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*Indian Standard*

EXTERNAL HYDRANT SYSTEMS —  
PROVISION AND MAINTENANCE —  
CODE OF PRACTICE

UDC 614.843.1.004.5 : 006.76

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NEW DELHI 110002

## FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Fire Fighting Sectional Committee had been approved by the Civil Engineering Division Council.

One of the methods for extinguishing fire in towns, cities and industrial buildings is by providing external hydrant systems. Fire hydrant systems consist of suitable capacity reservoirs, arrangements to impart pressure to the water, means to convey the water to various locations and suitable water outlets at the required locations. In order that such system could function efficiently, it will be necessary to give guidance for the provision, installation, inspection and maintenance of this system. This standard covers minimum requirements for such system. The provisions for this system were earlier covered in IS 9668 : 1980 'Code of practice for provision and maintenance of water supplies for fire fighting' and during the revision of IS 9668 : 1980, the requirements of that standard have been limited to the water supply and the external hydrant system has been covered separately in this standard incorporating modifications based on the experience gained in the use of the system. The provision of internal hydrant is covered in IS 3844 : 1989. 'Code of practice for installation and maintenance of internal hydrants and hose reel on premises (*first revision*)'.

## *Indian Standard*

# EXTERNAL HYDRANT SYSTEMS — PROVISION AND MAINTENANCE — CODE OF PRACTICE

### 1 SCOPE

This standard covers provisions of installation, inspection and maintenance of external hydrant systems.

### 2 REFERENCES

The Indian Standards listed in Annex A are necessary adjuncts to this standard.

### 3 WATER RESERVOIRS

The water reservoirs to feed the fire hydrant system should be provided underground, at ground level or at higher level. The capacity and the details of such reservoirs are given in IS 9668 : 1991.

### 4 PUMPS AND THEIR PRIME MOVERS

The static fire fighting pumps shall conform to the requirements given in IS 12469 : 1988. The capacity of pumps should be worked out based on requirements of output and pressure for the system. Provision shall be made for standby pumps fed from different source of power at the rate of 50 percent of aggregate number of pumps, subject to minimum of one and maximum of two. Where pumps are of different capacities, standby pump should be of highest capacity.

### 5 MAINS

**5.1** The mains should be of cast iron pipes conforming to IS 1536 : 1976, IS 8329 : 1977, IS 1537 : 1976 and IS 7181 : 1986 or mild steel conforming to IS 1239 ( Part 1 ) : 1979 or IS 3589 : 1981. The fittings of cast iron pipes should conform to IS 1538 ( Parts 1 to 23 ) : 1976 and of mild steel pipes conform to IS 1239 ( Part 2 ) : 1982.

**5.2** Underground mains should be laid not less than 1 m below ground level. Where soil conditions are unsatisfactory, masonry or equal supports should be provided at regular intervals.

**5.3** Above ground mains should be adequately supported at regular intervals not exceeding 3.5 m. When located near buildings, the main should be at least 2 m away from the face of the building.

**5.4** The fire hydrant mains should always be laid in rings or crosslinked rings, that is, all the mains should be interconnected. The size of

main should depend on the output and pressure requirements and the total number of hydrants to be installed on a single system. However, the minimum size of mains should be not less than 150 mm.

**5.5** Adequate number of sluice valves distributed according to the general layout of the installation should be provided for the purpose of isolating any portion of the installation for purposes of repairs, etc.

**5.6** All sluice valves should conform to IS 780 : 1984 and enclosed in properly constructed surface boxes so as to allow for broken joints being easily re-made. Valve wheels should have an arrow head engraved or cast thereon showing direction for turning 'open' and 'close'.

**5.7** The mains should not be laid under buildings, large open storages, railway lines and roads carrying very heavy traffic as far as possible. Where, however, it is inescapable to lay mains under the above condition, they should be laid in masonry trenches with removable covers and sluice valves should be provided at the points of entry and exit.

**5.8** The mains should be laid according to the provision given in IS 5822 : 1986 and IS 10221 : 1982, as applicable.

**5.9** The ground hydrant system should normally not be extended to feed riser main in storeyed buildings. Only in special circumstances building not exceeding 15 m. in height, an extension may be used, provided sufficient output and pressure can be ensured from the system. In such cases, since ring mains may not be possible, terminal main of not less than 100 mm diameter to feed up to three hydrants and 150 mm dia to feed up to five hydrants may be used.

**5.10** Fire fighting mains should not be utilized for any other purpose such as process use for industrial premises.

### 6 FIRE HYDRANTS

**6.1** Fire hydrants, namely, stand post type, conforming to IS 908 : 1975 and underground type conforming to IS 909 : 1975 should be provided. For use in industrial establishment, only stand post type hydrants should be provided.

**6.2** For cities and towns, stand post type hydrants should be provided preferably but where these

are likely to cause obstruction to traffic or are liable to be misused by public, underground type may be provided.

**6.3** Hydrant outlet and valve for the underground type hydrant and valves for the stand post type hydrant should be located as near the ground level as possible. The top of the outlet or spindle of the valve should be at a depth not exceeding 0.3 m.

**6.4** Ordinary manhole covers of cast iron or reinforced concrete should not be used to cover underground hydrants or the valves of the stand post type hydrants. They should be covered only by hinge cast iron covers as specified in IS 3950 : 1979 with letters 'FH' embossed on them.

**6.5** Apart from painting the fire hydrants and their covers in distinctive colours, all fire hydrants should have suitable indicating plates fixed to the nearest wall or suitable post erected for the purpose to facilitate easy location. The indicating plates can be made of vitreous enamelled mild steel, cast iron, aluminium alloy or plastic. The plates should be yellow in colour with letter 'H' in black, preferably with fluorescent colour paints. Where possible, size of the mains and the distance of the hydrant from the plate should be marked on the plate.

**6.6** Normally in towns/cities, the hydrants should be provided at intervals of 100 m but this distance may be suitably increased or decreased depending on the risk in the area desired to be protected.

**6.7** In case of industries of high hazard category ( Gr G-3, H and J ), the hydrants should be installed at every 30 m apart along building line and the hydrant outlet should be single or double hydrant with provision of landing valves. For moderate hazard ( Gr G-2 ) where the single hydrant is use, it should be installed at every 45 m apart. In case of any portion which has multiple hazards, the relevant portion should be covered according to the provision given for higher hazard. Further the pressure available at hydraulically most remote hydrant should not be less than 3.5 kgf/cm<sup>2</sup> for light ( Group A to F ) and moderate hazard. In case of high hazard ( Group G-3, H and J ), the hydrant system ( Group G-2 ) should be so designed that when half the aggregate pumping capacity is being discharged at the hydraulically most remote point and other half in the most vulnerable area enroute a minimum pressure of 5.25 kg/cm<sup>2</sup> is available at the remote point. For group classification IS 1641 : 1988 should be referred to.

**6.8** The hydrants should be located according to the attendant fire hazard so as to facilitate the most effective service. They need not necessarily be equidistant from each other. In industries where they are to cover specific buildings,

advantage should be taken of convenient doors or windows or both, to place hydrants so that only a minimum length of hose is required to reach the opening through which fires may be attacked. The location of hydrant landing valves on floors above the ground floor or a processing unit should be close to the staircase landings.

**6.9** Hydrants should be located at a distance of not less than 2 m from the face of the buildings. This distance may suitably be increased up to maximum 15 m where hydrants are installed to protect hazardous storages or processes so that the hydrants remain approachable and workable even in the case of a serious fire.

**6.10** All hydrants should be readily accessible to the fire appliances and for fire fighting operations.

**6.11** Hydrants located in situations where they are likely to be damaged by vehicular traffic should be suitably protected on all sides against possible damage.

**6.12** In cold climates where frost is likely to be experienced, the hydrants should be fitted with suitable means for draining off the water trapped in the body of the hydrant between the valve and the outlet.

**6.13** No portion of a protected building should be more than 45 m from an external hydrant, and where this requirement cannot be met, internal hydrants/landing valves should be provided ( see IS 3844 : 1966 ).

**6.14** Hydrant accessories, such as, hydrant stand pipes, hydrant key and bar suction collecting heads, delivery hoses, branch pipes and nozzles, etc, should be provided in sufficient quantities for quick operation of the hydrants.

**6.15** In case of industries having their own fire brigades, the hydrant accessories should be provided centrally on each of the fire appliance and at the fire station. However, in the case of industries which do not have their own brigade or where it is intended that the trained workers will engage in interim fire fighting, the appropriate essential accessories should be provided near each hydrant point in hydrant boxes of adequate size. In such cases, delivery hoses should be provided at the scale of two, 63 mm hoses generally conforming to type A of IS 636 : 1988, duly bound with instantaneous couplings in 15 m lengths and one branch pipe duly fitted with a nozzle (preferably universal branch conforming to IS 2871 : 1983). The key and other accessories should be provided according to the peculiar needs of each system.

## 7 INSPECTIONS, CHECKS AND MAINTENANCE

7.1 After installation the system should be capable of withstanding pressure equal to 150 percent of the maximum working pressure for 2 h.

7.2 Each hydrant provided in the area should be inspected as often as possible. The periodicity for such inspections should be determined and laid down depending on the local conditions. However, for cities and towns, such inspections for each hydrant should be carried out at intervals not exceeding one month and for industrial establishment once every week. The record of all such inspections should be maintained and remedial action for any defects observed should be immediately taken on priority basis.

7.3 The following action should be taken during the monthly/weekly inspections:

- a) The hydrant or valve pit should be opened and checked that it is clean and not filled with any dirt or leaking water. If the pit is full of water, it should be emptied and cleaned.
- b) The valve spindles should be checked and any signs of excessive wear including leakage in the gland got rectified. If a false spindle is fitted, it should be checked that it is in position and securely fixed.
- c) The valve should be opened slightly to see that water is flowing freely and there is no obstruction in the outlet. In the case of underground hydrants, the valves should be opened only after fixing the stand pipe and fully closed before the stand pipe is removed. Any blank caps or covers provided on the outlet should be replaced and securely fixed.
- d) If any washers are used in the outlet, it should be ascertained that these are in position and in working order. Unserviceable washers should be replaced by the inspection team immediately.
- e) The brick work of the pit, the cover and its frame and the state of the roadway or ground, round the frame should be examined and a report made if these are damaged.
- f) The pits should be thoroughly emptied of water and cleaned before the covers are closed.
- g) The paint work of the hydrants, pit covers, indicator plates, etc, should be checked and removed, if necessary. Brass parts should be cleaned and polished.
- h) Any obstruction in the approach to the appliances round the hydrants should be removed.

j) If frost valves are fitted, those should be checked for satisfactory working and replaced where required.

k) All cut off (isolating) valves should be operated and oiled, if necessary, once a month.

m) Isolating (cut off) valves should be thoroughly overhauled annually to remove sludge and other foreign matter collected in valve seating.

7.4 Apart from the monthly/weekly inspections, the performance of the hydrants should be thoroughly checked during the fire fighting operations and regular drills and practices. The practices should be so arranged that the maximum number of hydrants in different areas are operated in rotation.

7.5 Testing of pressure and output in different areas covered by the hydrant system should be carried, at least every quarter. Hydrant mains should be tested with the pump delivering at its maximum pressure with all the hydrants outlet closed and thereafter, with at least three adjacent hydrants opened to see that the hydrant yield the minimum output of 1 125 litres per minute at a minimum pressure of 5.25 kgf/cm<sup>2</sup> or higher, if needed. During such tests, apart from the senior officers of the fire authority, water department engineers should also be associated. The results of such tests should be recorded and remedial action taken where pressure and output fall short of the stipulated requirements.

7.6 Proper handling and working of the hydrants can go a long way in their better maintenance and satisfactory performance over long period. The following simple rules should be followed whenever hydrants are operated:

- a) Open the hydrant valves slowly, specially, if the hose is connected directly to a branch.
- b) Close the valve slowly to prevent water hammer and a possible main burst.
- c) After use, ensure that the hydrant valve is properly closed and there is no leakage.
- d) The valve of the hydrant should not be operated when the pit is full of water unless the stand pipe or hose are first fitted.
- e) The stand pipe or hose should not be disconnected from a hydrant in which no water is available or from which the flow has suddenly stopped until the valve has been closed.
- f) To avoid risk of contaminating the water supply, every endeavour should be made to avoid collecting water simultaneously in a pump from a drinking water main.



## ANNEX A

( Clause 2 )

## LIST OF REFERRED INDIAN STANDARDS

IS No.	Title	IS No.	Title
636 : 1988	Non-percolating flexible fire fighting delivery hose ( <i>third revision</i> )	2871 : 1983	Branch pipe, universal for fire fighting purposes ( <i>first revision</i> )
780 : 1984	Sluice valves for water works purposes ( 50 to 300 mm size ) ( <i>sixth revision</i> )	3589 : 1981	Electrically welded steel pipes for water, gas and sewage 150 to 2 000 mm nominal size ) ( <i>first revision</i> )
908 : 1975	Fire hydrant, stand post type ( <i>second revision</i> )	3844 : 1966	Code of practice for installation and maintenance of internal hydrants and hose-reel on premises ( <i>first revision</i> )
909 : 1975	Underground fire hydrant, sluice valve type ( <i>second revision</i> )	3950 : 1979	Surface boxes for sluice valves ( <i>first revision</i> )
1239 (Part 1) : 1979	Mild steel tubes, tubulars and other wrought steel fittings: Part 1 Mild steel tubes ( <i>fourth revision</i> )	5822 : 1986	Code of practice for laying of welded steel pipes for water supply ( <i>first revision</i> )
1239 (Part 2) : 1982	Mild steel tubes, tubulars and other wrought steel pipe fittings: Part 2 Mild steel tubulars and other wrought steel pipe fittings ( <i>third revision</i> )	7181 : 1986	Horizontally cast iron double flanged pipes for water, gas and sewage ( <i>first revision</i> )
1536 : 1976	Centrifugally cast ( spun ) iron pressure pipes for water, gas and sewage ( <i>second revision</i> )	8329 : 1977	Centrifugally cast ( spun ) ductile iron pressure pipes for water, gas and sewage ( <i>first revision</i> )
1537 : 1976	Vertically cast iron pressure pipes for water, gas and sewage ( <i>first revision</i> )	9668 : 1991	Code of practice for provision and maintenance of water supplies for fire fighting ( <i>first revision</i> )
1538 (Parts 1 to 23) : 1976	Cast iron fittings for pressure pipes for water, gas and sewage	10221 : 1982	Code of practice for coating and wrapping of underground mild steel pipelines
1641 : 1988	Code of practice for fire safety of buildings (general): General principles of fire grading and classification ( <i>first revision</i> )	12469 : 1988	Pumps for fire fighting applications

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