

4-89

$$\text{fillet: } \frac{r}{h} = \frac{15 \text{ mm}}{30 \text{ mm}} = 0.5$$

$$\frac{w}{h} = \frac{60 \text{ mm}}{30 \text{ mm}} = 2.0$$

$$\text{(from Fig 4-23)} \quad K = 1.4$$

$$\sigma_{\text{avg}} = \frac{N}{ht}$$

$$\sigma_{\text{max}} = K \sigma_{\text{avg}}$$

$$150 \times 10^3 \frac{\text{kN}}{\text{m}^2} = (1.4) \frac{N}{(0.030 \text{ m})(0.020 \text{ m})}$$

$$N = 64.29 \text{ kN}$$

$$\text{hole: } \frac{2t}{w} = \frac{2(12 \text{ mm})}{60 \text{ mm}} = 0.4$$

$$\text{(from Fig 4-24)} \quad K = 2.2$$

$$\sigma_{\text{avg}} = \frac{N}{(w-2t)t}$$

$$\sigma_{\text{max}} = K \sigma_{\text{avg}}$$

$$150 \times 10^3 \frac{\text{kN}}{\text{m}^2} = 2.2 \frac{N}{(0.060 \text{ m}) - 2(0.012 \text{ m})(0.020 \text{ m})}$$

$$N = 49.09 \text{ kN}$$

$$N_{\text{max}} = 49.09 \text{ kN}$$