Solutions

2.1

- $A_0 = \pi(6.0)^2 = 113.1$ mm^2.
- $\sigma = 20{,}000/113.1 \times 10^{-6} \cdot 10^6 = 176.8$ MPa.

2.2

- Steel: $\varepsilon = 176.8/200{,}000 = 8.84 \times 10^{-4}$, $\delta = 1.061$ mm.
- Aluminium: $\delta = 1.061 \times 200/70 = 3.032$ mm.

2.3

- $\varepsilon_t = \ln 1.15 = 0.1398$.
- $\sigma_t = 1.15\sigma$.

2.4

- The offset line defines where plastic flow counts as begun, removing judgement from the yield read.
- Necking localises strain, so the percentage depends on the length over which it is averaged.

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