

Bolt Torque Chart — M6

M6 · 6 property classes · 5 friction states · N·m (typ / min–max) · coarse + fine thread

M6

N·m · As 20.1 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	4.8	6 5–6	5 4–6	6 5–7	4 3–4	3 2–3
8.8	640	9	11 10–12	9 8–11	12 10–14	7 6–8	5 4–6
10.9	940	13.2	16 14–17	13 12–16	17 14–20	10 10–12	8 6–10
12.9	1100	15.5	19 17–20	16 14–19	20 17–23	12 11–14	9 7–11
A2-70	450	6.3	8 7–8	6 6–8	8 7–9	5 5–6	4 3–5
A4-80	600	8.4	10 9–11	9 8–10	11 9–13	7 6–8	5 4–6

Torque follows the K-factor (nut factor) method $T = K \cdot D \cdot F$: D is the nominal diameter and F the target preload = 70% of $Rp0.2 \times$ thread stress area (M6 As = 20.1 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 $K \approx 0.10$ follows Machine Design test data). The grease/MoS₂ band ($K \approx 0.11$) nearly overlaps anti-seize and is available in the calculator instead of a separate column.

Fine-Thread Torque Matrix

M6 is not covered by the fine-thread stress area table of ISO 898-1:2013 (Table 6 starts at M8×1); the fine-thread values shown on this page equal the coarse chart. 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 ($K \approx 0.10$)

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