



**SLOVENSKI STANDARD**  
**oSIST prEN 17526:2020**  
**01-maj-2020**

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**Plinomeri - Plinomer na osnovi termičnega merjenja masnega toka**

Gas meters - Thermal-mass flow-meter based gas meter

Gaszähler - Thermische Massendurchflussgaszähler

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**Ta slovenski standard je istoveten z: prEN 17526**

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EUROPEAN STANDARD  
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**prEN 17526**

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English Version

## Gas meters - Thermal-mass flow-meter based gas meter

Gaszähler - Thermische Massendurchflussgaszähler

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 237.

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## European foreword

This document (prEN 17526:2020) has been prepared by Technical Committee CEN/TC 237 “Gas meters”, the secretariat of which is held by BSI.

This document is currently submitted to the CEN Enquiry.

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**prEN 17526:2020 (E)****1 Scope**

This document specifies requirements and tests for the construction, performance and safety of class 1,5 Capillary Thermal-Mass Flow sensor gas meters (hereinafter referred to as meter(s)). This applies to meters having co-axial single pipe, or two pipe connections, that are used to measure volumes of fuel gases of the 2nd and/or 3rd family, as given in EN 437:2018.

In general, the term “thermal mass flow meters” applies to a flow-measuring device using heat transfer to measure and indicate gas flowrate, as defined in ISO 14511.

NOTE 1 Although the word “mass” is present in the definition of the measurement principle, gas meters covered by this document provide measurement of gas at base conditions of temperature and pressure.

These meters have a maximum working pressures not exceeding 0,5 bar and a maximum flowrate not exceeding  $160 \text{ m}^3\cdot\text{h}^{-1}$  over a minimum ambient temperature range of  $-10 \text{ }^\circ\text{C}$  to  $+40 \text{ }^\circ\text{C}$  and a gas temperature range as specified by the manufacturer with a minimum range of 40 K.

This document applies to meters indicating volume at base conditions, which are installed in locations with vibration and shocks of low significance. It applies to meters in:

- closed locations (indoor or outdoor with protection, as specified by the manufacturer) with condensing humidity or with non-condensing humidity;

or, if specified by the manufacturer:

- open locations (outdoor without any covering) both with condensing humidity or with non-condensing humidity;

and in locations with electromagnetic disturbances likely to be found in residential, commercial and light industrial use.

For meters which indicate unconverted volume reference can be made to Annex C.4-

Unless otherwise stated, all pressures given in this document are gauge pressures.

Requirements for electronic indexes, valves and additional requirements for batteries incorporated in the meter and any other additional functionalities are given in EN 16314:2013.

Unless otherwise stated in a particular test, the tests are carried out on meters that include additional functionality devices intended by the manufacturer.

Clauses 1 to 13 are for design and type testing only.

**2 Normative references**

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 437:2018, *Test gases — Test pressures — Appliance categories*

EN 549:2019, *Rubber materials for seals and diaphragms for gas appliances and gas equipment*

EN 1092-1:2018, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated — Part 1: Steel flanges*

EN 16314:2013, *Gas meters — Additional functionalities*

- EN ISO 228-1:2003, *Pipe threads where pressure-tight joints are not made on the threads — Dimensions, tolerances and designation (ISO 228-1:2000)*
- EN ISO 1518-1:2019, *Paints and varnishes — Determination of scratch resistance — Part 1: Constant-loading method (ISO 1518-1:2019)*
- EN ISO 2409:2013, *Paints and varnishes — Cross-cut test (ISO 2409:2013)*
- EN ISO 2812-1:2017, *Paints and varnishes — Determination of resistance to liquids — Part 1: Immersion in liquids other than water (ISO 2812-1:2017)*
- EN ISO 4628-2:2016, *Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance — Part 2: Assessment of degree of blistering (ISO 4628-2:2016)*
- EN ISO 4628-3:2016, *Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance — Part 3: Assessment of degree of rusting (ISO 4628-3:2016)*
- EN ISO 4892-3:2016, *Plastics — Methods of exposure to laboratory light sources — Part 3: Fluorescent UV lamps (ISO 4892-3:2016)*
- EN ISO 6270-1:2018, *Paints and varnishes — Determination of resistance to humidity — Condensation (single-sided exposure) (ISO 6270-1:2017)*
- EN ISO 6272-1:2011, *Paints and varnishes — Rapid-deformation (impact resistance) tests — Part 1: Falling-weight test, large-area indenter (ISO 6272-1:2011)*
- EN ISO 9227:2017, *Corrosion tests in artificial atmospheres — Salt spray tests (ISO 9227:2017)*
- EN ISO 11664-4:2019, *Colorimetry — Part 4: CIE 1976 L\*a\*b\* colour space (ISO/CIE 11664-4:2019)*
- EN 55032:2015, *Electromagnetic compatibility of multimedia equipment — Emission Requirements*
- EN 50561-1:2013, *Power line communication apparatus used in low-voltage installations — Radio disturbance characteristics - Limits and methods of measurement — Part 1: Apparatus for in-home use*
- EN IEC 60079-0:2018,<sup>1)</sup> *Explosive atmospheres — Part 0: Equipment — General requirements (IEC 60079-0:2017)*
- EN 60079-10-1:2015, *Explosive atmospheres — Part 10-1: Classification of areas — Explosive gas atmospheres (IEC 60079-10-1:2015)*
- EN 60079-11:2012, *Explosive atmospheres — Part 11: Equipment protection by intrinsic safety “i” (IEC 60079-11:2011)*
- EN IEC 60079-15:2019, *Explosive atmospheres — Part 15: Equipment protection by type of protection “n” (IEC 60079-15:2017)*

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<sup>1)</sup> As impacted by EN IEC 60079-0:2018/AC:2020-02.

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EN 60529:1991,<sup>2)</sup> *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)*

EN 60695-11-5:2017, *Fire hazard testing — Part 11-5: Test flames — Needle-flame test method - Apparatus, confirmatory test arrangement and guidance (IEC 60695-11-5:2016)*

EN 60695-11-20:2015,<sup>3)</sup> *Fire hazard testing — Part 11-20: Test flames — 500 W flame test method (IEC 60695:2015)*

EN 60730-1:2016,<sup>4)</sup> *Automatic electrical controls — Part 1: General requirements (IEC 60730-1:2013 , modified + COR1:2014)*

EN 61000-4-2:2009, *Electromagnetic compatibility (EMC) — Part 4-2: Testing and measurement techniques — Electrostatic discharge immunity test (IEC 61000-4-2:2008)*

EN 61000-4-3:2006,<sup>5)</sup> *Electromagnetic compatibility (EMC) — Part 4-3: Testing and measurement techniques — Radiated, radio-frequency, electromagnetic field immunity test (IEC 61000-4-3:2006)*

EN 61000-4-8:2010, *Electromagnetic compatibility (EMC) — Part 4-8: Testing and measurement techniques — Power frequency magnetic field immunity test (IEC 61000-4-8:2009)*

EN 61000-6-1:2007, *Electromagnetic compatibility (EMC) — Part 6-1: Generic standards — Immunity for residential, commercial and light-industrial environments (IEC 61000-6-1:2005)*

EN 61000-4-9:2016, *Electromagnetic compatibility (EMC) — Part 4-9: Testing and measurement techniques — Impulse magnetic field immunity test (IEC 61000-4-9:2016)*

EN IEC 61000-6-2:2019, *Electromagnetic compatibility (EMC) — Part 6-2: Generic standards — Immunity standard for industrial environments*

EN 62056-21:2002, *Electricity metering — Data exchange for meter reading, tariff and load control — Part 21: Direct local data exchange (IEC 62056-21:2002)*

ISO 834-1:1999, *Fire resistance tests — Elements of building construction — Part 1: General requirements*

ISO 12213-2:2006, *Natural gas — Calculation of compression factor — Part 2: Calculation using molar-composition analysis*

ASTM D 1003-13, *Standard Test Method for Haze and Luminous Transmittance of transparent plastics*

**3 Terms, definitions and symbols**

For the purposes of this document, the following terms, definitions and symbols apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

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<sup>2)</sup> As impacted by EN 60529:1991/AC:2006-12, EN 60529:1991/A1:2000, EN 60529:1991/A2:2013 and EN 60529:1991/A2:2013/AC:2019-02.

<sup>3)</sup> As impacted by EN 60695-11-20:2015/AC:2016.

<sup>4)</sup> As impacted by EN 60730-1:2016/A1:2019.

<sup>5)</sup> As impacted by EN 61000-4-3:2006/A1:2008, EN 61000-4-3:2006/A2:2010 and EN 61000-4-3:2006/IS1:2009.

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

### 3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

#### 3.1.1

##### **actual flow rate**

flow rate at the gas pressure and gas temperature conditions prevailing in the gas distribution line in which the meter is fitted, at the meter inlet

#### 3.1.2

##### **additional functionality**

functions over and above that within the meter, which can be integral to the meter, or included within a connected device

#### 3.1.3

##### **additional functionality device**

device that carries out additional functionalities

#### 3.1.4

##### **air**

air of density approximately 1,2 kg/m<sup>3</sup>

#### 3.1.5

##### **base conditions**

fixed conditions to which a volume of gas is converted (e.g. base gas temperature 273,15 K plus 15 K at base gas pressure of 1 013,25 mbar)

#### 3.1.6

##### **class 1,5 meter**

accuracy achieved by a meter, which has an error of indication between -3 % and +3 % for flow rates  $Q$ , where  $Q_{\min} \leq Q < Q_t$ , and an error of indication between -1,5 % and +1,5 % for flow rates  $Q$ , where  $Q_t \leq Q \leq Q_{\max}$ , where  $Q_{\max}$  to  $Q_{\min} > 150$  and  $Q_{\max}$  to  $Q_t > 10$  and  $Q_t$  to  $Q_{\max}$  is 1,2

#### 3.1.7

##### **contaminants**

gas borne dust, vapour and other substances that could affect the operation of the meter

#### 3.1.8

##### **diameter**

nominal size of diameter

#### 3.1.9

##### **display**

device which shows information from the meter (e.g. liquid crystal that displays registers, volume or flags)

#### 3.1.10

##### **distributed gas**

locally available gas

**prEN 17526:2020 (E)****3.1.11****disturbance**

influence quantity having a value within the limits specified but outside the specified rated operating conditions of the measuring instrument

Note 1 to entry: An influence quantity is a disturbance if the rated operating conditions for that influence quantity are not specified.

**3.1.12****durability**

ability of an instrument to maintain its performance characteristics over a specified period of use

**3.1.13****error of indication**

value which shows the relationship in percentage terms of the difference between the volume indicated by the meter and the volume which has actually flowed through the meter, to the latter value:

Note 1 to entry:

$$\varepsilon = 100 \frac{V_i - V_c}{V_c}$$

where

$V_i$  is the indicated volume;

$V_c$  is the volume which has actually flowed through the meter

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**3.1.14****event**

condition requiring action or to log an action

**3.1.15****external leak tightness**

leak tightness of the gas carrying components of the gas meter with respect to the atmosphere

**3.1.16****galvanic connection/interface**

hard wired serial connection or pulse output from the meter

**3.1.17****gas meter**

instrument designed to measure, memorize and display the volume of fuel gas that has passed through it

**3.1.18****gauge pressure**

absolute pressure minus atmospheric pressure

**3.1.19****index**

current reading of the total volume passed through the meter

**3.1.20****maximum operating pressure**

maximum pressure at which a system can be operated continuously under normal conditions

Note 1 to entry: Normal conditions are no fault in any device or stream.

**3.1.21****maximum error shift**

maximum mean error shift at any of the tested flow rates

**3.1.22****maximum flow rate**

highest flow rate at which the gas meter provides indications that satisfy the requirements regarding maximum permissible error (MPE)

**3.1.23****maximum permissible error**

extreme value of measurement error, with respect to a known reference quantity value, permitted by specifications for a given measurement, measuring instrument, or measuring system

**3.1.24****maximum working pressure**

upper limit of the working pressure for which the meter has been designed, as declared by the manufacturer and marked on the index or the data plate

**3.1.25****mean error**

arithmetic mean of consecutive errors of indication at a flow rate

<https://standards.iteh.ai/catalog/standards/sist/1df5ce22-4632-4c6d-9be4-a89fb6d51869/osist-pren-17526-2020>

**3.1.26****memory**

element which stores digital information

**3.1.27****meter case**

pressure containing structure of the meter

**3.1.28****meter class**

class to which a meter belongs, according to the metrological requirements of this document, i.e. class 1,5

**3.1.29****meter error curve**

plot of average error of indication against actual flow rate

**3.1.30****minimum flow rate**

lowest flowrate at which the gas meter provides indications that satisfy the requirements regarding MPE

**3.1.31****normal conditions of use**

conditions referring to the meter operating:

— at a pressure up to the maximum working pressure (with or without a flow of gas);