

## Hydraulic Bolt Tensioner Selection

### Bolt and nut tension reference table

#### Design premise

In order to better use the tensioner, the thread of the bolt needs to protect the nut with a distance of  $(0.6-1) \times$  bolt diameter. The ratio of thread diameter to clamping length is 1:5.

#### Calculate the initial tensile force

The required initial tensile force is obtained by detailed calculations (German standard VDI 2230). The following is a table of recommended initial tensile forces for axles and anti-fatigue axle bolts using the 90% elongation limit.

force level		8.8		10.9		12.9	
elastic limit		640		900		1080	
extended limit		660		940		1100	
bolt	nut						
DIN	DIN 934	Fvs[KN]	Fv <sup>D</sup> [KN]	Fvs[KN]	Fv <sup>D</sup> [KN]	Fvs[KN]	Fv <sup>D</sup> [KN]
2510/13							
M 20X2.5	32	137.9	105	196.4	149.5	229.2	175
M 24X3	36	199.2	151.2	283.8	215.3	332	251.9
M 27X3	41	261.3	196.1	372.1	279.2	435.5	326.8
M 30X3.5	46	319.1	246.8	454.5	351.5	531.9	411.3
M 33X3.5	50	396.5	303.4	564.7	432.1	660.9	505.6
M 36X4	55	467.1	352.8	665.3	502.5	778.5	588
M 39X4	60	559.9	434	797.4	618.1	933.1	723.3
M 42X4.5	65	643.2	492.8	916	701.8	1072	821.3
M 45X4.5	70	751.3	587.9	1070	837.4	1252.2	979.9
M 48X5	75	847.2	656.1	1206.6	934.4	1412	1093.4
M 52X5	80	1013.7	784.2	1443.8	1116.9	1689.5	1307.1
M 56X5.5	85	1170.9	903.2	1667.6	1286.4	1951.4	1505.3
M 60X5.5	90	1403	1052.6	1998.3	1499.2	2388.4	1754.3
M 64X6	95	1543.6	1213.4	2198.4	1728.2	2572.6	2022.4
M 68X6	100	1814.9	1385.7	2584.8	1973.6	3024.8	2309.5
M 72X6	105	2002.8	1596.6	2852.5	2273.9	3338	2661
M 76X6	110	2310.3	1793.3	3290.4	2554.1	3850.5	2988.9
M 80X6	115	2512.7	2032.2	3291.6	2894.3	4202.9	3387
M 90X6	130	3254.4	2624.2	4635	3737.5	5224	4373.7
M 100X6	145	4073.4	3291.8	5801.6	4688.3	6789.1	5486.4
M 110X6	155	4992	3991.7	7109.8	5685.2	8319.9	6652.9
M 120X6	175	6003.8	4853.7	8550.8	6912.9	10006.3	8089.6
M 125X8	180	6311.3	5341.3	8988.9	7607.3	10518.9	8902.1
M 130X8	185	7000.2	5800	9970	8260.6	11667.0	9666.6
M 140X8	200	8044.2	6830.4	11456.9	9728.2	13407	11384
M 150X8	215	9316	8006.1	13268.3	11420.6	15526.7	13343.4

Reference values for initial tension shaft and fatigue-resistant shaft bolts using the 90% elongation limit.