

[Remarks:](#) See §6.2.2 and §6.2.3, pages 421 till 426

See §6.4 example 1, pages 446 till 448

[Answers:](#)

- a.  $M_t = 5,3 \text{ kNm}$
- b.  $d_3 = 145 \text{ mm}$
- c.  $\tau = 6,44 \text{ N/mm}^2$

[Explanation:](#)

- a. solid cross-section:  $I_p = 49,7 \times 10^6 \text{ mm}^4$

$$\text{b. } \tau_{\max} = \frac{(5,3 \times 10^6 \text{ Nmm})(90 \text{ mm})}{I_p} = 8 \text{ N/mm}^2$$

$$\rightarrow I_p = 59,625 \times 10^6 \text{ mm}^4$$

$$\frac{1}{2} \pi \left\{ \left( \frac{180 \text{ mm}}{2} \right)^4 - \left( \frac{d_3}{2} \right)^4 \right\} = 59,625 \times 10^6 \text{ mm}^4 \rightarrow d_3 = 145 \text{ mm}$$

$$\text{c. } \tau = \frac{145}{180} \times 8 \text{ N/mm}^2 = 6,44 \text{ N/mm}^2$$