



Assembly of screwed fastenings

Preloads and tightening torques for fasteners from stainless steel

For fasteners from stainless steel, the friction coefficients in the thread and on the contact surfaces are much higher than with quenched and tempered steel screws. Even the spread of the friction coefficients is much higher here (up to and over 100%). To finally determine the correct torque it is recommended that testing should be carried out under operating conditions.

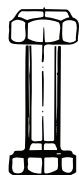
While it is possible to reduce friction coefficients by using lubricating agents, the very high spread will remain.

The table lists non-binding typical values for various friction coefficients, valid for screws and nuts according to DIN 912, 931, 933 and 934/ISO 4762, 4014, 4017, 4032 made from stainless steels A1–A5, in property classes –50, –70 and –80 at room temperature (approx. +20 °C) and utilisation of the minimum yield stress of 90%.

The tightening torques listed in Table 17 may only be used as **very rough and non-binding typical values**.

Table 17

Ø	Prop. Class	Assembly preload in kN for $\mu_{total} =$								Tightening torque in Nm for $\mu_{total} =$							
		0.10	0.12	0.14	0.16	0.18	0.20	0.30	0.40	0.10	0.12	0.14	0.16	0.18	0.20	0.30	0.40
M 4	50	1.47	1.48	1.39	1.35	1.31	1.26	1.07	0.91	0.8	0.9	1.0	1.1	1.2	1.3	1.6	1.8
	70	3.14	2.71	2.97	2.89	2.80	2.71	2.30	1.95	1.8	2.0	2.2	2.4	2.6	2.8	3.4	3.8
	80	4.19	4.08	3.96	3.85	3.73	3.61	3.06	2.61	2.4	2.7	3.0	3.3	3.5	3.7	4.6	5.1
M 5	50	2.39	2.33	2.27	2.20	2.14	2.07	1.76	1.50	1.7	1.9	2.1	2.3	2.4	2.6	3.2	3.6
	70	5.13	5.00	4.86	4.72	4.58	4.44	3.77	3.21	3.5	4.0	4.5	4.9	5.2	5.6	6.8	7.6
	80	6.84	6.66	6.48	6.29	6.10	5.91	5.02	4.28	4.7	5.4	5.9	6.5	7.0	7.4	9.1	10.2
M 6	50	3.39	3.30	3.21	3.11	3.02	2.93	2.48	2.11	2.9	3.3	3.6	3.9	4.2	4.5	5.5	6.2
	70	7.26	7.07	6.87	6.67	6.47	6.27	5.32	4.53	6.2	7.0	7.7	8.4	9.1	9.7	11.9	13.2
	80	9.68	9.43	9.13	8.90	8.63	8.36	7.09	6.04	8.2	9.3	10.3	11.3	12.1	12.9	15.8	17.7
M 8	50	6.21	6.05	5.88	5.72	5.54	5.37	4.57	3.89	7.0	7.9	8.8	9.6	10.3	11.0	13.6	15.2
	70	13.30	12.96	12.61	12.25	11.88	11.51	9.79	8.34	15.0	17.0	18.8	20.6	22.2	23.6	29.1	32.5
	80	17.74	17.29	16.81	16.33	15.84	15.35	13.05	11.11	19.9	22.6	25.1	27.4	29.5	31.5	38.8	43.4
M 10	50	9.87	9.62	9.37	9.10	8.83	8.56	7.28	6.20	13.8	15.7	17.4	19.0	20.5	21.8	27.0	30.2
	70	21.16	20.63	18.40	19.50	18.92	18.34	15.60	13.29	29.5	33.5	37.3	40.7	41.9	46.8	57.8	67.7
	80	28.21	27.50	26.76	25.99	25.22	24.45	20.79	17.72	39.4	44.7	49.7	54.3	58.5	62.4	77.1	86.2
M 12	50	14.38	14.03	13.65	13.27	12.87	12.48	10.62	9.05	23.8	27.1	30.1	32.9	35.4	37.8	46.8	52.3
	70	30.83	30.06	29.26	28.43	28.59	26.75	22.76	19.40	51	58	64.5	70.5	76	81	100.2	112.1
	80	41.10	40.08	39.01	37.90	36.78	35.66	30.35	25.87	68	77.3	85.9	93.9	101	108	133.6	149.5
M 14	50	19.74	19.25	18.74	18.21	17.68	17.14	14.59	12.44	37.8	43	47.9	52.4	56.5	60.2	74.6	83.5
	70	42.31	41.26	40.16	39.03	37.88	36.73	31.27	26.65	81.1	92.2	103	112	121	129	160	179
	80	56.41	55.01	53.54	52.04	50.50	48.97	41.69	35.54	108	123	137	150	161	172	212	238.5
M 16	50	27.04	26.39	25.71	25.01	24.29	23.56	20.10	17.16	58.2	66.5	74.2	81.4	87.9	94	117	131
	70	57.94	56.55	55.09	53.58	52.04	50.49	43.08	36.77	125	143	159	174	188	201	251	282
	80	77.25	74.40	73.46	71.44	69.39	67.33	57.44	49.03	166	190	212	233	251	269	334	375
M 18	50	33.01	32.20	31.35	30.47	29.58	28.68	24.43	20.83	81.3	92.6	103	113	122	130	161	180
	70	70.73	69.00	67.17	65.29	63.38	61.46	52.34	44.64	174	198	221	242	261	278	345	387
	80	94.31	92.00	89.56	87.05	84.51	81.95	69.79	59.52	232	265	295	322	348	371	460	515
M 20	50	42.27	41.26	40.20	39.10	37.79	36.84	31.34	26.83	114	130	146	160	173	184	230	258
	70	90.58	88.40	86.14	83.78	81.37	78.95	67.35	57.49	245	280	312	342	370	395	492	552
	80	120.8	117.9	114.9	111.7	108.5	105.3	89.8	76.7	326	373	416	456	493	527	656	736
M 22	50	52.67	51.45	50.15	48.80	47.42	46.02	39.32	33.59	156	178	200	219	237	254	318	257
	70	112.87	110.24	107.46	104.56	101.61	98.61	84.25	~	334	382	428	470	508	544	680	~
M 24	50	60.88	59.43	57.90	56.30	54.69	53.01	45.27	38.64	197	225	251	275	297	318	396	444
	70	130.5	127.4	124.1	120.7	117.2	113.7	97	~	421	482	537	589	637	680	848	~
M 27	50	79.86	78.02	76.05	74.01	71.93	69.82	59.67	50.98	289	332	371	408	442	473	591	666
	70	171	167	163	159	154	150	128	~	620	711	795	873	946	1013	1267	~
M 30	50	97.23	94.96	92.54	90.04	87.48	84.90	72.50	61.90	394	451	504	553	599	640	800	900
	70	208	203	198	193	187	182	155	~	844	966	1080	1186	1283	1373	1715	~
M 33	50	121	118	115	112	109	106	90	77	531	610	683	751	813	871	1092	1230
M 36	50	142	139	135	132	128	124	106	91	684	784	876	964	1044	1117	1398	1573
M 39	50	170	166	162	158	154	149	128	109	883	1014	1137	1250	1355	1452	1822	2054



The prevailing torque type hexagon nuts from stainless steel sometimes tend to jam in the locking element due to the high thread flank pressure when inserting the screw thread. Here, treating the screw thread with an anti-friction agent usually helps. Accordingly, the changed friction coefficients are to be taken into account when assembly the screwed fastening.