

# RING-JOINTS RTJ

Ring joint gaskets are made from metallic materials. The requirements in terms of dimensional accuracy and surface quality are therefore high. This relates to both the gasket and the sealing section of the flange.

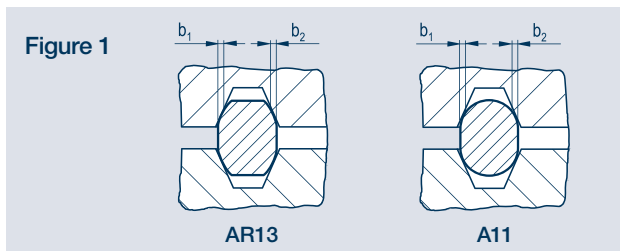
The necessary surface quality depends substantially on the Brinell hardness of the gasket material. The relationship  $R_z[\mu\text{m}] \leq 300/\text{HB}$  provides a useful indication.

A distinction is made between two kinds of ring joint gaskets and two different calculation methods are therefore used:

## 1. RTJ gaskets with osculating radius (Figure 1)

- The convex octagonal RTJ gaskets, Profile AR 13, in which the convex cone case surfaces of the gasket are pressed against the even cone case surfaces of the groove when tensioned.
- The oval ring-joint gasket, Profile A11, in which the circular surface is pressed against the cone case surfaces of the groove.

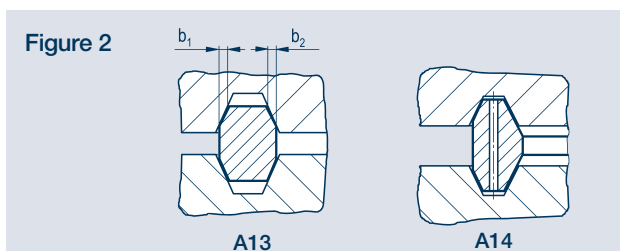
The sealing surface pressure increases or decreases to a **lesser extent** in response to any change in the bolt load.



## 2. RTJ gaskets with flat sealing surfaces (Figure 2)

The octagonal RTJ gasket, Profiles A13 and A14, are flat gaskets in which the sealing surfaces are two cone case surfaces. The projection in the direction of the bolting force  $b_G = b_1 + b_2$  should be set as the sealing surface width.

The sealing surface pressure increases or decreases **proportionally** in response to any change in the bolt load.



The application thresholds values of oval octagonal RTJ gaskets can be more accurately calculated in relation to material, diameter, pressure, temperature and the surface pressure limits.

Here the fictitious sealing characteristic values in accordance with AD are replaced with the values of  $\sigma_v$  and  $\sigma_g$ .

Ring Joint gaskets in accordance with API and ASME standards are mainly used in the petrochemical industry and in refineries as a reliable gasket for production pipelines.

We are permitted to give our products the API Monogram. This guarantees that our products meet the latest API standards.

It should be noted that in Profile A12 the flanges have metal-to-metal contact. Profile AR13 with convex sealing surfaces.

Ring Joint gaskets can be produced as blind gaskets in Profile A11S, A13S etc. or as blind spectacle gaskets in Profile A11BS, A13BS (see Blind Gaskets).



## Material

Code designation	Material no.	Hardness (HB)	US-Type AISI	Code
Pure iron, e.g. Armo	1.1003	90-100	Soft-Iron	D
Stw24mod	-	90-110	Soft-Iron	D
Low-Carbon-Steel	-	120	Low-Carbon-Steel	S
13 CrMo 4 4	1.7335	ca. 160	-	7335
12 CrMo 19 5 mod	1.7362 mod	ca. 130	501	F5
X6 Cr 13	1.4000	ca. 160	410	S 410
X5 CrNi 18 10	1.4301	ca. 160	304	S 304
X5 CrNiMo 17 12 2	1.4401	ca. 160	316	S 316
X6 CrNiTi 18 10	1.4541	ca. 160	321	S 321
X6 CrNiNb 18 10	1.4550	ca. 160	347	S 347
X6 CrNiMo Ti 17 12 2	1.4571	ca. 160	316Ti	316 Ti

\* Further technical data see section "Materials commonly used".

# RING-JOINTS RTJ

Material, profiles, surface pressure limits, surface roughness

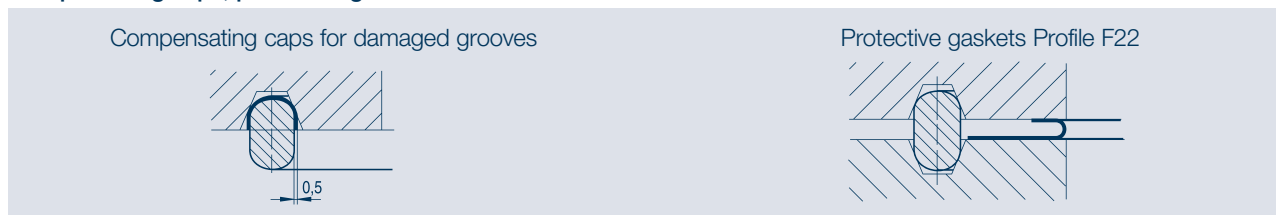
With the addition of a protective ring made from sheet metal to Profile F22, disruptive turbulence and accretions are avoided. At small edge widths the protective gaskets are symmetrical, at larger edge widths they are centred on one side. We can supply soft-iron compensating caps for damaged grooves, such as Profile AK11, AK12, AK13, AK14.

For a complete estimate on sealing flange connections, our efficient sealing estimate service is available.

## Gasket profiles

Profile	Cross-section
A11	
A12	
A13	
AR13	
A14	
F22	
AK11	
AK12	
Ak13	
AK14	

## Compensating caps, protective gaskets

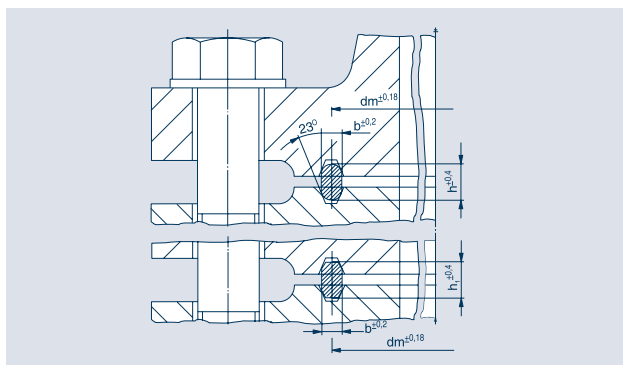


## Gasket limiting values

Profiles	A11, A11S, A11BS, A12, A13, A13S, A13BS, AR13, AR13S, AR13BS, A14									
	Materials	Iron 1.1003 Stw24mod	Heat-resistant mild steel 1.5415	Heat-resistant mild steel 1.7362	Stainless Steel 1.4541	Stainless Steel 1.4828	Carbon steel 1.0308 copper-plated	Stainless steel 1.4541 plated	Copper 2.0090	Monel 2.4360
Recommended max. roughness of the flange surfaces	$\mu\text{m}$ from to	3,2 6,3	3,2 6,3	3,2 6,3	1,6 3,2	1,6 3,2	3,2 6,3	6,3 12,5	3,2 6,3	3,2 6,3
Surface pressure limits for 20 °C	$\text{N/mm}^2$ $\sigma_v$ $\sigma_s$	235	300	400	335	400	135	100	135	260
		525	675	900	750	900	600	750	300	660
E-Modul at 20 °C	$\text{kN/mm}^2$	210	210	210	200	200	210	200	128	178
Surface pressure limits for 300 °C	$\text{N/mm}^2$ $\sigma_v$ $\sigma_s$	235	300	400	335	400	135	100	135	260
		315	585	730	630	750	390	630	150	650
E-Modul at 300 °C	$\text{kN/mm}^2$	185	185	190	186	186	185	186	114	175

# RING JOINT GASKETS, TYPE R

Ring joint gaskets, Type R, dimensions  
in accordance with ASME B16.20, API Std 6 A for flanges  
in accordance with ASME B16.5 and ASME B16.47 Series A  
in accordance with EN 12560-5



Ordering example for an oval ring joint gasket,  
Profile A11, NPS 5, Class 150, made of ... 1):

**Ring joint gasket R 40 A11 / 1.4541**

Ordering example for an octagonal ring joint gasket,  
Profile A13, NPS 20, Class 1500, made of ... 1):

**Ring joint gasket R 75 A13 / 1.4541**

## Ring joint gaskets, Type R

NPS	class	Ring-No.	Ring measurements			
			dm	b	h	h <sub>1</sub>
½	300 to 600	R 11	34,13	6,35	11,11	9,53
½	900 1500	R 12	39,69	7,94	14,29	12,70
½	2500	R 13	42,86	7,94	14,29	12,70
¾	300 to 600	R 13	42,86	7,94	14,29	12,70
¾	900,1500	R 14	44,45	7,94	14,29	12,70
1	150	R 15	47,63	7,94	14,29	12,70
¾	2500	R 16	50,80	7,94	14,29	12,70
1	300 to 1500	R 16	50,80	7,94	14,29	12,70
1¼	150	R 17	57,15	7,94	14,29	12,70
1	2500	R 18	60,33	7,94	14,29	12,70
1¼	300 to 1500	R 18	60,33	7,94	14,29	12,70
1½	150	R 19	65,09	7,94	14,29	12,70
1½	300 to 1500	R 20	68,26	7,94	14,29	12,70
1½	2500	R 21	72,23	11,11	17,46	15,88
2	150	R 22	82,55	7,94	14,29	12,70
1½	2500	*R 23	82,55	11,11	17,46	15,88
2	300 to 600	*R 23	82,55	11,11	17,46	15,88
2	900,1500	*R 24	95,25	11,11	17,46	15,88
2½	150	R 25	101,60	7,94	14,29	12,70
2	2500	*R 26	101,60	11,11	17,46	15,88
2½	300 to 600	*R 26	101,60	11,11	17,46	15,88
2½	900,1500	*R 27	107,95	11,11	17,46	15,88
2½	2500	R 28	111,13	12,70	19,05	17,46
3	150	R 29	114,30	7,94	14,29	12,70
3	300 to 600	R 30	117,48	11,11	17,46	15,88
3	300 to 900	*R 31	123,83	11,11	17,46	15,88
3	2500	R 32	127,00	12,70	19,05	17,46
3½	150	R 33	131,76	7,94	14,29	12,70
3½	300 to 600	R 34	131,76	11,11	17,46	15,88
3	1500	*R 35	136,53	11,11	17,46	15,88
4	150	R 36	149,23	7,94	14,29	12,70
4	300 to 900	*R 37	149,23	11,11	17,46	15,88
4	2500	R 38	157,16	15,88	22,23	20,64
4	1500	*R 39	161,93	11,11	17,46	15,88
5	150	R 40	171,45	7,94	14,29	12,70
5	300 to 900	*R 41	180,98	11,11	17,46	15,88
5	2500	R 42	190,50	19,05	25,40	23,81
6	150	R 43	193,68	7,94	14,29	12,70
5	1500	*R 44	193,68	11,11	17,46	15,88
6	300 to 900	*R 45	211,14	11,11	17,46	15,88
6	1500	*R 46	211,14	12,70	19,05	17,46
6	2500	R 47	228,60	19,05	25,40	23,81
8	150	R 48	247,65	7,94	14,29	12,70
8	300 to 900	*R 49	269,88	11,11	17,46	15,88
8	1500	*R 50	269,88	15,88	22,23	20,64
8	2500	R 51	279,40	22,23	28,58	26,99
10	150	R 52	304,80	7,94	14,29	12,70
10	300 to 900	*R 53	323,85	11,11	17,46	15,88
10	1500	*R 54	323,85	15,88	22,23	20,64
10	2500	R 55	342,90	28,58	36,51	34,93
12	150	R 56	381,00	7,94	14,29	12,70
12	300 to 900	*R 57	381,00	11,11	17,46	15,88
12	1500	R 58	381,00	22,23	28,58	26,99
14	150	R 59	396,88	7,94	14,29	12,70

Dimensions in mm

NPS	class	Ring-No.	Ring measurements			
			dm	b	h	h <sub>1</sub>
12	2500	R 60	406,40	31,75	39,69	38,10
14	300 to 600	R 61	419,10	11,11	17,46	15,88
14	900	R 62	419,10	15,88	22,23	20,64
14	1500	R 63	419,10	25,40	33,34	31,75
16	150	R 64	454,00	7,94	14,29	12,70
16	300 to 600	*R 65	469,90	11,11	17,46	15,88
16	900	*R 66	469,90	15,88	22,23	20,64
16	1500	R 67	469,90	28,58	36,51	34,93
18	150	R 68	517,53	7,94	14,29	12,70
18	300 to 600	R 69	533,40	11,11	17,46	15,88
18	900	R 70	533,40	19,05	25,40	23,81
18	1500	R 71	533,40	28,58	36,51	34,93
20	150	R 72	558,80	7,94	14,29	12,70
20	300 to 600	*R 73	584,20	12,70	19,05	17,46
20	900	*R 74	584,20	19,05	25,40	23,81
20	1500	R 75	584,20	31,75	39,68	38,10
24	150	R 76	673,10	7,94	14,29	12,70
24	300 to 600	R 77	692,15	15,88	22,23	20,64
24	900	R 78	692,15	25,40	33,34	31,75
24	1500	R 79	692,15	34,92	44,45	41,28
22	150	R 80	615,95	7,93	-	12,70
22	300 to 600	R 81	635,00	14,28	-	19,05
1	10000	R 82	57,15	11,11	-	15,87
1½	10000	R 84	63,50	11,11	-	15,87
2	10000	R 85	79,37	12,70	-	17,46
2½	10000	R 86	90,49	15,87	-	20,63
3	10000	R 87	100,01	15,87	-	20,63
4	10000	R 88	123,83	19,05	-	23,81
3½	10000	R 89	114,30	19,05	-	23,81
5	10000	R 90	155,58	22,22	-	26,98
10	10000	R 91	260,35	31,75	-	38,10
		R 92	228,60	11,11	17,46	15,87
26	300, 400, 600	R 93 <sup>2)</sup>	749,30	19,05	-	23,81
28	300, 400, 600	R 94 <sup>2)</sup>	800,10	19,05	-	23,81
30	300, 400, 600	R 95 <sup>2)</sup>	857,25	19,05	-	23,81
32	300, 400, 600	R 96 <sup>2)</sup>	914,40	22,22	-	26,98
34	300, 400, 600	R 97 <sup>2)</sup>	965,2	22,22	-	26,98
36	300, 400, 600	R 98 <sup>2)</sup>	1022,35	22,22	-	26,98
8	2000, 3000	R 99	234,95	11,11	-	15,87
26	900	R 100 <sup>2)</sup>	749,30	28,57	-	34,92
28	900	R 101 <sup>2)</sup>	800,10	31,75	-	38,10
30	900	R 102 <sup>2)</sup>	857,25	31,75	-	38,10
32	900	R 103 <sup>2)</sup>	914,40	31,75	-	38,10
34	900	R 104 <sup>2)</sup>	965,20	34,92	-	41,27
36	900	R 105 <sup>2)</sup>	1022,35	34,92	-	41,27

- Flanges compliant with the standard not available Dimensions in mm

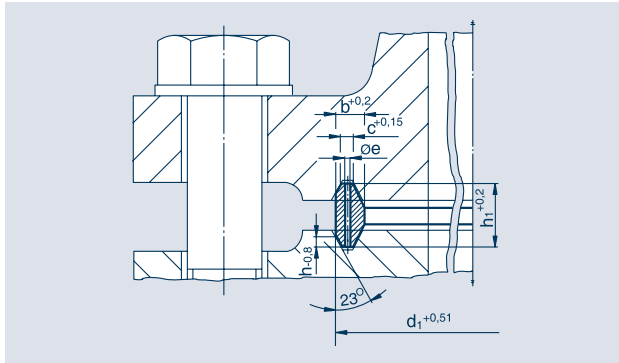
\* These rings conform to API standard 6A. The measurements given in mm are converted measurements and will differ marginally from the metric API table.

1) Specify material when placing order

2) Ring for flanges in accordance with ASME B16.47 Series A

# RING JOINT GASKETS, TYPE RX

Ring joint gaskets, Type RX, dimensions in accordance with ASME B16.20 and/or API Std 6 A for API 6B flanges



Ordering example for an oval ring joint gasket, Profile A14, NPS 4, Class 3000, made of ...<sup>1)</sup>:

**Ring joint gasket R 37 A14 / 1.4541**

## Ring joint gaskets, Type RX

NPS	class	Ring-No.	Ring measurements					Bore* e
			d <sub>1</sub>	b	c	h <sub>1</sub>	h	
1½	2000, 3000, 5000	RX 20	76,2	8,73	4,62	19,05	3,18	-
2	2000	RX 23	93,27	11,91	6,45	25,4	4,24	-
2	3000,5000	RX 24	105,97	11,91	6,45	25,4	4,24	-
3½	5000	RX 25	109,54	8,73	4,62	19,05	3,18	-
2½	2000	RX 26	111,92	11,91	6,45	25,4	3,78	-
2½	3000, 5000	RX 27	118,27	11,91	6,45	25,4	4,24	-
3	2000, 3000	RX 31	134,54	11,91	6,45	25,4	4,24	-
3	5000	RX 35	147,24	11,91	6,45	25,4	4,24	-
4	2000, 3000	RX 37	159,94	11,91	6,45	25,4	4,24	-
4	5000	RX 39	172,64	11,91	6,45	25,4	4,24	-
5	2000, 3000	RX 41	191,69	11,91	6,45	25,4	4,24	-
5	5000	RX 44	204,39	11,91	6,45	25,4	4,24	-
6	2000, 3000	RX 45	221,85	11,91	6,45	25,4	4,24	-
6	5000	RX 46	222,25	13,49	6,68	28,58	4,78	-
8	crossover flange	RX 47	245,3	19,84	10,34	41,28	6,88	-
8	2000, 3000	RX 49	280,59	11,91	6,45	25,4	4,24	-
8	5000	RX 50	283,37	16,67	8,51	31,75	5,28	-
10	2000, 3000	RX 53	334,57	11,91	6,45	25,4	4,24	-
10	5000	RX 54	337,34	16,67	8,51	31,75	5,28	-
12	2000, 3000	RX 57	391,72	11,91	6,45	25,4	4,24	-
14	5000	RX 63	441,72	26,99	14,78	50,8	8,46	-
16	2000	RX 65	480,62	11,91	6,45	25,4	4,24	-
16	3000	RX 66	483,39	16,67	8,51	31,75	5,28	-
18	2000	RX 69	544,1	11,91	6,45	25,4	4,24	-
18	3000	RX 70	550,1	19,84	10,34	41,28	6,88	-
20	2000	RX 73	596,1	13,49	6,68	31,75	5,28	-
20	3000	RX 74	600,87	19,84	10,34	41,28	6,88	-
1	10000	RX 82	67,87	11,91	6,45	25,4	4,24	1,6
1½	10000	RX 84	74,22	11,91	6,45	25,4	4,24	1,6
2	10000	RX 85	90,09	13,49	6,68	25,4	4,24	1,6
2½	10000	RX 86	103,58	15,08	8,51	28,58	4,78	2,4
3	10000	RX 87	113,11	15,08	8,51	28,58	4,78	2,4
4	10000	RX 88	139,3	17,46	10,34	31,75	5,28	3,2
3½	10000	RX 89	129,78	18,26	10,34	31,75	5,28	3,2
5	10000	RX 90	174,62	19,84	12,17	44,45	7,42	3,2
10	10000	RX 91	286,94	30,16	19,81	45,24	7,54	3,2
8	2000, 3000	RX 99	245,67	11,91	6,45	25,4	4,24	-
1¼	5000	RX 201	51,46	5,74	3,2	11,3	1,45	-
1¾	5000	RX 205	62,31	5,56	3,05	11,1	1,83	-
2½	5000	RX 210	97,63	9,53	5,41	19,05	3,18	-
4	5000	RX 215	140,89	11,91	5,33	25,4	4,24	-
4x 4¼	5000	RX 215	140,89	11,91	5,33	25,4	4,24	-

- Flanges compliant with the standard not available

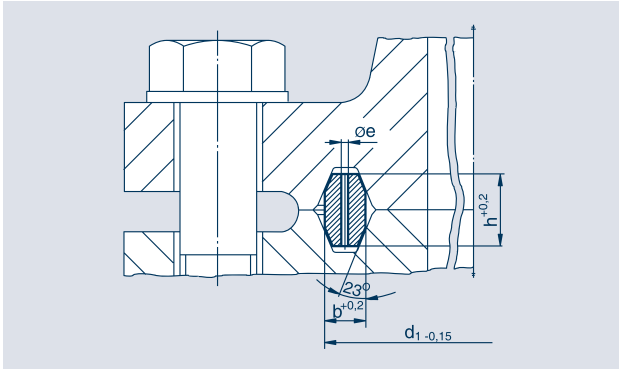
Dimensions in mm

\* A compensating bore on the ring circumference.  
The compensating bore equalises the pressure in both air chambers.

<sup>1)</sup> Specify material when placing order.

# RING JOINT GASKET, TYPE RX

Ring joint gasket, Type BX, dimensions in accordance with API Std 6 A for API 6BX flanges



Ordering example for an ring joint gasket, Profile A12, NPS 3 1/16, Class 15000, made of ...<sup>1)</sup>:

**Ring joint gasket BX 154 A12 / 1.4541**

## Ring joint gaskets, Type BX

NPS	class	Ring-No.	d <sub>1</sub>	b	h	Bore* e
1 11/16	10000,15000	BX 150	72,19	9,30	9,30	1,6
1 13/16	10000,15000,20000	BX 151	76,40	9,63	9,63	1,6
2 1/16	10000,15000,20000	BX 152	84,68	10,24	10,25	1,6
2 9/16	10000,15000,20000	BX 153	100,94	11,38	11,38	1,6
3 1/16	10000,15000,20000	BX 154	116,84	12,40	12,40	1,6
4 1/16	10000,15000,20000	BX 155	147,96	14,22	14,22	1,6
7 1/16	10000,15000,20000	BX 156	237,92	18,62	18,62	3,2
9	10000,15000	BX 157	294,46	20,98	20,98	3,2
11	10000,15000	BX 158	352,04	23,14	23,14	3,2
13 5/8	10000	BX 159	426,72	25,70	25,70	3,2
13 5/8	5000	BX 160	402,59	13,74	23,83	3,2
16 3/4		BX 161	491,41	16,20	28,07	3,2
16 3/4	5000,10000	BX 162	475,49	14,22	14,22	1,6
18 3/4	5000	BX 163	556,16	17,37	30,10	3,2
18 3/4	10000	BX 164	570,56	24,59	30,10	3,2
21 1/4	5000	BX 165	624,71	18,49	32,03	3,2
21 1/4	10000	BX 166	640,03	26,14	32,03	3,2
26 3/4	2000	BX 167	759,36	13,11	35,86	1,6
26 3/4	3000	BX 168	765,25	16,05	35,86	1,6
5 1/8	10000	BX 169	173,52	12,93	15,84	1,6
9		BX 170	218,03	14,22	14,22	1,6
11		BX 171	267,44	14,22	14,22	1,6
13 5/8		BX 172	333,07	14,22	14,22	1,6
30	2000, 3000	BX 303	852,75	16,97	37,95	1,6

Dimensions in mm

\* A compensating bore on the ring circumference.  
The compensating bore equalises the pressure in both air chambers.

<sup>1)</sup> Specify material when placing order.