بسم الله الرحمن الرحيم

SULTANATE OF OMAN
ROYAL OMAN POLICE
DIRECTORATE GENERAL OF CIVIL DEFENCE

FIRE SAFETY REQUIREMENTS

PART FIVE

Water Supplies For Fire-Fighting

CONTENTS

SCOPE **Page**

Section 1

Fire Water Supplies

Section 1

Water Supplies for fire-fighting

1 Definitions:

a. Sources of water supply:

The sources which are used to provide sufficient quantities of water for fire fighting. It may be fabricated as public water mains and water tanks (Fixed or mobile), or natural sources as rivers, lakes, wells and other similar.

b. Public water mains:

Distribution Pipelines forming a part of the water supply distribution network of any town or village which is pressurized under normal circumstances.

c. Public fire hydrants:

The hydrants which are fixed on branches distributed from public water mains for the purpose of fighting fires and to be used only by Civil Defense Authorities.

d. Private fire hydrants:

The hydrants which are recommended by the Civil Defense authorities for the protection of private properties, it may be installed inside a building with special connections or outside around the building within the boundary of the property. These hydrants shall however be installed and maintained at the owner's cost.

e. Suction tanks:

Tanks which need water pumping system to provide adequate flow and pressure which will be suitable to extinguish the fire.

2 Water Supplies requirements:

2.1 Most of water demanded for fire-fighting is taken from public wale mains, where these mains are available in the area with suitable capacities. Generally a water supply capable of providing a minimum of (11251itre/min) at all times be required.

2.2 In cases where the public water main supply does not meet the above requirement, each fire main should be fed from either an elevated reservoir or a suction tank or interconnected tanks having a minimum capacity of (45,000) liters.

2.3 The tank or tanks should be automatically supplied form any other source of water controlled by a ball valve (s) and the capacity of these mains together with the contents of the reservoir or tanks should be such as to maintain a flow of water capable of supplying three fire-fighting jets for 45 min, when water is supplying a total rate of (1125 liter/min).

2.4 Tanks supplying water for domestic purposes should not be used as suction tanks unless arrangements have been made for these domestic supplies to be drawn off in such a manner that the requisite reserve of water is always preserved.

3 Fire hydrants:

3.1 Public fire hydrants should comply with the following:

a. It should comply with the standard approved by General Directorate of Civil Defense.
b. It should be included in piped water distribution system and located along the Pavements of streets and public roads.
c. Its locations must be determined by the General Directorate of Civil Defense in coordination with Water local Authorities.
d. The local water authorities are responsible for installing, maintaining and repairing public fire hydrants.
e. In cities and urban areas a spacing of (90) - (120) m is desired between the hydrants. The distance between a nearest public hydrant and residential buildings should not Exceed 100m, and for industrial or commercial buildings should not exceed (60) m.
f. Flow requirements from each hydrant should be (1125) - (2000) Lt/min. In major fires the flow requirements may range from (5000) to (15000) It/min from several hydrants.

3.2 In case of installing private hydrants, the water supply, installation and location of the hydrant, should comply with the requirements of three General Directorate of Civil Defense.

4 Fire fighting pump set:

Where a fire fighting pump set is to be installed to provide sufficient flow of water under suitable pressure for fire fighting, the following requirement should be met:

4.1 The pumps used should comply with the standards approved by General Directorate of Civil Defense.

4.2 There should be one duty electric pump and one standby diesel pump and should be capable of maintaining a system pressure of 4.5 Bar while delivering (1125) Lt/min.

4.3 It should be fitted adjacent to the main water storage tank.

4.4 The power supply equipment must be solely for the use of the fire pumps. Where it is the practice to switch off the supply to the premises it should be ensured that such switching off does not interrupt the mains supply to the fire pumps.

4.5 A separate diesel oil storage tank should be provided, sized to allow (30) minutes running of the diesel pump.

4.6 Pumps room should be constructed from fire resistance non-combustible construction, and used for no purpose other than housing water supplies. Adequate ventilation and light should be provided. Floors should be clear form waste at all times.

4.7 In the event of system pressure falling to (2.7) Bar the electric pump should cut in and boost pressure to (4.5} Bar. The pumps should remain energized until either manually switched off or low water level cut out switch mounted (30} me above tank floor over rides pump. In the event of system pressure falling to (3.0) Bar the diesel pump should cut in and boost pressure to (4.5) Bar. The pump should remain energized until either manually switched off or until fuel runs out.

4.8 The pump set should include a normally closed by-pass valve to allow for testing. The pump set should include a pressure relief valve connected to the by-pass system to open at a pressure of 4.8 Bar.

4.9 All control panels are to provide the following facilities:

a) On/Off/Auto switch for each pump.

b) On light for each pump (Green).

c) Trip light for each pump (Red).

d) Hour run meter for each pump.

e) System pressure gauge.

f) Adjustable pressure settings for high and low pressure setting points.

4.10 Automatic priming devices must be provided, to ensure that the pump will be fully primed with water at all times.

4.11 The correct sequence of operation of the units shall be ensured and all controls to ensure that the system works satisfactorily shall be included.

Section 2

PUBLIC PILLAR FIRE HYDRANT

Section 2

PUBLIC PILLAR FIRE HYDRANT

1 GENERAL:

1.1 The pillar hydrants shall be designed to be installed in public roads for the use of Civil Defense.

1.2 The pillar hydrant shall be free from difficulties, such as trouble in openings and closing working loose of interior mechanical parts, leakage, and excessive friction loss, failure to drain properly and loose nipples.

1.3 The hydrant shall meet all the requirements of applicable American water works Association and National Fire Protection Association Standards or equivalent.

2 HYDRANT CONTENTS:

(General description of the hydrant is shown of figure 1)

2.1 The body:

2.1.1 The upper part of the barrel shall be from best quality cast iron, and the lower part from ductile iron for extra strength. Bolts and nuts shall be from cadmium plated steel. The upper part may be fabricated from ductile iron, if it is connected to the lower part through a special flange which breaks when the hydrant is subjected to severe mechanical impact. This avoids serious damage to the lower half of the hydrant and facilitates easy repair.

2.1.2 The diameter of the barrel shall be:

a) Not less than (180) mm for the use in crowdie or heavy traffic roads.
b) Not less than (150) mm for the use in quite or light traffic roads.

2.2 Outlets:

2.2.1 The upper part of the hydrant shall be provided by three outlets:

a) Two female outlets (2.5) inch (65) mm diameter each instantaneous, according to the type use by Directorate General of Civil Defense in Oman (B.S. 5041 parts 1,2,/1975) to be installed on both sides of the upper part of the barrel.

The out lets shall be valve according to the B.S., and to be protected by a cap secured by a suitable length of chain.

b) One female (4) inch diameter, screw type connection according to the B.S. (336/1980), in the middle of the upper part of the barrel, provided with a suitable closing cap which can be opened by a special ranch. This outlet shall face the street or road to be suitable for feeding the fire pumps with water by using (4) inch suction hose.

2.2.2 The lowest discharge outlet shall be at a height not less than (40) me and not exceeding (50) l above ground level (fig. 2)

2.3 Operating Units:

2.3.1 The operating nut shall be at the top of the hydrant and made form cast bronze. The nut shall directly actuate the hydrant rod. Antifriction bearings shall be provided and lifetime lubrication of the operating threaded portion shall be ensured.

2.3.2 The hydrant rod shall be from steel, the two parts of rod shall be held together by a rod coupling with bronze pins.

2.3.3 The hydrant valve shall incorporate suitable top and bottom valve supports guides. The cone-shaped valve shall be molded from synthetic rubber and shall open against & close with the pipeline pressure.

2.3.4 The hydrant should be provided by drain valve made of non corrodible materials.

2.3.5 The valve shall open anticlockwise.

2.4 Friction loss:

Permissible loss of head through the hydrants shall be as follows:

Flow liters (min)	**Head loss (meters)**
1000	1.0
2000	1.5
3000	2.0
4000	2.5

2.5 Finish:

The inside of the barrel & the rod shall be coated with solvent free non toxic epoxy paint. The exterior surface shall have a red polyurethane coating.

2.6 Hydrant valve:-

Each hydrant should be provided with a valve on the distributing branch which feed the hydrant, to stop the flow of water in case of repairing without shutting off large portions of the mains. The valve shall be near as possible to be seat of the hydrant and installed in manhole with a suitable indicated cover. Figure (2).

2.7 Hydrant Protection:

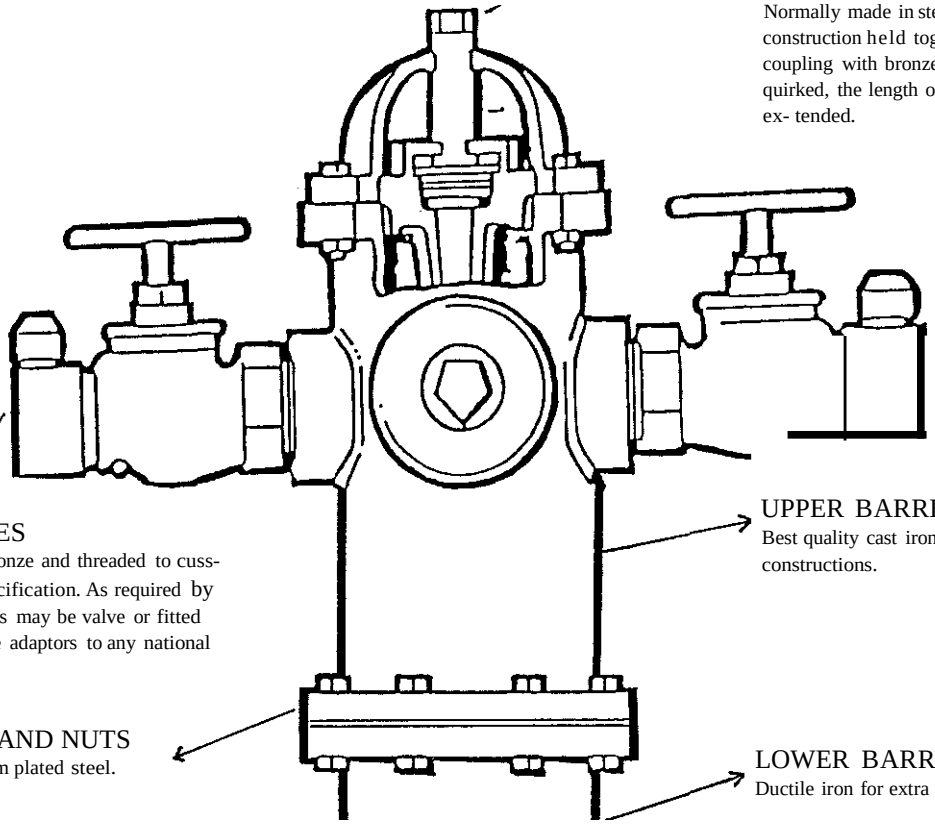
Where considered necessary pillar fire hydrant shall be protected by barriers, fabricated from rigid metal pipes (about 3" diameter) securely fixed with the ground. The barriers should not hamper opening and closing operations and the connection of all types of fire hoses to the outlets figure (3).

OPERATING NUT

Cast bronze nut directly actuates hay drat rod. Grease proof ensures com-plate lubrication and long life.

HYDRANT ROD

Normally made in steel. A two part construction held together by a rod coupling with bronze pins. Where re-quirked, the length of the rod can be ex- tended.



NOZZLES

Made of bronze and threaded to cuss-tamer's specification. As required by order outlets may be valve or fitted with bronze adaptors to any national standard.

UPPER BARREL

Best quality cast iron to outline steel constructions.

BOLTS AND NUTS

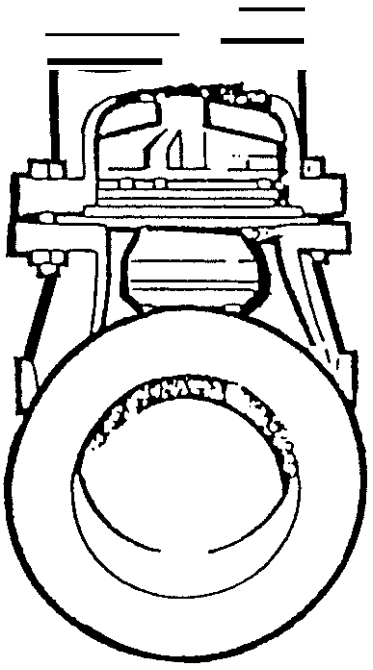
All cadmium plated steel.

LOWER BARREL

Ductile iron for extra strength

DRAIN RING

Made of bronze provides bronze to bronze threaded connection for the hay-drat heat.



HYDRANT SEAT

Made of bronze accurately machined.

DRAIN LEVER

Rugged three-part drain carrying drain level washers.

FINISH

All barrel castings are painted inside And out with a special paint. Section be Low ground is given two coats of black bituminous paint. Exterior sure-face above ground are painted with high-grade enamel to customer's re-quirements.

VALVE

Incorporates a top bottom valve support in cast iron with a connected valve molded form synthetic rubber.

(Firure **(I)**

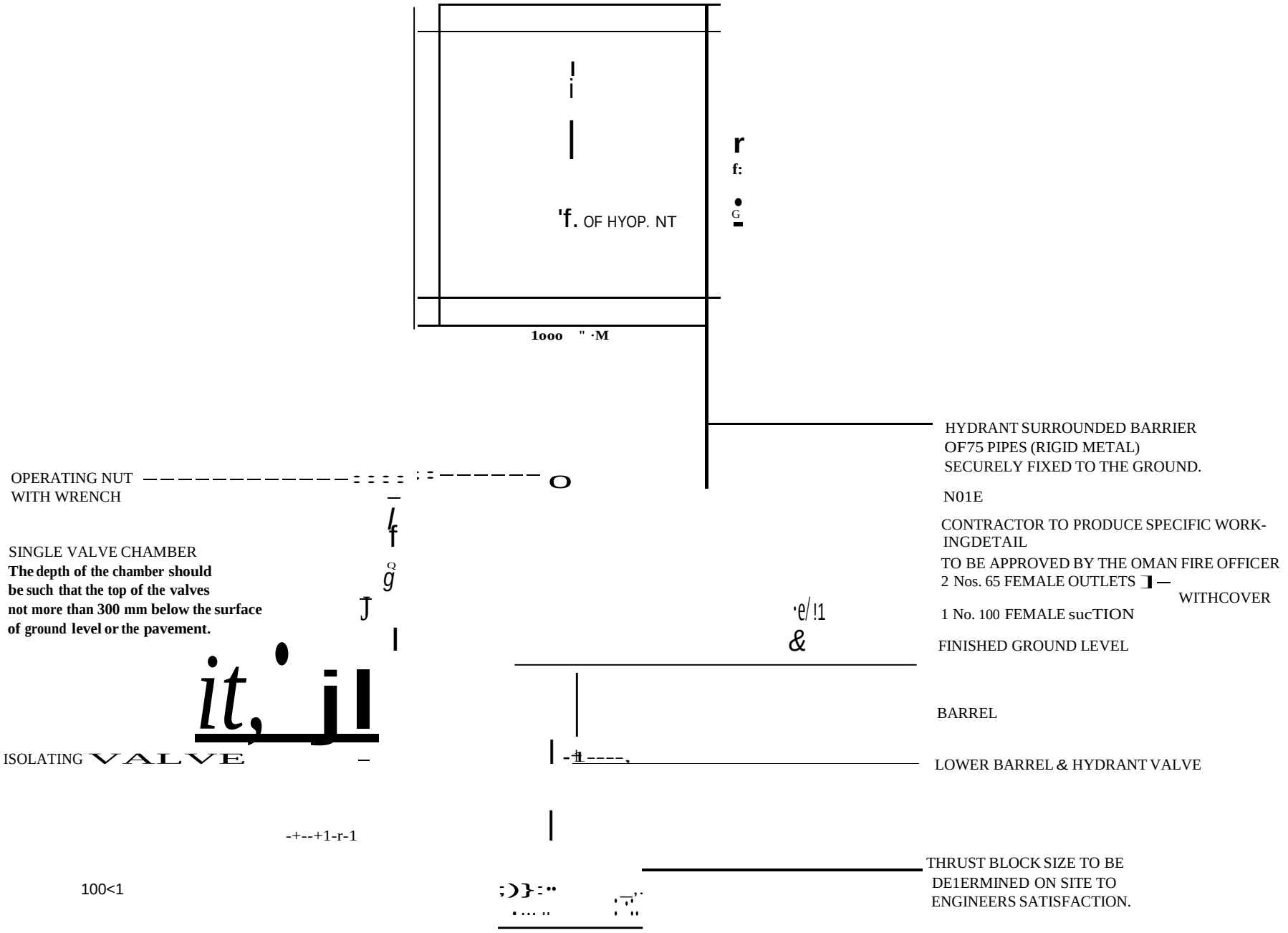


Fig (2)

Installation details of the pillar fire hydrant
All dimensions in millimeters (as a guide, not in scale)

Painting:

1- Exterior surfaces of the hydrant should be painted outsi.de in red colour.

2- The metal barriers should be red and white

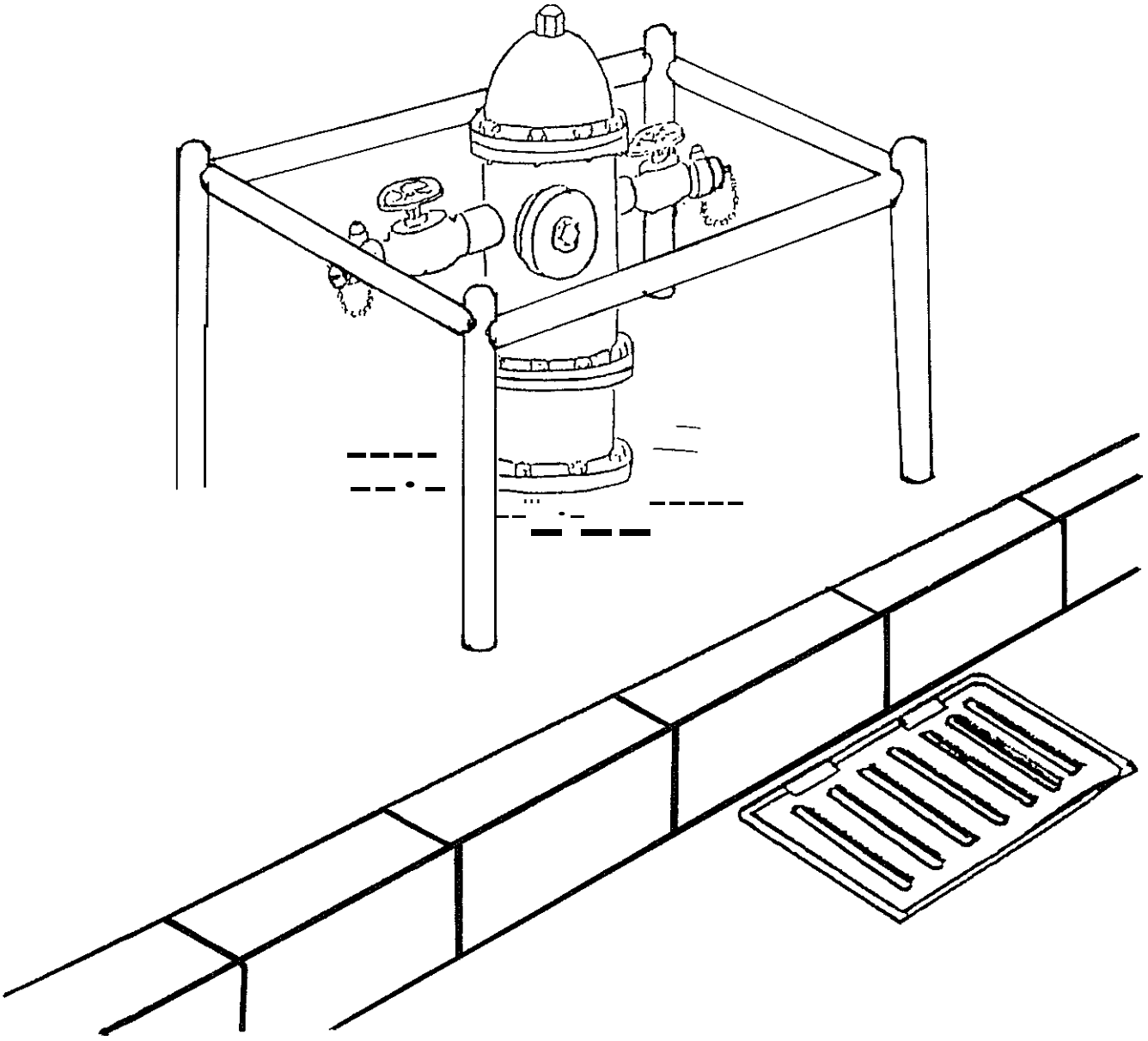


Figure (3)

حنفية الحريق العمودية محاطة بحواجز من المواسير المعدنية بقطر (٣) بوصة مثبتة بالارض لمنع الصدمات

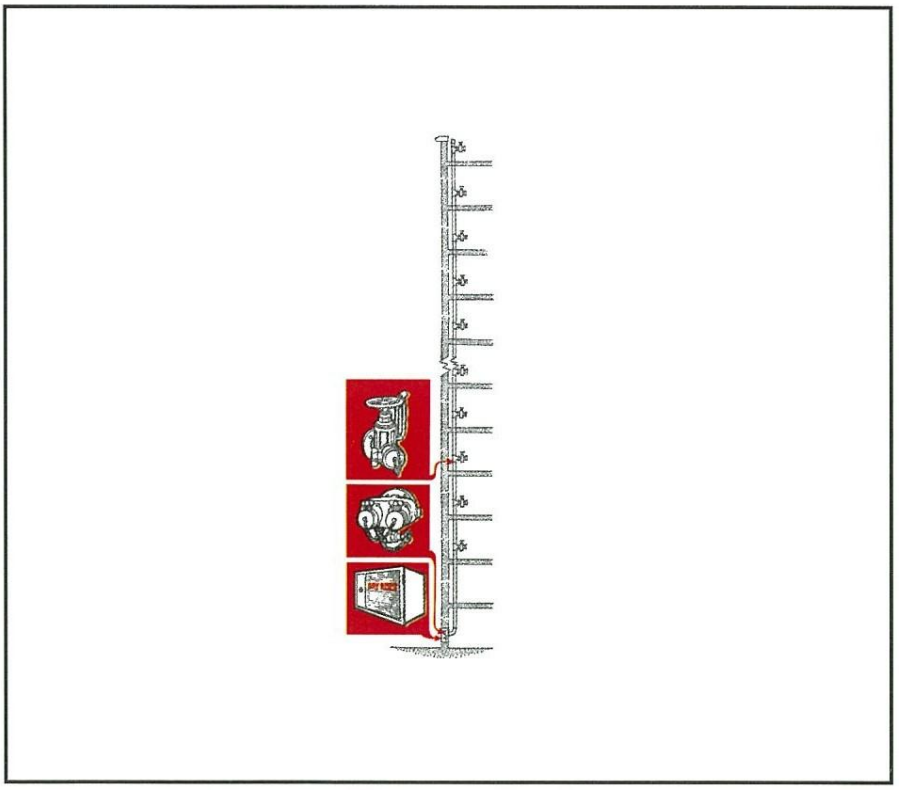
For protection from accidental damage pillar fire hydrant should be surrounded by barriers, which can be from rigid metal pipes (about 3 in diameter) securely fixed with the ground.

Section 3

Dry and Wet Rising Mains

1 - Dry Rising Mains

2 - Wet Rising Mains



Section 3

DRY AND WET RISING MAINS

First : Dry Rising Mains

1 Definitions:

A vertical pipe installed in a building for fire fighting purposes, fitted with inlet connections at fire brigade access level and landing valves at specified points, which is normally dry but is capable of being charged with water usually by pumping from Fire Service appliances or form other pressurized sources.

2 General:

a - Risers shall be installed in buildings where any floor is at a height of more than (18) metres above ground level

b - For building where the upper floor is less than (30) metres above ground level, dry risers can be provided.

c - For buildings where the upper floor is more than (30} metres above ground level wet risers shall be provided.

d - The Fire Prevention Officer should be consulted in each case.

3 Siting:

3.1 Each rising main shall be provided with landing valves (hydrant outlets) at various floor levels sited:

a) Within a ventilated lobby or a lobby approach, where this is provided.
b) in a staiway enclosure.
c) in such other positions as may be agreed upon with the Fire Authority.

3.2 On selection of positions for inlet connections for a dry rising main, attention shall be paid to the position of fire hydrants available near the building, the possibility of damage resulting from falling parts from windows and other possible occurences during a fire.

3.3 Inlet connections for dry rising main should be installed in an external wall or in a boundary wall of the buildings as close as possible to the position of the main which they serve, and any rim between the inlet and the vertical rim of the main should be given fall towards the drain valve. Easy access shall be provided for the fire brigade to the inlets.

3.4 The number and positions of rising mains normally should be such that:

a) one is provided for each (900) m2
b) rising mains are not more than (50} metres apart in horizontal direction.
c) no part of the floor area is more than (60} metres distant from a landing valve. The distance is to be measured along a route suitable for hose lines, including any distance up or down a stairway.

4 Construction:

Dry and wet risers shall be designed in accordance with the approved standards.

The riser should be of galvanised wrought steel piping, heavy quality to BS (1387/1967), screwed and socketed; the fittings to be malleable iron or wrought iron, galvanised and of steam quality. All changes of direction should be made with standard bends, springs or long turn fittings; elbows should not be used.

5 Diameter of Riser:

The internal diameter of a riser main which has two outlets at any level should be not less than (152) mm and, in case of one outlet the diameter should be not less than (102) mm.

6 Air Valve:

An automatic air valve will be required, this should be fitted at the topmost point of the riser.

7 Inlets:

a A (102) mm riser should be fitted with two inlets and a (152) mm riser with four inlets, each inlet consisting of a 63 mm instantaneous male coupling and a non-return valve as the type used by the General Direct?rate of Civil Defence (BS 5041Part : 1975)

b Inlets should be protected by a cap secured by a suitable length of chain, the coupling to conform t BS (336/1965).

8 Inlet Boxes:

The inlets to a dry rising fire main should be housed in a glass fronted box, so sited that access for a pumping appliance can be obtained to within (18) metres and within sight of the inlet. The door of the box containing the inlets should be:

a) Glazed with wired glass and conspicuously indicated by words (Fire Service - Dry Main Inlet) in block letters on" the inner face of the glass in English and Arabic.
b) Fastened only by means of a spring lock which can also be operated from the inside without the aid of a key after the glass has been broken.
c) Made large enough for hose to be connected to the inlets·even if the door cannot be opened and the only means of access is by breaking the glass. The minimum external length, height and depth of box containing the inlet connections should be in accordance with BS (5041/Part 5/1974) namely:

(102) mm diameter riser:
(609) mm x (405) mm x (304) mm or
(405) mm x (609) mm x (304) mm
(152) mm diameter riser:
(609) mm x (609) mm x (304) mm.

d) All boxes should have a fall of one in twelve towards the front at the base.

9 Drain Valves:

9.1 A(25) mm drain valve should be fitted to the riser, normally in the inlet box. Where any part of the pipework falls below the inlet box level, a similar valve should also be provided at the lowest point of the pipework, together with facilities to conduct water from the valve to a suitable drain.

9.2 Where a low level drain valve is fitted a permanent notice should be provided in the inlet box reading (Low level Drain Valve in .....Room).

9.3 The low level valve should be kept strapped and padlocked closed except when in use.

10 Provision of Outlets:

Outlets should be provided on each riser at each level above first floor and where appropriate, on the roof. Where not withstanding conformity with the distance factor, prescribed at paragraph (2 Siting - d), it is deemed necessary lor the purpose of adequate coverage, to provide more than one outlet of any floor, two outlets at a floor level may be allowed on one riser. In buildings with basements of unusual depth, it may be advisable to extend the installation to serve outlets at levels below ground.

11 Type of Outlets:

11.1 The outlets should be of a type approved by the General Directorate of Civil Defence (BS 5041/Part 1 and 2/1975) and should comprise a gate pattern valve (63) mm bore, constructed in gunmetal, screwed or flanged for attachment to the riser and fitted with a (63) mm bore, and fitted with (63) mm instantaneous female coupling to conform to the requirements of the General Directorate of Civil Defence, and a blank cap secured by a suitable length of chain.

11.2 The valve spindle should not be less than (22) mm in diameter and fitted with a gun metal handwheel, about (152) mm in diameter, which should be marked with Open and Shut directions.

11.3 Sound constructions and hydraulically tested to a pressure of (20) bars before being connected to the rising main.

11.4 Where outlets are required to be recessed into the wall in a duct or valve, the opening should give not less than (152) mm clearance on both sides and below the valve and not less than (203) mm clearance above the handwheel. The depth of the opening should not be greater than is necessary and in no case should the front edge of the female coupling be more than (76) mm behind the face of the wall. The opening should be fitted with a hinged door and the lock of the door should be spring - loaded so that in an emergency the door can be opened from the inside after the glass has been broken. If a glazed door is provided, this should be conspicuously indicated by words (Fire Service Dry Main) in Arabic and English with clear letters on the inner face of the glass.

11.5 If this is not practicable, each outlet should be kept strapped shut, the strap being secured by a padlock.

11.6 Outlets should be installed about (760) mm above floor level.

12 Earthing:

Dry rising mains should be electrically earthed.

13 Telephone System:

In some cases, a simple single cable and plug telephone may be required by the Fire Service to assist communication between the ground floor and the floor at the which a landing valve is in use.

14 Test on Dry Rising Mains:

14.1 Notification to interested parties:

No test shall be carried out without prior notification to the interested parties (i.e. water undertakings, owners or occupiers of the building, and a representative of the installers).

14.2 Joint Inspection:

On the arrival of the Civil Defence officer who is responsible to carry out the test at the premises he should make contact with a suitable representative of those responsible for the site. Both these representatives should then carry out in company a physical check of the installation. The inspection should verify that earthing requirements have been carried out satisfactorily or certified by the electrical contractor.

14.3 Static pressure test:

On being satisfied that the system is in order, water should be allowed to flow through it discharging via the topmost outlet to flush out any debris that may be present. This procedure is of particular importance at acceptance tests when quantities of foreign matter may be lodged in the pipe work. The system should then be completely charged with water to a pressure of (10) bar measured at the inlet for a period of at least (15) minutes. During this period, an inspection of the system should be made to check that no leakage of water is taking place at any of the points or landing valves.

14.4 Flow test:

After the test in accordance with (c) completed, a flow test should be carried out if this is considered to be necessary. For this test, water should be passed through the system under pressure and the flow gauge readings recorded. Inability to sustain an effective fire-fighting jet from the topmost outlet, or any undue pressure loss in the rising main (after allowing for the height involved) should be investigated.

14.5 Remedial action and retesting

If as a result of these tests any defects are found, these should be remedied as necessary and a retest of the system should be carried out. When the pressure has been released at the pumping appliance of the coupling to the rising main inlet should be disconnected and the action of the non-return valves checked. The systern should then be drained and left ready for use.

15 Indemnities:

Before testing any system a signed indemnity should be sought from the person at that time responsible for the work site or premises. This may be required by the Civil Defence Authority in respect of liability for damage caused to persons or property arising out of, or in connection with any test.

16 Maintenance of Dry Rising Mains:

The service of a competent person should be obtained to carry out maintenance and repairs as under:

a) Inlets landing valves, drains valves, door hinges and locking arrangements to the inlet and landing valve boxes should be inspected every three months.

b) Special attention should be given to all valves, spindles, glands and washers to ensure that they are in satisfactory condition, so that all equipment is ready for immediate use.

c) In addition, it is recommended that wet tests be carried out annually when the main can be checked for leaks

17 Rectification of defects:

It is essential that all defects are rectified in the shortest possible time to ensure that the fixed fire fighting equipment is restored to satisfactory condition in as short a time as possible. Where, due to unforeseen difficulties, it is necessary to leave an installation not available for use, the fire brigade should be informed immediately in order that alternative arrangements may be made to cover this deficiency should the need arise. In addition a suitable notice to indicate that the installation is not available for use should be placed in a prominent position. The notice should be in the inlet box. When the installation is reinstated, the fire brigade should again be informed so that any alternative arrangements may be cancelled and, if considered necessary, an inspection and test of the repaired installation may be carried out.

18 Test Records:

A permanent record of all initial inspections and acceptance tests should be kept by the owner or occupier. This should record

a) date and time for inspection or test:

b) person carrying out the test:

c) test results noted:

d) any external factors significantly affecting the results (e.g. weather conditions):

e) work carried out as result of (e) with the date and result of retest.

Scanned : Wet Rising Mains

The installations of wet rising mains are very similar to those of dry rising mains but it should be permanently charged with water from a pressurised supply. It is essential that pressures and flows at all times be adequate to serve the designed number of outlets likely to be used. This is irrespective of the source of water supply.

1 Means of Water Supply for Wet Risers:

1.1 In all cases where town's main supply is involved, the capacity of the mains is important and should be checked. Generally a water supply capable of providing a minimum of (1125 litre/min) at all times will be required.

1.2 In many cases the town's main supply may not provide sufficient pressure to provide the supply necessary at upper floors on a high building. In such cases each rising main should fed from a suction tank or interconnected tanks having a minimum capacity of (45,000) litres. The tank or tanks should be automatically supplied from a town's main (s) controlled by ball valves(s) and the capacity of these mains together with the contents of the tank(s) should be such as to maintain a flow of water capable of supplying three fire-fighting jets for 45 minutes when water is being used at a total rate of (1125 litres/min).

1.3 Tanks supplying water for domestic purposes should not be uses as suction tanks for wet rising mains unless arrangements have been made for these domestic supplies to be drawn off in such a manner that the requisite reserve of water for the rising main is always preserved.

2 Pumps for Wet Rising Mains:

2.1 Two automatic pumps should be installed to feed the wet rising main, one of which should act as standby, each pump being supplied by a different source of power, e.g. electricity or diesel engine, and arranged so that when acting as duty pump it will operate automatically. I.e. on a flow of water or a fall in pressure on the installation. The secondary pump should be so arranged that it will be operate automatically on a failure for any reason of the duty pump. Both pumps should be so arranged that it will operate automatically at all times. This will be effected if the pumps are sited so that at least two thirds of the effective capacity casings. Where this is not possible separate priming tanks and foot valves should be provided for each pump.

2.2 All pumps should also be capable of being started and stopped manually.

2.3 An audible and visual alarm should be provided at an agreed position to indicate that the equipment and the pumping plant have operated.

2.4 Each pump should be capable of providing a flow of water of at least (25) litre/s (1500 litres/min) in the wet rising main, i.e. sufficient to serve three lines of hose from three landing valves simultaneously. A minimum running pressure of (4) bar and a maximum of (5) bar should be maintained at each landing valve when any number, up to three, are fully opened.

3 Additional Precautions for Wet Rising Mains:

3.1 Arrangements for draining a wet rising main should be incorporated to enable any necessary repairs to be carried out

3.2 To reduce the risk of hose bursting, arrangements should be made in accordance with (BS 5041/Part 1) so that when the water is shut off at the nozzle the static pressure in any line of hose connected to a landing valve does not exceed (7) bar.

To dispose of excess flows and pressures over and above those required (i.e. when only jet is in use) a pressure control valve should be incorporated in the body of the landing valve which is then permanently connected into the relief pipe. This relief pipe should run throughout the length of the wet rising main installation and should terminate, as required by the water undertakings, either back into the suction tank or to waste.

3.3 Where a rising main is supplied direct from a town, a main supply and a shut off valve is incorporated in the rising main the valve should be kept secured in the open position by a chain and padlock. In addition a notice reading (fire main control valve) in Arabic and English with the letters should be kept displayed adjacently.

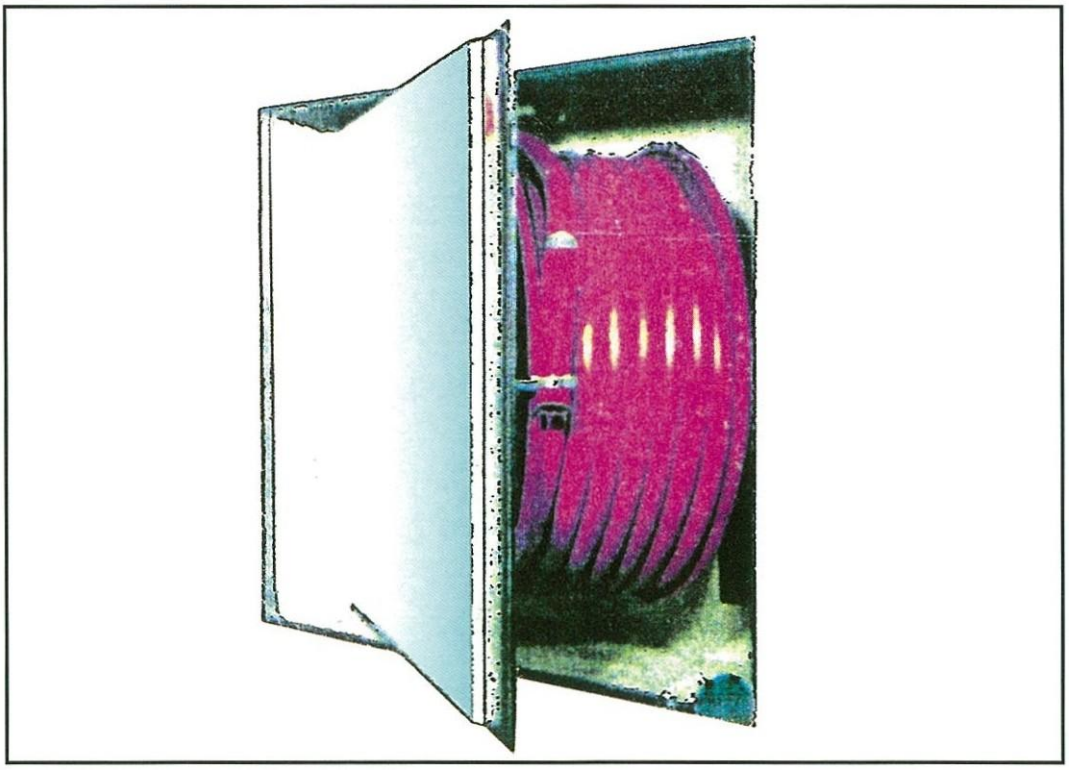
3.4 Where a rising main is bifurcated, valves should be provided to enable either branch to be isolated for repair without adversely affecting the other one.

3.5 Emergency arrangements for filling suction tanks. It must be envisaged that conditions can arise when the pre-arranged methods of filling the suction tanks may be out of action due to circumstances beyond the control of the building occupiers or owner. It is therefore recommended that where the tanks are no higher than (60) metres above ground level, pipes of not less 100 mm nominal size be installed having an open end at a convenient distance above the maximum level of water in the tank (s) their other ends connected to an appropriately sized inlet branching provided in an inlet box at a convenient position on the face of the building (see 7. Inlet boxes for Dry Rising Mains). By these means the fire brigade would be able to keep the tanks replenished in the event of an emergency and so provide the minimum amount of water necessary (see 1/1above). The water authority should be consulted in this connection.

3.6 Ring main supply: Where a number of underground fire hydrants or wet rising mains are required because of the area of the premises to be covered, the mains supplying these fire hydrants should be in the form of a ring main to form a complete circuit of the site. It is advisable for water to be supplied to the ring at more than one position, preferably from supplies obtained from different mains. Isolating valves complying with the requirements of (BS 5163 / 1974) should be incorporated in the system so that sections of the ring main can be isolated to enable repairs to be carried out. Branches to town's mains should also have an isolating valve and a non-return valve to suit the water undertaking's requirement.

Section 4

FIRE HOSE REELS



Section 4

FIRE HOSE REELS

1 Definitions

A fire hose reel is a fixed installation permanently connected to a water supply and designed to approved standard to facilitate the quick withdrawal of the hose in any direction for rapid first aid fire fighting measures. Hose reels shall be designed, installed and maintained in accordance with the requirement given below.

2 Provision and Siting:

one hose reel should be provided to cover every (800) m2 of floor space or part thereof. Hose reels should be sited in prominent and accessible positions at each floor level adjacent to exits in corridors on exit routes, in such a way that the nozzle of the hose can be taken into every room and within six metres of each part of a room, having regard to any obstruction. Where heavy furniture or equipment rnay be introduced into room, the hose and nozzle should be capable additionally of directing a jet into the back of nay recess formed. In exceptional circumstances consideration may also be needed as to the desirability of siting hose reels in such a way that if a fire prevents access to one site, the fire can be attacked from another hose reel in the vicinity.

3 Installation of hose reels:

3.1 Hose reels in recesses:

Preferably hose reels should be installed in recesses so that they do not form obstructions on a route of escape. The details of installation will vary considerably owing to the wide variation of types of hose reel and their size. A typical example of an installation of a fixed hose reel is illustrated in figure 1.

3.2 Recess doors:

Any doors provided for hose reel recesses should be so hinged that they open approximately (180) so as not to offer any obstruction to the hose being run out in either direction the doors should not normally be fitted with locks.

3.3 Hose reels in open areas:

When installed on open floor areas it may be necessary to position hose reels above head height, but in these cases the nozzle retainer, the hose guide and the inlet valve should be fitted at provide an anti-over run device to prevent the hose from becoming entangled when run out.

3.4 Importance of firm fixing:

Hose reel brackets should be firmly fixed to the wall so that casual knocks received during normal use of the building and the stresses incurred during use of fire-fighting will not prevent the unimpeded use of the hose reel.

4 Types of Hose Reels:

4.1 Fixed hose reel:

A hose reel mounted on a wall or in a recess with its axis at right angles to the plane of the wall. If mounted in a recess a hose guide or stirrup shall be provided to enable the hose to be guided in any direction (an example of a wall mounted hose reel is illustrated at figure (3).

4.2 Horizontal hose reel:

A hose reel on trunnion brackets which may be mounted on a wall or on a floor with its axis horizontal (an example is illustrated in figure 6)

4.3 Swinging arm hose reel:

A hose reel designed to be mounted on a flush wall and which is capable of being swung through an arc of approximately (180) in a horizontal plane (an example is illustrated in figure 4)

4.4 Recess hose reels:

A hose reels designed specifically for mounting in a recess and which is capable of being pulled out of the recess to a limited extent in a horizontal plane or which is capable of being swung out the recess through an arc of approximately (180) in a horizontal plane (an example of the latter type is illustrated in figure 5).

5 Sizes of Complete Assembly of Hose Reels:

5.1 The overall sizes of the complete assembly of the typical hose reels shown in figures 3 to 6 shall not exceed those given in table 1.

Table 1. Overall size for different types of hose reel.

Type	Refer to figure	Dimension A	Dimension B	Dimenssion C
		mm	mm	mm
Fixed (outside recess)	3	560	800	360
Fixed (in recess)	3	560	800	360
Swinging arm	4	730	660	430
Recess	5	640	660	390
Horizontal	6	600	555	545

5.2 The differing space requirement for fixed hose reels located inside and outside recesses, the co-ordinating spaces for all types, the preferred height of fixing above the floor and other information dealing with the installation of hose reels in buildings is given in figures (1 and 2).

5.3 The complete assembly of the typical hose reel include the following parts

a) the reel and valve.
b) the hanging loop of hose.
c) the guide or necessary space for proper withdrawal of the hose.
d) the component case (if any).

6 Material and Workmanship:

6.1 Hose reel components, other than inlet valves, shall be made only from the following materials:

a) Copper alloys: copper alloy suitable for the method of manufacture employed.
b) Aluminium alloys: Aluminium alloys complying with the requirements of the series (BS 1470 to BS 1474)
c) Cast iron: Cast iron complying with the requirements of BS (1452) but with minimum tensile strength not less than that specified for grade (14).
d) Steel: Steel shall comply with the requirement of (BS 970/Part 1 orBS 970/Part 4).

6.2 All components subject to external corrosion shall be suitably treated to resist corrosion. All external parts shall be thoroughly cleaned and painted except where non-ferrous parts, in red as standards approved by the General Directorate of Civil Defence.

6.3 Every reel and valve shall be tested by the manufacturer before delivery. It shall be subject to the standard test described in item (13).

6.4 Every subassembly constructed and successfully tested in conformity with the requirements in item (13) shall be clearly marked as follows:-

7 Hose

7.1 Hose lengths shall not exceed the reel size which is necessary to carry either:

a) (45) metres of (19) mm internal diameter hose.
b) (35) metres of (25) mm internal diameter hose.

8 Nozzle:

8.1 Every hose shall terminate in shut off nozzle to give either A plain jet, or A jet/ spray.

8.2 A plain jet nozzle shall be controlled by an on/off cock, and a jet/spray nozzle by a screw control (see figure 7-8)

8.3 Shut-off nozzles shall be manufactured only from copper alloy, aluminium alloy or plastics.

8.4 The diameter of the nozzle outlet shall be not less than 4.5 mm and not more than (6.5) mm.

9 Water Supply for Hose Reels:

As a minimum the water supply to hose reels should be such that when the two topmost reels in a building are in use simultaneously, each will provide a get of approximately (6) metres in length and will deliver not less than 0.5 litres/s (30) litres/min). For example, when a length of (30) metres of hose reel tubing (type 1 of B S 3169) is in use with a (6.35) mm nozzle, a minimum static pressure of (1.25) bar will be required at the entry to each reel and with a 4.8 mm nozzle, a minimum static pressure of (3) bar will be required. All hose reel systems to have a booster fire pump set installed as part of the system.

10 Booster Pumps:

10.1 In general a twin electric fire pump set will be satisfactory subject to an emergency supply of electricity, if not, the pump set will have to consist of one electric and one diesel driven pump.

10.2 Both motors and pumps should be sited in fire protected positions and the electrical supply to them should be by an exclusive circuit with the cables following a route of negligible fire risk or be provided with adequate protection.

10.3 The booster pumps system should come into operation automatically on a drop in pressure or a flow of water.

10.4 Both pumps should be automatically primed at all times.

10.5 An audile and visual alarm should be provided at an agreed position to indicate that the equipment and the pumping plant have operated.

11 Connection for Boosted Supplies:

11.1 Some water undertakings do not permit a booster pump to be connected directly into a supply main. In such cases the installation should be fed from a suction tank or interconnected tanks having a minimum capacity of (1125) litres. The tank or tanks should be automatically supplied from a towns main, controlled by a ball valve of minimum diameter of (50) mm.

11.2 Tanks supplying water for domestic purposes should not be used as suction tanks for hose reel installations unless arrangements have been made for these domestic supplies to be drawn off in such a manner that the requisite reserve of water for the hose reel installation is always preserved.

12 Hose Reel Notices :

12.1 For hose reels which do not have automatic action a notice should be provided indicating the need to turn on the inlet *valve* before running out the hose. This notice should be affixed to the wall in a prominent position adjacent to the reel (see figure 1)

12.2 All notices should be set out in letters easily readable in adverse conditions. They should be made so that they are not unreasonably affected by weathering or by corrosion caused by industrial processes in the vicinity.

12.3 If hose reel are located in recesses to which doors are fitted, the doors (whether glazed or otherwise) should bear the words (FIRE HOSE REEL) in red letters at least (50) mm high on a white background.

13 Test Requirements:

13.1 The reel and *valve* assembly shall be connected to a water supply and with the outlet blocked it shall be subjected to an internal hydraulic pressure of (20) bar for a period of not less than (5) minutes.

13.2 The test shall be considered successful only if at the end of the test period there has been no sign of leakage nor any visible distortion in any part.

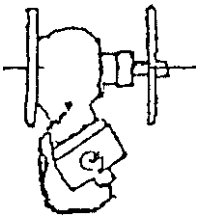
13.3 Overall performance test: The complete hose reel when installed shall produce the jet length and delivery flow rate in item (9) when tested as described before. It shall do this without showing any leakage or nay visible distortion in any part.

WET RISER

AIR RELEASE VALVE

AIR RELEASE VALVE

CUTLET OR LANDING VALVES



DRY RISER

AIR RELEASE VALVE

FLAT ROOF

مخرج

LANDING VALVE

الانبوب الصاعد

RISER PIPE

PRESSURE RE

VALVES ON

FLOORS, IF NE

DRY RISER CABINET WITH BREECHING IN WALL

GROUND FLOOR

PAVEMENT

GROUND FLOOR

BECONNECTED TOWN MAINS

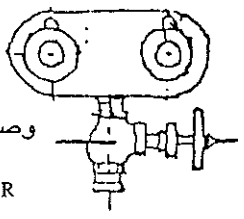
ELECTRICALLY EARTHED

CTRICALLY EARTHED

BASEMENT

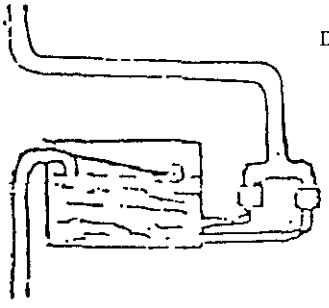
طابق أسفل مستوى الارض

BASEMENT

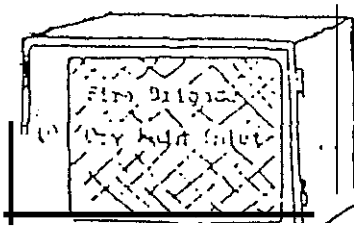


وصلة سحب ذات مدخلين لأنبوب صاعد جاف
ومزودة ببلف تصفية

DOUBLE INLET AND DRAIN VALVES FOR DRY RISING FIRE MAIN



TWIN BOOSTER WITH BREAK PRESSURE TANK



TYPICAL GLASS FRONTED INLET BOX FOR DRY RISING FIRE MAIN