

Flanges and their joint — Circular flanges for pipes, valves, fittings and accessories, class designated —

Part 4: Aluminium alloy flanges

The European Standard EN 1759-4:2003 has the status of a
British Standard

ICS 23.040.60

National foreword

This British Standard is the official English language version of EN 1759-4:2003.

The UK participation in its preparation was entrusted to Technical Committee PSE/15, Flanges, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 16, an inside back cover and a back cover.

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Amendments issued since publication

Amd. No.	Date	Comments

English version

**Flanges and their joint - Circular flanges for pipes, valves,
fittings and accessories, class designated - Part 4: Aluminium
alloy flanges**

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

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

This European Standard was approved by CEN on 10 July 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.

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Foreword

This document (EN 1759-4:2003) has been prepared by Technical Committee CEN/TC74 "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of an identical text or by endorsement, at the latest by March 2004, and conflicting national standards shall be withdrawn at the latest by March 2004.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 1759 consists of the following parts:

- Part 1: Steel flanges (draft stage);
- Part 3: Copper alloy flanges (draft stage);
- 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 1759 and with those flanges of ISO 7005.

Annexes A and B 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.

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 Class designated circular flanges for pipes, valves, fittings and accessories made from aluminium alloy in the range of DN 15 to DN 600 (NPS 1/2 to NPS 24) and Class 150 to Class 300 (see Table 1).

This 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 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 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 12560, *Flanges and their joints - Gaskets for Class-designated flanges (in different parts)*

EN ISO 4287:1998, *Geometrical product specification (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 European Standard the following terms and definitions apply:

3.1

DN

see EN ISO 6708:1995

3.2

NPS (Nominal pipe size)

An alphanumeric designation of size for components of a pipework system, which is used for reference purposes. It comprises, for the purpose of Class designated flanges according to this standard, the letters NPS followed by a dimensionless number which is indirectly related to the physical size of the bore or outside diameter of the end connections.

NOTE 1 The number following the letters NPS does not represent a measurable value and should not be used for calculation purposes except where specified in the relevant standard.

NOTE 2 The relationship between DN and NPS is given in the tables.

3.3

Class

An alphanumeric designation used for reference purposes related to a combination of mechanical and dimensional characteristics of a component of a pipework system. It comprises the word Class followed by a dimensionless whole number.

NOTE 1 The number following the word Class does not represent a measurable value and should not be used for calculation purposes except where specified in the relevant standard.

NOTE 2 The designation Class is not meaningful unless it is related to the relevant component standard number.

NOTE 3 It is intended that all components with the same Class and NPS designations shall have the same mating dimensions for compatible flange types.

3.4

Ra, Rz

see EN ISO 4287:1998

3.5

Maximum allowable pressure, PS

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

3.6

Maximum allowable temperature, TS

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

4 Designations

4.1 Range of nominal sizes

The range of DN (NPS) applicable to each Class shall be as given in Table 1.

4.2 Range of Class designations

The range of Class 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 1759-4);
- c) Flange type (11, 05 resp.);
- d) Flange facing type (e.g. C);
- e) DN or NPS (e.g. DN 300);
- f) For type 11 flanges only, neck diameter, A and neck thickness, S (e.g. 324 x 5);
- g) Class (e.g. Class 150);

EN 1759-4:2003 (E)

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

EXAMPLE 1 For a type 11 flange:

Flange EN 1759-4 - 11 - C - DN 300 - 324 x 5 - Class 150 - EN AW-5083-O

EXAMPLE 2 For a type 05 flange:

Flange EN 1759-4 - 05 - C - DN 300 - Class 150 - 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 according to 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;

NOTE The choice of this bolting should 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 is recommended.

5.4 Gaskets

Gaskets shall be selected from the relevant part of EN 12560.

NOTE If spiral wound gaskets are selected, then 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 7.

5.6 Dimensions

5.6.1 Dimensions of flanges shall be in accordance with the following figures and tables:

- Class 150 flanges: Figure 3 and Table 4;
- Class 300 flanges: Figure 4 and Table 5.

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

NOTE 2 Figures 3 and 4 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 neck thickness S is ordered smaller than given in tables 4 and 5, 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 $A - 2 \times S$.

5.6.4 For flanges made of EN AW-6061 (AlMg1SiCu) -T6 the neck thickness S shall be sufficient to take account of lower strength properties due to welding.

5.7 Flange facings

5.7.1 Types of jointing faces

For the types of jointing faces see Figure 2, for the dimensions of jointing faces see Table 2.

5.7.2 Jointing face finish

All 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 finishes may be agreed between the manufacturer and purchaser.

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 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 are as specified in Table 6.

5.10 Marking

All flanges shall be marked as follows:

- Flange manufacturer's name or trade-mark (e.g. xxx);
- Number of this standard (EN 1759-4);
- DN or NPS (e.g. DN 300);
- Class (e.g. Class 150);
- Neck thickness if not standard (e.g. 7,1);
- Material designation (e.g. EN AW-5083-O);
- Batch number or suitable quality control number traceable to the batch number when test certification is required (e.g. yyy).

EXAMPLE xxx - EN 1759-4 - DN 300 - Class 150 - 7,1 - EN AW-5083-O - yyy

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

Table 1 — Synoptic table

Type	Class	DN and NPS														
		15 1/2	25 1	40 1 1/2	50 2	80 3	100 4	150 6	200 8	250 10	300 12	350 14	400 16	450 18	500 20	600 24
05, 11	150	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	300 ^a	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

^A Pressure temperature (p/T) ratings for material EN AW-5083-O are valid only for nominal sizes less and equal to DN 300 (NPS 12).

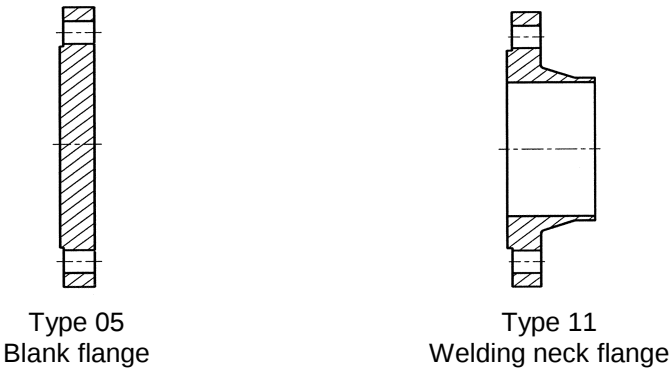
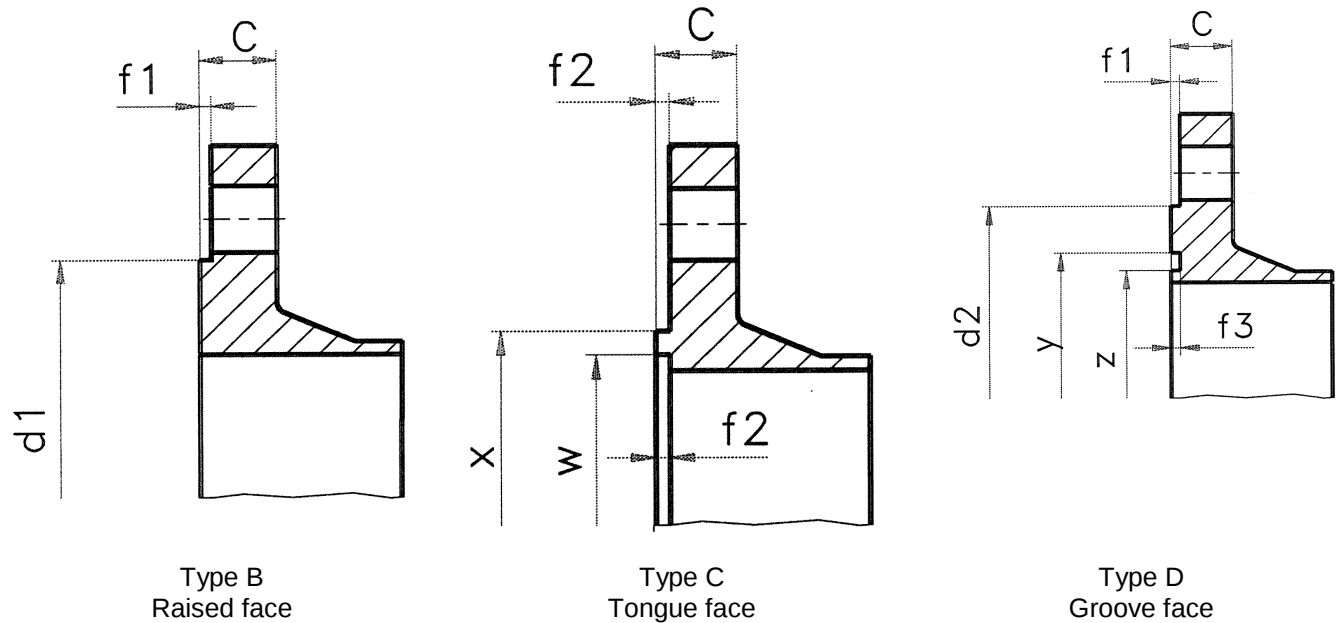


Figure 1 — Types of flanges



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

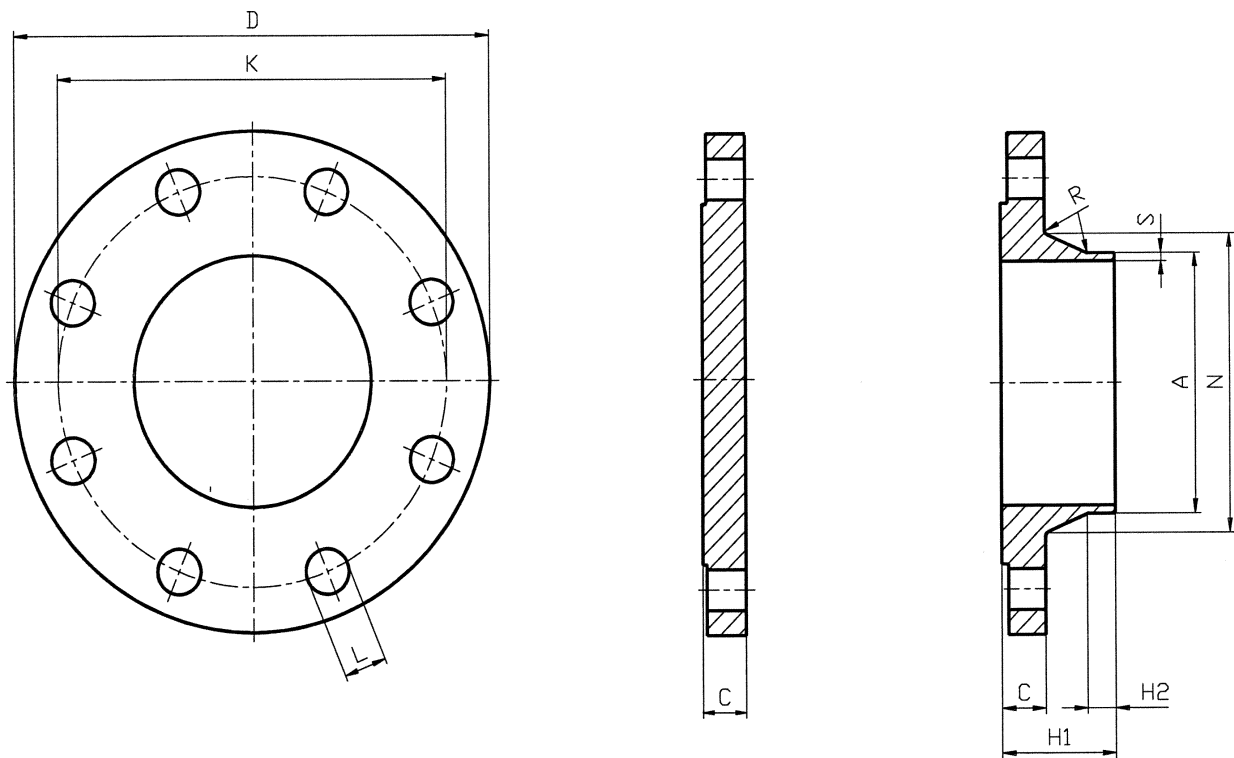
DN	NPS	d1	d2		f1	f2	f3	w	x		y		z
			CI 150	CI 300					CI 150	CI 300	CI 150	CI 300	
15	1/2	34,9	44,5	46,0	1,6	6,4	4,8	25,4	35,1	35,1	36,6	36,6	23,8
20	3/4	42,9	52,3	54,0	1,6	6,4	4,8	33,3	42,9	42,9	44,4	44,4	31,7
25	1	50,8	57,1	61,9	1,6	6,4	4,8	38,1	47,8	50,8	49,3	52,3	36,5
40	1 1/2	73,0	73,1	84,1	1,6	6,4	4,8	54,0	63,5	73,2	65,0	74,7	52,4
50	2	92,1	91,9	103,2	1,6	6,4	4,8	73,0	82,5	91,9	84,1	93,7	71,4
80	3	127,0	127,0	138,1	1,6	6,4	4,8	107,9	84,1	127,0	119,1	128,5	106,4
100	4	157,2	157,2	168,3	1,6	6,4	4,8	131,8	144,5	157,2	146,0	158,8	130,2
150	6	215,9	215,9	227,0	1,6	6,4	4,8	190,5	203,2	215,9	204,7	217,4	188,9
200	8	269,9	269,7	287,0	1,6	6,4	4,8	238,1	254,0	269,7	255,5	271,5	236,5
250	10	323,8	323,8	335,0	1,6	6,4	4,8	285,7	304,8	323,8	306,3	325,4	284,1
300	12	381,0	381,0	392,7	1,6	6,4	4,8	342,9	361,9	381,0	363,5	382,5	341,3
350	14	412,7	412,7	423,9	1,6	6,4	4,8	374,6	393,7	412,7	395,2	414,3	373,1
400	16	469,9	469,9	491,0	1,6	6,4	4,8	425,4	447,5	469,9	449,3	471,4	423,9
450	18	533,4	533,4	544,5	1,6	6,4	4,8	488,9	511,0	533,4	512,8	534,9	487,4
500	20	584,2	584,2	595,3	1,6	6,4	4,8	584,2	558,8	584,2	560,3	585,7	531,8
600	24	692,1	692,1	703,3	1,6	6,4	4,8	641,3	666,7	692,1	668,3	693,7	639,8

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.	max.	min.	max.
B1 ^a	Turning ^b	1,0	3,2	12,5	12,5	50
B2 ^a , C, D	Turning ^b	—	0,8	3,2	3,2	12,5

^a B1 and B2 are raised face (type B) with different surface roughness.

^b The term "turning" includes any method of machine operation producing either serrated concentric or serrated spiral grooves.



This diagram illustrates the arrangement but not necessarily the correct number of bolt holes.

Type 05

Type 11

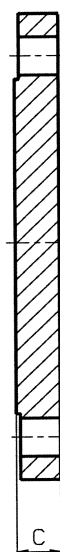
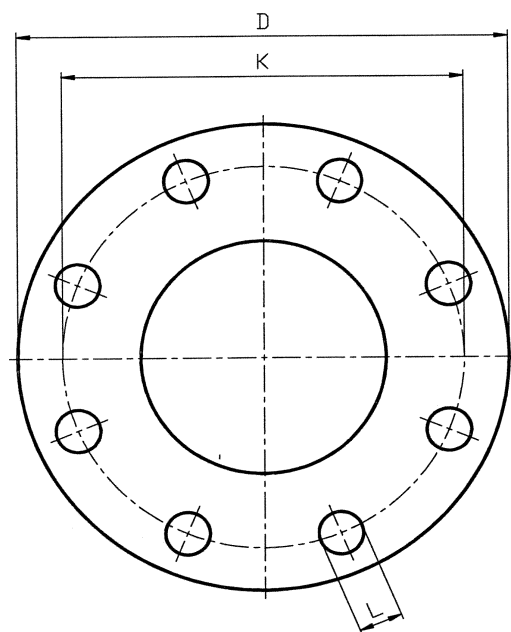
- NOTE 1 Dimension N is measured at the intersection of the projections of the hub draft angle and the back face of the flange.
- NOTE 2 For facing dimensions see Table 2.

Figure 3 — Dimensions of Class 150 flanges

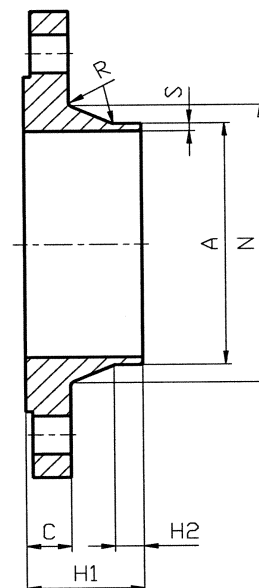
Table 4 — Dimensions of Class 150 flanges

Dimensions in millimetres

Nominal size		Mating dimensions					Flange thick- ness	Length		Neck			Corner Radii
					Bolting					Diameter		Thick- ness	
					Number	Nominal Size		N	A				
DN	NPS	D	K	L			inch	C	H1	H2			
15	1/2	89	60,3	15,9	4	1/2	11,3	47,6	5	30	21,3	2	3
20	3/4	98	69,8	15,9	4	1/2	12,7	52,4	5	38	26,7	2	3
25	1	108	79,4	15,9	4	1/2	14,3	55,6	5	49	33,4	2	3
40	1 1/2	127	98,4	15,9	4	1/2	17,5	61,9	5	65	48,3	2,5	3
50	2	152	120,6	19,0	4	5/8	19,0	63,5	5	78	60,3	2,5	3
80	3	190	152,4	19,0	4	5/8	23,8	69,9	5	108	88,9	2,5	3
100	4	229	190,5	19,0	8	5/8	23,8	76,2	6	135	114,3	3	3
150	6	279	241,3	22,2	8	3/4	25,4	88,9	6	192	168,3	3	6,5
200	8	343	298,4	22,2	8	3/4	28,6	101,6	8	246	219,1	4	6,5
250	10	406	362,0	25,4	12	7/8	30,2	101,6	8	305	273,0	4	6,5
300	12	483	431,8	25,4	12	7/8	31,8	114,3	10	365	323,9	5	9,5
350	14	533	476,2	28,6	12	1	34,9	127,0	10	400	355,6	6	9,5
400	16	597	539,8	28,6	16	1	36,5	127,0	10	457	406,4	6	9,5
450	18	635	577,8	31,8	16	1 1/8	39,7	139,7	12	505	457,2	8	9,5
500	20	698	635,0	31,8	20	1 1/8	42,9	144,5	12	559	508,0	8	9,5
600	24	813	749,3	34,9	20	1 1/4	47,6	152,4	15	664	609,6	10	9,5



Type 05



Type 11

This diagram illustrates the arrangement but not necessarily the correct number of bolt holes.

NOTE 1 Dimension N is measured at the intersection of the projections of the hub draft angle and the back face of the flange.

NOTE 2 For facing dimensions see Table 2.

Figure 4 — Dimensions of Class 300 flanges

Table 5 — Dimensions of Class 300 flanges

Dimensions in millimetres

Nominal size ^a		Mating dimensions					Flange thick-ness	Length		Neck			Corner Radii
					Bolting					Diameter	Thick-ness		
					Number	Nominal Size		N	A			S	R
DN	NPS	D	K	L			inch	C	H1	H2			
15	1/2	95	66,7	15,9	4	1/2	14,3	52,4	5	38	21,3	2	3
20	3/4	117	82,6	19,0	4	5/8	15,9	57,2	5	48	26,7	2	3
25	1	124	88,9	19,0	4	5/8	17,5	61,9	5	54	33,4	2	3
40	1 1/2	156	114,3	22,2	4	3/4	20,6	68,3	6	70	48,3	3	3
50	2	165	127,0	19,0	8	5/8	22,2	69,9	6	84	60,3	3,5	3
80	3	210	168,3	22,2	8	3/4	28,6	79,4	8	117	88,9	4	3
100	4	254	200,0	22,2	8	3/4	31,8	85,7	10	146	114,3	5	3
150	6	318	269,9	22,2	12	3/4	36,5	98,4	12	206	168,3	8	6,5
200	8	381	330,2	25,4	12	7/8	41,3	111,1	15	260	219,1	10	6,5
250	10	444	387,4	28,6	16	1	47,6	117,5	18	321	273,0	12	6,5
300	12	521	450,8	31,8	16	1 1/8	50,8	130,2	21	375	323,9	14	9,5
350	14	584	514,4	31,8	20	1 1/8	54,0	142,9	21	425	355,6	14	9,5
400	16	648	571,5	34,9	20	1 1/4	57,2	146,1	21	483	406,4	14	9,5
450	18	711	628,6	34,9	24	1 1/4	60,3	158,8	24	533	457,2	16	9,5
500	20	775	685,8	34,9	24	1 1/4	63,5	162,0	27	587	508,0	18	9,5
600	24	914	812,8	41,3	24	1 1/2	69,8	168,3	30	702	609,6	20	9,5

^a Pressure temperature (p/T) ratings for material EN AW-5083-O are valid only for nominal sizes less and equal to DN 300 (NPS 12).

Table 6 — Tolerances on dimensions

Dimensions in millimetres

Dimension	Symbol	Flange type	Size	Tolerance
Outside diameter of neck	<i>A</i>	11	all	$\pm 1\%$ max. $+2$ -1 including ovality
Neck thickness	<i>S</i>	11	all	$\pm 8\%$
Outside diameter of flange	<i>D</i>	05, 11	$\leq \text{DN } 150 \text{ (NPS } 6)$	± 2
			$> \text{DN } 150 \text{ (NPS } 6)$	± 3
Lengths	<i>H1, H2</i>	11	$\leq \text{DN } 80 \text{ (NPS } 3)$	$\pm 1,5$
			$> \text{DN } 80 \text{ to DN } 250 \text{ (NPS } 3 \text{ to NPS } 10)$	± 2
			$> \text{DN } 250 \text{ (NPS } 10)$	± 3
Neck diameter	<i>N</i>	11	$\leq \text{DN } 50 \text{ (NPS } 2)$	± 2
			$> \text{DN } 50 \text{ to DN } 250 \text{ (NPS } 3 \text{ to NPS } 10)$	± 3
			$> \text{DN } 250 \text{ (NPS } 10)$	± 4
Flange thickness	<i>C</i>	05, 11	all	± 1
Facing diameter	<i>d1</i>	05, 11	$\leq \text{DN } 250 \text{ (NPS } 10)$	$+2$ -1
			$> \text{DN } 250 \text{ (NPS } 10)$	$+3$ -1
Facing height	<i>f1</i> <i>f2</i> <i>f3</i>	05, 11	all	$+0,5$ 0
Facing diameter	<i>w</i>	05,11	all	$+0,5$ 0
	<i>x</i>			0 $-0,5$
	<i>y</i>			$+0,5$ 0
	<i>z</i>			0 $-0,5$
Diameter of bolt circle	<i>K</i>	05, 11	$\leq \text{M}24$	± 1
			$> \text{M}24$	$\pm 1,5$
Bolt hole diameter	<i>L</i>	05, 11	all	$+1,5$ 0
Center to center of adjacent bolt holes		05, 11	$\leq \text{M}24$	± 1
			$> \text{M}24$	$\pm 1,5$
Eccentricity of facing diameter		05, 11	$\leq \text{DN } 50 \text{ (NPS } 2)$	$0,5$
			$> \text{DN } 50 \text{ to DN } 150 \text{ (NPS } 2 \text{ to NPS } 6)$	1
			$> \text{DN } 150 \text{ to DN } 500 \text{ (NPS } 6 \text{ to NPS } 20)$	2
			$\text{DN } 600 \text{ (NPS } 24)$	3
Parallelism between bolting bearing surface and jointing face		05, 11	all	1°

Table 7 — p/T ratings

Class	Max. allowable pressure, PS (bar) for material at max. allowable temperature TS				
	EN AW-5083 (AlMg4,5Mn0,7) -O		EN AW-6061 T6		
	-270 °C to 50 °C	65 °C	-270 °C to 50 °C	100 °C	150 °C
150	13,5	13,3	18	17,1	14
300 ^a	35	34,5	49	46,6	38,2

^a Pressure temperature (p/T) ratings for material EN AW-5083-O are valid only for nominal sizes less and equal to DN 300 (NPS 12).

Annex A (informative)

Masses of flanges

Table A1 gives calculated masses of the flanges, which may be used for guidance only. These calculated masses are based on nominal dimensions given in Tables 4 and 5 and on a density of $2,7 \text{ kg/dm}^3$ for aluminium alloy materials.

The actual masses may vary from the calculated masses due to dimensional variations within the tolerances given in Table 6.

Table A.1 — Masses of flanges

Masses in kg

Nominal size		Masses			
DN	NPS	Class 150		Class 300	
		Type		Type	
		05	11	05	11
15	1/2	0,14	0,16	0,21	0,25
20	3/4	0,2	0,23	0,37	0,42
25	1	0,29	0,33	0,47	0,53
40	1 1/2	0,52	0,57	0,9	0,99
50	2	0,82	0,85	1,1	1,2
80	3	1,7	1,6	2,3	2,3
100	4	2,4	2,2	4	3,8
150	6	3,9	3,2	7,2	6,8
200	8	6,7	5,4	12	11
250	10	9,4	7,2	18	15
300	12	15	11	16	22
350	14	20	16	36	31
400	16	26	20	47	39
450	18	32	23	60	49
500	20	42	28	76	60
600	24	64	40	120	87

Annex B (informative)

Comparison of metric bolting to imperial bolting

If metric bolting is required in place of imperial bolting, table B1 gives the comparable metric bolt sizes that are given in ISO 7005.

NOTE The metric bolt sizes are larger in diameter than the imperial bolting. Depending on the tolerances of flange and gasket this may cause problems during assembly

Table B.1 — Comparison of nominal bolt sizes

Bolting	Nominal size							
	inch and mm							
Imperial	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 1/2
Metric	M14	M16	M20	M24	M27	M30	M33	M39

Annex ZA (informative)

Relationship between this European Standard and the Essential Requirements of EU Directive 97/23/EC

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association (EFTA) to provide a means of conforming to Essential Requirements of the New Approach Directive 97/23/EC (Pressure Equipment Directive, PED).

Once this standard is cited in the Official Journal of the European Communities under that Directive and has been implemented as a national standard in at least one Member State, compliance with the clauses of this standard given in table ZA confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding Essential Requirements of that Directive and associated EFTA regulations.

Table ZA — Correspondence between this European Standard and Directive 97/23/EC

Clause(s)/sub-clause(s) of this EN	Essential Requirements (ERs) of Directive 97/23/EC	Qualifying remarks/Notes
5.1	Materials: Materials for pressure equipment to be suitable during lifetime.	4
	Materials for pressurised parts to have appropriate properties for all operating and test conditions: — to be sufficiently ductile and tough.	4.1 (a)
5.5	Design	2
	To be designed to ensure safety throughout intended life – to incorporate appropriate safety coefficients.	2.1
	To be designed for adequate strength.	2.2
	To be designed for loadings appropriate to its intended use.	2.2.1
	To be designed for appropriate strength based on a calculation method.	2.2.2
	Requirements to be met by applying one of the following methods – design by formula.	2.2.3 (a)
	Design calculations to establish the resistance of equipment, in particular: — account to be taken of combinations of temperature and pressure; — maximum stresses and peak stresses to be within safe limits.	2.2.3 (b)
5.1 5.10.1 (f)	Traceability Identification of the material making up the component.	3.1.5

WARNING: Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

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