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GASKETS APPLICATIONS AND USE

Type	Section	Application	MAX DIMENSIONS (mm)		MAX OPERATING	MAX OPERATING	Page Nr.
			Diameter	Thickness	PRESSURE (bar)	TEMPERATURE (°C)	
ST10		Valves bonets, stoppers for boilers	4000	2.5-7.2	400	550	5
ST20		for high pressures, turbulences	4000	3.2-7.2	400	550	5
ST30		for high pressures	4000	3.2-7.2	400	550	5
ST40		for high pressures, turbulences	4000	3.2-7.2	400	550	5
ST10Z		gasket with sealing zone of PTFE	4000	3.2-4.5	400	260	5
OT0		flange mail-female	200	1.5-5.0	100	550	14
OT1		heat exchangers, steam and fluid seal	4000	2.0-10.0	100	550	14
OT2		heat exchangers, steam and fluid seal	4000	3.0-5.0	100	550	14
OT3		big flanges, not ideal flat	4000	2.0-10.0	100	550	14
OT4		heat exchangers, steam and fluid seal	4000	2.0-10.0	100	550	14
OT6		gas and vapor seals	4000	2.0-5.0	100	550	14
OT7		gas and vapor seals	4000	2.0-5.0	100	550	14
OT8		valve covers and vacuum seals	4000	2.0-4.0	100	550	14
OT9		steam (vapor) and fluid seal	2000	2.0-5.0	100	550	14
PT 4A		power plants, manhole, heat exchangers	4000	2.5-6.0	400	550	11
PT 4B		power plants, manhole, heat exchangers	4000	2.5-7.0	400	550	11
PT 4C		power plants, manhole, heat exchangers	4000	2.5.-8.0	400	550	11
PT 4D		power plants, manhole, heat exchangers	4000	2.5-9.0	400	550	11
PT 4E		power plants, manhole, heat exchangers	4000	0.2-3.0	400	550	11
PT 4E-G		power plants, manhole, heat exchangers	4000	2.0-6.0	400	550	11
PT 4X		power plants, manhole, heat exchangers	1500	3.0 - 6.0	400	550	11
KT 11		air and gas compressors	1000	30	160	550	18
KT 21-R		high temperature and pressure	1000	11.18-44.45	700	550	18
KT 31-R		high temperature and pressure	1000	9.65-41.4	700	550	18
KT 41-L		check valves, high temperature	1000	8.0-50.0	320	550	18
KT 51-RX		high temperature and pressure	600	19.05-25.4	700	550	18
KT 61-BX		high temperature and pressure	850	9.30-39.84	1500	550	18
NT1		low pressure applications, space limitation	4000	1.2-1.5	50	550	22
NT1A		low pressure applications, higher temperatures, gas ducts	4000	3.0-5.0	50	550	22
NT1AE		low pressure applications, higher temperatures, gas ducts	4000	4.0-5.0	50	550	22
NT2A		low pressure applications, higher temperatures, gas ducts	4000	5.0-5.0	50	550	22
NT10A		flanges with large diameter, process industry	4000	8.0-12.0	50	550	22
NT12A		flanges with large diameter, process industry	4000	8.0-12.0	50	550	22
NT1AP		flanges with large diameter, process industry	4000	5.0-8.0	50	550	22
MT1		all common applications	3000	1.5-3.0	100	250	27
MT1A		good resistance to erosion	1500	1.5-3.0	150	550	27
MT1E		good resistance to erosion	1500	1.5-3.0	250	550	27

Given values are recommended for typical flange gaskets constructions and operating conditions. Max. operating pressure and temperature can be increased by using special materials.

1. SPIRAL WOUND GASKETS

PROPERTIES AND CHARACTERISTICS

spiral wound gaskets are semi-metallic products designed for high pressure and tempera-ture applications used in chemical, petrochemical, pharmaceutical, food industries and power plants.

Spiral wound gaskets are one of the most commonly used semi-metal gaskets. The sealing element of the spiral wound gasket consists of a v-shaped metal strip spirally wound in combination with a soft sealing material filler. The metal strip provides outstanding resilience, while the flexible sealing filler guarantees excellent sealing. Due to this combination of materials the spiral wound gasket is suitable for sealing under severely fluctuating temperature and pressure conditions. Depending on the application the spiral wound gasket can be specified with outer and/or inner rings or without rings.

We also produce oval-shaped spiral wound gaskets for the sealing of valve covers or manhole covers.

General characteristics :

- The spiral wound gasket is suitable for use across a wide pressure range and is therefore widely applicable.
- The spiral wound gasket can be used to seal fluid pressures up to 250 bar and cryogenic temperatures as low – 200°C and up to elevated temperatures 800°C by using special metal materials and fillers.
- Due to its special design the spiral wound gasket is simple to install without causing damage (although extra care should be taken during transportation and installation of large diameter gaskets without guide rings).
- The outer guide ring serves to locate the spiral element centrally on the flange faces and prevent blow-out.
- By combining different winding materials and metals the gasket can be tailored to a wide variety of operating conditions.
- Due to its non-sticking character the gasket is easy to remove after service.
- The gasket does not cause damage to flange faces.

APPLICATION

- Refineries
- Petrochemical and chemical industry
- Food processing industry
- Power plants
- Compressors
- Pipelines
- Heat exchangers
- Valves
- Pumps

CERTIFICATES

- Ta-Luft

Standard gasket profiles

1. ST10
ST 10 / spiral wound gasket consists of sealing element without rings

2. ST20
ST 20 / spiral wound gasket consists of sealing element with inner ring

3. ST30
ST 30 / spiral wound gasket consists of sealing element with outer ring

4. ST40
ST 40 / spiral wound gasket consists of sealing element with outer and inner ring

5. ST10Z
ST 10Z / spiral wound gasket consists of sealing element without rings and special PTFE sealing zone

Metallic strip - winding

The most commonly used metallic strips are SS316, SS316L, SS 304, SS 321, SS 316Ti and Monel. Other materials are available on request.

STANDARD METAL MATERIALS

Material	AISI/ASTM	DIN EN 10 027-2 material No.	DIN EN 10 027-1 specification	BS	CSN specification	Temperature (°C)		Hardness (HB)
						Min.	Max.	
carbon steel	238-C	1.0038	RSt. 37.2 CS	40B	11 375	-40	+500	100 - 130
low carbon steel	/	1.1003	M2 / ARMCO	/	/	-60	+500	90 - 110
stainless steel	304	1.4301	X5CrNi 18	304S15/16/31	17 240	-200	+550	130 - 180
stainless steel	304L	1.4306	X2CrNi 189	304S11	17 249	-270	+550	130 - 170
stainless steel	309	1.4828	X15CrNiSi 2012	309S24	17 251	-110	+1000	130 - 220
stainless steel	316	1.4401	X5CrNiMo 1810	316S31/33	17 346	-200	+550	130 - 180
stainless steel	316Ti	1.4571	X10CrNiMoTi 1810	320S31	17 348	-270	+550	130 - 190
stainless steel	316L	1.4404	X2CrNiMo 1810	316S11/13	17 349	-200	+550	120 - 170
stainless steel	321	1.4541	X10CrNiTi 189	321S12/49/87	17 247	-270	+550	130 - 190

Standard fillers

The most commonly used fillers are expanded graphite, PTFE, ceramic paper, mica.

Material	Temperature (°C)		pH	Application	Colour coding
	Min.	Max.			
Graphite	-200	+550	0 - 14	agressive medium	grey
PTFE	-200	+260	0 - 14	agressive medium	white
Ceramic	-200	+1100	-	very high temperatures	light green
Mica	-200	+1000	-	high temperatures	pink

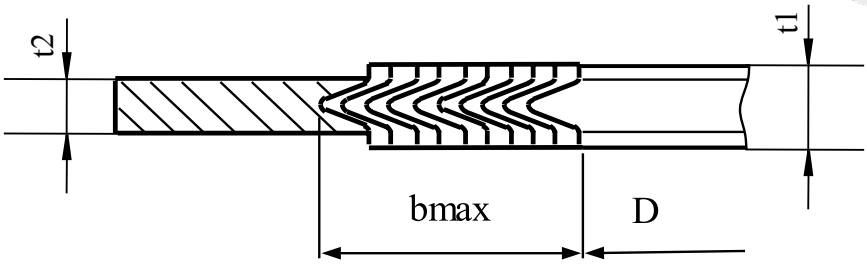
Centering and inner rings

Centering rings are usually made of carbon steel. Inner rings are usually made of the same material as the gasket metallic strip. SS316L, SS304, SS321 and SS316Ti are most often used for inner rings. Monel and other materials are available on demand.

DIMENSIONS

Thickness of gaskets

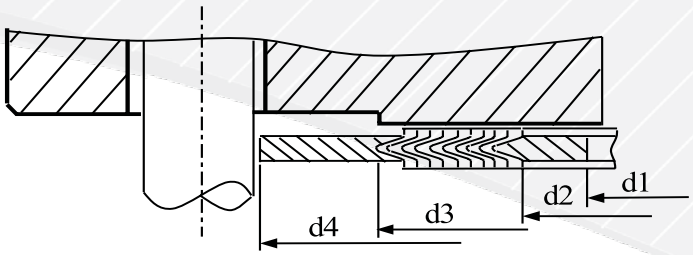
Standard thicknesses of SWG gaskets are from 2.5 mm up to 7.2 mm.



t1 [mm]	Tolerance (t1) [mm]	D [mm]	bmax [mm]	t2 [mm]	Thickness after fitting [mm]
7.2	+0,35	100 - 4000	33	5	5.3-5.6
6.4	+0,30	100 - 1600	30	4	4.6-4.8
		1601 - 4000	25		
standard 4.5	+0,30	15 - 630	35	3	3.2-3.4
		631 - 1600	30		
		1601 - 4000	20		
3.5	+0,25	15 - 1000	25	2	2.3-2.5
3.2	+0,25	15 - 1000	20		
2.5	+0,25	15 - 500	10	1.5	1.8-2.0

Standard sizes

Gasket dimensions are available according to EN 1514-2, ASME/ANSI B 16.5, ASME B 16.47 series B, ASME B 16.47 series A, BS 1560, DIN standard and non-standard sizes.



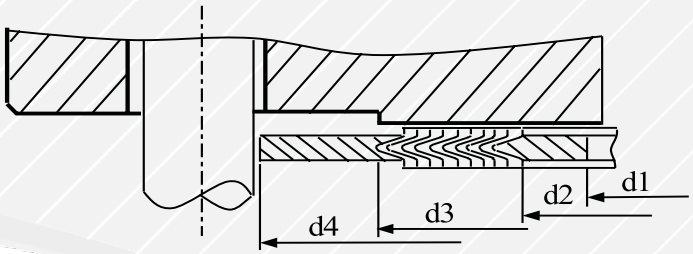
BS 3381 for BS 1560 - ANSI B 16.5 flanges

NPS (in)	d1 [mm]		d2 [mm]		d3 [mm]	d4 [mm]						
Class (lb)	150-400	600-2500	150-400	600-2500	150-2500	150	300	400	600	900	1500	2500
1/2	12,7	12,7	19,1	19,1	31,8	44,4	50,8	50,8	50,8	60,3	60,3	66,7
3/4	20,6	20,6	27	27	39,7	53,9	63,5	63,5	63,5	66,7	66,7	73
1	27	27	33,3	33,3	47,6	63,5	69,8	69,8	69,8	76,2	76,2	82,5
1 1/4	41,3	39,7	47,6	46	60,3	73	79,4	79,4	79,4	85,7	85,7	101,6
1 1/2	49,2	47,6	55,6	54	69,9	82,5	92,1	92,1	92,1	95,2	95,2	114,3
2	61,9	60,3	71,4	69,9	85,7	101,6	108	108	108	139,7	139,7	142,8
2 1/2	74,6	73	84,1	82,6	98,4	120,6	127	127	127	161,9	161,9	165,1
3	95,3	92,1	104,8	101,6	120,7	133,4	146,1	146,1	146,1	165,1	171,5	193,7
3 1/2	108	104,8	117,5	114,3	133,4	158,8	161,9	158,7	158,7			
4	117,5	114,3	130,2	127	149,2	171,5	177,8	174,6	190,5	203,2	206,4	231,7
5	144,5	141,3	157,2	154	177,8	193,7	212,7	209,5	238,1	244,5	250,8	276,2
6	171,5	168,3	184,2	181	209,6	219,1	247,7	244,5	263,5	285,5	279,4	314,3
8	222,3	219,1	235	231,8	263,5	276,2	304,8	301,6	317,5	355,6	349,3	384,1
10	276,2	269,9	288,9	282,6	317,5	336,5	358,8	355,6	396,9	431,8	431,8	473
12	330,2	323,8	342,9	336,5	374,6	406,4	419,1	415,9	454	495,3	517,5	546,1
14	361,9	355,6	374,6	368,3	406,4	447,4	482,6	479,4	488,9	517,5	574,7	
16	412,7	406,4	425,4	419,1	463,5	511,2	536,6	533,4	561,9	571,5	638,1	
18	466,7	460,4	479,4	473,1	527	546,1	593,7	590,5	609,6	635	701,7	
20	517,5	511,2	530,2	523,9	577,8	603,2	650,9	644,5	679,5	695,3	752,4	
22	574,4	568,4	587,4	581,1	635	657,2	701,7	698,5	730,3			
24	622,3	615,9	635	628,6	685,8	714,4	771,5	765,2	787,4	835	898,5	

DN (mm)	NPS (in)
15	1/2
20	3/4
25	1
32	1 1/4
40	1 1/2
50	2
65	2 1/2

DN (mm)	NPS (in)
80	3
90	3 1/2
100	4
125	5
150	6
200	8
250	10

DN (mm)	NPS (in)
300	12
350	14
400	16
450	18
500	20
550	22
600	24



EN 1514-2 for EN 1092-1 flanges

DN [mm]	d1 [mm]	d2 [mm]	d3 [mm]		d4 [mm]									
	pressure class [bar]	pressure class [bar]	pressure class [bar]		pressure class [bar]									
	10-320	10-320	10-40	64-320	10	16	25	40	64	100	160	250	320	400
10	18	24	36	36	46	46	46	46	56	56	56	67	67	67
15	22	28	40	40	51	51	51	51	61	61	61	72	72	78
20	27	33	47	47	61	61	61	61	72	72	72	77	77	
25	34	40	54	54	71	71	71	71	82	82	82	83	92	104
32	43	49	65	65	82	82	82	82	90	90	90	100		
40	48	54	70	70	92	92	92	92	103	103	103	109	119	135
50	57	66	84	84	107	107	107	107	113	119	119	124	134	150
65	73	82	102	104	127	127	127	127	137	143	143	153	170	192
80	86	95	115	119	142	142	142	142	148	154	154	170	190	207
100	108	120	140	144	162	162	168	168	174	180	180	202	229	256
125	134	146	168	172	192	192	194	194	210	217	217	242	274	301
150	162	174	196	200	217	217	224	224	247	257	257	284	311	348
175	183	195	221	227	247	247	254	265	277	287	284	316	358	402
200	213	225	251	257	272	272	284	290	309	324	324	358	398	442
250	267	279	307	315	327	328	340	352	364	391	388	442	488	
300	318	330	358	366	377	383	400	417	424	458	458	538		
350	363	375	405	413	437	443	457	474	486	512				
400	414	426	458	466	488	495	514	546	543	572				
450	460	478	526	551	558	567	574	578	534					
500	518	530	566	574	593	617	624	628	657	704				
600	618	630	666	674	695	734	731	747	764	813				
700	718	730	770	778	810	804	833	852	879					
800	818	830	874	882	917	911	942	974	988					
900	910	930	974	982	1017	1011	1042	1084	1108					
1000	1010	1030	1078	1086	1124	1128	1154	1194	1220					
1200	1210	1230	1280	1290	1341	1342	1364	1398	1452					
1400	1420	1450	1510		1548	1542	1578	1618						
1600	1630	1660	1720		1772	1764	1798	1830						
1800	1830	1860	1920		1972	1964	2000							
2000	2020	2050	2120		2182	2168	2230							
2200	2230	2260	2330		2384	2376								
2400	2430	2480	2530		2594									
2600	2630	2660	2730		2794									
2800	2830	2860	2930		3014									
3000	3030	3060	3130		3228									

ASME B 16.20 gaskets for ASME B 16.5 flanges

NPS (in)	d1 [mm]					d2 [mm]					d3 [mm]		d4 [mm]						
Class (lb)	150-300	400-600	900	1500	2500	150-300	400-600	900	1500	2500	150-600	900-2500	150	300	400	600	900	1500	2500
1/2	14,2	14,2	14,2	14,2	14,2	19,1	19,1	19,1	19,1	19,1	31,8	31,8	47,8	54,1	54,1	54,1	63,5	63,5	69,9
3/4	20,6	20,6	20,6	20,6	20,6	25,4	25,4	25,4	25,4	25,4	39,6	39,6	57,2	66,8	66,8	66,8	69,9	69,9	76,2
1	26,9	26,9	26,9	26,9	26,9	31,8	31,8	31,8	31,8	31,8	47,8	47,8	66,8	73,2	73,2	73,2	79,5	79,5	85,9
1 1/4	38,1	38,1	38,1	33,3	33,3	47,8	47,8	39,6	39,6	39,6	60,5	60,5	76,2	82,6	82,6	82,6	88,9	88,9	104,9
1 1/2	44,5	44,5	44,5	41,4	41,4	54,1	54,1	47,8	47,8	47,8	69,9	69,9	85,9	95,3	95,3	95,3	98,6	98,6	117,6
2	55,6	55,6	55,6	52,3	52,3	69,9	69,9	58,7	58,7	58,7	85,9	85,9	104,9	111,3	111,3	111,3	143,0	143,0	146,1
2 1/2	66,5	66,5	66,5	63,5	63,5	82,6	82,6	69,9	69,9	69,9	98,6	98,6	124,0	130,3	130,3	130,3	165,1	165,1	168,4
3	81,0	81,0	81,0	81,0	81,0	101,6	101,6	95,3	92,2	92,2	120,7	120,7	136,7	149,4	149,4	149,4	168,4	174,8	196,9
4	106,4	106,4	106,4	106,4	106,4	127,0	120,7	120,7	117,6	117,6	149,4	149,4	174,8	181,1	177,8	193,8	206,5	209,6	235,0
5	131,8	131,8	131,8	131,8	131,8	155,7	147,6	147,6	143,0	143,0	177,8	177,8	196,9	215,9	212,9	241,3	247,7	254,0	279,4
6	157,2	157,2	157,2	157,2	157,2	182,6	174,8	174,8	171,5	171,5	209,6	209,6	222,3	251,0	247,7	266,7	289,1	282,7	317,5
8	215,9	209,6	196,9	196,9	196,9	233,4	225,6	222,3	215,9	215,9	263,7	257,3	279,4	308,1	304,8	320,8	358,9	352,6	387,4
10	268,2	260,4	246,1	246,1	246,1	287,3	274,6	276,4	266,7	270,0	317,5	311,2	339,9	362,0	358,9	400,1	435,1	435,1	476,3
12	317,5	317,5	292,1	292,1	292,1	339,9	327,2	323,9	323,9	317,5	374,7	368,3	409,7	422,4	419,1	457,2	498,6	520,7	549,4
14	349,3	349,3	320,8	320,8		371,6	362,0	356,6	362,0		406,4	400,1	450,9	485,9	482,6	492,3	520,7	577,9	
16	400,1	400,1	374,7	368,3		422,4	412,8	412,8	406,7		463,6	457,2	514,4	539,8	536,7	565,2	574,8	641,4	
18	449,3	449,3	425,5	425,5		474,7	469,9	463,6	463,6		527,1	520,7	549,4	596,9	593,9	612,9	638,3	704,9	
20	500,1	500,1	482,6	476,3		525,5	520,7	520,7	514,4		577,9	571,5	606,6	654,1	647,7	682,8	698,5	755,7	
24	603,3	603,3	590,6	577,9		628,7	628,7	628,7	616,0		685,8	679,5	717,6	774,7	768,4	790,7	838,2	901,7	

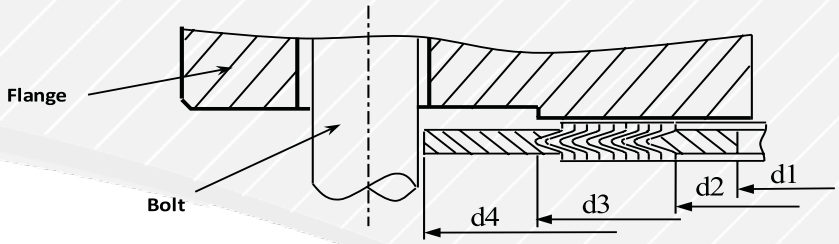
ASME B 16.20 for ASME B 16.47 series B flanges

NPS	d1 [mm]					d2 [mm]					d3 [mm]					d4 [mm]				
	pressure class [lbs]					pressure class [lbs]					pressure class [lbs]					pressure class [lbs]				
	150	300	400	600	900	150	300	400	600	900	150	300	400	600	900	150	300	400	600	900
26"	654,10	654,10	654,10	644,70	666,80	673,10	673,10	666,80	663,70	692,20	698,50	711,2	698,5	714,5	749,3	725,4	771,7	746,3	765,3	838,2
28"	704,9	704,9	701,8	692,2	717,8	723,9	723,9	714,5	704,9	743,0	749,3	762,0	749,3	755,7	800,1	776,2	825,5	800,1	819,2	901,7
30"	755,7	755,7	752,6	752,6	781,1	774,7	774,7	765,3	778,0	806,5	800,1	812,8	806,5	828,8	857,3	827,0	886,0	857,3	879,6	958,9
32"	806,5	806,5	800,1	793,8	838,2	825,5	825,5	812,8	831,9	863,6	850,9	863,6	858,8	882,7	914,4	881,1	939,8	911,4	933,5	1016,0
34"	857,3	857,3	850,9	850,9	859,4	876,3	876,3	866,9	889,0	920,8	908,1	914,4	911,4	939,8	971,6	935,0	993,9	962,2	997,0	1073,2
36"	908,1	908,1	898,7	901,7	920,8	927,1	927,1	917,7	939,8	946,2	958,9	962,2	965,2	990,6	997,0	987,6	1047,8	1022,4	1047,8	1124,0
38"	958,9	971,6	952,5	952,5	1009,7	974,6	1009,7	971,6	990,6	1035,1	1009,7	1047,8	1022,4	1041,4	1085,9	1044,7	1098,6	1073,2	1104,9	1200,2
40"	1009,7	1003,3	1000,3	1009,7	1060,5	1022,4	1060,5	1025,7	1047,8	1098,6	1063,8	1098,6	1076,5	1098,6	1149,4	1095,5	1149,4	1127,3	1155,7	1251,0
42"	1060,5	1054,1	1051,1	1066,8	1111,3	1079,5	1111,3	1076,5	1104,9	1149,4	1114,6	1149,4	1127,3	1155,7	1200,2	1146,3	1200,2	1178,1	1219,2	1301,8
44"	1111,3	1124,0	1104,9	1111,3	1155,7	1124,0	1162,1	1130,3	1162,1	1206,5	1165,4	1200,0	1181,1	1212,9	1257,3	1197,1	1251,0	1231,9	1270,0	1368,6
46"	1162,1	1178,1	1168,4	1162,1	1219,2	1181,1	1216,2	1193,8	1212,9	1270,0	1224,0	1254,3	1244,6	1263,7	1320,8	1255,8	1317,8	1289,1	1327,2	1435,1
48"	1212,9	1231,9	1206,5	1219,2	1270,0	1231,9	1263,7	1244,6	1270,0	1320,8	1270,0	1311,4	1295,4	1320,8	1371,6	1306,6	1368,6	1346,2	1390,7	1485,9
50"	1263,7	1267,0	1257,3	1270,0		1282,7	1317,8	1295,4	1320,8		1325,6	1355,9	1346,2	1371,6		1357,4	1419,4	1403,4	1447,8	
52"	1314,5	1317,8	1308,1	1320,8		1333,5	1368,6	1346,2	1371,6		1376,4	1406,7	1397,0	1422,4		1408,2	1470,2	1454,2	1498,6	
54"	1365,3	1365,3	1352,6	1378,0		1384,3	1403,4	1403,4	1428,8		1422,4	1454,2	1454,2	1479,6		1463,8	1530,4	1517,7	1555,8	
56"	1422,4	1428,8	1403,4	1428,8		1444,8	1479,6	1454,2	1479,6		1477,8	1524,0	1505,0	1530,4		1514,6	1593,9	1568,5	1612,9	
58"	1478,0	1484,4	1454,2	1473,2		1500,4	1535,2	1505,0	1536,7		1528,8	1573,3	1555,8	1587,5		1579,6	1655,8	1619,3	1663,7	
60"	1535,2	1557,3	1517,7	1530,4		1557,3	1589,0	1568,5	1593,9		1586,0	1630,4	1619,3	1644,7		1630,4	1706,6	1682,8	1733,6	

ASME B 16.20 for ASME B 16.47 series A flanges

NPS	d1 [mm]					d2 [mm]					d3 [mm]					d4 [mm]				
	pressure class [lbs]					pressure class [lbs]					pressure class [lbs]					pressure class [lbs]				
	150	300	400	600	900	150	300	400	600	900	150	300	400	600	900	150	300	400	600	900
26"	654,1	654,1	660,4	647,7	666,8	673,1	685,8	685,8	685,8	685,8	704,9	736,6	736,6	736,6	736,6	774,7	835,2	831,9	866,9	882,7
28"	704,9	704,9	711,2	698,5	711,2	723,9	736,6	736,6	736,6	736,6	755,7	787,4	787,4	787,4	787,4	831,9	898,7	892,3	914,4	946,2
30"	755,7	755,7	755,7	755,7	774,7	774,7	793,8	793,8	793,8	793,8	806,5	844,6	844,6	844,6	844,6	882,7	952,5	946,2	971,6	1009,7
32"	806,5	806,5	812,8	812,8	812,8	825,5	850,9	850,9	850,9	850,9	860,6	901,7	901,7	901,7	901,7	939,8	1006,6	1003,3	1022,4	1073,2
34"	857,3	857,3	863,6	863,6	863,6	876,3	901,7	901,7	901,7	901,7	911,4	952,5	952,5	952,5	952,5	990,6	1057,4	1054,1	1073,2	1136,7
36"	908,1	908,1	917,7	917,7	920,8	927,1	955,8	955,8	955,8	958,9	968,5	1006,6	1006,6	1006,6	1009,7	1047,8	1117,6	1117,6	1130,3	1200,2
38"	958,9	952,5	952,5	952,5	1009,7	977,9	977,9	971,6	990,6	1035,1	1019,3	1016,0	1022,4	1041,4	1085,9	1111,3	1054,1	1073,2	1104,9	1200,2
40"	1009,7	1003,3	1000,3	1009,7	1060,5	1028,7	1022,4	1025,7	1047,8	1098,6	1070,1	1070,1	1076,5	1098,6	1149,4	1162,1	1114,6	1127,3	1155,7	1251,0
42"	1050,5	1054,1	1051,1	1066,8	1111,3	1079,5	1073,2	1076,5	1104,9	1149,4	1124,0	1120,9	1127,3	1155,7	1200,2	1219,2	1165,4	1178,1	1219,2	1301,8
44"	1111,3	1104,9	1104,9	1111,3	1155,7	1130,3	1130,3	1130,3	1162,1	1206,5	1178,1	1181,1	1181,1	1212,9	1257,3	1276,4	1219,2	1231,9	1270,0	1368,6
46"	1162,1	1152,6	1168,4	1162,1	1219,2	1181,1	1178,1	1193,8	1212,9	1270,0	1228,9	1228,9	1244,6	1263,7	1320,8	1327,2	1273,3	1289,1	1327,2	1435,1
48"	1212,9	1209,8	1206,5	1219,2	1270,0	1231,9	1235,2	1244,6	1270,0	1320,8	1279,7	1286,0	1295,4	1320,8	1371,6	1384,3	1324,1	1346,2	1390,7	1485,9
50"	1263,7	1244,6	1257,3	1270,0		1282,7	1295,4	1295,4	1320,8		1333,5	1346,2	1346,2	1371,6		1435,1	1378,0	1403,4	1447,8	
52"	1314,5	1320,8	1308,1	1320,8		1333,5	1346,2	1346,2	1371,6		1384,3	1397,0	1397,0	1422,4		1492,3	1428,8	1454,2	1498,6	
54"	1358,9	1352,6	1352,6	1378,0		1384,3	1403,4	1403,4	1428,8		1435,1	1454,2	1454,2	1479,6		1549,4	1492,3	1517,7	1555,8	
56"	1409,7	1403,4	1403,4	1428,8		1435,1	1454,2	1454,2	1479,6		1485,9	1505,0	1505,0	1530,4		1606,6	1543,1	1568,5	1612,9	
58"	1460,5	1447,8	1454,2	1473,2		1485,9	1511,3	1505,0	1536,7		1536,7	1562,1	1555,8	1587,5		1663,7	1593,9	1619,3	1663,7	
60"	1511,3	1524,0	1517,7	1530,4		1535,7	1562,1	1568,5	1593,9		1587,5	1612,9	1619,3	1644,7		1714,5	1644,7	1682,8	1733,6	

Production tolerances



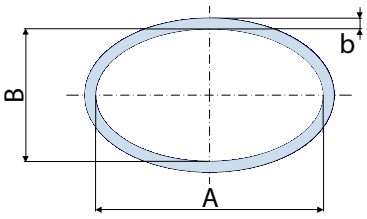
Gasket standard	ASME B 16.20				BS 3381		DIN / EN	
Flange standard	ASME/ANSI B16.5		series A,B		BS 1560			
Dimension	Ø	tolerance [mm]	Ø	tolerance [mm]	Ø	tolerance [mm]	Ø	tolerance [mm]
d1	1/2"-3"	±0,8	26"-60"	±3	1/2"-3"	+0,8	≤600	±0,8
	4"-24"	±1,5			4"-24"	+1,5	>600≤800	±1,5
							>800≤1600	±3
							>2000	±3
d2	1/2"-8"	±0,4	26"-34"	±0,8	1/2"-8"	+0,4	≤600	±0,8
	10"-24"	±0,8	36"-60"	±1,3	10"-24"	+1,5	>600≤800	±1,5
							>800≤1600	±1,5
							>1600	±3
d3	1/2"-8"	±0,8	26"-60"	±1,5	1/2"-8"	-0,8	≤600	±0,8
	10"-24"	+1,5-0,8			10"-24"	-1,5	>600≤1600	±1,5
							>1600	±3
d4	1/2"-24"	±0,8	26"-60"	±0,8	1/2"-24"	±0,8	≤600	-0,8
							>600≤1000	-1,5
							>1000≤2000	-2
							>2000	-3

Recommended flange surface finish

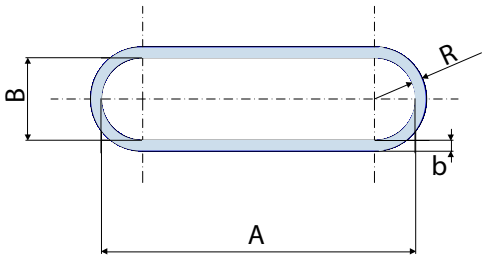
Ra = 3,2 – 12,5 µm

NON STANDARD SPIRAL WOUND GASKETS

SWG gaskets can be delivered not only in circular but also in oval, oblong or rectangular shape and in dimensions according to customer request.



Dim.: AxBxbxs (thickness)



Dim.: AxBxbxs (thickness)

GASKET ORDERING EXAMPLE

SWG ST 40 ASME B 16.20 for
ASME B16.5 Dimension: 3"
150 lbs Winding : AISI 316
Filler : Graphite 98 %
Inner ring : AISI 316
Outer ring : Carbon steel (CS)

GASKET ORDERING EXAMPLE

SWG ST10 AxBxbxs
Winding: AISI 316
Filler: Graphite 98%

2. GROOVED GASKETS

PROPERTIES AND CHARACTERISTICS

grooved or cammprofile gaskets consist of a metal core with concentric grooves and a soft layer of sealing material bonded to both grooved faces. Grooved gaskets are an excellent solution for extreme operating conditions. Non-metal layers ensure that flanges remain undamaged while a metal core ensures the gasket's stability. Grooved gaskets provide the highest level of sealing integrity and have the ability to seal at low seating stress. Very low diffusion level and very high density ensure very low leakage rates. Grooved gaskets are proven to be very effective where temperatures and pressures are constantly fluctuating. They can be used as an alternative for applications associated with metal jacketed gaskets and are ideal choice for heat exchanger services.

General characteristics :

- Cammprofiles resist pressures up to 400 bar, and depending on the sealing layer gaskets can resist temperatures up to approx. +1000 °C.
- Gaskets are suitable for applications according to various specifications for flanges (DIN, ASTM, EN, CSN, etc.) and a very wide seating stress range (highly suitable for varying temperatures and pressures, less sensitive to assembly faults, suitable for light and heavy designed flanges).
- Grooved gaskets do not damage the flange surface and can be easily removed.

APPLICATION

- Chemical and petrochemical industry
- Nuclear power stations
- Steam generation
- Power plants
- Heat exchangers

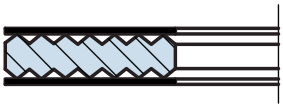
Standard gasket profiles

Grooved gaskets are made in several different profiles to Profile shapes PT4A, PT4B, PT4C, PT4D, PT4E, PT4E-G, PT4X.

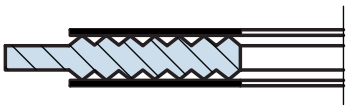
CERTIFICATES

- Ta-Luft

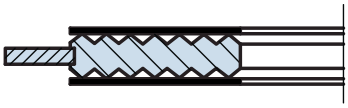
PT4A



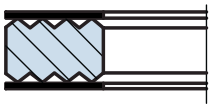
PT4B



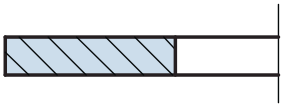
PT4C



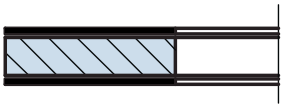
PT4D



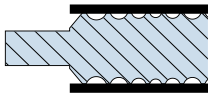
PT4E



PT4E-G



PT4X



Standard core materials

Material	AISI/ASTM	DIN EN 10 027-2 material No.	DIN EN 10 027-1 specification	BS	CSN specification	Temperature (°C)		Hardness (HB)
						Min.	Max.	
carbon steel	238-C	1.0038	RSt. 37.2 CS	40B	11 375	-40	+500	100 - 130
low carbon steel	/	1.1003	M2 / ARMCO	/	/	-60	+500	90 - 110
stainless steel	304	1.4301	X5CrNi 18	304S15/16/31	17 240	-200	+550	130 - 180
stainless steel	304L	1.4306	X2CrNi 189	304S11	17 249	-270	+550	130 - 190
stainless steel	309	1.4828	X15CrNiSi 2012	309S24	17 251	-110	+1000	130 - 190
stainless steel	316	1.4401	X5CrNiMo 1810	316S31/33	17 346	-200	+550	130 - 180
stainless steel	316Ti	1.4571	X10CrNiMoTi 1810	320S31	17 348	-270	+550	130 - 190
stainless steel	316L	1.4404	X2CrNiMo 1810	316S11/13	17 349	-200	+550	130 - 190
stainless steel	321	1.4541	X10CrNiTi 189	321S12/49/87	17 247	-270	+550	130 - 190

RECOMMENDED CORE THICKNESS	STANDARD LAYERS - MIN. AND MAX. TEMPERATURE (°C)					
3 mm and for new systems 4 mm	Graphite	-200	+550	Ceramic	-200	+1100
	PTFE	-200	+260	CSF	-40	+250

Sealing layer

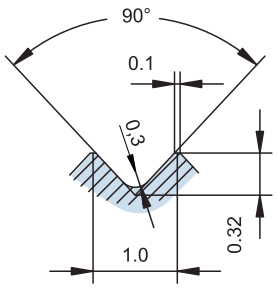
The most commonly used sealing layers in grooved gaskets are expanded graphite, PTFE or ceramic paper. Usual thickness of the sealing layer is 0.5 or 1.0 mm.

Recommended flange surface finish

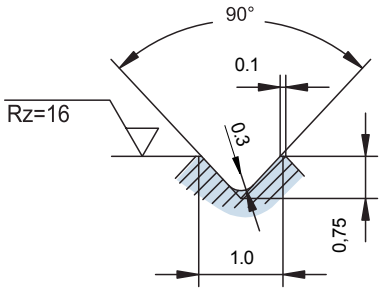
Ra = 3,2 – 6,3 µm

DIMENSIONS AND SIZES

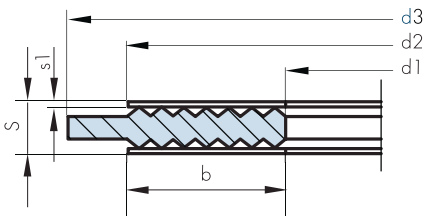
Standard sizes are made according to EN or ASME/ANSI, non-standard sizes are available on request. Dimensions of grooved gaskets can be from 15 mm to 4000 mm.



FINE GROOVE PROFILE
S1= 0,5mm



STANDARD GROOVE PROFILE
S1= 1mm



PT 4B

Grooved gaskets for ASME B16.5 flanges

NPS	d1 [mm]	d2 [mm]	d3 [mm]						
	class (lb)	class (lb)	150	300	400	600	900	1500	2500
1/2"	23,8	33,3	44,5	50,8	50,8	50,8	60,4	60,4	66,8
3/4"	31,8	39,7	54	63,5	63,5	63,5	66,7	66,7	73,1
1"	36,5	47,6	63,5	69,9	69,9	69,9	76,2	76,2	82,5
1 1/4"	46	60,3	73	79,4	79,4	79,4	85,8	85,8	101,6
1 1/2"	52,4	69,8	82,6	92,1	92,1	92,1	95,3	95,3	114,3
2"	73,2	88,9	101,6	108	108	108	139,7	139,7	143
2 1/2"	85,9	101,6	120,6	127	127	127	161,9	161,9	165,1
3"	107,8	123,8	133,4	146,1	146,1	146,1	165,1	171,5	193,8
4"	131,8	154	171,5	177,8	174,1	190,5	203,2	206,5	231,9
5"	152,4	182,6	193,8	212,8	209,5	238,2	244,6	250,9	276,3
6"	190,5	212,7	219,1	247,7	244,5	263,6	285,8	279,4	314,5
8"	238,3	266,7	276,3	304,8	301,7	317,5	355,6	349,3	384,3
10"	285,8	320,7	336,6	358,8	355,6	396,9	431,8	431,8	473,2
12"	342,9	377,8	406,4	419,1	415,9	454,1	495,3	517,6	546,1
14"	374,7	409,6	447,4	482,6	479,5	489	517,6	574,7	
16"	425,5	466,7	511,2	536,6	533,4	562	571,5	638,2	
18"	489	530,2	546,1	593,7	590,6	609,6	635	701,8	
20"	533,4	581	603,3	650,9	644,5	679,5	695,5	752,5	
24"	641,4	682,6	714,4	771,6	765,3	787,4	835,1	898,6	

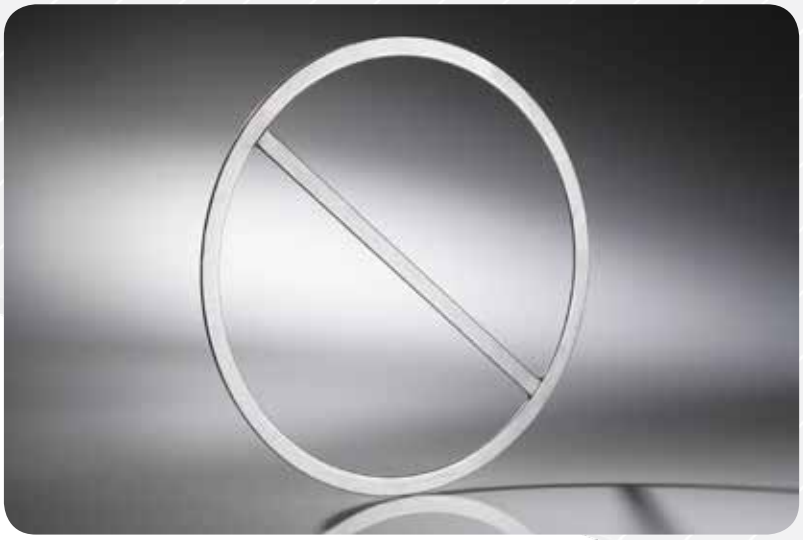
EN 1514-6 for EN 1092-1 flanges

DN [mm]	d1 [mm]	d2 [mm]			d3 [mm]							
	PN class	PN 10-40	PN 63-160	PN 250-400	PN 10	PN 16	PN 25	PN 40	PN 63	PN 100	PN 160	PN 250
10	22	36	36	36	46	46	46	46	56	56	56	67
15	26	42	42	42	51	51	51	51	61	61	61	72
20	31	47	47	47	61	61	61	61				
25	36	52	52	52	71	71	71	71	82	82	82	83
32	46	62	62	66	82	82	82	82				
40	53	69	69	73	92	92	92	92	103	103	103	109
50	65	81	81	87	107	107	107	107	113	119	119	124
65	81	100	100	103	127	127	127	127	137	143	143	153
80	95	115	115	121	142	142	142	142	148	154	154	170
100	118	138	138	146	162	162	168	168	174	180	180	202
125	142	162	162	178	192	192	194	194	210	217	217	242
150	170	190	190	212	217	217	224	224	247	257	257	284
175	195	215	215	245	247	247	254	265	277	287	284	316
200	220	240	248	280	272	272	284	290	309	324	324	358
250	270	290	300	340	327	328	340	352	364	391	388	442
300	320	340	356	400	377	383	400	417	424	458	458	
350	375	395	415		437	443	457	474	486	512		
400	426	450	474		489	495	514	546	543	572		
450	480	506			539	555		571				
500	530	560	588		594	617	624	628	657	704		
600	630	664	700		695	734	731	747	764	813		
700	730	770	812		810	804	833	852	879	950		
800	830	876	886		917	911	942	974	988			
900	930	982	994		1017	1011	1042	1084	1108			
1000	1040	1098	1110		1124	1128	1154	1194	1220			
1200	1250	1320	1334		1341	1342	1364	1398	1452			

GASKET ORDERING EXAMPLE

GROOVED GASKET PT 4A
EN 15146, DN 40, PN 25
DIN 1.4404 / Graphite

3. METAL JACKETED GASKETS



PROPERTIES AND CHARACTERISTICS

metal jacketed gaskets consist of a soft filler encapsulated in a metallic material. The filler material provides the gasket with compressibility and resilience while the jacket provides compressive strength and blow out resistance. Metal jacketed gaskets can withstand over 30% deviation from nominal thickness, which is welcome in cases of imperfect flat fl ange surfaces. Me tal jacketed gaskets can be produced in a variety of shapes, making them ideal for heat exchanger applications. A wide range of jacket and filler materials is available to suit every service condition. Bars can be integrated or welded into the gasket.

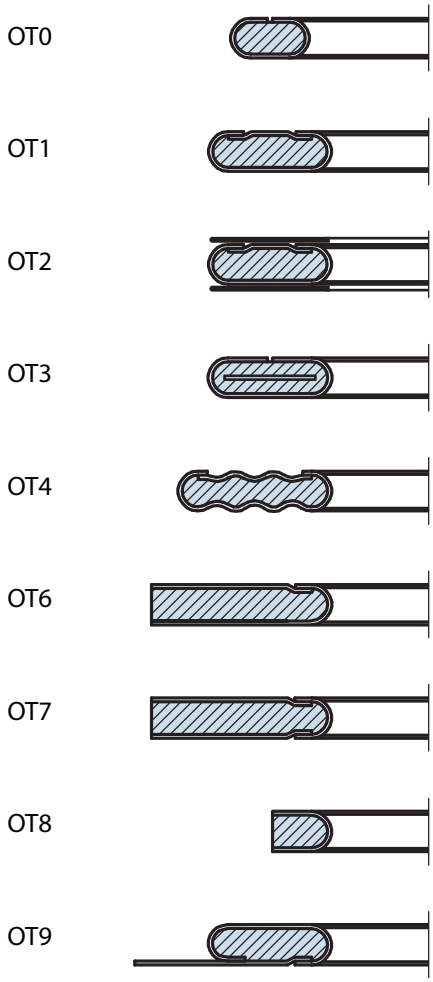
The minimum radius between the bars and internal diameter is 8mm for gaskets with integrated bars, while there is no limit for gaskets with welded bars. Metal jacketed gaskets are available in different shapes such as circular, oval, rectangular or any other shape.

APPLICATION

- Refineries
- Chemical and petrochemical industry
- Gas production and distribution
- Petrochemical industry
- Pumps and valves
- Boilers and flues

Gasket profiles

Metal jacketed gaskets can be made in several different profiles to profile shapes OT0, OT1, OT2, OT3, OT4, OT6, OT7, OT8, OT9.



Materials for coating

Material	AISI/ASTM	DIN EN 10 027-2 Material No.
Low carbon steel	Soft iron (CS)	1.0333
Stainless steel	AISI 304	1.4301
Stainless steel	AISI 316, 316 L	1.4401, 1.4404
Stainless steel	AISI 321	1.4541
Stainless steel	AISI 316 Ti	1.4571
Monel (NiCu30Fe)	Alloy 400	2.4360
Copper	Copper	2.0090
Brass	Brass Ms 63	2.0321
Titanuim	B348 Gr.1	3.7025

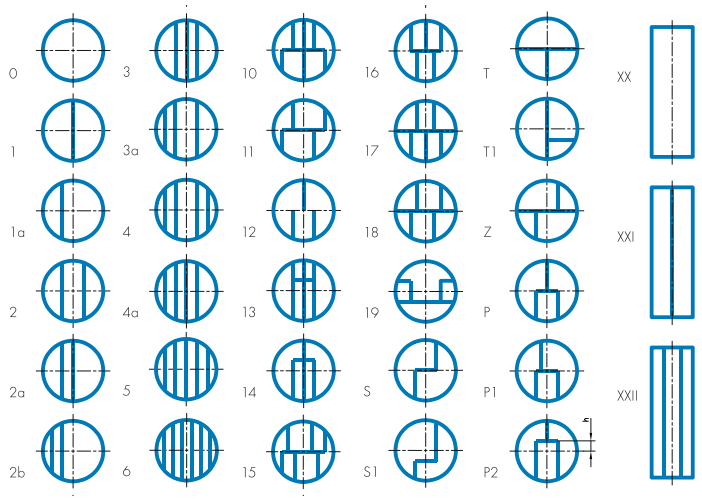
Filler

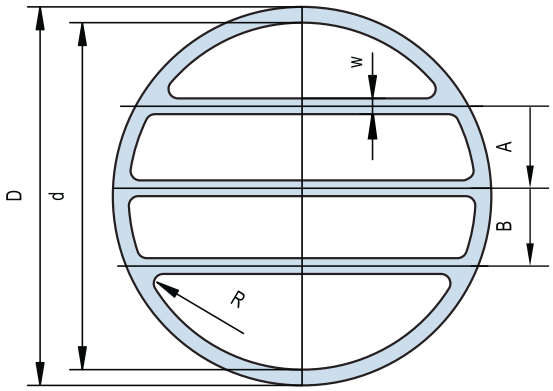
The most common filler in metal jacketed gaskets is expanded graphite. Other fillers like ceramic, CSF or other can be also used.

STANDARD SEALING FILLER - TEMPERATURE RANGE		
Graphite	-200 °C	+550 °C
CSF	- 40 °C	+250 °C
Ceramic	-200°C	+1100°C

Shapes

Metal jacketed gaskets can be produced in different shapes with or without bars as shown in the drawing below.





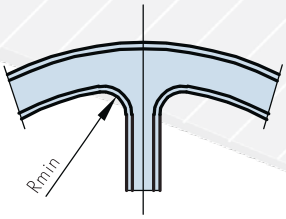
OT1, type 3

Gaskets with integrated bars

Usually, double-jacketed gaskets for heat exchangers are manufactured with integrated bars. There is a radius between the bars and an internal diameter of the gaskets.

The values of the corresponding radius for the most commonly used metals and alloys are shown in the following table. If a radius is less than R min, the material can crack, reducing the sealing properties of the gaskets.

GASKET MATERIAL and R min	
Copper	8 mm
Soft iron (CS)	8 mm
Brass, Monel	10 mm
Stanless steel	10 mm

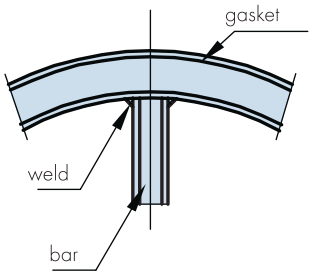


OT1 with integrated bars

Gaskets with welded bars

Gaskets with welded bars have eliminated one of the greatest problems of conventional gaskets, which are cracks in the radius area.

The primary and secondary seals are continuous all around the gasket. The gasket has an excellent sealability, reducing leaks to the environment. The bars which seal between the heat exchanger passages are plasma or TIG welded with spot welds at each end.



OT1 with welded bars

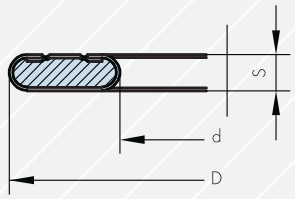
DIMENSIONS AND SIZES

Standard sizes are made according to EN 1514-4 or ASME B 16.21 standards. Non standard sizes are available on request. Outside diameter of metal jacketed gaskets can be up to 4000 mm, thickness of the gasket can be from 2 to 12 mm.

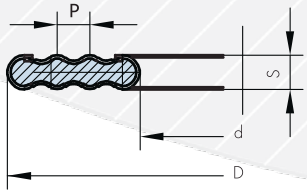
STANDARD DIMENSIONS	
Gasket thickness	3,2 mm
Gasket width	10, 13 and 16 mm
Bar width	8,10 and 13 mm

Metal jacketed gasket for ASME B 16.5 flanges

NPS	d [mm]	D [mm]						
	Class (lb)	150	300	400	600	900	1500	2500
1/2"	23.8	44.5	50.8	50.8	50.8	60.4	60.4	66.8
3/4"	31.8	54	63.5	63.5	63.5	66.7	66.7	73.1
1"	36.5	63.5	69.9	69.9	69.9	76.2	76.2	82.5
1 1/4"	46	73	79.4	79.4	79.4	85.8	85.8	101.6
1 1/2"	52.4	82.6	92.1	92.1	92.1	95.3	95.3	114.3
2"	73.2	101.6	108	108	108	139.7	139.7	143
2 1/2"	85.9	120.6	127	127	127	161.9	161.9	165.1
3"	107.8	133.4	146.1	146.1	146.1	165.1	171.5	193.8
4"	131.8	171.5	177.8	174.7	190.5	203.2	206.5	231.9
5"	152.4	193.8	212.8	209.5	238.2	244.6	250.9	276.3
6"	190.5	219.1	247.7	244.5	263.6	285.8	279.4	314.5
8"	238.3	276.3	304.8	301.7	317.5	355.6	349.3	384.3
10"	285.8	336.6	358.8	355.6	396.9	431.8	431.8	473.2
12"	342.9	406.4	419.1	415.9	454.1	495.3	517.6	546.1
14"	374.7	447.7	482.6	479.5	489	517.6	574.7	
16"	425.5	511.2	536.6	533.4	562	571.5	638.2	
18"	489	546.1	593.7	590.6	609.6	635	701.8	
20"	533.4	603.3	650.9	644.5	679.5	695.5	752.5	
24"	641.4	714.4	771.6	765.3	787.4	835.1	898.6	



OT1



OT4

Metal jacketed gasket dimensions for ASME B16.47 series A raised face flanges

NPS	d [mm]	D [mm]				
	Class (lb)	150	300	400	600	900
26"	673,1	771,6	831,8	828,8	863,6	879,6
28"	723,9	828,8	895,3	889	911,3	943,1
30"	774,7	879,6	949,4	943,1	968,5	1006,6
32"	825,5	936,7	1003,3	1000,2	1019,3	1070,1
34"	876,3	987,5	1054,1	1051	1070,1	1133,6
36"	927,1	1044,7	1114,7	1114,5	1127,2	1197,1
38"	977,9	1108,2	1051	1070,1	1101,8	1197,1
40"	1028,7	1159	1111,2	1124	1152,6	1248
42"	1079,5	1286,1	1162	1174,7	1216,1	1298,7
44"	1130,3	1273,3	1216,1	1228,8	1267	1365,2
46"	1181,1	1324,1	1270	1286	1324,1	1432
48"	1231,9	1381,2	1320,8	1343,1	1387,6	1482,8
50"	1282,7	1432	1374,9	1400,3	1444,7	
52"	1333,5	1489,2	1425,7	1451,1	1495,5	
54"	1384,3	1546,3	1489,2	1514,6	1552,7	
56"	1431,1	1603,5	1540	1565,4	1603,5	
58"	1485,9	1660,6	1590,8	1616,2	1660,6	
60"	1536,7	1711,4	1641,6	1679,7	1730,5	

GASKET ORDERING EXAMPLE

Standard dimension
Metal jacketed gasket OT1
ASME B 16.5
Dimension 6" 300 lbs
Material : AISI 316
Filler : Graphite

Non-standard dimension
Metal jacketed gasket OT1
D = 730 mm, d = 710 mm, s = 3,0 mm
Material : AISI 316
Filler : Graphite

4. RING JOINT GASKETS

PROPERTIES AND CHARACTERISTICS

Ring joint gaskets (RTJs) are designed for high pressure applications. They are available in a variety of forms to suit different flange formats. RTJs can be used for very high and/or fluctuating pressures (up to 1500 bar), depending on the profile selected. Material selection determines use for high temperatures (up to 1000 °C) and in aggressive media. To ensure proper sealing the surface of contact between the gaskets and flange have to be carefully processed. The small sealing area and high contact pressure results in excellent sealability.

General characteristic:

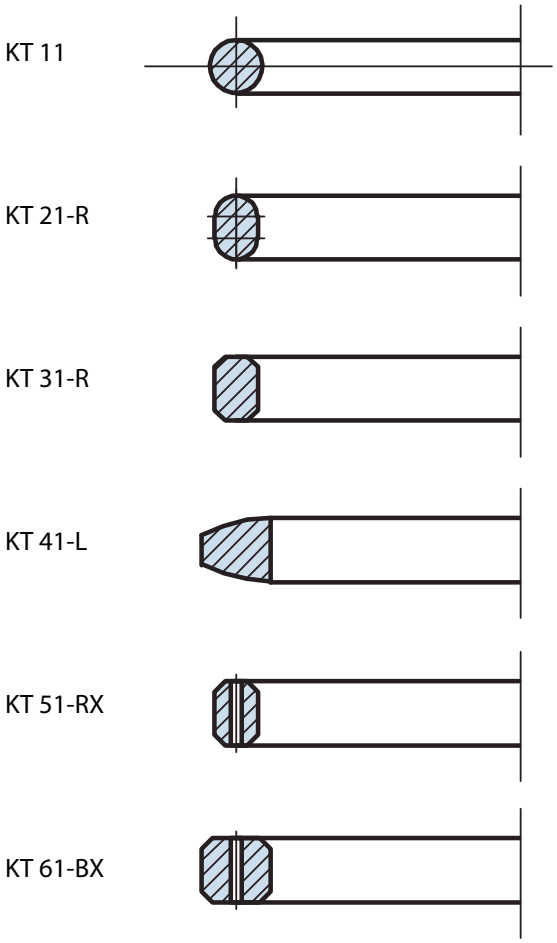
- RTJs are metallic sealing rings suitable for high pressure and high temperature applications.
- RTJs are supplied in different profiles.
- RTJ are always used in combination with special flanges which ensure good and reliable sealing with the correct choice of material and profile.

APPLICATION

- Refineries
- Power plants
- Petrochemical industry
- Pipelines
- Valves
- Pressure vessels

Gasket profiles

The ring joint gaskets are produced in different profiles and dimensions.



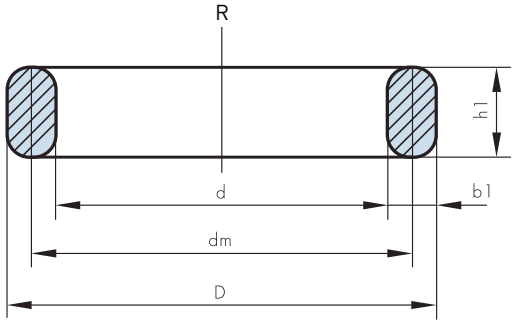
MATERIALS

Standard materials such as soft iron, Low CS and the range of SS are available as well as other materials which are available on request.

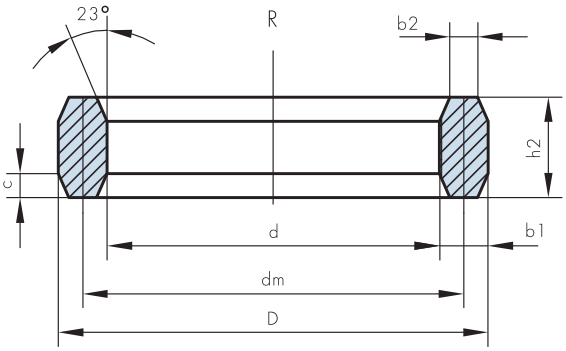
STANDARD MATERIALS RECOMMENDED BY THE ASME B16.20				
ASME/ ASTM	DIN EN 10 027-2 Material No.	Maximum HB	Maximum HV	Material Code
Soft iron	1.1003	90	56	D
Low CS	1.0038	120	68	S
4-6 Cr ½ Mo	1.7362	130	72	F5
AISI 410	1.4000	170	86	S 410
AISI 304	1.4301	160	83	S 304
AISI 316	1.4401	160	83	S 316
AISI 321	1.4541	160	83	S 321
AISI 347	1.4550	160	83	S 347

DIMENSIONS

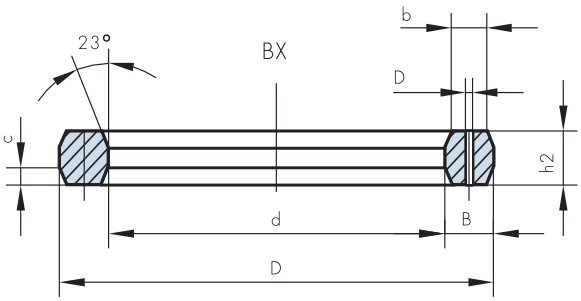
STANDARDS FOR RING JOINT GASKETS USED WITH FLANGES		
Ring Joint Gaskets Style	Ring Joint Gaskets Standard	Flange Standard
R	ASME B 16.20 API 6A	ASME B 16.5 ASME B 16.47 series A
RX	ASME B 16.20 API 6A	API 6B
BX	API 6A	API 6BX



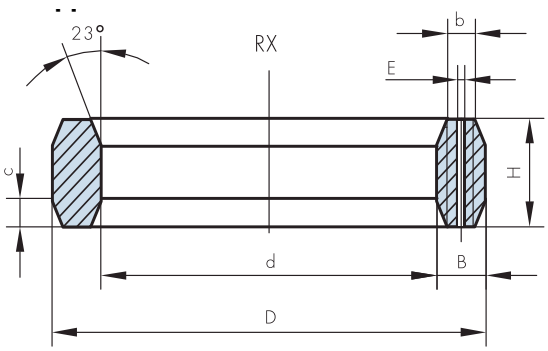
Style R
Oval section



Style R
Octagonal section



Style BX



Style RX

RING JOINTS R-according to ASME (ANSI) B16.20, API Std 6a

NOMINAL PIPE SIZE/NOMINAL PRESSURE										DIMENSIONS								WEIGHT	
ASME-ANSI B16.5					ASME B16.47 A		API 6B			Tollerances	± 0,38	± 0,38	± 0,17	± 0,39	± 0,39	± 0,20	± 0,20	OVAL	OCTAG.
150	300-600	900	1500	2500	300-600	900	2000	3000	5000	R	D (mm)	d (mm)	dm (mm)	h_1 (mm)	h_2 (mm)	b_1 (mm)	b_2 (mm)	kg	kg
	½									R11	40,49	27,79	34,14	11,18	9,65	6,35	4,32	0,05	0,05
		½	½							R12	47,65	31,75	39,70	14,22	12,70	7,95	5,23	0,10	0,10
	¾			½						R13	50,83	34,93	42,88	14,22	12,70	7,95	5,23	0,10	0,10
		¾	¾							R14	52,40	36,50	44,45	14,22	12,70	7,95	5,23	0,11	0,11
1										R15	55,58	39,68	47,63	14,22	12,70	7,95	5,23	0,12	0,11
	1	1	1	¾			1	1	1	R16	58,75	42,85	50,80	14,22	12,70	7,95	5,23	0,12	0,11
1 ¼										R17	65,10	49,20	57,15	14,22	12,70	7,95	5,23	0,14	0,13
	1 ¼	1 ¼	1 ¼	1			1 ¼	1 ¼	1 ¼	R18	62,28	52,38	60,33	14,82	12,70	7,95	5,23	0,15	0,14
1 ½										R19	73,05	57,15	65,10	14,82	12,70	7,95	5,23	0,16	0,15
	1 ½	1 ½	1 ½				1 ½	1 ½	1 ½	R20	76,23	60,33	68,28	14,82	12,70	7,95	5,23	0,17	0,15
				1 ¼						R21	83,37	61,11	72,24	17,53	16,00	11,13	7,75	0,30	0,29
2										R22	90,50	74,60	82,55	14,82	12,70	7,95	5,23	0,20	0,19
	2			1 ½			2			R23	93,68	71,42	82,55	17,53	16,00	11,13	7,75	0,34	0,33
		2	2					2	2	R24	106,38	84,12	95,25	17,53	16,00	11,13	7,75	0,39	0,38
2 ½										R25	109,55	93,65	101,60	14,22	12,70	7,95	5,23	0,25	0,23
	2 ½			2			2 ½			R26	112,73	90,47	101,60	17,53	16,00	11,13	7,75	0,42	0,41
		2 ½	2 ½					2 ½	2 ½	R27	119,08	96,82	107,95	19,05	16,00	11,13	7,75	0,45	0,43
				2 ½						R28	123,87	98,43	111,13	14,22	17,53	12,70	8,66	0,57	0,55
3										R29	122,25	107,95	114,30	17,53	12,70	7,95	5,23	0,28	0,26
	3									R30	128,61	106,35	117,48	17,53	16,00	11,13	7,75	0,48	0,47
	3	3					3	3		R31	134,96	112,70	123,85	17,53	16,00	11,13	7,75	0,51	0,50
				3						R32	139,70	114,30	127,00	19,05	17,53	12,70	8,66	0,65	0,63
3 ½										R33	139,73	123,83	131,78	14,22	12,70	7,95	5,23	0,32	0,30
	3 ½									R34	142,91	120,65	131,78	17,53	16,00	11,13	7,75	0,54	0,52
			3						3	R35	147,66	125,40	136,53	17,53	16,00	11,13	7,75	0,56	0,55
4										R36	157,18	141,28	149,23	14,22	12,70	7,95	5,23	0,37	0,34
	4	4					4	4	3 ½	R37	160,36	138,10	149,23	17,53	16,00	11,13	7,75	0,62	0,60
				4						R38	173,06	141,30	157,18	22,35	20,57	15,88	10,49	1,16	1,14
			4						4	R39	173,06	150,80	161,93	17,53	16,00	11,13	7,75	0,67	0,65
5										R40	179,40	163,50	171,45	14,22	12,70	7,95	5,23	0,42	0,39
	5	5					5	5		R41	192,11	169,85	180,98	17,53	16,00	11,13	7,75	0,75	0,73
				5						R42	209,55	171,45	190,50	24,40	23,88	19,05	12,32	1,91	1,88
6										R43	201,63	185,73	193,68	14,22	12,70	7,95	5,23	0,48	0,44
			5						5	R44	204,81	182,55	193,68	17,53	16,00	11,13	7,75	0,80	0,78
	6	6					6	6		R45	222,28	200,02	211,15	17,53	16,00	11,13	7,75	0,87	0,85
			6						6	R46	223,85	198,45	211,15	19,05	17,53	12,70	8,66	1,08	1,05
				6						R47	247,65	209,55	228,60	25,40	23,88	19,05	12,32	2,29	2,26
8										R48	255,60	239,70	247,60	14,22	12,70	7,95	5,23	0,61	0,56
	8	8					8	8		R49	281,01	258,75	269,88	17,53	16,00	11,13	7,75	1,11	1,09
			8						8	R50	285,76	254,00	269,88	22,35	20,57	15,88	10,49	1,99	1,95
				8						R51	301,63	257,17	279,40	28,70	26,92	22,23	14,81	3,65	3,69
10										R52	312,75	296,85	304,80	14,22	12,70	7,95	5,23	0,75	0,69
	10	10					10	10		R53	334,98	312,72	323,85	17,53	16,00	11,13	7,75	1,34	1,30
			10						10	R54	339,73	307,97	323,85	22,35	20,57	15,88	10,49	2,39	2,35
				10						R55	371,48	314,32	342,90	36,58	35,05	28,58	19,81	7,35	7,68
12										R56	388,95	373,05	381,00	14,22	12,70	7,95	5,23	0,93	0,87
	12	12			12	12	12	12		R57	392,13	369,87	381,00	17,53	16,00	11,13	7,75	1,57	1,53
			12							R58	403,23	358,77	381,00	28,70	26,92	22,23	14,81	4,98	5,03
14										R59	404,83	388,93	396,88	14,22	12,70	7,95	5,23	0,98	0,90
				12						R60	438,15	374,65	406,40	39,62	38,10	31,75	22,33	10,47	11,09
	14				14		14	14		R61	430,23	407,97	419,10	17,53	16,00	11,13	7,75	1,73	1,69
		14				14				R62	434,98	403,22	419,10	22,35	20,57	15,88	10,49	3,09	3,04
			14							R63	444,50	393,70	419,10	33,27	31,75	25,40	17,30	7,33	7,54
16										R64	461,98	446,08	454,03	14,22	12,70	7,95	5,21	1,12	1,03
	16				16		16			R65	481,03	458,77	469,90	17,53	16,00	11,13	7,75	1,94	1,89
		16				16		16		R66	485,78	454,02	469,90	22,35	20,57	15,88	10,49	3,47	3,40
			16							R67	498,48	441,32	469,90	36,58	35,05	28,58	19,81	10,07	10,53
18										R68	525,48	509,58	517,53	14,22	12,70	7,95	5,23	1,28	1,18
	18				18		18			R69	544,53	522,27	533,40	17,53	16,00	11,13	7,75	2,20	2,15
		18				18		18		R70	552,45	514,35	533,40	25,40	23,88	19,05	12,32	5,35	5,27
			18							R71	561,98	504,82	533,40	36,58	35,05	28,58	19,81	11,43	11,95

NOMINAL PIPE SIZE/NOMINAL PRESSURE										DIMENSIONS								WEIGHT	
ASME-ANSI B16.5				ASME B16.47 A			API 6B			Tollerances	± 0,38	± 0,38	± 0,17	± 0,39	± 0,39	± 0,20	± 0,20	OVAL	OCTAG.
150	300-600	900	1500	150	300-600	900	2000	3000	10000	R	D (mm)	d (mm)	dm (mm)	h_1 (mm)	h_2 (mm)	b_1 (mm)	b_2 (mm)	kg	kg
20										**R72**	566,75	550,85	558,80	14,22	12,70	7,95	5,23	1,38	1,27
	20				20		20			**R73**	596,90	571,50	584,20	19,05	17,53	12,70	8,66	2,99	2,92
		20				20		20		**R74**	603,25	565,15	584,20	25,40	23,88	19,05	12,32	5,85	5,77
			20							**R75**	615,95	552,45	584,00	39,62	38,10	31,75	22,33	15,05	15,94
24										**R76**	681,05	665,15	673,10	14,22	12,70	7,95	5,23	1,66	1,53
	24				24					**R77**	708,03	676,27	692,15	22,35	20,57	15,88	10,49	5,11	5,01
		24				24				**R78**	717,55	666,75	692,15	33,27	31,75	25,40	17,30	12,10	12,46
			24							**R79**	727,08	657,22	692,15	44,45	41,40	34,93	24,82	22,58	22,06
				22						**R80**	623,90	608,00	615,95		12,70	7,95	5,23		1,40
					22					**R81**	649,30	620,70	635,00		19,05	14,30	9,58		3,86
									1	**R82**	68,28	46,02	57,15		16,00	11,13	7,75		0,23
									1 ½	**R84**	74,63	52,37	63,50		16,00	11,13	7,75		0,25
									2	**R85**	92,08	66,68	79,38		17,53	12,70	8,66		0,40
									2 ½	**R86**	106,38	74,62	90,50		20,57	15,88	10,49		0,65
									3	**R87**	115,91	84,15	100,03		20,57	15,88	10,49		0,72
									4	**R88**	142,88	104,78	123,83		23,88	19,05	12,32		1,22
									3 ½	**R89**	133,35	95,25	114,30		23,88	19,05	12,32		1,13
									5	**R90**	177,81	133,35	155,58		26,92	22,23	14,81		2,05
									10	**R91**	292,10	228,60	260,35		38,10	31,75	22,33		7,10
										R92	239,73	217,47	228,60	17,53	16,00	11,13	7,75	0,94	0,92
					26					**R93**	768,35	730,25	749,30		23,88	19,05	12,32		7,40
					28					**R94**	819,15	781,05	800,10		23,88	19,05	12,32		7,90
					30					**R95**	876,30	838,20	857,25		23,88	19,05	12,32		8,47
					32					**R96**	936,63	892,17	914,40		26,92	22,23	14,81		12,08
					34					**R97**	987,43	942,97	965,20		26,92	22,23	14,81		12,75
					36					**R98**	1044,58	1000,12	1022,35		26,92	22,23	14,81		13,51
							8	8		**R99**	246,08	223,82	234,95		16,00	11,13	7,75		0,95
						26				**R100**	777,88	720,72	749,30		35,05	28,58	19,81		16,79
						28				**R101**	831,85	768,35	800,10		38,10	31,75	22,33		21,83
						30				**R102**	889,00	825,50	857,25		38,10	31,75	22,33		23,39
						32				**R103**	946,15	882,65	914,40		38,10	31,75	22,33		24,95
						34				**R104**	1000,13	930,27	966,20		41,40	36,93	24,82		31,49
						36				**R105**	1057,28	987,42	1022,35		41,40	34,93	24,82		33,35

GASKET ORDERING EXAMPLE

RING JOINT GASKET API 6a
R-34 OVAL, material AISI 316

5. CORRUGATED GASKETS

PROPERTIES AND CHARACTERISTICS

corrugated gaskets are universally usable sealing elements. Due to the different possibilities of manufacturing in the form of rings, ovals, long ovals or frames, which can be with or without ribs, holes, and fixing loops, the field of application for these gaskets is expanding continuously. The gaskets can be completely or partly covered with a soft layer. Even in cases of uneven flanges, a satisfactory tightness could be achieved with adequate flexible soft layers.

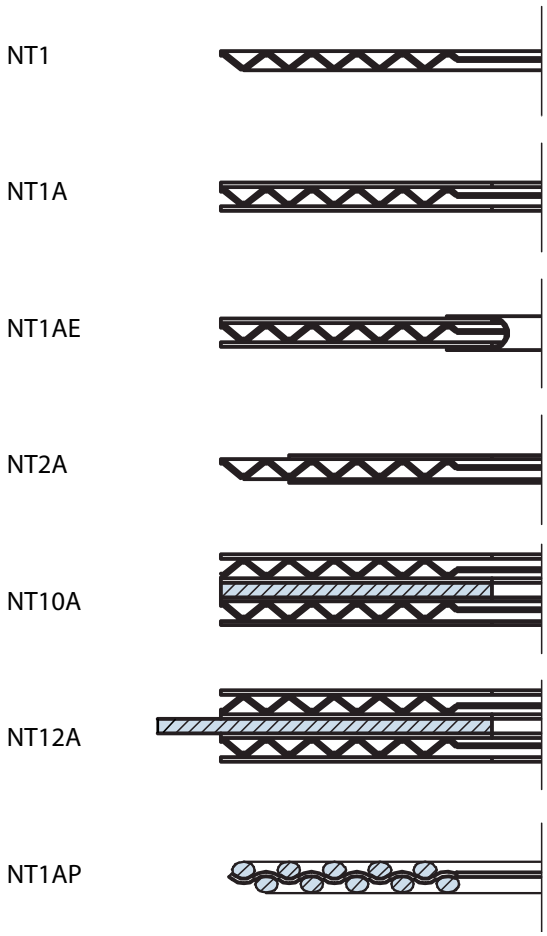
Corrugated gaskets are used in applications where mechanical strength, thermal conductivity, temperature and corrosion resistance are requested. The field of application for these gaskets is growing.

APPLICATION

- Pipes and valves
- Chemical industry
- Vacuum applications
- Low pressure and high temperature applications

Gasket profiles

The corrugated gaskets are produced in different profiles and dimensions.



MATERIALS

Standard materials for the core are carbon steel, SS 316L, SS 304, SS 321. Other materials are available on request. Standard thickness of the metal part is 1.3 mm while the thickness of the layer on each side is 0.8 mm, however other thicknesses are available at the customer's request.

STANDARD MATERIALS

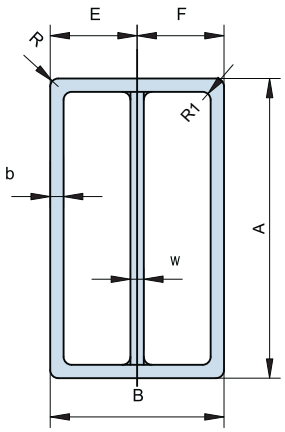
Material	ASTM	DIN 10 027-2 Material No.
Low carbon steel	Soft iron (CS)	1.0333
Stainless steel	AISI 304	1.4301
Stainless steel	AISI 316, 316 L	1.4401, 1.4404
Stainless steel	AISI 321	1.4541
Stainless steel	AISI 316 Ti	1.4571

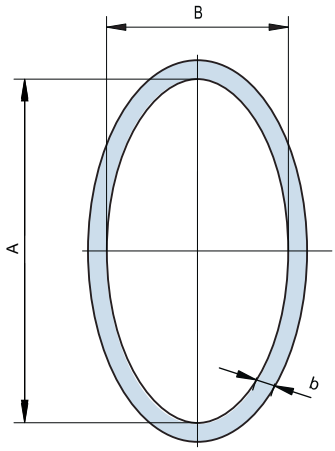
Layer

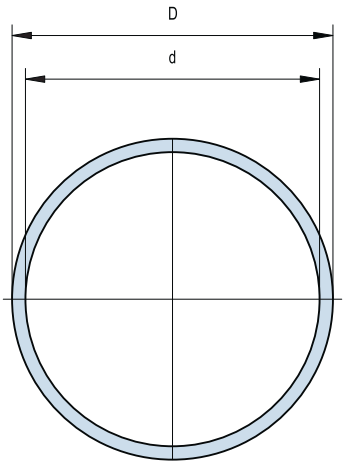
Standard material of layers: expanded graphite, CSF, PTFE, mica.

SHAPE AND DIMENSION

Shapes of corrugated gaskets can be circular, oval, rectangular, etc. Dimensions of the gaskets are available from 50 mm to 4000 mm according EN or ASME standard or in non-standard dimensions, according to custumer 's request.







Type: A x B x b (oval)

GASKET ORDERING EXAMPLE

Standard dimension
Corrugated gasket NT 1A
EN 1514-4 DN 100, PN 40
Material : AISI 316/Graphite

Non-standard dimension
Corrugated gasket NT 1A
D = 730 mm, d = 700 mm, s = 3,5 mm
Material : AISI 316/Graphite

6. PTFE ENVELOPED GASKETS

PROPERTIES AND CHARACTERISTICS

An insertion is made from a soft material, corrugated stainless steel or rubber and then enveloped with virgin PTFE. PTFE enveloped gaskets are used for flange joints where extreme chemical resistance is required. These gaskets have good pressure stability under different applications.

General characteristics:

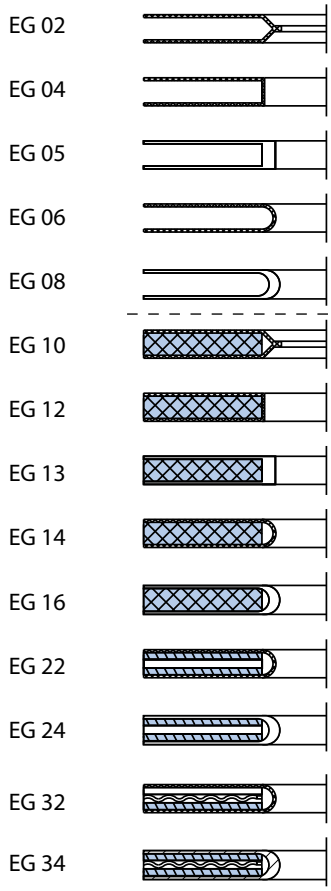
- Good chemical resistance to different media withstand temperature
- Temperature resistance up to 260°C
- Low friction coefficient
- Non-adhesive surface
- Very good electrical insulation and low thermal conductivity

APPLICATION

- Pharmaceutical industry
- Chemical industry
- Manhole applications
- Processing industry
- Food industry
- Petrochemical industry

Gasket profiles

PTFE enveloped gaskets are produced in several different profiles. Virgin PTFE is used for enveloped materials. Stainless steel, CSF or rubber are used as core material.



SIZES AND DIMENSION

One-piece gaskets are made up to an external diameter of 500 mm, gaskets with diameters greater than 500 mm are welded.

EN 1514-3

DN (mm)	Gasket inside diameter (mm)	Envelope outside diameter (mm)	Gasket outside diameter (mm)					
	PN Class		PN 6	PN 10	PN 16	PN 25	PN 40	PN 63
10	18	36	39	46	46	46	46	56
15	22	40	44	51	51	51	51	61
20	27	50	54	61	61	61	61	72
25	34	60	64	71	71	71	71	82
32	43	70	76	82	82	82	82	88
40	49	80	86	92	92	92	92	103
50	61	92	96	107	107	107	107	113
65	77	110	116	127	127	127	127	138
80	89	126	132	142	142	142	142	148
100	115	151	152	162	162	168	168	174
125	141	178	182	192	192	194	194	210
150	169	206	207	218	218	224	224	247
200	220	260	262	273	273	284	290	309
250	273	314	317	328	329	340	352	364
300	324	365	373	378	384	400	417	424
350	356	412	423	438	444	457	474	486
400	407	469	473	489	495	514	546	543
450	458	528	528	539	555	564	571	
500	508	578	578	594	617	624	628	
600	610	679	679	695	734	731	747	

GASKET ORDERING EXAMPLE

EN 1514-3, TYPE EG 10, DN 40, PN 10, 2,0 mm,
Material : SIL 30 / Virgin PTFE

7. NON-METALLIC FLAT FLANGE GASKETS

PROPERTIES AND CHARACTERISTICS

Non-metallic flat flange gaskets are the most typical static gaskets. They are used in large number by various industries and in a variety of applications, especially when low and medium sealing conditions are applied. Non-metallic gaskets are made of compressed fibre sheets, graphite, PTFE , mica or rubber sealing materials. Flat-flange gaskets are produced in several different sizes according to standard or customer design.

Special type of non-metallic flat flange gaskets are metal eyeleted gaskets, which provide special protection against blowout for the sealing of critical or agressive media. The core of the gasket is usually made of CSF or expanded graphite material, while the U-shaped eyelet is made from different metals.

APPLICATION

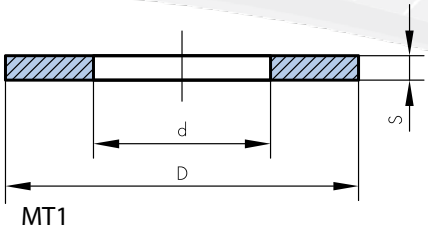
- Water systems
- Gas and oil instalations
- Food industry
- Chemical industry
- Petrochemical industry
- Shipyard industry
- Automotive industry

Gasket materials and application

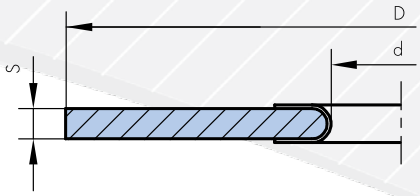
GRADE	Basis	Max.T [°C]	Max.P [bar]	Application and properties
DIMERSIL 10	Organic fibres, NBR	-40 +210	40	for lower loadings, good resistance to water, gases, oils, fuels
DIMERSIL 20	Aramid fibres, NBR	-40 +400	100	for medium loading, good resistance to water, gases, oils, fuels
DIMERSIL 30	Aramid fibres, NBR	-40 +450	120	for high loading, good resistance to alcohol, gases, oils, fuels
DIMERSIL 40	Carbon fibres, NBR	-40 +450	100	for medium loading, good resistance to alkaline medium, refrigerants, oils, fuels
DIMERGRAF 10	Expanded graphite	-200 +550	40	for cammprofiles and double jacketed gaskets
DIMERGRAF 20	Expanded graphite, SS flat insertion	-200 +550	140	for chemical, petrochemical and other industries
DIMERGRAF 21	Expanded graphite, Nickel, flat insertion	-200 +550	120	for medium loading in chemical and petrochemical industries
DIMERGRAF 30	Expanded graphite, SS tanged insertion	-200 +550	140	for high loading in chemical and petrochemical industries
DIMERFLON 10	Filled PTFE	-200 +260	85	for strong chemicals
DIMERFLON 11	Filled PTFE	-200 +260	85	for strong chemicals
DIMERFLON 13	Filled PTFE	-200 +260	85	for strong chemicals

SIZES AND DIMENSIONS

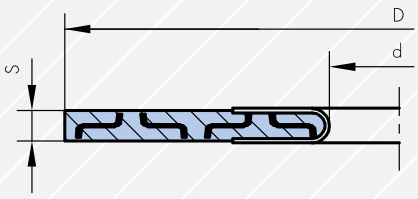
Non-metallic gaskets can be produced in standard or various non-standard sizes and shapes. Standard gaskets are mostly made according to EN 1514-1, ANSI B 16.21 or other standards. Gaskets of dimension up to 1.500 mm x 1.500 mm are made as one-piece, while larger ones are assembled from segments. There is no special limit for metal eyeleted gaskets.



MT1



MT1A



MT1E

Flat gaskets for raised face flanges ASME B 16.21 (ASME B 16.5)

NPS	d [mm]	D [mm]					
	class (lb)	150	300	400	600	900	1500
1/2"	21,4	47,6	54	54	54	63,5	63,5
3/4"	27	57,2	66,7	66,7	66,7	69,8	69,8
1"	33,3	66,7	73	73	73	79,4	79,4
1 1/4"	42	76,2	82,5	82,5	82,5	88,9	88,9
1 1/2"	48,4	85,7	95,2	95,2	95,2	98,4	98,4
2"	60,3	104,8	111,1	111,1	111,1	142,9	142,9
2 1/2"	73	123,8	130,2	130,2	130,2	165,1	165,1
3"	88,9	136,5	149,2	149,2	149,2	168,3	174,6
3 1/2"	101,6	161,9	165,1	161	161		
4"	114,3	174,6	181	177,8	193,7	206,4	209,5
5"	141,3	196,8	215,9	212,7	241,3	247,6	254
6"	168,3	222,2	250,8	247,6	266,7	288,9	282,9
8"	219,1	279,4	308	304,8	320,7	358,8	352,4
10"	273	339,7	362	358,8	400	435	435
12"	323,8	409,6	422,3	419,1	457,2	498,5	520,7
14"	355,6	450,9	485,8	482,6	492,1	520,7	577,8
16"	406,4	514,4	539,7	536,6	565,1	574,7	641,3
18"	457,2	549,3	596,9	593,7	612,8	638,2	704,8
20"	508	606,4	654	647,7	682,6	698,5	755,7
22"	558,8	660,4	704,9	701,7	733,4		
24"	609,6	717,5	774,7	768,3	790,6	838,2	901,7
26"	660,4	774	835	831,9	866,8	882,6	
28"	711,2	831,9	898,5	892,2	914,4	946,1	
30"	762	882,7	952,5	946,2	971,6	1010	
32"	812,8	939,8	1006	1003	1022	1073	
34"	863,6	990,6	1057	1054	1073	1037	
36"	914,4	1047	1118	1118	1130	1200	
38"	965,2	1111,3					
40"	1016	1162,1					
42"	1066	1219					
44"	1117,5	1276					
46"	1169,6	1327					
48"	1220	1384					
50"	1270	1435					
52"	1320	1492					
54"	1372	1549					
56"	1422	1606					
58"	1475	1663					
60"	1525	1714					

Flat gaskets for EN 1092-1 flanges

DN [mm]	d [mm]	D [mm]							
	PN class	PN 2,5	PN 6	PN 10	PN 16	PN 25	PN 40	PN 64	PN 100
10	18	38	38	45	45	45	45	56	56
15	22	43	43	50	50	50	50	61	61
20	28	53	53	60	60	60	60	72	72
25	35	63	63	70	70	70	70	82	82
32	43	75	75	82	82	82	82	88	88
40	49	85	85	92	92	92	92	103	103
50	61	95	95	107	107	107	107	113	120
65	77	115	115	127	127	127	127	138	145
80	90	132	132	142	142	142	142	148	155
100	115	152	152	162	162	168	168	175	180
125	141	182	182	192	192	195	195	210	217
150	169	207	207	218	218	225	225	247	257
175	195	237	237	248	248	255	267	277	287
200	220	262	262	273	273	285	292	309	324
250	274	318	318	328	330	342	353	364	391
300	325	373	373	378	385	402	418	424	458
350	368	423	423	438	445	458	475	486	512
400	420	473	473	490	497	515	547	543	627
450	470	528	528	540	557	565	572	588	704
500	520	578	578	595	618	625	628	657	813
600	620	680	680	695	735	730	745	764	950
700	720	785	785	810	805	830	850	879	
800	820	890	890	915	910	940	970	988	
900	920	990	990	1015	1010	1040	1080	1108	
1000	1020	1090	1090	1120	1125	1150	1190	1220	
1200	1220	1290	1305	1340	1340	1360	1395		
1400	1420	1490	1520	1545	1540	1575	1615		
1600	1620	1700	1720	1770	1760	1795	1830		
1800	1820	1900	1930	1970	1960	2000			
2000	2020	2100	2135	2180	2165	2230			
2200	2220	2305	2345	2380	2375				
2400	2420	2505	2555	2590	2585				
2600	2620	2705	2760	2790	2785				
2800	2820	2920	2970	3010					
3000	3020	3120	3170	3225					
3200	3220	3320	3380						
3400	3420	3520	3590						
3600	3620	3730	3800						
3800	3820	3930							
4000	4020	4130							

GASKET ORDERING EXAMPLE

EN 1514-1, DN 40, PN 10, form RF, type MT1A
Material : SIL 30 / eyelet AISI 304

8. CUSTOM MADE GASKETS

PROPERTIES AND CHARACTERISTICS

can provide any type of custom made gas-ket to meet various customer needs and requirements. Custom made gaskets are special gaskets, which are different from standard ones due to the following :

Special design

- Special materials or combination of materials
- Special large sizes up to 4000 mm
- Special service conditions (temperature, pressure, media, mechanical loadings)

SIZES AND DIMENSIONS

Custom made gaskets are made according to the customer`s drawing and specification, samples or templates. Dimension of the gasket is usually limited up to 4000 mm.

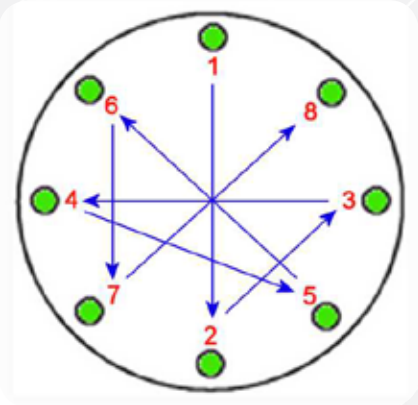
9. PROPERTIES OF METAL MATERIALS

AISI/ASTM	Individual name	Material No.	DIN 17 006	Hardness HB	Tensile strenght [N/mm²]	Tensile strenght [N/mm²] (d0,2)	Temperature [°C]		Density [g/mm³]
							min.	max.	
A 570 Gr.36	low carbon steel	1.0038	RSt 37-2	100-130	370-450	220	-40	+500	7,85
A 619 (10 0)	steel sheet	1.0333	Ust 13; St 13; St t3	90-120	270-370	250	-40	+500	7,85
Soft iron	soft iron	1.1003	M2/Armco	90-110	270-350	190	-60	+500	7,85
430	stainless steel	1.4016	X6 Cr 17	130-170	450-600	270	-20	+650	7,70
304 (30 4H)	stainless steel	1.4301	X5 CrNi 18 10	130-180	500-700	195	-200	+550	7,90
304L	stainless steel	1.4306	X2 CrNi 19 11	130-170	460-680	180	-270	+550	7,90
316	stainless steel	1.4401	X5 CrNiMo 17 12 2	130-180	500-670	205	-200	+550	7,95
316L	stainless steel	1.4404	X2 CrNiMoTi 17 13 2	120-170	490-690	190	-200	+550	7,95
316L	stainless steel	1.4435	X2 CrNi 18 14 3	120-170	490-690	190	-200	+550	7,98
321	stainless steel	1.4541	X6 CrNiTi 18 10	130-190	500-730	205	-270	+550	7,90
347	stainless steel	1.4550	X6 CrNiNb 18 10	130-190	510-740	205	-200	+550	7,90
316 Ti	stainless steel	1.4571	X6 CrNiMoTi 17 12 2	130-190	500-730	215	-270	+550	7,98
309	stainless steel	1.4828	X15 CrNiSi 20 12	130-220	500-750	230	-110	+1000	7,90
B 408, B 409	incoloy 800	1.4876	X10 NiCrAlTi 32 20	130-220	500-750	210	-110	+850	8,00
-	cooper	2.0090	SF-CU	55-65	200-250	90	-270	+400	8,94
Brass	Messing Ms 63	2.0321	CuZn 37	60-80	290-370	140	-200	+350	8,44
-	Plimbum 99,9	2.3040	Pb 99,9	4	12	-	-250	+200	11,50
-	Nickel 99,6	2.4060	Ni 99,6	100-150	340-400	140	-60	+600	8,90
Alloy 200	Nickel 99,2	2.4066	Ni 99,2	100-150	380-450	160	-60	+600	8,90
Alloy 400	Monel 400	2.4360	NiCu 30 Fe	100-130	450-580	200	-60	+500	8,88
Alloy 600	Inconel 600	2.4816	NiCr 15 Fe	140-200	550-800	200	-60	+600	8,42
-	Aluminium 99,5	3.0255	Al 99,5	20-25	70-80	509	-250	+350	2,70
-	Aluminium alloy	3.3315	AlMg 1	25-35	90-110	60	-250	+300	2,70
B 348 Gr. 1	Titan I	3.7025	Ti	110-140	290-410	180	-60	+300	4,50
B 348 Gr. 2	Titan II	3.7035	Ti	120-160	390-540	250	-60	+350	4,50

10. GASKET INSTALLATION PROCEDURES *

HOW TO INSTALL AND USE GASKETS IN THE FIELD?

Successfully sealing a flanged connection is dependent upon all elements of a well-designed flange system working well together. Following summary provides guidance to maintenance operators, engineers, and fitters to ensure successful gasket installation and assembly of bolted flange connections.



TOOLS REQUIRED

Special tools are required for cleaning and tensioning the fasteners. Additionally, always use standard safety equipment and follow good safety practices. Acquire the following equipment prior to installation:

- Calibrated torque wrench, hydraulic or other tensioner
- Wire brush (brass if possible)
- Helmet
- Safety goggles
- Lubricant
- Other plant-specified equipment

1. Clean and examine

Remove all foreign material and debris from the seating surfaces, fasteners (bolts or studs), nuts and washers. Use plant-specified dust control procedures. Examine fasteners (bolts or studs), nuts and washers for defects such as burrs or cracks. Examine flange surfaces for warpping, radial scores, heavy tool marks or anything prohibiting proper gasket seating. Replace components if found to be defective.

2. Align flanges

Align flange faces and bolt holes without using excessiv force. Report any misalignment.

3. Install gaskets

Assure gasket is the specified size and material. Examine the gasket to ensure it is free of defects. Carefully insert gasket between flanges. Make sure the gasket is centered between the flanges. Do not use jointing compounds or release agents on the gasket or seating surfaces unless specified by the gasket manufacturer. Bring flanges together, ensuring the gasket isn't pinched or damaged.

4. Lubricate load-bearing surfaces

Use only specified or approved lubricants. Liberally apply lubricant uniformly to all thread, nut, and washers load-bearing surfaces. Ensure lubricant doesn't contaminate either flange or gasket face.

5. Install and tighten bolts

Always use proper tools: calibrated torque wrench or other controlled tensioning device. Consult your gasket manufacturer for guidance on torque specifications. Always torque nuts in a cross bolt tightening pattern.
Tighten the nuts in multiple steps:

Step 1 Tighten all nuts initially by hand (larger bolts may require a small hand wrench).
Step 2 Torque each nut to approximately 30% of full torque.
Step 3 Torque the nuts to approximately 60% of full torque.
Step 4 Torque each nut to full torque, again using the cross bolt tightening pattern (large-diameter flanges may require additional tightening passes).
Step 5 Apply at least one final full torque to all nuts in a clock-wise direction until all torque is uniform (large-diameter flanges may require additional tightening passes).

6. Retightening

Do not retorque elastomer-based, asbestos-free gaskets after they have been exposed to elevated temperatures unless otherwise specified. Retorque fasteners exposed to aggressive thermal cycling. All retorquing should be performed at ambient temperature and atmospheric pressure.

** Gasket Installation Procedures has been published and acknowledged by European Sealing Assoaction.*