TCVN VIETNAM NATIONAL STANDARDS

TCVN 6379: 1998

FIRE PROTECTION EQUIPMENT - FIRE HYDRANT - TECHNICAL REQUIREMENTS

(This English version is for reference only)

HA NOI – 2008

Foreword

TCVN 6379:1998 was prepared on the basis of GOST 8220:1985.

TCVN 6379:1998 was prepared by Technical Committee TCVN/TC 21 *Equipment for fire protection and fire fighting*, proposed by Directorate for Standards, Metrology and Quality, and approved by Ministry of Science and Technology.

This standard was transferred in 2008 from Vietnam Standard into Vietnam National Standard under the same identifier number, as stipulated in Section 1, Article 69 of the Law on Standards and Technical Regulations and in Point a, Section 1, Article 6 of Decree No 127/2007/ND-CP of the Government dated 01 August 2007 detailing the implementation of a number of articles of the Law on Standards and Technical Regulation.

Fire protection equipment - Fire hydrant - Technical requirements

1. Scope

This standard is applicable to all kind of fire hydrant (hereinafter: hydrant) attacked to the common water supply systems such as urban water supply systems, outside water supply systems of works or buildings .

2. Normative references

TCVN 209-66 Trapezoidal screw threads with diameters from 10 to 640 mm. Basic dimensions

TCVN 210-66: Trapezoidal screw threads with diameters from 10 to 300 mm tolerances

TCVN 257-85 Metals. Rockwell hardness test. A, B, C scales

TCVN 385-70 Grey cast iron. Tolerances of dimensions and masses. Excess dimensions for mechanical treatment

TCVN 1917:1993 Metric threads. Fit with gap. Tolerances

TCVN 2003:1977 Rubber O-ring gaskets for hydraulic and pneumatic systems

TCVN 2097:1993 Paints. Gross cut test for the determination of adhesion

TCVN 2254:1977 Trapezoidal threads. Profiles

TCVN 4681:1989 Pipe cylindrical threads.

TCVN 5739:1993 Fire fighting equipment. Coupling heads

3. Terms and definitions

These terms are mentioned in this standard

3.1. Fire hydrant: is specialized equipment installed in the water supply pipelines for drawing water to use in fighting fires. Main parts of fire hydrant are valve, stand pipe and nozzle with standard dimensions.

There are two types of fire hydrants: above-ground fire hydrant (above-ground hydrant) and underground fire hydrant (underground hydrant)

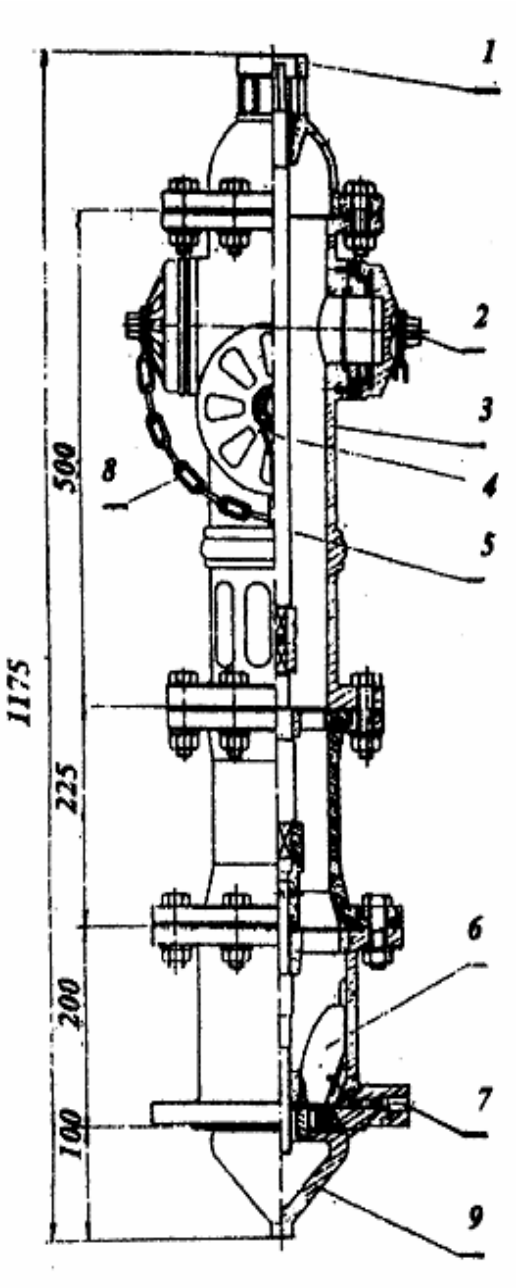
3.1.1. Above-ground hydrant : Is the kind of fire hydrant with its nozzles lied above the ground with regulated high (fig.1)

3.1.2. Underground hydrant: Is the kind of hydrant which all of its parts are laid under the ground. (fig.2). Different from the above-ground type, this type of hydrant requires using a fire hydrant standpipe in order to drawing water.

3.2. Fire hydrant standpipe is specialized equipment that goes with fire truck. This standpipe is attached to the underground hydrant to drawing water. A fire hydrant standpipe often has two nozzles for direct water taking to the fire truck or for mounting with fire nozzle .

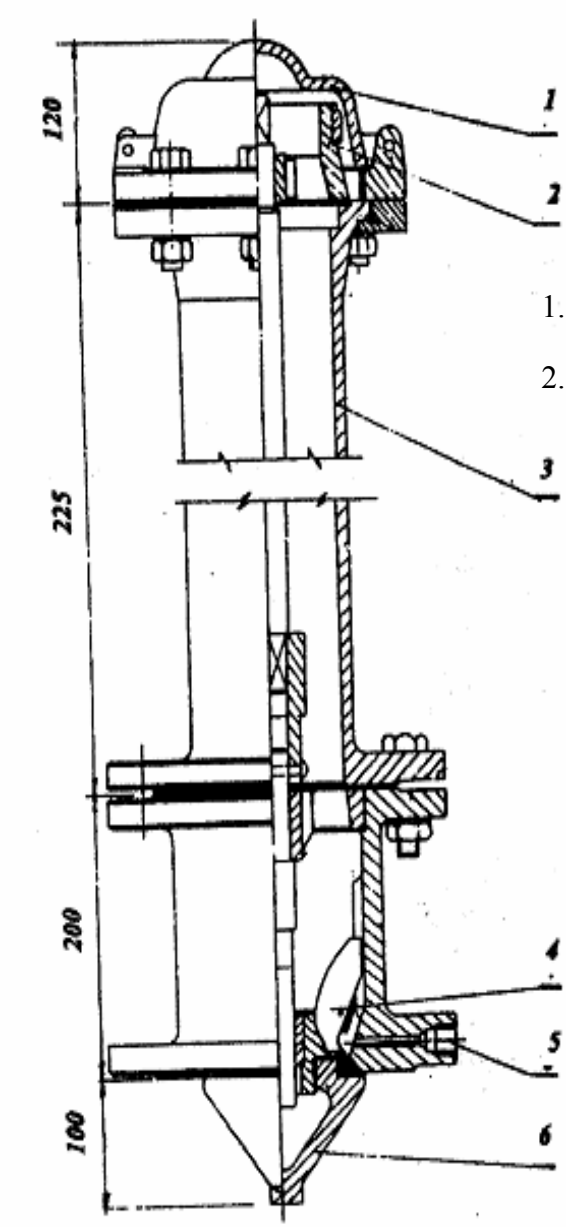
4. Basic parameter and dimension

4.1. Basic parameter and dimensions of hydrant is regulated in table.1 and fig. 1.2



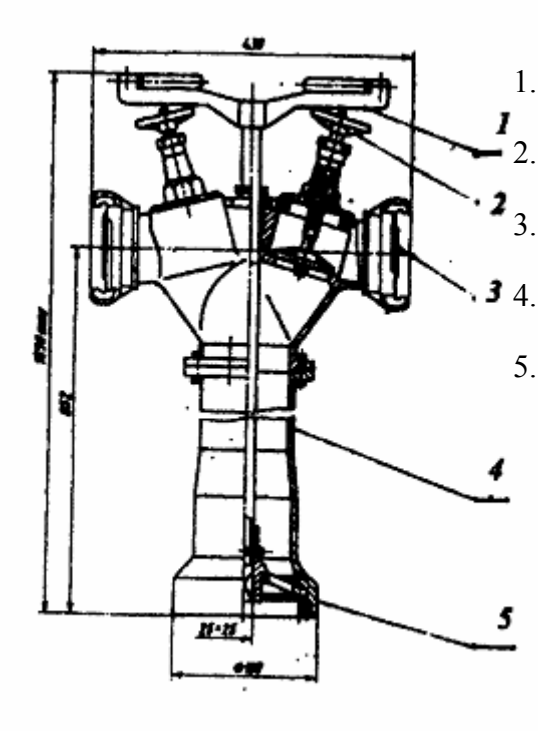
1. safety cap
2. small nozzle and nozzle cap
3. shaft
4. Large nozzle and nozzle cap
5. valve needle
6. valve leaf
7. drain hole
8. nozzle protection chain
9. valve

Fig.1 Above ground fire hydrant



1. safety cap
2. thread
3. shaft
4. valve leaf
5. drain hole
6. valve

Fig.2- Underground fire hydrant



1. 1.valve handle
2. 2.nozzle
3. 3.nozzle connector
4. 4.shaft
5. 5.connector part (to connect with the underground hydrant

Fig.3 - Fire hydrant standpipe

Table 1

Factor	Above ground hydrant	Underground hydrant
Working pressure, MPa, (KG/cm2), not below	1 (10)	1 (10)
Inner diameter of hydrant, mm	125	125
Lifting height of valve, mm	30	30
Loose of axial valve when open, mm, not exceed	0.4	0.4
Hydrant's height, mm	1175	645
The number of revolution for the valve to be completely open, round	15	15
Coefficient of pressure loss in hydrant, s2m(-5), not exceed	$1,2 \times 10^3$	$1,2 \times 10^3$
Diameter of exit nozzle, mm:		
- Large nozzle	110	-
- Small nozzle	69	-
Nipple connected with hydrant standpipe	-	thread 6''
Flange parameter		
- Diameter of the bolt-hole circle, mm, +/- 0.65	280	280
- Diameter of the bolt hole, mm	22	22
- the number of hole	6	6
Weight of hydrant, kg, not exceed	150	95

4.2. Parameter and dimension of hydrant's valve are illustrated in Fig.4

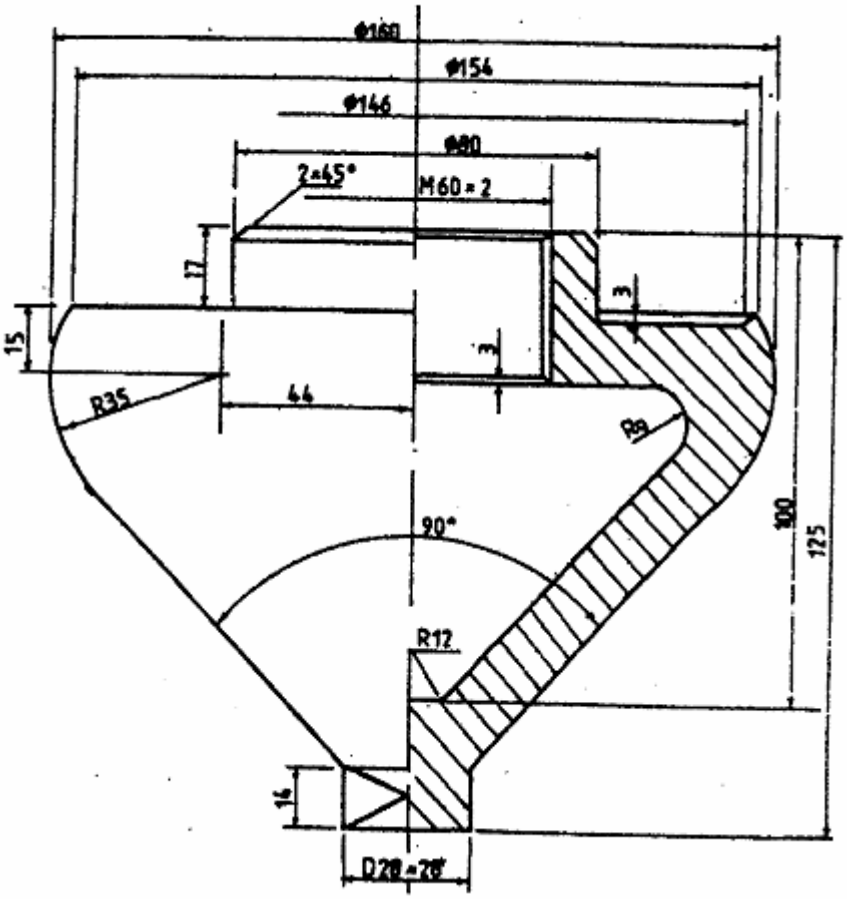


Fig.4 - Hydrant's valve

5. Technical requirements

5.1. The making of hydrant must be in accordance with regulations of this standard. The making of other type of hydrants whose construction and dimensions are similar with or special different from this type must be approved by Department for preventing and fighting fire.

5.2. The hydrant must be incapable of standing testing pressure not lower than 1.5 MPa. In 6.10 test, there must be no sign of crack or residual deformation noticed in hydrant

5.3. After the installation of hydrant, it must be ensured that

The hydrant is close under hydraulic pressure not lower than 1Mpa

Rolling moment for the opening and closing of hydrant valve when water pressure is at the minimum of 1 Mpa must not exceed 150 N.m. When carrying out the test mentioned in 6.11, with the condition of closing valve, no leaking or sweating phenomenon should be noticed in the joints and the hydrant's body.

5.4. Water piston valve and the valve actuator must suffer from an axle load greater than 3.10^4N. When testing valves according to 6.13, broken valves or valves with damaged threads and collared pins are not accepted.

5.5. The amount of stagnant water in the pillar hydrant shall be not greater than 50 cm^3. A greater amount of stilling water needs approval of competent authorities.

5.6. The diameter of stagnant water drain hole on the body of pillar hydrant shall not be smaller than 8 mm. A straight pipe thread Ô 1/2'' following Vietnamese Standard 4681: 1989 is placed at the outlet of the water drain hole.

5.7. The external thread connecting with the standpipe of underground pillar shall be a straight pipe thread Ô 6'' with the margin of 8g according to Vietnamese Standard 1917: 1993.

5.8. Great fire dydzants and small ones of buoyant pillar shall be suitable with the adaptor of DR.2-125 (M 150 x 6) and the adaptor of DT.1 – 77, respectively, according to Vietnamese Standard 5739 : 1993.

5.9. Valve thread is the acme thread according to Vietnamese Standard 209: 1966; Vietnamese Standard 210: 1966; and Vietnamese Standard 2254: 1977.

5.10. The threaded joint between the valve leaf and the valve spindle is 7 H/8g according to Vietnamese Standard 1917: 1993.

5.11. Mast body and valve of the pillar must be made from mechanical material with its antirust no less than cast iron GX 15 – 32.

5.12. Threaded valve needle of the pillar hydrant must be made from inoxidable steel with its physic-mechanical properties no less than steel of 30 Cr 13.

5.13. Threaded parts of nipples of underground pillar must be made from the material with the antirust no less than cooper alloy Cu5Sn5Zn5Pb or brass CuZn4Si.

The structure and the way to fix in the valve needle of pillar hydrant must ensure the dependability and the accuracy of the coupler, and make it impossible for the couple to be slewed when unlocking the pillar to extinguish fire.

5.14. The valve gasket must be made from heat-resistant, cold resistance and antifriction rubber with high hardness and antirust according to Vietnamese Standard 2003: 1977.

Other materials with the same characteristics are allowed to be the alternatives of rubber.

5.15. Dimension and volume deviations of cast iron – the accuracy level 3 according to 385: 1970.

5.16. The valve connecting with hydrant pillar must be made from materials with basic characteristics no less than cupomanganese Cu5Sn5Zn5Pb or brassmaganese CuZn4Si.

5.17. The exterior mat coat of pillar must not be blistered, in defined operation conditions.

All protecting cap of the valve needle at the top of the buoyant pillar must be painted in reflecting orange or yellow.

5.18. The dimension of square part of the needle for mounting the underground hydrant with the hydrant standpipe is 22 mm x 22 mm with the accuracy rate of minus 0,5.

The hardness of the square surface is from 26 to 38 HRC.

5.19. The cover hood of underground pillar must be in flip type in order not to restrain withdrawing water from the pillar.

The cover hood of fire cock and valve needle of the buoyant pillar must allow to be unlocked by the five – square key Z 22.

6. Test method

6.1. Testing for hydrant pillar should be implemented in the following climatic conditions:

Atmospheric pressure: 760 mm Hg;

Temperature: 25^0C ÷ 30^0C;

Relative humidity: 85 % ÷ 95 %.

6.2. Testing the operation pressure (according to 4.1) by a manometer with the maximum limit of measurement of 2 MPa and the degree of accuracy no less than 1,5.

6.3. Testing the internal diameter (according to 4.1) and the dimension of the square part of valve needle (according to 5.18) by a caliper rule with the deviation ± 0,05 mm. Testing the hardness according to Vietnamese Standard 257: 1985.

6.4. Testing the lifting height of valve (according to 4.1) and the dimension of valve (according to 4.2) by a rule with degree of accuracy 0,5.

6.5. Testing the loose of valve (according to 4.1) by using gap measuring ruler

6.6. Testing the height of pillar (according to 4.1), marginal dimension and connection dimension by millimeter – rule with the accuracy level 3.

6.7. Testing necessary number of rotation to open the valve completely by counting directly, testing threads (according to 5.8; 5.9) by thread gauge, visually testing the fixation of pillar cover hood (according to 5.9), testing dimension and weight of cast (according to 5.15) by a rule with the accuracy degree level 3 and a scale with the accuracy degree of ± 0,5 kg.

6.8. Coefficient of pressure loss in hydrant pillar, $s^2 . m^{-5}$ (according to 4.1) is identified according to the formula as follows:

$$S = \Delta h/Q^2,$$

With:

Δh: pressure loss in pillar, in meter;

Q: hydraulic discharge, in cubic meter per second.

Identifying coefficient of pressure loss in the case of water pressure at the inlet of hydrant pillar is 0,2; 0,4 and 0,6 MPa while the hydraulic discharge is from 15×10^{-3} to 28×10^{-3} m^3/s.

Identifying pressure loss Δh by differential manometer with the maximum measurement limit of 1,6 MPa and the accuracy degree off 1,5. When identifying pressure of the water height, measuring at the inlet and outlet of the hydrant pillar.

Identify water discharge by measuring instrument for water discharge. In this case, the counter needs to be placed at the straight pipe so that the length of pipe before the counter is no less than 8 times of the pipe's diameter, and the pipe after the counter is not smaller than 5 times of diameter of pipe.

The water discharge can be identified through the volume method by measuring the volume and the needed time to fill a fluid column no less than 2 m^3 with the accuracy rate $\pm$ 0,01 m^3.

6.9. Testing the weight of hydrant pillar (according to 4.1) by a scale with the average accuracy rate and the maximum scale bar of 500 kg.

6.10. Testing the bearing capacity of the hydrant pillar according to 5.2 is undertaken in the water pressure of 1,5 PMa in one minute with the opened valve. Measuring the pressure by a manometer with the measurement limit of 2,5 MPa and the accuracy rate no less than 1,5.

6.11. Testing tightness of hydrant pillar (according to 5.3) at the pressure of one MPa in one minute in both cases of opened and closed valve. Testing the pressure according to 6.2.

6.12. Using dynamometer to measure moment when opening and closing the valve (according to 5.3) by the hand lock of hydrant pillar or by key.

6.13. Testing the mechanical durability of valve and its actuating mechanism (according to 5.4) by putting a compressive force onto the valve or pulling a dynamometer with 3000 KG load along the measured needle in 3 minutes.

6.14. The amount of stagnant water in the hydrant pillar (according to 5.5) is the difference between the amount of water pouring into the dry, sealed and standing pillar and the amount of water running out in 3 minutes. The amount of water pouring into the pillar is not less than 2×10^{-3} m^3.

6.15. Testing factor and dimension of the stagnant water outlet (according to 5.6) and the adaptor by a popular measuring instrument.

6.16. Testing the fixation of adaptor (according to 5.13) by screwing hard the water standpipe into hydrant pillar for underground pillars and by screw hard the suction cock or injector for buoyant pillars in the state of ensuring testing conditions according to 6.11.

6.17. Testing the quality of the painting coat according to Vietnamese Standard 2097: 1993.

7. Labeling, packing, transporting and maintaining

7.1. The following information must be written on every hydrant pillar:

- Name or signal of the manufacture;

- Types of hydrant;

- Year of manufacture;

- Standard number.

The label shall be tagged at the back of the great fire cock and the below body for buoyant pillars and underground pillars, respectively.

7.2. Part of open thread and the surface of unpainted metal elements must be covered with protective lubricant.

7.3. Every hydrant pillar must go along with a user's manual for installation and operation according to regulations in Appendix A and B.

7.4. Keep hydrant pillars dry. The valve must be closed when hydrant pillar is transported or in maintenance.

7.5. When being transported, each hydrant pillar must be packed privately and fasten tightly. If hydrant pillars are packing in packets, each packet is not allowed to include 6 buoyant pillars or 10 underground pillars.

Annex A

(regulations)

Installation instruction

A.1 The hydrant must be kept at vertical working position. Requirements on installation, installation spacing, curing period will be as regulated by authoritative bodies.

A.2 If the above-ground hydrant is placed on the road side, it is necessary to make sure that the minimum distance between the hydrant and the walls of the buildings is 5m and the maximum distance from the hydrant to the pavement's edge is 2.5m

A.3 In special case, where it is impossible to place the hydrant on the pavement, a underground hydrant can be placed on a hole for hydrant on the roadway as long as the hole is at least 0.5 m away from other underground structure, and regulations on distance with underground structure of related legal documents are respected.

A.4 When installing an above-ground hydrant, make sure that the hydrant large nozzle must turn to the roadway, and the distance from the ground to the top of the hydrant is 700mm (Fig.5)

A.5 The dimensions of underground hydrant hole is illustrated in Fig.6

In the case where underground hydrant is placed in a hole on the roadway, the cap of the hydrant hole must have a loading capacity of over 20 tons.

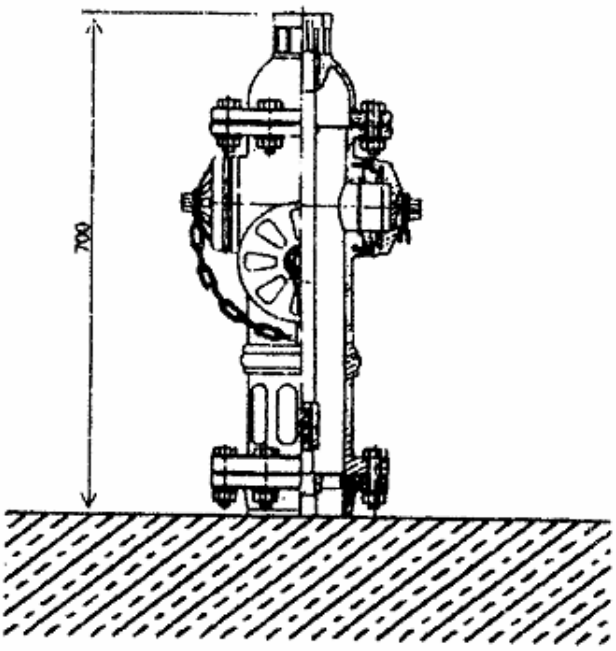
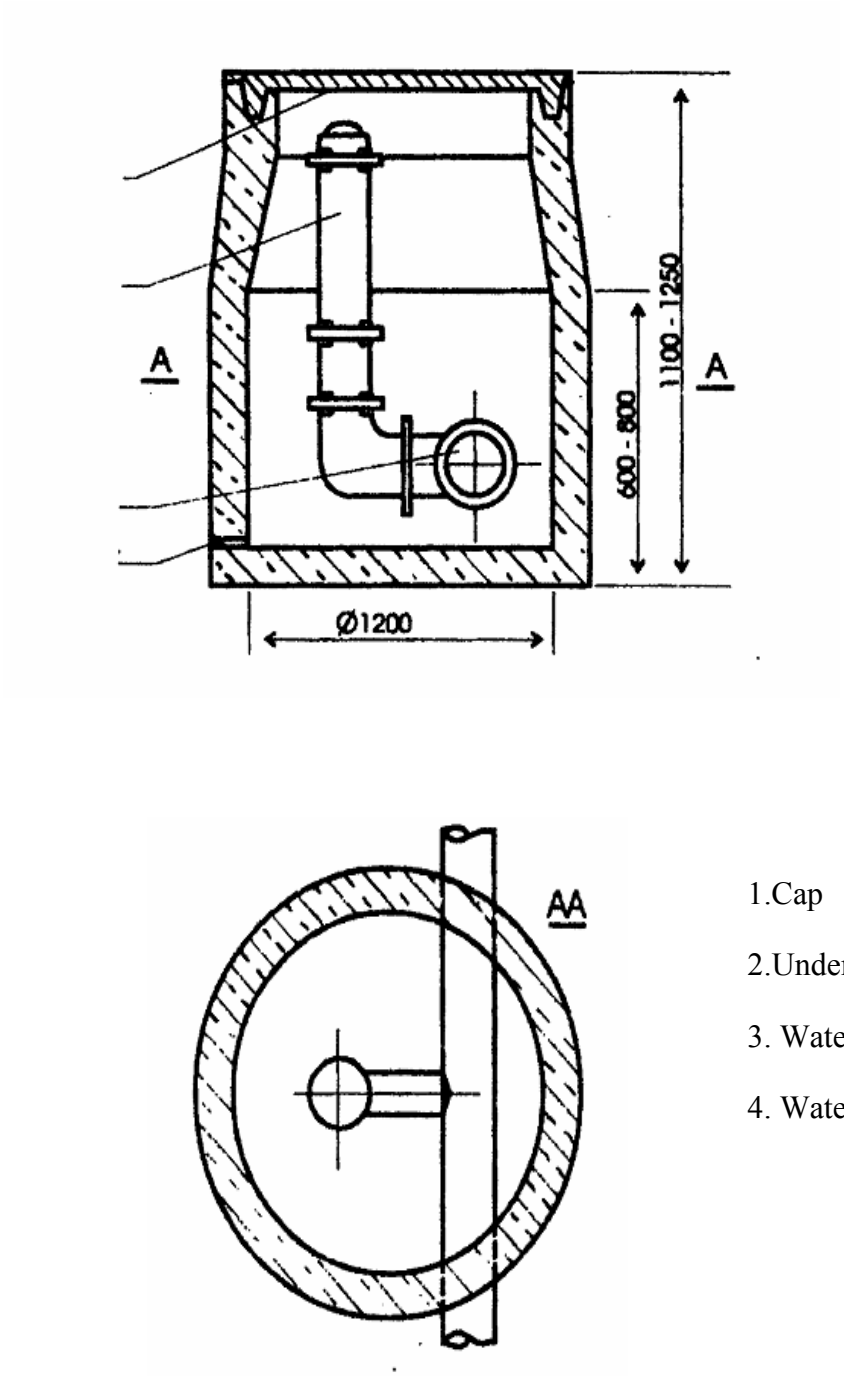


Fig.5 - Installation of above-ground hydrant



1.Cap

2.Underground hydrant

3. Water supply pipe

4. Water discharge hole

Fig.6 - Underground hole for hydrant

There must be a opening hole on the cap of the hydrant hole. On the road, there must be a light reflected line, in yellow or white, surrounding the cap of the hydrant hole. The width of the line is 100mm.

A.6 There must be a fire hydrant sign next to the underground hydrant. The sign is placed on a column of 2.5m height on the pavement. The sign is designed with the dimension of 700mm x 450mm, red background and the note "TRỤ NƯỚC CHỮA CHÁY - FIRE HYDRANT" in light reflected white paint. The distance m from the hydrant to the sign column must not exceed 10m. The height of the letter on the sign must exceed 80mm (Fig.7).

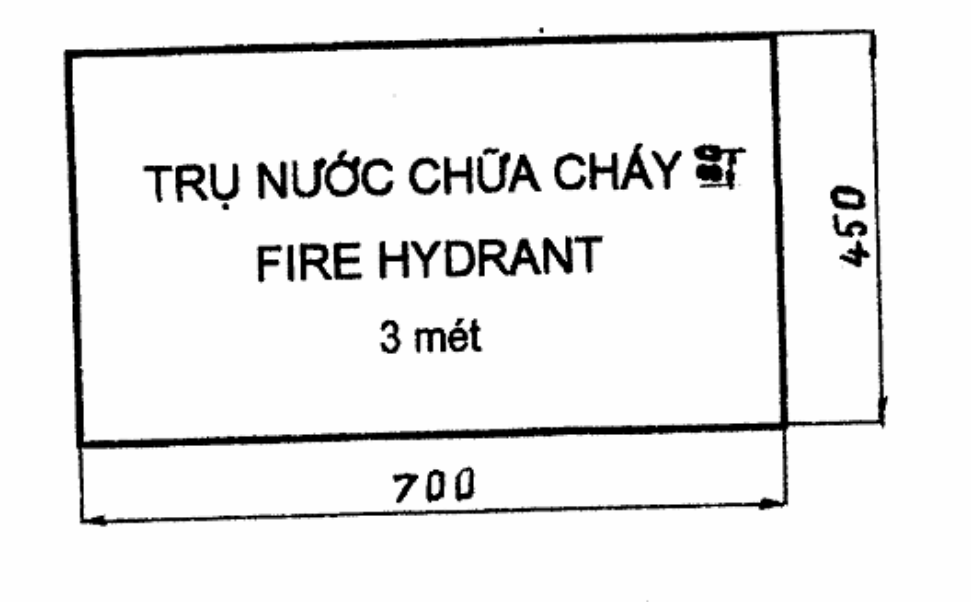


Fig.7 - Sign for underground hydrant

A.7 There must be a conduit from the hydrant hole (in the case of underground hydrant) or from the hydrant (in the case of above-ground hydrant) to keep the hole and the above space of the hydrant valve always in dry condition. (Fig.1 and Fig.6)

Depending on the terrain of the place where the hydrant is installed, the discharge valve of the hydrant's body must be equipped with a reverse-acting valve in order to prevent the penetration of water to the hydrant space.

Annex B

(Regulations)

Handling instructions

B.1 Hydrant is opened/closed with a dedicated key (in the case of above ground hydrant) or with hydrant standpipe (in the case of underground hydrant)

B.2 Water from fire hydrant is used for the purpose of fire distinguish, fire practice or technical maintenance only

B.3 Technical condition of fire hydrant must be checked at least twice a year, the later check must be no later then 6 months after the previous one.

B.4 Technical maintenance includes the checking of:

The condition of exit nozzle in above ground hydrant, of valve cap and hole's cap in underground hydrant, and of all the other parts of a hydrant;

The water level in the hole and in the hydrant's body;

The tightness of valve;

The operation of fire hydrant after mounting with fire nozzle, estimate the capacity of the hydrant;

The ease in opening/closing the valve.