

	Aço (1)	Alumínio (2)
$\tau_{adm} [MPa]$	120	70
$G [GPa]$	80	27

$$J_1 = \frac{\pi \times 0,025^4}{2} = 613,6 \times 10^{-9} m^3$$

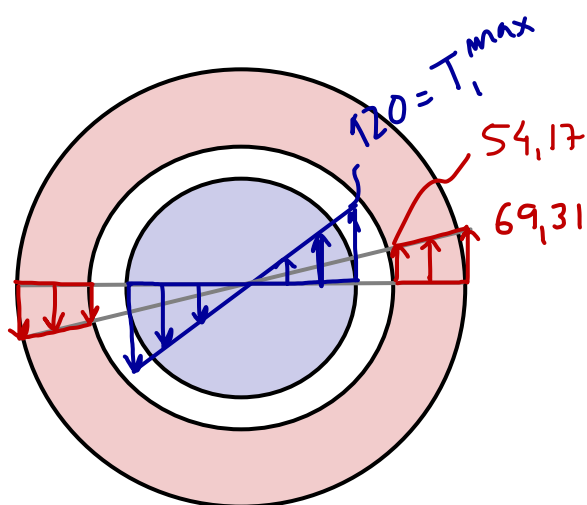
$$J_2 = \frac{\pi}{2} \left[\left(\frac{0,036}{2} \right)^4 + \left(\frac{0,06}{2} \right)^4 \right] = 2 \times 10^{-6} m^3$$

$$\tau_1^{max} = 120 \times 10^3 = \frac{T_1^{max}}{613,6 \times 10^{-9}} \times 0,025 \Rightarrow T_1^{max} = 2,945 kNm$$

$$\tau_2^{max} = 70 \times 10^3 = \frac{T_2^{max}}{2 \times 10^{-6}} \times 0,038 \Rightarrow T_2^{max} = 3,684 kNm$$

$$\alpha_1 = \alpha_2 \Rightarrow \frac{T_1}{G_1 J_1} = \frac{T_2}{G_2 J_2} \Rightarrow T_2 = \frac{27 \times 2 \times 10^{-6}}{80 \times 613,6 \times 10^{-9}} T_1 \Rightarrow \boxed{T_2 = 1,1 T_1}$$

$$T = T_1 + T_2 \Rightarrow T = \min \left[\underbrace{T_1^{max} (1 + 1,1)}_{6,185}; \underbrace{T_2^{max} \left(1 + \frac{1}{1,1} \right)}_{6,931} \right] = \underline{\underline{6,185 kNm}}$$



$$\tau = \frac{3,648 \times 10^{-3}}{2 \times 10^{-6}} \times 0,038 = 69,31$$

$$69,31 \times \frac{0,03}{0,038} = 54,17$$