



## Corrosion protection: Hot dip galvanized fasteners

For hot dip galvanized fasteners, the technical conditions of delivery apply according to ISO 10684.

The minimum layer thickness of at least 40 µm at the point of measurement stipulated by this standard requires that the thread dimensions be adjusted (see Table 9).

The undersize is usually to be found in the screw thread with the tolerance group 6az so that the hot dip galvanized screw thread does not exceed the (ISO-compatible) zero line (h tolerance). These screws are also identified with a "U". Rethreading the screw is not permitted.

For high-strength structural bolting assemblies-system HV-according to EN 14399-4, a **non-rethreaded** screw (g tolerance) is coated which means that the screw thread with hot dip galvanization is above the zero line. In this case the necessary oversize is in the nut thread (= 6 AZ). The nut thread is later cut into the hot dip galvanized castings. The corrosion protection of the bare nut thread comes from the zinc coating of the screw thread with remote cathodic protection.

**Table 9: Basic measurements of the screw thread before hot dip galvanization – tolerance group 6az according to ISO 10684/ISO 965-4**

Thread	M6*	M8	M10	M12	M14 M16	M18 M22	M24 M27	M30 M33	M36 M39	M42 M45	M48 M52	M56 M60	M64
Upper limit dimension es [µm ]	-290	-295	-330	-335	-340	-350	-360	-370	-380	-390	-400	-410	-420

\* not regulated by standards

After hot dip galvanization, the requirements of ISO 898-1 and ISO 898-2 apply to hot dip galvanized screws and nuts ≥ M12. For thread sizes M8 and M10, reduced resilience applies according to ISO 10684.

**Table 10: Min. tensile strength [N] for screws of the 6az tolerance**

Property class Marking	4.6 4.6 U	5.6 5.6 U	8.8 8.8 U	10.9 10.9 U
M 6*	7 075	8 844	14 150	17 687
M 8	13 300	16 600	26 600	34 500
M 10	21 400	26 800	42 900	55 700
M 12	33 700	42 200	67 400	87 700
M 16	62 800	78 500	125 000	163 000
M 20	98 000	122 000	203 000	255 000
M 24	141 000	176 000	293 000	367 000
M 30	224 000	280 000	466 000	583 000
M 36	327 000	408 000	678 000	850 000

\* not regulated by standards

**Table 11: Proof loads [N] for nuts of the tolerance class 6AZ**

Property class Marking	5 5 Z	6 6 Z	8 8 Z	10 10 Z
M 6*	7 969	9 962	15 934	19 923
M 8	17 300	20 000	25 500	30 600
M 10	28 600	33 000	42 200	50 400
M 12	51 400	59 000	74 200	88 500
M 16	95 800	109 900	138 200	164 900
M 20	154 400	176 400	225 400	259 700
M 24	222 400	254 200	324 800	374 200
M 30	353 400	403 900	516 100	594 700
M 36	514 700	588 200	751 600	866 000

\* not regulated by standards

**When assembly hot dip galvanized screws and nuts, especially with additional lubrication of the threading, different friction coefficients and tightening torques need to be reckoned with. DIN 18800-7/EN 1993 – 1 – 8 NA need to be considered for hot dip galvanized high-strength structural bolting assemblies! (→ TI-attachment)**

The zinc coating may give a small excess to the outer measurements (head, shaft).

Articles with hollow sections (e.g. keys for hexagon socket screws, cap nuts, etc.) are not suitable for hot dip galvanizing.

The grey appearance of the hot dip galvanizing is dependent on the material and not characteristic for the quality of the corrosion protection. White rust and/or whitish to dark corrosion points (zinc-oxide) which can occur after hot dip galvanization, e.g. through dampness, do not usually impair the corrosion protection and no reason for rejection (→ ISO 1461, Section 6.1).

A certain surface rawness and small dents in the thread tips are dependent on the procedure. For this reason, an assembly tool may be required for initial screwing. (→ DIN 18800-7, Section 8.3 (2)).