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M10 · English · bolt-torque-chart-m10-en

Bolt Torque Chart — M10

M10 · 6 property classes · 5 friction states · N·m (typ / min–max) · coarse + fine thread

M10

N·m · As 58 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	**13.8**	28 25–30	23 21–28	30 25–35	18 17–21	14 11–17
8.8	640	**26**	52 47–57	44 39–52	57 47–65	34 31–39	26 21–31
10.9	940	**38.2**	76 69–84	65 57–76	84 69–95	50 46–57	38 31–46
12.9	1100	**44.7**	89 80–98	76 67–89	98 80–112	58 54–67	45 36–54
A2-70	450	**18.3**	37 33–40	31 27–37	40 33–46	24 22–27	18 15–22
A4-80	600	**24.4**	49 44–54	41 37–49	54 44–61	32 29–37	24 19–29

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 (M10 As = 58 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	**15.4**	31 28–34	26 23–31	34 28–38	20 18–23	15 12–18
8.8	640	**28.9**	58 52–64	49 43–58	64 52–72	38 35–43	29 23–35
10.9	940	**42.4**	85 76–93	72 64–85	93 76–106	55 51–64	42 34–51
12.9	1100	**49.7**	99 89–109	84 74–99	109 89–124	65 60–74	50 40–60
A2-70	450	**20.3**	41 37–45	35 30–41	45 37–51	26 24–30	20 16–24
A4-80	600	**27.1**	54 49–60	46 41–54	60 49–68	35 33–41	27 22–33

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 — M10 — 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/m10