SLOVENSKI STANDARD
SIST EN 1092-4:2002

01-november-2002

Prirobnice in prirobnični spoji - Okrogle prirobnice za cevi, ventile, vezne elemente (fitinge) in dodatke z oznako PN - 4. del: Prirobnice iz aluminijevih zlitin

Flanges and their joints - Circular flanges for pipes, valves, fittings and accessories, PN designated - Part 4: Aluminium alloy flanges

Flansche und ihre Verbindungen - Runde Flansche für Rohre, Armaturen, Formstücke und Zubehörteile, nach PN bezeichnet - Teil 4: Flansche aus Aluminiumlegierungen

Brides et leurs assemblages - Brides circulaires pour tubes, appareils de robinetterie, raccords et accessoires, désignées PN - Partie 4: Brides en alliages d'aluminium

Ta slovenski standard je istoveten z: **EN 1092-4:2002**

ICS:

23.040.60	Prirobnice, oglavki in spojni elementi	Flanges, couplings and joints
77.150.10	Aluminijski izdelki	Aluminium products

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EUROPEAN STANDARD

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English version

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This European Standard was approved by CEN on 28 March 2002.

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 Management Centre or to any CEN member.

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, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

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Contents

Foreword

This document EN 1092-4:2002 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 November 2002, and conflicting national standards shall be withdrawn at the latest by November 2002.

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(s).

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.

The mating dimensions of the flanges of this standard are compatible with those flanges of other materials in accordance with the other parts of EN 1092 and with those flanges of ISO 7005.

Annex A is 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, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard specifies requirements for PN designated circular flanges for pipes, valves, fittings and accessories made from aluminium alloy in the range of DN 15 to DN 600 and PN10 to PN 63 (see Table 1).

This European Standard specifies the types of flanges and their facings, dimensions and tolerances, bolt sizes, surface finish of jointing faces, marking and materials together with associated pressure/temperature (*p*/*T*) ratings.

The flanges are intended to be used for piping as well as for pressure vessels.

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 provisions 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 764, *Pressure equipment - Terminology and symbols - Pressure, temperature, volume.*

EN 1333, *Pipework components - Definition and selection of PN.*

EN 1514, *Flanges and their joints - Dimensions of gaskets for PN-designated flanges.*

EN 1515-1, *Flanges and their joints - Bolting - Part 1: Selection of bolting.*

EN 12392, *Aluminium and aluminium alloys - Wrought products - Special requirements for products intended for the production of pressure equipment.*

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, *Pipework Components - Definition and selection of DN (nominal size) (ISO 6708:1995).*

3 Terms and definitions

For the purposes of this European Standard the following terms and definitions apply.

3.1
DN
see EN ISO 6708

3.2
PN
see EN 1333

3.3
Ra, Rz
see EN ISO 4287

3.4
maximum allowable pressure, PS
PS means the maximum pressure for which the equipment is designed, as specified by the equipment manufacturer
(See also EN 764, where it is defined as allowable pressure p_S).

3.5
maximum allowable temperature, TS
TS means the maximum temperature for which the equipment is designed, as specified by the equipment manufacturer
(See also EN 764, where it is defined as allowable temperature t_S).

4 Designations

4.1 Range of DN

The range of DN applicable to each PN shall be as given in Table 1.

4.2 Range of PN designations

The range of PN designations shall be as given in Table 1.

4.3 Types of flanges

Figure 1 illustrates flanges identified according to type:

a) Type 05 Blank flange;

b) Type 11 Weld-neck flange.

4.4 Designation of flanges

The designation of the flanges shall contain the following information:

a) Description (flange);

b) Number of this standard (EN 1092-4);

c) Flange type number (11, 05 resp.);

d) Flange facing type (e.g. C);

e) DN (e.g. DN 300);

f) For type 11 flanges only, the neck diameter, *A* and the neck thickness, *S*, (e.g. 324 x 4);

g) PN (e.g. PN 40);

h) Material (e.g. EN AW-5083-O).

EXAMPLE 1
For a type 11 flange : Flange EN 1092-4 - 11 - C - DN 300 - 324 x 4 - PN 40 - EN AW-5083-O

EXAMPLE 2
For a type 05 flange : Flange EN 1092-4 - 05 - C - DN 300 - PN 40 - EN AW-5083-O

5 General requirements

5.1 Flange materials

Flanges shall be manufactured from the material grades EN AW-5083 (AlMg4,5Mn0,7) -O or EN AW-6061 (AlMg1SiCu) -T6 as specified in EN 12392. Other materials may be used. For the p/T ratings see 5.5.

Weld-neck flanges shall be forged or made from extruded bars; blank flanges shall be forged or made from plate.

5.2 Repairs

Repair welding of the flanges is not permitted.

5.3 Bolting

5.3.1 The bolting shall be chosen according to the pressure, temperature and gasket.

5.3.2 Bolting materials shall be selected according to the following criteria:

a) For all service conditions in accordance with EN 1515-1 (bolt/nut): 5.6/5, 8.8/8, 25Ni-15Cr-Ti/25Ni-15Cr-Ti, A4-70/A4-70, A2-70/A2-70, 18Cr-9Ni-Mo-AT+C/18Cr-9Ni-Mo, 18Cr-9Ni-AT+C/18Cr-9Ni;

b) For less severe service conditions e. g. water service or in case of oversized flanged joints, in accordance with EN 1515-1 (bolt/nut): A4-50/A4-50, A2-50/A2-50, 18Cr-9Ni-Mo/18Cr-9Ni-Mo, 18Cr-9Ni/18Cr-9Ni;

The choice of this bolting shall be based on either special experience or on recalculations.

c) Where bolting other than specified in EN 1515-1 is required, this shall be chosen according to the parameters above so that the flanged joint remains tight under the expected operating conditions.

5.3.3 The use of washers (EN ISO 887) is recommended.

5.4 Gaskets

Gaskets shall be selected from the relevant part of EN 1514.

NOTE If spiral wound gaskets are selected, than they should be low stress design (y = 5000, m = 3 for calculation in accordance with ASME Code).

5.5 Pressure temperature (*p*/*T*) ratings

The pressure temperature ratings (p/T ratings) for the material grades in 5.1 are given in Table 10.

For other aluminium alloys, which may be used, the p/T ratings shall be established according to the service conditions.

5.6 Dimensions

5.6.1 Dimensions of flanges shall be in accordance with Figure 3 to Figure 7 and as appropriate the following Tables:

- PN 10 flanges: Table 4;

- PN 16 flanges: Table 5;
- PN 25 flanges: Table 6;
- PN 40 flanges: Table 7;
- PN 63 flanges: Table 8.

NOTE 1 Approximate masses of flanges are given in annex A.

NOTE 2 Figures 3 to 7 are identical. They are repeated for better handling of the standard.

5.6.2 Bolt holes shall be equally spaced on the pitch circle diameter.

5.6.3 If the neck thickness, *S* is ordered smaller than given in Tables 4 to 8, the inside diameter at the neck shall be tapered at an angle of 14 ° to 18 °. If *S* is ordered greater, the bore diameter shall be $A - 2 \times S$.

5.7 Flange facings

5.7.1 Types of facings

The types of flange facings shall be as given in Figure 2, and their dimensions shall be as given in Table 2.

If not stated in the purchase order, flange facing B1 is standard for flanges up to PN 40, flange facing B2 is standard for PN 63 flanges.

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 3.

NOTE 1 It is not intended that instrument measurements are taken on the jointing faces.

NOTE 2 Other jointing face finishes may be agreed.

For jointing face type B1, turning shall be carried out with a round-nosed tool in accordance with Table 3.

5.8 Spot facing and back facing of flanges

Any spot facing and back facing required shall not reduce the flange thickness to less than the thickness 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.

5.9 Tolerances

Tolerances on dimensions shall be as specified in Table 9.

5.10 Marking

All flanges shall be marked as follows:

a) Flange manufacturer's name or trade-mark (e.g. xxx);

b) Number of this standard (EN 1092-4);

c) DN (e.g. DN 300);

d) PN (e.g. PN 25);

e) Neck thickness if not standard (e.g. 7,1);

f) Material designation (e.g. EN AW-5083-O);

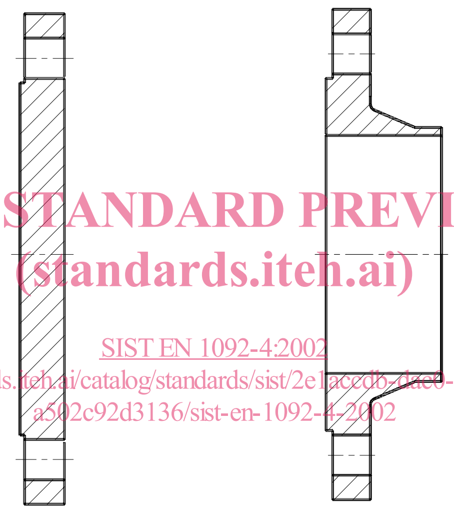
g) Batch number or suitable quality control number traceable to the batch number when test certification is required (e.g. yyy).

EXAMPLE: xxx - EN 1092-4 - DN 300 - PN 25 - 7,1 - EN AW-5083-O - yyy

The flanges shall be clearly and permanently marked around the rim.

Table 1 - Synoptic table

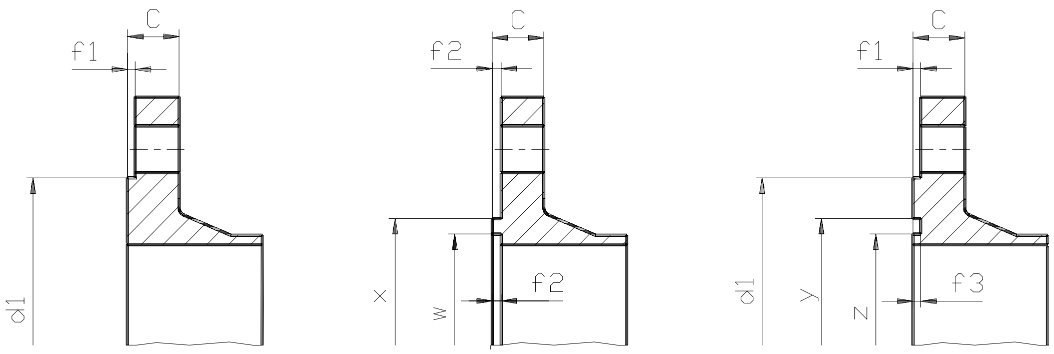
Type	PN	DN												
		15	25	40	50	80	100	150	200	250	300	400	500	600
05 and 11	10	Use PN 40				Use PN 16			x	x	x	x	x	x
	16	Use PN 40				x	x	x	x	x	x	x	x	x
	25	Use PN 40							x	x	x	x	x	x
	40	x	x	x	x	x	x	x	x	x	x	x	-	-
	63	x	x	x	x	x	x	x	x	x	x	-	-	-



Type 05
Blank flange

Type 11
Weld-neck flange

Figure 1 - Types of flanges



Type B
Raised face

Type C
Tongue face

Type D
Groove face

NOTE For types B and D, the transition from the edge of the raised face (d1) to the flange face is either by radius or chamfer.

Figure 2 - Flange facings

Table 2 - Flange facing dimensions

Dimensions in millimetres

DN	***d1***					***f1***	***f2***	***f3***	***w***	***x***	***y***	***z***
	PN10	PN16	PN25	PN40	PN63							
15	Use PN 63				45	2	4,5	4	29	39	40	28
25					68	2	4,5	4	43	57	58	42
40					88	2	4,5	4	61	75	76	60
50					102	2	4,5	4	73	87	88	72
80					138	2	4,5	4	106	120	121	105
100	Use PN 16	156	Use PN 40	156	162	2	5	4,5	129	149	150	128
150		211		211	218	2	5	4,5	183	203	204	182
200	266	266	274	284	285	2	5	4,5	239	259	260	238
250	319	319	330	345	345	2	5	4,5	292	312	313	291
300	370	370	389	409	410	2	5	4,5	343	363	364	342
400	480	480	503	535	-	2	5,5	5	447	473	474	446
500	582	609	609	-	-	2	5,5	5	549	575	576	548
600	682	720	720	-	-	2	5,5	5	649	675	676	648

Table 3 - Surface finish of flange jointing faces

Facing types	**Method of machining**	**Radius of tool nose** mm	***R*$_a$** µm		***R*$_z$** µm	
		min.	min.	max.	min.	max.
B1 1)	turning 2)	1,0	3,2	12,5	12,5	50
B2 1), C, D	turning 2)	-	0,8	3,2	3,2	12,5

1) B1 and B2 are raised face (type B) with different surface roughness.
2) The term "turning" includes any method of machine operation producing either serrated concentric or serrated spiral grooves.