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Water meters for cold potable water and hot water —

Part 5: Installation requirements

Compteurs d'eau potable froide et d'eau chaude —

Partie 5: Exigences d'installation

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Contents

Page

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2, www.iso.org/directives.

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The committee responsible for this document is ISO/TC 30, *Measurement of fluid flow in closed conduits*, Subcommittee SC 7, *Volume methods including water meters*. It supersedes ISO 4064-2:2005, which has been technically revised.

ISO 4064 consists of the following parts, under the general title *Water meters for cold potable water and hot water*:

— *Part 1: Metrological and technical requirements*

— *Part 2: Test methods*

— *Part 3: Test report format*

— *Part 4: Non-metrological requirements not covered in* ISO 4064-1

— *Part 5: Installation requirements*

Water meters for cold potable water and hot water —

Part 5:
Installation requirements

1 Scope

This part of ISO 4064 applies to water meters used to meter the volume of cold potable water and hot water flowing through a fully charged, closed conduit. These water meters incorporate devices which indicate the integrated volume.

This part of ISO 4064 specifies criteria for the selection of single, combination and concentric water meters, associated fittings, installation, special requirements for meters, and the first operation of new or repaired meters to ensure accurate constant measurement and reliable reading of the meter.

In addition to meters based on mechanical principles, this part of ISO 4064 also applies to water meters based on electrical or electronic principles, and to water meters based on mechanical principles incorporating electronic devices, used to measure the volume of cold potable water and hot water. It also applies to electronic ancillary devices. Ancillary devices are optional. However, national or international regulations may make some ancillary devices mandatory in relation to the utilization of the water meter.

The recommendations of this part of ISO 4064 apply to water meters, irrespective of technology, defined as integrating measuring instruments continuously determining the volume of water flowing through them.

NOTE Any national regulations apply in the country of use.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 4064-1:2014|OIML R 49-1:2013, Water meters for cold potable water and hot water — Part 1: Metrological and technical requirements

ISO 6817, *Measurement of conductive liquid flow in closed conduits — Method using electromagnetic flowmeters*

3 Terms and definitions

For the purposes of this part of ISO 4064, the definitions given in ISO 4064-1|OIML R 49-1 and the following apply.

3.1
parallel operation
<water meters> operation of two or more meters grouped together and connected to a common source and a common delivery

3.2
multiple meter operation
operation of several meters grouped together where their inlets are connected to a common source, or their outlets to a common delivery, but not both at the same time

3.3
adaptor
<water meters> additional mechanical device fitted into a connection interface on location in order to combine an unmodified cartridge meter of one geometry with a connection interface of another geometry

3.4
converter
<water meters> connection interface consisting of several parts produced as a complete unit prior to installation into the supply system

Note 1 to entry: No assembly work is to be done on location other than the installation of the complete interface. Conversion is related to either change of flow pattern, change of flow direction or extension of seat depth.

4 Criteria for the selection of water meters

4.1 General considerations

The type, metrological characteristics, and sizes of water meters should be determined according to the operating conditions of the installation and the environmental class(es) demanded, taking into account, particularly, the following:

— the available supply pressure;

— the physical and chemical characteristics of the water, including water temperature and water quality (suspended particles);

— the acceptable pressure loss across the meter;

— the expected flow rates: the flow rates Q_1 and Q_3 of the meter (as defined in ISO 4064-1:2014|OIML R 49-1:2013, Clause 3) shall be compatible with the expected flow rate conditions of the installations, including the water flow direction(s);

— the suitability of the meter type for the intended mechanical, climatic, electrical, and hydraulic conditions, including ambient relative humidity, vibrations, electrostatic discharges, continuous magnetic field, and electromagnetic disturbances;

— the available space and pipe work to install the meter and fittings;

— the possibility of deposition of substances from solution within the meter;

— the sustainability of the power supply of the water meter (where applicable).

When using combination meters, changeover flow rates shall be different from normal operating flow rates.

4.2 Information to be provided by the manufacturer

Sufficient information shall be provided to enable customers to choose and install a meter that conforms to particular metrological characteristics.

The influence factors that affect the indicating error of the individual design should be stated. For each influence factor, the relevant rated operating conditions applicable to the meter should be stated.

4.3 Meters operating in parallel or in a group

4.3.1 For meters operating in parallel, means shall be provided so that the unserviceability of one or more meters within a group shall not cause the remaining meters to operate at a flow rate in excess of the limit of operation of each individual meter.

4.3.2 To ensure that water meters of different types operate satisfactorily in parallel, the individual characteristics of meters operating in parallel shall be compatible, e.g. by grouping them according to pressure loss, flow rate range and maximum working pressure. However, the installation conditions for each type shall be respected.

4.3.3 For meters operating in parallel and multiple meter operation, the possibilities of interaction between one meter or meter type and another to the detriment of their life and accuracy, e.g. pressure surges and vibration, should be considered.

NOTE Examples of the use of meters operating in parallel and multiple meter operation are:

— meters operating in parallel where the installation of one large meter to meet the maximum water demand or to cover the required flow rate range is impractical;

— meters installed in parallel where 'stand by' meters are necessary to ensure continuity of delivery and flow measurement in the case of filter blockage or water meter breakdown;

— meters grouped in multiple operation for ease of access, service and reading, where it is necessary to split a water supply into a number of branches, as for instance in a block of flats, or where it is necessary to unite a number of metered tributary flows into a common main, as in a water treatment plant.

5 Associated fittings

5.1 General

The water meter installation shall include the associated fittings listed in 5.2 and 5.3 as applicable.

5.2 Upstream of the meter

5.2.1 A stopcock or valve, optionally with the direction of the valve operation indicated.

5.2.2 A flow straightening device and/or a length of straight pipe fitted between the valve and the meter.

5.2.3 A strainer fitted between the stop valve and the meter.

5.2.4 A means of sealing the connection of the water meter to the water supply line in order to detect any unauthorized removal of the water meter.

5.3 Downstream of the meter

5.3.1 An adjustable length device to allow for easy installation and removal of the water meter. This device is specially recommended for meters having $Q_3 \geq 16$ m^3/h.

5.3.2 A device including a drain valve, which may be used for pressure monitoring, sterilization, and water sampling.

5.3.3 A stopcock or a valve for meters having $Q_3 > 4{,}0$ m^3/h; this valve shall be operated in the same sense as the upstream valve.

5.3.4 A check valve, if required, except for bi-directional flow applications.

6 Installation

6.1 General requirements

6.1.1 Every water meter, single or in a group, shall be easily accessible for reading (without the use of a mirror or ladder, for instance), for installation, for maintenance, for removal and for *in situ* dismantling of the mechanism if required.

In addition, for water meters of a mass in excess of 25 kg, there shall be clear access to the installation site to allow the water meter to be brought to, or removed from, its working position, and adequate space around the working position for the installation of lifting gear. The following points should be taken into account:

a) the need for adequate illumination of the installation site;

b) the need for the floor to be even, rigid, non-slip and clear of obstacles.

6.1.2 Associated fittings such as those specified in Clause 5, if fitted, shall also be readily accessible, and the requirements of 6.1.1 relating to large meters are also applicable for the fittings.

6.1.3 Measures shall be employed to avoid contamination, especially when the meter is installed in a pit, by mounting the water meter and the fittings at a sufficient height above the floor. If necessary, the pit shall be provided with a sump or drain for water removal.

6.2 Installation requirements

6.2.1 For correct operation, a water meter shall always be full of water. If there is a risk of air entering the meter, an upstream air release valve shall be installed.

6.2.2 The meter shall be protected from the risk of damage by shock or vibration.

6.2.3 The meter shall not be subjected to undue stresses caused by pipes and fittings. If necessary, it shall be mounted on a plinth or bracket.

The water pipe lines and associated fittings shall be adequately anchored to ensure that no part of the installation can be displaced under water thrust when the meter is dismantled or disconnected on one side.

6.2.4 The meter shall be protected from the risk of damage from extremes of temperature of the water or ambient air.

6.2.5 Where possible, the meter pit shall be protected from flooding and rainwater.

6.2.6 The instructions shall give limits on orientation dependent on the meter type.

6.2.7 The meter shall be protected from the risk of damage due to external environmental corrosion.

6.2.8 In the case where the water meter is part of an electrical earthing, in order to minimize the risk to operational staff, there shall be a permanent shunt for the water meter and its associated fittings.

NOTE Any national or local legislation concerning the use of water pipes for this purpose applies in the country of use.

6.2.9 Unfavourable hydraulic conditions, e.g. cavitation, surging and water hammer, should be avoided.

6.3 Water quality (suspended particles)

If, for the specific installation conditions, the accuracy of measurement of volume flow by the water meter is likely to be affected by the presence of suspended particles in the water, then it may be installed with a strainer or filter. The strainer or filter shall be placed either at the inlet of the water meter or in the pipe work upstream.

6.4 Electromagnetic meters

To ensure accurate measurement and prevent galvanic corrosion at the electrodes, the meter and the measured fluid shall be electrically connected at the same potential. While in general this means earthing the water, the individual installation instructions for a particular meter design shall be followed.

On a conducting but uninsulated fluid pipe, without a non-conducting internal coating, the connecting point(s) of the primary element of the meter shall be electrically linked to the secondary element and both connected to earth.

On non-conducting pipes, or pipes isolated from the fluid, metal earthing rings shall be interposed between the pipe and the primary element of the meter. These shall be electrically linked to the secondary element and both to earth.

Where the fluid cannot be earthed for technical reasons, the meter may be connected without referencing the fluid potential, but only when the meter model and manufacturer's instructions permit.

For other requirements for electromagnetic meters, ISO 6817 shall apply.

6.5 Meters operating in parallel or in a group

6.5.1 Means shall be provided to permit installation, reading, servicing, *in situ* dismantling and removal of any meter, without interference from, or interfering with, the operation of any other meter in the group.

6.5.2 For multiple meter operation, with common outlet, check valves shall be installed, downstream of each meter, to prevent back flow through the meter.

6.5.3 For multiple meter operation, means shall be provided, affixed on or immediately adjacent to each water meter, to identify the source or delivery each water meter is registering.

6.6 Security of operation

Water meters should have protective devices installed which can be sealed in such a way that after sealing has taken place and the water meter has been correctly installed, there is no possibility of removing the water meter or its adjustment device without visibly damaging the protective devices.

7 Hydraulic disturbances

7.1 General considerations

Many types of meter are sensitive to upstream flow disturbances, which may cause large errors and premature wear. They are likewise, though to a lesser extent, sensitive to downstream flow disturbances.

It should be noted that proper functioning of different water meters is related not only to their construction but to their installation conditions as well.

A flow can be subject to two types of disturbance: velocity profile distortion and swirl.

Velocity profile distortion is caused typically by an obstruction partially blocking the pipe, e.g. the presence of a partly closed valve, a butterfly valve, a check valve, an orifice, a flow or pressure regulator.