BS EN 14525:2022

BSI Standards Publication

Ductile iron and steel wide tolerance couplings and flange adaptors for use with pipes of different materials: ductile iron, Grey iron, steel, PVC-U, PVC-O, PE, fibre-cement

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National foreword

This British Standard is the UK implementation of EN 14525:2022. It supersedes BS EN 14525:2004, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PSE/10, Iron pipes and fittings.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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English Version

Ductile iron and steel wide tolerance couplings and flange adaptors for use with pipes of different materials: ductile iron, Grey iron, steel, PVC-U, PVC-O, PE, fibre-cement

Manchons et adaptateurs de brides à larges tolérances en fonte ductile et acier destinés à être utilisés avec des tuyaux faits de différents matériaux : fonte ductile, fonte grise, acier, PVC-U, PVC-O, PE, fibre-ciment

Großbereichskupplungen und Flanschadapter aus duktilem Gusseisen und Stahl zur Verbindung von Rohren aus unterschiedlichen Werkstoffen: duktiles Gusseisen, Grauguss, Stahl, PVC-U, PVC-O, PE, Faserzement

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European foreword

This document (EN 14525:2022) has been prepared by Technical Committee CEN/TC 203 “Cast iron pipes, fittings and accessories”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by April 2023, and conflicting national standards shall be withdrawn at the latest by April 2023.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 14525:2004.

The significant changes made since the previous edition EN 14525:2004 are:

— allowance of steel as material (as EN 12842);

— introduction of type test for pipes made from ductile iron in delivery conditions;

— introduction of long-term testing for pipes made from PVC-U and PE (as per EN 12842);

— correction on pressure testing depending on pipe material (as per EN 12842);

— wording and paragraphs harmonized with EN 12842 and EN 545.

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

In respect of potential adverse effects on the quality of water intended for human consumption caused by the product covered by this document:

— this document provides no information as to whether the product may be used without restriction in any of the member states of the EU or EFTA;

— it should be noted that, while awaiting the adoption of verifiable European criteria, existing national regulations concerning the use and/or the characteristics of these products remain in force.

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.

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1 Scope

This document specifies the requirements and associated test methods applicable to wide tolerance ductile iron and steel (restricted sizes for steel) couplings, stepped/reducing couplings and flange adaptors intended for use with pipe components made from a number of pipe materials (ductile iron, grey iron, PE in conformity with EN 12201-1 to EN 12201-5, PVC-U in conformity with EN ISO 1452-1 to EN ISO 1452-5, PVC-O in conformity with EN 17176-1 to EN 17176-5, steel, fibre-cement), for providing a leak tight seal over a wide range of pipe outside diameters:

— to convey water (e.g. water intended for human consumption);

— with or without pressure;

— to be installed below or above ground, inside or outside buildings.

This document is not intended to cover sewerage or gas applications, where additional requirements may be necessary.

This document specifies requirements for materials, dimensions and tolerances, mechanical properties and standard coatings of products.

This document covers wide tolerance couplings, stepped/reducing couplings and flange adaptors:

— manufactured with socketed or flanged ends;

— supplied externally and internally coated;

— suitable for pipes made from ductile iron in conformity with EN 545, grey iron, PE in conformity with EN 12201-1 to EN 12201-5, PVC-U in conformity with EN ISO 1452-1 to EN ISO 1452-5, PVC-O in conformity with EN 17176-1 tot EN 17176-5, steel, fibre-cement in a size range extending from DN 40 to DN 800, for an allowable operating pressure (PFA) up to 16 bar, for fluid temperatures between 0 °C and 25 °C excluding frost. For higher temperatures, (up to 45 °C for PVC-U and PVC-O or 40 °C for PE) the PFA is derated as given in EN ISO 1452 and EN 12201;

— not intended for use in areas subjected to reaction to fire regulations.

NOTE 1 This does not preclude special arrangements for the products to be used at higher temperatures. Temperature limitations and pressure limitations are those coming from the PVC-U, PVC-O or PE pipes.

This document covers ductile iron couplings, stepped/reducing couplings and flange adaptors 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 800.

As long as no equivalent European Standard exists for steel accessories, this document also covers couplings and flange adaptors which are fabricated partly or entirely from steel as well as corresponding joints, in a size range extending from DN 600 to DN 800.

This document specifies requirements for materials, dimensions and tolerances, mechanical properties and standard coatings. It also gives minimum performance requirements for all components, including restrained and non-restrained flexible joints. Joint design and gasket shapes are outside the scope of this document.

NOTE 2 PFA can be limited depending on pipe materials effectively connected.

NOTE 3 In this document, if not specified, all pressures are relative gauge pressures, expressed in bars (100 kPa = 1 bar).

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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 545, *Ductile iron pipes, fittings, accessories and their joints for water pipelines — Requirements and test methods*

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

EN 805, *Water supply — Requirements for systems and components outside buildings*

EN 1092-2, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated — Part 2: Cast iron flanges*

EN 10025-1:2004, *Hot rolled products of structural steels — Part 1: General technical delivery conditions*

EN 10310, *Steel tubes and fittings for onshore and offshore pipelines — Internal and external polyamide powder based coatings*

EN 14901-1, *Ductile iron pipes, fittings and accessories — Requirements and test methods for organic coatings of ductile iron fittings and accessories — Part 1: Epoxy coating (heavy duty)*

EN 15189, *Ductile iron pipes, fittings and accessories — External polyurethane coating for pipes — Requirements and test methods*

EN 15655-1, *Ductile iron pipes, fittings and accessories — Requirements and test methods for organic linings of ductile iron pipes and fittings — Part 1: Polyurethane lining of pipes and fittings*

EN ISO 4016, *Hexagon head bolts — Product grade C (ISO 4016)*

EN ISO 4034, *Hexagon regular nuts (style 1) — Product grade C (ISO 4034)*

EN ISO 6506-1, *Metallic materials — Brinell hardness test — Part 1: Test method (ISO 6506-1)*

EN ISO 6892-1, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature (ISO 6892-1)*

EN ISO 7091, *Plain washers — Normal series — Product grade C (ISO 7091)*

EN ISO 11177, *Vitreous and porcelain enamels — Inside and outside enamelled valves and pressure pipe fittings for untreated and potable water supply — Quality requirements and testing (ISO 11177)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions 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/ui

— IEC Electropedia: available at https://www.electropedia.org/

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

3.2
fitting and accessory
casting or manufactured steel component other than a pipe which allows pipeline deviation, change of direction or bore

Note 1 to entry: Flanged-socket pieces, flanged spigot pieces are also classified as fittings (EN 545) as far as their dimension are defined in EN 545. As they have no dimensional requirement in EN 545 couplings, stepped/reducing couplings and flange adaptors are defined as accessories in EN 545.

3.3
flange
end of a pipe or fitting extending perpendicular to its axis, with bolt holes equally spaced on a circle

Note 1 to entry: 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 axis before jointing. See EN 545.

3.4
spigot
male end of a pipe or fitting

3.5
socket
female end of a pipe or fitting to make the connection with the spigot of the next component

3.6
gasket
sealing component of a joint

3.7
joint
connection between the ends of two pipes and/or fittings in which a gasket is used to effect a seal

3.8
flexible joint
joint which permits significant angular deflection both during and after installation and which can accept a slight offset of the centreline

3.9
push-in flexible joint
flexible joint assembled by pushing the spigot through the gasket in the socket of the mating component

3.10
mechanical flexible joint
flexible joint in which sealing is obtained by applying pressure to the gasket by mechanical means, e.g. a gland

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3.11
restrained flexible joint
flexible joint in which a means is provided to prevent axial separation of the assembled joint

3.12
flanged joint
joint between two flanged ends

3.13
joint angular deflection
angle between the axis of two connected pipeline components which a flexible joint can accommodate

3.14
joint gap/ withdrawal
axial distance between any point of the spigot ends of the pipes to be connected, when aligned (couplings, stepped/reducing couplings), or, axial distance between any point of the spigot end of the pipe and the flange face, when aligned (flange adaptor)

Note 1 to entry: See also 4.2.3. The word joint gap is used for accessories where withdrawal is used for socketed pipes as per EN 545.

3.15
depth of engagement
when jointed, the distance between the end of the spigot and the face of the socket on a coupling, stepped/reducing couplings and flange adaptors

Note 1 to entry: See also 4.2.3.

3.16
outside diameter
OD
nominal outside diameter of the pipe(s) to be connected and current designation of PVC-U and PE diameter designation

3.17
nominal size
DN
alphanumerical designation of size for components of a pipework system, which is used for reference purposes

Note 1 to entry: 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.

Note 2 to entry: See EN ISO 6708.

3.18
nominal pressure
PN
alphanumerical designation used for reference purposes related to a combination of mechanical and dimensional characteristics of a component of a pipework system

Note 1 to entry: It comprises the letters PN followed by a dimensionless number. (See EN 1333.)

Note 2 to entry: All equipment of the same nominal size DN designated by the same PN number have compatible mating dimensions.

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3.19
Water tightness test pressure
pressure applied to a component during manufacture in order to ensure its water tightness

3.20
allowable operating pressure
PFA
maximum hydrostatic pressure that a component is capable of withstanding continuously in service

Note 1 to entry: See EN 805.

Note 2 to entry: In EN ISO 1452 and EN 12201, the term nominal pressure (PN) at 20 °C is used in place of PFA.

3.21
allowable maximum operating pressure
PMA
maximum pressure occurring from time to time, including surge, that a component is capable of withstanding in service

Note 1 to entry: See EN 805.

3.22
allowable test pressure
PEA
maximum hydrostatic pressure that a newly installed component is capable of withstanding for a relatively short duration, in order to insure the integrity and tightness of the pipeline

Note 1 to entry: See EN 805.

3.23
performance test
proof of design test which is done once and is repeated after change of design or change of elastomeric or plastic components (source or grade)

3.24
wide tolerance flange adaptor
accessory intended for use with pipes of various materials which:

— is used in a pipeline to make the connection with a spigot of a pipe or a fitting and the flange of another component of the pipeline (e.g. pipe, fitting, valve, etc.); and

— allows for angular and axial displacements for unrestrained joints and angular displacements for restrained flexible joints

Note 1 to entry: Some flange adaptors are designed such that they can be slid over the pipes in order to facilitate easy assembly.

3.25
wide tolerance coupling
accessory intended for use with pipes of various materials which:

— is used in a pipeline to make the connection between two spigots of pipes, fittings or valves, etc. of the same nominal size; and

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— allows for angular and axial displacements for unrestrained joints and angular displacements for restrained flexible joints

3.26
wide tolerance stepped or reducer coupling
wide tolerance coupling intended for use with pipeline components of different nominal sizes

3.27
annulus gap
gap between the sealing surfaces of the gasket chamber and of the outside diameter of the pipe that is inserted into the socket of the coupling, stepped / reducing coupling or flange adaptor

4 Technical requirements

4.1 General

4.1.1 Diameter range

The diameter range of wide tolerance couplings and flange adaptors is defined by the maximum and minimum outside diameters of the pipes to be connected. Within this diameter range the performance shall be guaranteed at the Manufacturers declared PFA.

The preferred PFA's are 6 bars, 10 bars and 16 bars.

The minimum diameter range of wide tolerance couplings and flange adaptors is given in Table 1.

NOTE The diameter range of wide tolerance couplings, stepped/reducing couplings and flange adaptors is applicable to the accessory and is not to be confused with the diameter tolerances of the pipes.

Table 1 — Minimum diameter range

Maximum OD or DN of the pipes to be connected		**Minimum diameter range**
OD for plastic pipes (mm)	**DN for other pipes**	(mm)
OD ≤ 110	DN ≤ 100	10
110 < OD ≤ 225	100 < DN ≤ 200	15
225 < OD ≤ 315	200 < DN ≤ 300	20
315 < OD ≤ 400	300 < DN ≤ 400	25
400 < OD ≤ 800	400 < DN ≤ 800	30

The working range defined by the minimum and the maximum outside diameter range shall be specified by the manufacturer.

Informative Annex A gives the outside diameters of existing pipes, according to current ISO, EN or national standards (see Table A.1).

4.1.2 Surface condition and repairs

Wide tolerance couplings, stepped / reducing couplings and wide tolerance flange adaptors shall be free from defects and surface imperfections which could lead to non-compliance with Clauses 4 and 5.

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