BS EN 12560-2:2013

BSI Standards Publication

Flanges and their joints — Dimensions of gaskets for Class-designated flanges

Part 2: Spiral wound gaskets for use with steel flanges

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National foreword

This British Standard is the UK implementation of EN 12560-2:2013. It supersedes BS EN 12560-2:2001 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PSE/15/2, Flanges - Jointing materials and compounds.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Brides et leurs assemblages - Dimensions des joints pour brides désignées Class - Partie 2: Joints spiralés pour utilisation avec des brides en acier

Flansche und ihre Verbindungen - Dichtungen für Flansche mit Class-Bezeichnung - Teil 2: Spiraldichtungen für Stahlflansche

This European Standard was approved by CEN on 10 August 2013.

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

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Foreword

This document (EN 12560-2:2013) 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of an identical text or by endorsement, at the latest by March 2014, and conflicting national standards shall be withdrawn at the latest by March 2014.

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 EN 12560-2:2001.

The main changes to this standard compared with EN 12560-2:2001 are:

a) The normative references have been updated.

b) 5.2 has been revised, and warning clause on asbestos has been deleted.

c) Gasket requirements in Clause 8 have been revised.

d) All tables in the standard have been revised.

e) Informative Annex A with A-deviations for use of asbestos has been deleted.

f) A Bibliography has been added.

EN 12560, "*Flanges and their joints — Gaskets for Class-designated flanges*" consists of seven parts:

— *Part 1: Non-metallic flat gaskets with or without inserts*

— *Part 2: Spiral wound gaskets for use with steel flanges* (the present document)

— *Part 3: Non-metallic PTFE envelope gaskets*

— *Part 4: Corrugated, flat or grooved metallic and filled metallic gaskets for use with steel flanges*

— *Part 5: Metallic ring joint gaskets for use with steel flanges*

— *Part 6: Covered serrated metal gaskets for use with steel flanges*

— *Part 7: Covered metal jacketed gaskets for use with steel flanges*

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1 Scope

This European Standard specifies the dimensions, design, types, designation, materials and marking of spiral wound gaskets for use with type A flat face or type B raised face flange facings complying with EN 1759-1 for the following Class designations:

— Class 150, to Class 1 500 for nominal sizes DN 15 to DN 600, and

— Class designation 2 500 up to and including DN 300.

The centering rings for the spiral wound gaskets according to this standard are sized for use with imperial bolting.

The dimensions of spiral wound gaskets for tongue and groove flange facing types and spigot and recess flange facing types to EN 1759-1 are not included in this standard.

Such gaskets may be available, however, for these types of flange and the purchaser is advised to consult the manufacturer as to their availability. Similarly, for slip-on or screwed flange types, the manufacturer should be consulted about availability.

NOTE Dimensions of other types of gasket for use with flanges complying with the requirements of EN 1759-1 are given in EN 12560-1, EN 12560-3, EN 12560-4 and EN 12560-5, EN 12560-6 and EN 12560-7.

2 Normative references

Not applicable.

3 Terms and definitions

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

3.1
DN
alphanumeric designation of size for components of a pipework system, which is used for reference purposes, comprised of the letters DN followed by a dimensionless whole number which is indirectly related to the physical size, in millimetres, of the bore or outside diameter of the end connections

Note 1 to entry: The number following the letters DN does not represent a measurable value and should not be used for calculation purposes except where specified in the relevant standard.

[SOURCE: EN ISO 6708:1995, 2.1, definition slightly modified]

3.2
NPS
alphanumeric designation of size for components of a pipework system, which is used for reference purposes, comprised of 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 to entry: 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.

[SOURCE: EN 1759-1:2004, 3.3, definition slightly modified]

3.3
Class
alphanumeric designation used for reference purposes related to a combination of mechanical and dimensional characteristics of a component of a pipework system, comprised of the word Class followed by a dimensionless whole number

Note 1 to entry: 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 to entry: The designation Class is not meaningful unless it is related to the relevant component standard number.

[SOURCE: EN 1759-1:2004, 3.1, definition slightly modified and NOTE 3 deleted]

4 Designations

4.1 Range of Class designations

Gaskets shall be designated as suitable for use with one or more of the flanges designated:

a) Class 150;

b) Class 300;

c) Class 600;

d) Class 900;

e) Class 1 500;

f) Class 2 500.

4.2 Range of gasket sizes

Gasket nominal sizes shall be designated in accordance with the ranges specified in Table 1.

4.3 Gasket designation

Gasket types, as defined in Clause 8 and illustrated in Figure 1, shall be designated as:

a) Type C/I; or

b) Type C/O.

4.4 Information to be supplied by the purchaser

When ordering gaskets, the purchaser shall provide to the supplier the:

a) number and Part of this European Standard;

b) gasket type designation (see 4.3) for incorporation of inner ring (see Clause 8);

c) nominal size (see Table 1);

d) Class designation (see Table 1);

e) required gasket materials or, where the gasket manufacturer is required to select the materials, the expected operating conditions for the application(s) for which the gasket(s) will be used.

Before ordering a gasket, it is recommended that the selection of the gasket type be made in consultation with the gasket supplier. The selection of gasket type should take account of the fluid, the operating conditions, the properties of the gasket materials, the type and surface finish of the flange facing and the flange bolt loading.

EXAMPLE A gasket according to EN 12560-2, Type C/I, of nominal size DN 100, Class 150, winding material X4CrNi18-10 (abbreviation 304) and PTFE filler material shall be designated as:

Gasket EN 12560-2 — C/I — DN 100 — Class 150 — 304 — PTFE

5 Gasket designs and materials

5.1 Gasket designs

Gaskets for which dimensions are specified shall be one of the designs shown in Figure 1.

The centering ring and, where used, the inner ring, shall be suitably grooved to retain the sealing element.

a) Type C/I **b) Type C/O**

Figure 1 — Spiral wound gasket designs

NOTE 1 Type A and type B flange facings are shown in EN 1759 -1.

NOTE 2 The profile of the metal winding of the sealing element is at the option of the manufacturer.

5.2 Materials

A list of metal windings and filler materials is given in Table 3.

The inner ring material shall match the winding material unless the purchaser specifies otherwise.

Gaskets made to this standard shall not contain asbestos.

The centering ring may be carbon steel that is painted, metal plated or otherwise coated to inhibit atmospheric corrosion.

The materials of the gasket, may, if required be chosen by the manufacturer to suit the operating conditions in the enquiry and/or order (see 4.4).

6 Construction

Spiral wound gaskets shall be constructed as alternative plies of preformed metal windings and pliant fillers which are spirally wound. For the finished gasket, the filler shall be essentially flush with, but not below, the metal winding on both contact faces of the gasket. The thickness of the metal winding strip in the sealing

element shall be between 0,15 mm and 0,23 mm. The filler material thickness is left to the discretion of the manufacturer. The profile of the metal winding of the sealing element is at the option of the manufacturer.

The inner windings shall have a minimum of three plies of preformed metal strip without filler. The inner plies shall be spot-welded about their circumference with a minimum of three welds, each no further than 75 mm apart.

The outer windings shall have a minimum of three plies of preformed metal without filler. The outer two plies shall be spot-welded about their circumference with a minimum of three terminal welds, with no more than 40 mm distance between the first and terminal welds.

Four additional loose preformed metal windings beyond the terminal weld may be used to retain the gasket into the centering ring.

7 Gasket compression

Gaskets for DN 15, DN 20 and DN 25 in Class 150, Class 300 and Class 600 shall be constructed so that an applied uniform bolt stress of 172 MPa, based on the nominal bolt root diameter, will compress the gasket to a thickness of 3,2 mm to 3,4 mm. All other gasket sizes and classes shall be constructed so that a uniform bolt stress of 207 MPa will compress the gasket to a thickness of 3,2 mm to 3,4 mm.

8 Gasket types

Gaskets shall be either of the following types:

a) sealing element type with centering ring and inner ring (designation: Type C/I); or

b) sealing element type with centering ring only (designation: Type C/O).

All gaskets shall have a centering ring. The centering ring thickness shall be from 2,97 mm to 3,33 mm and suitably grooved on the inside diameter so as to retain the spiral wound sealing element.

Inner rings shall be furnished with all spiral wound gaskets having PTFE (polytetrafluoroethylene) filler material.

Inner rings for flexible graphite filled spiral wound gaskets shall be furnished unless the purchaser specifies otherwise.

All filler material inner rings shall be furnished in spiral wound gaskets for:

— DN 600 in Class 900;

— DN 300 and larger in Class 1 500;

— DN 100 and larger in Class 2 500.

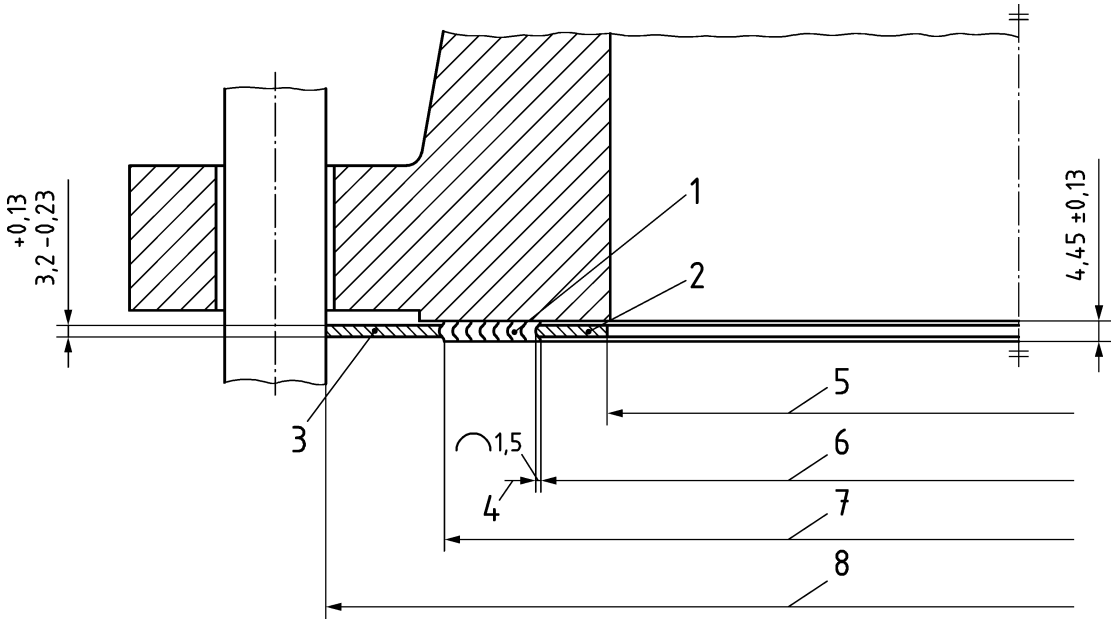
9 Dimensions

The diameters of spiral wound gaskets with centering ring, for use with types A and B flange facings, shall be as given in Table 1. For gaskets with an inner ring, the sealing element outside diameter and centering ring outside diameter shall be as given in Table 1 and the inner ring inside diameter shall be as given in Table 2.

NOTE Type A and B flange facings are shown in EN 1759-1.

The overall thickness is measured across the metallic portion of the sealing element of the gasket, the part not including the filler, as the latter may protrude slightly beyond the metal. The centering ring thickness shall be as given in Figure 2.

Dimensions in millimetres



Key

1 sealing element
2 inner ring
3 centering ring
4 bead
5 inner ring diameter
6 sealing element inner diameter
7 sealing element outer diameter
8 centering ring outer diameter

Figure 2 — Spiral wound gasket dimensions

Table 1 — Diameters of spiral wound gaskets with centering ring

Nominal size		Sealing element outside diameter [a] mm		Sealing element inside diameter [b] mm						Centering ring outside diameter [c] mm					
		Class 150, 300, 600	Class 900, 1 500, 2 500	Class 150	Class 300	Class 600	Class 900 [f]	Class 1 500	Class 2 500	Class 150	Class 300	Class 600	Class 900	Class 1 500	Class 2 500
DN	NPS [e]														
15 [d]	½ [d]	31,8	31,8	19,1	19,1	19,1	-	19,1	19,1	47,8	54,1	54,1	63,5	63,5	69,9
20 [d]	¾ [d]	39,6	39,6	25,4	25,4	25,4	-	25,4	25,4	57,2	66,8	66,8	69,9	69,9	76,2
25 [d]	1 [d]	47,8	47,8	31,8	31,8	31,8	-	31,8	31,8	66,8	73,2	73,2	79,5	79,5	85,9
32 [d]	1¼ [d]	60,5	60,5	47,8	47,8	47,8	-	39,6	39,6	76,2	82,6	82,6	88,9	88,9	104,9
40 [d]	1½ [d]	69,9	69,9	54,1	54,1	54,1	-	47,8	47,8	85,9	95,3	95,3	98,6	98,6	117,6
50	2	85,9	85,9	69,9	69,9	69,9	-	58,7	58,7	104,9	111,3	111,3	143,0	143,0	146,1
65	2½	98,6	98,6	82,6	82,6	82,6	-	69,9	69,9	124,0	130,3	130,3	165,1	165,1	168,4
80	3	120,7	120,7	101,6	101,6	101,6	95,3	92,2	92,2	136,7	149,4	149,4	168,4	174,8	196,9
100	4	149,4	149,4	127,0	127,0	120,7	120,7	117,6	117,6	174,8	181,1	193,8	206,5	209,6	235,0
125	5	177,8	177,8	155,7	155,7	147,6	147,6	143,0	143,0	196,9	215,9	241,3	247,7	254,0	279,4
150	6	209,6	209,6	182,6	182,6	174,8	174,8	171,5	171,5	222,3	251,0	266,7	289,1	282,7	317,5
200	8	263,7	257,3	233,4	233,4	225,6	222,3	215,9	215,9	279,4	308,1	320,8	358,9	352,6	387,4
250	10	317,5	311,2	287,3	287,3	274,6	276,4	266,7	270,0	339,9	362,0	400,1	435,1	435,1	476,3
300	12	374,7	368,3	339,9	339,9	327,2	323,9	323,9	317,5	409,7	422,4	457,2	498,6	520,7	549,4
350	14	406,4	400,1	371,6	371,6	362,0	355,6	362,0	-	450,9	485,9	492,3	520,7	577,9	-
400	16	463,6	457,2	422,4	422,4	412,8	412,8	406,4	-	514,4	539,8	565,2	574,8	641,4	-
450	18	527,1	520,7	474,7	474,7	469,9	463,6	463,6	-	549,4	596,9	612,9	638,3	704,9	-
500	20	577,9	571,5	525,5	525,5	520,7	520,7	514,4	-	606,6	654,1	682,8	698,5	755,7	-
600	24	685,8	679,5	628,7	628,7	628,7	628,7	616,0	-	717,6	774,7	790,7	838,2	901,7	-

NOTE For limitations on the maximum flange bore for use with these special wound gaskets, see Table A.2.

[a] The gasket outside diameter tolerance for DN 15 through DN 200 is ± 0,8 mm; for DN 250 through DN 600 $^{+1,5}_{-0,8}$ mm.

[b] The gasket inside diameter tolerance for DN 15 through DN 200 is ± 0,4 mm; for DN 250 through DN 600 ± 0,8 mm.

[c] Tolerance is ± 0,8 mm.

[d] These gasket dimensions are not suitable for use with slip-on or screwed flanges; in this case consult the manufacturer.

[e] For information only.

[f] For Class 900 flanges in DN 15 through DN 65 use Class 1 500.

Table 2 — Inner ring inside diameters

Nominal Size		Inner ring inside diameter [a] mm					
DN	NPS [c]	Class					
		150	300	600	900 [d]	1 500	2 500
15[b]	½[b]	14,2	14,2	14,2	-	14,2	14,2
20[b]	3/4[b]	20,6	20,6	20,6	-	20,6	20,6
25[b]	1[b]	26,9	26,9	26,9	-	26,9	26,9
32[b]	1¼[b]	38,1	38,1	38,1	-	33,3	33,3
40[b]	1½[b]	44,5	44,5	44,5	-	41,4	41,4
50	2	55,6	55,6	55,6	-	52,3	52,3
65	2½	66,5	66,5	66,5	-	63,5	63,5
80	3	81,0	81,0	81,0	78,7	78,7	78,7
100	4	106,4	106,4	102 ,6	102,6	97,8	97,8
125	5	131,8	131,8	128,3	128,3	124,5	124,5
150	6	157,2	157,2	154,9	154,9	147,3	147,3
200	8	215,9	215,9	205,7	196,9	196,9	196,9
250	10	268,2	268,2	255,3	246,1	246,1	246,1
300	12	317,5	317,5	307,3	292,1	292,1	292,1
350	14	349,3	349,3	342,9	320,8	320,8	-
400	16	400,1	400,1	389,9	374,7	368,3	-
450	18	449,3	449,3	438,2	425,5	425,5	-
500	20	500,1	500,1	489,0	482,6	476,3	-
600	24	603,3	603,3	590,6	590,6	577,9	-

NOTE See Annex A, Table A.1 for minimum pipe wall thickness that is suitable for use with inner rings.

[a] For DN 32 to DN 80, the tolerance is ± 0,8 mm; for larger sizes the tolerance is ± 1,5 mm.

[b] These gasket dimensions are not suitable for use with slip-on or screwed flanges; in this case consult the manufacturer.

[c] For information only.

[d] For Class 900 flanges in DN 15 through 65 use Class 1 500.

10 Marking

10.1 General

Gaskets shall be marked either individually or on the packaging containing the gaskets or, by agreement between manufacturer and purchaser on the packaging of each individual gasket with the number of this European Standard, i.e. EN 12560-2.

The centering ring of each gasket shall be permanently marked with:

a) the manufacturer's name or trade mark;

b) the nominal size (see Table 1);

c) the Class designation (see Table 1);

d) the manufacturer's symbols or colour coding as required in 10.2 for the materials of the metal winding, and the filler material and centering ring, unless carbon steel, and inner ring unless 304 stainless steel.

EXAMPLE AAA/BBB — N 200 — Class 150 — XXX

10.2 Colour coding

Spiral wound gaskets shall be marked with colour codes that identify the metal of the winding strip and the filler material.

A continuous colour around the centering ring edge shall identify the metal of the winding strip.

Intermittent stripes around the edge of the centering ring shall identify the filler material. For gasket sizes below DN 40 there will be a minimum of two stripes spaced approximately 180° apart. For gaskets of DN 40 and above there will be a minimum of four stripes spaced approximately 90° apart.

The colour codes shall conform to those listed in Table 3. For materials not given in Table 3, the colour code shall be agreed between the purchaser and the manufacturer.

Table 3 — Colour coding and abbreviations for spiral-wound gasket materials

Material (Mat. number)	Abbreviation	Colour code
Metallic materials		
Carbon steel	CRS	Silver
X4CrNi 18-10 (1.4301)	304	Yellow
X2CrNi 19-11 (1.4306)	304 L	No colour
X15CrNiSi 20-12 (1.4828)	309	No colour
X15CrNiSi 25-20 (1.4841)	310	No colour
X5CrNiMo17-12-2 (1.4401)	316 L	Green
X2CrNiMo 18-15-4 (1.4438)	317 L	Maroon
X6CrNiNb 18-10 (1.4550)	347	Blue
X6CrNiTi 18-10 (1.4541)	321	Turquoise
X6Cr 17 (1.4016)	430	No colour
NiCu30Fe (2.4360)	MON	Orange
Ni99.2 (2.4066)	NI	Red
Titanium	TI	Purple
NiCr20CuMo (2.4660)	A-20	Black
NiMo28 (2.4617)	HAST B	Brown
NiMo16Cr15W (2.4819)	HAST C	Beige
NiCr15Fe (2.4816)	INC 600	Gold
NiCr22Mo9Nb (2.4856)	INC 625	Gold
NiCr15Fe7TiAl (2.4669)	INX	No colour
X10NiCrAlTi32-20 (1.4876)	IN 800	White
NiCr21Mo (2.4858)	IN 825	White
Zirconium	ZIRC	No colour
Non-metallic filler materials		
Polytetrafluoroethylene	PTFE	White stripe
Mica-graphite	Manufacturer’s designation	Pink stripe
Flexible-graphite	F.G.	Gray stripe
Ceramic	CER	Light Green stripe

Annex A
(informative)

Minimum pipe wall thickness

Table A.1 — Minimum pipe wall thickness suitable for use with inner rings for EN 1759-1 flanges

<table>
<tr><th>Nominal size</th><th>Flange size</th><th colspan="6">Class</th></tr>
<tr><td>DN</td><td>(NPS)</td><td>150</td><td>300</td><td>600</td><td>900</td><td>1 500</td><td>2 500</td></tr>
<tr><td>15
20
25</td><td>½
¾
1</td><td colspan="6">Schedule 80</td></tr>
<tr><td>32
40
50
65
80
100
150</td><td>1¼
1½
2
2½
3
4
6</td><td colspan="4" rowspan="7">Schedule 40</td><td colspan="2"></td></tr>
<tr><td>200
250
300
350
400
450
500
600</td><td>8
10
12
14
16
18
20
24</td><td colspan="2" rowspan="8">Schedule 10S</td><td rowspan="8">Schedule 30</td><td colspan="2" rowspan="8">Schedule 80</td><td rowspan="8">No Flanges</td></tr>
</table>

Table A.2 — Maximum bore of flanges according to EN 1759-1 for use with spiral-wound gaskets

<table>
<tr><th>Nominal size</th><th>Flange size</th><th colspan="6">Class</th></tr>
<tr><td>DN</td><td>NPS</td><td>150</td><td>300</td><td>600</td><td>900 [a]</td><td>1 500 [a]</td><td>2 500 [a]</td></tr>
<tr><td>15</td><td>½</td><td colspan="3" rowspan="3">WN flange only [b]</td><td rowspan="6">No flanges
Use Class
1 500</td><td colspan="2" rowspan="6">WN flange only [b]</td></tr>
<tr><td>20</td><td>¾</td></tr>
<tr><td>25</td><td>1</td></tr>
<tr><td>32</td><td>1¼</td><td colspan="3">SO flange [c]
WN flange [b]</td></tr>
<tr><td>40</td><td>1½</td></tr>
<tr><td>50</td><td>2</td><td colspan="3">SO flange [c]
WN flange, any bore</td></tr>
<tr><td>65</td><td>2½</td><td rowspan="10">SO flange [c]
WN flange, any bore</td><td colspan="2">SO flange [c] WN flange, any bore</td><td rowspan="2"></td><td colspan="2">WN flange with SW bore
(includes nozzle [d] but excludes SO flange)</td></tr>
<tr><td>80</td><td>3</td><td rowspan="4">WN flange with Schedule 10 bore as described in ASME B 36.19M [d] (includes nozzle but excludes SO flange)</td></tr>
<tr><td>100</td><td>4</td><td rowspan="5">WN flange with Schedule 80 bore (excludes nozzle [d] and SO flange) [e]</td></tr>
<tr><td>150</td><td>6</td></tr>
<tr><td>200</td><td>8</td></tr>
<tr><td>250</td><td>10</td></tr>
<tr><td>300</td><td>12</td><td rowspan="5">WN flange with Schedule 10S bore as described in ASME B36.19M [d] (includes nozzle but excludes SO flange) [e]</td><td rowspan="5">No flanges</td></tr>
<tr><td>350</td><td>14</td></tr>
<tr><td>400</td><td>16</td></tr>
<tr><td>450</td><td>18</td></tr>
<tr><td>500</td><td>20</td></tr>
<tr><td>600</td><td>24</td></tr>
</table>

NOTE 1 This table shows the maximum bore of flanges for which the spiral-wound gasket dimensions shown in Table A.1 are recommended considering the tolerances involved, possible eccentric installation, and the possibility that the gasket may extend into the assembled flange bore.

NOTE 2 For maximum permissible flange bores for non-mandatory inner rings, see Table A.1.

NOTE 3 Abbreviations: SO – slip on and threaded; WN – welding neck; SW – standard wall.

[a] Refer to Clause 8 for the required use of inner rings. These inner rings may extend into the pipe bore a maximum of 1,52 mm under the worst combination of maximum bore, eccentric installation, and additive tolerances.

[b] In these sizes, the gasket is suitable for a welding neck flange for a standard wall bore, if the gasket and flanges are assembled concentrically. This also applies to a nozzle. It is the user's responsibility to determine if the gasket is satisfactory for a flange of any larger bore.

[c] Gaskets in these sizes are suitable for slip-on flanges only if the gaskets and flanges are assembled concentrically.

[d] A nozzle is a long welding neck; the bore equals the flange DN.

[e] A DN 600 gasket is suitable for nozzles.

Bibliography

[1] EN 1759-1, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, Class designated — Part 1: Steel flanges, NPS 1/2 to 24*

[2] EN 12560-1, *Flanges and their joints — Gaskets for Class-designated flanges — Part 1: Non-metallic flat gaskets with or without inserts*

[3] EN 12560-3, *Flanges and their joints — Gaskets for Class-designated flanges — Part 3: Non-metallic PTFE envelope gaskets*

[4] EN 12560-4, *Flanges and their joints — Gaskets for Class-designated flanges — Part 4: Corrugated, flat or grooved metallic and filled metallic gaskets for use with steel flanges*

[5] EN 12560-5, *Flanges and their joints — Gaskets for Class-designated flanges — Part 5: Metallic ring joint gaskets for use with steel flanges*

[6] EN 12560-6, *Flanges and their joints — Gaskets for Class-designated flanges — Part 6: Covered serrated metal gaskets for use with steel flanges*

[7] EN 12560-7, *Flanges and their joints — Gaskets for Class-designated flanges — Part 7: Covered metal jacketed gaskets for use with steel flanges*

[8] EN ISO 6708, *Pipework components — Definition and selection of DN (nominal size)(ISO 6708)*

[9] ASME B 36.19M, *Stainless steel pipe*

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