SLOVENSKI STANDARD

SIST EN 1092-3:2004

01-junij-2004

Prirobnice in prirobniļ ni spoji - Okrogle prirobnice za cevi, ventile, vezne elemente (fitinge) in dodatke z oznako PN - 3. del: Prirobnice iz bakrovih zlitin

Flanges and their joints - Circular flanges for pipes, valves, fittings and accessories, PN designated - Part 3: Copper alloy flanges

Flansche und ihre Verbindungen - Runde Flansche für Rohre, Armaturen, Formstücke und Zubehörteile, nach PN bezeichnet - Teil 3: Flansche aus Kupferlegierungen

Brides et leurs assemblages - Brides circulaires pour tubes, appareils de robinetterie, raccords et accessoires, désignées PN - Partie 3: Brides en alliages de cuivre

Ta slovenski standard je istoveten z: **EN 1092-3:2003**

ICS:

23.040.60

SIST EN 1092-3:2004 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 1092-3

September 2003

ICS 23.040.60

English version

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This European Standard was approved by CEN on 27 June 2003.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Ref. No. EN 1092-3:2003 E

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Foreword

This document (EN 1092-3:2003) 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of an identical text or by endorsement, at the latest by March 2004, and conflicting national standards shall be withdrawn at the latest by March 2004.

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 the Pressure Equipment Directive (PED)[1)].

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

EN 1092 consists of the following parts:

— Part 1: Steel flanges;

— Part 2: Cast iron flanges;

— Part 3: Copper alloy flanges;

— Part 4: Aluminium alloy flanges.

The annexes A, B, C and ZA are informative.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

This standard is related to ISO 7005-3 in respect of flanges having the same PN. The types of flanges and their mating dimensions are identical with those flanges of the same DN and PN given in ISO 7005-3, except that certain flange types in accordance with this standard may regularly be supplied with raised face facings.

The mating dimensions of the flanges of this standard are compatible with PN designated flanges of other materials in accordance with the other parts of EN 1092.

1) Directive 97/23 EC of the European Parliament and of the Council of 29 May 1997 on the approximation of the Laws of the Member States concerning pressure equipment; OIEC L 181.

1 Scope

This European Standard specifies requirements for circular copper alloy flanges and copper alloy collars combined with loose steel plate flanges in PN designations from PN 6 to PN 40 and nominal sizes from DN 10 to DN 1800 in the types shown in Table 1.

This standard also specifies dimensions and tolerances, materials and their associated pressure/temperature (p/T) ratings, flange facings and related surface finish, weld repairs, and marking, together with information on bolting, gaskets, application/installation and approximate flange masses.

The flanges specified, with the exception of integral (type 21) flanges, are for attachment to copper or copper alloy tubes in accordance with EN 12449.

NOTE 1 When the flanges specified in this standard are required for use with copper or copper alloy tubes to EN 1057 in those tube diameters which are different to EN 12449, this should be agreed between the equipment manufacturer and the flange manufacturer.

NOTE 2 The size of copper and copper alloy tubes is designated by reference to the outside diameter in millimetres.

NOTE 3 See also annex B.

NOTE 4 Non-gasketed pipe joints are outside the scope of this standard.

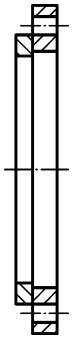
Table 1 — Types of flanges and collars

Type no.	Description
01	Plate flange in copper alloy for brazing or welding
02	Loose plate flange in steel with a plate collar (type 32) in copper alloy, for brazing or welding.
04	Loose plate flange in steel with a weld-neck collar (type 34) in copper alloy, for welding.
05	Blank flange in copper alloy.
05C	Blank flange in steel clad with a copper alloy jointing face.
07	Loose plate flange in steel with a slip-on collar (type 37) in copper alloy, for soft soldering, brazing or welding.
11	Weld-neck flange in copper alloy for welding.
12	Hubbed slip-on flange in copper alloy, for soft soldering, brazing or welding.
14	Hubbed slip-on flange in copper alloy supplied with tube stops, for soft soldering, brazing or welding.
21	Integral flange in copper alloy as part of some other equipment or component
32	Plate collar in copper alloy
34	Weld-neck collar in copper alloy.
37	Slip-on collar in copper alloy.

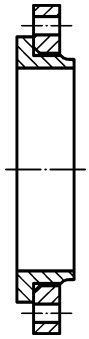
Copper alloy component

Steel component

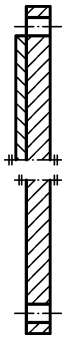
Type 01
Plate flange in copper alloy for brazing or welding



Type 02, 32
Loose plate flange in steel with a plate collar (type 32) in copper alloy for brazing and welding

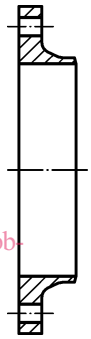


Type 04, 34
Loose plate flange in steel with a weld-neck collar(type 34) in copper alloy for welding

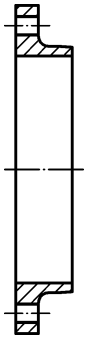


Type 05, 05C
05 Blank flange in copper alloy
05C Blank flange in steel clad with a copper alloy jointing face

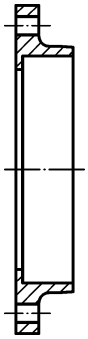
Type 07, 37
Loose plate flange in steel with a slip-on collar (type 37) in copper alloy, for soft soldering, brazing or welding



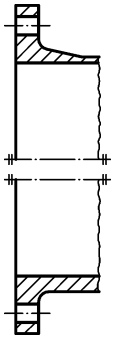
Type 11
Weld-neck flange in copper alloy for welding



Type 12
Hubbed slip- on flange in copper alloy, for soft soldering, brazing or welding



Type 14
Hubbed slip-on flange in copper alloy supplied with tube stops, for soft soldering, brazing or welding



Type 21
Integral flange in copper alloy as part of some other equipment or component

Figure 1 — Types of flanges and collars

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 1333:1996, *Pipework components — Definition and selection of PN.*

EN 1652, *Copper and copper alloys — Plate, sheet, strip and circles for general purposes.*

EN 1982, *Copper and copper alloys — Ingots and castings.*

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

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

EN 12420, *Copper and copper alloys — Forgings.*

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

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

EN ISO 4287, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Terms, definitions and surface texture parameters (ISO 4287:1997).*

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

3 Terms and definitions

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

3.1
DN
see EN ISO 6708:1995

3.2
PN
see EN 1333:1996

3.3
maximum allowable pressure, PS
means the maximum allowable pressure for which the equipment is designed, as specified by the equipment manufacturer

3.4
maximum allowable temperature, TS
means the maximum allowable temperature for which the equipment is designed, as specified by the equipment manufacturer

4 Designation

4.1 General

The types of flanges and their reference numbers are given in Table 1 and the range of DN applicable to each flange type and to each PN shall be as given in Table 3.

4.2 Standard designation

Flanges and collars in accordance with this standard shall be designated by the following:

a) Designation, e.g. flange or collar;

b) Number of this standard, EN 1092-3;

c) Number of flange type in accordance with Figure 1;

d) Type of flange facing, A or B in accordance with Figure 1 (only for types 11, 12, 14 and 21);

e) PN designation, PN....;

f) Nominal size, DN....;

g) Bore diameter B_1 (only for flanges which can be made to suit more than one tube diameter — see Tables 5 to 9);

h) Material number or symbol (see Tables 11 and 12) (for type 05C flanges it is necessary to specify both the material of the flange and the material of the cladding).

EXAMPLE 1 Designation of a plate flange type 01 with facing type A, in PN 6 and nominal size DN 800 and in material symbol CuAl8Fe3:

Flange EN 1092-3/01A/PN 6/DN 800/CW303G

EXAMPLE 2 Designation of a loose flange type 07, in PN 10 and nominal size DN 50 and in material symbol S235JR:

Flange EN 1092-3/07/PN 10/DN 50/S235JR

EXAMPLE 3 Designation of slip-on collar type 37, in PN 10 and nominal size DN 50 with bore diameter B_1 = 57,23 and in material symbol CuZn20Al2As:

Collar EN 1092-3/37/PN 10/DN 50/57,23/CW702R

EXAMPLE 4 Designation of a blank flange type 05C with clad jointing face, in PN 25 and nominal size DN 150 and in materials symbols S235JR (for blank flange) and CuNi30Mn1Fe (for cladding):

Flange EN 1092-3/05C/PN 25/DN 150/S235JR-CW354H

EXAMPLE 5 Designation of a weld-neck flange type 11 with facing type B, in PN 16 and nominal size DN 100 and in material symbol CuAl10Fe2-C:

Flange EN 1092-3/11B/PN 16/DN 100/CC331G

4.3 Information to be supplied by the equipment manufacturer

For information to be supplied by the equipment manufacturer see annex A.

5 General requirements

5.1 Materials

Flanges and collars shall be manufactured from the materials specified in Tables 11 and 12 except for type 21 flanges where the flange manufacturer may use other materials by agreement with the equipment manufacturer.

The flange manufacturer shall provide means of identifying the material of the flange. An equipment manufacturer may require a certificate in accordance with EN 10204 which is suitable for the category of the equipment to which the flange is fitted.

NOTE If a protective coating such as zinc coating or zinc painting is required on steel components, the equipment manufacturer should state this on the enquiry and/or order.

5.2 Repairs

5.2.1 Repairs by welding are permitted when there is a proven method and where not otherwise prohibited by the applicable material standard. All welding shall be carried out in accordance with a written procedure.

NOTE For approval of welding procedures, see EN 288-1. For approval of welders, see EN 287-1.

5.2.2 Any filler rod used for weld repairs shall be such as to produce a weld having characteristics at least equal to the parent metal. Flanges shall be heat treated after repair welding when the material standard requires such treatment.

5.3 Bolting

Flanges shall be suitable for use with the nominal size and number of bolts specified in Tables 5 to 9 as appropriate.

The bolting material shall be chosen by the equipment manufacturer according to the pressure, temperature, flange material and the selected gasket so that the flanged joint remains tight under the expected operating conditions.

NOTE 1 For information on bolting, see EN 1515-1 and EN 1515-2 and annex B.

NOTE 2 For flange types 01, 05, 11, 12, 14 and 21, where copper alloy bolting is used, the recommended bolting materials are EN 12420 Alloy Nos. CW306G or CW307G for temperatures up to and including 120 °C.

For flange types 02, 04, 05C and 07, steel bolting should be used and reference should be made to EN 1515.

5.4 Gaskets

The various gasket types, dimensions, design characteristics and materials used are not within the scope of this standard. Dimensions of gaskets are given in the relevant parts of EN 1514.

5.5 Pressure/temperature (p/T) ratings

5.5.1 General

The p/T ratings of the flanges manufactured from the materials specified in Tables 11 and 12 are given in Tables 13 and 14.

The p/T ratings indicate the relationship between the maximum allowable pressure, PS and the maximum allowable temperature, TS.

Linear interpolation is permitted for intermediate temperatures.

NOTE 1 See EN 764 for terminology.

NOTE 2 When type 21 flanges are supplied as part of another component (for example, a valve or pump) in a material other than those listed in Table 11, reference should be made to the relevant product or application standard for the appropriate p/T ratings.

NOTE 3 The rating of a flange is not necessarily the rating of the whole pipework system. Gasket materials can also impose limitation of the p/T rating of a flanged joint and the gasket manufacturer should be consulted when selecting the material of the gasket.

5.5.2 p/T ratings of flanged joints

When two flanges in a flanged joint do not have the same p/T rating at any temperature, then the lower of the two flange p/T ratings at that temperature shall apply.

NOTE 1 For any p/T rating, the temperature shown is considered to be the same as that of the contained fluid. Use at a pressure corresponding to a temperature other than that of the contained fluid is the responsibility of the user.

NOTE 2 Application of the p/T ratings given in this standard to flange joints should take into consideration the risks of leakage due to forces and moments developed in the connecting pipework, see annex B.

NOTE 3 These notes on service considerations are not intended to be exhaustive.

5.6 Dimensions

5.6.1 Flanges

Dimensions of flanges shall be in accordance with Figure 2 and the following tables and figures as appropriate:

- PN 6 flanges: Table 5 and Figure 3;
- PN 10 flanges: Table 6 and Figure 4;

- PN 16 flanges: Table 7 and Figure 5;
- PN 25 flanges: Table 8 and Figure 6;
- PN 40 flanges: Table 9 and Figure 7.

NOTE 1 The bore sizes of type 21 flanges are usually equal to the nominal size of the pipe, valve or fitting of which they form a part and the actual bore sizes are usually given in the appropriate standard(s) for the pipe, valve or fitting.

NOTE 2 When type 07, 12 and 14 flanges are for use with soft soldering techniques only, then reference should be made to EN 1254-1 for socket depths.

NOTE 3 For types 34 and 11 flanges the recommended weld preparation angle is 37,5° ± 2,5° when butt welding to pipe with thickness of 3 mm and greater.

5.6.2 Bolt holes

Bolt holes shall be equally spaced on the pitch circle diameter. In the case of type 21 flanges, the bolt holes shall be positioned such that they are symmetrical to the principle axes and such that no holes fall on these axes, i.e. positioned "off-centre", see Figures 3 to 7.

5.7 Flange facings

5.7.1 Types of facings

Figure 2 illustrates facing types (types A and B) which are used, where applicable, in conjunction with the flanges shown in Figure 1. Diameters of type B raised faces are given in Table 4.

Types 01 and 05 flanges in copper alloy shall be provided with type A flat face. Types 11, 12, 14 and 21 flanges in copper alloy shall be provided with either type A flat face or type B raised face.

NOTE 1 Flanges with type A facings are suitable for bolting to flat face mating flanges using a full face gasket. Flanges with type B facings are suitable for bolting to raised face mating flanges and/or used with inside bolt circle gaskets.

NOTE 2 For types 11, 12, 14 and 21 flanges, the equipment manufacturer's enquiry or order should advise the flange manufacturer of the facing type required, see annex A.

NOTE 3 For certain large size flanges in types 11, 12 and 14 and PN 6 to PN 25 (see Tables 5 to 8), type B facings only are specified. The provision of type A facings on these flanges would be by agreement between the flange manufacturer and equipment manufacturer.

Types 02, 04, 05C and 07 flanges have a raised face formed by the face of the collar or the cladding, for bolting to raised face mating flanges using an inside bolt circle gasket.

NOTE 4 The bolting of these flanges to a flat face iron or steel mating flange using full face or inside bolt circle gaskets is not precluded.

5.7.2 Jointing face finish

All flange jointing faces shall be machine finished and when compared by visual or tactile means with reference specimens, shall be in accordance with Table 2.

NOTE 1 It is not intended that instrument measurements are taken on the flange faces, and the R_a and R_z values as defined in ISO 468 relate to the reference specimens.

NOTE 2 Other finishes may be agreed between the flange manufacturer and equipment manufacturer.

Table 2 — Surface finish of jointing faces

Method of machining	R_a[a] µm		R_z[a] µm	
	min.	max.	min.	max.
Turning[b]	3,2	12,5	12,5	50m
[a] R_a and R_z are defined in EN ISO 4287				
[b] Turning covers any method of machining operation producing either serrated concentric or serrated spiral grooves.				
Machining processes other than turning are permissible provided that they give a surface finish in accordance with the R_a and R_z values specified.				

5.7.3 Rims

Rims of flanges and collars may be machined or un-machined.

5.7.4 Collars and loose flanges

Collars and loose flanges shall be machine finished, or have a surface equivalent to that obtained by machining on all locating diameters, bores and abutment faces. The abutment faces shall be flat and square to the bore axis.

5.8 Spot facing or back facing

Any spot facing or back facing required shall not reduce the flange thickness to less than the minimum specified.

When spot facing is used, the diameter shall be large enough to accommodate the outside diameter of the equivalent normal series of washers in accordance with EN ISO 887 for the bolt size being fitted.

When a flange is back faced, it is permissible for the fillet radius to be reduced but it shall not be eliminated entirely. The bearing surfaces for the bolting shall be parallel to the flange jointing face within the limits given in Table 10.