

Total force on bolts $F_t := 9200 \text{ N}$

Number of bolts $B_q := 4$

Force per bolt $F_1 := \frac{F_t}{B_q} = 2.3 \text{ kN}$

Bolt Root Area (RA)

For metric series, the root area = $(\pi/4) \cdot (D - 1.3P)^2$

D=Nominal Dia P=Thread Pitch

$$RA := \left(\frac{\pi}{4} \right) \cdot (10 \text{ mm} - 1.3 \cdot 1.5 \text{ mm})^2 = 50.896 \text{ mm}^2$$

Stress per bolt (SB)

$$SB := \frac{F_1}{RA} = 45.19 \text{ MPa}$$

Proof load for M10 (Grade 12.9) capscrew

$$PL_{10} := 56.3 \text{ kN}$$

Size	PL10.9 (kN)	PL12.9 (kN)
6	16.7	19.5
8	30.4	35.5
10	48.1	56.3
12	70	81.8
16	130	152

Material: Mild Steel

$$YieldStrength_1 := 300 \text{ MPa}$$

Material: Aluminum 6082-T6

$$YieldStrength_2 := 250 \text{ MPa}$$

Material: Aluminum 6083-T6

$$YieldStrength_3 := 214 \text{ MPa}$$