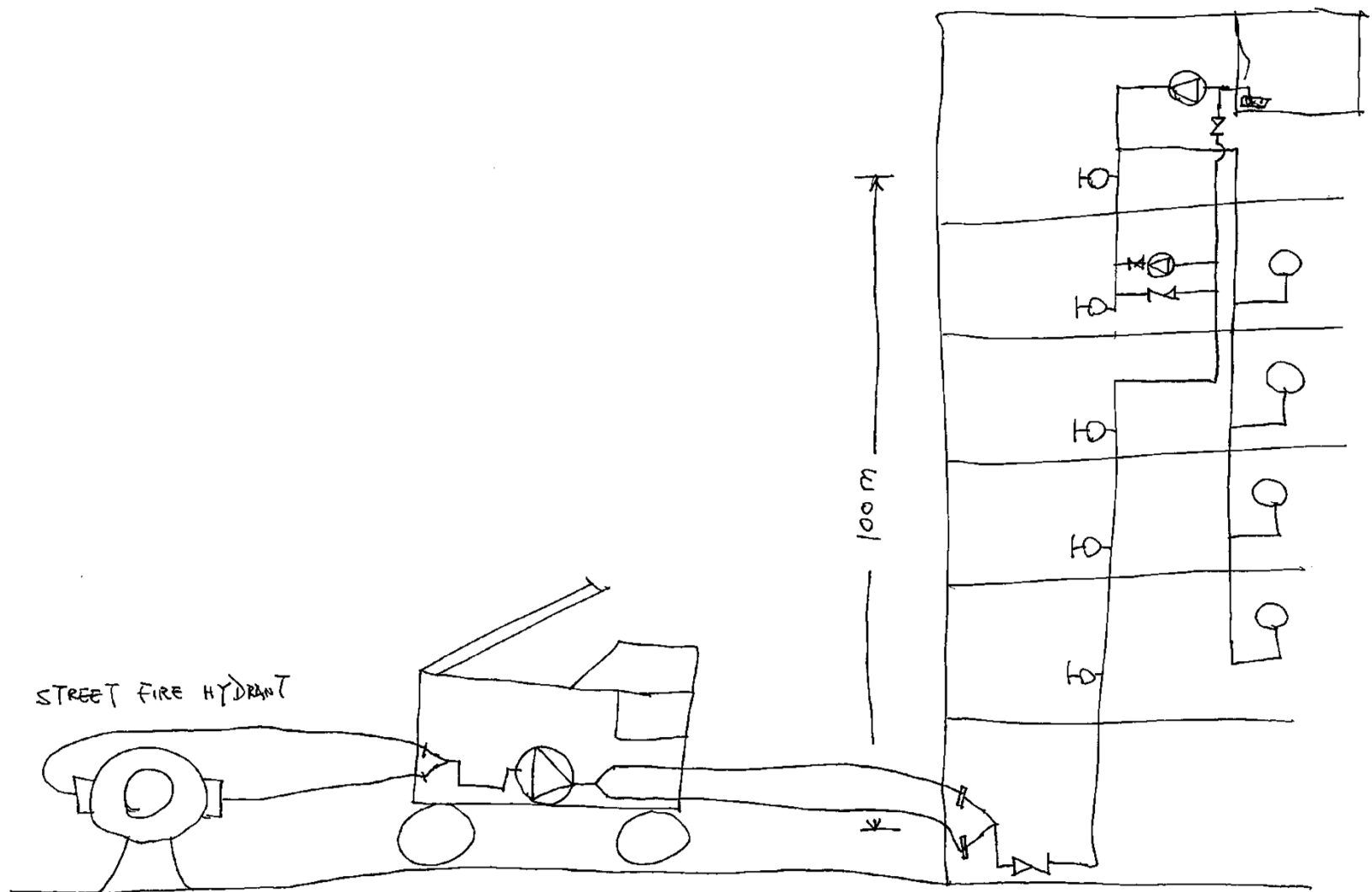
**Please determine the pressure of the Intermediate Booster pump.**

**Gravity Head : 100m (10bar)**

**Minimum pressure from top of the fire Hydrant : 3.5 bar ( 4 bar)**

**Pump head from fire engine : - 8 bar**

**Intermediate Booster pump pressure = Gravity Head + Minimum pressure  
from top of the fire Hydrant + Pump head from fire engine**





## **Fire Hydrant / Hose Reel Installation**

### **Design of FH/HR Installation**

**Intermediate Booster pump pressure = Gravity Head + Minimum pressure  
from top of the fire Hydrant + Pump head from fire engine**

**Intermediate Booster pump pressure = 10bar + 4 bar + (- 8 bar)  
= 6 bar**

# Sprinkler System

# Specification of Sprinkler System

|                                       |                                                                                                                             |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| Before 1 April 1995                   | Rules of the F.O.C. for Automatic Sprinkler Installations.<br>F.O.C. Rule<br>F.O.C. – Fire Offices' Committee               |
| From 1 April 1995 to 31 December 2006 | Rules for automatic sprinkler installations<br>L.P.C. Rule BS 5306 Part 2<br>L.P.C. – Loss Prevention Council               |
| Before 1 January 2007                 | Fixed firefighting systems –<br>Automatic sprinkler system –<br>Design, installation and<br>maintenance<br>BS EN 12835:2003 |

# Automatic Sprinkler Installation

## Design of Sprinkler Installation

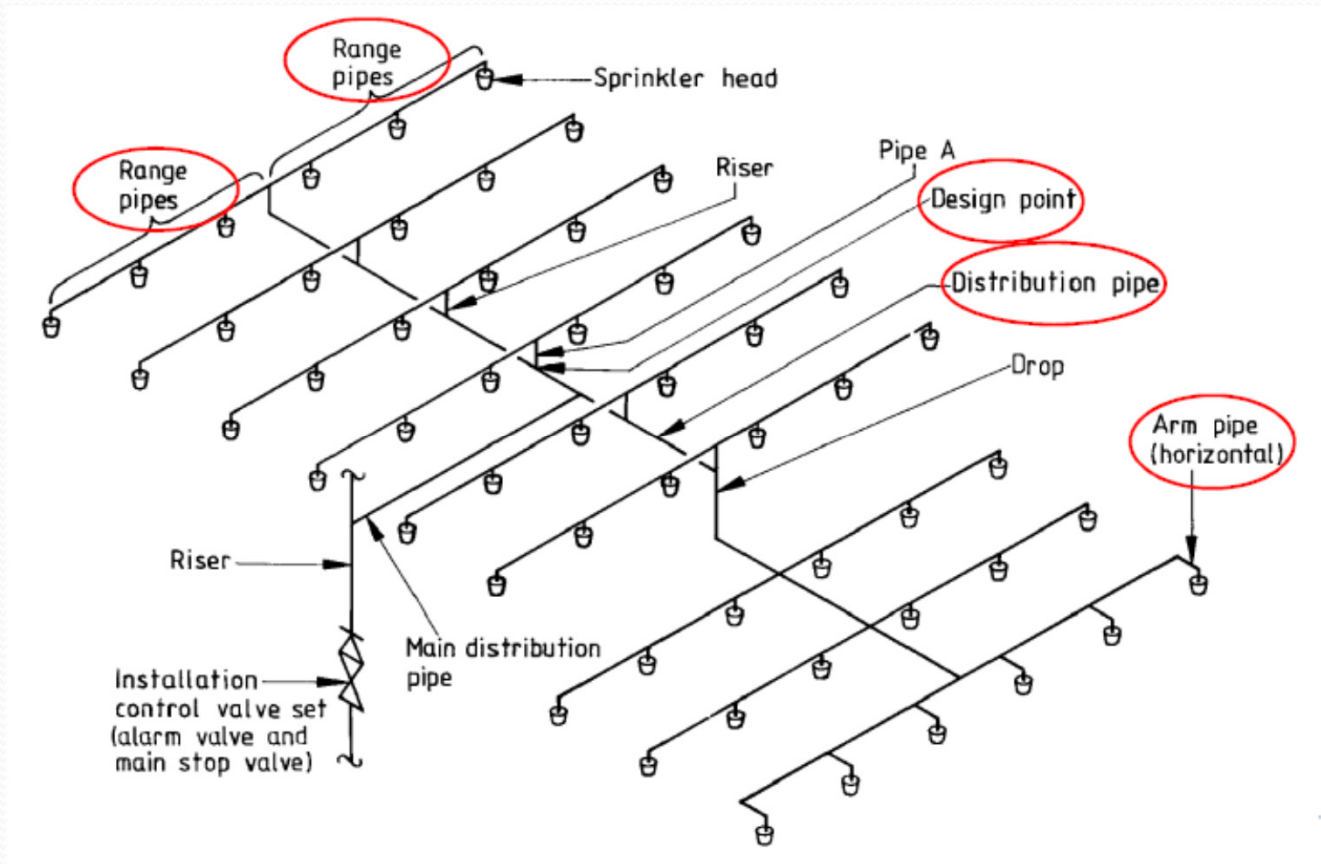
- **Suction pipe ( Water Tank Outlet pipe)**  
(Please refer to LPC Rules page 69 Table 30)
- **Orifice of Sprinkler Head**  
(Please refer to LPC Rules page 115 Table 66)
- **Flow rate and Pressure of Sprinkler pump**  
(Please refer to LPC Rules page 65 Table 28)
- **Pipe sizing**      **(Full hydraulic Calculation for HH or Special Project e.g. Extension Coverage Sprinkler Head)**  
                             **(Pre- calculated for General Building)**  
(Please refer to LPC Rules page 106 Table 57, 58 & 59)



# Classification of Occupancies and Fire Hazards

- Light hazard (LH)
- Ordinary hazard (OH)
  - Subdivided into Group I, II, III and III Special
- High hazard
  - Subdivided in accordance with process risk and high pile storage risk

# Main elements of a sprinkler installation





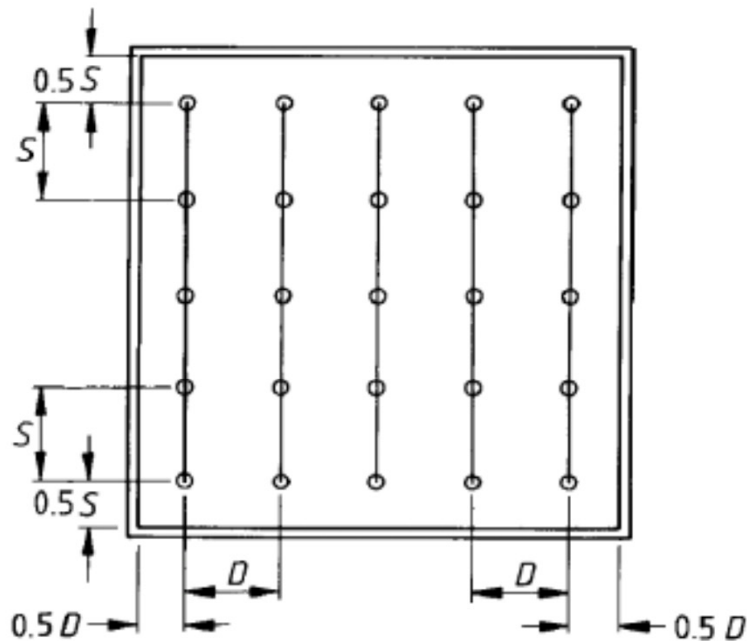
# Definitions

- Design Point
  - A point on a distribution pipe of a pre calculated installation, downstream of which pipework is sized from tables and upstream of which pipework is sized by hydraulic calculation.
- Distribution Pipe
  - A pipe feeding either a range pipe directly or a single sprinkler on a non – terminal range pipe more than 300mm long
- Range Pipe
  - A pipe feeding sprinklers directly or via arm pipes of restricted length
- Arm Pipe
  - A pipe, other than the last section of range pipe, feeding a single sprinkler

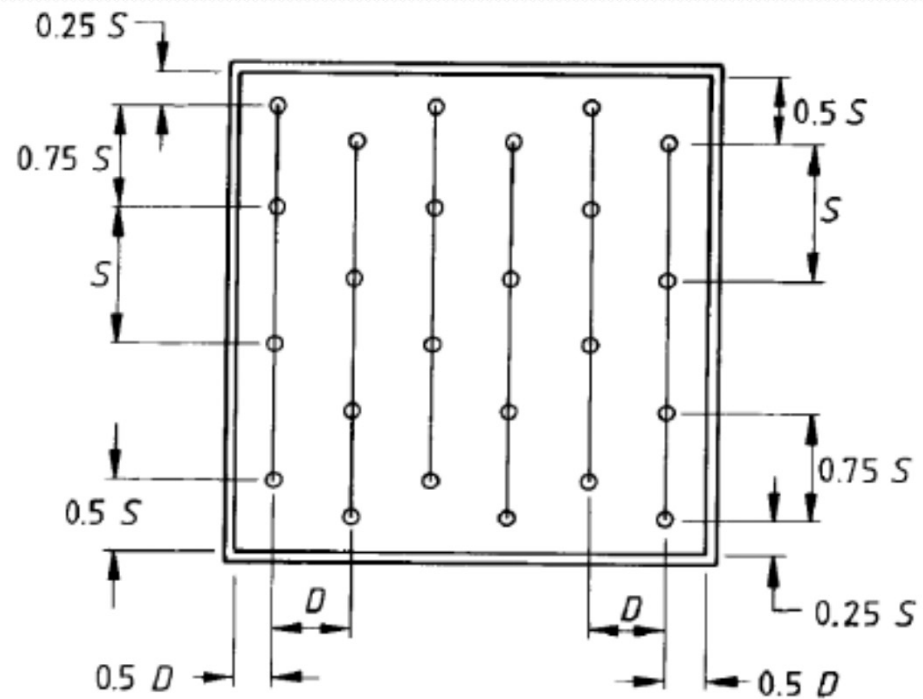
# Maximum area covered by a sprinkler

| Hazard Class    | General          | Special Risk areas or storage racks |
|-----------------|------------------|-------------------------------------|
| Light hazard    | 21m <sup>2</sup> | 9m <sup>2</sup>                     |
| Ordinary hazard | 12m <sup>2</sup> | 9m <sup>2</sup>                     |
| High hazard     | 9m <sup>2</sup>  | 9m <sup>2</sup>                     |

# Sprinkler Layout



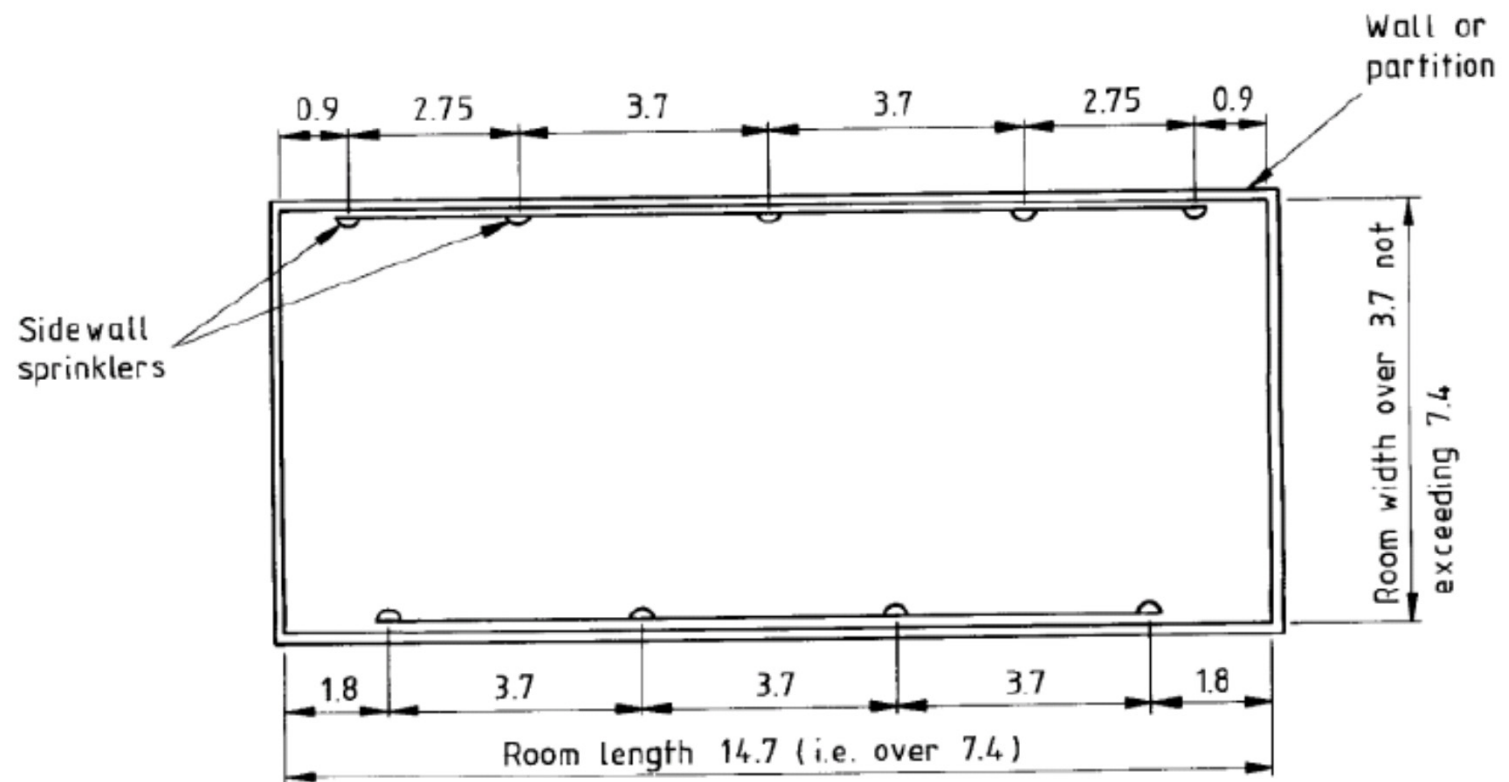
Standard Layout



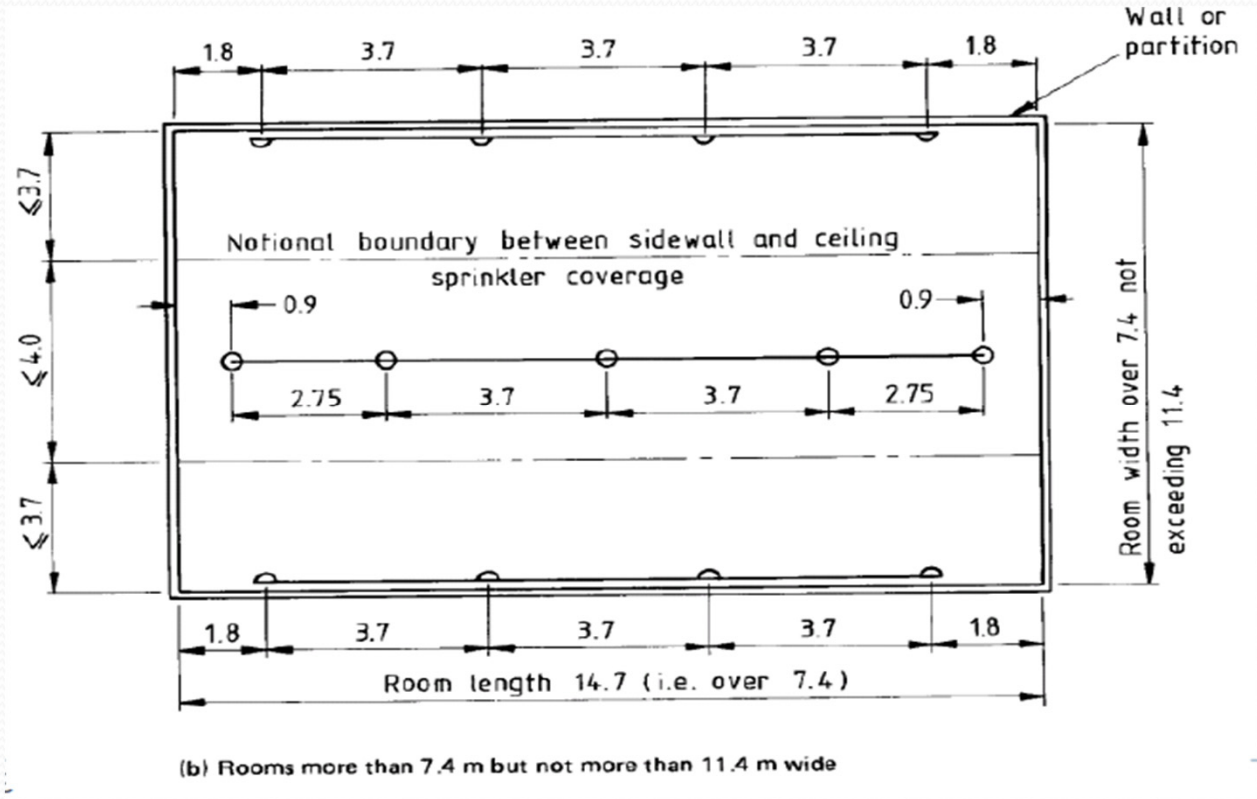
Staged Layout

- Provide sprinklers for most of the areas (based on  $12\text{m}^2$  per sprinkler) in design building (except rooms with electrical services, some M&E plant rooms)
- Allow sufficient sprinkler heads for ceiling voids exceed 800mm

# Sidewall Sprinkler Layout (1)



(a) Rooms over 3.7 m but not more than 7.4 m wide



# Automatic Sprinkler Installation

## Design of Sprinkler Installation

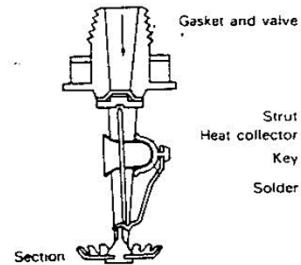
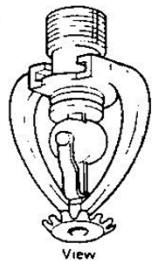
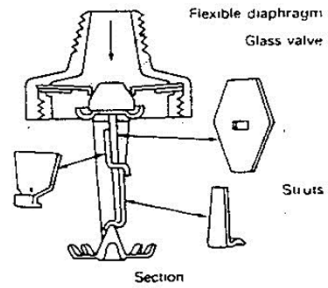
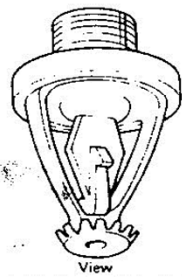
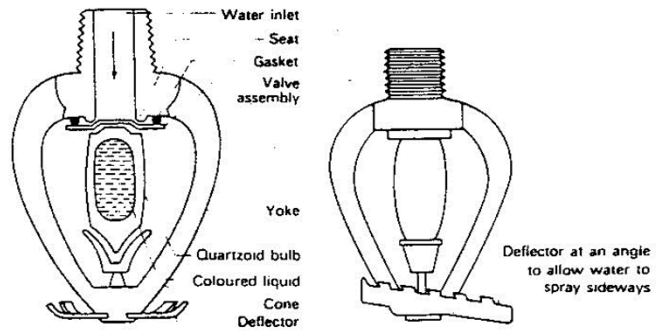
### **Others requirement for Sprinkler Installation Design**

- Double layer sprinkler heads is required if space of False ceiling void exceeded 800mm**
- Fast response sprinklers are to be used in following areas**
  - i. Staircase from podium floor to residential floor**
  - ii. Basement or floor below Ground floor level**
  - iii. Concealed type sprinkler head**
- Max. distance below measuring point from roof or ceiling to sprinkler head**
  - i. Distance is 450mm, if the construction of ceiling is non-combustible and their thickness is not less than 75 mm.**
  - ii. Distance is 150mm, if the construction of ceiling is non-combustible.**

# Size of Installation

| System Installation   | Hazard Class    | Number of Sprinkler                                                                  | Remak                                                                                                                                                                                                                                                                                                  |
|-----------------------|-----------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Wet pipe Installation | Light Hazard    | 500 per installation                                                                 |                                                                                                                                                                                                                                                                                                        |
|                       | Ordinary Hazard | 1000 per installation                                                                | <ul style="list-style-type: none"> <li>• In single – storey buildings or unheated service areas and car parks near or below ground level in multi-storey buildings, ordinary and / or high hazard inclusive of any light hazard sprinklers on the same installation main control valve set.</li> </ul> |
|                       |                 | 500 per zone, or if an installation is not divided into zones, 1000 per installation | <ul style="list-style-type: none"> <li>• In multi – storey buildings, and or high – rise system, excluding unheated service areas and car parks near or below ground leve.</li> </ul>                                                                                                                  |
|                       | High Hazard     | 1000 per installation                                                                |                                                                                                                                                                                                                                                                                                        |

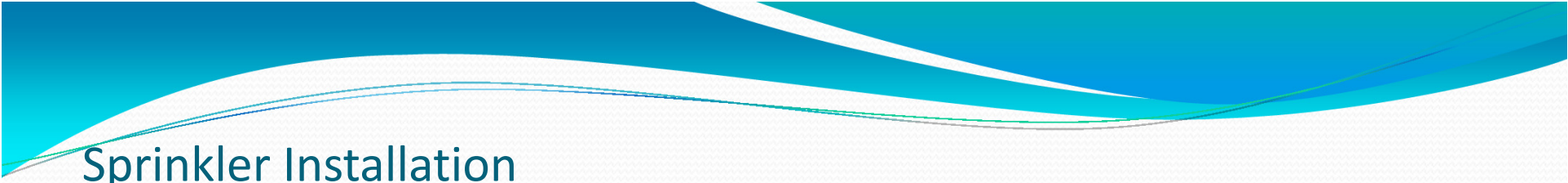
# Different Type of Sprinkler





## Installing Location of Sprinkler Head

| Temperature Rating | Color of Bulb | Installing        |
|--------------------|---------------|-------------------|
| 57°C               | Orange        | Refuse Duct       |
| 68°C               | Red           | General use       |
| 79°C               | Yellow        | Kitchen Area      |
| 93°C               | Green         | Hood              |
| 141°C              | Blue          | Boiler Room       |
| 182°C              | Mauve         | Steel Manufactory |
| 227 / 288°C        | Black         | Steel Manufactory |



## **Sprinkler Installation**

### **Direct Water Supply**

**Water supply via the Town Main to Fire Service Tank**

### **Indirect Water Supply**

**Water supply via the Town Main to Fire Service Transfer Tank (Sump Tank)  
and then refill to Fire Service Tank by FS Transfer pump**

**WHEN? WHERE?**

**(Please refer to COP page 58)**

# Capacity of Water Tank – Single end-feed

| Group | Height of highest sprinkler<br>lowest sprinkler not exceeding | Minimum Capacity | Minimum capacity 2/3 of full holding<br>(+ Direct Link) |
|-------|---------------------------------------------------------------|------------------|---------------------------------------------------------|
|       | m                                                             | m <sup>3</sup>   | m <sup>3</sup>                                          |
| I     | 15                                                            | 55               | 37                                                      |
|       | 30                                                            | 70               | 47                                                      |
|       | 45                                                            | 80               | 54                                                      |
| II    | 15                                                            | 105              | 70                                                      |
|       | 30                                                            | 125              | 84                                                      |
|       | 45                                                            | 140              | 94                                                      |
| III   | 15                                                            | 135              | 90                                                      |
|       | 30                                                            | 160              | 107                                                     |
|       | 45                                                            | 185              | 124                                                     |
| IIIS  | 15                                                            | 160              | 107                                                     |
|       | 30                                                            | 185              | 124                                                     |



# Normal Size of Distribution Pipe

| Pipe Layout           | Distribution Pipe Normal Size | Maximum number of sprinklers to be fed by pipe of size listed |
|-----------------------|-------------------------------|---------------------------------------------------------------|
| Two end – side layout | mm                            |                                                               |
|                       | 32                            | 2                                                             |
|                       | 40                            | 4                                                             |
|                       | 50                            | 8                                                             |
|                       | 65                            | 16                                                            |
| All other layouts     | 32                            | 3                                                             |
|                       | 40                            | 6                                                             |
|                       | 50                            | 9                                                             |
|                       | 65                            | 18                                                            |

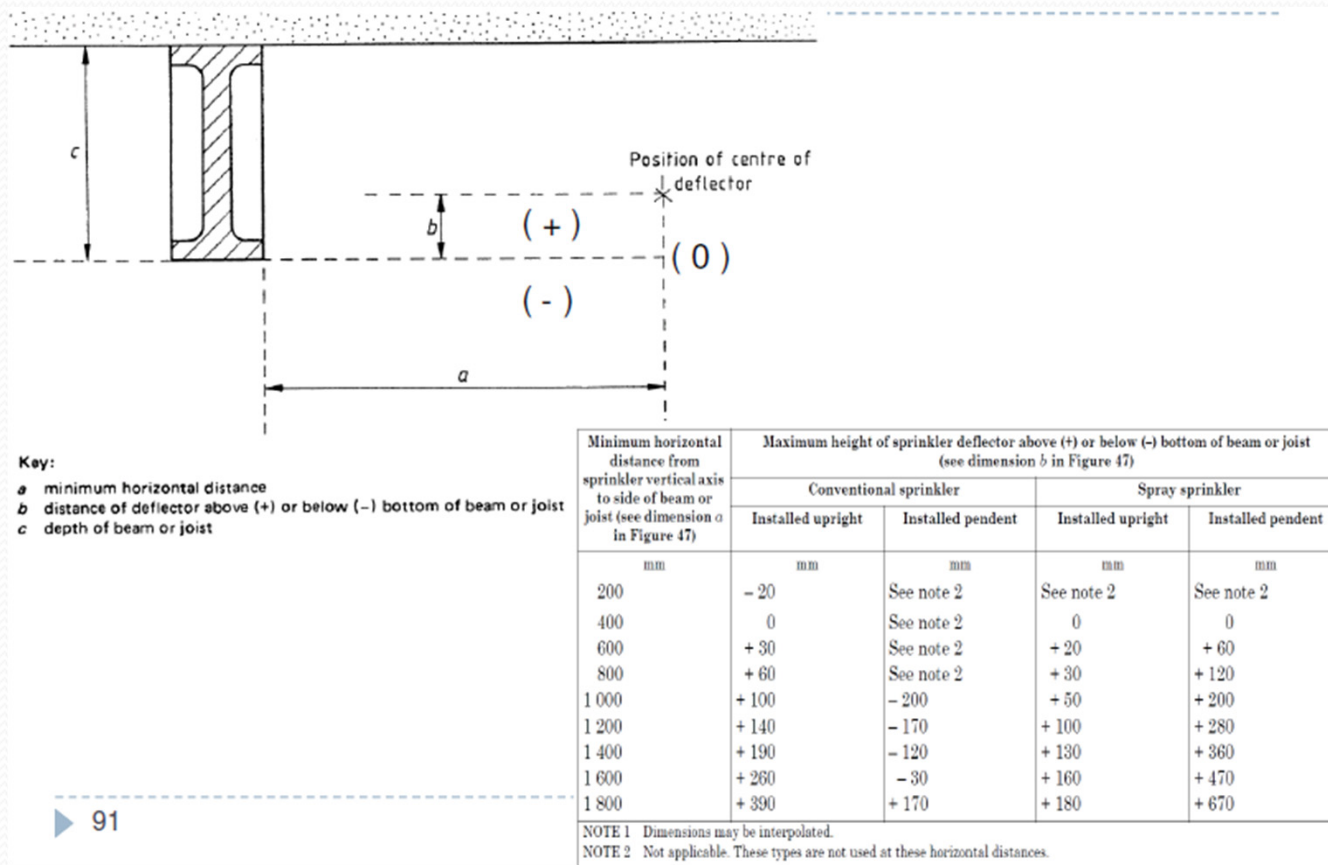
# Sprinkler Pump Characteristic

| Hazard Group | Normal Duty          |     | Characteristics Not Exceeding |     |                      |     |
|--------------|----------------------|-----|-------------------------------|-----|----------------------|-----|
|              | dm <sup>3</sup> /min | bar | dm <sup>3</sup> /min          | bar | dm <sup>3</sup> /min | bar |
| ELH-15       | 300                  | 1.5 | 225                           | 3.7 |                      |     |
| ELH-30       | 340                  | 1.8 | 225                           | 5.2 |                      |     |
| ELH-45       | 375                  | 2.3 | 225                           | 6.7 |                      |     |
|              |                      |     |                               |     |                      |     |
| OH1-15       | 900                  | 1.2 | 540                           | 2.2 | 375                  | 2.5 |
| OH1-30       | 1150                 | 1.9 | 540                           | 3.7 | 375                  | 4   |
| OH1-45       | 1360                 | 2.7 | 540                           | 5.2 | 375                  | 5.5 |
|              |                      |     |                               |     |                      |     |
| OH2-15       | 1750                 | 1.4 | 1000                          | 2.5 | 725                  | 2.9 |
| OH2-30       | 2050                 | 2.0 | 1000                          | 4.0 | 725                  | 4.4 |
| OH2-45       | 2350                 | 2.6 | 1000                          | 5.5 | 725                  | 5.9 |
|              |                      |     |                               |     |                      |     |
| OH3-15       | 2250                 | 1.4 | 1350                          | 2.9 | 1100                 | 3.2 |
| OH3-30       | 2700                 | 2.0 | 1350                          | 4.4 | 1100                 | 4.7 |
| OH3-45       | 3100                 | 2.5 | 1350                          | 5.9 | 1100                 | 6.2 |
|              |                      |     |                               |     |                      |     |
| OH3ap-15     | 2650                 | 1.9 | 2100                          | 3.0 | 1800                 | 3.5 |
| OH3ap-30     | 3050                 | 2.4 | 2100                          | 4.5 | 1800                 | 5.0 |

# Design Flow Rate

- Light – hazard installation
  - 225 l/min
- Ordinary – hazard installation
  - 1000 l/min
- High – hazard installation
  - Reference to the design density in LPC

# Beam Rule for Sprinkler Installation

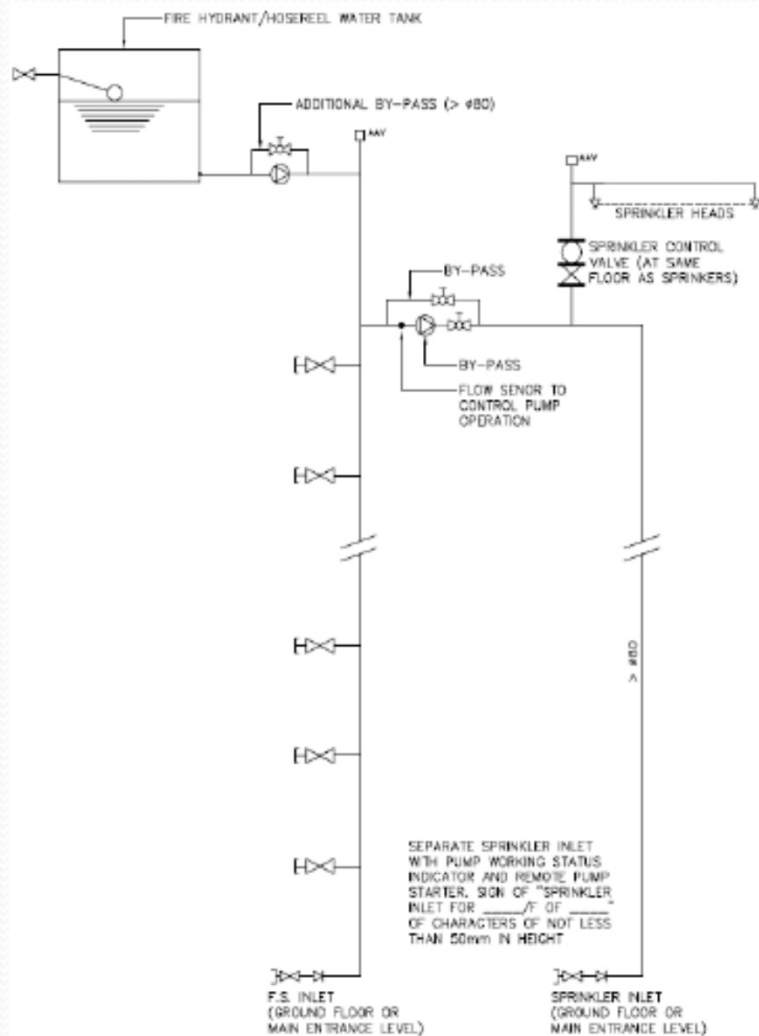




# Improvised Sprinkler System

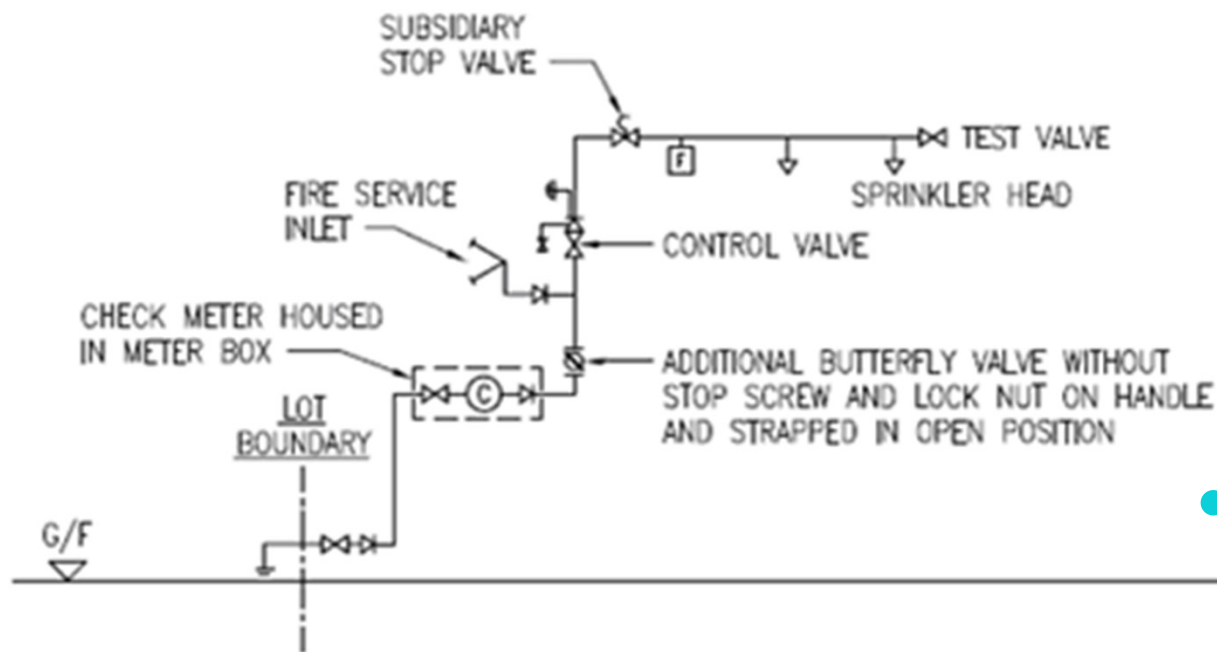
- the Sprinkler System could not be provided at existing building
- or construction Constraints, could not be provided the additional water tanks

# Improvised Sprinkler System



- Indirect water supply for Improved Sprinkler System

# Improvised Sprinkler System



直接供水消防花洒裝置

LAYOUT DRAWING FOR IMPROVISED SPRINKLER SYSTEM

- Indirect water supply for Improvised Sprinkler System

# Improvised Sprinkler System

- Sprinkler System in LPC Rule
- Ordinary Hazard Group I
- Protect Area : 9m<sup>2</sup>
- Fast response type Sprinkler head



## **Fire Hydrant / Hose Reel Installation**

### **Government Submission Procedure for Fire Services Installation**

**Form(s)**

**Form 314**

**Form 501**

**Form 314A**

**Form 314 B**

**Form 314 C**

# Fire Hydrant / Hose Reel Installation

## Government Submission Procedure for Fire Services Installation

### Form 314

FSI/314 (Rev. 08) Appendix A  
To : Director of Fire Services  
Fire Service Installation Plans for Building at .....

---

PART I

This is to certify that the attached fire service installation plans are identical to the building plans approved by you on ..... Your file reference is \*FP 8/43/.....

Signed ..... Date .....  
Full Name of Authorized Person .....

PART II

This is to certify that the details and specifications of all installations shown on the attached fire service installation plans are as prescribed by the Fire Services Department and in accordance with the relevant Rules and Codes of Practice as listed below :-

☐ **Rules of Fire Offices' Committee for :**  
☐ Automatic Sprinkler Installations (29th Edition)  
☐ Automatic Fire Alarm Installations (12th Edition)  
☐ Installation of Drenchers (4th Edition)

☐ **Rules of the Loss Prevention Council for :**  
☐ Automatic Sprinkler Installations (BS EN 12845) (BS 5306 Part 2)\*  
☐ Automatic Fire Alarm Installations (BS 5839 Part 1)

☐ **Codes of National Fire Protection Association for :**  
☐ Carbon Dioxide Extinguishing Systems (Standard 12)  
☐ Clean Agent Fire Extinguishing Systems (Standard 2001)  
☐ Water Spray Fixed Systems for Fire Protection (Standard 15)

☐ **Codes of Practice for Minimum Fire Service Installations and Equipment, Fire Services Department for :**  
☐ Fire Alarm Systems ☐ Fire Hydrant / Hose Reel Systems  
☐ Exit Signs ☐ Emergency Lighting Installations  
☐ Emergency Generator Installations ☐ Ventilation / Air Conditioning Control Systems  
☐ Smoke Extraction Systems ☐ Staircase Pressurization Installations

☐ **Others**  
☐ .....

Signed ..... Date .....  
Full Name of FSI Contractor/Consultant .....  
Correspondence Address.....  
..... Tel. No. : .....

☐ Mark "x" where applicable  
\* Delete where appropriate



## **Fire Hydrant / Hose Reel Installation**

### **Government Submission Procedure for Fire Services Installation**

#### **New Project**

- Two full sets of schematic and as-fitted layout plans accompanied with Form 314**

**Authorized Person (AP) certifying that the FSI plans are identical to the approved building plans held by FSD**

**FSI Contractor or Consultant certifying that the details and specifications of all installations shown thereon are as prescribed by FSD requirements**

# Fire Hydrant / Hose Reel Installation

## Government Submission Procedure for Fire Services Installation

### Form 501

FSI/501 (Rev.08) Appendix B

Section 21(6)(d) of Buildings Ordinance  
-Application for Inspection and Testing of  
Fire Service Installations and Equipment

To : Director of Fire Services Date : .....  
FP Ref. no. \*8/43/.....  
\*19/20/43/.....

Description of Fire Service Installations/Equipment :

---

**Part A :**  
The above installations / equipment have been installed at (address of premises)..... and the installation work was completed on..... I hereby certify that such installations / equipment in accordance with the FSI plans submitted under the cover of FSI/314 (Rev. 08) dated ..... have been inspected and are in efficient working order. \* Copies of completed checklist, equipment test reports and catalogue/data sheets are attached herewith for your information.

Signature of  
FSI Contractor : .....

Office/Chop : ..... Name in Full : .....  
Tel. : ..... Registration no. : .....  
Class : ..... Date : .....

**Part B :**  
I, ....., Authorized Person, certify that the above installations have been installed in accordance with the approved building plans stamped by FSD on ..... and, in my opinion they are ready for inspection.

The Fire Service Completion Advice from Water Supplies Department in respect of Fire Service Installations (\*copy attached) requiring Government water mains connection has been \* issued / applied for.

\*An undertaking letter / memo from building owner for providing 24-hour attendant service with normal telephone provision pending the connection of direct telephone link for the fire service installation(s) is attached herewith.

I request that a \*Certificate F.S. 172, required under S21(6)(d) of the Buildings Ordinance / acceptance memo / letter be issued to me. I can be contacted on telephone no. .... for collection.

I also certify that the building gross floor area as defined under the Buildings Ordinance is .....m<sup>2</sup> and the type of building is domestic / non-domestic.\*

Signed : .....

Office : ..... Full Name of  
Authorized Person : .....  
Tel. : ..... Date : .....

\*Delete where appropriate



## **Fire Hydrant / Hose Reel Installation**

### **Government Submission Procedure for Fire Services Installation**

#### **New Project**

#### **Form 501**

- This form shall be signed by Authorized Person / FSIC**

**Both copies of plans will be stamped the following statement**

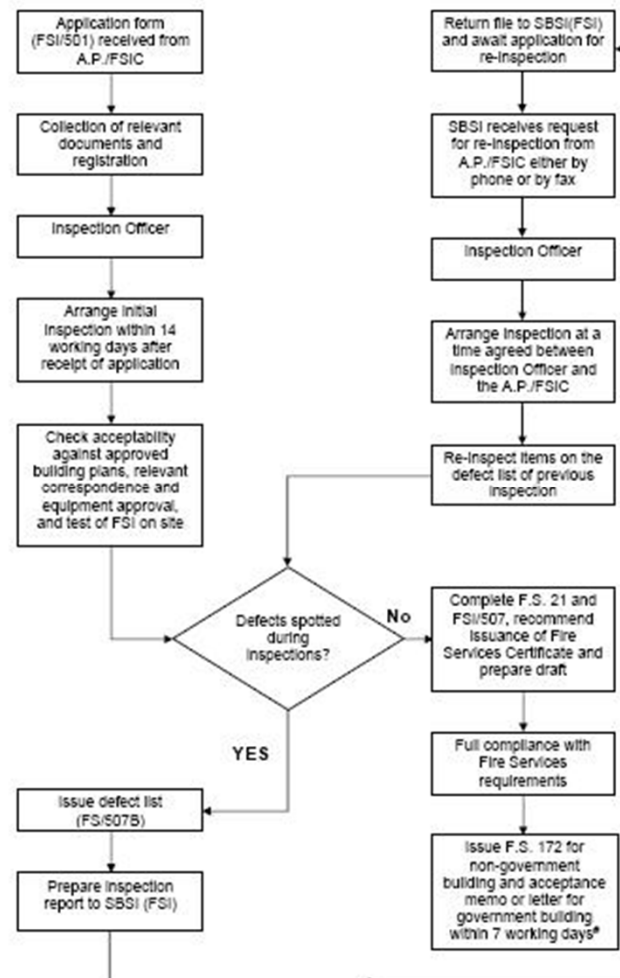
**“ As-fitted Fire Services Installations Plans as certified by Authorized Person / Fire Service installation Contractor / Consultant (For Compliance Inspection) as the official record”**

**The target time for arrangement of initial compliance inspection will be within 15 working days from the date of receipt of form FSI/501(Rev.08)**

# Fire Hydrant / Hose Reel Installation

## Government Submission Procedure for Fire Services Installation

**Flow Chart for FSI Acceptance Inspection and Issuance of Certificate**



\* Issue F.S. 172 within 4 working days for projects submitted under the One Stop Centre for Warehouse Construction Permits administered by the Efficiency Unit.



# Fire Hydrant / Hose Reel Installation

## **Government Submission Procedure for Fire Services Installation**

**Form(s)**

**Alternation and Additional works**

**Form 314A**

**Form 314 B**

**Form 314 C**

## Fire Hydrant / Hose Reel Installation

### Government Submission Procedure for Fire Services Installation

#### FSD Circular letter no. 4/96 dated 22 October 1996

#### 4. Certification of Alteration & Addition to FSI

- 4.1 There have been cases where fire extinguishers originally provided are replaced by a different type. In a number of instances the replacement is unacceptable (e.g. CO<sub>2</sub> replaced by water type). This Department must be consulted before any alterations of this nature to existing installations is undertaken.
- 4.2 All installation, maintenance, repair or inspection of FSI systems which do not involve major alterations and additions to the building in excess of 50% by volume will be certified by the FSI contractor in the following manner:-
  - 4.2.1 If the work does not involve change of FSI layout or location of the fixed equipment, a Certificate of Registered FSI (F.S. 251) to the owner with copy to the Director of Fire Services will be sufficient.
  - 4.2.2 If the work involves change of FSI layout or location of fixed equipment, a Certificate of Compliance, i.e. FSI/314A as attached in Appendix B, together with two copies of as-built FSI layout plans should be submitted to the Director of Fire Services in addition to the copy of F.S. 251 as described above.

# Fire Hydrant / Hose Reel Installation

## Government Submission Procedure for Fire Services Installation

### Alternation and Additional works

**Form 314A for all buildings excluded Prescribed Commercial Premises / Specified Commercial Building / Composite Building / Residential Building**

FSI/314A

To : Director of Fire Services

Fire Service Installation Plans for Building at

This is to certify that the details and specifications of all installations shown on the attached fire service installation plans are as prescribed by the Fire Services Department and in accordance with the relevant Rules and Codes of Practice as listed below :-

- ☐ Rules of the Fire Offices' Committee for -
  - ☐ Automatic Sprinkler Installations (29<sup>th</sup> Edition)
  - ☐ Automatic Fire Alarm Installations (11<sup>th</sup>/12<sup>th</sup> Edition)
  - ☐ Installation of External Drenchers (4<sup>th</sup> Edition)
- ☐ Rules of the Loss Prevention Council for -
  - Automatic Sprinkler Installations
- ☐ Codes of National Fire Protection Association for -
  - ☐ Carbon Dioxide Extinguishing Systems (Standard 12)
  - ☐ Clean Agent Fire Extinguishing Systems (Standard 2001)
  - ☐ Water Spray Fixed Systems for Fire Protection (Standard 15)
- ☐ Code of Practice for Minimum Fire Service Installations and Equipment, Fire Services Department.
  - ☐ Fire Alarm Systems
  - ☐ Fire Hydrant/Hose Reel Systems
- ☐ Others .....

Signed ..... Date .....

Full Name of FSI Contractor/ Consultant .....

Correspondence Address .....

Tel. No. : .....

☐ Mark "x" where applicable

# Fire Hydrant / Hose Reel Installation

## Government Submission Procedure for Fire Services Installation

### Alternation and Additional works

### Form 314B for Prescribed Commercial Premises / Specified Commercial Building

FSI/314B (Revised 5/98)

To: Director of Fire Services  
( Attn: Legislation and Control Division)

Fire Service Installation Plans for  
\* Prescribed Commercial Premises / Specified Commercial Building at

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

This is to certify that the details and specifications of all installations shown on the attached fire service installation plans are as prescribed by the Fire Services Department under the Fire Safety (Commercial Premises) Ordinance and in accordance with the relevant Rules and Codes of Practices, as may be applicable, e.g. :-

- \* Rules of Loss Prevention Council for Automatic Sprinkler Installation
- \* Fire Offices' Committee for Automatic Sprinkler Installation (20<sup>th</sup> Edition)
- \* Code of Practice for Minimum Fire Service Installations and Equipment, Fire Services Department

Signed \_\_\_\_\_

(Full Name of FSI Contractor/Consultant)

Date \_\_\_\_\_

\* To be deleted as appropriate

# Fire Hydrant / Hose Reel Installation

## Government Submission Procedure for Fire Services Installation

### Alternation and Additional works

### Form 314C for Composite Building / Residential Building

FSI/314C

To : Director of Fire Services  
(Attn: Building Improvement Division) \* 1 / 2

Fire Service Installation Plans for  
\*Composite Building / Domestic Building at

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
  
This is to certify that the details and specifications of all installations shown on the attached fire service installation plans are as prescribed by the Fire Services Department under the Fire Safety (Buildings) Ordinance and in accordance with the relevant Rules and Codes of Practices, as may be applicable, e.g. :-

- \* Rules of Loss Prevention Council for Automatic Sprinkler Installation
- \* Fire Offices' Committee for Automatic Sprinkler Installation (29<sup>th</sup> Edition)
- \* Code of Practice for Minimum Fire Service Installations and Equipment, Fire Services Department

Signed \_\_\_\_\_

(Full Name of FSI Contractor/Consultant)

Date \_\_\_\_\_

\*To be deleted as appropriate

# Automatic Sprinkler Installation

## Design of Sprinkler Installation

### Reference

- **Code of Practice for Minimum Fire Service Installations and Equipment**
- **Rules for Automatic Sprinkler Installations (LPC), BS 5306 Part 2:1990**
- **Fire Service Department's Circular Letter**
- **British Standard**
- **Handbook on Plumbing Installation for Building (WSD's regulation)**