



SLOVENSKI STANDARD

SIST EN 545:1998

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Cevi, fitingi in dodatki iz duktilne litine za vodovod - Zahteve in postopki preskušanja

Ductile iron, pipes, fittings, accessories and their joints for water pipelines - Requirements and test methods

Rohre, Formstücke, Zubehörteile aus duktilem Gußeisen und ihre Verbindungen für Wasserleitungen - Anforderungen und Prüfverfahren

Tuyaux, raccords et accessoires en fonte ductile et leurs assemblages pour canalisations d'eau - Prescriptions et méthodes d'essai

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EUROPEAN STANDARD

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Descriptors: Piping, water pipelines, cast iron products, spheroidal-graphite cast-iron, pipes : tubes, pipe fittings, accessories, definitions, dimensions, coatings, mechanical properties, test, marking, tables (data)

English version

Ductile iron, pipes, fittings, accessories and their joints for water pipelines - Requirements and test methods

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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.

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CEN

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 was prepared by AHG1 "Water pipelines under pressure" of CEN TC 203 "Iron pipes, fittings, accessories and their joints", the Secretariat of which is held by the French Standardization Association (AFNOR).

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

This European Standard deals with the subjects covered by the International Standards ISO 2531, ISO 4179 and ISO 8179. The major differences are the presentation in one single standard and the addition of product performance specifications.

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of an identical text or by endorsement, at the latest by May 1995, and conflicting national standards shall be withdrawn at the latest by May 1995.

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

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Introduction

This standard is in conformity with the general requirements already established by CEN TC 164 in the field of water supply.

The product which is in permanent or in temporary contact with water intended for human consumption, does not adversely affect the quality of the drinking water and does not contravene the EC Directives and EFTA regulations on the quality of drinking water.

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1 Scope

This European Standard specifies the requirements and associated test methods applicable to ductile iron pipes, fittings, accessories and their joints for the construction of pipelines :

- to convey water (e.g. potable water);
- with or without pressure;
- to be installed below or above ground.

NOTE: In this standard, all pressures are relative pressures, expressed in bars (100 kPa = 1 bar).

This standard specifies requirements for materials, dimensions and tolerances, mechanical properties and standard coatings of ductile iron pipes and fittings. It also gives performance requirements for all components including joints.

This standard covers pipes, fittings and accessories cast by any type of foundry process or manufactured by fabrication of cast components, as well as corresponding joints, in a size range extending from DN 40 to DN 2 000, inclusive.

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This standard applies to pipes, fittings and accessories which are :

- manufactured with socketed, flanged or spigot ends for jointing by means of various types of gaskets which are not within the scope of this standard;
- normally delivered externally and internally coated;
- suitable for fluid temperatures between 0 °C and 50 °C, excluding frost.

2 Normative references

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

EN 196-1: 1989 Methods of testing cement - Determination of strength

ENV 197-1: 1992	Cement - composition, specifications and conformity criteria Part 1: Common cements
prEN 805: 1992	Water supply requirements for external systems and components
prEN 1092-2: 1993	Cast iron flanges
EN 10002-1: 1990	Metallic materials - Tensile testing - Part 1: Method of test at ambient temperature
EN 29002: 1987	Quality systems - Model for quality assurance in production and installation
EN 45012: 1989	General criteria for certification bodies operating quality system certification
ISO 2531: 1991	Ductile iron pipes, fittings and accessories for pressure pipelines
ISO 4633: 1983	Rubber seals - Joint rings for water supply, drainage and sewerage pipelines - Specification for materials
ISO 6506: 1981	Metallic materials - Hardness tests - Brinell test
ISO 6708: 1980	Pipe components - Definition of nominal size
ISO 7268: 1983	Pipe components - Definition of nominal pressure
ISO 7268/A1: 1984	Pipe components - Definition of nominal pressure
ISO 7483: 1991	Dimensions of gaskets for use with flanges to ISO 7005

3 Definitions

For the purposes of this standard, the following definitions apply.

3.1 ductile iron: Cast iron used for pipes, fittings and accessories in which graphite is present substantially in spheroidal form.

3.2 pipe: Casting of uniform bore, straight in axis, having either socket, spigot or flanged ends, except for flanged-socket pieces, flanged-spigot pieces and collars which are classified as fittings.

3.3 fitting: Casting other than a pipe which allows pipeline deviation, change of direction or bore. In addition flanged-socket pieces, flanged-spigot pieces and collars are also classified as fittings.

3.4 accessory: Any casting other than a pipe or fitting which is used in a pipeline:

- glands and bolts for mechanical flexible joints (see 3.13);
- glands, bolts and locking rings for restrained flexible joints (see 3.14);
- pipe saddles for service cocks connection;
- adjustable flanges and flanges to be welded or screwed-on.

NOTE: Valves of all types are not covered by the term accessory.

3.5 flange: Flat circular end of a pipe or fitting extending perpendicular to its axis, with bolt holes equally spaced on a circle.

NOTE: A flange may be fixed (e.g. integrally cast or welded-on) or adjustable; an adjustable flange comprises a ring, in one or several parts assembled together, which bears on an end joint hub and can be freely rotated around the pipe axis before jointing.

3.6 collar; coupling: Connecting piece used to join together the spigots of mating pipes or fittings.

3.7 spigot: Male end of a pipe or fitting.

3.8 socket: Female end of a pipe or fitting to make the connection with the spigot of the next component.

3.9 gasket: Sealing component of a joint.

3.10 joint: Connection between the ends of two pipes and/or fittings in which a gasket is used to effect a seal.

3.11 flexible joint: Joint which permits significant angular deflection both during and after installation and which can accept a slight offset of the centreline.

3.12 push-in flexible joint: Flexible joint assembled by pushing the spigot through the gasket in the socket of the mating component.

3.13 mechanical flexible joint: Flexible joint in which sealing is obtained by applying pressure to the gasket by mechanical means, e.g. a gland.

3.14 restrained flexible joint: Flexible joint in which a means is provided to prevent separation of the assembled joint.

3.15 flanged joint: Joint between two flanged ends.

3.16 nominal size (DN): Numerical designation of size which is common to all components in a piping system. It is a convenient round number for reference purposes and is only loosely related to manufacturing dimensions (see ISO 6708).

3.17 nominal pressure (PN): A numerical designation which is a convenient rounded number for reference purposes. All equipment of the same nominal size (DN) designated by the same PN number shall have compatible mating dimensions (see ISO 7268 and 7268/A.1).

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3.18 leaktightness test pressure: Pressure applied to a component during manufacture in order to ensure its leaktightness.

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3.19 allowable operating pressure (PFA): Internal pressure, exclusive of surge, that a component can safely withstand in permanent service (see prEN 805).

3.20 allowable maximum operating pressure (PMA): Maximum internal pressure, including surge, that a component can safely withstand in service. (see prEN 805).

3.21 allowable test pressure (PEA): Maximum hydrostatic pressure that a newly installed component can withstand for a relatively short duration, when either fixed above ground level or laid and backfilled underground in order to measure the integrity and tightness of the pipeline. (see prEN805).

NOTE: This test pressure is different from the system test pressure (STP), which is related to the design pressure of the pipeline and is intended to ensure its integrity and leaktightness; see also A.1.

3.22 diametral stiffness of a pipe: Characteristic of a pipe which allows it to resist ovalization under loading when installed.

3.23 batch: Quantity of castings from which a sample is taken for testing purposes during manufacture.

3.24 type test: Proof of design test which is done once and is repeated only after change of design.

3.25 length :Effective length of a pipe or fitting, as shown on the figures of clause 9.

NOTE : For flanged pipes and fittings, the effective length L (l for branches) is equal to the overall length. For socketed pipes and fittings, the effective length L_u (l_u for branches), is equal to the overall length minus the spigot insertion depth as given in the manufacturer's catalogues.

3.26 deviation: Design length allowance with respect to the standardized length of a pipe or a fitting.

NOTE: Pipes and fittings are designed to a length taken in the range of standard length plus or minus the deviation (see table 5); they are manufactured to this length plus or minus the tolerance given in table 6.

3.27 ovality: Out of roundness of a pipe section; it is equal to:

$$\frac{(A_1 - A_2)}{(A_1 + A_2)} \times 100$$

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where:

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 A_1 is the maximum axis, in millimetres;

A_2 is the minimum axis, in millimetres.

4 Technical requirements

4.1 General

4.1.1 Ductile iron pipes and fittings

Nominal sizes, thickness classes, lengths and coatings are specified in 4.1.1, 4.2.1, 4.2.3, 4.4 and 4.5 respectively. When, by agreement between manufacturer and purchaser, pipes and fittings with different wall thickness classes, lengths and/or coatings and other types of fittings than those given in 9.3 and 9.4, are supplied with reference to this standard, they shall comply with all the other requirements of this standard.

NOTE 1: Other types of fittings include angle branches, tees and tapers with other combinations DN x dn, draining tees, ...

The standardized nominal sizes DN of pipes and fittings are as follows : 40, 50, 60, 65, 80, 100, 125, 150, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1 000, 1 100, 1 200, 1 400, 1 500, 1 600, 1 800, 2 000.

The functional properties of ductile iron pipes and fittings shall be as given in the annexes A to C dealing respectively with allowable pressures, longitudinal bending resistance and diametral stiffness.

NOTE 2: When installed and operated under the conditions for which they are designed (see annexes D to F), ductile iron pipes, fittings, accessories and their joints maintain all their functional characteristics over their operating life, due to the constant material properties, to the stability of their cross section and to their design with high safety factors.

4.1.2 *Surface condition and repairs*

Pipes, fittings and accessories shall be free from defects and surface imperfections which could lead to non-compliance with clauses 4 and 5.

When necessary, pipes and fittings may be repaired, for example by welding, in order to remove surface imperfections and localized defects which do not affect the entire wall thickness, provided that :

- the repairs are carried out according to a written procedure included in the manufacturer's quality assurance system;
- the repaired pipes and fittings comply with all the requirements of clauses 4 and 5.

4.1.3 *Types of joints and interconnection*

4.1.3.1 *General*

Joint design and gasket shapes are outside the scope of this standard.

Rubber gasket materials shall comply with the requirements of ISO 4633. When materials other than rubber are necessary (e.g. for flanged joints), they shall comply with the appropriate EN standard or, where no EN standard exists, the appropriate ISO standard.