



Assembly of screwed fastenings

High-strength structural boltings – System HV

Table 14: Preloads and tightening torques for torque control, impact turn, angle torquing and combined preloading methods for high-strength structural bolting assemblies (system HV) of the property class 10.9 according to DIN 18800-7 or the DAST guideline 021

| Dimensions | Nominal preload F_V kN | Torque method | Impact turn method | Angle torquing method | Combined preloading method |
|---|-----------------------------|---|--|---|---|
| | | Tightening torque M_A to be applied in order to achieve nominal preload F_V Nm | Preload $F_{V,DI}^*$ to be set in order to achieve nominal preload F_V kN | Preliminary tightening torque $M_{VA,DW}^*$ Nm | Preliminary tightening torque $M_{VA,KV}$ Nm |
| Surface condition: hot dip galvanized, nut lubricated with MoS_2 Black assembly, nut lubricated with MoS_2 | | | | | |
| M 12 | 50 | 100 | 60 | 10 | 75 |
| M 16 | 100 | 250 | 110 | 50 | 190 |
| M 20 | 160 | 450 | 175 | 50 | 340 |
| M 22 | 190 | 650 | 210 | 100 | 490 |
| M 24 | 220 | 800 | 240 | 100 | 600 |
| M 27 | 290 | 1250 | 320 | 200 | 940 |
| M 30 | 350 | 1650 | 390 | 200 | 1240 |
| M 36 | 510 | 2800 | 560 | 200 | 2100 |
| M 39 | 610 | 3500** | according to factory standards/on request | | |
| M 42 | 710 | 4500** | | | |
| M 45 | 820 | 5500** | | | |
| M 48 | 930 | 6500** | | | |
| M 56 | 1280 | 10000** | | | |
| M 64 | 1680 | 15000** | | | |

* Independent of the lubrication of the thread and the supporting surface of nut and screw
 ** Only applies to hot dip galvanized surface condition

Table 15: Further rotation angle or rotation factor V for the combined preloading method for bolt and nut assemblies of property class 10.9

| Total nominal thickness L_k of the components to be connected (including all lining plates and flat washers) | Further rotation angle | Further rotation factor V |
|--|------------------------|---------------------------|
| $L_k < 2 d$ | 45 | 1/8 |
| $2 d \leq L_k < 6 d$ | 60 | 1/6 |
| $6 d \leq L_k < 10 d$ | 90 | 1/4 |
| $10 d < L_k$ | no recommendation | no recommendation |

Table 16: Inspection of the preloading for nominal preloads**

| Further rotation angle | Evaluation | Measure |
|------------------------|---|---|
| < 30° | Preloading was sufficient | None |
| 30° to 60° | Preloading was sufficient to a limited extent | Leave assembly alone and inspect two adjacent joints in the same flange |
| > 60° | Preloading was insufficient | Change* assembly and inspect two adjacent joints in the same flange |

* These inspected fasteners can only be left in the construction with predominantly statically stressed SLV or SLVP joints without any additional tensile stress.
 ** The inspection of the prestressing force is to be done on the screws in the joint according to DIN 18800-7.