
Cevni sistemi iz polimernih materialov za oskrbo s plinastimi gorivi - Cevni sistemi iz nemehčanega poliamida (PA-U) z zvari in mehanskimi spoji - 2. del: Cevi (ISO/DIS 16486-2:2024)

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/DIS 16486-2:2024)

Kunststoff-Rohrleitungssysteme für die Gasversorgung - Rohrleitungssysteme aus weichmacherfreiem Polyamid (PA-U) mit Schweißverbindungen und mechanischen Verbindungen - Teil 2: Rohre (ISO/DIS 16486-2:2024)

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 2: Tubes (ISO/DIS 16486-2:2024)

Ta slovenski standard je istoveten z: prEN ISO 16486-2

ICS:

75.200	Oprema za skladiščenje nafte, naftnih proizvodov in zemeljskega plina	Petroleum products and natural gas handling equipment
83.140.30	Polimerne cevi in fittingi za snovi, ki niso tekočine	Plastics pipes and fittings for non fluid use

oSIST prEN ISO 16486-2:2024

en,fr,de



DRAFT International Standard

ISO/DIS 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

*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 2: Tubes

ICS: ISO ics

This document is circulated as received from the committee secretariat.

ISO/CEN PARALLEL PROCESSING

Reference number
ISO/DIS 16486-2:2024(en)

ISO/TC 138/SC 4

Secretariat: **NEN**

Voting begins on:
2024-04-16

Voting terminates on:
2024-07-09

iTeh Standards
(<https://standards.itih.ai>)
Document Preview

oSIST prEN ISO 16486-2:2024

<https://standards.itih.ai/catalog/standards/sist/4aafcd90-c82a-40d0-97a1-123a7ecd0035/osist-pren-iso-16486-2-2024>

THIS DOCUMENT IS A DRAFT CIRCULATED FOR COMMENTS AND APPROVAL. IT IS THEREFORE SUBJECT TO CHANGE AND MAY NOT BE REFERRED TO AS AN INTERNATIONAL STANDARD UNTIL PUBLISHED AS SUCH.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.

© ISO 2024

ISO/DIS 16486-2:2024(en)

iTeh Standards (<https://standards.iteh.ai>) Document Preview

[oSIST prEN ISO 16486-2:2024](https://standards.iteh.ai/catalog/standards/sist/4aafcd90-c82a-40d0-97a1-123a7ecd0035/osist-pren-iso-16486-2-2024)

<https://standards.iteh.ai/catalog/standards/sist/4aafcd90-c82a-40d0-97a1-123a7ecd0035/osist-pren-iso-16486-2-2024>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2024

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

© ISO 2024 – All rights reserved

ISO/DIS 16486-2:2024(en)

Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
3.1 Terms related to geometrical characteristics.....	2
3.2 Terms related to material.....	2
3.3 Terms related to joints.....	2
3.4 Abbreviated terms.....	3
4 Compound	3
5 General characteristics	3
5.1 Appearance.....	3
5.2 Colour.....	3
5.3 Fusion compatibility.....	3
6 Geometrical characteristics	3
6.1 Measurement of dimensions.....	3
6.2 Mean outside diameters, out-of-roundness and their tolerances.....	3
6.3 Wall thicknesses and tolerances.....	4
6.3.1 Minimum wall thickness.....	4
6.3.2 Tolerances on wall thickness at any point.....	5
7 Mechanical characteristics	6
7.1 Conditioning.....	6
7.2 Requirements.....	6
8 Physical characteristics	8
8.1 Conditioning.....	8
8.2 Requirements.....	9
9 Marking	9
Annex A (normative) Squeeze-off technique	10
Annex B (informative) Examples of the water uptake over time as a function of the sample thickness	11
Bibliography	13

ISO/DIS 16486-2:2024(en)

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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 4, *Plastics pipes and fittings for the supply of gaseous fuels*, 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 16486-2:2020), which has been technically revised.

The main changes compared to the previous edition are as follows:

- The revision of this System Standard has been carried out to add reference to information related to the suitability of PA-U pipe systems for 100 % hydrogen and its admixtures with natural gas;
- Update of the references in the introduction.
- Addition of the symbols that are deleted in ISO 16486-1:2023, while they are used in this document;
- Direct reference to EN 12106 Squeeze-off substitutes previous “in line”;
- Circumferential reversion for large diameters will be taken into account;
- In the NOTE in [clause 9](#) about marking of traceability information also reference to ISO 12176-5 has been made;
- Extension of the bibliography.

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.

ISO/DIS 16486-2:2024(en)

Introduction

This document specifies the requirements for a piping system and its components made from unplasticized polyamide (PA-U), which is intended to be used for the supply of gaseous fuels.

NOTE Additional information about the suitability of PA-U pipe systems for hydrogen and its admixtures is given in ISO 16486-1:2023, Annex D.

Requirements and test methods for material and components, other than pipes of the piping system are specified in ISO 16486-1, ISO 16486-3^[1], and ISO 16486-4.

Characteristics for fitness for purpose of the system and generic fusion parameters are covered 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 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^[12].

Parts 1, 2 (this document), 3, 5 and 6 (and future Part 7) of the ISO 16486 series have been prepared by ISO/TC 138/SC4. Part 4 has been prepared by ISO/TC 138/SC 7.

iTeh Standards (<https://standards.iteh.ai>) Document Preview

[oSIST prEN ISO 16486-2:2024](https://standards.iteh.ai/catalog/standards/sist/4aafcd90-c82a-40d0-97a1-123a7ecd0035/osist-pren-iso-16486-2-2024)

<https://standards.iteh.ai/catalog/standards/sist/4aafcd90-c82a-40d0-97a1-123a7ecd0035/osist-pren-iso-16486-2-2024>

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

Part 2: Pipes

1 Scope

This document specifies the physical and mechanical properties of pipes 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 Additional information about the suitability of PA-U pipe systems for hydrogen and its admixtures is given in ISO 16486-1:2023, Annex D.

It also specifies the test parameters for the test methods to which it refers.

The ISO 16486 series of standards is applicable to PA-U piping systems, the components of which are connected by fusion jointing and/or mechanical jointing.

In addition, this document lays down dimensional characteristics and requirements for the marking of pipes.

Pipes conforming to this document are jointed typically by using mechanical, electrofusion or butt fusion techniques.

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, *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*

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 1167-2, *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids — Determination of the resistance to internal pressure — Part 2: Preparation of pipe test pieces*

ISO 2505, *Thermoplastics pipes — Longitudinal reversion — Test method and parameters*

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

ISO 6259-1, *Thermoplastics pipes — Determination of tensile properties — Part 1: General test method*

ISO 6259-3, *Thermoplastics pipes — Determination of tensile properties — Part 3: Polyolefin pipes*

ISO 11922-1, *Thermoplastics pipes for the conveyance of fluids — Dimensions and tolerances — Part 1: Metric series*

ISO/DIS 16486-2:2024(en)

ISO 13477, *Thermoplastics pipes for the conveyance of fluids — Determination of resistance to rapid crack propagation (RCP) — Small-scale steady-state test (S4 test)*

ISO 13479, *Polyolefin pipes for the conveyance of fluids — Determination of resistance to crack propagation — Test method for slow crack growth on notched pipes*

ISO 16486-1:2020, *Plastics piping systems for the supply of gaseous fuels — Unplasticized polyamide (PA-U) piping systems with fusion jointing and mechanical jointing — Part 1: General*

EN 12106, *Plastics piping systems - Polyethylene (PE), crosslinked polyethylene (PE-X) and unplasticized polyamide (PA-U) pipes - Test method for the resistance to internal pressure after application of squeeze-off*

3 Terms and definitions

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

ISO and IEC maintain terminological 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/>

3.1 Terms related to geometrical characteristics

3.1.1

out-of-roundness

(pipe or fitting) difference between the measured maximum outside diameter and the measured minimum outside diameter in the same cross-sectional plane of a pipe or spigot end of a fitting

3.1.2

minimum mean outside diameter

$d_{em,min}$

minimum value for the *mean outside diameter* (3.1.3) as specified for a given nominal size

3.1.3

maximum mean outside diameter

$d_{em,max}$

maximum value for the *mean outside diameter* (3.1.3) as specified for a given nominal size

3.1.4

nominal wall thickness

e_n

wall thickness, in millimetres, corresponding to the minimum wall thickness, e_{min}

3.2 Terms related to material

3.2.1

virgin material

material in a form such as granules or powder that has not been previously processed other than for compounding and to which no rework material or recyclable material has been added

3.3 Terms related to joints

3.3.1

squeeze-off

gas flow restricted by squeezing the pipe when compressed between two clamps in such a way that the distance between both clamps is less than twice the nominal wall thickness