

**Flanges and their joints - Circular flanges for pipes,  
valves, fittings and accessories, PN designated - Part 1:  
Steel flanges**

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

See Eesti standard EVS-EN 1092-1:2007+A1:2013 sisaldab Euroopa standardi EN 1092-1:2007+A1:2013 ingliskeelset teksti.	This Estonian standard EVS-EN 1092-1:2007+A1:2013 consists of the English text of the European standard EN 1092-1:2007+A1:2013.
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 23.01.2013.	Date of Availability of the European standard is 23.01.2013.
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ICS 23.040.60

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English Version

**Flanges and their joints - Circular flanges for pipes, valves,  
fittings and accessories, PN designated - Part 1: Steel flanges**

Brides et leurs assemblages - Brides circulaires pour tubes,  
appareils de robinetterie, raccords et accessoires,  
désignées PN - Partie 1: Brides en acier

Flansche und ihre Verbindungen - Runde Flansche für  
Rohre, Armaturen, Formstücke und Zubehörteile, nach PN  
bezeichnet - Teil 1: Stahlflansche

This European Standard was approved by CEN on 23 June 2007 and includes Amendment 1 approved by CEN on 24 November 2012.

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## Foreword

This document (EN 1092-1:2007+A1:2013) has been prepared by Technical Committee CEN/TC 74 “Flanges and their joints”, the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by July 2013, and conflicting national standards shall be withdrawn at the latest by July 2013.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 A1 EN 1092-1:2007 A1.

This document includes Amendment 1, approved by CEN on 2012-11-24.

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 EU Directive 97/23/EC.

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

EN 1092 consists of the following four parts:

- *Part 1: Steel flanges;*
- *Part 2: Cast iron flanges;*
- *Part 3: Copper alloy flanges;*
- *Part 4: Aluminium alloy flanges.*

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.

## Introduction

When the Technical Committee CEN/TC 74 commenced its work of producing this European Standard it took as its basis, the International Standard, ISO 7005-1, Steel flanges.

In taking this decision, CEN/TC 74, agreed that this standard would differ significantly from the ISO standard in respect of the following:

- a) whereas ISO 7005-1 included in its scope both the original DIN based flanges and also the original ANSI/ASME based flanges, EN 1092-1 contains only the PN based flanges. CEN/TC 74 has produced a separate series of standards, EN 1759-1, EN 1759-3 and EN 1759-4, dealing with the ANSI/ASME based flanges in their original Class designations;
- b) the opportunity was taken to revise some of the technical requirements applicable to the DIN origin flanges.

Consequently, whilst the mating dimensions, the flange and facing types and designations are compatible with those given in ISO 7005-1, it is important to take account of the following differences which exist in EN 1092-1:

- 1) the p/t ratings of this standard have been reduced in many cases by either limiting the lower temperature ratings which can no longer exceed the PN value, or by increasing the rate at which allowable pressures shall reduce with increase in temperature;
- 2) in addition to the range of PN 2,5 to PN 40 DIN origin flanges contained in the ISO standard, EN 1092-1 also includes flanges up to PN 400.

Major changes against edition 2001:

- i. flanges PN 160, PN 250, PN 320 and PN 400 have been introduced;
- ii. further methods of manufacture have been introduced;
- iii. welding conditions, inspection and testing have been introduced;
- iv. flange facing height  $f_1$  changed back to former DN related dimensions;
- v. further collar types have been introduced;
- vi. materials have been updated;
- vii. new p/t-ratings are related to the flange material;
- viii. rings for tongue and groove flanges have been introduced;
- ix. the following flange types have been re-calculated according to the calculation method in EN 1591-1 with the basic rules as described in Annex E of this standard:
  - flanges type 11 for PN 2,5 to PN 400. Types 12 and 13 have been adjusted to the results for Type 11. As a result the thickness of some flanges above DN 500 had to be increased and the  $A_1$  wall thickness  $A_1$  had to be adjusted;
  - flanges type 05;
  - flanges type 01;
  - flanges type 02 with 32 resp. 33 up to DN 600 for PN 2,5 to PN 40;
  - flanges types 35, 36 and 37 for PN 10 to PN 40;
  - types 21 and 04 with 34 have not been re-calculated according to EN 1591-1.

## 1 Scope

This European Standard for a single series of flanges specifies requirements for circular steel flanges in PN designations PN 2,5 to PN 400 and nominal sizes from DN 10 to DN 4000.

This European Standard specifies the flange types and their facings, dimensions, tolerances, threading, bolt sizes, flange jointing face surface finish, marking, materials, pressure/ temperature ratings and approximate flange masses.

For the purpose of this European Standard, "flanges" include also lapped ends and collars.

This European Standard applies to flanges manufactured in accordance with the methods described in Table 1.

Non-gasketed pipe joints are outside the scope of this European Standard.

## 2 Normative references

**[A1]** 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. **[A1]**

**[A1]** EN 287-1:2011 **[A1]**, *Qualification test of welders — Fusion welding — Part 1: Steels*

**[A1]** *deleted text* **[A1]**

EN 571-1:1997, *Non destructive testing — Penetrant testing — Part 1: General principles*

EN 764-5:2002, *Pressure equipment — Part 5: Compliance and Inspection Documentation of Materials*

**[A1]** *deleted text* **[A1]**

EN 1333:2006, *Flanges and their joints — Pipework components — Definition and selection of PN*

EN 1418, *Welding personnel — Approval testing of welding operators for fusion welding and resistance weld setters for fully mechanized and automatic welding of metallic materials*

EN 1435:1997, *Non-destructive examination of welds — Radiographic examination of welded joints*

**[A1]** EN 1591-1:2001+A1:2009 **[A1]**, *Flanges and their joints — Design rules for gasketed circular flange connections — Part 1: Calculation method*

**[A1]** EN 1708-1:2010 **[A1]**, *Welding — Basic weld joint details in steel — Part 1: Pressurized components*

**[A1]** *deleted text* **[A1]**

EN 4014:2004, *Aerospace series — Inserts, thickwall, self-locking — Design standard*

**[A1]** EN 10028-2:2009 **[A1]**, *Flat products made of steels for pressure purposes — Part 2: Non-alloy and alloy steels with specified elevated temperature properties*

**[A1]** EN 10028-3:2009 **[A1]**, *Flat products made of steels for pressure purposes — Part 3: Weldable fine grain steels, normalized*

**[A1]** EN 10028-4:2009 **[A1]**, *Flat products made of steels for pressure purposes — Part 4: Nickel alloy steels with specified low temperature properties*

**[A1]** EN 10028-7:2007 **[A1]**, *Flat products made of steels for pressure purposes — Part 7: Stainless steels*

EN 10160:1999, *Ultrasonic testing of steel flat product of thickness equal or greater than 6 mm (reflection method)*



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

EN 10213-2:1995, *Technical delivery conditions for steel castings for pressure purposes — Part 2: Steel grades for use at room temperature and elevated temperatures*

EN 10213-3:1995, *Technical delivery conditions for steel castings for pressure purposes — Part 3: Steel grades for use at low temperatures*

EN 10213-4:1995, *Technical delivery conditions for steel castings for pressure purposes — Part 4: Austenitic and austenitic-ferritic steel grades*

EN 10216-2:2002+A2:2007 <sup>A1</sup>, *Seamless steel tubes for pressure purposes — Technical delivery conditions — Part 2: Non-alloy and alloy steel tubes with specified elevated temperature properties*

EN 10216-3:2002, *Seamless steel tubes for pressure purposes — Technical delivery conditions — Part 3: Alloy fine grain steel tubes*

EN 10216-4:2002, *Seamless steel tubes for pressure purposes — Technical delivery conditions — Part 4: Non-alloy and alloy steel tubes with specified low temperature properties*

EN 10216-5:2004, *Seamless steel tubes for pressure purposes — Technical delivery conditions — Part 5: Stainless steel tubes*

EN 10217-2:2002, *Welded steel tubes for pressure purposes — Technical delivery conditions — Part 2: Electric welded non-alloy and alloy steel tubes with specified elevated temperature properties*

EN 10217-3:2002, *Welded steel tubes for pressure purposes — Technical delivery conditions — Part 3: Alloy fine grain steel tubes*

EN 10217-7:2005, *Welded steel tubes for pressure purposes — Technical delivery conditions — Part 7: Stainless steel tubes*

EN 10220:2002, *Seamless and welded steel tubes — Dimensions and masses per unit length*

EN 10222-2:1999, *Steel forgings for pressure purposes — Part 2: Ferritic and martensitic steels with specified elevated temperature properties*

EN 10222-3:1998, *Steel forgings for pressure purposes — Part 3: Nickel steels with specified low temperature properties*

EN 10222-4:1998, *Steel forgings for pressure purposes — Part 4: Weldable fine grain steels with high proof strength*

EN 10222-5:1999, *Steel forgings for pressure purposes — Part 5: Martensitic, austenitic and austenitic-ferritic stainless steels*

EN 10226-3:2005, *Pipe threads where pressure tight joints are made on the threads — Part 3: Verification by means of limit gauges*

EN 10272:2007 <sup>A1</sup>, *Stainless steel bars for pressure purposes*

EN 10273:2007 <sup>A1</sup>, *Hot rolled weldable steel bars for pressure purposes with specified elevated temperature properties*

EN 12517-1:2006, *Non-destructive testing of welds — Part 1: Evaluation of welded joints in steel, nickel, titanium and their alloys by radiography — Acceptance levels*

EN 13445-3:2009, *Unfired pressure vessels — Part 3: Design* <sup>A1</sup>

EN ISO 887:2000, *Plain washers for metric bolts, screws and nuts for general purposes — General plan (ISO 887:2000)*

EN ISO 1127:1996, *Stainless steel tubes — Dimensions, tolerances and conventional masses per unit length (ISO 1127:1992)*

EN ISO 5817:2007, *Welding — Fusion-welded joints in steel, nickel, titanium and their alloys (beam welding excluded) — Quality levels for imperfections (ISO 5817:2003, corrected version:2005, including Technical Corrigendum 1:2006)* (A1)

EN ISO 6708:1995, *Pipe components — Definition and selection of DN (nominal size) (ISO 6708:1995)*

EN ISO 9692-2:1998, *Welding and allied processes — Joint preparation — Part 2: Submerged arc welding of steels (ISO 9692-2:1998)*

EN ISO 9712:2012, *Non-destructive testing — Qualification and certification of NDT personnel (ISO 9712:2012)* (A1)

EN ISO 11666:2010, *Non-destructive testing of welds — Ultrasonic testing — Acceptance levels (ISO 11666:2010)* (A1)

EN ISO 15614-1:2004, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys (ISO 15614-1:2004)*

EN ISO 15614-13:2005, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 13: Resistance butt and flash welding (ISO 15614-13:2005)*

EN ISO 17637:2011, *Non-destructive testing of welds — Visual testing of fusion-welded joints (ISO 17637:2003)*

EN ISO 17638:2009, *Non-destructive testing of welds — Magnetic particle testing (ISO 17638:2003)*

EN ISO 17640:2010, *Non-destructive testing of welds — Ultrasonic testing — Techniques, testing levels, and assessment (ISO 17640:2010)*

EN ISO 23277:2009, *Non-destructive testing of welds — Penetrant testing of welds — Acceptance levels (ISO 23277:2006)*

EN ISO 23278:2009, *Non-destructive testing of welds — Magnetic particle testing of welds — Acceptance levels (ISO 23278:2006)* (A1)

ISO 7-1:1994, *Pipe threads where pressure-tight joints are made on the threads — Part 1: Dimensions, tolerances and designation*

ISO 2768-1:1989, *General tolerances — Part 1: Tolerances for linear and angular dimensions without individual tolerance indications*

### 3 Terms and definitions

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

#### 3.1

##### **DN**

see EN ISO 6708

#### 3.2

##### **PN**

see EN 1333

#### 3.3

##### **maximum allowable pressure, PS**

maximum pressure for which the equipment is designed, as specified by the equipment manufacturer

#### 3.4

##### **maximum allowable temperature, TS**

maximum temperature for which the equipment is designed, as specified by the equipment manufacturer