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# International Standard



# 7858/1

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## Measurement of water flow in closed conduits — Meters for cold potable water — Combination meters — Part 1: Specifications

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

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**Descriptors:** flow measurement, water flow, pipe flow, water supply meters, specifications.

## 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 7858/1 was prepared by Technical Committee ISO/TC 30, *Measurement of fluid flow in closed conduits*.

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# Measurement of water flow in closed conduits — Meters for cold potable water — Combination meters — Part 1: Specifications

## 1 Scope and field of application

This part of ISO 7858 defines the characteristics peculiar to combination meters consisting of

- one large meter (the meter with the larger nominal flowrate,  $Q_n$ );
- one small meter;
- one change-over device functioning automatically without using any source of energy other than that of the fluid being measured.

Depending on the flowrate of the water passing through the combination meters, this change-over device directs the water

- either through the small meter at low flows, and then through the large meter only at higher flows;
- or through the small meter at low flows, and then through both meters at higher flows.

The indicating device of each of the component meters displays a part of the total quantity; the reading of the total volume passed through the combination meter requires the addition of the readings of each of the two meters.

This part of ISO 7858 is only to be applied in conjunction with clauses 1 to 6 of ISO 4064/1, the provisions of which shall be complied with. In particular the large and small meters shall be complete meters conforming to ISO 4064/1, except for the modifications of the meter casings necessary for the inter-connection of the component meters forming the combination meter; these casing modifications shall have no metrological effect upon the component meters.

In all cases the relevant requirements of ISO 4064/1 shall be complied with.

## 2 Reference

ISO 4064/1, *Measurement of water flow in closed conduits — Meters for cold potable water — Part 1: Specification.*

## 3 Definitions

For the purpose of this part of ISO 7858, the definitions given in ISO 4064/1, supplemented, as follows, for the case of combination meters, apply.

NOTE — In this part of ISO 7858, the capital letter  $Q$  signifies the flowrate of the combination meter, the lower case letter  $q$  signifies the flowrate of the component meters, completed by the subscript 1 for the large meter and the subscript 2 for the small meter.

**3.1 maximum flowrate,  $Q_{\max}$ :** The maximum flowrate of the combination meter is equal to the maximum flowrate of the large meter,  $q_{\max 1}$ .

**3.2 minimum flowrate,  $Q_{\min}$ :** The minimum flowrate of the combination meter is equal to the minimum flowrate of the small meter,  $q_{\min 2}$ .

**3.3 transitional flowrate,  $Q_t$ :** The flowrate at which the maximum permissible error of the combination meter changes in value. The value,  $Q_t$ , to be considered characterizes the assembly of the three elements comprising the combination meter as defined in clause 1.

This value is equal to

- either the transitional flowrate of the small meter,  $q_{t2}$ ;
- or the transitional flowrate of the large meter,  $q_{t1}$ .

In the case where the transitional flowrate of the combination meter,  $Q_t$ , is equal to that of the small meter, the change-over shall take place in such a manner that the large meter is never subjected to a flowrate less than that of its transitional flowrate  $q_{t1}$ .

**3.4 nominal flowrate,  $Q_n$ :** The nominal flowrate of the combination meter is equal to the nominal flowrate of the large meter,  $q_{n1}$ .

**3.5 flowrate range:** The flowrate range of the combination meter is limited by the maximum flowrate of the large meter,  $q_{max1}$ , and by the minimum flowrate of the small meter,  $q_{min2}$ .

**3.6 pressure loss:** The pressure loss caused by the presence of the complete combination meter.

## 4 Technical characteristics

The technical characteristics are those of ISO 4064/1 with the following modifications and additions.

### 4.1 Dimensions

#### 4.1.1 Length, $L_1$

The overall length of a combination meter may be a fixed dimension, in the same way as simple meters, or may be adjustable by means of a sliding coupling. In this case, the minimum possible adjustment of the meter overall length shall be  $\pm 15$  mm relative to the nominal value of  $L_1$  defined below.

The value of  $L_1$  shall be chosen either from the table or from the lengths of simple meters of the same diameter defined by ISO 4064/1 (see clause 4, table 2).

Table

Dimensions in millimetres

Large meter $Q_n$	Flange DN	$L_1$ preferred value	$L_2 = L_3$	
			max.	max.
15	50	600	220	
20 or 25	65	650	240	
30 or 40	80	700	260	
50 or 60	100	800	350	
100 or 150	150	1 000	400	
250	200	1 200	400	

#### 4.1.2 Breadths $L_2$ and $L_3$

However the various components of the combination meter are arranged, the values of  $L_2$  and  $L_3$  given in the table shall not be exceeded.

### 4.1.3 Heights $H_1$ and $H_2$

Because of the wide variations in the height of the various types of combination meter, it has not been possible to standardize these dimensions.

The tolerances for the table are the same as those of table 2 of ISO 4064/1.

## 4.2 Change-over device

The change-over device shall function in such a manner that

- the large meter never operates at a flowrate less than its minimum flowrate  $q_{min1}$ ;
- the small meter shall never be submitted to a flowrate exceeding  $1,2 q_{n2}$ .

The device shall have resistance to wear and reliability comparable to that of the component meters. If the change-over device can only operate in a horizontal or vertical position, it shall include a levelling aid (reference plane or spirit level) allowing its correct installation.

## 4.3 Marking

**4.3.1** Each of the component meters shall be marked in accordance with 4.10 of ISO 4064/1.

**4.3.2** The change-over device shall be clearly and indelibly marked on the casing or on an identification plate with the following:

- a) the name or trade name of the manufacturer, or registered trade mark;
- b) the transitional flowrate,  $Q_t$ , and the pressure loss group of the combination meter;
- c) the year and serial number of manufacture;
- d) one or more arrows indicating the direction of flow;
- e) space for type approval mark;
- f) maximum working pressure, in megapascals (bars), if in excess of 1 MPa (10 bar);

## 4.4 Seals

Combination meters shall have protection devices which shall be sealed in such a way that, both before and after the combination meter has been correctly installed, there is no possibility of dismantling or altering the combination meter, the component meters, the change-over device or their adjustment devices, without damaging the protection devices.

## 5 Metrological characteristics

### 5.1 Change-over zone

The zone of the flowrate range affected by the action of the change-over devices shall be as narrow as possible.

The manufacturer's catalogue and, if there is a national requirement for one, the pattern approval certificate shall stipulate the flowrate zone in which the change-over occurs both with increasing and decreasing flow.

The action of the change-over device shall not result in a contravention of the maximum permissible errors as defined in 5.2.

### 5.2 Maximum permissible errors

#### 5.2.1 Component meters

Each component meter working alone shall conform with the maximum permissible errors defined by ISO 4064/1.

#### 5.2.2 Combination meters

The maximum permissible error in the zone between  $Q_{\min}$  inclusive and  $Q_t$  exclusive is  $\pm 5\%$ .

The maximum permissible error in the zone between  $Q_t$  inclusive and  $Q_{\max}$  inclusive is  $\pm 2\%$ .

### 5.3 Metrological classes

The large and small component meters of a combination meter shall conform to a metrological class as defined in 5.2 of ISO 4064/1.

## 6 Maximum pressure loss

From the results of the test, combination meters are divided into four groups on the basis of the following maximum values over the flowrate range: 0,1; 0,06; 0,03; and 0,01 MPa (1; 0,6; 0,3 and 0,1 bar).

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