

SLOVENSKI STANDARD

SIST EN 1455-1:2023

01-april-2023

Nadomešča:
SIST EN 1455-1:2000

Cevni sistemi iz polimernih materialov za nizko- in visokotemperaturne odvodne sisteme v zgradbah - Akrylonitril-butadien-stiren (ABS) - 1. del: Specifikacije za cevi, fite in sistem

Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure - Acrylonitrile-butadiene-styrene (ABS) - Part 1: Specifications for pipes, fittings and the system

Kunststoff Rohrleitungssysteme zum Ableiten von Abwasser (niedriger und hoher Temperatur) innerhalb der Gebäudestruktur - Acrylnitril Butadien Styrol (ABS) - Teil 1: Anforderungen an Rohre, Formstücke und das Rohrleitungssystem

Systèmes de canalisations en plastique pour l'évacuation des eaux-vannes et des eaux usées (à basse et à haute température) à l'intérieur de la structure des bâtiments - Acrylonitrile-butadiène-styrène (ABS) - Partie 1 : Spécifications pour tubes, raccords ainsi que pour le système

Ta slovenski standard je istoveten z: EN 1455-1:2022

ICS:

23.040.01	Deli cevovodov in cevovodi na splošno	Pipeline components and pipelines in general
91.140.80	Drenažni sistemi	Drainage systems

SIST EN 1455-1:2023

en,fr,de

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 1455-1

December 2022

ICS 23.040.01; 91.140.80

Supersedes EN 1455-1:1999

English Version

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and high temperature) within the building structure -
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Specifications for pipes, fittings and the system

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der Gebäudestruktur - Acrylnitril Butadien Styrol
(ABS) - Teil 1: Anforderungen an Rohre, Formstücke
und das Rohrleitungssystem

This European Standard was approved by CEN on 30 October 2022.

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European foreword

This document (EN 1455-1:2022) has been prepared by Technical Committee CEN/TC 155 “Plastics piping systems and ducting systems”, the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2023, and conflicting national standards shall be withdrawn at the latest by June 2023.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 1455-1:1999.

The main changes compared to the previous edition are listed below:

- updating of normative references;
- editorial improvement and alignment with new recently revised standards, e.g. EN 1329-1 [1], EN 1401-1 [2], EN 1451-1 [3], EN 14541-1 [4];
- addition of subclause 6.3 *External above ground application*;
- addition of subclause 6.4 *Reaction to fire*;
- introduction of a subclause 8.3.2 *Additional requirements of fittings* with Table 18 introducing mechanical strength or flexibility and impact strength;
- deletion of Clause 10 as its content is distributed elsewhere in the document;
- deletion of Annex A *General characteristics of ABS pipes and fittings*;
- addition of a new Annex A *Product standards*.

The EN 1455 / CEN/TS 1455 series, *Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure - Acrylonitrile-butadiene-styrene (ABS)*, consists of the following parts:

- EN 1455-1, *Part 1: Specifications for pipes, fittings and the system* (the present document);
- CEN/TS 1455-2, *Part 2: Assessment of conformity*.

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

EN 1455-1:2022 (E)**1 Scope**

This document specifies the requirements for solid wall pipes with smooth internal and external surfaces, extruded from the same formulation throughout the wall, fittings and the system of acrylonitrile-butadiene-styrene (ABS) and acrylonitrile-styrene-acrylester (ASA) piping systems intended for soil and waste discharge applications (low and high temperature):

- inside buildings (application area code “B”);
- for both inside buildings and buried in ground within the building structure (application area code “BD”).

NOTE 1 The intended use is reflected in the marking of products by “B” or “BD”.

NOTE 2 Application “B” covers uses above ground inside buildings, or outside buildings fixed onto the wall.

NOTE 3 Pipes and fittings of the pipe series S 25 are intended to be used for application area “B” only.

NOTE 4 For use buried in ground within the building structure are intended only those components (marked with “BD”) with nominal outside diameters equal to or greater than 75 mm.

NOTE 5 EN 476 [5] specifies the general requirements for components used in discharge pipes, drains and sewers for gravity systems. Pipes and fittings conforming to this document fully meet these requirements.

This document is also applicable to ABS and ASA pipes, fittings and the system intended for the following purposes:

- ventilating part of the pipework in association with discharge applications;
- rainwater pipework within the building structure.

It also specifies the test parameters for the test methods that are referred to.

This document covers a range of nominal sizes, a range of pipes and fittings series and gives recommendations concerning colours.

NOTE 6 It is the responsibility of the purchaser or specifier to make the appropriate selections from these aspects, taking into account their particular requirements and any relevant national regulations and installation practices or codes.

NOTE 7 Pipes, fittings and other components conforming to any of the plastics product standards listed in Annex A can be used with pipes and fittings conforming to this document, provided they conform to the requirements for joint dimensions given in Clause 7 and to the requirements of Table 21.

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.

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

EN 681-2, *Elastomeric seals - Material requirements for pipe joint seals used in water and drainage applications - Part 2: Thermoplastic elastomers*

EN 13501-1, *Fire classification of construction products and building elements - Part 1: Classification using 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 14680, *Adhesives for non-pressure thermoplastics piping systems - Specifications*

EN 14814, *Adhesives for thermoplastic piping systems for fluids under pressure - Specifications*

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 472, *Plastics - Vocabulary (ISO 472)*

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

EN ISO 1043-1, *Plastics - Symbols and abbreviated terms - Part 1: Basic polymers and their special characteristics (ISO 1043-1)*

EN ISO 1167-1:2006, *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 1167-2:2006, *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 2505:2005, *Thermoplastics pipes - Longitudinal reversion - Test method and parameters (ISO 2505:2005)*

EN ISO 2507-1, *Thermoplastics pipes and fittings - Vicat softening temperature - Part 1: General test method (ISO 2507-1)*

EN ISO 2507-3, *Thermoplastics pipes and fittings - Vicat softening temperature - Part 3: Test conditions for acrylonitrile/butadiene/styrene (ABS) and acrylonitrile/styrene/acrylic ester (ASA) pipes and fittings (ISO 2507-3)*

EN ISO 3126, *Plastics piping systems - Plastics components - Determination of dimensions (ISO 3126)*

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

EN ISO 9969, *Thermoplastics pipes - Determination of ring stiffness (ISO 9969)*

EN ISO 11173, *Thermoplastics pipes - Determination of resistance to external blows - Staircase method (ISO 11173)*

EN ISO 11925-2, *Reaction to fire tests - Ignitability of products subjected to direct impingement of flame - Part 2: Single-flame source test (ISO 11925-2)*

EN ISO 13254, *Thermoplastics piping systems for non-pressure applications - Test method for watertightness (ISO 13254)*

EN ISO 13255, *Thermoplastics piping systems for soil and waste discharge inside buildings - Test method for airtightness of joints (ISO 13255)*

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EN ISO 13257, *Thermoplastics piping systems for non-pressure applications - Test method for resistance to elevated temperature cycling (ISO 13257)*

EN ISO 13259, *Thermoplastics piping systems for underground non-pressure applications - Test method for leaktightness of elastomeric sealing ring type joints (ISO 13259)*

EN ISO 13263, *Thermoplastics piping systems for non-pressure underground drainage and sewerage - Thermoplastics fittings - Test method for impact strength (ISO 13263)*

EN ISO 13264, *Thermoplastics piping systems for non-pressure underground drainage and sewerage - Thermoplastics fittings - Test method for mechanical strength or flexibility of fabricated fittings (ISO 13264)*

ISO 7245, *Pipes and fittings of acrylonitrile/butadiene/styrene (ABS) — General specification for moulding and extrusion materials*

ISO 7246, *Pipes and fittings of acrylonitrile/styrene/acrylester (ASA) — General specification for moulding and extrusion materials*

ISO 8361-1, *Thermoplastics pipes and fittings — Water absorption — Part 1: General test method*

ISO 8361-3, *Thermoplastics pipes and fittings — Water absorption — Part 3: Test conditions for acrylonitrile/butadiene/styrene (ABS) pipes and fittings*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 472 and EN ISO 1043-1 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

application area code

code used in the marking of pipes and fittings to indicate the application area(s) for which they are intended, as follows:

- B: application area code for components intended for use above ground inside the building, or for components outside buildings fixed onto the wall;
- D: application code for the area under and within 1 m from the building where the pipes and fittings are buried in ground and are connected to the underground drainage and sewerage system

Note 1 to entry: In D application areas the existence of external forces from the surroundings in addition to the hot water discharge is usual.

Note 2 to entry: Components intended for use for both code B and code D application areas are marked BD.

Note 3 to entry: Other application area codes U and UD not covered by this document are defined elsewhere, e.g. in EN 1401-1 [2].

3.2**nominal size****DN**

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

Note 1 to entry: It is expressed in millimetres, mm.

3.3**nominal size, outside diameter related****DN/OD**

nominal size, related to the outside diameter

3.4**nominal outside diameter** d_n

specified outside diameter, assigned to a nominal size DN/OD

Note 1 to entry: It is expressed in millimetres, mm.

3.5**outside diameter** d_e

value of the measurement of the outside diameter through its cross section at any point of a pipe or spigot of a fitting, rounded to the next greater 0,1 mm

3.6**mean outside diameter** d_{em}

value of the measurement of the outer circumference of a pipe or spigot of a fitting in any cross section, divided by π ($\approx 3,142$), rounded to the next greater 0,1 mm

3.7**inside diameter** d_s

value of the measurement of the inside diameter through its cross section at any point of a socket, rounded to the next greater 0,1 mm

3.8**mean inside diameter of socket** d_{sm}

arithmetical mean of a number of measurements of the inside diameter of a socket in the same cross section

3.9**out-of-roundness**

ovality

difference between the measured maximum and the measured minimum outside diameter in the same cross section of a component

3.10**wall thickness** e

value of the measurement of the wall thickness at any point around the circumference of a component

EN 1455-1:2022 (E)**3.11****mean wall thickness** e_m

arithmetical mean of a number of measurements of the wall thickness, regularly spaced around the circumference and in the same cross section of a component, including the measured minimum and the measured maximum values of the wall thickness in that cross section

3.12**pipe series****S**

dimensionless number for pipe designation

Note 1 to entry: See ISO 4065 [9].

3.13**standard dimension ratio****SDR**

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

[SOURCE: ISO 4065:2018, 3.5, modified — No symbol is introduced in the definition and Note 1 to entry is not included here]

3.14**ring stiffness class****SN**

numerical designation of the ring stiffness of a pipe or fitting which is a convenient round number, indicating the minimum required ring stiffness of the pipe or stiffness of the fitting

3.15**assembled fitting**

fitting which is made from several injection moulded parts to be assembled together by screwing or clipping

Note 1 to entry: Such fittings can incorporate rubber membranes or joints.

3.16**fabricated fitting**

fitting produced from pipe and/or from injection-moulded fittings by thermoforming, adhesive joint or welding

Note 1 to entry: Fabricated fittings need an additional fabrication step.

3.17**solid wall pipe**

pipe with smooth internal and external surface with the same formulation throughout the wall

Note 1 to entry: Pipes having more than one layer are considered as solid wall pipes, provided they are all made from the same formulation.

3.18**virgin material**

plastics material in the form of pellets, granules, powder, floc, etc. that has not been subjected to use or processing other than that required for its initial manufacture

Note 1 to entry: Does not contain any reworked plastic material and/or plastics recycle.

Note 2 to entry: Sometimes also referred to as “primary material” or “primary plastics feedstock”.

Note 3 to entry: It is understood that the addition of additives such as stabilizers and pigments is still resulting into a virgin (plastics) material.

Note 4 to entry: Material which contains any reworked or recycle material is considered as non-virgin.

[SOURCE: EN 14541-1:2022, 3.1, modified — Note 4 to entry is added]

3.19**reworked material**

plastics material from rejected unused products or trimmings capable of being reclaimed within the same process that generated it

Note 1 to entry: Reworked material does not change the status of the feedstock.

Note 2 to entry: This definition does not cover the conditions for the use of reworked material, which can be found in the applicable product standard.

Note 3 to entry: Previously referred to as “own reprocessed material”.

[SOURCE: EN 14541-1:2022, 3.2]

4 Symbols and abbreviations

For the purposes of this document, the following symbols and abbreviations apply.

4.1 Symbols

A	length of engagement
α	nominal angle of fitting
B	length of lead-in
C	depth of sealing zone
e_{\min}	minimum wall thickness
e_2	wall thickness of socket
e_3	wall thickness at the groove
L_1	length of spigot
L_2	length of adhesive joint socket
l	effective length of pipe
N	effective insertion depth
R	radius of swept fittings
X	stop width
Z	design length of fitting

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4.2 Abbreviations

ABS	acrylonitrile-butadiene-styrene
ASA	acrylonitrile-styrene-acrylester
TIR	true impact rate
Type S	short socket type for ring seal joints
Type N	normal socket type for ring seal joints
Type L	long socket type for ring seal joints
Type CS	short socket type for adhesive joints

5 Material

5.1 General

The compound shall be a mixture of ABS copolymer or terpolymer conforming to ISO 7245 to which are added ASA conforming to ISO 7246 and additives and, if applicable, reworked material that shall allow the final product to comply with the requirements of this document.

Reworked material may be used in the conditions given in 5.4.

NOTE In order to conform to national requirements on fire regulations other additives can be used.

5.2 Additional material requirements for BD application

The material of pipes and fittings intended to be used in application area BD shall comply with the additional requirement given in Table 1, when tested in accordance with the test method as specified in Table 1, using the indicated parameters.

The compound shall be tested in the form of a pipe.

Table 1 — Material characteristics for BD application

Characteristic	Requirement	Test parameters		Test method
Resistance to internal pressure	No failure during the test period	End caps	type A or B	EN ISO 1167-1:2006 ^a and EN ISO 1167-2:2006
		Test temperature	(70 ± 1) °C	
		Orientation	free	
		Number of test pieces	3	
		Circumferential (hoop) stress	4,0 MPa	
		Conditioning period	1 h	
		Type of test	Water-in-water	
		Test period	1 000 h	
^a Pressure shall be calculated according to EN ISO 1167-1:2006, 7.2 (measured dimensions of the test piece).				

5.3 Fabricated fittings

Fabricated fittings shall be made from parts of pipes and/or injection moulded fittings conforming to this document.

5.4 Utilization of non-virgin material

The use of reworked material conforming to this document is permitted.

5.5 Sealing ring retaining means

Sealing rings may be retained using means made from plastics other than ABS, provided the joints conform to the requirements given in Clause 10.

6 General characteristics

6.1 Appearance

When viewed without magnification the following requirements apply:

- internal and external surfaces of pipes and fittings shall be smooth, clean and free from grooving, blistering, impurities, pores or other surface irregularity likely to prevent their conformity to this document;
- pipe ends shall be cleanly cut and the ends of pipes and fittings shall be square to their axis.

6.2 Colour

The pipes and the fittings shall have the same colour through the wall.

The colours of pipes and fittings should be preferably grey, black or white. Other colours may be used.

6.3 External above ground application

Additional requirements depending on the climate should be considered and may be agreed between the manufacturer and the user.

6.4 Reaction to fire

Where required, the reaction to fire performance of products complying with this document shall be classified according to EN 13501-1 using, as applicable, EN ISO 11925-2 and EN 13823 with mounting and fixing according to EN 16000.

7 Geometrical characteristics

7.1 General

Dimensions shall be measured in accordance with EN ISO 3126.

NOTE All figures in this document are schematic sketches only, to indicate the relevant dimensions. They do not necessarily represent the manufactured components.

7.2 Dimensions of pipes

7.2.1 Outside diameters

The mean outside diameter, d_{em} , shall conform to Table 2 or Table 3, as applicable.