Remarks: See §4.6, pages 168 till 170

Answers 4.57-1:

a. $h = 260$ mm

b. $\sigma_{max} = 9,25$ N/mm^2

Explanation:

$M_{max} = 6,25$ kNm

a. $\sigma = \dfrac{M_{max}}{W} \le \bar{\sigma} = 10$ N/mm^2

$W = \frac{1}{6} bh^2 \ge \dfrac{M_{max}}{\bar{\sigma}} \Rightarrow h \ge \sqrt{\dfrac{6M_{max}}{b\bar{\sigma}}} = 250$ mm

b. $W = \frac{1}{6} \times (60 \text{ mm})(260 \text{ mm})^2 = 676 \times 10^3$ mm^3

$\sigma_{max} = \dfrac{6,25 \times 10^6 \text{ Nmm}}{676 \times 10^3 \text{ mm}^3} = 9,25$ N/mm^2

Answers 4.57-2:

a. $h = 230$ mm

b. $\sigma_{max} = 9,07$ N/mm^2

Explanation:

$M_{max} = 8$ kNm

a. $\sigma = \dfrac{M_{max}}{W} \le \bar{\sigma} = 10$ N/mm^2

$W = \frac{1}{6} bh^2 \ge \dfrac{M_{max}}{\bar{\sigma}} \Rightarrow h \ge \sqrt{\dfrac{6M_{max}}{b\bar{\sigma}}} = 219$ mm

b. $W = \frac{1}{6} \times (100 \text{ mm})(230 \text{ mm})^2 = 881,7 \times 10^3$ mm^3

$\sigma_{max} = \dfrac{8 \times 10^6 \text{ Nmm}}{881,7 \times 10^3 \text{ mm}^3} = 9,07$ N/mm^2