BS EN 488:2011+A1:2014

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# District heating pipes — Preinsulated bonded pipe systems for directly buried hot water networks — Steel valve assembly for steel service pipes, polyurethane thermal insulation and outer casing of polyethylene

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## National foreword

This British Standard is the UK implementation of EN 488:2011+A1:2014. It supersedes BS EN 488:2011 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee RHE/9, Insulated underground pipelines.

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

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

# EN 488:2011+A1

February 2014

ICS 23.060.01

English Version

# District heating pipes - Preinsulated bonded pipe systems for directly buried hot water networks - Steel valve assembly for steel service pipes, polyurethane thermal insulation and outer casing of polyethylene

Tuyaux de chauffage urbain - Systèmes bloqués de tuyaux préisolés pour les réseaux d'eau chaude enterrés directement - Robinets préisolés pour tubes de service en acier, isolation thermique en polyuréthane et tube de protection en polyéthylène

Fernwärmerohre - Werkmäßig gedämmte Verbundmantelrohrsysteme für direkt erdverlegte Fernwärmenetze - Vorgedämmte Absperrarmaturen für Stahlmediumrohre mit Polyurethan-Wärmedämmung und Außenmantel aus Polyethylen

This European Standard was approved by CEN on 19 February 2011 and includes Amendment 1 approved by CEN on 30 November 2013.

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 CEN-CENELEC Management Centre or to any CEN member.

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# Foreword

This document (EN 488:2011+A1:2014) has been prepared by Technical Committee CEN/TC 107 “Prefabricated district heating pipe systems”, the secretariat of which is held by DS.

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of an identical text or by endorsement, at the latest by August 2014, and conflicting national standards shall be withdrawn at the latest by August 2014.

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 includes Amendment 1, approved by CEN on 2013-11-30.

[A1⟩ This document includes Amendment A1 to EN 488:2011, that comprises technical changes to:

- Sub-Clause 4.6.2, End of stem construction. ⟨A1]

This document supersedes [A1⟩ EN 488:2011 ⟨A1].

The start and finish of text introduced or altered by amendment is indicated in the text by tags [A1⟩ ⟨A1].

Annex A is informative, Annexes B and C are normative.

This document includes a Bibliography.

The first edition of EN 488 was approved in 1994. The first revised standard was published in 2003. In this second revision, in general the whole standard has been edited to make it more readable. Requirements and test methods have been separated; therefore, clause numbers have changed and some clauses have been split up in several clauses. Exact references for changes are not always possible. The main areas of the current revision are:

a) The scope has been amended. The standard applies no longer only to insulated valve assemblies for continuous operation with hot water at various temperatures in accordance with EN 253:2009, Clause 1 but also to the valve assemblies with a maximum operation pressure of 25 bar. For higher pressure, additional demands apply. It is also explained that the calculation rules of loads and stresses are not included. They depend on the configuration of the system as it is installed. The design and installation rules are given in EN 13941:2009+A1:2010.

b) In Clause 3, “terms and definitions”, definitions for the nominal pressure (PN), nominal size (DN) and maximum operation pressure have been added. A figure “Example valve assembly components” of a valve assembly, its components and definitions has been added.

c) Clause 4, “requirements”

   1) material of the steel parts in the pressurized parts of the valve shall be certified in accordance with EN 10204, the 3.1 certificate (4.3.1);

   2) it is added that flanged or screwed connections, except sealing system at the stem, shall not be used except in the non-pressurized area e.g. for the stem extensions (4.3.2);

   3) the requirements for the use of stop devices are amended (4.7);

   4) the minimum water temperature has been adjusted to 4 °C (4.2);



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5) 4.3.5 “Welding of steel parts” has been changed and adjusted to EN 13941:2009+A1:2010 and the text in EN 448;

6) 4.1.6 has become 4.8 “resistance to axial forces bending moments” and has been rewritten in Annex B;

7) additions have been made to the requirements to the corrosion protection of the stem (see 4.6);

8) the Clause “increase in diameter” has been changed to “diameter and wall thickness of the casing” (see 4.4.3);

9) a table with the tolerances of the main dimensions has been added together with a figure to explain the dimensions (see 4.6.3);

10) a clause was added about the installation of measuring elements for surveillance (see 4.6.4).

d) Clause 5, “test methods”

1) the clause “Testing, test methods and test requirements” has been adjusted to make the order of test clearer;

2) a test for the surveillance system is added (see 5.7).

e) Clause 6, “marking”

1) for the steel valve pressure and temperature and marking with closed and open position;

2) for the casing the date of manufacture has been changed to year and week of manufacture (see 6.3);

3) for the valve assembly, the type of blowing agent and diffusion barrier has been added (see 6.4).

f) Annex A, “guidelines for inspection and testing”

1) the clause about quality surveillance had been changed in quality control (see A.3);

2) a table for the valve assembly inspection had been added.

g) Former Annex B, the guidelines for installation of the valves has been deleted. New Annexes B and C have been added, in which the actual testing is included.

h) The former Table 1, “Service pipe dimensions and test forces” has been changed due to cold laying conditions. Therefore, the compressive forces have been adapted. In this table the maximum allowable bending moments have been included and the table has been moved to Annex B.

i) A description of the test method for bending forces has been added in Annex C.

In general, references were changed were needed. If possible references to European standards were used.

For information on the minimum expected thermal life with operation at various temperatures with respect to PUR foam performance see EN 253.

The other standards from CEN/TC 107 covering this subject are:

— EN 253, *District heating pipes — Preinsulated bonded pipe systems for directly buried hot water networks — Pipe assembly of steel service pipe, polyurethane thermal insulation and outer casing of polyethylene;*



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— EN 448, *District heating pipes — Preinsulated bonded pipe systems for directly buried hot water networks — Fitting assemblies of steel service pipes, polyurethane thermal insulation and outer casing of polyethylene;*

— EN 489, *District heating pipes — Preinsulated bonded pipe systems for directly buried hot water networks — Joint assembly for steel service pipes, polyurethane thermal insulation and outer casing of polyethylene;*

— EN 13941:2009+A1:2010, *Design and installation of preinsulated bonded pipe systems for district heating;*

— EN 14419, *District heating pipes — Preinsulated bonded pipe systems for directly buried hot water networks — Surveillance systems;*

— EN 15632 (all parts), *District heating pipes — Pre-insulated flexible pipe systems;*

— EN 15698-1, *District heating pipes — Preinsulated bonded twin pipe systems for directly buried hot water networks — Part 1: Twin pipe assembly of steel service pipe, polyurethane thermal insulation and outer casing of polyethylene.*

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.



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## 1 Scope

This European Standard specifies requirements and test methods for valves of prefabricated thermally insulated valve assemblies comprising a steel valve, rigid polyurethane foam insulation and an outer casing of polyethylene for use in directly buried hot water networks with pre-insulated pipe assemblies in accordance with EN 253.

This European Standard applies only to insulated valve assemblies for continuous operation with hot water at various temperatures in accordance with EN 253:2009, Clause 1 and the valve assemblies with a maximum operation pressure of 25 bar. For higher pressures, additional demands apply.

Guidelines for quality inspection are given in Annex A of this European Standard.

NOTE For this application, the following valve types are commonly used: ball valves, gate valves, and butterfly valves.

This European Standard does not include calculation rules for loads and stresses. These depend on the configuration of the system as it is installed. The design and installation rules are given in EN 13941:2009+A1:2010.

## 2 Normative references

The following referenced documents are indispensable for the application 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 19, *Industrial valves - Marking of metallic valves*

EN 253:2009, *District heating pipes — Preinsulated bonded pipe systems for directly buried hot water networks — Pipe assembly of steel service pipe, polyurethane thermal insulation and outer casing of polyethylene*

EN 448:2009, *District heating pipes - Preinsulated bonded pipe systems for directly buried hot water networks - Fitting assemblies of steel service pipes, polyurethane thermal insulation and outer casing of polyethylene*

EN 736-1:1995, *Valves - Terminology - Part 1: Definition of types of valves*

[A1] EN 10088-1:2005, *Stainless steels - Part 1: List of stainless steels* [A1]

EN 10204:2004, *Metallic products - Types of inspection documents*

EN 12266-1:2003, *Industrial valves — Testing of valves — Part 1: Pressure tests, test procedures and acceptance criteria — Mandatory requirements*

EN 13941:2009+A1:2010, *Design and installation of preinsulated bonded pipe systems for district heating*

EN 14419, *District heating pipes - Preinsulated bonded pipe systems for directly buried hot water networks - Surveillance systems*

[A1] EN ISO 12944-2, *Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Part 2: Classification of environments (ISO 12944-2)*

EN ISO 12944-5, *Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Part 5: Protective paint systems (ISO 12944-5)* [A1]



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## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 253:2009 and EN 448:2009 and the following apply. For types of valves, the terms and definitions given in EN 736-1:1995 apply.

**3.1**
**nominal pressure (PN) class**
alphanumeric designation used for reference purposes related to a combination of mechanical and dimensional characteristics of a component of a pipe work system

NOTE 1 It comprises the letters PN followed by a dimensionless number.

NOTE 2 The number following the letters PN does not represent a measurable value and should not be used for calculation purposes except where specified in the relevant standard.

NOTE 3 The designation PN is not meaningful unless it is related to the relevant component standard number.

NOTE 4 The allowable pressure of a pipe work component depends on the PN number, the material and design of the component, its allowable temperature, etc., and is given in tables of pressure/temperature ratings specified in the appropriate standards.

NOTE 5 Definition is according to EN 1333.

**3.2**
**maximum operation pressure**
maximum internal pressure acting against the pipe wall at any point or in any section of the pipeline at a given operating temperature

NOTE Definition is according to EN 13941:2009+A1:2010.

**3.3**
**nominal size (DN)**
numerical metric designation of size is common to components in piping systems of any one size

NOTE Definition is according to EN ISO 6708.

**3.4**
**valve assembly**
assembly of valve, valve extension pipe, PE-casing and PUR-foam

NOTE Figure 1 gives an example a valve assembly and its components.



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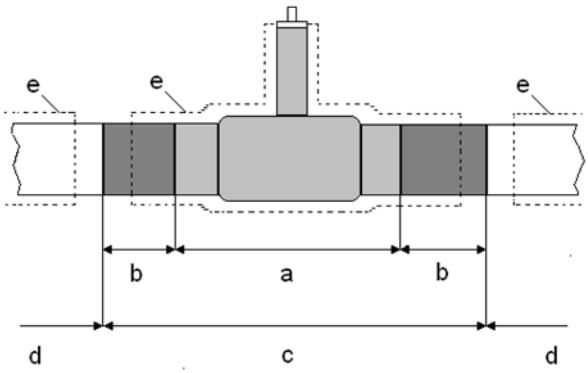


**Key**

a valve

b valve extension pipe

c valve assembly

d service pipe

e insulation

**Figure 1 — Example valve assembly components**

**3.5**
**valve**
part of the valve assembly supplied by the valve manufacturer (with or without valve extension pipe)

**3.6**
**valve extension pipe**
pipe part of the valve assembly welded to the valve

NOTE The valve extension may be required before the insulation process. This can be done by the valve manufacturer or the insulation manufacturer. The valve can be extended with valve extension pipes before insulation or delivered by the valve manufacturer with extensions.

**3.7**
**welding end on valve**
welding end of the valve

**3.8**
**steel service pipe**
service pipe according to EN 253

# 4 Requirements

## 4.1 Pressure ratings for valves

### 4.1.1 General

The valves shall be designed for use in pipe systems with a maximum operating pressure of 16 bar or 25 bar.

The valves shall be able to withstand a strength test pressure of the district heating system of 1,5 times the maximum operating pressure at ambient temperature in open and closed position.



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