
**Cevni sistemi iz polimernih materialov - Podzemne in nadzemne cevne
komponente za vodo pod tlakom - Zahteve in preskusi/metode ocenjevanja za cevi
in fitinge**

Plastics piping systems - Buried and above ground piping components for water under pressure - Requirements and test/assessment methods for pipes and fittings

Kunststoff-Rohrleitungssysteme - Erdverlegte und oberirdische Rohrleitungsteile für Wasser unter Druck - Anforderungen und Prüf-/Beurteilungsmethoden für Rohre und Formstücke

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Systèmes de canalisations en plastique - Composants de canalisation enterrés et aériens pour eau avec pression - Exigences et méthodes d'essais/d'évaluation pour tubes et raccords

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

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Foreword

This document (prEN 15014:2014) 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 15014:2007.

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.

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Introduction

This European Standard specifies only those characteristics of pipes and fittings for pressure applications for water supply, drainage, sewerage and irrigation 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 plastics pipes and fittings under pressure. Valves are covered by CEN/TC 69.

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1 Scope

This European Standard specifies product characteristics for plastics pipes and fittings for pressure applications for water supply, drainage, sewerage and irrigation with the exception of water intended for human consumption.

Pipes and fittings covered by this standard are intended to be used for buried or above-ground conveyance of water, waste water, water for general purposes, vacuum-operated soil and waste conveyance, for both outside and inside buildings.

It gives the associated test/assessment methods.

This standard does not cover valves, adhesives, joint sealings and gaskets.

NOTE Products complying with this document may be used for the transport of water intended for human consumption and raw water prior to treatment if they comply with the relevant national, regional or local regulatory provisions applicable in the 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 Regulation (EU) No. 305/2011 (CPR).

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 681-4, *Elastomeric seals — Materials requirements for pipe joint seals used in water and drainage applications — Part 4: Cast polyurethane sealing elements*

EN 713, *Plastics piping systems — Mechanical joints between fittings and polyolefin pressure pipes — Test method for leaktightness under internal pressure of assemblies subjected to bending*

EN 911, *Plastics piping systems — Elastomeric sealing ring type joints and mechanical joints for thermoplastics pressure piping — Test method for leaktightness under external hydrostatic pressure*

EN 1119, *Plastics piping systems — Joints for glass-reinforced thermosetting plastics (GRP) pipes and fittings — Test methods for leaktightness and resistance to damage of non-thrust resistant flexible joints with elastomeric sealing elements*

EN 1447:2009+A1:2010, *Plastics piping systems — Glass-reinforced thermosetting plastics (GRP) pipes — Determination of long-term resistance to internal pressure*

FprCEN/TS 1452-7:2013, *Plastics piping systems for water supply — Unplasticized poly(vinyl chloride) (PVC-U) — Part 7: Guidance for the assessment of conformity*

EN 1796:2013, *Plastics piping systems for water supply with or without pressure — Glass-reinforced thermosetting plastics (GRP) based on unsaturated polyester resin (UP)*

EN 12201-1, *Plastics piping systems for water supply, and for drainage and sewerage under pressure — Polyethylene (PE) — Part 1: General*

EN 12201-2:2011+A1:2013, *Plastics piping systems for water supply, and for drainage and sewerage under pressure — Polyethylene (PE) — Part 2: Pipes*

EN 12201-3:2011+A1:2012, *Plastics piping systems for water supply, and for drainage and sewerage under pressure — Polyethylene (PE) — Part 3: Fittings*

EN 12201-5:2011, *Plastics piping systems for water supply, and for drainage and sewerage under pressure — Polyethylene (PE) — Part 5: Fitness for purpose of the system*

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

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 14364:2013, *Plastics piping systems for drainage and sewerage with or without pressure — Glass-reinforced thermosetting plastics (GRP) based on unsaturated polyester resin (UP) — Specifications for pipes, fittings and joints*

CEN/TS 14632:2012, *Plastics piping systems for drainage, sewerage and water supply, pressure and non-pressure — Glass-reinforced thermosetting plastics (GRP) based on polyester resin (UP) — Guidance for the assessment of conformity*

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 580, *Plastics piping and ducting systems — Injection-moulded thermoplastics fittings — Methods for visually assessing the effects of heating (ISO 580:2005)*

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 1452-2:2009, *Plastics piping systems for water supply and for buried and above-ground drainage and sewerage under pressure — Unplasticized poly(vinyl chloride) (PVC-U) — Part 2: Pipes (ISO 1452-2:2009)*

EN ISO 1452-3:2010, *Plastics piping systems for water supply and for buried and above-ground drainage and sewerage under pressure — Unplasticized poly(vinyl chloride) (PVC-U) — Part 3: Fittings (ISO 1452-3:2009)*

EN ISO 1452-5:2010, *Plastics piping systems for water supply and for buried and above-ground drainage and sewerage under pressure — Unplasticized poly(vinyl chloride) (PVC-U) — Part 5: Fitness for purpose of the system (ISO 1452-5:2009)*

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 12162, *Thermoplastics materials for pipes and fittings for pressure applications — Classification and designation — Overall service (design) coefficient (ISO 12162:2009)*

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EN ISO 13783, *Plastics piping systems — Unplasticized poly(vinyl chloride) (PVC-U) end-load-bearing double socket joints — Test method for leaktightness and strength while subjected to bending and internal pressure (ISO 13783:1997)*

EN ISO 13844, *Plastics piping systems — Elastomeric-sealing-ring-type socket joints of unplasticized poly(vinyl chloride) (PVC-U) for use with PVC-U pipes — Test method for leaktightness under negative pressure (ISO 13844:2000)*

EN ISO 13845, *Plastics piping systems — Elastomeric-sealing-ring-type socket joints for use with unplasticized poly(vinyl chloride) (PVC-U) pipes — Test method for leaktightness under internal pressure and with angular deflection (ISO 13845:2000)*

EN ISO 13846, *Plastics piping systems — End-load-bearing and non-end-load-bearing assemblies and joints for thermoplastics pressure piping — Test method for long-term leaktightness under internal water pressure (ISO 13846:2000)*

EN ISO 13968, *Plastics piping and ducting systems — Thermoplastics pipes — Determination of ring flexibility (ISO 13968:2008)*

ISO 161-1, *Thermoplastics pipes for the conveyance of fluids — Nominal outside diameters and nominal pressures — Part 1: Metric series*

ISO 3459, *Plastic piping systems — Mechanical joints between fittings and pressure pipes — Test method for leaktightness under external hydrostatic pressure*

ISO 3501, *Plastics piping systems — Mechanical joints between fittings and pressure pipes — Test method for resistance to pull-out under constant longitudinal force*

ISO 3503, *Plastics piping systems — Mechanical joints between fittings and pressure pipes — Test method for leaktightness under internal pressure of assemblies subjected to bending*

ISO 7432, *Glass-reinforced thermosetting plastics (GRP) pipes and fittings — Test methods to prove the design of locked socket-and-spigot joints, including double-socket joints, with elastomeric seals*

ISO 7685, *Plastics piping systems — Glass-reinforced thermosetting plastics (GRP) pipes — Determination of initial specific ring stiffness*

ISO 8483, *Plastics piping systems for pressure and non-pressure drainage and sewerage — Glass-reinforced thermosetting plastics (GRP) pipes and fittings — Test methods to prove the design of bolted flange joints*

ISO 8513, *Plastics piping systems — Glass-reinforced thermosetting plastics (GRP) pipes — Test methods for the determination of the apparent initial longitudinal tensile strength*

ISO 8521, *Plastics piping systems — Glass-reinforced thermosetting plastics (GRP) pipes — Test methods for the determination of the apparent initial circumferential tensile strength*

ISO 8533, *Plastics piping systems for pressure and non-pressure drainage and sewerage — Glass-reinforced thermosetting plastics (GRP) systems based on unsaturated polyester (UP) resin — Test methods to prove the design of cemented or wrapped joints*

ISO 9852, *Unplasticized poly(vinyl chloride) (PVC-U) pipes — Dichloromethane resistance at specified temperature (DCMT) — Test method*

ISO 10466, *Plastics piping systems — Glass-reinforced thermosetting plastics (GRP) pipes — Test method to prove the resistance to initial ring deflection*

ISO 10468, *Glass-reinforced thermosetting plastics (GRP) pipes — Determination of the long-term specific ring creep stiffness under wet conditions and calculation of the wet creep factor*

ISO 10471, *Glass-reinforced thermosetting plastics (GRP) pipes — Determination of the long-term ultimate bending strain and the long-term ultimate relative ring deflection under wet conditions*

ISO 11357-6, *Plastics — Differential scanning calorimetry (DSC) — Part 6: Determination of oxidation induction time (isothermal OIT) and oxidation induction temperature (dynamic OIT)*

ISO 13761, *Plastics pipes and fittings — Pressure reduction factors for polyethylene pipeline systems for use at temperature above 20 °C*

ISO 13954, *Plastics pipes and fittings — Peel decohesion test for polyethylene (PE) electrofusion assemblies of nominal outside diameter greater than or equal to 90 mm*

ISO 13955, *Plastics pipes and fittings — Crushing decohesion test for polyethylene (PE) electrofusion assemblies*

ISO 13956, *Plastics pipes and fittings — Decohesion test of polyethylene (PE) saddle fusion joints — Evaluation of ductility of fusion joint interface by tear test*

ISO 14236:2000, *Plastics pipes and fittings — Mechanical-joint compression fittings for use with polyethylene pressure pipes in water supply systems*

ISO/DIS 16422:2013, *Pipes and joints made of oriented unplasticized poly(vinyl chloride) (PVC-O) for the conveyance of water under pressure — Specifications*

ISO 17454, *Plastics piping systems — Multilayer pipes — Test method for the adhesion of the different layers using a pulling rig*

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

ISO/DIS 17885:2013, *Plastics piping systems — Mechanical fittings for pressure piping systems — Specifications*

ISO 21004:2006, *Plastics piping systems — Multilayer pipes and their joints, based on thermoplastics, for water supply*

ISO 21751, *Plastics pipes and fittings — Decohesion test of electrofusion assemblies — Strip-bend test*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

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

3.1.1

nominal size

DN

numerical designation of the size of a component, other than a component designated by thread size, which is a convenient round number approximately equal to the manufacturing dimension

Note 1 to entry: This can apply to either the internal diameter (DN/ID) or external diameter (DN/OD).

Note 2 to entry: The nominal size is expressed in millimetres (mm).

3.1.2

nominal outside diameter

d_n

specified diameter, in millimetres, assigned to a nominal size (for thermoplastics pipes and fittings only)

prEN 15014:2014 (E)**3.1.3****nominal wall thickness** e_n

numerical designation of the wall thickness of a component, which is a convenient round number, approximately equal to the manufacturing dimension in millimetres (for thermoplastics pipes and fittings only)

3.1.4**standard dimension ratio****SDR**

numerical designation of a pipe series, which is a convenient round number, approximately equal to the dimension ratio of the nominal outside diameter, d_n , and the nominal wall thickness, e_n

3.1.5**nominal pressure****PN**

numerical designation used for reference purposes related to the mechanical characteristics of the component of a piping system

Note 1 to entry: For plastic piping systems conveying water it corresponds to the maximum continuous operating pressure in bar, which can be sustained with water at 20 °C for thermoplastics and 35 °C for glass-reinforced thermosetting materials, based on the minimum design coefficient.

3.1.6**connection**

assembly of pipe(s) and fitting(s)

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

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3.2 Abbreviations

For the purposes of this document, the following abbreviations apply

GRP: glass-reinforced thermosetting plastics

GRP UP: glass-reinforced thermosetting plastics based on unsaturated polyester resin

PE: polyethylene

PVC: poly(vinyl chloride)

PVC-O: oriented poly(vinyl chloride)

PVC-U: unplasticized poly(vinyl chloride)

4 Product characteristics**4.1 Reaction to fire (only for above ground uses)**

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

The test result shall be expressed by the classification.

4.2 Internal and external pressure strength

4.2.1 Internal pressure strength of pipes

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

4.2.1.1 For thermoplastics materials the internal pressure strength of the pipe shall be determined in accordance with 5.2.1.1 and shall be declared by the manufacturer as nominal pressure PN in accordance with ISO 161-1.

The design coefficient shall not be less than that specified in EN ISO 12162 for the relevant material. Depending on the intended use, standards as referred to in clause 2 define the design coefficient to be applied.

The design coefficient may also be enhanced by derating the PN.

The verification of the PN by the internal pressure strength of pipes shall be performed in accordance with 5.2.1.1

The test results shall be expressed as a PN value.

4.2.1.2 For multilayer pipes the internal pressure strength shall be determined in accordance with 5.2.1.2 and shall be declared by the manufacturer as nominal pressure PN in accordance with ISO 161-1.

The verification of the PN by the internal pressure strength of pipes shall be performed in accordance with 5.2.1.2.

The test results shall be expressed as a PN value.

4.2.1.3 For glass-reinforced thermosetting materials the internal pressure strength of the pipe shall be determined in accordance with 5.2.1.3 and shall be declared by the manufacturer as nominal pressure PN in accordance with EN 1796 or EN 14364, depending on the intended use.

The verification of the PN by the internal pressure strength of pipes shall be performed in accordance with 5.2.1.3.

The test results shall be expressed as a PN value.

4.2.2 External pressure strength of pipes

The pipe, when buried in the ground, must have mechanical properties able to assure the resistance to external pressure from the embedding.

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

NOTE Instructions on limitations for the use in vacuum-operated soil and waste pipes may be found in the manufacturers technical file.

4.2.2.2 The external pressure strength of glass-reinforced thermosetting pipes shall be determined in accordance with 5.2.2.2 and shall be declared as the initial specific ring stiffness SN.

The SN shall be verified by the initial specific ring stiffness and resistance to initial ring deflection in accordance with 5.2.2.2. The test results shall be expressed as an SN value.

prEN 15014:2014 (E)**4.2.3 Internal pressure strength of fittings**

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

4.2.3.1 For thermoplastics materials the internal pressure strength of the fitting shall be determined in accordance with 5.2.3.1 and shall be declared by the manufacturer as nominal pressure PN in accordance with ISO 161-1.

The design coefficient shall not be less than that specified in EN ISO 12162 for the relevant material. Depending on the intended use, standards as referred to in clause 2 define the design coefficient to be applied.

The design coefficient may also be enhanced by derating the PN.

The verification of the PN by the internal pressure strength of fittings shall be performed in accordance with 5.2.3.1.

The test results shall be expressed as a PN value.

4.2.3.2 For glass-reinforced thermosetting materials the internal pressure strength of the fitting shall be determined in accordance with 5.2.3.2 and shall be declared by the manufacturer as nominal pressure PN in accordance with EN 1796 or EN 14364, depending on the intended use.

The verification of the PN by the internal pressure strength of fittings shall be performed in accordance with 5.2.3.2. The test results shall be expressed as a PN value.

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.

- a) 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 specific European standard as given in Clause 2, as applicable,
- b) only in the absence of a), a specific publicly available product specification,
- c) only in the absence of a) and b), an International Standard,
- d) only in the absence of a), b), and c), by stating the values of his own specification and associated connecting method.

For thermoplastics pipes and fittings, the test results shall be expressed as a d_n value with the appropriate SDR series, respectively for small dimensions as a d_n value with the appropriate e_n value.

For thermosetting pipes and fittings, the test result shall be expressed as a DN value with the appropriate diameter series.

4.4 Tightness: Liquid

4.4.1 Pipes and fittings

Pipes and fittings shall be tight to confirm the PN.

Pipes fulfilling the requirements of 5.2.1 and fittings fulfilling the requirements of 5.2.3 are deemed to be tight.

This shall be verified.

4.4.2 Connections

Connections between pipes and/or fittings shall be tight to confirm the PN.

Connections between pipes and/or fittings shall be tested in accordance with 5.4.2 by using the conditions and meeting the requirements as given in the applicable standard as referenced in clause 2.

No leakage shall occur during the test period.

4.5 Release of dangerous substances of pipes and fittings

National regulations on dangerous substances may require verification and declaration on release, and sometimes content, when construction products covered by this standard are placed on those markets. In the absence of European harmonized test methods, verification and declaration on release/content should be done taking into account national provisions in the place of use.

NOTE An informative database covering European and national provisions on dangerous substances is available at the Construction web site on EUROPA accessed through: <http://ec.europa.eu/enterprise/construction/cpd-ds/>.

4.6 Durability

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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 with the conditions and requirements as given in the relevant standard referenced in clause 2, as applicable.

The requirement shall be met.

If the nature of the liquid is different from water or this liquid or water has a higher temperature than 20 °C (35 °C for glass-reinforced thermosetting materials), guidance for de-rating the pressure shall be in accordance with the appropriate following standards: EN ISO 1452-2 for PVC-U, ISO 16422 for PVC-O, ISO 13761 and/or EN 12201-1 for PE, EN 1796 and/or EN 14364 for glass-reinforced thermosetting materials and ISO 17456 and/or ISO 21004 for multilayer piping systems.

Instead of de-rating the pressure, a shorter working life may be declared.

4.6.2 Durability of tightness of connections

The durability of tightness of connections shall be assessed by testing the relevant characteristics in accordance with 5.6.2 with the conditions and requirements as given in the relevant standard referenced in clause 2, as applicable.

The requirement shall be met.