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Plastics piping systems for the supply of gaseous fuels — Unplasticized polyamide (PA-U) piping systems with fusion jointing and mechanical jointing —

Part 4: Valves

Systèmes de canalisations en matières plastiques pour la distribution de combustibles gazeux — Systèmes de canalisations en polyamide non plastifié (PA-U) avec assemblages par soudage et assemblages mécaniques —

Partie 4: Robinets

Reference number
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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established 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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*, Subcommittee SC 7, *Valves and auxiliary equipment of plastics materials,* in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 155, *Plastics piping systems and ducting systems,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This third edition cancels and replaces the second edition (ISO 16486-4:2022), which has been technically revised.

The main changes are as follows:

— references to information related to the suitability of PA-U piping systems for 100 % hydrogen and its admixtures with natural gas have been added;

— for the actuation mechanism resistance test, the elements given in the requirements were moved to the test parameters cells and ‘no leakage’ and ‘no external leakage’ were added in the requirements cells;

— the Bibliography has been updated and extended with additional references.

A list of all parts in the ISO 16486 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

This document specifies the requirements for valves used in a piping system made from unplasticized polyamide (PA-U) that is intended to be used for the supply of gaseous fuels.

General requirements for unplasticized polyamide (PA-U) materials used for a piping system and its components, intended for the supply of gaseous fuels, are specified in ISO 16486-1.

Requirements and test methods for pipes are specified in ISO 16486-2 and for fittings in ISO 16486-3.

Characteristics for fitness for purpose of the system and generic fusion parameters are specified in ISO 16486-5.

Recommended practice for installation is given in ISO 16486-6, which will not be implemented as a European standard under the Vienna Agreement.

NOTE 1 Recommended practice for installation is also given in CEN/TS 12007-6, which has been prepared by Technical Committee CEN/TC 234, *Gas infrastructure*.

Assessment of conformity of the system is given in ISO/TS 16486-7.

Training and assessment of fusion operators is covered by ISO/TS 16486-8.

NOTE 2 For CEN member countries, the recommended practice for installation is given in CEN/TS 12007-6 and the qualification of welders is given by EN 13067.[5]

ISO 16486-1, ISO 16486-2, ISO 16486-3, ISO 16486-5 and ISO 16486-6 as well as ISO/TS 16486-7 and ISO/TS 16486-8 have been prepared by ISO/TC 138/SC 4. ISO 16486-4 (this document) has been prepared by ISO/TC 138/SC 7.

NOTE 3 For conformance of components in CEN member countries, relevant EN standards can apply. Alternative standards can be applied in cases where suitable EN standard(s) do not exist.

The ISO 16486 series covers a range of maximum operating pressures and gives requirements concerning colours.

It is the responsibility of the purchaser or specifier to make the appropriate selections from these aspects, taking into consideration their particular requirements and any relevant national regulations and installation practices or codes.

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Plastics piping systems for the supply of gaseous fuels — Unplasticized polyamide (PA-U) piping systems with fusion jointing and mechanical jointing —

Part 4: Valves

1 Scope

This document specifies the characteristics of valves made from unplasticized polyamide (PA-U) in accordance with ISO 16486-1, intended to be buried and used for the supply of gaseous fuels.

NOTE 1 For the purpose of this document the term gaseous fuels include for example natural gas, methane, butane, propane, hydrogen, manufactured gas, biogas, and mixtures of these gases. Additional information about the suitability for 100 % hydrogen and its admixtures with natural gas is given by ISO 16486-1:2023, Annex C and Annex D.

It is applicable to isolating unidirectional and bi-directional valves with spigot ends or electrofusion sockets intended to be fused with PA-U pipes conforming to ISO 16486-2 and PA-U fittings conforming to ISO 16486-3.

This document also specifies the test parameters for the test methods it describes.

In conjunction with ISO 16486-1, ISO 16486-2, ISO 16486-3 and ISO 16486-5, this document is applicable to PA-U valves and their joints and to joints with components of PA-U and other materials intended to be used under the following conditions:

a) a maximum operating pressure (MOP) of up to and including 18 bar[1)], or limited to 16 bar under regional CEN requirements, at a reference temperature of 20 °C for design purposes;

   NOTE 2 For the purpose of this document and the references to ISO 8233, MOP is considered to be nominal pressure.

b) an operating temperature of –20 °C to 40 °C;

   NOTE 3 For operating temperatures between 20 °C and 40 °C, derating coefficients are specified in ISO 16486-5.

This document covers valves for pipes with a nominal outside diameter, d_n, ≤400 mm.

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.

ISO 291, *Plastics — Standard atmospheres for conditioning and testing*

ISO 307, *Plastics — Polyamides — Determination of viscosity number*

ISO 1133-2:2011, *Plastics — Determination of the melt mass-flow rate (MFR) and melt volume-flow rate (MVR) of thermoplastics — Part 2: Method for materials sensitive to time-temperature history and/or moisture*

1) 1 bar = 0,1 MPa = 10^5 Pa; 1 MPa = 1 N/mm^2.

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ISO 1167-1, *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids — Determination of the resistance to internal pressure — Part 1: General method*

ISO 1167-4, *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids — Determination of the resistance to internal pressure — Part 4: Preparation of assemblies*

ISO 3126, *Plastics piping systems — Plastics components — Determination of dimensions*

ISO 3127, *Thermoplastics pipes — Determination of resistance to external blows — Round-the-clock method*

ISO 8233, *Thermoplastics valves — Torque — Test method*

ISO 16010, *Elastomeric seals — Material requirements for seals used in pipes and fittings carrying gaseous fuels and hydrocarbon fluids*

ISO 16486-1, *Plastics piping systems for the supply of gaseous fuels — Unplasticized polyamide (PA-U) piping systems with fusion jointing and mechanical jointing — Part 1: General*

ISO 16486-2, *Plastics piping systems for the supply of gaseous fuels — Unplasticized polyamide (PA-U) piping systems with fusion jointing and mechanical jointing — Part 2: Pipes*

ISO 16486-3:2025, *Plastics piping systems for the supply of gaseous fuels — Unplasticized polyamide (PA-U) piping systems with fusion jointing and mechanical jointing — Part 3: Fittings*

ISO 16486-5, *Plastics piping systems for the supply of gaseous fuels — Unplasticized polyamide (PA-U) piping systems with fusion jointing and mechanical jointing — Part 5: Fitness for purpose of the system*

ISO 17778, *Plastics piping systems — Fittings, valves and ancillaries — Determination of gaseous flow rate/pressure drop relationships*

EN 682, *Elastomeric seals - Material requirements for seals used in pipes and fittings carrying gas and hydrocarbon fluids*

EN 736-1, *Valves Terminology — Part 1: Definition of types of valves*

EN 736-2, *Valves Terminology — Part 2: Definition of components of valves*

EN 1680, *Plastics piping systems — Valves for polyethylene (PE) piping systems — Test method for leaktightness under and after bending applied to the operating mechanisms*

EN 1704, *Plastics piping systems — Thermoplastics valves — Test method for the integrity of a valve after temperature cycling under bending*

EN 1705, *Plastics piping systems — Thermoplastics valves — Test method for the integrity of a valve after an external blow*

EN 12100, *Plastics piping systems — Polyethylene (PE) valves — Test method for resistance to bending between supports*

EN 12119, *Plastics piping systems — Polyethylene (PE) valves — Test method for resistance to thermal cycling*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 16486-1, EN 736-1, EN 736-2 and the following apply.

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

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