

Measurement of flow of cold potable water in closed conduits —

Part 7: Specification for single mechanical type meters

ICS 17.120.10

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee CPL/30, Measurement of fluid flow in closed conduits, upon which the following bodies were represented:

- British Compressed Air Society
- British Gas
- Department of Trade & Industry (Gas & Oil Measurement Branch)
- Department of Trade & Industry (National Engineering Laboratory)
- Department of Trade & Industry (National Weights and Measures Laboratory)
- Electricity Association
- Energy Industries Council
- Engineering Equipment and Materials Users' Association
- GAMBICA (BEAMA) Ltd.
- Institute of Measurement and Control
- Institute of Petroleum
- Institute of Trading Standards Administration
- Institution of Gas Engineers
- Institution of Mechanical Engineers
- Petrol Pump Manufacturers' Association
- Society of British Gas Industries
- Water Services Association of England and Wales

The following bodies were also represented in the drafting of the standard, through subcommittees and panels:

- Society of British Water Industries
- United Kingdom Automatic Meter Reading Association
- Water Research Centre

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Foreword

This British Standard has been prepared by Technical Committee CPL/30, with the assistance of subcommittee CPL/30/7/1.

This is a new Part of BS 5728, specific to single mechanical type water meters. It is based on BS 5728-1:1979 but brought up to date, particularly with the inclusion of concentric meters. This new Part 7 replaces BS 5728-1:1979 which is withdrawn. A new edition of BS 5728-1 is in preparation, which will be a generic specification applicable to all types of water meters regardless of technology.

The other Parts of BS 5728 on the measurement of flow of cold potable water in closed conduits are as follows:

- *Part 1: Generic specification for single meters; (in preparation)*
- *Part 2: Specification for installation requirements for single meters;*
- *Part 3: Methods of test for single mechanical water meters;*
- *Part 4: Specification for combination meters;*
- *Part 5: Specification for installation requirements for combination meters;*
- *Part 6: Test methods for combination meters.*

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 14, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

This Part of BS 5728 specifies the technical, metrological and pressure loss characteristics for single mechanical type water meters and establishes the nomenclature for them.

It applies to water meters of various metrological classes (see clause 5) which can withstand permanent flow-rates from 0.6 m³/h to 4 000 m³/h, maximum admissible working pressures (MAP) equal to or greater than 10 bar¹⁾ and a maximum admissible temperature (MAT) of 30 °C.

The requirements of this Part of BS 5728 apply to water meters described 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).

2 Normative references

This British Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the cited publications are listed on the inside back cover. For dated references, only the edition cited applies; any subsequent amendments to, or revisions of, the cited publications apply to this Part of BS 5728 only when incorporated in the reference by amendment or revision. For undated references, the latest edition of the cited publication applies, together with any amendments.

3 Definitions

For the purposes of BS 5728, the following definitions apply.

3.1 volumetric meter

a 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 totalizes the volume flow

3.2 velocity meter

a device, fitted into a closed conduit, which consists of a moving element set in motion directly by the velocity of water flow. The movement of the moving element is transmitted by mechanical or other means to the indicating device, which totalizes the volume flow

3.3 Woltmann meter

a velocity meter consisting of a rotor carrying helical blades which rotates about the axis of flow in the meter

3.4 single-jet meter

a velocity meter consisting of a turbine rotor rotating about the axis perpendicular to the flow of water in the meter, in which the jet impinges at a single place on the periphery of the rotor

3.5 multi-jet meter

a velocity meter in which the jets impinge simultaneously at several points around the periphery of the rotor

3.6 in-line meter

a type of water meter, fitted directly into a closed conduit by means of the meter end connections (screwed or flanged) provided

3.7 concentric meter

a type of water meter, fitted indirectly into a closed conduit by means of an intermediate fitting called a manifold. The inlet and outlet passages of the meter and manifold, at the interface between them, are coaxial

3.8 meter manifold

the pipe fitting specific to the connection of a concentric meter

3.9 flow-rate

the quotient of the volume of water passing through the water meter and the time taken for this volume to pass through the water meter

3.10 volume flow

the volume of water passing through the water meter, irrespective of the time taken

¹⁾ 1 bar = 10⁵ N/m² = 100 kPa.

3.11**maximum permissible error²⁾ (MPE)**

extreme values of the error permitted by the specification, regulations etc. for a water meter

3.12**permanent flow-rate, q_p ²⁾**

the flow-rate at which the meter is required to operate in a satisfactory manner under normal conditions of use, e.g. under steady and/or intermittent flow conditions

3.13**overload flow-rate, q_s ²⁾**

the flow-rate at which the water meter is required to operate in a satisfactory manner for a short period of time without deteriorating

3.14**minimum flow-rate, $q_{\min}$ ²⁾**

the lowest flow-rate at which the meter is required to give indications within the maximum permissible error. It is determined in relation to the meter designation

3.15**transitional flow-rate, q_t ²⁾**

the flow-rate value, occurring between overload and minimum flow-rates, at which the flow-rate range is divided into two zones, an "upper zone" and a "lower zone", each characterized by a maximum permissible error

3.16**flow-rate range²⁾**

the range limited by the overload flow-rate and the minimum flow-rate in which the meter indications remain within the maximum permissible errors

3.17**indicating device**

a device displaying the volume flow

3.18**verification device**

the part of the indicating device used for the visual verification and calibration of a water meter

3.19**control element**

the part of the verification device formed from the indicating element having the lowest value decade of the indicating device

3.20**verification scale interval**

the lowest value scale division of the control element

3.21**nominal pressure (PN)**

a numerical designation which, for reference purposes, is a rounded number

3.22**maximum admissible working pressure (MAP)**

the maximum internal pressure that a water meter can withstand permanently at a given temperature

NOTE For 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 the MAP is equal to the PN.

3.23**nominal size (DN)**

a 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

3.24**pressure loss**

the pressure loss, at a given flow-rate, caused by the presence of a water meter in the pipeline

3.25**maximum admissible temperature (MAT)**

the maximum temperature that a water meter can withstand at a given internal pressure

3.26**meter designation (N)**

a numerical value, preceded by the capital letter N, to designate the meter in relation to tabulated values of dimensions

4 Technical characteristics**4.1 Units**

Flow-rates for all types of water meters shall be expressed in m³/h.

4.2 In-line meters**4.2.1 Meter designations, size and overall dimensions**

Meter size shall be characterized either by the thread size of the end connections or by the nominal size of the flange. Each meter size shall conform to the corresponding fixed set of overall dimensions (see Figure 2) which are given in Table 1 and Table 2.

For threaded end connections, two minimum dimensions, *a* and *b*, shall be specified (see 4.2.5 and Figure 3).

²⁾ The relationships between flow-rates are shown in Figure 1.