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Ductile iron fittings for PVC-U or PE piping systems - Requirements and test methods

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Ductile iron fittings for PVC-U or PE piping systems - Requirements and test methods

Raccords en fonte ductile pour systèmes de canalisations en PVC-U ou en PE - Prescriptions et méthodes d'essai

Duktile Gussformstücke für PVC-U oder PE-Rohrleitungssyteme - Anforderungen und Prüfverfahren

This European Standard was approved by CEN on 23 June 2012.

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Foreword

This document (EN 12842:2012) has been prepared by Technical Committee CEN/TC 203 “Cast iron pipes, fittings and their joints”, 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of an identical text or by endorsement, at the latest by February 2013, and conflicting national standards shall be withdrawn at the latest by February 2013.

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

This document supersedes EN 12842:2000.

The significant changes made since the previous version are as follows:

a) Wording (relating to accessories, fittings, coupling and flange adaptor) modified in accordance with EN 545;

b) Improvement of shear load test for flange adapter and one socket fitting;

c) Addition of aging test for PE pipe fittings and accessories.

This European Standard was prepared in co-operation with CEN/TC 155 "Plastics piping systems".

This standard 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 standard:

— this standard 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.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard specifies the requirements and associated test methods applicable to ductile iron fittings, ductile iron and mild steel couplings and flange adaptors and their joints to be used with poly(vinyl chloride) (PVC-U) pipes or polyethylene (PE) pipes. It is in conformity with EN 1452-1 to -5, ENV 1452-6 and -7 and EN 12201-1 to -5 respectively, for the construction of pipelines:

— 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 European Standard is not intended to cover sewerage applications, where additional requirements may be necessary.

This European Standard is applicable to fittings which are:

— manufactured with socketed, flanged or spigot ends;

— supplied externally and internally coated;

— suitable for PE and PVC-U pipes with fluid temperatures between 0°C and 25°C, excluding frost, and for pressures up to 16 bar (PFA). For higher temperatures (up to 45°C for PVC-U or 40°C for PE) the PFA is derated as given in EN 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 or PE pipes.

This European Standard covers ductile iron fittings, 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 60 to DN 700, to be used with pipes of external diameter from 63 mm to 710 mm.

As long as no equivalent European Standard exists for mild steel accessories, this European Standard also covers couplings and flange adaptors for use with PVC-U and PE pipes which are fabricated partly or entirely from mild steel as well as corresponding joints, in a size range extending from DN 60 to DN 700, to be used with pipes of external diameter from 63 mm to 710 mm.

This European Standard 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 standard.

This European Standard does not cover fittings, couplings and flange adaptors intended to be used with different pipe materials other than PVC-U and PE.

NOTE 2 Fittings, couplings and flange adaptors complying with the requirements of this European Standard for PVC-U also usually meet the requirements for PVC-O and PVC-A pipes. Where this is not the case, the manufacturer is expected to declare this in the relevant literature.

NOTE 3 In this European Standard, all pressures are relative pressures, expressed in bars (100 kPa = 1 bar).

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 — Material requirements for pipe joint seals used in water and drainage applications — Part 1: Vulcanised rubber*

EN 805:2000, *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 — General technical delivery conditions*

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

EN 14901, *Ductile iron pipes, fittings and accessories — Epoxy coating (heavy duty) of ductile iron fittings and accessories – Requirements and test methods*

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

EN 15655, *Ductile iron pipes, fittings and accessories — Internal polyurethane lining for pipes and fittings — Requirements and test methods*

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

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

EN ISO 6506-1, *Metallic materials — Brinell hardness test — Part1: Test method (ISO 6506-1)*

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

EN ISO 9001:2008, *Quality management systems — Requirements (ISO 9001:2008)*

EN ISO 13846:2000, *Plastic 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)*

3 Terms and definitions

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

3.1
ductile iron
cast iron used for fittings in which graphite is present substantially in spheroïdal form

3.2
fitting
casting other than a pipe which allows pipeline deviation, change of direction or bore

[SOURCE: EN 545]

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

Note 1 to entry: A flange can be fixed (e.g. integrally cast or welded) 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.

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 components 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

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

3.12
flanged joint
joint between two flanged ends

3.13
nominal size
DN/OD
alphanumeric 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: Adapted from EN ISO 6708:1995, definition 2.1.

Note 3 to entry: Plastic pipes are only defined as DN/OD.

3.14
nominal outside diameter (d_n)
specified outside diameter, in millimetres, assigned to a nominal size DN/OD

[SOURCE: EN 12201-1]

3.15
minimum socket inside diameter ($d_{i\ min}$)
minimum value of the internal diameter of the socket mouth

3.16
nominal pressure PN
alphanumerical designation, which comprises a convenient rounded number used for reference purposes

Note 1 to entry: All components of the same nominal size, DN, designated by the same PN have compatible mating dimensions.

Note 2 to entry: Adapted from EN 1333:2006.

Note 3 to entry: In EN 1452 and EN 12201, the term nominal pressure (PN) at 20°C is used in place of PFA.

3.17
allowable operating pressure (PFA)
maximum hydrostatic pressure that a component is capable of withstanding continuously in service

[SOURCE: EN 805:2000]

Note 1 to entry: In EN 1452 and EN 12201, the term nominal pressure (PN) at 20°C is used in place of PFA.

3.18
leak tightness test pressure
pressure applied to a component during manufacture in order to ensure its leak tightness

3.19
allowable maximum operating pressure (PMA)
maximum pressure occurring from time to time, including surge, that a component is capable of withstanding in service

[SOURCE: EN 805:2000]

3.20
allowable test pressure (PEA)
maximum hydrostatic pressure that a newly installed component is capable of withstanding for a relatively short duration, in order to ensure the integrity and tightness of the pipeline

[SOURCE: EN 805:2000]

Note 1 to entry: 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 leak tightness.

3.21
batch
quantity of castings from which a sample is taken for testing purposes during manufacture

3.22
performance test
proof of design test which is done once and is repeated only after change of design