TÖÖSTUSLIKUD VENTIILID. KORPUSE TUGEVUS. OSA 4: TERASEST ERINEVATEST METALLIDEST VALMISTATUD VENTIILIKORPUSTE ARVUTUSMEETOD

Industrial valves - Shell design strength - Part 4: Calculation method for valve shells manufactured in metallic materials other than steel

EESTI STANDARDIKESKUS
ESTONIAN CENTRE FOR STANDARDISATION

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 12516-4:2014+A1:2018 sisaldab Euroopa standardi EN 12516-4:2014+A1:2018 ingliskeelset teksti.	This Estonian standard EVS-EN 12516-4:2014+A1:2018 consists of the English text of the European standard EN 12516-4:2014+A1:2018.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 12.09.2018.	Date of Availability of the European standard is 12.09.2018.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

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English Version

Industrial valves - Shell design strength - Part 4: Calculation method for valve shells manufactured in metallic materials other than steel

Robinetterie industrielle - Résistance mécanique des enveloppes - Partie 4 : Méthode de calcul relative aux enveloppes d'appareils de robinetterie en matériaux métalliques autres que l'acier

Industriearmaturen - Gehäusefestigkeit - Teil 4: Berechnungsverfahren für drucktragende Gehäuse von Armaturen aus anderen metallischen Werkstoffen als Stahl

This European Standard was approved by CEN on 9 August 2014 and includes Amendment 1 approved by CEN on 2 March 2018.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. EN 12516-4:2014+A1:2018 E

Contents

Page

European foreword

This document (EN 12516-4:2014+A1:2018) has been prepared by Technical Committee CEN/TC 69 “Industrial valves”, 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 March 2019, and conflicting national standards shall be withdrawn at the latest by March 2019.

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 includes Amendment 1 approved by CEN on 2018-03-02.

This document supersedes ⟦A1⟩ EN 12516-4:2014 ⟨A1⟧.

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

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of ⟦A1⟩ European legislation for pressure equipment ⟨A1⟧.

For relationship with ⟦A1⟩ European legislation for pressure equipment ⟨A1⟧, see informative Annex ZA, which is an integral part of this document.

EN 12516 comprises the following parts:

— *Industrial valves — Shell design strength — Part 1: Tabulation method for steel valve shells*;

— *Industrial valves — Shell design strength — Part 2: Calculation method for steel valve shells*;

— *Valves — Shell design strength — Part 3: Experimental method*;

— *Industrial valves — Shell design strength — Part 4: Calculation method for valve shells manufactured in metallic materials other than steel*.

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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard specifies the calculation method for valve shells manufactured in metallic materials other than steel. The loadings to be accounted for are in accordance with EN 12516-2.

Design methods are in accordance with EN 12516-2, design by formulae according to the relevant clauses.

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 485-2:2013, *Aluminium and aluminium alloys — Sheet, strip and plate — Part 2: Mechanical properties*

EN 586-2:1994, *Aluminium and aluminium alloys — Forgings — Part 2: Mechanical properties and additional property requirements*

EN 754-2:2013, *Aluminium and aluminium alloys — Cold drawn rod/bar and tube — Part 2: Mechanical properties*

EN 755-2:2013, *Aluminium and aluminium alloys — Extruded rod/bar, tube and profiles — Part 2: Mechanical properties*

〚A1〛 EN 1092-2:1997 〚A1〛, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated — Part 2: Cast iron flanges*

〚A1〛 EN 1092-3:2003 〚A1〛, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated — Part 3: Copper alloy flanges*

〚A1〛 EN 1092-4:2002 〚A1〛, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated — Part 4: Aluminium alloy flanges*

EN 1561:2011, *Founding — Grey cast irons*

EN 1562:2012, *Founding — Malleable cast irons*

EN 1563:2011, *Founding — Spheroidal graphite cast irons*

EN 1653:1997, *Copper and copper alloys — Plate, sheet and circles for boilers, pressure vessels and hot water storage units*

〚A1〛 EN 1759-3:2003 〚A1〛, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, Class designated — Part 3: Copper alloy flanges*

EN 1982:2008, *Copper and copper alloys — Ingots and castings*

EN 12163:2011, *Copper and copper alloys — Rod for general purposes*

EN 12420:2014, *Copper and copper alloys — Forgings*

EN 12449:2012, *Copper and copper alloys — Seamless, round tubes for general purposes*

EN 12516-2:2014, *Industrial valves — Shell design strength — Part 2: Calculation method for steel valve shells*

CEN/TS 13388:2013, *Copper and copper alloys — Compendium of compositions and products*

EN 13445-8:2009, *Unfired pressure vessels — Part 8: Additional requirements for pressure vessels of aluminium and aluminium alloys*

〚A1〉 ISO 7005-3:1988 〈A1〛, *Metallic flanges — Part 3: Copper alloy and composite flanges*

3 Symbols and units

Table 1 — Symbols and units

Symbol	Characteristic	Unit
f	nominal design stress	MPa
$f_{d/t}$	nominal design stress for design conditions at temperature t °C	MPa
$f_{d/20}$	nominal design stress for design conditions at 20 °C	MPa
R_m	minimum tensile strength	MPa
$R_{m/20}$	Tensile strength at 20 °C	MPa
$R_{m/t}$	tensile strength at temperature t °C	MPa
$R_{p0,1}$	minimum 0,1 %-proof strength	MPa
$R_{p0,2}$	minimum 0,2 %-proof strength	MPa
$R_{p0,2/t}$	0,2 % — proof strength at temperature t °C	MPa
$R_{p1,0/t}$	1,0 % — proof strength at temperature t °C	MPa

4 Interrelation of thickness definitions

For interrelation of thickness definitions refer to EN 12516-2:2014, Clause 4.

5 Requirements

5.1 General

The calculation method for a valve shell in materials other than steel shall be in accordance with EN 12516-2. The choice of materials and their parameters shall be taken from the following clauses of this European Standard.

5.2 Materials — Cast iron

5.2.1 Allowable grades

Materials shall be in accordance with Table 2.