
APOLLON

CHARACTERISTICS VALUES & PRE STRESSING FORCES



Ein Unternehmen der



Gasket & Pipe
Holding GmbH

Spiral-wound gaskets Characteristic values

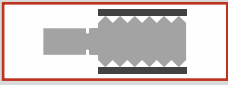
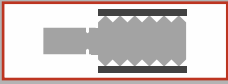
Cross-section	Materials		Thickness		KH	KN	Adv. Surf. Roughness	min. Width	Operating limits		Max. surface pressure			Pre-forming	Op. State	
	Gasket	Compound	High of metal strip	Depth of groove					Temp.	Pres- sure	Mounting Min.	operating Max.	Factor			Ko • KD
			hD	t												
		mm	mm	μm	mm	$^{\circ}C$	bar	$\frac{N}{mm^2}$	$\frac{N}{mm^2}$		$\frac{N}{mm}$	mm				
	Graphite strip	1.4541 0.2 mm corrugated metal strip	4.5		X			20				500				
			4.5	3.3		X	12,5 -30	5	200 300 400 500 550	400*	65	170 160 150 140 135	1,4	KH 55 bD	KH 1,4bD	
	Graphite strip	1.4541 0.2 mm corrugated metal strip	4.5		X			20				300				
			4.5	3.3		X	12,5 -30	6	200 300 400 500 550	400*	55	170 160 150 140 135	1,4	KH 55 bD	KH 1,4bD	
	Graphite strip	1.4541 0.2 mm corrugated metal strip	4.5		X			20				160				
			4.5	3.3		X	12,5 -30	4	200 300 400 500 550	400*	55	130 120 110 100 95	1,4	KH 55 bD	KH 1,4bD	
	Graphite strip	1.4541 0.2 mm corrugated metal strip	4.5		X			20				300				
			4.5	3.3		X	12,5 -30	5	200 300 400 500 550	400*	60	170 160 150 140 135	1,4	KH 55 bD	KH 1,4bD	

* Dependent on: Flange type, temperature, pressure, media

The maximum permissible, basically controllable temperature at the sealing surface in the case of continuous use with graphite is 460 °C.

Information for temperatures from 480 °C - 550 °C is based on laboratory data.

Grooved gaskets Characteristic values

Cross-section	Materials		Thickness		KH	KN	Adv. Surf. Roughness	min. Width	Operating limits		Max. surface pressure			Pre-forming	Op. State		
	Gasket	Compound	High of metal strip	hD					Temp.	Pres-sure	Mounting Min.	operating Max.	Factor			K _o • K _D	K ₁
	Graphite Layer 0,5 mm dick	1.4541	4.0 (+2x0,5)	X	8-25	7	20 200 300 400 500 550	400*	40	1,1	KH 14 bD	KH 0,8bD					
													500				
													450				
													420				
													390				
													350				
335																	
	PTFE Layer 0,5 mm dick	1.4541	4.0 (+2x0,5)	X	8-25	7	20 200 250	400*	40	1,1	KH 14 bD	KH 0,8bD					
													450				
													390				
													330				

* Dependent on: Flange type, temperature, pressure, media

The maximum permissible, basically controllable temperature at the sealing surface in the case of continuous use with graphite is 460 °C.

Information for temperatures from 480 °C - 550 °C is based on laboratory data.

Pre-stressing forces and tightening torques for screws

		Materials																											
		5.6		8.8		10.9		12.9		1.1181 Ck 35		1.7258 24 CrMo 5		1.7709 21 CrMoV 57		1.7711 40 CrMoV 47		1.4923 X 22 CrMoV 121		1.4913 X 19 CrMo Vnbn 111		1.4986 X 8 CrNi MoBnB 1616		2.4952 NiCr 20 TiAl					
		Yield strength(N/mm ²)																											
		300		660		940		1100		280		440		550		700		600		780		500		600					
		Mounting pre-stressing (kN)												Tightening torques (Nm)															
		kN		Nm		kN		Nm		kN		Nm		kN		Nm		kN		Nm		kN		Nm		kN		Nm	
M10	○	--	--	--	--	--	--	--	--	7,5	12,0	11,7	20,0	14,6	24,0	18,6	31,0	16,0	27,0	20,8	35,0	13,3	22,0	16,0	27,0	--	--		
	●	12,2	21,0	26,0	44,0	38,2	64,0	44,7	75,0	11,4	19,0	17,9	30,0	22,3	38,0	28,4	48,0	24,4	41,0	31,7	53,0	20,3	34,0	--	--	--	--		
M12	○	--	--	--	--	--	--	--	--	11,0	23,0	17,3	36,0	21,6	44,0	27,4	57,0	23,5	49,0	30,6	63,0	19,6	40,0	23,5	49,0	--	--		
	●	17,6	35,0	37,6	75,0	55,3	110,0	64,7	130,0	16,5	33,0	29,9	52,0	32,3	65,0	41,2	82,0	35,3	71,0	45,9	92,0	29,4	59,0	--	--	--	--		
M14	○	--	--	--	--	--	--	--	--	15,3	35,0	24,0	55,0	30,0	69,0	38,2	88,0	32,8	75,0	42,6	98,0	27,3	63,0	32,8	75,0	--	--		
	●	24,2	56,0	51,5	120,0	75,7	175,0	88,6	205,0	22,5	52,0	35,4	82,0	44,3	100,0	56,4	130,0	48,3	110,0	62,8	145,0	40,3	93,0	--	--	--	--		
M16	○	--	--	--	--	--	--	--	--	22,2	58,0	34,8	92,0	43,5	115,0	55,4	145,0	47,5	125,0	61,7	160,0	39,6	105,0	47,5	125,0	--	--		
	●	33,0	85,0	70,3	180,0	103,5	265,0	121,0	310,0	30,8	79,0	48,4	125,0	60,4	155,0	76,9	200,0	65,9	170,0	85,7	220,0	55,0	140,0	--	--	--	--		
M18	○	--	--	--	--	--	--	--	--	25,9	80,0	40,7	125,0	50,8	155,0	64,7	195,0	55,4	170,0	72,1	220,0	46,2	140,0	55,4	170,0	--	--		
	●	40,3	120,0	88,7	260,0	126,5	370,0	148,0	430,0	37,6	110,0	59,1	170,0	73,9	215,0	94,1	275,0	80,6	235,0	105,0	305,0	67,2	195,0	--	--	--	--		
M20	○	--	--	--	--	--	--	--	--	34,5	110,0	54,2	175,0	67,8	220,0	86,2	280,0	73,9	240,0	96,1	310,0	61,6	200,0	73,9	240,0	--	--		
	●	51,5	165,0	113,0	360,0	161,0	520,0	188,5	600,0	48,0	155,0	75,5	240,0	94,3	300,0	120,0	385,0	103,0	330,0	134,0	425,0	85,8	275,0	--	--	--	--		
M22	○	--	--	--	--	--	--	--	--	44,3	150,0	69,6	240,0	87,0	300,0	110,5	380,0	94,9	325,0	123,5	425,0	79,1	270,0	94,9	325,0	--	--		
	●	63,6	220,0	140,0	485,0	199,5	690,0	233,5	810,0	59,4	205,0	93,3	320,0	116,5	405,0	148,5	510,0	127,5	440,0	165,5	570,0	106,0	365,0	--	--	--	--		
M24	○	--	--	--	--	--	--	--	--	49,8	190,0	78,2	300,0	97,8	370,0	124,5	475,0	106,5	405,0	138,5	530,0	88,9	340,0	106,5	405,0	--	--		
	●	74,1	285,0	163,0	630,0	232,5	890,0	272,0	1050,0	69,2	265,0	108,5	415,0	136,0	520,0	173,0	660,0	148,5	570,0	192,5	740,0	123,5	475,0	--	--	--	--		
M27	○	--	--	--	--	--	--	--	--	64,5	275,0	101,5	435,0	126,5	545,0	161,0	690,0	138,0	590,0	179,5	770,0	115,0	495,0	138,0	590,0	--	--		
	●	96,4	415,0	212,0	910,0	302,0	1300,0	353,0	1500,0	90,0	390,0	141,5	610,0	176,5	760,0	225,0	970,0	193,0	830,0	250,5	1100,0	160,5	690,0	--	--	--	--		
M30	○	--	--	--	--	--	--	--	--	81,3	390,0	128,0	610,0	160,0	770,0	203,0	980,0	174,5	840,0	226,5	1100,0	145,5	700,0	174,5	840,0	--	--		
	●	118,0	570,0	259,0	1250,0	369,0	1800,0	432,0	2100,0	110,0	530,0	173,0	830,0	216,0	1050,0	275,0	1300,0	235,5	1100,0	306,0	1500,0	196,5	950,0	--	--	--	--		
M33	○	--	--	--	--	--	--	--	--	100,0	520,0	157,0	820,0	196,5	1000,0	250,0	1300,0	214,0	1100,0	278,5	1450,0	178,5	930,0	214,0	1100,0	--	--		
	●	146,0	760,0	321,0	1700,0	457,0	2400,0	534,0	2800,0	136,0	710,0	214,0	1100,0	267,0	1400,0	340,0	1800,0	291,5	1500,0	379,0	2000,0	243,0	1250,0	--	--	--	--		
M36	○	--	--	--	--	--	--	--	--	116,0	660,0	182,5	1050,0	228,5	1300,0	290,5	1650,0	249,0	1400,0	324,0	1850,0	207,5	1200,0	249,0	1400,0	--	--		
	●	172,0	980,0	377,0	2150,0	538,0	3100,0	629,0	3600,0	160,0	920,0	251,5	1450,0	315,0	1800,0	400,0	2300,0	343,0	1950,0	446,0	2550,0	286,0	1650,0	--	--	--	--		
M39	○	--	--	--	--	--	--	--	--	143,0	880,0	225,0	1400,0	281,0	1750,0	358,0	2200,0	307,0	1900,0	399,0	2450,0	255,5	1550,0	307,0	1900,0	--	--		
	●	205,0	1250,0	451,0	2800,0	642,0	3950,0	752,0	4650,0	191,5	1200,0	301,0	1850,0	376,0	2300,0	478,0	2950,0	410,0	2500,0	533,0	3300,0	342,0	2100,0	--	--	--	--		
M42	○	--	--	--	--	--	--	--	--	162,5	1100,0	255,5	1700,0	319,0	2100,0	406,0	2700,0	348,0	2300,0	453,0	3000,0	290,0	1950,0	348,0	2300,0	--	--		
	●	235,0	1550,0	517,0	3450,0	737,0	4900,0	862,0	5800,0	219,5	1450,0	345,0	2300,0	431,0	2900,0	549,0	3650,0	470,0	3150,0	612,0	4100,0	392,0	2600,0	--	--	--	--		
M45	○	--	--	--	--	--	--	--	--	194,0	1400,0	305,0	2150,0	381,0	2700,0	485,0	3450,0	415,0	2950,0	540,0	3850,0	346,0	2450,0	415,0	2950,0	--	--		
	●	273,0	1950,0	601,0	4300,0	855,0	6100,0	1000,0	7100,0	255,0	1800,0	400,0	2850,0	500,0	3600,0	637,0	4500,0	546,0	3900,0	710,0	5100,0	455,0	3200,0	--	--	--	--		
M48	○	--	--	--	--	--	--	--	--	216,5	1650,0	340,0	2600,0	425,0	3250,0	541,0	4150,0	464,0	3550,0	603,0	4600,0	386,0	2950,0	464,0	3550,0	--	--		
	●	309,0	2400,0	679,0	5200,0	967,0	7400,0	1130,0	8700,0	288,0	2200,0	453,0	3500,0	566,0	4300,0	720,0	5500,0	617,0	4700,0	803,0	6100,0	515,0	3950,0	--	--	--	--		
M52	○	--	--	--	--	--	--	--	--	258,5	2100,0	407,0	3350,0	508,0	4150,0	647,0	5300,0	554,0	4550,0	721,0	5900,0	462,0	3800,0	554,0	4550,0	--	--		
	●	370,0	3000,0	813,0	6700,0	1160,0	9500,0	1355,0	11100,0	345,0	2850,0	542,0	4450,0	678,0	5600,0	862,0	7100,0	739,0	6100,0	961,0	7900,0	616,0	5100,0	--	--	--	--		
M56	○	--	--	--	--	--	--	--	--	297,5	2650,0	468,0	4150,0	585,0	5200,0	744,0	6600,0	638,0	5600,0	829,0	7300,0	532,0	4700,0	638,0	5600,0	--	--		
	●	426,0	3800,0	938,0	8300,0	1335,0	11800,0	1565,0	13900,0	398,0	3500,0	625,0	5500,0	782,0	6900,0	995,0	8800,0	853,0	7600,0	1110,0	9800,0	711,0	6300,0	--	--	--	--		

Pre-stressing forces (kN) and tightening torque (Nm) with reduced shaft (○) and full shaft (●) in the case of 70% of the minimum distance. Coefficient of friction $\eta = 0,14$.

Materials*

Iron & steel

	DIN	DIN	AISI	Characteristic	Article	Hardness	Temperature C°		Spec. Weight g/cm³
	17006	17007			Work standard	HB	From	To	
Steel & Iron	RSt 37-2	1.0038	--		0038	100-130	-40°	500°	7,85
	St 35	1.0308	--		0308	100-130	-40°	500°	7,85
	Ust 13	1.0333	1.003		0333	80-115	-40°	500°	7,85
	StW 24 mod.	1.0335	Soft-Iron	D	0335	90-100			
	Soft-Iron (Armco)	1.1003	Soft-Iron	D	1003	90-100	-60°	500°	7,85
Stainless Steel	X6 Cr13	1.4000	410	S 410	4000	130-180	-20°	500°	7,85
	X6 Cr17	1.4016	430		4016	130-170	-20°	350°	7,70
	X20 Cr13	1.4021	420		4021	225-275	-20°	500°	7,70
	X5 CrNi 18 10	1.4301	304	S 304	4301	130-180	-250°	550°	7,90
	X5 CrNiMo 17 12 2	1.4401	316	S 316	4401	130-180	-110°	550°	7,90
	X2 CrNiMo 17 13 2	1.4404	316 L		4404	120-180	-110°	550°	7,90
	X6 CrNiTi 18 10	1.4541	321	S 321	4541	130-190	-250°	550°	7,90
	X6 CrNiNb 18 10	1.4550	347	S 347	4550	130-190	-250°	550°	7,90
	X6 CrNiMoTi 17 12 2	1.4571	316 Ti	316 Ti	4571	130-190	-110°	550°	7,80
	X15 CrNiSi 20 12	1.4828	309		4828	130-190	-110°	800°	7,90
	X10 NiCrAlTi 32 20	1.4876	B 407-409		4876	140-220	-110°	850°	8,00
Heat treatable	16 Mo 3	1.5415	F9		5415	130-170	-20°	530°	7,85
	13 CrMo 4-5	1.7335	F12	7.335,0	7335	130-175	-60°	560°	7,85
	12 CrMo 195	1.7362	F5	F5	7362	175-220	-40°	650°	7,85
	10 CrMo 910	1.7380	F22		7380	130-175	-40°	590°	7,85

Non-ferrous metals

	Material	Designation	Article	Hardnesse	Temperature C°		Spec. weight g/cm³
				HB	From	To	
	Copper	SF-Cu	8001	55	-250°	400°	9,00
	Brass	CuZn37	8002	60-80	-100°	350°	8,00
	Lead	Pb 99,9	8003	4	-250°	220°	12,00
	Nickel	Ni 99,2	8004	100-150	-250°	600°	9,00
	Monel	NiCu30Fe	8005	95-125	-125°	600°	9,00
	Aluminium	Al 99,5	8006	20-23	-250°	300°	3,00
	Alu Composite	AlMg1	8007	25-32	-250°	300°	3,00

* Metal gaskets from other materials and materials we like to produce on request

APOLLON



Apollon InduTec GmbH

Kurt-A.-Körper-Chaussee 73
Halle J
21033 Hamburg
Germany

Tel. +49 (0)40 361 661 52
Fax +49 (0)40 361 661 53

info@apollon-indutec.de
www.apollon-indutec.de



Ein Unternehmen der
 **Gasket & Pipe**
Holding GmbH