SLOVENSKI STANDARD
SIST EN 877:2001

01-januar-2001

Cevi, fitingi in pribor iz litega železa za hišne vodne odtoke – Zahteve, postopki preskušanja in zagotavljanje kakovosti

Cast iron pipes and fittings, their joints and accessories for the evacuation of water from buildings - Requirements, test methods and quality assurance

Rohre und Fromstücke aus Gußeisen, deren Verbindungen und Zubehör zur Entwässerung von Gebäuden - Anforderungen, Prüfverfahren und Qualitätssicherung

Tuyaux et raccords en fonte, leurs assemblages et accessoires destinés a l'évacuation des eaux des bâtiments - Prescriptions, méthodes d'essais et assurance qualité

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23.040.10	Železne in jeklene cevi	Iron and steel pipes
23.040.40	Kovinski fitingi	Metal fittings
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EUROPEAN STANDARD
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This European Standard was approved by CEN on 19 June 1998.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists 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 Central Secretariat has the same status as the official versions.

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

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 203 "Cast iron pipes, fittings and their joints", the secretariat of which is held by AFNOR.

It is one of a series of standards for cast iron products for pipelines for various applications.

It deals with subjects covered by the International Standard ISO 6594. The major difference is the inclusion of requirements for joints and for product performance.

This standard is in conformity with the general requirements already established by CEN/TC 165 in the field of waste water engineering, as required by EN 476.

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 March 2000, and conflicting national standards shall be withdrawn at the latest by March 2000.

This European Standard 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).

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard applies to cast iron pipeline components used for the construction of discharge systems for buildings and of drains, normally as gravity systems.

The range of nominal sizes extends from DN 40 to DN 600 inclusive.

This standard specifies the requirements for the materials, dimensions and tolerances, mechanical properties, appearance, standard coatings for cast iron pipes, fittings and accessories. It also indicates performance requirements for all components, including joints. Quality assurance is covered in an informative annex.

It covers pipes, fittings and accessories cast by any foundry process or manufactured by fabrication of cast components, as well as the corresponding joints.

2 Normative references

This European Standard incorporates by dated or undated reference provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the last edition of the publication referred to applies.

EN 476	1997	General requirements for components used in discharge pipes, drains and servers for gravity systems
EN 598	1994	Ductile cast iron pipes, fittings, accessories and their joints for sewerage application - Requirements and test methods
EN 605	1992	Paints and varnishes - Standard panels for testing (ISO 1514:1984 modified)
EN 10002-1	1990	Metallic materials - Tensile testing - Part 1: Method of test (at ambient temperature)
EN 10003-1	1994	Metallic materials - Brinell hardness test - Part 1: Test method
EN 10088-1	1995	Stainless steels - Part 1: List of stainless steels
EN 10088-2	1995	Stainless steels - Part 2: Technical delivery conditions for sheet/plate and strip for general purposes
EN 10088-3	1995	Stainless steels - Part 3: Technical delivery conditions for semi-finished products, bars, rods and sections for general purposes
EN 10204	1991	Metallic products - Types of inspection documents

EN 45011	1989	General criteria for certification bodies operating product certification
prEN 1366-3	-	Fire tests for building elements and components - Fire resistance testing of service installations - Part 3: Penetration seals
EN ISO 6708	1995	Pipework components - Definition and selection of DN (nominal size) (ISO 6708:1995)
EN ISO 9001	1994	Quality systems - Model for quality assurance in design, development, production, installation and servicing (ISO 9001:1991)
EN ISO 9002	1994	Quality systems - Model for quality assurance in production, installation and servicing (ISO 9002:1994)
ISO 185	1988	Grey cast iron - Classification
EN 20898-1	1991	Mechanical properties of fasteners - Part 1: Bolts, screws and studs (ISO 898-1:1988)
EN 20898-2	1993	Mechanical properties of fasteners - Part 2: Nuts with specified proof load values - coarse thread (ISO 898-2:1992)
ISO 1817	1985	Rubber, vulcanised - Determination of the effect of liquids
EN ISO 2409	1994	Paints and varnishes - Cross-cut test (ISO 2409:1992)
ISO 2808	1991	Paints and varnishes - Determination of film thickness
EN ISO 2812-1	1994	Paints and varnishes - Determination of resistance to liquids - Part 1: General methods (ISO 2812-1:1993)
ISO 4628-2	1982	Paints and varnishes - Evaluation of degradation of paint coatings - Designation of intensity, quantity and size of common types of defect - Part 2: Designation of degree of blistering
ISO 4628-3	1982	Paints and varnishes - Evaluation of degradation of paint coatings - Designation of intensity, quantity and size of common types of defect - Part 3: Designation of degree of rusting
ISO 4633	1996	Rubber seals - Joint rings for water supply, drainage and sewerage pipelines - specification for materials

ISO 7253	1984	Paints and varnishes - Determination of resistance to neutral salt spray
ISO 7724-1	1988	Paints and varnishes - Colorimetry - Part 1: Principles
ISO 7724-2	1988	Paints and varnishes - Colorimetry - Part 2: Colour measurement
ISO 7724-3	1988	Paints and varnishes - Colorimetry - Part 3: Calculation of colour differences

3 Definitions

For the purposes of this European Standard, the following definitions apply:

3.1 discharge system for buildings

System of pipes, fittings, accessories and joints used to collect and drain waste water and rainwater from a building; it comprises discharge pipes, stack ventilation and rainwater pipes, installed within the limits of a building or attached to the building.

3.2 drain

System of pipes, fittings, accessories and joints installed outside the limits of a building in order to connect the discharge system of this building to a sewer or a septic tank.

3.3 sewer

System of pipes designed to collect waste water and rainwater from buildings and surface water and to convey them to the point of disposal or treatment.

3.4 cast iron

Alloy of iron and carbon in which graphite can be present in different forms.

3.5 pipe

Casting of uniform bore, straight in axis, normally having plain ends but which can also be socketed.

3.6 fitting

Cast iron component, other than a pipe, which allows a deviation, a change of direction or diameter, including flanged and access components.

3.7 accessory

Any casting other than a pipe or fitting used in a pipeline, e.g. inspection/junction chambers.

3.8 joint

Connection between the ends of pipes and/or fittings, including the coupling or clamping component, with sealing effected by elastomeric gasket(s).

3.9 nominal size (DN)

An alphanumeric designation of size for components of a pipework system, which is used for reference purposes. It comprises the letters DN followed by a dimensionless whole number which is indirectly related to the physical size, in millimetres, of the bore or outside diameter of the end connections [EN ISO 6708].

NOTE : in this standard, it is the bore.

3.10 length

Effective length of a pipe or fitting

NOTE: For flanged pipes and fittings, the effective length is equal to the overall length. For spigot and socket pipes and fittings, the effective length is equal to the overall length minus the spigot insertion depth as given in the manufacturer's catalogues.

3.11 type test

Proof of design test which is carried out once to demonstrate compliance with the requirements of this standard and which is repeated only after significant change in manufacture, design or material.

3.12 manufacturer

Legal entity, manufacturing and selling systems as defined in 3.1 and 3.2, presenting them as his own work, i.e. showing on all products his manufacturing mark and/or name.

4 Technical requirements

4.1 General

4.1.1 Introduction

The general requirements for pipes, fittings, joints and accessories are defined in 4.1 to 4.7 and in 4.10. Additional requirements are given in 4.8 for buried systems and in 4.9 for rainwater systems to be installed outside buildings.

NOTE : Information on manufacturing criteria and quality assurance is given in annex D.

4.1.2 Surface condition

Pipes, fittings and accessories shall be free from defects (superficial and other defects) which could be detrimental to their correct operation or long service life as defined in this standard.

4.1.3 Safety in case of fire

In the absence of European harmonisation the performance of products complying with this standard shall be assessed in relation to the existing national regulations at the place of installation with particular regard to performance criteria and possible classification (see also annex F).

In his installation guide the manufacturer shall provide information about possible protective measures.

4.1.4 Noise protection

In the absence of European harmonisation the level of noise protection performance of products complying with this standard shall be assessed in relation to the existing national regulations at the place of installation with particular regard to admissible noise levels (see also annex F).

In his installation guide the manufacturer shall provide information about possible protective measures.

4.2 Dimensions

4.2.1 Nominal size (DN)

The nominal sizes shall be as given in column 1 of table 1.

4.2.2 External diameter (DE)

The standard external diameters (DE) of pipes and fittings, as well as the tolerances applicable to these, shall comply with the values given in table 1, when measured in accordance with 5.2.1. When, by agreement between manufacturer and purchaser, specific coatings are supplied for special applications, other tolerances are permitted. Due regard shall be given to 4.7, in this case.

Table 1: Dimensions of pipes and fittings

Dimensions in millimetres

DN	External diameter DE		Wall thickness	
	Nominal value	Tolerance	Nominal value	Minimum value
40	48	+2 -1	3,0	2,5
50	58	+2 -1	3,5	3,0
70	78	+2 -1	3,5	3,0
75	83	+2 -1	3,5	3,0
100	110	+2 -1	3,5	3,0
125	135	+2 -2	4,0	3,5
150	160	+2 -2	4,0	3,5
200	210	+2,5 -2,5	5,0	4,0
250	274	+2,5 -2,5	5,5	4,5
300	326	+2,5 -2,5	6,0	5,0
400	429	+2 -3	6,3	5,0
500	532	+2 -3,5	7,0	5,2
600	635	+2 -4	7,7	5,8

NOTE 1: In countries where the nominal sizes DN 60 and DN 80 are still mentioned in application standards these nominal sizes can still be used.
NOTE 2: DN 75 is permitted according to local custom and conditions until harmonisation.
NOTE 3: Other dimensions are given in 4.8 for buried systems and in 4.9 for rainwater systems installed outside buildings.

4.2.3 Wall thickness

Wall thicknesses of pipes and fittings shall comply with the values given in table 1, when measured in accordance with 5.2.2.

4.2.4 Internal diameter

In order to ensure the hydraulic function, the internal diameter of pipes when measured in accordance with 5.2.3, shall be not less than:

- 0,975 DN for nominal sizes equal to or greater than DN 70;
- 0,950 DN for nominal sizes less than DN 70.

4.2.5 Ovality

When measured in accordance with 5.2.4 the ovality of the pipes and of the sealing zones of fittings (see 4.2.9) shall remain within the tolerances on DE shown in table 1 for DN 40 to DN 300 and shall not exceed 1 % for DN 400 to DN 600 (see 3.32 of EN 598:1994).

4.2.6 Straightness of pipes

When measured in accordance with 5.2.5 the pipes shall be straight with a maximum deviation of:

- 0,15 % of their length for nominal sizes greater than DN 70;
- 0,20 % of their length for nominal sizes equal to or less than DN 70.

4.2.7 End faces

The end faces of the products shall be free from faults which may impair their fitness for use and their planes shall be perpendicular with the axes of symmetry of the products. When measured in accordance with 5.2.6, the maximum deviation from the right angle shall be:

- 3° for nominal sizes DN 40 to DN 200;
- 2° for nominal sizes DN 250 to DN 600.

4.2.8 Length of pipes

Pipes shall be normally produced with a length of 3 m.

NOTE: Other lengths are permitted and can be supplied with special identification by agreement between the manufacturer and the purchaser.

When measured in accordance with 5.2.7 the length of all pipes shall be within a tolerance of ± 20 mm.

4.2.9 Lengths of fittings and sealing zones

Lengths of fittings shall be given in the manufacturers' catalogues. When measured in accordance with 5.2.7 the lengths of fittings shall be within a tolerance of ± 5 mm.

The ends of the fittings shall have sealing zones straight in axis and free from marking and free from defects which could impair the fitness for use.

The length *T* (see figure 1) of this sealing zone shall comply with the values given in table 2.

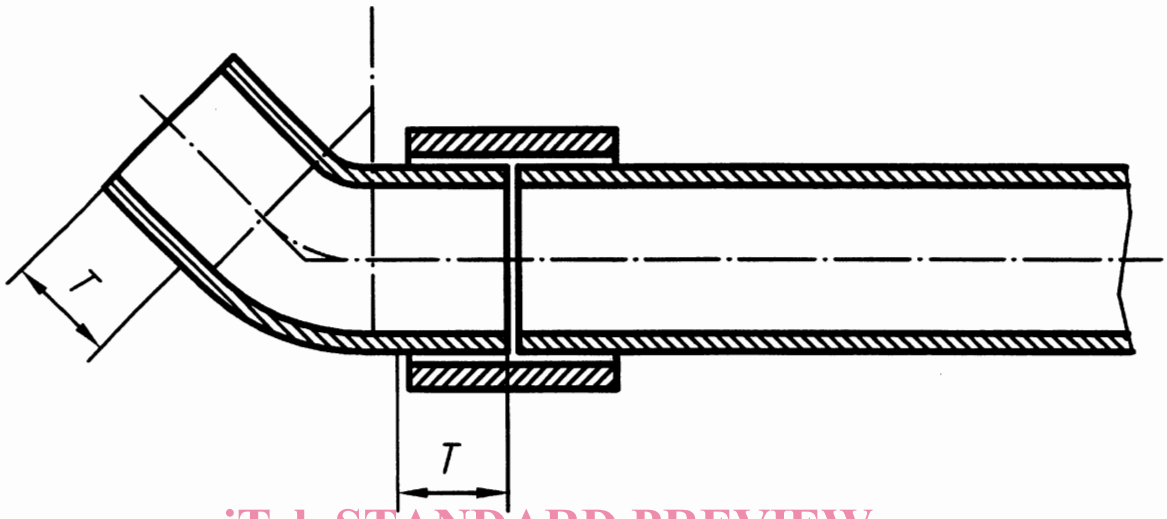

Figure 1

4.2.10 Geometry of fittings and accessories

The geometry of fittings and accessories is not standardized at this stage. Fittings and accessories of geometry presently used in various countries are in conformity with this standard as long as they comply with all other technical requirements of this standard.

Table 2: Sealing zone of fittings

DN	Length T of sealing zone mm	Lower deviation on T*) mm
40	30	- 5
50	30	
70	35	
75	35	
100	40	
125	45	
150	50	
200	60	- 4
250	70	
300	80	
400	80	
500	80	
600	80	

*) Upper deviations are not given and sealing zones with a length greater than T are permitted.

4.2.11 Angles of fittings

Fittings shall be designed to the angles specified below with a design tolerance of ± 2°:

- bends: 15°; 22°; 30°; 45°, 68°; 88°;
- single/double branches: 45°; 68°; 88°.

4.2.12 Access components and traps

The minimum dimension of the openings of access components up to DN 150 inclusive, shall be at least equal to the whole number of the nominal size in millimetres. For access components over DN 150, the minimum dimension of the opening shall be at least 150 mm.

The height of water seal of traps shall be at least 50 mm.

4.3 Interconnection

Products of the same DN in accordance with this standard (see table 1) can be connected with each other.

4.4 Mass

The nominal masses of finished products (pipes, fittings and accessories) shall be given in the manufacturers' catalogues. When the mass is measured in accordance with 5.3, the lower deviation shall not exceed 15 % of the nominal mass.

4.5 Material characteristics of pipes, fittings and accessories

4.5.1 Cast iron

Pipes, fittings and accessories shall be manufactured from:

- grey cast iron in accordance with ISO 185; or
- spheroidal graphite cast iron in accordance with EN 598; or
- any other type of cast iron in accordance with 4.5.2.

4.5.2 Mechanical properties

Pipes, fittings and accessories shall have the mechanical properties given in table 3.

Table 3: Mechanical properties of pipes, fittings and accessories

Type of casting and material [1)2)]	Minimum tensile strength MPa	Minimum ring crush strength MPa	Maximum Brinell hardness HB
Pipes			
- grey cast iron	200	350 [3)]	260
- spheroidal graphite cast iron	420	--	230
Fittings and accessories			
- grey cast iron	150	--	260
- spheroidal graphite cast iron	420	--	250

1) Other types of cast iron shall satisfy the criteria laid down for grey cast iron.
2) Tensile and ring crush strength for other products see annex A.
3) 332 MPa for nominal sizes equal to or greater than DN 250.

The modulus of elasticity E shall be given by the manufacturer. It is normally at least 110 GPa for grey cast iron and at least 170 GPa for spheroidal graphite cast iron.