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Bolt Torque Chart — M27

M27 · 6 property classes · 5 friction states · N·m (typ / min–max) · coarse + fine thread

M27

N·m · As 459 mm²

Class	Rp0.2 (MPa)	Target preload (kN)	Dry / Black K 0.18–0.22 · N·m	Electro Zinc K 0.15–0.2 · N·m	Hot-Dip Galv. K 0.18–0.25 · N·m	Oiled K 0.12–0.15 · N·m	Wax / PTFE / Anti-seize K 0.08–0.12 · N·m
4.8	340	**109.2**	590 531–649	501 442–590	649 531–737	383 354–442	295 236–354
8.8	640	**205.6**	1110 999–1221	944 833–1110	1221 999–1388	722 666–833	555 444–666
10.9	940	**302**	1631 1468–1794	1386 1223–1631	1794 1468–2039	1060 979–1223	815 652–979
12.9	1100	**353.4**	1909 1718–2099	1622 1431–1909	2099 1718–2386	1241 1145–1431	954 763–1145
A2-70	450	**144.6**	781 703–859	664 586–781	859 703–976	507 468–586	390 312–468
A4-80	600	**192.8**	1041 937–1145	885 781–1041	1145 937–1301	677 625–781	521 416–625

Torque follows the K-factor (nut factor) method T = K·D·F: D is the nominal diameter and F the target preload = 70% of Rp0.2 × thread stress area (M27 As = 459 mm²). Yield strengths are published values from ISO 898-1 (carbon/alloy steel) and ISO 3506-1 (stainless A2/A4). K follows published empirical ranges per friction condition (Machinery's Handbook; the wax/PTFE/anti-seize band K≈0.10 follows Machine Design test data). The grease/MoS_2 band (K≈0.11) nearly overlaps anti-seize and is available in the calculator instead of a separate column.

Fine-Thread Torque Matrix

Class	Rp0.2 (MPa)	Target preload (kN)	Dry / Black K 0.18–0.22 · N·m	Electro Zinc K 0.15–0.2 · N·m	Hot-Dip Galv. K 0.18–0.25 · N·m	Oiled K 0.12–0.15 · N·m	Wax / PTFE / Anti-seize K 0.08–0.12 · N·m
4.8	340	**118**	637 574–701	542 478–637	701 574–797	414 382–478	319 255–382
8.8	640	**222.2**	1200 1080–1320	1020 900–1200	1320 1080–1500	780 720–900	600 480–720
10.9	940	**326.4**	1762 1586–1939	1498 1322–1762	1939 1586–2203	1146 1057–1322	881 705–1057
12.9	1100	**381.9**	2062 1856–2269	1753 1547–2062	2269 1856–2578	1341 1237–1547	1031 825–1237
A2-70	450	**156.2**	844 759–928	717 633–844	928 759–1055	548 506–633	422 337–506
A4-80	600	**208.3**	1125 1012–1237	956 844–1125	1237 1012–1406	731 675–844	562 450–675

Cell shows the typical value; the small line below is the range (min–max).

Basis of Calculation & Sources

Boundary: this chart is a simplified K-factor estimate, not a full VDI 2230 analysis (which accounts for joint resilience, embedment and assembly method). Friction is the dominant variable — no single torque value exists without its friction state. Always follow the design specification or manufacturer torque table.

References

- ISO 898-1:2013 — Mechanical properties of fasteners made of carbon and alloy steel — https://www.iso.org/standard/60610.html
- ISO 3506-1:2020 — Mechanical properties of corrosion-resistant stainless steel fasteners (A2/A4) — https://www.iso.org/standard/70045.html
- GB/T 3098.1-2010 — Mechanical properties of bolts, screws and studs (CN national standard, official full text) — https://openstd.samr.gov.cn/bzgk/gb/std?std_no=GB%2FT%203098.1-2010
- GB/T 3098.6-2014 — Mechanical properties of stainless steel bolts, screws and studs (CN, official full text) — https://openstd.samr.gov.cn/bzgk/gb/std?std_no=GB%2FT%203098.6-2014
- ISO 16047:2005 — Fasteners: torque/clamp force testing (K-factor measurement method)
- Machinery's Handbook (30th ed.) — empirical K-factor ranges
- Machine Design — anti-seize compound friction test (K≈0.10)

Disclaimer: This chart is an engineering estimation for selection and budgeting only. It does not constitute assembly instructions or acceptance criteria.

Bolt Torque Chart — M27 — Yaxiio full-range reference PDF, pack v1 · generated 2026-09-10 · data source: yaxiio-customer/utils/fastenerCalc.ts (single source of truth) · methodology matches the online tool pages · https://www.yaxiio.com/en/tools/bolt-torque-chart/m27