



**SLOVENSKI STANDARD**  
**oSIST prEN 15015:2014**  
**01-julij-2014**

---

**Cevni sistemi iz polimernih materialov - Cevne komponente za vročo in hladno vodo - Zahteve in preskusi/metode ocenjevanja za cevi in fittinge**

Plastics piping systems - Hot and cold water piping components - Requirements and test/assessment methods for pipes and fittings

Kunststoff-Rohrleitungssysteme - Bauteile für den Einsatz in Rohrleitungen für Warm- und Kaltwasser - Anforderungen und Prüf/Bewertungsverfahren für Rohre und Formstücke

(standards.iteh.ai)

Systèmes de canalisations en plastique - Composants de canalisations pour eau chaude et froide non destinée à la consommation humaine - Exigences et méthodes d'essais/d'évaluation pour tubes et raccords

**Ta slovenski standard je istoveten z: prEN 15015**

---

**ICS:**

23.040.20	Cevi iz polimernih materialov	Plastics pipes
23.040.45	Fitingi iz polimernih materialov	Plastics fittings
91.140.60	Sistemi za oskrbo z vodo	Water supply systems

**oSIST prEN 15015:2014**

**en,fr,de**

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[oSIST prEN 15015:2014](#)

<https://standards.iteh.ai/catalog/standards/sist/5970c5e3-9a9a-40c6-b755-ca191a0edd86/osist-pren-15015-2014>

EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**DRAFT**  
**prEN 15015**

April 2014

ICS 23.040.01

Will supersede EN 15015:2007

English Version

## Plastics piping systems - Hot and cold water piping components - Requirements and test/assessment methods for pipes and fittings

Systèmes de canalisations en plastique - Composants de canalisations pour eau chaude et froide non destinée à la consommation humaine - Exigences et méthodes d'essais/d'évaluation pour tubes et raccords

Kunststoff-Rohrleitungssysteme - Bauteile für den Einsatz in Rohrleitungen für Warm- und Kaltwasser - Anforderungen und Prüf /Bewertungsverfahren für Rohre und Formstücke

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 155.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CEN 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.

CEN members are the national standards bodies of 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 United Kingdom.

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.

**Warning** : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



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

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

## Contents

Page

Foreword.....	4
Introduction .....	5
<b>1</b> <b>Scope .....</b>	<b>6</b>
<b>2</b> <b>Normative references .....</b>	<b>6</b>
<b>3</b> <b>Terms, definitions and abbreviations .....</b>	<b>8</b>
<b>3.1</b> <b>Terms and definitions .....</b>	<b>8</b>
<b>3.2</b> <b>Abbreviations .....</b>	<b>8</b>
<b>4</b> <b>Product characteristics .....</b>	<b>8</b>
<b>4.1</b> <b>Reaction to fire of pipes and fittings .....</b>	<b>8</b>
<b>4.2</b> <b>Internal and external pressure strength .....</b>	<b>9</b>
<b>4.2.1</b> <b>Internal pressure strength .....</b>	<b>9</b>
<b>4.2.2</b> <b>External pressure strength .....</b>	<b>9</b>
<b>4.3</b> <b>Dimensional tolerances of pipes and fittings .....</b>	<b>9</b>
<b>4.4</b> <b>Tightness: Liquid .....</b>	<b>10</b>
<b>4.4.1</b> <b>Pipes and fittings .....</b>	<b>10</b>
<b>4.5</b> <b>Release of dangerous substances .....</b>	<b>10</b>
<b>4.6</b> <b>Durability of pipes and fitting .....</b>	<b>10</b>
<b>4.6.1</b> <b>Durability of internal pressure strength of pipes and fittings .....</b>	<b>10</b>
<b>4.6.2</b> <b>Durability of tightness of connections .....</b>	<b>10</b>
<b>5</b> <b>Testing, assessment and sampling methods .....</b>	<b>10</b>
<b>5.1</b> <b>Reaction to fire .....</b>	<b>10</b>
<b>5.2</b> <b>Internal and external pressure strength .....</b>	<b>11</b>
<b>5.2.1</b> <b>Internal pressure strength of thermoplastics pipes and plastic fittings .....</b>	<b>11</b>
<b>5.2.2</b> <b>Internal pressure strength of plastic fittings .....</b>	<b>13</b>
<b>5.2.3</b> <b>External pressure strength of pipes .....</b>	<b>14</b>
<b>5.3</b> <b>Dimensional tolerances of pipes and fittings .....</b>	<b>14</b>
<b>5.4</b> <b>Tightness: Liquid .....</b>	<b>15</b>
<b>5.4.1</b> <b>Pipes and fittings .....</b>	<b>15</b>
<b>5.4.2</b> <b>Connections .....</b>	<b>15</b>
<b>5.5</b> <b>Release of dangerous substances of pipes and fittings .....</b>	<b>16</b>
<b>5.6</b> <b>Durability of pipes and fittings .....</b>	<b>16</b>
<b>5.6.1</b> <b>Durability related to internal pressure strength of pipes and fittings .....</b>	<b>16</b>
<b>5.6.2</b> <b>Durability of tightness of connections .....</b>	<b>17</b>
<b>6</b> <b>Assessment and verification of the constancy of performance (AVCP) .....</b>	<b>18</b>
<b>6.1</b> <b>General .....</b>	<b>18</b>
<b>6.2</b> <b>Type Testing .....</b>	<b>18</b>
<b>6.2.1</b> <b>General .....</b>	<b>18</b>
<b>6.2.2</b> <b>Test samples, testing and compliance criteria .....</b>	<b>20</b>
<b>6.2.3</b> <b>Test reports .....</b>	<b>29</b>
<b>6.3</b> <b>Factory production control (FPC) .....</b>	<b>29</b>
<b>6.3.1</b> <b>General .....</b>	<b>29</b>
<b>6.3.2</b> <b>Requirements .....</b>	<b>30</b>
<b>6.3.3</b> <b>Product specific requirements .....</b>	<b>39</b>
<b>6.3.4</b> <b>Initial inspection of factory and of FPC .....</b>	<b>40</b>
<b>6.3.5</b> <b>Continuous surveillance of (only for reaction to fire under AVCP system 1) .....</b>	<b>40</b>
<b>6.3.6</b> <b>Procedure for modifications .....</b>	<b>40</b>
<b>6.3.7</b> <b>One-off products, and products produced in very low quantity .....</b>	<b>41</b>
<b>6.3.8</b> <b>Product specific requirements .....</b>	<b>41</b>
<b>6.3.9</b> <b>Initial inspection of factory and of FPC (only for reaction to fire under AVCP system 1) .....</b>	<b>42</b>
<b>6.3.10</b> <b>Continuous surveillance of FPC (only for reaction to fire under AVCP system 1) .....</b>	<b>42</b>

6.3.11	Procedure for modifications.....	42
6.3.12	One-off products, pre-production products (e.g. prototypes) and products produced in very low quantity .....	43
<b>Annex A</b>	<b>(normative) Overall service (design) coefficient .....</b>	<b>44</b>
<b>A.1</b>	<b>General .....</b>	<b>44</b>
<b>A.2</b>	<b>Overall service (design) coefficients .....</b>	<b>44</b>
<b>Annex ZA</b>	<b>(informative) Clauses of this European Standard addressing the provisions of the EU Construction Products Regulation .....</b>	<b>45</b>
<b>ZA.1</b>	<b>Scope and relevant characteristics .....</b>	<b>45</b>
<b>ZA.2</b>	<b>Procedure for AVCP of plastics pipes and fittings .....</b>	<b>46</b>
<b>ZA.2.1</b>	<b>System(s) of AVCP .....</b>	<b>46</b>
<b>ZA.2.2</b>	<b>Declaration of performance (DoP) .....</b>	<b>49</b>
<b>ZA.3</b>	<b>CE marking and labelling.....</b>	<b>51</b>
	<b>Bibliography.....</b>	<b>57</b>

## iTeh STANDARD PREVIEW (standards.iteh.ai)

[oSIST prEN 15015:2014](https://standards.iteh.ai/catalog/standards/sist/5970c5e3-9a9a-40c6-b755-ca191a0edd86/osist-pren-15015-2014)

<https://standards.iteh.ai/catalog/standards/sist/5970c5e3-9a9a-40c6-b755-ca191a0edd86/osist-pren-15015-2014>

prEN 15015:2014 (E)

## Foreword

This document (prEN 15015:2014) has been prepared by Technical Committee CEN/TC 155 “Plastics piping systems and ducting systems”, the secretariat of which is held by NEN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 15015:2007.

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

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

## iTeh STANDARD PREVIEW (standards.iteh.ai)

[oSIST prEN 15015:2014](https://standards.iteh.ai/catalog/standards/sist/5970c5e3-9a9a-40c6-b755-ca191a0edd86/osist-pren-15015-2014)

<https://standards.iteh.ai/catalog/standards/sist/5970c5e3-9a9a-40c6-b755-ca191a0edd86/osist-pren-15015-2014>

## Introduction

This European Standard specifies only those characteristics of pipes and fittings for hot and cold water applications with the exception of water intended for human consumption that need to be known to determine if the works in which these are to be installed can satisfy the essential requirements of the EU Directive(s). Additional characteristics are specified in the documents listed in clause 2 or in other appropriate product specifications.

This harmonised European Standard covers pipes and fittings for hot and cold water installations. Valves are covered by CEN/TC 69

## iTeh STANDARD PREVIEW (standards.iteh.ai)

[oSIST prEN 15015:2014](https://standards.iteh.ai/catalog/standards/sist/5970c5e3-9a9a-40c6-b755-ca191a0edd86/osist-pren-15015-2014)

<https://standards.iteh.ai/catalog/standards/sist/5970c5e3-9a9a-40c6-b755-ca191a0edd86/osist-pren-15015-2014>

**prEN 15015:2014 (E)****1 Scope**

This European Standard specifies requirements for plastics pipes and fittings for hot and cold water installations.

It gives associated test/assessment methods.

This standard does not cover adhesives, joint sealings and gasket

It is intended to be used for distribution of hot and cold water and for heating systems inside buildings with the exception of water intended for human consumption.

**NOTE** Products complying with this document may be used for the transport of water intended for human consumption if they comply with the relevant national, regional or local regulatory provisions applicable in place of use. Compliance of a product with this document does not confer a presumption of fitness of the product for the transport of water intended for human consumption within the meaning of the Directive 89/106/EEC.

**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 681-1, *Elastomeric seals — Materials requirements for pipe joint seals used in water and drainage applications — Part 1: Vulcanized rubber*

EN 727, *Plastics piping and ducting systems - Thermoplastics pipes and fittings - Determination of Vicat softening temperature (VST)*

CEN/TS 12201-7:2013, *Plastics piping systems for water supply, and for drainage and sewerage under pressure - Polyethylene (PE) — Part 7: Guidance for the assessment of conformity*

EN 12293, *Plastics piping systems — Thermoplastics pipes and fittings for hot and cold water — Test method for the resistance of mounted assemblies to temperature cycling*

EN 13501-1, *Fire classification of construction products and building elements — Part 1: Classification using test data from reaction to fire tests*

EN 13823, *Reaction to fire tests for building products — Building products excluding floorings exposed to the thermal attack by a single burning item*

EN 16000, *Plastics piping systems — Systems within the building structure — Mounting and fixing of components in the test apparatus to thermal attack by a single burning item*

EN ISO 1133, *Plastics—Determination of the melt mass-flow rate (MFR) and the melt volume-flow rate (MVR) of thermoplastics* (ISO 1133:2005)

EN 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 1167-1:2006)

EN 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 1167-2:2006)

EN ISO 1167-3, *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids — Determination of the resistance to internal pressure — Part 3: Preparation of components* (ISO 1167-3:2007)

EN 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 1167-4:2007)



EN ISO 3126, *Plastics piping systems — Plastics components — Determination of dimensions (ISO 3126:2005)*

EN ISO 9080, *Plastics piping and ducting systems — Determination of the long-term hydrostatic strength of thermoplastics materials in pipe form by extrapolation (ISO 9080:2003)*

EN ISO 13760, *Plastics pipes for the conveyance of fluids under pressure — Miner's rule — Calculation method of cumulative damage (ISO 13760:1998)*

EN ISO 15874-2:2013, *Plastics piping systems for hot and cold water installations — Polypropylene (PP) — Part 2: Pipes*

EN ISO 15874-3:2013, *Plastics piping systems for hot and cold water installations — Polypropylene (PP) — Part 3: Fittings*

CEN ISO/TS 15874-7:2003, *Plastics piping systems for hot and cold water installations - Polypropylene (PP) - Part 7: Guidance for the assessment of conformity (ISO/TS 15874-7:2003)*

EN ISO 15875-2:2003/A1:2007, *Plastics piping systems for hot and cold water installations — Crosslinked polyethylene (PE-X) — Part 2: Pipes*

EN ISO 15875-3:2003, *Plastics piping systems for hot and cold water installations — Crosslinked polyethylene (PE-X) — Part 3: Fittings*

CEN ISO/TS 15875-7:2003, *Plastics piping systems for hot and cold water installations - Crosslinked polyethylene (PE-X) - Part 7: Guidance for the assessment of conformity (ISO/TS 15875-7:2003)*

EN ISO 15876-2:2003/A1:2007, *Plastics piping systems for hot and cold water installations — Polybutylene (PB) — Part 2: Pipes*

EN ISO 15876-3:2003, *Plastics piping systems for hot and cold water installations — Polybutylene (PB) — Part 3: Fittings*

CEN ISO/TS 15876-7:2003, *Plastics piping systems for hot and cold water installations - Polybutylene (PB) - Part 7: Guidance for the assessment of conformity (ISO/TS 15876-7:2003)*

EN ISO 15877-2:2009/A1:2010, *Plastics piping systems for hot and cold water installations — Chlorinated poly(vinyl chloride) (PVC-C) — Part 2: Pipes*

EN ISO 15877-3:2009/A1:2010, *Plastics piping systems for hot and cold water installations — Chlorinated poly(vinyl chloride) (PVC-C) — Part 3: Fittings*

CEN ISO/TS 15877-7:2009, *Plastics piping systems for hot and cold water installations - Chlorinated poly(vinyl chloride) (PVC-C) - Part 7: Guidance for the assessment of conformity (ISO/TS 15877-7:2009)*

EN ISO 21003-2:2008+A1:2011, *Multilayer piping systems for hot and cold water installations inside buildings — Part 2: Pipes – Amendment 1 (ISO 21003-2:2008/Amd 1:2011)*

CEN ISO/TS 21003-7:2008/A1:2010, *Multilayer piping systems for hot and cold water installations inside buildings - Part 7: Guidance for the assessment of conformity - Amendment 1 (ISO/TS 21003-7:2008/Amd 1:2010)*

EN ISO 22391-2:2009, *Plastics piping systems for hot and cold water installations — Polyethylene of raised temperature resistance (PE-RT) — Part 2: Pipes*

EN ISO 22391-3:2009, *Plastics piping systems for hot and cold water installations — Polyethylene of raised temperature resistance (PE-RT) — Part 3: Fittings*

**prEN 15015:2014 (E)**

CEN ISO/TS 22391-7:2011, *Plastics piping systems for hot and cold water installations - Polyethylene of raised temperature resistance (PE-RT) - Part 7: Guidance for the assessment of conformity (ISO/TS 22391-7:2011)*

ISO 10508, *Plastics piping systems for hot and cold water installations — Guidance for classification and design*

ISO 17456:2006, *Plastics piping systems — Multilayer pipes — Determination of the long-term strength*

**3 Terms, definitions and abbreviations****3.1 Terms and definitions**

For the purposes of this document, the following terms and definitions and apply.

**3.1.1****nominal outside diameter** $d_n$ 

specified outside diameter, in millimetres, assigned to a nominal size

**3.1.2****design pressure** $P_D$ 

highest pressure related to the circumstances for which the pipe or fitting has been designed and is intended to be used

**3.1.3****connection**

assembly of pipe(s) and fitting(s)

Note 1 to entry: For this standard, the term fitting includes the term joint.

iTeh STANDARD PREVIEW  
(standards.iteh.ai)

<https://standards.iteh.ai/catalog/standards/sist/5970c5e3-9a9a-40c6-b755-ca191a0edd86/osist-pr-en-15015-2014>

**3.2 Abbreviations**

For the purposes of this document, the following abbreviations apply

PP; polypropylene  
PE-X; crosslinked polyethylene  
PB; polybutene  
PVC-C; chlorinated poly(vinyl chloride)  
PE-RT; polyethylene of raised temperature resistance  
PVDF; poly(vinylidene fluoride)

**4 Product characteristics****4.1 Reaction to fire of pipes and fittings**

The contribution of fire development of products falling under the scope of this EN is verified according to the provisions of 5.1.

Test results shall be expressed by the classification.

## 4.2 Internal and external pressure strength

### 4.2.1 Internal pressure strength

The pipe and fitting must have mechanical properties able to assure the resistance to internal pressure of the conveyed water.

#### 4.2.1.1 Internal pressure strength of thermoplastic pipes

The internal pressure strength of the pipe shall be determined in accordance with 5.2.1 for a given class of application according to ISO 10508 and shall be declared by the manufacturer.

The verification of the design pressure by the internal pressure strength of pipe at a specified class of application shall be performed in accordance with 5.2.1.

The test result shall be expressed as a  $P_D$  value of 4 bar, 6 bar, 8 bar or 10 bar for a given class of application.

#### 4.2.1.2 Internal pressure strength of multilayer pipes

The internal pressure strength of the pipe shall be determined in accordance with 5.2.2 for a given class of application according to ISO 10508 and shall be declared by the manufacturer.

The verification of the design pressure by the internal pressure strength of pipes at a specified class of application shall be performed in accordance with 5.2.2.

The test result shall be expressed as a  $P_D$  value of 4 bar, 5 bar, 8 bar or 10 bar for the specified class of application.

#### 4.2.1.3 Internal pressure strength of plastic fittings

The internal pressure strength of the fitting shall be determined in accordance with 5.2.3 for a given class of application according to ISO 10508 and shall be declared by the manufacturer.

The verification of the design pressure by the internal pressure strength of pipe at a specified class of application shall be performed in accordance with 5.2.3.

The test result shall be expressed as a  $P_D$  value of 4 bar, 6 bar, 8 bar or 10 bar for the specified class of application.

### 4.2.2 External pressure strength

The external pressure strength of pipes and fittings is deemed to be satisfied by the internal pressure strength.

## 4.3 Dimensional tolerances of pipes and fittings

Dimensions including the dimensional tolerances are assuring the proper functioning of the connections when installing the pipes and fittings. Dimensions shall be measured in accordance with 5.3. The dimensions and the dimensional tolerances shall comply with what is declared by the manufacturer. This shall be done by using the values given in one of the documents listed hereafter:

- a) a specific European Standard listed in Clause 2
- b) only in the absence of a) , reference to a specific publicly available product specification ,
- c) only in the absence of a) and b), reference to an International Standard,

**prEN 15015:2014 (E)**

- d) only in the absence of a), b) and c), by stating the values of his own specification and associated jointing method.

The test result shall be expressed as a  $d_n$  value with the appropriate  $e_n$  value. ( $d_n \times e_n$ ).

**4.4 Tightness: Liquid**

Pipes, fittings and their connections shall be tight.

**4.4.1 Pipes and fittings**

Pipes fulfilling the requirements of 5.2.1 and 5.2.2, as applicable, and fittings fulfilling the requirements of 5.2.3 are deemed to be tight.

.Connections between pipes and fittings shall be tested in accordance with 5.4.2 taking the design pressure  $P_D$  and the declared classification of service conditions as in ISO 10508 into account.

No leakage shall occur during the test period and shall be expressed by the design pressure and the classification of service conditions as in ISO 10508.

**4.5 Release of dangerous substances**

The products covered by this standard should not contain or release any of the substances considered dangerous according to the existing national provisions.

**4.6 Durability of pipes and fitting****4.6.1 Durability of internal pressure strength of pipes and fittings**

The durability of internal pressure strength shall be assessed by testing the relevant material characteristics in accordance with 5.6.1 as applicable.

The requirement shall be met and expressed as given in table 11.

**4.6.2 Durability of tightness of connections****4.6.2.1 Connections containing elastomeric sealing rings**

Sealing rings used in the connections shall be chosen according 5.6.2.1.

**4.6.2.2 Durability of tightness of connections incorporating plastics and metallic compression fittings**

The durability of tightness of connections is deemed to be satisfied by the Tightness: Liquid (for connections) in accordance with 5.6.2.

The requirement shall be met and expressed by the design pressure at the specified class of service condition.

**5 Testing, assessment and sampling methods****5.1 Reaction to fire**

The reaction to fire is tested according to the test methods relevant for the claimed class.

When tested in accordance with EN 13823 (SBI test), the mounting and fixing conditions of samples to be tested shall be in accordance with EN 16000.

Test results shall be classified according to EN 13501-1.

## 5.2 Internal and external pressure strength

### 5.2.1 Internal pressure strength of thermoplastics pipes and plastic fittings

**5.2.1.1** For checking the internal pressure strength of thermoplastics pipes, first the design pressure  $P_D$  shall be determined as follows:

- The hydrostatic stress properties of the material shall be determined by testing in accordance with EN ISO 9080. Data shall be provided either by the compound manufacturer or the product manufacturer.
- The test results from EN ISO 9080 shall be used to calculate the design pressure by using the method described in EN ISO 13760 taking into account an applicable class of service condition according to ISO 10508 and service coefficients according to Annex A.

The  $P_D$  declared by the manufacturer shall be verified by the internal pressure strength using the test methods referenced in the following table.

**Table 1 — Internal pressure strength of thermoplastics pipes**

Material	Test parameters	Compliance criteria	Test methods
PP-H Hydrostatic strength at: 20 °C / 1 h / 21 MPa 95 °C / 22 h / 5,1 MPa 95 °C / 165 h / 4,2 MPa 95 °C / 1000 h / 3,65 MPa	Clause 7, Table 10 of EN ISO 15874-2:2013	Clause 4.2.1.1	EN ISO 1167-1 and EN ISO 1167-2
PP-B Hydrostatic strength at 20 °C / 1 h / 16 MPa 95 °C / 22 h / 3,5 MPa 95 °C / 165 h / 3,0 MPa 95 °C / 1000 h / 2,6 MPa	Clause 7, Table 10 of EN ISO 15874-2:2013	Clause 4.2.1.1	EN ISO 1167-1 and EN ISO 1167-2
PP-R Hydrostatic strength at 20 °C / 1 h / 16 MPa 95 °C / 22 h / 4,3 MPa 95 °C / 165 h / 3,8 MPa 95 °C / 1000 h / 3,5 MPa	Clause 7, Table 10 of EN ISO 15874-2:2013	Clause 4.2.1.1	EN ISO 1167-1 and EN ISO 1167-2
PP-RCT Hydrostatic strength at 20 °C / 1 h / 15 MPa 95 °C / 22 h / 4,2 MPa 95 °C / 165 h / 4,0 MPa 95 °C / 1000 h / 3,8 MPa	Clause 7, Table 10 of EN ISO 15874-2:2013	Clause 4.2.1.1	EN ISO 1167-1 and EN ISO 1167-2
PE-X Hydrostatic strength at 20 °C / 1 h / 12 Mpa 95 °C / 1 h / 4,8 Mpa 95 °C / 22 h / 4,7 MPa	Clause 7, Table 7 of EN ISO 15875-2:2003/A1:2007	Clause 4.2.1.1	EN ISO 1167-1 and EN ISO 1167-2

## prEN 15015:2014 (E)

95 °C / 165 h / 4,6 MPa 95 °C / 1000 h / 4,4 MPa			
PB Hydrostatic strength at 20 °C / 1 h / 15,5 Mpa 95 °C / 22 h / 6,5 MPa 95 °C / 165 h / 6,2 MPa 95 °C / 1000 h / 6,0 MPa	Clause 7, Table 7 of EN ISO 15876- 2:2003/A1:2007	Clause 4.2.1.1	EN ISO 1167-1 and EN ISO 1167-2
PVC-C Type I Hydrostatic strength at 20 °C / 1 h / 43 Mpa 95 °C / 165 h / 5,6MPa 95 °C / 1000 h / 4,6 MPa	Clause 7, Table 5 of EN ISO 15877- 2:2009/A1:2010	Clause 4.2.1.1	EN ISO 1167-1 and EN ISO 1167-2
PVC-C Type II Hydrostatic strength at 20 °C / 1 h / 48 Mpa 95 °C / 165 h / 5,9 MPa 95 °C / 1000 h / 4,7 MPa	Clause 7, Table 6 of EN ISO 15877- 2:2009/A1:2010	Clause 4.2.1.1	EN ISO 1167-1 and EN ISO 1167-2
PE-RT Type I Hydrostatic strength at 20 °C / 1 h / 9,9 Mpa 95 °C / 22 h / 3,8 MPa 95 °C / 165 h / 3,6 MPa 95 °C / 1000 h / 3,4 MPa	Clause 7, Table 8 of EN ISO 22391-2:2009	Clause 4.2.1.1	EN ISO 1167-1 and EN ISO 1167-2
PE-RT Type II Hydrostatic strength at 20 °C / 1 h / 10,8 Mpa 95 °C / 22 h / 3,9 MPa 95 °C / 165 h / 3,7 MPa 95 °C / 1000 h / 3,6 MPa	Clause 7, Table 9 of EN ISO 22391-2:2009	Clause 4.2.1.1	EN ISO 1167-1 and EN ISO 1167-2

iTeh STANDARD PREVIEW  
(standards.iteh.ai)

### 5.2.1.2 Internal pressure strength of multilayer pipes

For checking the internal pressure strength of multi-layer pipes, first the design pressure  $P_D$  shall be determined as follows.

The hydrostatic stress properties shall be determined according to ISO 17456. The result shall then be used as described in 5.2.1.

The design pressure for designs where single dimensions are pressure rated at specific temperatures can be calculated using the same procedure as in 5.2.1 but based on pressure instead of hydrostatic stress.

For checking the design pressure, internal pressure strength testing of multilayer pipes shall be done in accordance with EN ISO 1167-1 and EN ISO 1167-2 or ISO 17456, as appropriate using the conditions as given in EN ISO 21003-2.

The  $P_D$  declared by the manufacturer shall be verified by the internal pressure strength using the test methods referenced in the following table.

Table 2 — Internal pressure strength of multilayer pipes

Materials	Test parameters	Compliance criteria	Test methods
95 % of LPL 22 h 165 h 1000 h	Clause 6.1 of ISO 17456:2006	Clause 4.2.1.2	EN ISO 1167-1 and EN ISO 1167-2

### 5.2.2 Internal pressure strength of plastic fittings

For checking the internal pressure strength of plastics fittings, first the design pressure  $P_D$  shall be determined as follows:

- The hydrostatic stress properties of the material shall be determined by testing in accordance with EN ISO 9080. Data shall be provided either by the compound manufacturer or the product manufacturer.
- The test results from EN ISO 9080 shall be used to calculate the design pressure by using the method described in EN ISO 13760 taking into account an applicable class of service condition according to ISO 10508 and service coefficients according to Annex A.

For plastic fitting material not covered by Annex A the manufacturer shall declare overall service coefficients with appropriate verification methods, e.g. by making reference to a publically available product specification [see 4.3 b)].

The  $P_D$  declared by the manufacturer shall be verified by the internal pressure strength using the test methods referenced in the following table.

Table 3 — Internal pressure strength of thermoplastics fittings

Materials	Test parameters	Compliance criteria	Test methods
PP-H Hydrostatic strength at: 20 °C / 1 h 95 / 80 °C / 1000 h	Clause 7.2, Table 6 of EN ISO 15874-3:2013	Clause 4.2.1.3	EN ISO 1167-1, EN ISO 1167-3 and EN ISO 1167-4
PP-B Hydrostatic strength at: 20 °C / 1 h 95 / 80 °C / 1000 h	Clause 7.2, Table 7 of EN ISO 15874-3:2013	Clause 4.2.1.3	EN ISO 1167-1, EN ISO 1167-3 and EN ISO 1167-4
PP-R Hydrostatic strength at: 20 °C / 1 h 95 / 80 °C / 1000 h	Clause 7.2, Table 8 of EN ISO 15874-3:2013	Clause 4.2.1.3	EN ISO 1167-1, EN ISO 1167-3 and EN ISO 1167-4
PP-RCT Hydrostatic strength at: 20 °C / 1 h 95 / 80 °C / 1000 h	Clause 7.2, Table 9 of EN ISO 15874-3:2013	Clause 4.2.1.3	EN ISO 1167-1, EN ISO 1167-3 and EN ISO 1167-4