

CG - Corrugated Rings | Corrugated Frames



Gaskets fulfill requirements, depending on design:

Characteristic values according to EN 13555 | TA Luft according to VDI 2440 | Fire Safe according to ISO 10497 / API 607

Blow-out test according to VDI 2200 | BAM for oxygen applications

Corrugated ring gaskets

Möller gaskets stand for highest quality at competitive prices. Our quality in corrugated ring gaskets and frames ensures reproducible sealing properties. This guarantees plant safety and availability.

General Information

Corrugated ring gaskets with soft material layers, mostly made of graphite or PTFE, have a very high tightness in combination with lowest creep (loss of bolt load). In addition, there are excellent elastic properties due to the metallic corrugated ring. This combination of extraordinary properties makes corrugated ring gaskets the perfect gaskets for refineries, chemical and petrochemical plants. They are well suited for sealing of steel flanges as well as glass lined steel flanges with high pressure and thermal demands.

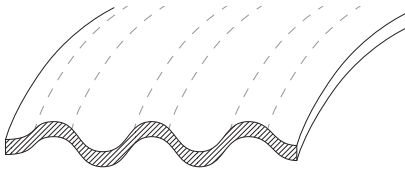
Designs

Gewellte Dichtungen (Corrugated-Gaskets) werden als Universaldichtungen in allen Bereichen der Industrie eingesetzt. Sie sind in vielseitigen Aus-
Corrugated gaskets are used as universal gaskets in all areas of industry. They are available in versatile designs and forms with various layers (MMD-CG-FG), cords (cord, CG-C, without illustration) or without layers (MMD-CG). Square frames, oval and round versions, with or without webs, can be produced, both with screw holes (MMD-CG-FG-FFF), as well as versions with idle centering edge (MMD-CG-FG-CR) or versions with external torque multiplier (MMD-CG-FG-FF-BUR) for solving sealing problems on non-rigid flanges with weak bending. For flanges with large diameters of several meters, the gaskets can be doubled over a sheet metal ring (MMD-CG-FG-FG-CG-FG-FG). In contrast to grooved gaskets, corrugated ring gaskets adapt to flange blade inclinations with the entire sealing surface.

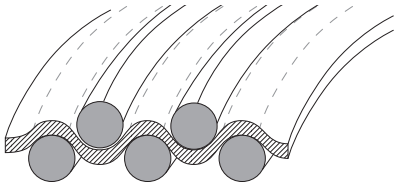
To reduce the flange dimensions (compact flanges) or for non-rigid flanges with a smooth sealing surface (form A), the corrugated ring gaskets are provided with a support ring (MMD-CG-FG-BUR-FF) and placed in the force shunt. This principle is particularly useful for sealed joints with extreme alternating loads, e.g. exhaust systems. For shipbuilding, these gaskets specified in DIN 86072-2 are standardized with the associated compact flanges according to DIN 86044-2. To keep PTFE coated gaskets electrically conductive, it may be necessary to make a part of the layer of conductive material (MMD-CG-FG-CG-EC)

Corrugated ring seals are usually fitted with graphite or PTFE layers. The application limits in the thermal range are 250°C for PTFE and up to 550°C for graphite, depending on purity. When the gasket is installed, the soft material layer partially presses into the grooves of the gasket (similar to cam-profile gaskets). For very high temperatures up to 800 °C, high-temperature steels with heat-resistant supports can be used. The soft material is chambered in the troughs of the waves, which, in combination with the elastic behavior of the corrugated carrier material results in a very flexible gasket with an exceptionally low leakage rate. For corrugated gaskets with soft material layers, the minimum surface pressure is approx. 10 to 15 MPa (N/mm²). The maximum bearable surface pressures are very high, up to over 220 MPa (N/mm²).

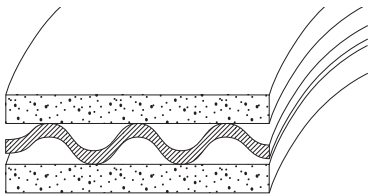
Overview of corrugated rings and corrugated frames



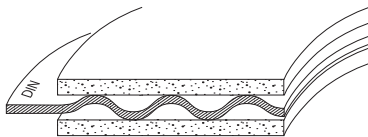
MMD-CG



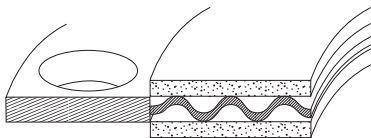
MMD-CG-C



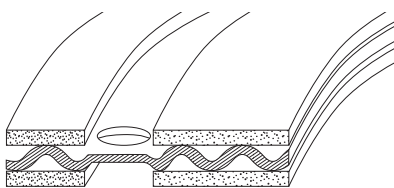
MMD-CG-FG



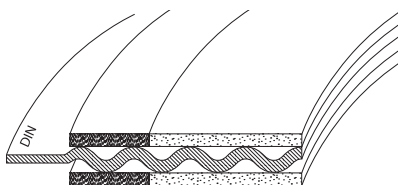
MMD-CG-FG-CR



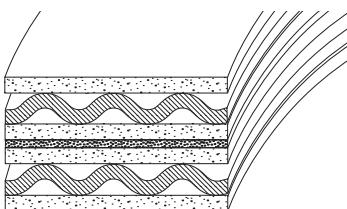
MMD-CG-FG-BUR-FF



MMD-CG-FG-FF-BUR



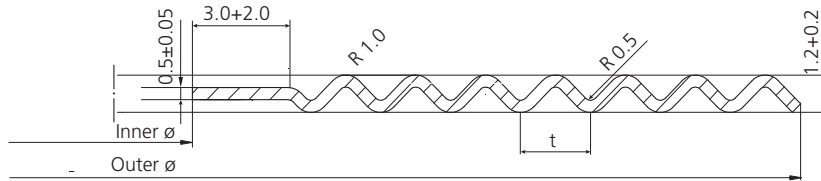
MMD-CG-FG-CR-EC



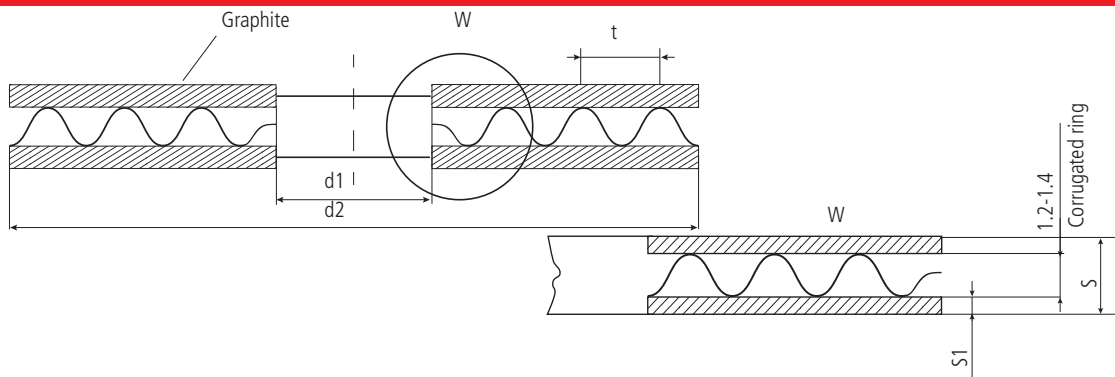
MMD-CG-FG-FG-CG-FG

Designs of the corrugated ring gaskets

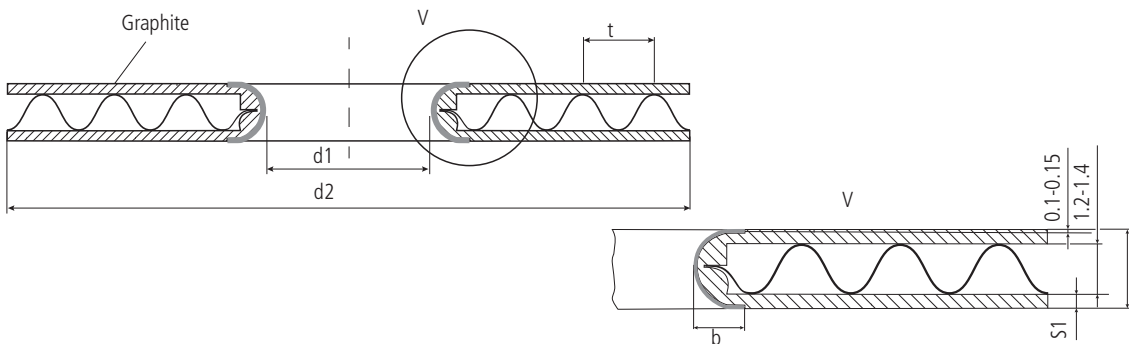
Corrugated ring - schematic representation



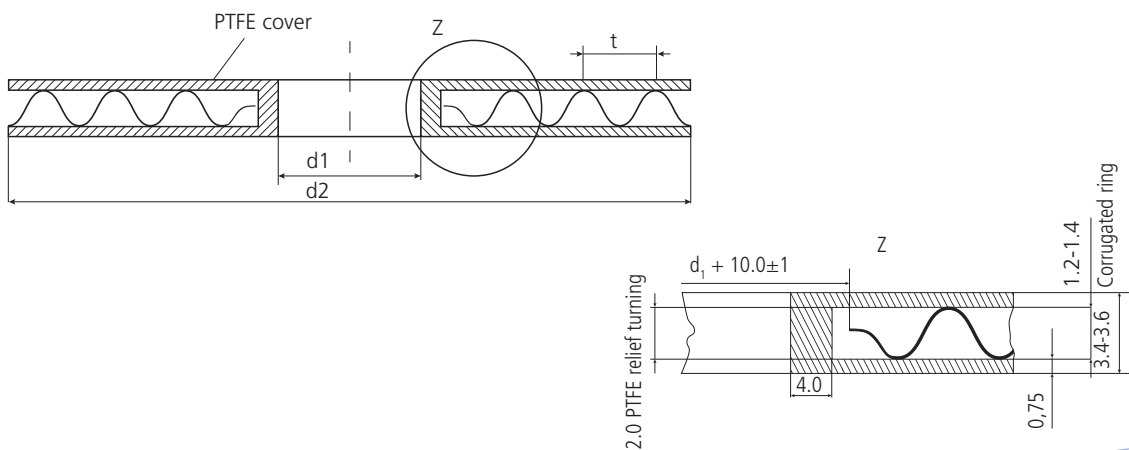
Corrugated ring with soft material on both sides



Corrugated ring with soft material on both sides and inner eyelet



Corrugated ring with PTFE cover and diffusion barrier



Corrugated ring layers – Dimensions

Materials and color code for gasket materials according to EN 1514-2, -4, -6, -7 and EN 12560-2, -6 with additions (common materials with material number in bold print)								
Material ¹⁾²⁾	Material number	Material group	Designation	Color code EN1514 ³⁾	Hardness HB	Temperature in °C		Spec. weight g/cm ³
						min.	max	
Chrysotile-asbestos ⁴⁾			ASB	No stripes		-60	550	
PTFE / ePTFE			PTFE	White stripes		-200	230	
Mica (micaceous graphite)			Manufacturer designation	Pink stripes		-40	900	
more flexible Graphite			F.G.	Grey stripes		-200	500	
Ceramics ⁴⁾			CER	Light green stripe		-40	1.000	

¹⁾ old designation in brackets ²⁾ common steels in bold ³⁾ materials without color or line (-) are not mentioned in the standards ⁴⁾ application in Europe forbidden or restricted, regional rules must be observed

Thickness of the materials

Soft material layers:

- graphite 0.5 or 0.8 mm with density of approx. 1.0 g/cm³ (other thicknesses according to customer requirements)
- PTFE (unsintered) 0.5 mm
- corrugated rings with PTFE sleeve and diffusion barrier optionally with support layers on both sides made of graphite gaskets with smooth sheet metal inserts.
- mica 0.5 mm
- fiber gaskets 1.0 mm
- silver 0.5 mm

Dimensionen und Toleranzen

1. the general tolerances „very coarse“ according to DIN ISO 2768-1 apply to all diameter specifications not tolerated below.
2. all corrugated rings must be designed so that the inner diameter is centered and straight.
3. The outer diameters for soft-material supports with full-surface soft-material coating comply with the specifications of the standards DIN EN 1514-1 and DIN EN 121560-1, in each case form IBC.
4. the outer diameters for soft-material supports with partial soft-material coating are manufactured according to customer specifications.
5. the inner diameters of the soft-material layers correspond to those of the corrugated rings, unless otherwise specified.
6. the outer and inner diameters of the gaskets (d1 and d2) correspond to DIN EN1514-1 or DIN EN12560-1 or corresponding customer specifications.

Corrugated ring dimensions

Inner diameter

corrugated ring without support and with support on both sides: according to EN1514-1 or EN12560-1
 with support and inner eyelet: +2.0 +1.0/0 mm larger than required by DIN EN 1514-1 or DIN EN 12560
 with PTFE-sheath and diffusion barrier: +10.0 ±1.0 mm larger than according to DIN EN 1514-1 or DIN EN 12560 required

outer diameter

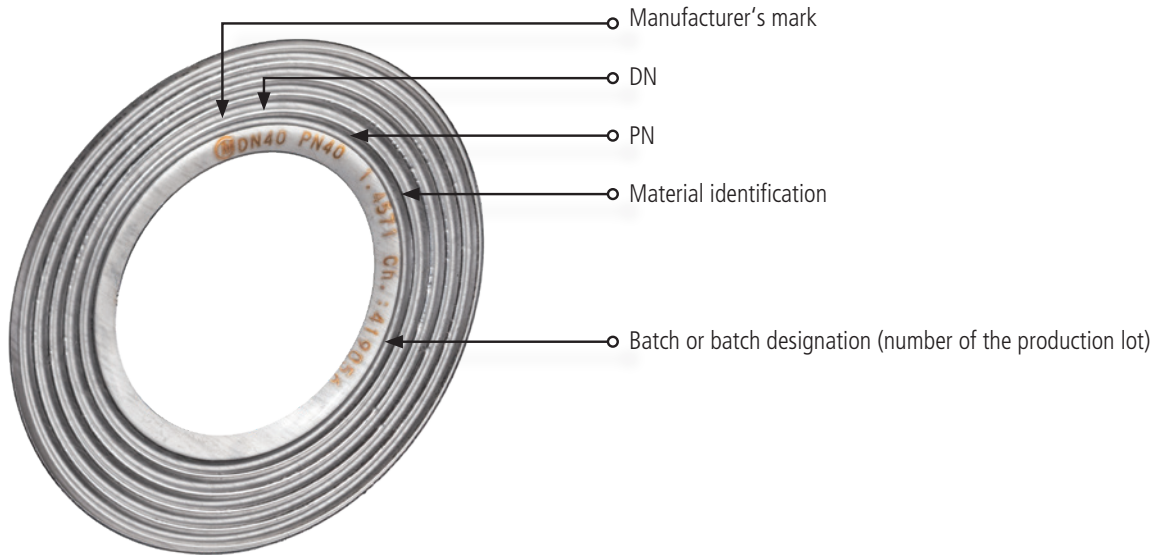
without support: according to EN1514-4 or EN12560-4
 with support on both sides and
 with PTFE-sheath and diffusion barrier: according to EN1514-1 or EN12560-1

corrugated partition (t)

„pressed“ corrugated rings: 3.0 +0.3/0 mm
 „rolled“ corrugated rings: 5.0 +0.3/0 mm

Dimensions for corrugated ring gaskets

Our gaskets are marked: The marking is made near the outer edge with the following information.



Dimensions of metal gaskets with corrugated, flat or notched profile according to EN 1514-4 for flanges according to EN 1092-1 (DIN 2632 to 2638)										
DN	Inner Ø of gasket	Outer Ø of gasket or centering ring								
		PN 10	PN 16	PN 25	PN 40	PN 63	PN 100	PN 160 ¹⁾		
10	18	Dimensions according to PN 40			48	Dimensions according to PN 100	58	58		
15	22				53		63	63		
20	27				73		84	84		
25	34				94		109	115	121	121
32	43				129		144	140	146	146
40	49				170		176	150	156	156
50	61				196		213	170	183	183
65	77				226		250	196	220	220
80	89	275	286	226	260	260				
100	115	Dimensions according to PN 16	164	Dimensions according to PN 40	293	312	327	327		
125	141		194		355	367	394	391		
150	169		220		420	427	461	461		
200	220		275		477	489	515			
250	273	330	331	460	549	546	575			
300	324	380	386	517	574					
350	356	440	446	567	574					
400	407	491	498	627	631	660	708			
450	458	541	558	734	750	768	819			
500	508	596	620	836		883	956			
600	610	698	737	945		994				
700	712	813	807	1045		1114				
800	813	920	914							
900	915	1020	1014							

Dimensions in mm

Note: The outer or centering diameters are larger than according to EN 1514-1 | 1) Dimensions for PN 160 are added

Attention! The centering diameters of this standard protrude into the bolt holes. It is recommended to use the centering diameters according to EN 1514-1!

Characteristic values and dimensions for corrugated ring gaskets

Limit values of the material combinations									
Material			Recommended roughness of the sealing surface	Room temperature			Operating temperature		
				Surface pressure		E-Modulus E_D	Surface pressure		Tmax
Corrugated ring	Support layer	Material number	μm	min	max			min	
				MPa (N/mm ²)	MPa (N/mm ²)		MPa (N/mm ²)	MPa (N/mm ²)	
Aluminum	Cord	3.0255	25 - 50	30	80		40	60	300
Copper	Cord	2.0090	25 - 50	35	110		50	80	350
X2CrNiMo17-12-2	Cord	1.4404	25 - 50	45	150		70	95	500
X6CrNiMoTi17-12-2	PTFE	1.4571	50 - 100	20	180		25	150	280
X6CrNiMoTi17-12-2	Graphite	1.4571	25 - 50	15	180		25	130	500
X15CrNiSi20-12	Mica	1.4828	25 - 50	35	180		45	100	700

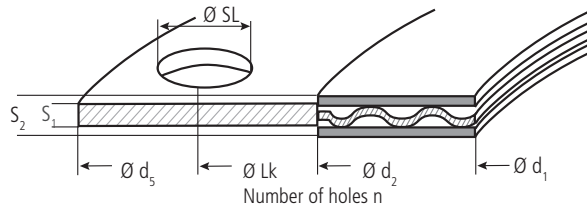
Dimensions of metal gaskets with corrugated, flat or notched profile according to EN 12560-4 for flanges according to EN 1759-1 (ASME B16.5) Class 150 to 2500								
Nominal width		Inner \varnothing of gasket	Outer \varnothing of gasket or centering ring					
			Class					
DN	NPS	mm	150	300	600	900	1500	2500
		mm	mm	mm	mm	mm	mm	mm
15	1/2	22	47.6		54.0		63.5	69.9
20	3/4	27	57.2		66.7		69.9	76.2
25	1	34	66.7		73.0		79.4	85.7
32	1 1/4	43	76.2		82.6		88.9	104.8
40	1 1/2	49	85.7		95.3		98.4	117.5
50	2	61	104.8		111.1		142.9	146.1
65	2 1/2	73	123.8		130.2		165.1	168.3
80	3	89	136.5		149.2	168.3	174.6	196.9
100	4	115	174.6	181.0	193.7	206.4	209.6	235.0
125	5	141	196.9	215.9	241.3	247.7	254.0	279.4
150	6	169	222.3	250.8	266.7	288.9	282.6	317.5
200	8	220	279.4	308.0	320.7	358.8	352.4	387.4
250	10	273	339.7	362.0	400.1	435.0	435.0	476.3
300	12	324	409.6	422.3	457.2	498.5	520.7	549.3
350	14	356	450.9	485.8	492.1	520.7	577.9	
400	16	407	514.4	539.8	565.2	574.7	641.4	
450	18	458	549.3	596.9	612.8	638.2	704.9	
500	20	508	606.4	654.1	682.6	698.5	755.7	
600	24	610	717.6	774.7	790.6	838.2	901.7	

Corrugated ring seals with filler

Inner Ø of flat metal gaskets or metal coated gaskets with filler according to EN 12560-4
for flanges according to EN 1759-1 (ASME B16.5) Class 150 to 2500

Nominal width		Inner Ø of the gasket					
		Class					
		150	300	600	900	1500	2500
DN	NPS	mm	mm	mm	mm	mm	mm
15	1/2				22		
20	3/4				29		
25	1				38		
32	1 1/4				48		
40	1 1/2		57			54	
50	2		75			73	
65	2 1/2		90			86	
80	3		113			108	
100	4		141			132	
125	5		165			152	
150	6		196			190	
200	8		253			238	
250	10		294			286	
300	12		256			343	
350	14		382		375		
400	16		434		425		
450	18		500		489		
500	20		540		533		
600	24		647		641		

Dimensions for corrugated rings with support ring



Dimensions for corrugated ring seals with back-up rings Form B and 2-material seals Form A according to DIN 86072-2 for flanges according to DIN 86044-2

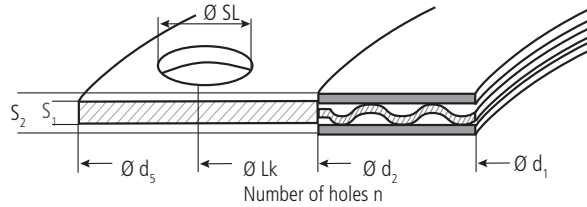
Nominal width	Sealing element		Support ring			approx. mass		
	Inner Ø	Outer Ø	Bolt circle	Outer Ø	Bolt holes		(1,9 kg/dm ³)	
					Quantity	Ø	Form A	Form B
DN	d1	d2	Lk	d2	n	SL	kg	
32	45	81	98	120	8	14	0.047	0.079
40	51	87	104	126	8		0.050	0.085
50	63	101	118	140	8		0.059	0.101
65	79	117	134	156	8		0.069	0.118
80	92	130	147	169	12		0.072	0.124
100	119	159	176	198	12		0.090	0.157
125	145	185	202	224	12		0.106	0.185
150	174	214	231	253	16		0.119	0.209
175	199	239	256	278	16		0.134	0.236
200	226	268	289	316	12		0.184	0.317
250	280	322	343	370	16	0.216	0.373	
300	331	373	394	421	20	18	0.245	0.426
350	363	405	426	453	20		0.269	0.466
400	414	456	477	504	20		0.306	0.531
450	465	507	528	555	24		0.335	0.583
500	516	558	579	606	28		0.365	0.636
550	566	608	629	656	28*		0.400	0.695
600	618	660	681	708	32		0.432	0.753
650	668	710	731	758	32*		0.593	0.812
700	720	762	783	810	36		0.498	0.870
750	770	812	833	860	40		0.528	0.772
800	822	864	885	912	44		0.557	0.974
850	872	914	935	962	44*		0.591	1.033
900	924	966	987	1014	48		0.624	1.092
950	974	1016	1037	1064	48*		0.658	1.151
1000	1026	1068	1089	1116	52		0.691	1.209
1100	1130	1172	1193	1220	60	0.751	1.316	
1200	1230	1272	1293	1320	64	0.816	1.430	
1300	1330	1372	1393	1420	68	0.881	1.545	
1400	1430	1472	1493	1520	72	0.947	1.659	
1500	1530	1572	1593	1620	76	1.012	1.774	

Further measurements on following page.

Dimensions in mm

* Number of bolts in draft standard not divisible by 4, problem for alignment, here already adjusted

Dimensions for corrugated rings with support ring



Dimensions for corrugated ring seals with back-up rings form B and 2-substance gaskets form A according to DIN 86072-2 for flanges according to DIN 86044-2

Nominal width	Sealing element		Support ring				approx. mass	
	Inner Ø	Outer Ø	Bolt circle	Outer Ø	Bolt holes		(1,9 kg/dm ³)	
					Quantity	Ø	Form A	Form B
DN	d1	d2	Lk	d2	n	SL	kg	
1600	1630	1672	1693	1720	80	18	1.073	1.888
1700	1730	1772	1793	1820	84		1.143	2.003
1800	1830	1872	1893	1920	92		1.200	2.105
1900	1930	1972	1993	2020	96		1.265	2.220
2000	2030	2072	2093	2120	100		1.331	2.334
2100	2130	2172	2193	2220	108		1.388	2.436
2200	2230	2272	2293	2320	112		1.453	2.551
2300	2330	2372	2393	2420	116		1.519	2.665
2400	2430	2472	2493	2520	120		1.584	2.780
2500	2530	2572	2593	2620	128		1.641	2.882
2600	2630	2672	2693	2720	132		1.706	2.997
2700	2730	2772	2793	2820	136		1.775	3.111
2800	2830	2872	2893	2920	140		1.837	3.226
2900	2930	2972	2993	3020	148		1.894	3.328
3000	3030	3072	3093	3120	152		1.960	3.442

Dimensions in mm

* Number of bolts in draft standard not divisible by 4, problem for alignment, here already adjusted

Thickness of gaskets according to DIN 86072-2

Gasket form 2600	Material thickness	
	Sealing element	Support ring
Form A	2	1
	4 ¹⁾	2 ¹⁾
Form B	1,5	3

Dimensions in mm

1) Thicknesses not mentioned in standard

Overview of metallic materials

Materials and color code for metallic corrugated ring materials according to EN 1514-2, -4, -6, -7 and EN 12560-2, -6 with additions (common materials with material number in bold print)

Material ¹⁾²⁾	Material number	Material group	Designation	Color code EN1514 ³⁾	Hardness HB	Temperature in °C		Spec. weight g/cm ³				
						min.	max.					
unalloyed steel	general		CRS	Silver	120	-10	450	7.85				
soft iron	1.1001		Soft Iron		max. 90	-60	450	7.85				
soft iron StW24 mod.	1.0335	EN 10111	Soft Iron		max. 90			7.85				
DD13 (StW 24)	1.0330	EN 10152	Low Carbon		max. 120	-10	450	7.75				
DC01 /St 12)	1.0038	EN 10305-2	36		130	-40	450	7.85				
S235JGR2 (RSt37-2)												
P235GH (HI)	1.0345	EN 10028-2 pressure vessel steel	C		130-180	-40	450	7.85				
P265GH (HII)	1.0425		60			-60	450					
P295 GH	1.0481		G			-60	480					
16Mo3 (15 Mo 3)	1.5415	EN 10028-2 heat resistant pressure vessel steel	T1		140-170 150-180 130-180	-20	530	7.85				
13CrMo4-5	1.7335		11 / 12			-60	560					
10CrMo9-10	1.7380		22			-40	590					
12CrMo19-5G	1.7362	SEW 028 resistant to pressurized water steel VdTÜV Wb 004/1	5		130-220	-60	650	7.85				
12CrMo19-5V												
P275NH (WStE 285)	1.0487	EN 10028-3 cold tough fine grained structural steel	A		130-180	-110	400	7.85				
P355NH (WStE 355)	1.0565		B									
P355NL1 (TStE 355)	1.0566		B									
P460NH (WStE 460)	1.8935											
X6Cr17	1.4016	EN 10088-1-3 10028-7 stainless steel	430	-	130-170	-20	350	7.70				
X4CrNi18-10	1.4301		304	yellow	120-170	-200	550	7.95				
X2CrNi19-11	1.4306		304L	-	120-170	-200	550	7.95				
X2CrNi18-9	1.4307		(304L)	-	120-170	-200	550	7.95				
X5CrNiMo17-12-2	1.4401		316	green	120-170	-200	550	7.95				
X2CrNiMo17-12-2	1.4404		316L	green	120-170	-200	550	7.95				
X2CrNiMoN17-11-2	1.4406		316LN	-	120-170	-200	550	7.95				
X2CrNiMo18-14-3	1.4435		317L	-	120-170	-200	550	7.95				
X2CrNiMo18-15-4	1.4438		317L	-	120-170	-200	550	7.95				
X2CrNiMoN17-13-5	1.4439		317LMN	-	120-170	-200	400	7.95				
X6CrNiTi18-10	1.4541		321	turquoise	130-190	-270	550	7.90				
X6CrNiNb18-10	1.4550		347	blue	130-190	-200	550	7.90				
X6CrNiMoTi17-12-2	1.4571		316Ti	-	130-190	-270	550	7.98				
X2CrNiN23	1.4362		EN 10028-7 Duplex-Stahl	A 2304		130-190	-200	250	7.85			
X2CrNiMoN22-5-3	1.4462			182 F51	-							
X15CrNiSi20-12	1.4828		EN 10095 heat resistant steel	309	-	130-190	-110	800	7.90			
X15CrNiSi2520	1.4841			310	-	130-190	-110	800	7.90			
X10NiCrAlTi32-20	1.4876	IN 800		white	130-220	-110	850	8.00				
ECu57	2.0060	copper			35-70	-270	350	8.93				
SF-Cu	2.0090							8.94				
CuZn37	2.0321	brass / Ms63			60-100	-200	300	8.44				
Ni	2.4060	nickel	Ni	red	80-150	-60	600	8.90				
Ni99.2	2.4066											
NiCu30Fe	2.4360	z.B. Monel 400 z.B. Hasteloy B2 VdTÜV Wb 436	MON B333	orange brown	100-160	-60	500	8.88				
NiMo28	2.4617		200	-29	425	9.22						
NiCr20CuMo	2.4660	z. B. Inconel 600 z.B. Hasteloy C276 VdTÜV Wb 400	A-20	black	140-200	-60	600	8.42				
NiCr15Fe7TiAl	2.4669		INX	-								
NiCr15Fe	2.4816		INC 600	gold					160	-29	535	8.89
NiMo16Cr15W	2.4819		B575	beige								
NiCr22Mo9Nb	2.4856	z.B. Inconel 625 VdTÜV Wb 499	B443	gold	200	-29	62	8.44				
NiCr21Mo	2.4858	z.B. Inconel 825 VdTÜV Wb 432/1	B424	white	160	-29	535	8.14				
Ti (99,8)	3.7025	titanium 1 titanium 2	1	Purple	110-160	-60	300	4.50				
Ti (99,97)	3.7035		2	Purple	120-180	-60	350	4.50				
Aluminum	-		Al		20-45	-250	300	2.70				
Ag 99,97		fine silver FK silver	Ag		25-45 HV 45-65 HV	-270	750	10.50				
Ag 99,85 Ni 0,15												
Zirconium	-		ZIRC	-								

Individually made according to customer requirements

Corrugated rings and corrugated frames also with webs

We also manufacture corrugated ring gaskets in frame format. The installation of webs is possible with any design of corrugated rings and corrugated frames. For the production of such gaskets a drawing or a sample is required from the customer.

Order example:

according to standard with support
MMD-CG-FG
DN80
PN10/40 according to EN1514-6
1.4541/graphite total 5 mm
Orders are also possible according to sample gasket or drawing.



Satisfied customers are our incentive!

We achieve this, because we are committed to the needs of our consumers, we listen to them and produce exactly the metal gaskets that exactly meet their requirements for pressure, temperature and medium resistance.

Your advantages

- most modern production technologies
- every gasket tested and certified
- technical consulting and training
- all orders shipped within 24 hours
- fast assembly due to high fitting accuracy
- All gaskets are guaranteed Made in Germany!

Use our ...

- experience
- technologies
- designs and calculations
- trainings
- cooperation partners



Möller-Metalldichtungen GmbH | Brunnenweg 10 | 39444 Hecklingen
phone: +49 3925 37890-0 | fax: +49 3925 930037
e-mail: moeller@moeller-md.de | www.moeller-md.de