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Gas meters - Conversion devices - Part 1: Volume conversion

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 12/21

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EUROPEAN STANDARD
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EN 12405-1

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English Version

Gas meters - Conversion devices - Part 1: Volume conversion

Compteurs de gaz - Dispositifs de conversion - Partie 1 : Conversion de volume

Gaszähler - Umwerter - Teil 1: Volumenumwertung

This European Standard was approved by CEN on 18 July 2021.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN 12405-1:2021) has been prepared by Technical Committee CEN/TC 237 “Gas meters”, the secretariat of which is held by BSI.

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of an identical text or by endorsement, at the latest by April 2022, and conflicting national standards shall be withdrawn at the latest by April 2022.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 12405-1:2018.

The main changes in EN 12405-1:2021 compared with the previous edition EN 12405-1:2018 are:

— new table for relevant tests for the conversion device;

— reference added to natural gas according to EN 16726 and biomethane according to EN 16723-1;

— additional information on service life of battery;

— modification of parameters during installation and adjustment in the factory or on site;

— new optional functionality “Error curve correction” of a gas meter;

— new normative annex “Individual testing before putting into service”.

This document has been prepared under a Standardization Request given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s) / Regulation(s).

For relationship with EU Directive(s) / Regulation(s), see informative Annex ZA, which is an integral part of this document.

EN 12405 consists of the following parts:

— Part 1: Volume conversion (this European standard);

— Part 2: Energy conversion;

— Part 3: Flow computer.

In the preparation of this European standard, the content of OIML Publication, “International Document 11 D11:2013”, and “International Recommendations 140” and the content of member bodies' national standards on gas-volume electronic conversion devices have been taken into account.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This document specifies the requirements and tests for the construction, performance, safety and conformity of gas-volume electronic conversion devices associated to gas meters, used to measure volumes of fuel gases of the 1st and 2nd families according to EN 437.

This document is intended for type testing, the detailed relevant provisions of which are given in Annex A.

Only three kinds of conversion are treated in this document:

— conversion as a function of temperature only (called T conversion);

— conversion as a function of the pressure and of the temperature with constant compression factor (called PT conversion);

— conversion as a function of the pressure, the temperature and taking into account the compression factor (called PTZ conversion).

This document is not relevant to temperature conversion integrated into gas meters which only indicate the converted volume.

Gas-volume conversion devices consist of a calculator and a temperature transducer or a calculator, a temperature transducer and a pressure transducer locally installed.

For application of this document, a conversion device may be, as a choice of the manufacturer, considered as a complete instrument (Type 1) or made of separate elements (Type 2), according to the definitions given in 3.1.20.1 and 3.1.20.2.

In this last case, the provisions concerning pressure transducers, temperature sensors and temperature transducers are given in Annexes B, C and D respectively.

Any conversion device can provide an error curve correction for a gas meter.

NOTE When rendering an account to an end user the readings from the conversion device can be used in conjunction with the readings from a gas meter conforming to EN 1359, EN 12480, or EN 12261, as appropriate, or to any other appropriate and relevant international or national standard for gas meters, without prejudice of national regulations.

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 1776:2015, *Gas infrastructure — Gas measuring systems — Functional requirements*

EN 16723-1:2016, *Natural gas and biomethane for use in transport and biomethane for injection in the natural gas network — Part 1: Specifications for biomethane for injection in the natural gas network*

EN 16726:2015+A1:2018, *Gas infrastructure — Quality of gas — Group H*

EN 55011:2016,[1)] *Industrial, scientific and medical equipment — Radio-frequency disturbance characteristics — Limits and methods of measurement (CISPR 11:2015, modified)*

[1)] As impacted by EN 55011:2016/A1:2017, EN 55011:2016/A11:2020.

EN 60068-2-1:2007, *Environmental testing — Part 2-1: Tests — Tests A: Cold (IEC 60068-2-1:2007)*

EN 60068-2-2:2007, *Environmental testing — Part 2-2: Tests — Tests B: Dry heat (IEC 60068-2-2:2007)*

EN 60068-2-30:2006, *Environmental testing — Part 2-30: Tests — Test Db: Damp heat, cyclic (12 h + 12 h cycle) (IEC 60068-2-30:2005)*

EN 60068-2-31:2008, *Environmental testing — Part 2-31: Tests — Test Ec: Rough handling shocks, primarily for equipment-type specimens (IEC 60068-2-31:2008)*

EN 60068-2-64:2008,[2)] *Environmental testing — Part 2-64: Tests — Test Fh: Vibration, broadband random and guidance (IEC 60068-2-64:2008)*

EN 60068-2-78:2013, *Environmental testing — Part 2-78: Tests — Test Cab: Damp heat, steady state (IEC 60068-2-78:2012)*

EN 60068-3-1:2012, *Environmental testing — Part 3-1: Supporting documentation and guidance — Cold and dry heat tests (IEC 60068-3-1:2011)*

EN IEC 60079-0:2018, *Explosive atmospheres — Part 0: Equipment — General requirements (IEC 60079-0:2017)*

EN 60079-1:2014,[3)] *Explosive atmospheres — Part 1: Equipment protection by flameproof enclosures "d" (IEC 60079-1:2014)*

EN 60079-2:2014, *Explosive atmospheres — Part 2: Equipment protection by pressurized apparatus "p" (IEC 60079-2:2014)*

EN 60079-5:2015, *Explosive atmospheres — Part 5: Equipment protection by powder filling "q" (IEC 60079-5:2015)*

EN 60079-6:2015, *Explosive atmospheres — Part 6: Equipment protection by oil immersion "o" (IEC 60079-6:2015)*

EN 60079-7:2015, *Explosive atmospheres — Part 7: Equipment protection by increased safety "e" (IEC 60079-7:2015)*

EN 60079-11:2012, *Explosive atmospheres — Part 11: Equipment protection by intrinsic safety "i" (IEC 60079-11:2011)*

EN 60079-25:2010,[4)] *Explosive atmospheres — Part 25: Intrinsically safe systems (IEC 60079-25:2010)*

EN 60529:1991,[5)] *Degrees of protection provided by enclosures (IP code) (IEC 60529:1989)*

[2)] As impacted by EN 60068-2-64:2008/A1:2019.

[3)] As impacted by EN 60079-1:2014/AC:2018-09.

[4)] As impacted by EN 60079-25:2010/AC:2013.

[5)] 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.

EN 60730-1:2016,[6)] *Automatic electrical controls — Part 1: General requirements (IEC 60730-1:2013 , modified + COR1:2014)*

EN 60751:2008, *Industrial platinum resistance thermometer and platinum temperature sensors (IEC 60751:2008)*

EN 60950-1:2006,[7)] *Information technology equipment — Safety — Part 1: General requirements (IEC 60950-1:2005, modified)*

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,[8)] *Electromagnetic compatibility (EMC) — Part 4-3: Testing and measurement techniques — Radiated, radio-frequency, electromagnetic field immunity test (IEC 61000-4-3 COMPIL:2010)*

EN 61000-4-4:2013, *Electromagnetic compatibility (EMC) — Part 4-4: Testing and measurement techniques — Electrical fast transient/burst immunity test (IEC 61000-4-4:2012)*

EN 61000-4-5:2014,[9)] *Electromagnetic compatibility (EMC) — Part 4-5: Testing and measurement techniques — Surge immunity test (IEC 61000-4-5:2014)*

EN 61000-4-6:2014, *Electromagnetic compatibility (EMC) — Part 4-6: Testing and measurement techniques — Immunity to conducted disturbances, induced by radio-frequency fields (IEC 61000-4-6:2013)*

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 61000-4-11:2004,[10)] *Electromagnetic compatibility (EMC) — Part 4-11: Testing and measurement techniques — Voltage dips, short interruptions and voltage variations immunity tests (IEC 61000-4-11:2004)*

EN 61000-4-29:2001, *Electromagnetic compatibility (EMC) — Part 4-29: Testing and measurement techniques — Voltage dips, short interruptions and voltage variations on d.c. input power port immunity tests (IEC 61000-4-29:2000)*

EN ISO 12213-2:2009, *Natural gas — Calculation of compression factor — Part 2: Calculation using molar-composition analysis (ISO 12213-2:2006)*

EN ISO 12213-3:2009, *Natural gas — Calculation of compression factor — Part 3: Calculation using physical properties (ISO 12213-3:2009)*

6) As impacted by EN 60730-1:2016/A1:2019.

7) As impacted by EN 60950-1:2006/AC:2011, EN 60950-1:2006/A11:2009, EN 60950-1:2006/A1:2010, EN 60950-1:2006/A12:2011, EN 60950-1:2006/A12:2013.

8) As impacted by EN 61000-4-3:2006/A1:2008 and EN 61000-4-3:2006/A2:2011.

9) As impacted by EN 61000-4-5:2014/A1:2017.

10) As impacted by EN 61000-4-11:2004/A1:2017.