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CODE OF PRACTICE FOR SELECTION, INSTALLATION AND MAINTENANCE OF DOMESTIC WATER METERS

(First Revision)

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BUREAU OF INDIAN STANDARDS
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Indian Standard

CODE OF PRACTICE FOR SELECTION, INSTALLATION AND MAINTENANCE OF DOMESTIC WATER METERS

(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 16 February 1973, after the draft finalized by the Sanitary Appliances and Water Fittings Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 Water meters being available in many designs with different end-connections and varying flow characteristics, due consideration will have to be given when selecting any one type of meter for a particular situation. Besides the proper selection, they have to be properly installed so that they may give desired duty in service without involving frequent repairs and costly maintenance. This standard was first published in 1963 to give useful guidance to consumers and water supply authorities in the use of water meters and the first revision of the standard has been prepared to incorporate certain changes found necessary during the usage of the standard. A recommended period for testing of water meters has been incorporated for guidance of users and testing authorities. A stop valve and a non-return valve have been recommended for inclusion while installing water meters. Recommendations made in this Code may not, however, meet all the situations that arise in practice and necessary deviations from the provisions of this Code may have to be made in certain cases.

0.3 The Sectional Committee responsible for the preparation of this standard has taken into consideration the views of municipalities, municipal corporations, manufacturers and technologists and has related the standard to the practices of installation of water meters followed in the country in this field. Due weightage has also been given to the need for international co-ordination among standards prevailing in different countries of the world.

0.4 This standard contains clause **3.4** which calls for an agreement between the purchaser and the supplier.

1. SCOPE

1.1 This code covers the selection, installation and maintenance of inferential and semi-positive water meters conforming to IS : 779-1968*.

2. SELECTION

2.1 Water meters shall be selected according to flow to be measured and not necessarily to suit a certain size of main. The following points shall govern the selection of meters:

a) The maximum flow shall not exceed the nominal capacity of the meter specified in IS : 779-1968*.

b) The continuous flow shall be not greater than the continuous running capacity rating specified in IS : 779-1968*.

c) The minimum flow to be measured shall be within minimum starting flows specified in IS : 779-1968*.

2.1.1 Inferential water meter has the same accuracy as the semi-positive type at higher flows; it passes unfiltered water better than a semi-positive meter and is lower in cost.

2.2 Special care is necessary in selecting the most suitable meter where large rates of flow may exist for short periods. The normal working flow shall be well within the continuous running capacity specified in IS : 779-1968*, as high rates of flow over short period may cause excessive wear if the meter chosen is too small for the duty.

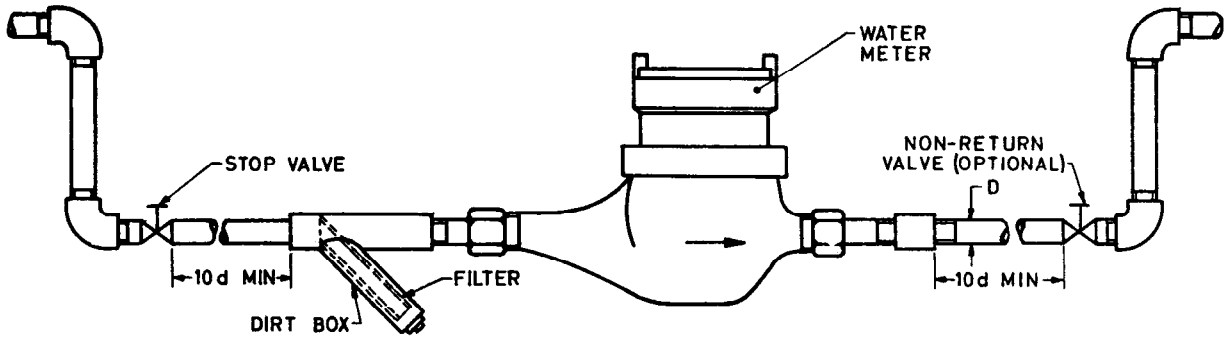
2.3 Owing to the fine clearances in the working parts of meters, they are not suitable for measuring water containing sand or similar foreign matter, and in such cases a filter or dirt box of adequate effective area shall be fitted on the upstream side of the meter (*see* Fig. 1). It should be noted that the normal strainer fitted inside a meter is not a filter and does not prevent the entry of small particles, such as sand.

3. INSTALLATION

3.1 A meter shall not be run with free discharge to atmosphere, if the static pressure on the main exceeds 10 m head of water, otherwise the meter is liable to be overloaded and damaged. For hose connections and similar applications, there shall always be some resistance on the downstream side of the meter.

3.2 A meter shall be located where it is not liable to get severe shock of water hammer, which might break the piston or damage the rotor, and the position shall be such that it is always full of water; a recommended

*Specification for water meters (domestic type) (*fourth revision*).



D = Nominal diameter of pipe.

FIG. 1 POSITIONING OF WATER METER

method of making connection to achieve the purpose is shown in Fig. 1. If the meter body or adjacent pipes become partially drained of water, the accumulated air, when passed through the meter, is registered as water, and may cause inaccuracies and perhaps damage. The inaccuracies may be more pronounced in the case of inferential meters. In such situations suitable devices like air-release valve may be fitted on the upstream side of the meter. In the case of intermittent water supply system, where there are frequent changes of air locks, the piston of the semi-positive meter often breaks. In such a case, it is advisable to ensure that the top of the meter is below the level of the communication pipe.

3.3 Semi-positive meters may be fixed in any position, with the dials facing upwards or sideways, and they may be installed in horizontal or vertical pipe runs without affecting wearing properties of accuracy at normal service flows. Where backward flows are anticipated, reflux valves are recommended to be provided. A stop valve should be provided on the upstream side as shown in Fig. 1 to isolate the meter whenever necessary.

3.4 Inferential meters shall be installed in position for which they are designed; in the case of meters conforming to IS : 779-1968*, they shall be placed horizontally with dial facing upwards. However, where meters are to be installed in vertical pipe lines, details shall be as agreed to between the manufacturer and the purchaser.

3.5 Turbulent flow of water affects the accuracy of the meter. There shall, therefore, be straight lengths of pipes upstream and downstream of meter for an equivalent length of ten times the nominal diameter of the pipe.

3.6 Meters liable to damage by frost shall be suitably protected. It is possible to incorporate frost protection devices in certain types of meters, if ordered. Several devices are adopted, the most common among them being a collapsible metal ring which, under frost pressure, allows the top plate carrying the mechanism to lift and thus safeguard the body, or a metal disc in the body which gives way under pressure. These devices have the following disadvantages.

a) The damaged ring or plate requires immediate replacement in order to stop wastage and restore water supply to consumer;

b) Water runs to waste till the meter is attended to, which means loss of revenue; and

c) Damage is discovered only after thawing has started.

3.6.1 A more satisfactory arrangement consists of a method whereby the proportionate increase in bulk of ice, which is approximately 14 percent, is accommodated by the provision of pads of special quality expanded natural rubber.

*Specification for water meters (domestic type) (*fourth revision*).

3.6.2 No arrangement, however, is regarded completely satisfactory, and for this reason, the general practice is to install meters well out of the way of frost. Meters should be fixed below ground level if they are located outside the building or, if in exposed portion inside the building, the bodies of the meters should be protected with some form of lagging; in the case of meters installed below ground, depth at which the meter should be fixed to afford frost protection will depend on the nature of the soil.

3.7 Before installing a meter, the section of line to be metered shall be thoroughly flushed to remove all foreign matter and, when starting up, control valves shall be opened slowly until the line is full, as a sudden discharge may damage the meter.

3.8 Water meters may be installed underground, either in the carriage way outside the premises or at a convenient place within the premises. In order to enable the meters to be accessible for periodical reading, inspection, testing and repairs, they shall be housed in water meter boxes conforming to IS : 2104-1962*. Top of the meter box shall be placed at a slightly higher level than the surrounding ground level so as to prevent ground water entering in and flooding the chamber during rains.

3.8.1 If it is required to be located in a private passage leading to the premises, proper precautions shall be taken consistent with safety.

3.9 The meters and connecting pipes shall be strongly supported for protection of the meters and to avoid noisy vibration.

4. MAINTENANCE

4.1 Periodic Testing of Water Meters

4.1.1 The period over which water meters retain their overall accuracy depends largely on the quality of water being measured and to a certain extent on other factors which cause excessive wear or inaccurate registration. The only way to determine whether any specific meter is operating efficiently is to test it and the meter maintenance programme should aim at establishing the frequency for testing every meter in service. From an individual customer's viewpoint, meters should be tested to protect him against meter inaccuracy that could result in over charges, while from the point of view of the water undertaking, it should be to protect the undertaking against the revenue loss from under registration by meters. No definite recommendations could be given in this regard as the economic results depend on such factors as the rates charged for water, the effect of water of different quality on meters, local conditions under which they operate and the cost of removal, testing, repairing and re-installation of meters. A reasonably proper economic balance should be attained.

*Specification for water meter boxes (domestic type).

Irrespective of these considerations, the meters should be tested at least once in two years.

4.1.2 In the case of inferential water meters, water is passed even if the meter stops registering, whereas, in the case of semi-positive meters, the water supply would be shut off when the meter stops registering. From the periodical readings of the meter and having regard to the seasonal fluctuation in the demand for water supply of a consumer, it is possible to determine whether the meter requires to be removed for test, being suspected of running slow.

4.2 When a meter is removed from the line for whatever reason, opportunity should be taken to see that it is clean and functioning properly before it is re-installed. It should also be tested for accuracy and reset to zero before installation.

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