

# Corrugated Gaskets

Corrugated gaskets are universally usable sealing elements. Due to the different possibilities of manufacture 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 continuously expands. The gaskets can be completely or partly covered. For the use on rotating flanges these corrugated gaskets are equipped with momentum support.

Even in case of unmachined flanges, a satisfactory tightness could be achieved with adequate flexible soft layers. The gaskets can be produced in all usual sizes up to approx. 6000 mm. Smaller gaskets (up to 2000) are made in one piece, larger gaskets and special frames are welded from parts.

Due to the particular method of manufacture the corrugated structure in the zone of the seam is not influenced. Gaskets should always be used with layers. Due to the fact that the supporting ring is corrugated, the layer remains in place. These gaskets are also suitable for vacuum application. Hereafter three main variations are named:

1. All-metal corrugated gaskets without layer
2. Corrugated gaskets with layers
3. Corrugated gaskets with cord rope layers

## Corrugated gaskets without layers

are corrugated metal rings as per **profile W1** with corrugation pitches of 3 mm, 4 mm, 5 mm or 6 mm. The corrugation pitch and gasket height depend upon the diameter and width of the gasket. For small diameters and small widths, there exist smaller corrugation pitches than for large diameters and large widths. The gaskets height amounts to approx. 1.5 mm up to an outer diameter of 150 mm and approx. 1.2 mm for larger diameters.

Corrugated gaskets without layers require high surface finish and levelness of the flanges, as it is a pure metallic sealing connection.

## Corrugated gaskets with soft layers,

as per **profile W1A**, consist of a supporting ring W1 with both faces covered with PTFE for applications up to 260 °C, or graphite up to 550 °C. When mounting, the soft plastic layer settles into the corrugation recesses. This means, there results an extraordinarily high elastic sealing element with low leakage rate. The leakage rate if at the same surface pressure, is several decimal places-lower than that of fibre-gaskets or corrugated types with cord rope layers. Due to its good sealing characteristics, this type of gasket has proven to be an excellent substitute for asbestos c.a.f.-gaskets, respectively corrugated gaskets with asbestos cord rope layers (which are no longer used because of the asbestos restriction).

For large diameters and gasket-widths and also for flange unevennesses, it would be advantageous to use RivaTherm-Super on both sides. From which the gasket obtains greater stability, and also adaptability. RivaTherm-Super layers are made of exfoliated graphite with special steel foil filler. The identification mark is, for 1 mm thickness RS1E1, for 1.5 mm RS1,5E1, and for 2 mm RS2E1. The layer width for RivaTherm-Super should be at least 15 mm. The required type of layer should be indicated.

Profile **W11A** are gaskets with bare centering edge. For large diameters (more than DN 1200), we recommend **profile W2A** respectively **profile W12A**. These gaskets are equipped with a stabilization ring to which W1A gaskets are attached on both sides. Therefore, they retain their shape, and are fully adaptable to the flange surface. The gaskets can also be equipped with an inner rim F1, for example profile W1A-F1.

Profile		W1	W1A W11A	W3, W5 W7, W13			WZ3 WZ13	W8	W1A- F1			
Materials		Carbon Steel	Stainless Steel	Aluminium Mineral Fibre	Cu, Ms Mineral Fibre	Carbon Steel Mineral Fibre	Steel Mineral Fibre PTFE	Carbon Steel Mineral Fibre	Stainless Steel Graphite			
Recommended max. surface Roughness of flange surface	$\mu\text{m}$	from to	6,3 12,5	25 50	50 100	50 100	50 100	6,3 12,5	25 50			
Limits of surface pressure for 20 °C	N/mm <sup>2</sup>	$\sigma_v$	120	15	30	35	45	35	75	20		
		$\sigma_a$	600	180	80	110	150	150	150	180		
Limits of surface pressure for 300 °C	N/mm <sup>2</sup>	$\sigma_v$	130	20	(40)	45	60	45	70	25		
		$\sigma_a$	390	150	(60)	90	125	125	125	150		



## Corrugated Gaskets

### Corrugated gaskets with cord rope layer

will be equipped with suitable cord rope layers to meet application requirements. The cord rope of gaskets, as per **profile W3**, is fixed by means of adhesive in the corrugation recesses of the supporting ring W1. Depending upon the purpose of application, different layer materials are available.

Circular rubber ropes are proven as the best for temperatures up to approx. 80 °C and PTFE ropes of unsintered PTFE up to approx. 260 °C. Mineral fibre yarns can be used up to temperatures of more than 500 °C. When using cord rope layers of rubber or PTFE highest requirements of tightness can be realized. When using mineral fibre yarns, only a lesser degree of tightness can be achieved. Mineral fibre yarns, with or without impregnation are inferior compared with asbestos yarns (used until before) because the mineral type has coarse single fibres.

**Profile W7** is equipped with an inner rim.

**Profile W8** is metal jacketed but open outside. Metal jacketing can be advantageous at high temperatures, and restricted space because metal jacketing protects the sensitive layers when mounting. The disadvantages for sealing, are the relevant parameters of metal jacketed gaskets.

Attention is drawn to the particularly good sealing characteristics of the corrugated gasket **profile WZ3** with sealing zone. Between the inner and outer cord rope (of mineral fibre yarns), there is arranged a zone of incompressible, but plastically easy to deform unsintered PTFE or RivaTherm-Super. From which results a surface pressure concentration in the middle of the gasket, which leads to very low leakage rates, and which can also withstand flange distortion.

Where the gaskets are not covered with cord ropes across the whole width, and therefore have an outer centering edge, this is identified in the type mark, by putting 1 in front of the type. For example, **profile W13** or **profile WZ13** are equipped with an uncovered centering edge.

### Materials\* for the supporting ring

1.033 (A366), 1.4016 (430), 1.4301 (304), 1.4401 (316), 1.4541 (321), 1.4571 (316Ti), 1.4828 (309), 2.0090 (--), 2.4066 (B162, alloy 200), 2.4360 (B162, alloy 400)

\*Corresponding AISI, ASTM, resp. SAE, designation in ( ).

### Materials for the facing layer

Graphite, RivaTherm-Super, PTFE, rubber, Mineral fibre rope

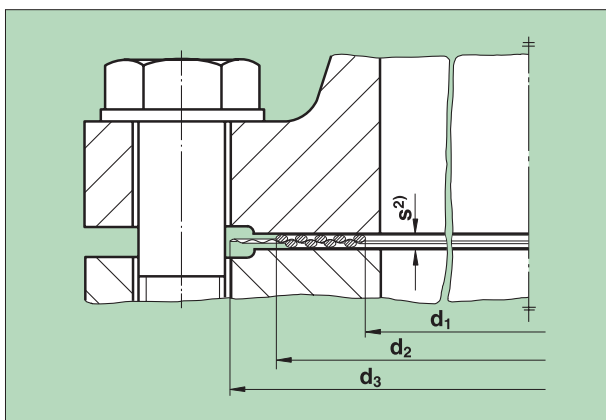
For further information see our leaflet „Common materials“

Profile	Cross-Section
W1	
W1A	
W1A-F1	
W11A	
W2A	
W12A	
W3	
W13	
W7	
W8	
WZ3	
WZ13	

### Dimension tables

Our corrugated gaskets with layers as per profile W1A and W11A, are dimensioned for DIN-flanges as per our works standard 157, and for flanges as per ANSI B 16.5, as per our works standard 158. The dimensions for flanges with tongue and groove, as well as for flanges with spigot and recess, as per DIN or ANSI, see our catalogue „General Dimension Tables for Flat Ring Gaskets“.

## Corrugated Gaskets

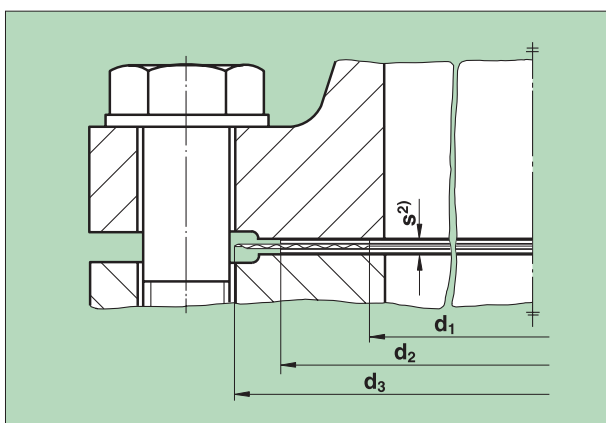


### Corrugated gasket with cord rope layer and centering edge

Example to order a corrugated gasket profile W13, DN 500, PN 25, of ...<sup>1)</sup>:

**Corrugated gasket, W13, 520 x 575 x 625, 1.4828/mineral fibre rope, graphited**

Dimensions of the covered part of gasket are taken from DIN 2692, for the centering outer ring from DIN 2690. For application of ANSI flanges the same applies.



### Corrugated gasket with layer

**For Flanges to ANSI B 16.5 (Class 150-2000) Works standard 158**

Example to order a corrugated gasket with layer, profile W11A, nominal pipe sizes 5" for ANSI flanges, Class 600, works standard 158, of ...<sup>1)</sup>:

**Corrugated gasket, W11A, NPS 5", Class 600, WS 158, 1.4541/PTFE**

- 1) Material to be indicated when ordering
- 2) Thickness as agreed in order

Dimensions in mm			Class							
NPS	d <sub>1</sub>	d <sub>2</sub>	150	300	400	600	900	1500	2500	
			d <sub>3</sub>							
½	21	35	44,4	50,8	-	50,8	-	60,3	66,7	
¾	27	43	53,9	63,5	-	63,5	-	66,7	73,0	
1	33	51	63,5	69,8	-	69,8	-	76,3	82,5	
1¼	42	64	73,0	79,4	-	79,4	-	85,7	101,6	
1½	48	73	82,5	92,1	-	92,1	-	95,2	114,3	
2	60	92	101,6	108,0	-	108,0	-	139,7	142,8	
2½	73	105	120,6	127,0	-	127,0	-	161,9	165,1	
3	89	127	133,4	146,1	-	146,1	165,1	174,5	193,7	
3½	102	140	158,8	161,9	-	158,7	-	-	-	
4	114	157	171,5	177,8	174,6	190,5	203,2	206,4	231,7	
5	141	186	193,7	212,7	209,5	238,1	244,5	250,8	276,2	
6	168	216	219,1	247,7	244,5	263,5	285,8	297,4	314,3	
8	219	270	276,2	304,8	301,6	317,5	355,6	349,3	384,1	
10	273	324	336,5	358,8	355,6	396,9	431,8	431,8	473,0	
12	324	381	406,4	419,1	415,9	454,0	495,3	517,5	546,1	
14	356	413	447,7	482,6	479,4	488,9	517,5	574,7	-	
16	406	470	511,2	536,6	533,4	561,9	571,5	638,1	-	
18	457	535	546,1	593,7	590,5	609,6	636,0	701,7	-	
20	510	585	603,2	650,9	644,5	679,5	695,3	752,4	-	
22	559	641	657,2	701,7	698,5	730,3	-	-	-	
24	610	690	714,4	771,5	765,2	787,4	835,0	898,5	-	

## For DIN-flanges PN 10 to PN 400

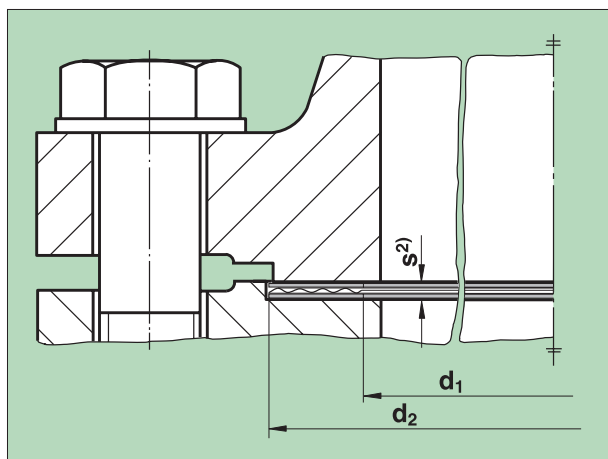
according to works standard 157

Example to order a corrugated gasket with layer, profile W11A, nominal diameter 100, nominal pressure 100, works standard 157, of ...<sup>1)</sup>:

**Corrugated gasket, W11A, DN 100, PN 100, WN 157 1.4541/Graphite**

Dimension in mm			PN									
			10	16	25	40	63	100	160	250	320	400
DN	d1	d2	d3									
10	18	34	46	46	46	46	56	56	56	67	67	67
15	22	39	51	51	51	51	61	61	61	72	72	78
20	28	50	60	60	60	60	-	-	-	-	-	-
25	35	57	70	70	70	70	82	82	82	83	92	104
32	43	65	82	82	82	82	-	-	-	-	-	-
40	49	75	92	92	92	92	103	103	103	109	119	135
50	61	87	107	107	107	107	113	119	119	124	134	150
65	77	109	127	127	127	127	137	143	143	153	170	192
80	90	120	142	142	142	142	148	154	154	170	190	207
100	115	149	162	162	168	168	174	180	180	202	229	256
125	114	175	192	192	194	194	210	217	217	242	274	301
150	169	203	218	218	224	224	247	257	257	284	311	348
175	195	233	247	247	254	265	277	287	284	316	358	402
200	220	259	272	272	284	290	309	324	324	358	398	442
250	274	312	327	328	340	352	364	391	388	442	488	-
300	325	363	377	383	400	417	424	458	458	536	-	-
350	368	421	437	443	457	474	486	512	-	-	-	-
400	420	473	489	495	514	546	543	572	-	-	-	-
450	470	524	539	555	-	571	-	-	-	-	-	-
500	520	575	594	617	624	628	657	704	-	-	-	-
600	620	675	695	734	731	747	764	813	-	-	-	-
700	720	777	810	804	833	852	879	950	-	-	-	-
800	820	882	917	911	942	974	988	-	-	-	-	-
900	920	987	1017	1011	1042	1084	1108	-	-	-	-	-
1000	1020	1091	1124	1128	1154	1194	1220	-	-	-	-	-
1200	1240	1320	1341	1342	1364	1398	1452	-	-	-	-	-
1400	1440	1520	1528	1542	1578	1618	-	-	-	-	-	-
1600	1640	1740	1772	1764	1798	1830	-	-	-	-	-	-
1800	1840	1940	1972	1964	2000	-	-	-	-	-	-	-
2000	2040	2140	2182	2168	2230	-	-	-	-	-	-	-
2200	2240	2340	3284	2378	-	-	-	-	-	-	-	-
2400	2440	2540	2594	-	-	-	-	-	-	-	-	-
2600	2650	2750	2794	-	-	-	-	-	-	-	-	-
2800	2870	2970	3014	-	-	-	-	-	-	-	-	-
3000	3080	3180	3228	-	-	-	-	-	-	-	-	-

## For flanges with spigot and recess



according to DIN 2692 (PN 10 to PN 100)

Dimensions see our leaflet "General Dimension Tables for Flat Ring Gaskets"

Example to order a corrugated gasket with layer, profile W1A, nominal diameter 100, of ...<sup>1)</sup>:

**Corrugated gasket, W1A, 100, DIN 2692, 1.4541/PTFE**

according to ANSI B16.21 (Class 150 to Class 1500)

Dimensions see our leaflet "General Dimension Tables for Flat Ring Gaskets"

Example to order a corrugated gasket with layer, profile W1A, nominal pipe size 5", broad version, of ...<sup>1)</sup>:

**Corrugated gasket, W1A, 5", ANSI B16.21, broad spigot and recess, 1.4541/Graphite**

- 1) Material to be indicated when ordering
- 2) Thickness as agreed in order

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