Fastener Torque at Material Yield Point		Units
Blocks shown as light blue are editable		
yield point or proof stress of the bolt δ_y =	640	N/mm^2
stress area of the thread A_s =	57.99	mm^2
dia. circle of area equal to stress area of thrd (Eq. 10) d_A =	8.59	mm^2
pitch diameter of the external thread d_2 =	9.026	mm
Bolt nominal diameter d =	10.00	mm
Bolt nominal radius r =	5.00	mm
flank angle of the thread ridge α =	30.0	°
screw thread pitch l = P =	1.500	mm
coefficient of friction between threads μ_s =	0.120	-
coefficient of friction between bearing surfaces μ_w =	0.120	-
bearing surface contact area (calc) D_w =	14.380	mm^2
Calculated Results		
tanβ =	0.04775	-
β =	2.734	°
tan α' =	0.577	-
α' =	29.972	°
Axial clamping force (Eq. 9) F_{fy} =	30453.99	N
torque coefficient (tables or calc eq. 2) K =	0.164	-
torque required stress bolt to the yield point (Eq. 8) T_{fy} =	49944.54	N-m

Torque Cumulative of Preload		Units
Bolt nominal diameter d =	10.00	mm
Bolt nominal radius r =	5.00	mm
bearing surface contact area (calc) D_w =	14.380	mm^2
screw thread pitch l = P =	1.500	mm
coefficient of friction between threads μ_s =	0.120	-
coefficient of friction between bearing surfaces μ_w =	0.120	-
pitch diameter of the external thread d_2 =	9.026	mm
flank angle of the thread ridge α =	30.0	°
(Eq 3) tan α' =	0.577	-
α' =	29.972	°
tanβ =	0.04775	-
β =	2.734	°
bolt preload F_f =	15000.0	N
Calculated Results		
Torque threaded portion of a fastener, T_s =	12958.41	N-m
fastener tightening torque T_w =	12942.00	N-m
Cumulative fastener torque T_f =	25900.413	N-m

Circular Bearing Surface Area		Units
Outside diameter bolt head D_o =	18.00	mm
Outside diameter bolt head D_i =	10.00	mm
Calculated Results		
bearing surface contact area (Eq 5) D_w =	14.381	mm^2