



SLOVENSKI STANDARD

SIST EN 24185:2001

01-julij-2001

Merjenje pretoka tekočin v zaprtih vodih - Metoda tehtanja (ISO 4185:1980)

Measurement of liquid flow in closed conduits - Weighing method (ISO 4185:1980)

Durchflußmessung von Flüssigkeiten in geschlossenen Leitungen - Wägeverfahren (ISO 4185:1980)

Mesure de débit des liquides dans les conduites fermées - Méthode par pesée (ISO 4185:1980)

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Ta slovenski standard je istoveten z: **EN 24185:1993**

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ICS:

17.120.10 Pretok v zaprtih vodih Flow in closed conduits

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EUROPEAN STANDARD

EN 24185:1993

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 1993

UDC 532.575:531.753

Descriptors: Flow measurement, liquid flow, pipe flow, measuring instruments, flowmeters, calibrating, weight measurement, error analysis

English version

**Measurement of liquid flow in closed conduits -
Weighing method (ISO 4185:1980)**

iTeh STANDARD PREVIEW

Mesure de débit des liquides dans les conduites
fermées - Méthode par pesée (ISO 4185:1980)

Durchflußmessung von Flüssigkeiten in
geschlossenen Leitungen - Wägeverfahren
(ISO 4185:1980)

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This European Standard was approved by CEN on 1993-06-18. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

The European Standards exist in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

Foreword

In 1991, ISO 4185:1980 "Measurement of fluid flow in closed conduits - Vocabulary and symbols" was submitted to the CEN Primary Questionnaire procedure.

Following Resolution BT C 42/1992, ISO 4185:1980 was submitted to the formal vote ; the result was positive.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 1993, and conflicting national standards shall be withdrawn at the latest by December 1993.

According to the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard : Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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Endorsement notice

The text of the International Standard ISO 4185:1980 was approved by CEN as a European Standard without any modification.

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NOTE: The European references to international publications are given in annex ZA (normative).

Annex ZA (normative)
Normative references to international publications
with their relevant European publications

This European 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 publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
ISO 4006	1991	Measurement of fluid flow in closed conduits - Vocabulary and symbols	EN 24006	1993
ISO 5168	1978	Measurement of fluid flow - Estimation of uncertainty of a flow-rate measurement	----	----

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International Standard



4185

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Measurement of liquid flow in closed conduits — Weighing method

Mesure de débit des liquides dans les conduites fermées — Méthode par pesée

First edition — 1980-12-15

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[SIST EN 24185:2001](https://standards.iteh.ai/catalog/standards/sist/bf4d40b9-631f-4d11-9095-7b5d636eddea/sist-en-24185-2001)

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Descriptors : flow measurement, liquid flow, pipe flow, measuring instruments, flowmeters, calibrating, weight measurement, error analysis.

Price based on 21 pages

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

International Standard ISO 4185 was developed by Technical Committee ISO/TC 30, *Measurement of fluid flow in closed conduits*, and was circulated to the member bodies in August 1978.

It has been approved by the member bodies of the following countries :

Australia	Germany, F.R.	Poland
Belgium	India	Romania
Brazil	Italy	Spain
Chile	Korea, Rep. of	United Kingdom
Czechoslovakia	Mexico	USA
Egypt, Arab Rep. of	Netherlands	USSR
France	Norway	Yugoslavia

The member bodies of the following countries expressed disapproval of the document on technical grounds :

Japan
South Africa, Rep. of

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Measurement of liquid flow in closed conduits — Weighing method

1 General

OIML, Recommendations Nos. 1, 2, 3, 20, 28, 33.

1.1 Scope and field of application

This International Standard specifies a method of liquid flow-rate measurement in closed conduits by measuring the mass of liquid delivered into a weighing tank in a known time interval. It deals in particular with the measuring apparatus, the procedure, the method for calculating the flow-rate and the uncertainties associated with the measurement.

The method described may be applied to any liquid provided that its vapour pressure is such that any escape of liquid from the weighing tank by vaporization is not sufficient to affect the required measurement accuracy. Closed weighing tanks and their application to the flow measurement of liquids of high vapour pressure are not considered in this International Standard.

This International Standard does not cover the cases of corrosive or toxic liquids.

Theoretically, there is no limit to the application of this method which is used generally in fixed laboratory installations only. However, for economic reasons, usual hydraulic laboratories using this method can produce flow-rates of 1.5 m³/s or less.

Owing to its high potential accuracy, this method is often used as a primary method for calibration of other methods or devices for mass flow-rate measurement or volume flow-rate measurement provided that the density of the liquid is known accurately. It must be ensured that the pipeline is running full with no air or vapour pockets present in the measuring section.

1.2 References

ISO 4006, *Measurement of fluid flow in closed conduits — Vocabulary and symbols.*

ISO 5168, *Measurement of fluid flow — Estimation of uncertainty of a flow-rate measurement.*

1.3 Definitions

Only terms which are used in a special sense or the meaning of which merits restatement are defined below.

1.3.1 static weighing : The method in which the net mass of liquid collected is deduced from tare and gross weighings made respectively before and after the liquid has been diverted for a measured time interval into the weighing tank.

1.3.2 dynamic weighing : The method in which the net mass of liquid collected is deduced from weighings made while fluid flow is being delivered into the weighing tank. (A diverter is not required with this method.)

1.3.3 diverter : A device which diverts the flow either to the weighing tank or to its by-pass without changing the flow-rate during the measurement interval.

1.3.4 flow stabilizer : A structure forming part of the measuring system, ensuring a stable flow-rate in the conduit being supplied with liquid; for example, a constant level head tank, the level of liquid in which is controlled by a weir of sufficient length.

1.3.5 buoyancy correction : The correction to be made to the readings of a weighing machine to take account of the difference between the upward thrust exerted by the atmosphere, on the liquid being weighed and on the reference weights used during the calibration of the weighing machine.

1.4 Units

The units used in this International Standard are the SI units, metre, kilogram, and second; the degree Celsius is used for convenience instead of the kelvin.

ISO 4185-1980 (E)

1.5 Notation

Symbol	Designation	Dimension	SI Units
q_m	Mass flow-rate	MT^{-1}	kg/s
q_V	Volume flow-rate	L^3T^{-1}	m^3/s
m	Mass	M	kg
V	Volume	L^3	m^3
t	Time	T	s
ρ	Density of liquid	ML^{-3}	kg/m^3
ρ_a	Density of air (at 20 °C and 1 bar*)	ML^{-3}	kg/m^3
ρ_p	Density of standard weights	ML^{-3}	kg/m^3
s_x	Estimated standard deviation		
σ_x	Standard deviation of variable x		
e	Uncertainty of measurement		
e_s	Systematic uncertainty		
E_s	Percentage systematic uncertainty		
e_R	Random uncertainty		
E_R	Percentage random uncertainty		

* 1 bar = 10^5 Pa

1.6 Certification

If the installations for flow-rate measurement by the weighing method are used for purposes of legal metrology, they should be certified and registered by the national metrology service. Such installations are then subject to periodical inspection, at

stated intervals. If a national metrology service does not exist, a certified record of the basic measurement standards (weight and time), and error analysis in accordance with this International Standard and ISO 5168, shall also constitute certification for legal metrology purposes.

2 Principle

2.1 Statement of the principle

2.1.1 Static weighing

The principle of the flow-rate measurement method by static weighing (for schematic diagrams of typical installations, see figures 1A, 1B, 1C) is :

- to determine the initial mass of the tank plus any residual liquid;
- to divert the flow into the weighing tank (until it is considered to contain a sufficient quantity to attain the desired accuracy) by operation of the diverter, which actuates a timer to measure the filling time;

— to determine the final mass of the tank plus the liquid collected in it.

The flow-rate is then derived from the mass collected, the collection time and other data as discussed in clause 5 and EN 24 annex A.

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