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Gas infrastructure - Gas measuring systems - Functional requirements

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

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English Version

Gas infrastructure - Gas measuring systems - Functional requirements

Infrastructures gazières - Systèmes de mesure de gaz - Prescriptions fonctionnelles

Gasinfrastruktur - Gasmesssysteme - Funktionale Anforderungen

This European Standard was approved by CEN on 10 October 2015.

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 CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists 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 CEN-CENELEC Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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European foreword

This document (EN 1776:2015) has been prepared by Technical Committee CEN/TC 234 “Gas infrastructure”, the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by June 2016, and conflicting national standards shall be withdrawn at the latest by June 2016.

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

This document supersedes EN 1776:1998.

This document has been prepared under the mandate M/017 given to CEN by the European Commission and the European Free Trade Association.

This version of the standard comprises a major revision of EN 1776:1998. The scope of the standard is expanded and now includes also gas measuring systems in light industry, commercial as well as residental use. For this purpose the document has been restructured and amended.

This European Standard has in part been developed in response to the work of the European Standards Organisations (CEN/CENELEC/ETSI) under the Commission Mandate M/441. The standard should be read in conjunction with CEN/CLC/ETSI TR 50572, *Functional Reference Architecture for Communications in Smart Metering Systems* and EN 16314, *Gas meters – Additional functionalities* (often referred to as a smart gas meter).

Directive 2009/73/EC concerning common rules for the internal market in natural gas and the related Regulation (EC) No 715/2009 on conditions for access to the natural gas transmission networks also aim at technical safety (security) including technical reliability of the European gas system. These aspects are also in the scope of CEN/TC 234 standardization. In this respect CEN/TC 234 evaluated the indicated EU legislation and amended this technical standard accordingly, where required and appropriate.

This European Standard covers the environmental aspects relevant to the design, construction, operation, and maintenance and commissioning/decommissioning of gas measuring systems, where appropriate, in accordance with CEN Guide 4 and CEN/TR 16388.

In preparing this European Standard, a basic understanding of gas infrastructure by the user has been assumed.

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

Introduction

This European Standard specifies different classes of measuring systems, each having their own specific requirements.

By nature, a measuring system is an aggregate of several components. In this European Standard, it is assumed that each component is in full compliance with applicable CEN or ISO standards, if any.

This European Standard allows the user to choose between different accuracy classes of measuring systems, the choice of which can be justified on economic grounds.

1 Scope

This European Standard specifies functional requirements for the design, construction, testing, commissioning/decommissioning, operation, maintenance and, where appropriate, calibration, together with suitable documented provisions for all new gas measuring systems and any major changes of existing systems.

This European Standard also specifies accuracy classes of measuring systems and thresholds applicable to these classes. Demonstration of compliance is achieved through the selection, installation and operation of appropriate measurement instruments, together with suitable documented provisions for calculations. Examples of demonstration of compliance are provided for each accuracy class; however, they are not prescriptive solutions.

This European Standard is applicable for gases of the 2nd family as classified in EN 437. It is also applicable for treated non-conventional combustible gases complying with EN 437 and for which a detailed technical evaluation of the functional requirements (such as injected biomethane) is performed ensuring there are no other constituents or properties of the gases that can affect the metrological and physical integrity of the measuring systems.

This European Standard can also be used as a guideline for 1st and 3rd family gases as classified in EN 437; however additional considerations should be taken with regard to the different constituents and physical characteristics of the gas family.

This European Standard is not applicable for raw or sour gases.

This European Standard is not applicable for gas measurement in CNG filling station.

This European Standard gives guidelines when designing, installing and operating gas meters with additional functionalities (smart gas meters).

Communication protocols and interfaces for gas meters and remote reading of gas meters are outside the scope of this European Standard and are covered by the appropriate parts of EN 13757, which provide a number of protocols for meter communications. Supervisory control and data acquisition protocols (SCADA) are also not covered by this European Standard.

Unless otherwise specified all pressures used in this European Standard are gauge pressures.

For associated pressure regulating systems the requirements of EN 12186 and/or EN 12279 apply.

For requirements on design, housing, lay-out, materials for components, construction, ventilation, venting and overall safety of gas measuring systems within the scope of this European Standard, EN 15001, EN 12186, EN 12279 and/or EN 1775 apply additionally, where relevant.

This European Standard specifies common basic principles for gas infrastructure. Users of this European Standard should be aware that more detailed national standards and/or codes of practice may exist in the CEN member countries.

This European Standard is intended to be applied in association with these national standards and/or codes of practice setting out the above mentioned basic principles.

In the event of conflicts in terms of more restrictive requirements in national legislation/regulation with the requirements of this European Standard, national legislation/regulation takes precedence as illustrated in CEN/TR 13737-1 and CEN/TR 13737-2.

CEN/TR 13737 (all parts) gives:

— clarification of all legislation/regulations applicable in a member state;

— if appropriate, more restrictive national requirements;

— a national contact point for the latest information.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 1359, *Gas meters — Diaphragm gas meters*

EN 1594, *Gas infrastructure — Pipelines for maximum operating pressure over 16 bar — Functional requirements*

EN 1775, *Gas supply — Gas pipework for buildings — Maximum operating pressure less than or equal to 5 bar — Functional recommendations*

EN 12186, *Gas infrastructure — Gas pressure regulating stations for transmission and distribution — Functional requirements*

EN 12261, *Gas meters — Turbine gas meters*

EN 12279, *Gas supply systems — Gas pressure regulating installations on service lines — Functional requirements*

EN 12327, *Gas infrastructure — Pressure testing, commissioning and decommissioning procedures — Functional requirements*

EN 12405-1, *Gas meters — Conversion devices — Part 1: Volume conversion*

EN 12405-2, *Gas meters — Conversion devices — Part 2: Energy conversion*

EN 12405-3, *Gas meters — Conversion devices — Part 3:Flow computers*

EN 12480, *Gas meters — Rotary displacement gas meters*

EN 13463-1, *Non-electrical equipment for use in potentially explosive atmospheres — Part 1: Basic method and requirements*

EN 15001-1, *Gas Infrastructure — Gas installation pipework with an operating pressure greater than 0,5 bar for industrial installations and greater than 5 bar for industrial and non-industrial installations — Part 1: Detailed functional requirements for design, materials, construction, inspection and testing*

EN 15001-2, *Gas infrastructure — Gas installation pipework with an operating pressure greater than 0,5 bar for industrial installations and greater than 5 bar for industrial and non-industrial installations — Part 2: Detailed functional requirements for commissioning, operation and maintenance*

EN 60079-10-1, *Explosive atmospheres — Part 10-1: Classification of areas — Explosive gas atmospheres (IEC 60079-10-1)*

EN 60079-14, *Explosive atmospheres — Part 14: Electrical installations design, selection and erection (IEC 60079-14)*

EN 60079-17, *Explosive atmospheres — Part 17: Electrical installations inspection and maintenance (IEC 60079-17)*

EN 61000 (all parts), *Electromagnetic compatibility (EMC)*

EN ISO 5167-1, *Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full — Part 1: General principles and requirements (ISO 5167-1)*

EN ISO 5167-2, *Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full — Part 2: Orifice plates (ISO 5167-2)*

EN ISO 6141, *Gas analysis — Contents of certificates for calibration gas mixtures (ISO 6141)*

EN ISO 6142-1, *Gas analysis — Preparation of calibration gas mixtures — Part 1: Gravimetric method for Class I mixtures (ISO 6142-1)*

EN ISO 6143, *Gas analysis — Comparison methods for determining and checking the composition of calibration gas mixtures (ISO 6143)*

EN ISO 6975, *Natural gas — Extended analysis — Gas-chromatographic method (ISO 6975)*

EN ISO 10715, *Natural gas — Sampling guidelines (ISO 10715)*

EN ISO 10723, *Natural gas — Performance evaluation for analytical systems (ISO 10723)*

EN ISO 12213-1, *Natural gas — Calculation of compression factor — Part 1: Introduction and guidelines (ISO 12213-1)*

EN ISO 15970, *Natural gas — Measurement of properties — Volumetric properties: density, pressure, temperature and compression factor (ISO 15970)*

ISO 2186, *Fluid flow in closed conduits — Connections for pressure signal transmissions between primary and secondary elements*

ISO 10790, *Measurement of fluid flow in closed conduits — Guidance to the selection, installation and use of Coriolis flowmeters (mass flow, density and volume flow measurements)*

ISO 17089-1, *Measurement of fluid flow in closed conduits — Ultrasonic meters for gas — Part 1: Meters for custody transfer and allocation measurement*