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Infrastruktura za plin - Definicije tlaka v CEN/TC 234 - Smernice

Gas Infrastructure - CEN/TC 234 Pressure Definitions - Guideline Document

Gasinfrastruktur - CEN/TC 234 Druckdefinitionen - Leitliniendokument

Infrastructures gazières - Définitions des pressions du CEN/TC 234 - Lignes directrices

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Gas Infrastructure - CEN/TC 234 Pressure Definitions - Guideline Document

Infrastructures gazières - Définitions des pressions du
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Gasinfrastruktur - CEN/TC 234 Druckdefinitionen -
Leitliniendokument

This draft Technical Report is submitted to CEN members for Technical Committee Approval. It has been drawn up by the Technical Committee CEN/TC 234.

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Foreword

This document (FprCEN/TR 16395:2012) has been prepared by Technical Committee CEN/TC 234 "Gas Infrastructure", the secretariat of which is held by DIN.

This document is currently submitted to the Technical Committee Approval.

Operating pressures levels of the gas infrastructure are different from one country to another in EU, because of many different factors such as history of gas systems, technologies and materials used, technical constraints.

When starting drafting the functional standards on gas infrastructure, CEN/TC 234 recognized various pressure levels and ranges in the European member countries, which are to some extent laid down in national laws.

To form a consensus for the standardisation work all pressure levels used in Europe have been brought together and classified in ranges. This subdivision in pressure levels should also permit the manufacturers of components to focus on a limited number of designs in order to reduce the costs.

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Introduction

Background

The standards issued by CEN/TC 234 "Gas Infrastructure" contain a large number of definitions used for the design, testing and operation of the different parts of the gas infrastructure. .

This document clarifies CEN/TC 234 concept behind the definitions and advises how to use the definitions correctly and consistently. In order to further that goal an inventory of existing definitions is made and the primary definitions are identified.

This document also gives guidance for the selection of components falling into the scope of the PED [1] and used in the gas infrastructure.

Apart from the issue of the consistency of the pressure definition in the standards there is also the issue of the pressure rating of equipment and systems. Other classifications (e.g. PN) do not necessarily completely coincide with the classification as defined in the CEN/TC 234 standards.

Concept of pressure conditions

On one hand three different sets of pressure conditions are to be considered:

- conditions during testing and commissioning (P_1);
- conditions during exceptional operating circumstances (P_2);
- conditions during normal operation (P_3).

where:

$$P_1 > P_2 > P_3$$

The maximum pressure levels related to these conditions are the topic of the primary definitions.

On the other hand two other pressure conditions are used for specifying the system:

- pressure on which design calculations are based (p_a);
- pressure rating of the system (p_b).

where

$$p_a > p_b.$$

The relationship between p_a and P_2 or P_3 is not uniform in the different CEN/TC 234 standards. This situation is confusing and undesirable. The recommended practice is stated in chapter 4.4 and 4.5 below and should be considered when revising standards or developing new standards.

Piping versus pressure regulating installations

Only two out of the three aforementioned conditions apply when specifying piping:

- conditions during testing and commissioning;
- operating conditions.

Normally for piping no distinction is made between normal operating conditions and exceptional operating conditions, as piping is a passive component. However, in gas infrastructure piping and pressure regulating installations both are present. This necessitates identification of the “normal operating conditions” and “exceptional operating conditions” of the pressure regulating installations and the “operating conditions” of the piping.

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FprCEN/TR 16395:2012 (E)**1 Scope**

This Technical Report gives explanation on the pressure definitions used by the gas network operators with regard to the standards of CEN/TC 234 "Gas Infrastructure" listed in Clause 2.

The European Standards of CEN/TC 234 comprise the functional requirements in the field of gas infrastructure from the input of gas into the on-shore transmission network up to the inlet connection of gas appliances, including transmission, distribution, storage, compression, pressure regulation and metering, installation, injection of non-conventional gases, gas quality issues and others.

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 1594, *Gas supply systems - 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 1776, *Gas supply systems - Natural gas measuring stations - Functional requirements*

EN 12007-1, *Gas supply systems - Pipelines for maximum operating pressure up to and including 16 bar - Part 1: General functional recommendations*

EN 12007-2, *Gas supply systems - Pipelines for maximum operating pressure up to and including 16 bar - Part 2: Specific functional recommendations for polyethylene (MOP up to and including 10 bar)*

EN 12007-3, *Gas supply systems - Pipelines for maximum operating pressure up to and including 16 bar - Part 3: Specific functional recommendations for steel*

EN 12007-4, *Gas supply systems - Pipelines for maximum operating pressure up to and including 16 bar - Part 4: Specific functional recommendations for renovation*

EN 12186, *Gas supply systems - Gas pressure regulating stations for transmission and distribution - Functional requirements*

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

EN 12327, *Gas supply systems - Pressure testing, commissioning and decommissioning procedures - Functional requirements*

EN 12583, *Gas supply systems - Compressor stations - Functional requirements*

EN 12732, *Gas supply systems - Welding steel pipework - Functional 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*

3 Terms and definitions

3.1 Key pressure definitions used in CEN/TC 234 standards

3.1.1 design pressure DP

pressure on which design calculations are based

Note 1 to entry: A system designed for a design pressure DP can comprise components designed for a different maximum allowable pressure (PS)

3.1.2 maximum operating pressure MOP

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

Note 1 to entry: 1) Normal operating conditions are: no fault in any device or stream
2) The set point of the regulator does not exceed MOP

3.1.3 maximum incidental pressure MIP

maximum pressure which a system can experience during a short time, limited by the safety devices

3.2 Derived pressure definitions used in CEN/TC 234 standards

3.2.1 operating pressure OP

nominal pressure on which the system is operated

3.2.2 temporary operating pressure TOP

pressure at which a system can be operated temporarily under control of regulating devices

3.2.3 test pressure TP

pressure at which pressure tests are conducted

3.2.4 strength test pressure STP

pressure applied to a system during strength testing

3.2.5 tightness test pressure TTP

pressure applied to a system during tightness testing

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3.2.6

combined test pressure

CTP

pressure applied to a system during combined testing, i.e. tightness and strength testing

3.3 Commonly used pressure definitions in European product standards

3.3.1

maximum allowable pressure

PS

maximum pressure for which the equipment is designed, as specified by the manufacturer

Note 1 to entry: Definition and requirements according Directive 97/23/EC (Pressure Equipment Directive - PED)

3.3.2

nominal pressure

PN

numerical designation which is a convenient rounded number for reference purposes

4 Explanation of Gas pressure definitions for gas transport and distribution systems

4.1 General

The pressure levels in the system MOP, TOP and MIP are to be chosen by the network operator when designing and operating its network according to its constraints and national regulations.

4.2 Pressure demarcation

For a pipeline system, the maximum pressure values will occur at the entrance of a pipeline section. However, in case the gas stream is interrupted for any reason, the whole pipeline section will be subjected to the same pressure level.

The demarcation line for different pressure levels are in the case of gas pressure regulating stations at the exit flange of the gas pressure regulator¹ [EN 12186] and for compressor stations at the entrance of the compressor [EN 12583].

4.3 Operating conditions

4.3.1 Normal operating conditions

4.3.1.1 MOP – Maximum operating pressure

The most relevant information related to the pressure in a network is the maximum pressure at which the system can be operated under normal conditions. This value is defined as the maximum operation pressure MOP.

The maximum set point of the operating pressure is MOP, considering the available accuracy classes and the lock-up pressure of gas pressure regulators [EN 334] or other regulating devices. The instantaneous pressure (peak level OP) in the system can be occasionally higher than MOP even under normal operating conditions.

¹ For details regarding the pressure demarcation in gas pressure regulating stations see EN 12186.