

KLINGER KGS GII

Booklet of Assembly Torques



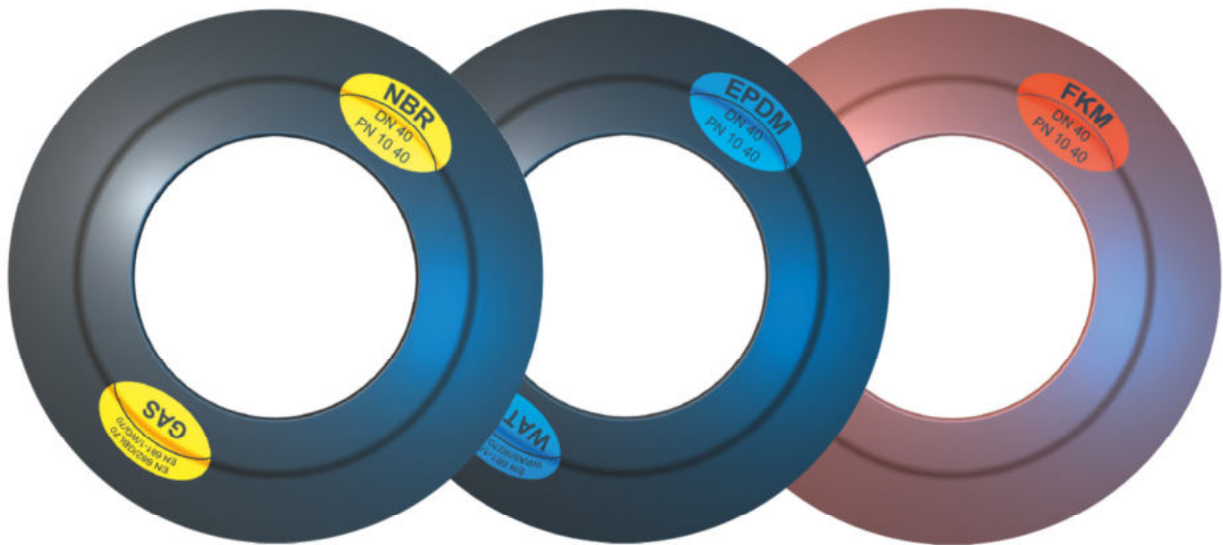


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Ad I.) General information to torque-tables of KLINGER KGS GII gaskets for carbon steel

Screws:

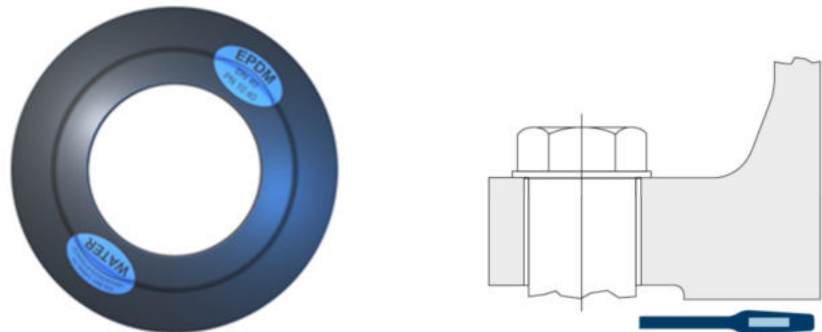
Calculation basis : - Dimension : gaskets acc. DIN EN 1514-1, Type IBC
 - Flanges : acc. DIN EN 1092-1
 - Mounting : Usage of washers
 - Friction : $\mu = 0,14$
 - Temperature : + 25 °C
 - Pressure : equal to design PN (PN 10 means 10 [bar])
 - Medium : Water
 - Aggregate state : liquid
 - Screw quality : 5.6 (mild steel) and 8.8 (high strength steel)

NOTIFICATION : **Minimum yield** for a safe bolt-/nut-connection should be **30%**!
 Otherwise there may be caused a problem by self rewinding of the nut caused by process-/pipe-vibration!

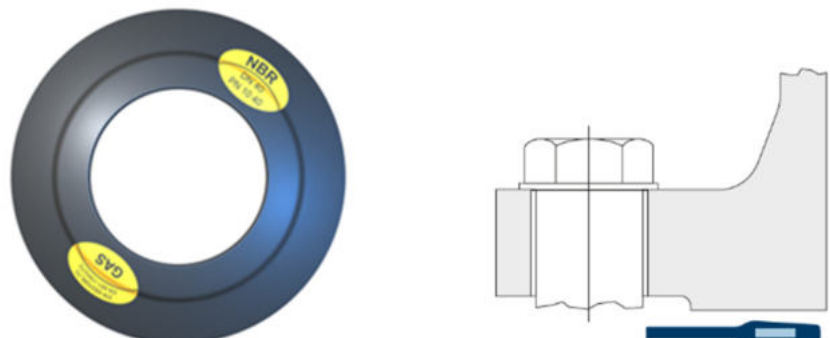
Maximum yield for a safe bolt-/nut-connection should be **80%**!
 Otherwise a proper calculation will be more difficult!

Elastomer-Qualities : Following there are named min. / max. torques for the Elastomers –

- EPDM

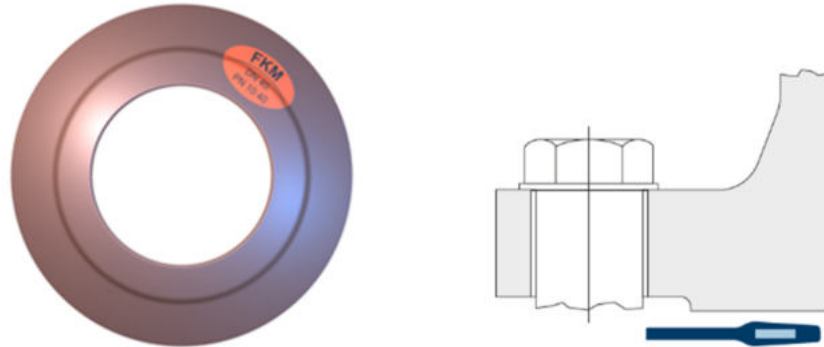


- NBR



The min. / max. Torques for –

- FKM



will be named ongoing separately.

Due to the possibility, that the new KGS GII could carry a very high load, the big differences in the modulus of elasticity will effect different loads!

The gasket work range of a KGS GII made of EPDM or NBR is –

- Min. load of 0,5 MPa

up to a

- Max. load of 40 MPa (80 MPa under special conditions possible!).

The gasket work range of a KGS GII made of FKM is –

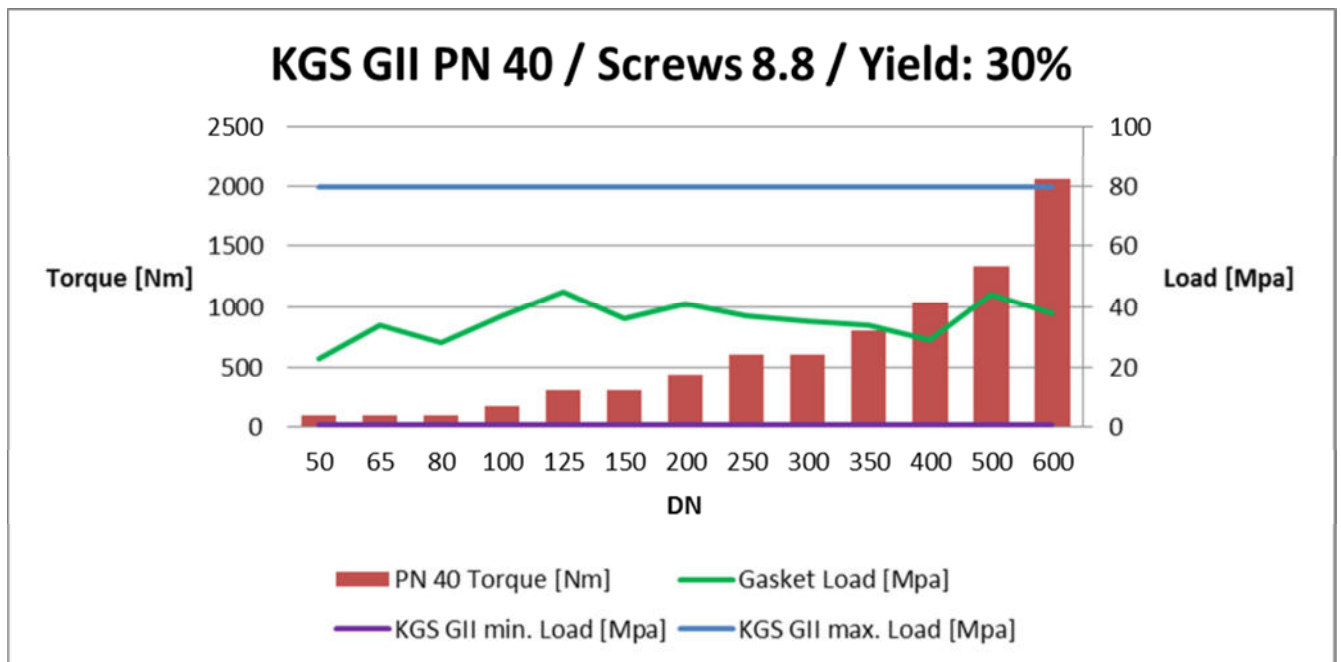
- Min. load of 0,5 MPa

up to a

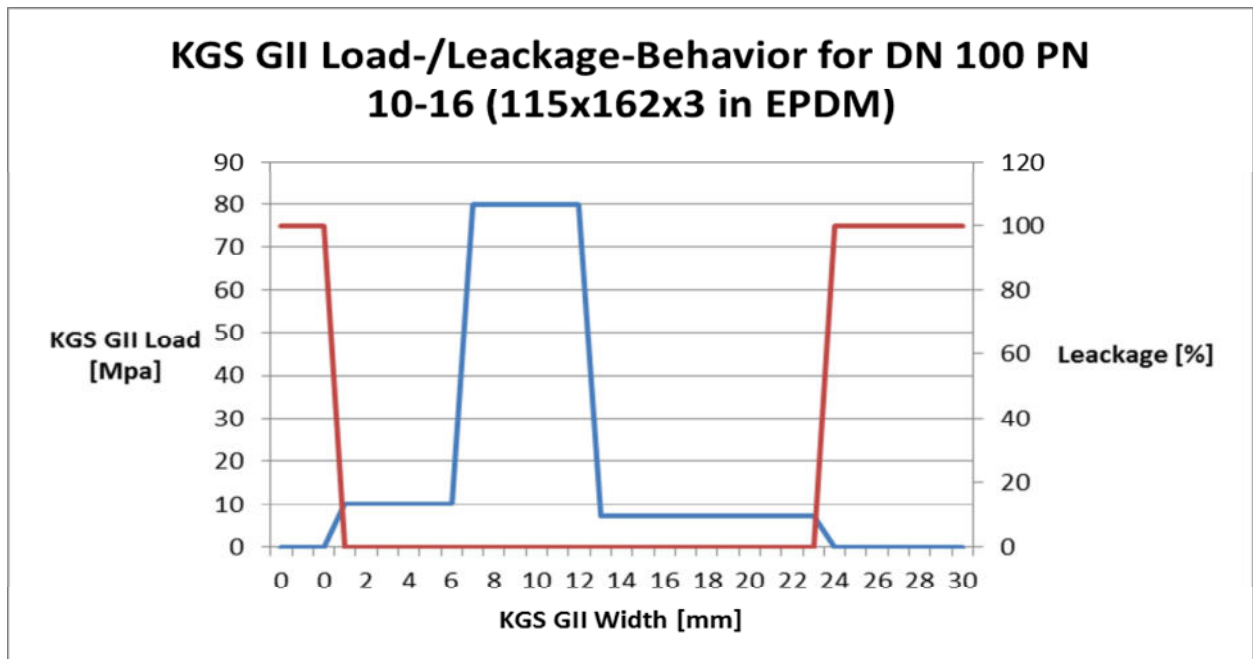
- Max. load of 25 MPa

The KLINGER Rubber-Steel-Gasket KGS GII – the only Elastomer gasket in EPDM and NBR, which could be properly used within the ideal tensile stress of following screw qualities, which are common standards as:

- 8.8
- 25 CrMo4
- A2-70 / A2-50



Graph I: The green curve shows the load effected by the screw quality at a min. yield of 30%. The violet and blue line shows the min. and max. load possible for KGS GII – at the end maximum safety and reliability at a flange. This is shown for material EPDM and NBR.



Graph II: For better orientation, compare the horizontal spear shape of the KGS GII gasket above with the X-achsie (Width [mm]) of the Graph II. **Blue Curve:** From the inner diameter of the rubber part to the inner diameter of the steel ring, there will be built up a load of up to 10 MPa. The steel ring itself is the major static carrier (> 80 MPa possible). From the outer diameter of the steel ring up to the outer diameter of the rubber part there will be built up a max. load of up to 7 MPa. **Brown curve:** Tightness efficiency within the total contact of rubber by 100%.

Ad II.) KLINGER KGS GII - torque tables min. and max. for carbon steel screws:

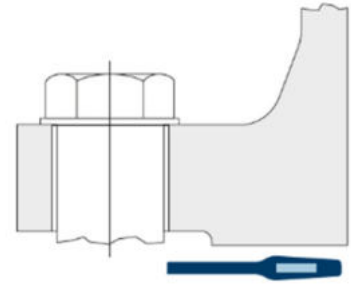
Torque tables min. and max. for screw quality 5.6 and KGS GII in Elastomer Quality –



KGS GII / EPDM



KGS GII / NBR



DN	n _{pcs} x M _{screw} [mm]	Flange PN 6 / Torque [Nm] Minimum to Maximum	5.6 yield [%] Minimum to Maximum	Gasket Load [Mpa] Minimum to Maximum
15	4 x M10	10 - 17	30 - 51	24 - 40
20	4 x M10	10 - 27	30 - 78	15 - 40
25	4 x M10	10 - 27	30 - 80	11 - 30
32	4 x M12	18 - 47	30 - 80	13 - 30
40	4 x M12	18 - 47	30 - 80	10 - 26
50	4 x M12	18 - 47	30 - 80	9 - 24
65	4 x M12	18 - 47	30 - 80	10 - 17
80	4 x M16	42 - 112	30 - 80	9 - 23
100	4 x M16	42 - 112	30 - 80	8 - 22
125	8 x M16	42 - 112	30 - 80	12 - 33
150	8 x M16	42 - 112	30 - 80	12 - 31
200	8 x M16	42 - 112	30 - 80	10 - 21
250	12 x M16	42 - 112	30 - 80	10 - 26
300	12 x M16	82 - 218	30 - 80	12 - 33
350	12 x M16	82 - 218	30 - 80	9 - 24
400	16 x M20	82 - 218	30 - 80	11 - 30
500	20 x M20	82 - 218	30 - 80	10 - 27
600	20 x M24	142 - 378	30 - 80	13 - 33
800	24 x M27	206 - 549	30 - 80	12 - 33
1000	28 x M27	206 - 549	30 - 80	10 - 31
1200	32 x M30	281 - 748	30 - 80	10 - 29
1400	36 x M33	378 - 1007	30 - 80	10 - 29

DN	n _{pcs} x M _{screw} [mm]	Flange PN 10 / Torque [Nm] Minimum to Maximum	5.6 yield [%] Minimum to Maximum	Gasket Load [Mpa] Minimum to Maximum
15	4 x M12	18 - 28	30 - 48	25 - 40
20	4 x M12	18 - 47	30 - 80	15 - 40
25	4 x M12	18 - 47	30 - 80	11 - 30
32	4 x M16	42 - 100	30 - 71	17 - 40
40	4 x M16	42 - 112	30 - 80	13 - 36
50	4 x M16	42 - 112	30 - 80	11 - 29
65	8 x M16	42 - 112	30 - 80	8 - 21
80	8 x M16	42 - 112	30 - 80	13 - 35
100	8 x M16	42 - 112	30 - 80	12 - 33
125	8 x M16	42 - 112	30 - 80	9 - 25
150	8 x M20	82 - 218	30 - 80	14 - 37
200	8 x M20	82 - 218	30 - 80	10 - 26
250	12 x M20	82 - 218	30 - 80	12 - 33
300	12 x M20	82 - 218	30 - 80	10 - 29
350	16 x M20	82 - 218	30 - 80	10 - 24
400	16 x M24	142 - 378	30 - 80	12 - 31
500	20 x M24	142 - 378	30 - 80	11 - 30
600	20 x M27	206 - 549	30 - 80	10 - 33
800	24 x M30	281 - 748	30 - 80	10 - 28
1000	28 x M33	378 - 1007	30 - 80	10 - 31
1200	32 x M36	487 - 1299	30 - 80	10 - 28
1400	36 x M39	628 - 1674	30 - 80	10 - 32

DN	n _{pcs} x M _{screw} [mm]	Flange PN 16 / Torque [Nm] Minimum to Maximum	5.6 yield [%] Minimum to Maximum	Gasket Load [Mpa] Minimum to Maximum
15	4 x M12	18 - 28	30 - 48	25 - 40
20	4 x M12	18 - 47	30 - 80	15 - 40
25	4 x M12	18 - 47	30 - 80	11 - 30
32	4 x M16	42 - 100	30 - 71	17 - 40
40	4 x M16	42 - 112	30 - 80	13 - 36
50	4 x M16	42 - 112	30 - 80	11 - 29
65	8 x M16	42 - 112	30 - 80	8 - 21
80	8 x M16	42 - 112	30 - 80	13 - 35
100	8 x M16	42 - 112	30 - 80	12 - 33
125	8 x M16	42 - 112	30 - 80	10 - 25
150	8 x M20	82 - 218	30 - 80	14 - 37
200	12 x M20	82 - 218	30 - 80	14 - 38
250	12 x M24	142 - 321	30 - 68	18 - 40
300	12 x M24	142 - 378	30 - 80	13 - 35
350	16 x M24	142 - 378	30 - 80	10 - 31

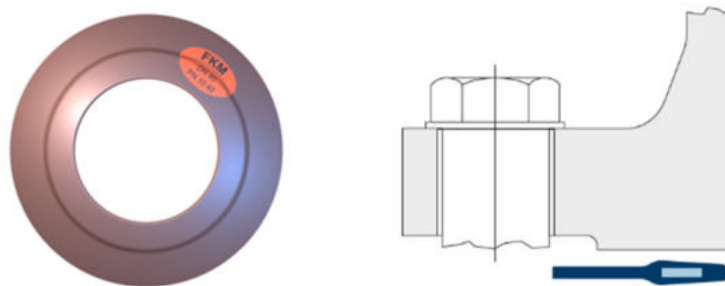
400	16 x M27	206 - 549	30 - 80	13 - 35
500	20 x M30	281 - 748	30 - 80	13 - 34
600	20 x M33	378 - 1007	30 - 80	10 - 30
800	24 x M36	487 - 1201	30 - 74	10 - 40
1000	28 x M39	628 - 1632	30 - 78	10 - 40
1200	32 x M45	969 - 2262	30 - 70	10 - 40
1400	36 x M45	969 - 2359	30 - 73	10 - 40

DN	n _{pcs} x M _{screw} [mm]	Flange PN 25 / Torque [Nm] Minimum to Maximum	5.6 yield [%] Minimum to Maximum	Gasket Load [Mpa] Minimum to Maximum
15	4 x M12	18 - 28	30 - 48	25 - 40
20	4 x M12	18 - 47	30 - 80	15 - 40
25	4 x M12	18 - 47	30 - 80	11 - 30
32	4 x M16	42 - 100	30 - 71	17 - 40
40	4 x M16	42 - 112	30 - 80	13 - 36
50	4 x M16	42 - 112	30 - 80	11 - 29
65	8 x M16	42 - 112	30 - 80	8 - 21
80	8 x M16	42 - 112	30 - 80	13 - 35
100	8 x M20	82 - 190	30 - 69	17 - 40
125	8 x M24	142 - 274	30 - 58	21 - 40
150	8 x M24	142 - 335	30 - 71	17 - 40
200	12 x M24	142 - 340	30 - 72	17 - 40
250	12 x M27	206 - 487	30 - 71	17 - 40
300	16 x M27	206 - 494	30 - 72	17 - 40
350	16 x M30	281 - 739	30 - 79	15 - 40
400	16 x M33	378 - 944	30 - 75	16 - 40
500	20 x M33	378 - 1007	30 - 80	15 - 39
600	20 x M36	487 - 1299	30 - 80	14 - 37
800	24 x M45	969 - 2101	30 - 65	19 - 40
1000	28 x M52	1500 - 2749	30 - 55	22 - 40

DN	n _{pcs} x M _{screw} [mm]	Flange PN 40 / Torque [Nm] Minimum to Maximum	5.6 yield [%] Minimum to Maximum	Gasket Load [Mpa] Minimum to Maximum
15	4 x M12	18 - 28	30 - 48	25 - 40
20	4 x M12	18 - 47	30 - 80	15 - 40
25	4 x M12	18 - 47	30 - 80	11 - 30
32	4 x M16	42 - 100	30 - 71	17 - 40
40	4 x M16	42 - 112	30 - 80	13 - 36
50	4 x M16	42 - 112	30 - 80	11 - 29
65	8 x M16	42 - 112	30 - 80	8 - 21
80	8 x M16	42 - 112	30 - 80	13 - 35
100	8 x M20	82 - 191	30 - 70	17 - 40

125	8 x M24	142 - 274	30 - 58	21 - 40
150	8 x M24	142 - 335	30 - 71	17 - 40
200	12 x M27	206 - 432	30 - 63	19 - 40
250	12 x M30	281 - 646	30 - 69	18 - 40
300	16 x M30	281 - 683	30 - 73	16 - 40
350	16 x M33	378 - 969	30 - 77	16 - 40
400	16 x M36	487 - 1299	30 - 80	14 - 36
500	20 x M39	628 - 1214	30 - 58	21 - 40

Torque tables min. and max. for screw quality 5.6 and KGS GII in Elastomer Quality –



KGS GII / FKM

DN	n _{pcs} x M _{screw} [mm]	Flange PN 6 / Torque [Nm] Minimum to Maximum	5.6 yield [%] Minimum to Maximum	Gasket Load [Mpa] Minimum to Maximum
15	4 x M10	10 - 11	30 - 32	24 - 25
20	4 x M10	10 - 17	30 - 49	15 - 25
25	4 x M10	10 - 23	30 - 68	11 - 25
32	4 x M12	18 - 35	30 - 60	13 - 25
40	4 x M12	18 - 46	30 - 79	10 - 25
50	4 x M12	18 - 47	30 - 80	9 - 25
65	4 x M12	18 - 47	30 - 80	10 - 17
80	4 x M16	42 - 112	30 - 80	9 - 23
100	4 x M16	42 - 112	30 - 80	8 - 22
125	8 x M16	42 - 87	30 - 62	12 - 25
150	8 x M16	42 - 92	30 - 65	12 - 25
200	8 x M16	42 - 112	30 - 80	10 - 21
250	12 x M16	42 - 109	30 - 78	10 - 25
300	12 x M16	82 - 169	30 - 62	12 - 25
350	12 x M16	82 - 218	30 - 80	9 - 24
400	16 x M20	82 - 182	30 - 67	11 - 25
500	20 x M20	82 - 201	30 - 74	10 - 25
600	20 x M24	142 - 283	30 - 60	13 - 25

800	24 x M27	206 - 418	30 - 61	12 - 25
1000	28 x M27	206 - 446	30 - 65	10 - 25
1200	32 x M30	281 - 655	30 - 70	10 - 25
1400	36 x M33	378 - 881	30 - 70	10 - 25

DN	n _{pcs} x M _{screw} [mm]	Flange PN 10 / Torque [Nm] Minimum to Maximum	5.6 yield [%] Minimum to Maximum	Gasket Load [Mpa] Minimum to Maximum
15	4 x M12	18	30	25
20	4 x M12	18 - 30	30 - 51	15 - 25
25	4 x M12	18 - 39	30 - 66	11 - 25
32	4 x M16	42 - 62	30 - 44	17 - 25
40	4 x M16	47 - 78	30 - 56	13 - 25
50	4 x M16	42 - 100	30 - 71	11 - 25
65	8 x M16	42 - 112	30 - 80	8 - 21
80	8 x M16	42 - 81	30 - 58	13 - 25
100	8 x M16	42 - 87	30 - 62	12 - 25
125	8 x M16	42 - 112	30 - 80	9 - 25
150	8 x M20	82 - 150	30 - 55	14 - 25
200	8 x M20	82 - 215	30 - 79	10 - 25
250	12 x M20	82 - 169	30 - 62	12 - 25
300	12 x M20	82 - 193	30 - 71	10 - 25
350	16 x M20	82 - 218	30 - 80	10 - 24
400	16 x M24	142 - 312	30 - 66	12 - 25
500	20 x M24	142 - 316	30 - 67	11 - 25
600	20 x M27	206 - 418	30 - 61	10 - 25
800	24 x M30	281 - 674	30 - 72	10 - 25
1000	28 x M33	378 - 818	30 - 65	10 - 25
1200	32 x M36	487 - 1153	30 - 71	10 - 25
1400	36 x M39	628 - 1339	30 - 74	10 - 25

DN	n _{pcs} x M _{screw} [mm]	Flange PN 16 / Torque [Nm] Minimum to Maximum	5.6 yield [%] Minimum to Maximum	Gasket Load [Mpa] Minimum to Maximum
15	4 x M12	18	30	25
20	4 x M12	18 - 30	30 - 51	15 - 25
25	4 x M12	18 - 39	30 - 66	11 - 25
32	4 x M16	42 - 62	30 - 44	17 - 25
40	4 x M16	47 - 78	30 - 56	13 - 25
50	4 x M16	42 - 100	30 - 71	11 - 25
65	8 x M16	42 - 112	30 - 80	8 - 21
80	8 x M16	42 - 81	30 - 58	13 - 25
100	8 x M16	42 - 87	30 - 62	12 - 25
125	8 x M16	42 - 112	30 - 80	10 - 25

150	8 x M20	82 - 150	30 - 55	14 - 25
200	12 x M20	82 - 144	30 - 53	14 - 25
250	12 x M24	142 - 203	30 - 43	18 - 25
300	12 x M24	142 - 274	30 - 58	13 - 25
350	16 x M24	142 - 312	30 - 66	10 - 25
400	16 x M27	206 - 391	30 - 57	13 - 25
500	20 x M30	281 - 561	30 - 60	13 - 25
600	20 x M33	378 - 843	30 - 67	10 - 25
800	24 x M36	487 - 747	30 - 46	10 - 25
1000	28 x M39	628 - 1025	30 - 49	10 - 25
1200	32 x M45	969 - 1422	30 - 44	10 - 25
1400	36 x M45	969 - 1486	30 - 46	10 - 25

DN	n _{pcs} x M _{screw} [mm]	Flange PN 25 / Torque [Nm] Minimum to Maximum	5.6 yield [%] Minimum to Maximum	Gasket Load [Mpa] Minimum to Maximum
15	4 x M12	18	30	25
20	4 x M12	18 - 30	30 - 51	15 - 25
25	4 x M12	18 - 39	30 - 66	11 - 25
32	4 x M16	42 - 62	30 - 44	17 - 25
40	4 x M16	47 - 78	30 - 56	13 - 25
50	4 x M16	42 - 100	30 - 71	11 - 25
65	8 x M16	42 - 112	30 - 80	8 - 21
80	8 x M16	42 - 81	30 - 58	13 - 25
100	8 x M20	82 - 120	30 - 44	17 - 25
125	8 x M24	142 - 170	30 - 36	21 - 25
150	8 x M24	142 - 208	30 - 44	17 - 25
200	12 x M24	142 - 213	30 - 45	17 - 25
250	12 x M27	206 - 309	30 - 45	17 - 25
300	16 x M27	206 - 309	30 - 45	17 - 25
350	16 x M30	281 - 458	30 - 49	15 - 25
400	16 x M33	378 - 592	30 - 47	16 - 25
500	20 x M33	378 - 642	30 - 51	15 - 25
600	20 x M36	487 - 877	30 - 54	14 - 25
800	24 x M45	969 - 1325	30 - 41	19 - 25
1000	28 x M52	1500 - 1750	30 - 35	22 - 25

DN	n _{pcs} x M _{screw} [mm]	Flange PN 40 / Torque [Nm] Minimum to Maximum	5.6 yield [%] Minimum to Maximum	Gasket Load [Mpa] Minimum to Maximum
15	4 x M12	18	30	25
20	4 x M12	18 - 30	30 - 51	15 - 25
25	4 x M12	18 - 39	30 - 66	11 - 25
32	4 x M16	42 - 62	30 - 44	17 - 25

40	4 x M16	47 - 78	30 - 56	13 - 25
50	4 x M16	42 - 100	30 - 71	11 - 25
65	8 x M16	42 - 112	30 - 80	8 - 21
80	8 x M16	42 - 81	30 - 58	13 - 25
100	8 x M20	82 - 120	30 - 44	17 - 25
125	8 x M24	142 - 170	30 - 36	21 - 25
150	8 x M24	142 - 208	30 - 44	17 - 25
200	12 x M27	206 - 268	30 - 39	19 - 25
250	12 x M30	281 - 402	30 - 43	18 - 25
300	16 x M30	281 - 430	30 - 46	16 - 25
350	16 x M33	378 - 604	30 - 48	16 - 25
400	16 x M36	487 - 909	30 - 56	14 - 25
500	20 x M39	628 - 753	30 - 36	21 - 25

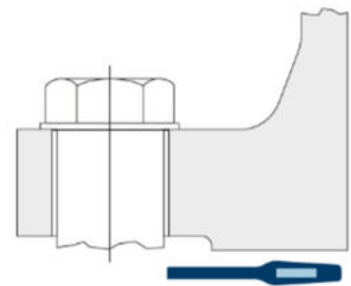
Torque tables min. and max. for screw quality 8.8 and KGS GII in Elastomer Quality –



KGS GII / EPDM



KGS GII / NBR



DN	n _{pcs} x M _{screw} [mm]	Flange PN 6 / Torque [Nm] Minimum to Maximum	8.8 yield [%] Minimum to Maximum	Gasket Load [Mpa] Minimum to Maximum
15	4 x M10	22	30	51
20	4 x M10	22 - 26	30 - 36	33 - 40
25	4 x M10	22 - 36	30 - 50	24 - 40
32	4 x M12	37 - 55	30 - 54	27 - 40
40	4 x M12	37 - 72	30 - 58	21 - 40
50	4 x M12	37 - 80	30 - 64	19 - 64
65	4 x M12	38 - 100	30 - 80	13 - 36
80	4 x M16	90 - 194	30 - 65	19 - 40
100	4 x M16	90 - 203	30 - 68	18 - 40
125	8 x M16	90 - 138	30 - 46	26 - 40
150	8 x M16	90 - 144	30 - 48	25 - 40
200	8 x M16	90 - 212	30 - 71	17 - 40
250	12 x M16	90 - 173	30 - 58	21 - 40

300	12 x M16	174 - 267	30 - 46	26 - 40
350	12 x M16	174 - 354	30 - 61	20 - 40
400	16 x M20	174 - 290	30 - 50	24 - 40
500	20 x M20	174 - 319	30 - 55	22 - 40
600	20 x M24	302 - 453	30 - 45	27 - 40
800	24 x M27	439 - 673	30 - 46	26 - 40
1000	28 x M27	439 - 702	30 - 48	25 - 40
1200	32 x M30	599 - 1018	30 - 51	23 - 40
1400	36 x M33	806 - 1397	30 - 52	23 - 40
1600	40 x M33	806 - 1423	30 - 53	23 - 40

DN	n _{pcs} x M _{screw} [mm]	Flange PN 10 / Torque [Nm] Minimum to Maximum	8.8 yield [%] Minimum to Maximum	Gasket Load [Mpa] Minimum to Maximum
15	4 x M12	37	30	53
20	4 x M12	37 - 47	30 - 38	32 - 40
25	4 x M12	37 - 62	30 - 50	24 - 40
32	4 x M16	90 - 99	30 - 33	36 - 40
40	4 x M16	90 - 126	30 - 42	29 - 40
50	4 x M16	90 - 156	30 - 52	23 - 40
65	8 x M16	90 - 210	30 - 70	17 - 40
80	8 x M16	90 - 129	30 - 43	28 - 40
100	8 x M16	90 - 137	30 - 46	26 - 40
125	8 x M16	90 - 180	30 - 60	20 - 40
150	8 x M20	174 - 238	30 - 41	29 - 40
200	8 x M20	174 - 337	30 - 41	20 - 40
250	12 x M20	174 - 267	30 - 46	26 - 40
300	12 x M20	174 - 302	30 - 52	23 - 40
350	16 x M20	174 - 360	30 - 62	19 - 40
400	16 x M24	302 - 494	30 - 49	25 - 40
500	20 x M24	302 - 504	30 - 50	24 - 40
600	20 x M27	439 - 658	30 - 45	26 - 40
800	24 x M30	599 - 1058	30 - 53	22 - 40
1000	28 x M33	806 - 1316	30 - 49	25 - 40
1200	32 x M36	1039 - 1836	30 - 53	23 - 40
1400	36 x M39	1339 - 2143	30 - 48	25 - 40
1600	40 x M45	2068 - 3033	30 - 44	27 - 40
1800	44 x M45	2068 - 3102	30 - 45	27 - 40

DN	n _{pcs} x M _{screw} [mm]	Flange PN 16 / Torque [Nm] Minimum to Maximum	8.8 yield [%] Minimum to Maximum	Gasket Load [Mpa] Minimum to Maximum
15	4 x M12	37	30	53
20	4 x M12	37 - 47	30 - 38	32 - 40

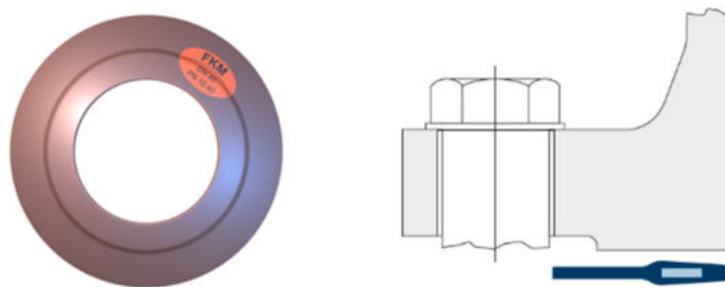
25	4 x M12	37 - 62	30 - 50	24 - 40
32	4 x M16	90 - 99	30 - 33	36 - 40
40	4 x M16	90 - 126	30 - 42	29 - 40
50	4 x M16	90 - 156	30 - 52	23 - 40
65	8 x M16	90 - 210	30 - 70	17 - 40
80	8 x M16	90 - 129	30 - 43	28 - 40
100	8 x M16	90 - 138	30 - 46	26 - 40
125	8 x M16	90 - 180	30 - 60	20 - 40
150	8 x M20	174 - 238	30 - 41	29 - 40
200	12 x M20	174 - 227	30 - 39	31 - 40
250	12 x M24	302 - 322	30 - 32	38 - 40
300	12 x M24	302 - 433	30 - 43	28 - 40
350	16 x M24	302 - 494	30 - 49	24 - 40
400	16 x M27	439 - 629	30 - 43	28 - 40
500	20 x M30	599 - 898	30 - 45	27 - 40
600	20 x M33	806 - 1343	30 - 50	24 - 40
800	24 x M36	1039 - 1212	30 - 35	35 - 40
1000	28 x M39	1339 - 1607	30 - 36	33 - 40
1200	32 x M45	2068 - 2275	30 - 33	36 - 40
1400	36 x M45	2068 - 2343	30 - 34	35 - 40
1600	40 x M52	3199 - 3306	30 - 31	39 - 41

DN	n _{pcs} x M _{screw} [mm]	Flange PN 25 / Torque [Nm] Minimum to Maximum	8.8 yield [%] Minimum to Maximum	Gasket Load [Mpa] Minimum to Maximum
15	4 x M12	37	30	53
20	4 x M12	37 - 47	30 - 38	32 - 40
25	4 x M12	37 - 62	30 - 50	24 - 40
32	4 x M16	90 - 99	30 - 33	36 - 40
40	4 x M16	90 - 126	30 - 42	29 - 40
50	4 x M16	90 - 156	30 - 52	23 - 40
65	8 x M16	90 - 210	30 - 70	17 - 40
80	8 x M16	90 - 129	30 - 43	28 - 40
100	8 x M20	174 - 192	30 - 33	37 - 40
125	8 x M24	302	30	45
150	8 x M24	302 - 332	30 - 33	36 - 40
200	12 x M24	302 - 337	30 - 34	36 - 40
250	12 x M27	439 - 483	30 - 33	36 - 40
300	16 x M27	439 - 498	30 - 34	36 - 40
350	16 x M30	599 - 739	30 - 37	33 - 40
400	16 x M33	806 - 940	30 - 35	35 - 40
500	20 x M33	806 - 1021	30 - 38	31 - 40
600	20 x M36	1039 - 1385	30 - 40	30 - 40

800	24 x M45	2068	30	40
1000	28 x M52	3199	30	46

DN	n _{pcs} x M _{screw} [mm]	Flange PN 40 / Torque [Nm] Minimum to Maximum	8.8 yield [%] Minimum to Maximum	Gasket Load [Mpa] Minimum to Maximum
15	4 x M12	37	30	53
20	4 x M12	37 - 47	30 - 38	32 - 40
25	4 x M12	37 - 62	30 - 50	24 - 40
32	4 x M16	90 - 99	30 - 33	36 - 40
40	4 x M16	90 - 126	30 - 42	29 - 40
50	4 x M16	90 - 156	30 - 52	23 - 40
65	8 x M16	90 - 210	30 - 70	17 - 40
80	8 x M16	90 - 129	30 - 43	28 - 40
100	8 x M20	174 - 192	30 - 33	37 - 40
125	8 x M24	302	30	45
150	8 x M24	302 - 332	30 - 33	36 - 40
200	12 x M27	439	30	40
250	12 x M30	599 - 639	30 - 32	37 - 40
300	16 x M30	599 - 679	30 - 34	35 - 40
350	16 x M33	806 - 967	30 - 36	34 - 40
400	16 x M36	1039 - 1420	30 - 41	29 - 40
500	20 x M39	1339	30	44

Torque tables min. and max. for screw quality 8.8 and KGS GII in Elastomer Quality –



KGS GII / FKM

NOTIFICATION : Please use the max. Torque named for Screws 5.6 and block the nuts from self rewinding (Loctite, etc.).

Ad III.) General information to torque tables of KLINGER KGS GII gaskets for stainless steel Screws:

Torque-tables of KLINGER KGS GII Gaskets for Stainless Steel Screws

- Calculation basis :
- Dimension : gaskets acc. DIN EN 1514-1, Type IBC
 - Flanges : acc. DIN EN 1092-1
 - Mounting : Usage of washers
 - Friction : $\mu = 0,14$
 - Temperature : + 25 °C
 - Pressure : equal to design PN (PN 10 means 10 [bar])
 - Medium : Water
 - Aggregate state : liquid
 - Screw quality : A2-70 for dimension \geq M10 up to \leq M30 and A2-50 for dimension $>$ M30 up to \leq M39

NOTIFICATION : **Minimum yield** for a safe bolt-/nut-connection should be **30%**! Otherwise there may be caused a problem by self rewinding of the nut caused by process-/pipe-vibration!

Maximum yield for a safe bolt-/nut-connection should be **80%**! Otherwise a proper calculation will be more difficult!

Ad IV.) KLINGER KGS GII - torque tables min. and max. for stainless steel screws

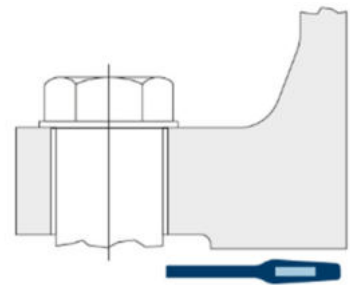
Torque tables min. and max. for screw quality A2-70 / A2-50 and KGS GII in Elastomer Quality –



KGS GII / EPDM



KGS GII / NBR



DN	$n_{pcs} \times M_{screw}$ [mm]	Flange PN 6 / Torque [Nm] Minimum to Maximum	A2-70 (\leq M30) / A2-50 ($>$ M30) yield [%] Minimum to Maximum	Gasket Load [Mpa] Minimum to Maximum
15	4 x M10	15 - 18	30 - 34	36 - 40

20	4 x M10	15 - 26	30 - 51	23 - 40
25	4 x M10	15 - 36	30 - 71	17 - 40
32	4 x M12	26 - 55	30 - 63	19 - 40
40	4 x M12	26 - 73	30 - 83	14 - 40
50	4 x M12	26 - 70	30 - 80	13 - 35
65	4 x M12	26 - 70	30 - 80	9 - 25
80	4 x M16	63 - 168	30 - 80	13 - 35
100	4 x M16	63 - 168	30 - 80	12 - 33
125	8 x M16	63 - 139	30 - 66	18 - 40
150	8 x M16	63 - 143	30 - 68	18 - 40
200	8 x M16	63 - 168	30 - 80	12 - 32
250	12 x M16	63 - 168	30 - 80	15 - 39
300	12 x M16	122 - 265	30 - 65	18 - 40
350	12 x M16	122 - 327	30 - 80	14 - 37
400	16 x M20	122 - 290	30 - 71	17 - 40
500	20 x M20	122 - 319	30 - 78	15 - 40
600	20 x M24	118 - 315	30 - 80	10 - 23
800	24 x M27	171 - 457	30 - 80	10 - 28
1000	28 x M27	172 - 457	30 - 80	10 - 26
1200	32 x M30	234 - 624	30 - 80	9 - 24

DN	n _{pcs} x M _{screw} [mm]	Flange PN 10 / Torque [Nm] Minimum to Maximum	A2-70 (≤ M30) / A2-50 (> M30) yield [%] Minimum to Maximum	Gasket Load [Mpa] Minimum to Maximum
15	4 x M12	26 - 28	30 - 32	38 - 40
20	4 x M12	26 - 40	30 - 54	22 - 40
25	4 x M12	26 - 61	30 - 70	17 - 40
32	4 x M16	63 - 99	30 - 47	25 - 40
40	4 x M16	63 - 126	30 - 60	20 - 40
50	4 x M16	63 - 155	30 - 74	16 - 40
65	8 x M16	63 - 168	30 - 80	12 - 32
80	8 x M16	63 - 128	30 - 61	20 - 40
100	8 x M16	63 - 137	30 - 65	18 - 40
125	8 x M16	63 - 168	30 - 80	14 - 37
150	8 x M20	123 - 241	30 - 59	21 - 40
200	8 x M20	123 - 327	30 - 80	14 - 38
250	12 x M20	123 - 265	30 - 65	18 - 40
300	12 x M20	123 - 306	30 - 75	16 - 40
350	16 x M20	123 - 327	30 - 80	14 - 36
400	16 x M24	118 - 315	30 - 80	10 - 26
500	20 x M24	118 - 315	30 - 80	9 - 25
600	20 x M27	171 - 457	30 - 80	10 - 28

800	24 x M30	234 - 624	30 - 80	9 - 23
1000	28 x M33	264 - 705	30 - 80	8 - 22
1200	32 x M36	341 - 909	30 - 80	7 - 20
1400	36 x M39	439 - 1172	30 - 80	8 - 22

DN	n _{pcs} x M _{screw} [mm]	Flange PN 16 / Torque [Nm] Minimum to Maximum	A2-70 (≤ M30) / A2-50 (> M30) yield [%] Minimum to Maximum	Gasket Load [Mpa] Minimum to Maximum
15	4 x M12	26 - 28	30 - 32	38 - 40
20	4 x M12	26 - 47	30 - 54	22 - 40
25	4 x M12	26 - 61	30 - 70	17 - 40
32	4 x M16	63 - 99	30 - 47	25 - 40
40	4 x M16	63 - 124	30 - 59	20 - 40
50	4 x M16	63 - 155	30 - 74	16 - 40
65	8 x M16	63 - 168	30 - 80	12 - 32
80	8 x M16	63 - 128	30 - 61	20 - 40
100	8 x M16	63 - 136	30 - 65	18 - 40
125	8 x M16	63 - 168	30 - 80	14 - 37
150	8 x M20	122 - 241	30 - 59	21 - 40
200	12 x M20	122 - 229	30 - 56	22 - 40
250	12 x M24	118 - 315	30 - 80	15 - 39
300	12 x M24	118 - 315	30 - 80	11 - 29
350	16 x M24	118 - 315	30 - 80	10 - 25
400	16 x M27	171 - 457	30 - 80	11 - 29
500	20 x M30	234 - 624	30 - 80	11 - 28
600	20 x M33	264 - 705	30 - 80	8 - 21
800	24 x M36	341 - 909	30 - 80	11 - 30
1000	28 x M39	439 - 1172	30 - 80	11 - 29
1200	32 x M45	670 - 1784	30 - 80	12 - 31
1400	36 x M45	670 - 1785	30 - 80	11 - 31

DN	n _{pcs} x M _{screw} [mm]	Flange PN 25 / Torque [Nm] Minimum to Maximum	A2-70 (≤ M30) / A2-50 (> M30) yield [%] Minimum to Maximum	Gasket Load [Mpa] Minimum to Maximum
15	4 x M12	26 - 28	30 - 32	38 - 40
20	4 x M12	26 - 47	30 - 54	22 - 40
25	4 x M12	26 - 62	30 - 71	17 - 40
32	4 x M16	63 - 99	30 - 47	25 - 40
40	4 x M16	63 - 126	30 - 60	20 - 40
50	4 x M16	63 - 158	30 - 75	16 - 40
65	8 x M16	63 - 105	30 - 50	24 - 40
80	8 x M16	63 - 128	30 - 61	20 - 40

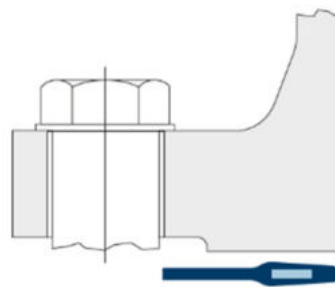
100	8 x M20	123 - 188	30 - 46	26 - 40
125	8 x M24	118 - 268	30 - 68	17 - 40
150	8 x M24	118 - 315	30 - 80	14 - 38
200	12 x M24	118 - 315	30 - 80	14 - 37
250	12 x M27	171 - 457	30 - 80	14 - 38
300	16 x M27	171 - 457	30 - 80	14 - 37
350	16 x M30	234 - 624	30 - 80	13 - 34
400	16 x M33	264 - 705	30 - 80	11 - 30
500	20 x M33	264 - 705	30 - 80	10 - 28
600	20 x M36	341 - 909	30 - 80	10 - 26

DN	n _{pcs} x M _{screw} [mm]	Flange PN 40 / Torque [Nm] Minimum to Maximum	A2-70 (≤ M30) / A2-50 (> M30) yield [%] Minimum to Maximum	Gasket Load [Mpa] Minimum to Maximum
15	4 x M12	26 - 28	30 - 32	38 - 40
20	4 x M12	26 - 47	30 - 54	22 - 40
25	4 x M12	26 - 62	30 - 71	17 - 40
32	4 x M16	63 - 99	30 - 47	25 - 40
40	4 x M16	63 - 126	30 - 60	20 - 40
50	4 x M16	63 - 158	30 - 75	16 - 40
65	8 x M16	63 - 105	30 - 50	24 - 40
80	8 x M16	63 - 128	30 - 61	20 - 40
100	8 x M20	123 - 188	30 - 46	26 - 40
125	8 x M24	118 - 268	30 - 68	17 - 40
150	8 x M24	118 - 315	30 - 80	14 - 38
200	12 x M27	171 - 429	30 - 75	16 - 40
250	12 x M30	234 - 624	30 - 80	15 - 39
300	16 x M30	234 - 624	30 - 80	14 - 37
350	16 x M33	264 - 705	30 - 80	11 - 29
400	16 x M36	341 - 909	30 - 80	10 - 25
500	20 x M39	439 - 1172	30 - 80	15 - 39

Torque tables min. and max. for screw quality A2-70 / A2-50 and KGS GII in Elastomer Quality –



KGS GII / FKM



NOTIFICATION : Please use the max. Torque named for Screws 5.6 and block the nuts from self rewinding (Loctite, etc.).

Torque-tables of KLINGER KGS GII Gaskets for Stainless Steel Screws with performance grease to reduce friction

- Calculation basis :
- Dimension : gaskets acc. DIN EN 1514-1, Type IBC
 - Flanges : acc. DIN EN 1092-1
 - Mounting : Usage of washers
 - **Friction** : $\mu = 0,12$
 - Temperature : + 25 °C
 - Pressure : equal to design PN (PN 10 means 10 [bar])
 - Medium : Water
 - Aggregate state : liquid
 - Screw quality : A2-70 for dimension \geq M10 up to \leq M30 and A2-50 for dimension $>$ M30 up to \leq M39

NOTIFICATION : **Minimum yield** for a safe bolt-/nut-connection should be **30%**! Otherwise there may be caused a problem by self rewinding of the nut caused by process-/pipe-vibration!

Maximum yield for a safe bolt-/nut-connection should be **80%**! Otherwise a proper calculation will be more difficult!

Torque tables min. and max. for screw quality A2-70 / A2-50 and KGS GII in Elastomer Quality –



KGS GII / EPDM



KGS GII / NBR

IMPORTANT: Friction $\mu = 0,12$ (performance grease)!				
DN	n _{pcs} x M _{screw} [mm]	Flange PN 10 / Torque [Nm] Minimum to Maximum	A2-70 (\leq M30) / A2-50 ($>$ M30) yield [%] Minimum to Maximum	Gasket Load [Mpa] Minimum to Maximum
15	4 x M12	23 - 25	30 - 32	38 - 41
20	4 x M12	23 - 41	30 - 53	22 - 40
25	4 x M12	23 - 54	30 - 70	17 - 40
32	4 x M16	55 - 86	30 - 47	25 - 40
40	4 x M16	55 - 108	30 - 59	20 - 40

50	4 x M16	55 - 135	30 - 73	16 - 40
65	8 x M16	55 - 147	30 - 80	12 - 32
80	8 x M16	55 - 112	30 - 61	20 - 40
100	8 x M16	55 - 119	30 - 65	18 - 40
125	8 x M16	55 - 147	30 - 80	14 - 37
150	8 x M20	107 - 207	30 - 58	21 - 40
200	8 x M20	107 - 285	30 - 80	14 - 38
250	12 x M20	107 - 232	30 - 65	18 - 40
300	12 x M20	107 - 267	30 - 75	16 - 40
350	16 x M20	107 - 285	30 - 80	14 - 36
400	16 x M24	103 - 275	30 - 80	10 - 26
500	20 x M24	103 - 275	30 - 80	9 - 25
600	20 x M27	149 - 398	30 - 80	10 - 28
800	24 x M30	204 - 544	30 - 80	9 - 23
1000	28 x M33	230 - 614	30 - 80	8 - 22
1200	32 x M36	297 - 792	30 - 80	7 - 20
1400	36 x M39	382 - 1019	30 - 80	8 - 22

IMPORTANT: Friction $\mu = 0,12$ (performance grease)!				
DN	$n_{pcs} \times M_{screw}$ [mm]	Flange PN 16 / Torque [Nm] Minimum to Maximum	A2-70 ($\leq M30$) / A2-50 ($> M30$) yield [%] Minimum to Maximum	Gasket Load [Mpa] Minimum to Maximum
15	4 x M12	23 - 25	30 - 32	38 - 40
20	4 x M12	23 - 41	30 - 54	22 - 40
25	4 x M12	23 - 54	30 - 70	17 - 40
32	4 x M16	55 - 86	30 - 47	25 - 40
40	4 x M16	55 - 108	30 - 59	20 - 40
50	4 x M16	55 - 136	30 - 74	16 - 40
65	8 x M16	55 - 147	30 - 80	12 - 32
80	8 x M16	55 - 112	30 - 61	20 - 40
100	8 x M16	55 - 119	30 - 65	18 - 40
125	8 x M16	55 - 147	30 - 80	14 - 37
150	8 x M20	107 - 210	30 - 59	21 - 40
200	12 x M20	107 - 200	30 - 56	22 - 40
250	12 x M24	103 - 275	30 - 80	15 - 39
300	12 x M24	103 - 275	30 - 80	11 - 29
350	16 x M24	103 - 275	30 - 80	10 - 25
400	16 x M27	149 - 398	30 - 80	11 - 29
500	20 x M30	204 - 544	30 - 80	11 - 28
600	20 x M33	230 - 614	30 - 80	8 - 21
800	24 x M36	297 - 792	30 - 80	11 - 30

1000	28 x M39	382 - 1019	30 - 80	11 - 29
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Torque-tables of KLINGER KGS GII Gaskets for Stainless Steel Screws with special coating to reduce friction

- Calculation basis :
- Dimension : gaskets acc. DIN EN 1514-1, Type IBC
 - Flanges : acc. DIN EN 1092-1
 - Mounting : Usage of washers
 - **Friction** : $\mu = 0,07$
 - Temperature : + 25 °C
 - Pressure : equal to design PN (PN 10 means 10 [bar])
 - Medium : Water
 - Aggregate state : liquid
 - Screw quality : A2-70 for dimension \geq M10 up to \leq M30 and A2-50 for dimension $>$ M30 up to \leq M39

NOTIFICATION : **Minimum yield** for a safe bolt-/nut-connection should be **30%**!
Otherwise there may be caused a problem by self rewinding of the nut caused by process-/pipe-vibration!

Maximum yield for a safe bolt-/nut-connection should be **80%**!
Otherwise a proper calculation will be more difficult!

Torque tables min. and max. for screw quality A2-70 / A2-50 and KGS GII in Elastomer Quality –



KGS GII / EPDM



KGS GII / NBR

IMPORTANT: Friction $\mu = 0,07$ (special coated screw surface)!				
DN	$n_{pcs} \times M_{screw}$ [mm]	Flange PN 10 / Torque [Nm] Minimum to Maximum	A2-70 (\leq M30) / A2-50 ($>$ M30) yield [%] Minimum to Maximum	Gasket Load [Mpa] Minimum to Maximum
15	4 x M12	15 - 16	30 - 32	38 - 40
20	4 x M12	15 - 26	30 - 54	22 - 40
25	4 x M12	15 - 34	30 - 70	17 - 40
32	4 x M16	35 - 55	30 - 47	25 - 40
40	4 x M16	35 - 69	30 - 59	20 - 40

50	4 x M16	35 - 86	30 - 74	16 - 40
65	8 x M16	35 - 93	30 - 80	12 - 32
80	8 x M16	35 - 71	30 - 61	20 - 40
100	8 x M16	35 - 76	30 - 65	18 - 40
125	8 x M16	35 - 93	30 - 80	14 - 37
150	8 x M20	68 - 133	30 - 59	21 - 40
200	8 x M20	68 - 181	30 - 80	14 - 38
250	12 x M20	68 - 147	30 - 65	18 - 40
300	12 x M20	68 - 170	30 - 75	16 - 40
350	16 x M20	68 - 181	30 - 80	14 - 36
400	16 x M24	65 - 174	30 - 80	10 - 26
500	20 x M24	65 - 174	30 - 80	9 - 25
600	20 x M27	94 - 251	30 - 80	10 - 28
800	24 x M30	129 - 343	30 - 80	9 - 23
1000	28 x M33	144 - 385	30 - 80	8 - 22
1200	32 x M36	187 - 498	30 - 80	7 - 20
1400	36 x M39	239 - 638	30 - 80	8 - 22

IMPORTANT: Friction $\mu = 0,07$ (special coated screw surface)!				
DN	$n_{\text{pcs}} \times M_{\text{screw}}$ [mm]	Flange PN 16 / Torque [Nm] Minimum to Maximum	A2-70 (\leq M30) / A2-50 ($>$ M30) yield [%] Minimum to Maximum	Gasket Load [Mpa] Minimum to Maximum
15	4 x M12	15 - 16	30 - 32	38 - 40
20	4 x M12	15 - 26	30 - 54	22 - 40
25	4 x M12	15 - 34	30 - 70	17 - 40
32	4 x M16	35 - 55	30 - 47	25 - 40
40	4 x M16	35 - 69	30 - 59	20 - 40
50	4 x M16	35 - 86	30 - 74	16 - 40
65	8 x M16	35 - 93	30 - 80	12 - 32
80	8 x M16	35 - 71	30 - 61	20 - 40
100	8 x M16	35 - 76	30 - 65	18 - 40
125	8 x M16	35 - 93	30 - 80	14 - 37
150	8 x M20	68 - 133	30 - 59	21 - 40
200	12 x M20	68 - 127	30 - 56	22 - 40
250	12 x M24	65 - 174	30 - 80	15 - 39
300	12 x M24	65 - 174	30 - 80	11 - 29
350	16 x M24	65 - 174	30 - 80	10 - 25
400	16 x M27	94 - 251	30 - 80	11 - 29
500	20 x M30	129 - 343	30 - 80	11 - 28
600	20 x M33	144 - 385	30 - 80	8 - 21
800	24 x M36	187 - 498	30 - 80	11 - 30
1000	28 x M39	239 - 638	30 - 80	11 - 29

Torque-tables of KLINGER KGS GII Gaskets for Stainless Steel –DUPLEX - Screws 1.4462

- Calculation basis :
- Dimension : gaskets acc. DIN EN 1514-1, Type IBC
 - Flanges : acc. DIN EN 1092-1
 - Mounting : Usage of washers
 - **Friction** : $\mu = 0,12$
 - Temperature : + 25 °C
 - Pressure : equal to design PN (PN 10 means 10 [bar])
 - Medium : Water
 - Aggregate state : liquid
 - Screw quality : DUPLEX steel – 1.4462

NOTIFICATION : **Minimum yield** for a safe bolt-/nut-connection should be **30%**!
 Otherwise there may be caused a problem by self rewinding of the nut caused by process-/pipe-vibration!

Maximum yield for a safe bolt-/nut-connection should be **80%**!
 Otherwise a proper calculation will be more difficult!

Torque tables min. and max. for screw quality DUPLEX 1.4462 and KGS GII in Elastomer Quality –



KGS GII / EPDM



KGS GII / NBR

IMPORTANT: Friction $\mu = 0,12$ (performance grease)!				
DN	$n_{pcs} \times M_{screw}$ [mm]	Flange PN 10 / Torque [Nm] Minimum to Maximum	1.4462 (DUPLEX) yield [%] Minimum to Maximum	Gasket Load [Mpa] Minimum to Maximum
15	4 x M12	22 - 26	30 - 33	38 - 41
20	4 x M12	28 - 35	30 - 44	28 - 40
25	4 x M12	28 - 46	30 - 58	21 - 40
32	4 x M16	67 - 74	30 - 38	31 - 40
40	4 x M16	67 - 94	30 - 49	25 - 40
50	4 x M16	67 - 117	30 - 60	20 - 40
65	8 x M16	67 - 157	30 - 80	15 - 40

80	8 x M16	67 - 97	30 - 50	24 - 40
100	8 x M16	67 - 103	30 - 53	22 - 40
125	8 x M16	67 - 135	30 - 70	17 - 40
150	8 x M20	130 - 178	30 - 48	25 - 40
200	8 x M20	130 - 252	30 - 67	17 - 40
250	12 x M20	130 - 200	30 - 53	22 - 40
300	12 x M20	130 - 226	30 - 60	20 - 40
350	16 x M20	130 - 269	30 - 72	16 - 40
400	16 x M24	226 - 370	30 - 57	22 - 40
500	20 x M24	226 - 377	30 - 58	21 - 40
600	20 x M27	328 - 492	30 - 52	22 - 40
800	24 x M30	448 - 792	30 - 61	19 - 40
1000	28 x M33	603 - 985	30 - 57	22 - 40
1200	32 x M36	777 - 1374	30 - 61	20 - 40
1400	36 x M39	1002 - 1603	30 - 56	22 - 56

IMPORTANT: Friction $\mu = 0,12$ (performance grease)!				
DN	$n_{\text{pcs}} \times M_{\text{screw}}$ [mm]	Flange PN 16 / Torque [Nm] Minimum to Maximum	1.4462 (DUPLEX) yield [%] Minimum to Maximum	Gasket Load [Mpa] Minimum to Maximum
15	4 x M12	22 - 26	30 - 33	38 - 41
20	4 x M12	28 - 35	30 - 44	28 - 40
25	4 x M12	28 - 46	30 - 58	21 - 40
32	4 x M16	67 - 74	30 - 38	31 - 40
40	4 x M16	67 - 94	30 - 49	25 - 40
50	4 x M16	67 - 117	30 - 60	20 - 40
65	8 x M16	67 - 157	30 - 80	15 - 40
80	8 x M16	67 - 97	30 - 50	24 - 40
100	8 x M16	67 - 103	30 - 53	22 - 40
125	8 x M16	67 - 135	30 - 70	17 - 40
150	8 x M20	130 - 178	30 - 48	25 - 40
200	12 x M20	130 - 170	30 - 45	27 - 40
250	12 x M24	226 - 241	30 - 37	33 - 40
300	12 x M24	226 - 324	30 - 50	24 - 40
350	16 x M24	226 - 370	30 - 57	21 - 40
400	16 x M27	328 - 471	30 - 50	24 - 40
500	20 x M30	448 - 672	30 - 52	23 - 40
600	20 x M33	603 - 1005	30 - 41	21 - 40
800	24 x M36	777 - 907	30 - 42	30 - 40
1000	28 x M39	1002 - 1202	30 - 42	28 - 40

POWER-TO-X

KLINGER® sealing materials - for all stages of the Power-to-X process

