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Merjenje pretoka vode v zaprtih vodih - Merila za hladno vodo - 1. del: Specifikacije

Measurement of water flow in closed conduits -- Meters for cold potable water -- Part 1: Specifications

Mesurage de débit d'eau dans les conduites fermées -- Compteurs d'eau potable froide -- Partie 1: Spécifications

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INTERNATIONAL STANDARD

ISO 4064-1

Second edition
1993-05-15

Measurement of water flow in closed conduits — Meters for cold potable water —

Part 1: Specifications

Mesurage de débit d'eau dans les conduites fermées — Compteurs d'eau potable froide —

Partie 1: Spécifications

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Contents

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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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 4064-1 was prepared by Technical Committee ISO/TC 30, *Measurement of fluid flow in closed conduits*, Sub-Committee SC 7, *Water meters*.

This second edition cancels and replaces the first edition (ISO 4064-1:1977), of which has been technically revised.

ISO 4064 consists of the following parts, under the general title *Measurement of water flow in closed conduits — Meters for cold potable water*:

— *Part 1: Specifications*

— *Part 2: Installation requirements*

— *Part 3: Test methods and equipment*

Annex A of this part of ISO 4064 is for information only.

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Measurement of water flow in closed conduits — Meters for cold potable water —

Part 1:
Specifications

1 Scope

This part of ISO 4064 deals with terminology, technical characteristics, metrological characteristics and pressure loss.

It applies to water meters of various metrological classes (see clause 5) which can withstand permanent flow-rates from 0,6 m^3/h to 4 000 m^3/h, maximum admissible working pressures (MAP) equal to or greater than 10 bar[1] and a maximum admissible temperature (MAT) of 30 °C.

The recommendations of this part of ISO 4064 apply to water meters defined as follows: self-contained integrating measuring instruments continuously determining the volume of water flowing through them, employing a direct mechanical process involving the use of volumetric chambers with mobile walls ("volumetric" water meters) or the action of the velocity of the water on the rotation rate of a moving part ("velocity" meters).

Legal requirements take precedence over the recommendations of this part of ISO 4064.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 4064. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 4064 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 228-1:1982, *Pipe threads where pressure-tight joints are not made on the threads — Part 1: Designation, dimensions and tolerances.*

ISO 7005-2:1988, *Metallic flanges — Part 2: Cast iron flanges.*

ISO 7005-3:1988, *Metallic flanges — Part 3: Copper alloy and composite flanges.*

IEC 529:1989, *Degrees of protection provided by enclosures (IP Code).*

3 Definitions

For the purposes of this part of ISO 4064, the following definitions apply.

3.1 "volumetric" meter: Device, fitted into a closed conduit, which consists of chambers of known volume and a mechanism driven by the flow, whereby these chambers are successively filled with water and then emptied. By counting the number of these volumes passing through the device, the indicating device totals the volume flow.

3.2 "velocity" meter: Device, fitted into a closed conduit, which consists of a moving element set in

1) 1 bar = 10^5 Pa

motion directly by the velocity of the water flow. The movement of the moving element is transmitted by mechanical or other means to the indicating device, which totals the volume flow.

3.2.1 Woltmann meter: Device consisting of a helical blade which rotates about the axis of flow in the meter.

3.2.2 single-jet and multi-jet meters: Devices consisting of a turbine rotor rotating about the axis perpendicular to the flow of water in the meter. The meter is called a single-jet meter if the jet impinges at a single place on the rotor's periphery, and a multi-jet if the jet impinges simultaneously at several points around the periphery of the rotor.

3.3 flow-rate: Quotient of the volume of water passing through the water meter and the time taken for this volume to pass through the water meter.

3.4 permanent flow-rate, q_p[2]**:** Flow-rate at which the meter is required to operate in a satisfactory manner (see 3.6) under normal conditions of use, e.g. under steady and/or intermittent flow conditions.

3.5 overload flow-rate, q_s[2]**:** Flow-rate at which the water meter is required to operate in a satisfactory manner (see 3.6) for a short period of time without deteriorating; its value is twice the value of q_p.

3.6 minimum flow-rate, q_{min}[2]**:** Lowest flow-rate at which the meter is required to give indications within the maximum permissible error tolerance. It is determined in relation with the numerical value of the meter designation.

3.7 flow-rate range: Range limited by the overload flow-rate, q_s, and the minimum flow-rate, q_{min}, in which the meter indications must not be subject to an error in excess of the maximum permissible errors.

This range is divided into two zones called "upper" and "lower" zones, separated by the transitional flow-rate.

3.8 transitional flow-rate, q_t[2]**:** Flow-rate value, occurring between overload and minimum flow-rates, at which the flow-rate range is divided into two zones, the "upper zone" and "lower zone", each characterized by a maximum permissible error in this zone.

3.9 volume flow: Volume of water passing through the water meter, disregarding the time taken.

3.10 indicating device: Device displaying the volume flow.

3.11 nominal pressure (PN): Numerical designation which is a rounded number for reference purposes.

All equipment of the same nominal size (DN) and designated by the same PN number shall have compatible mating dimensions.

3.12 maximum admissible working pressure (MAP): For a water meter, maximum internal pressure that it can withstand permanently at a given temperature.

NOTE 1 For low temperatures between 0 °C and 30 °C, the MAP for materials currently used for the bodies of water meters remains constant. For cold water meters PN = MAP.

3.13 nominal size (DN): Numerical designation common to all the components of a pipe system, excluding those designated by their external diameter or by the thread dimension. It is a whole number used for reference only, approximating the constructional dimensions.

3.14 pressure loss: Pressure loss caused by the presence of a water meter in the pipeline at a given flow-rate.

3.15 maximum admissible temperature (MAT): For a water meter, maximum temperature that it can withstand at a given internal pressure.

3.16 meter designation N: Numerical value, preceded by the capital letter N, to designate the meter in relation to tabulated values of dimensions.

4 Technical characteristics

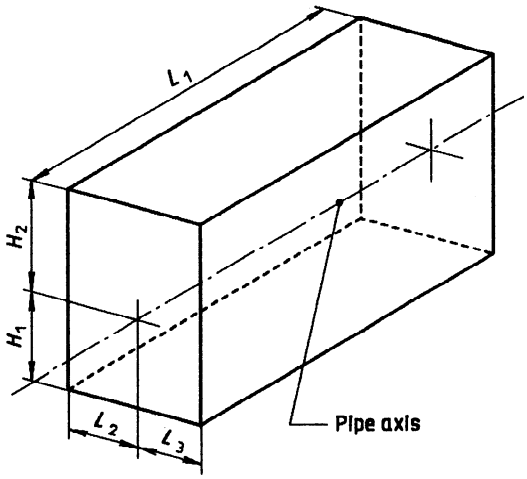
4.1 Meter size and overall dimensions — Meter designation and permanent flow-rate

4.1.1 Meter size and overall dimensions

Meter size is characterized either by the thread size of the end connections or by the nominal size of the flange. For each meter size there is a corresponding fixed set of overall dimensions (see figure 1). The dimensions are given in tables 1 and 2.

For threaded end connections, two minimum dimensions, a and b, are specified (see 4.1.4).

2) Flow-rates to be expressed in cubic metres per hour (m^3/h).



$H_1 + H_2$, L_1, $L_2 + L_3$ define the height, length and width respectively of a cuboid within which the water meter can be contained (the cover being at right angles to its closed position).

H_1, H_2, L_2, L_3 are maximum dimensions.

L_1 is a fixed value with specified tolerances.

Figure 1 — Meter size and overall dimensions

4.1.2 Relationship between meter designation and permanent flow-rate

The numerical value of the permanent flow-rate, q_p, expressed in cubic metres per hour (m^3/h), shall be at least equal to the meter designation. Where the value is greater than the meter designation, it shall be equal to one of the values given in tables 1 and 2 for meter designation provided that the relationship between meter size and meter designation according to 4.1.3 is maintained.

4.1.3 Relationship between meter size and meter designation

Meter size and hence overall dimensions are in principle linked to the designation of the water meter as specified in tables 1 and 2. For a given meter size, it nevertheless is permitted to adopt the immediately adjacent larger or smaller meter size, provided that the metrological requirements are met. In such a case the meter shall be designated not only by its numerical N value but also by its DN. End connections shall be the same at the water meter inlet and outlet.

Table 1 — Water meters with threaded end connections — Meter designation, meter sizes and dimensions

Dimensions in millimetres

Meter sizes		Meter dimensions						
Meter designation N	Meter size (nominal size of threaded end connection)	Thread	a_{min}	b_{min}	L_1 (tolerance $^{0}_{-2}$)	$L_{2\,max}$ and $L_{3\,max}$	$H_{1\,max}$	$H_{2\,max}$
—	—	G 3/4 B	10	12	80	50	50	180
N 0,6	G 3/4 B[1)]	G 3/4 B	10	12	110	50	50	180
N 1	G 3/4 B[1)]	G 3/4 B	10	12	130	50	50	180
N 1,5	G 3/4 B[1)]	G 3/4 B	10	12	165	50	50	180
N 2,5	G 1 B[1)]	G 1 B	12	14	190	65	60	240
N 3,5	G 1 1/4 B	G 1 1/4 B	12	16	260	85	65	260
N 6	G 1 1/2 B	G 1 1/2 B	13	18	260	85	70	280
N 10	G 2 B	G 2 B	13	20	300	105	75	300

1) The thread size of the next larger value is acceptable as an alternative.