Solutions

2.1

- $V = \pi(0.015)^2(0.06) = 4.24\times10^{-5}$ m^3; $A = 2\pi(0.015)^2+2\pi(0.015)(0.06) = 7.07\times10^{-3}$ m^2.
- $V/A = 6.0$ mm, $t = 1.8 \times 10^6 \times (6.0 \times 10^{-3})^2 = 64.8$ s.

2.2

- $V = 2.56 \times 10^{-4}$ m^3; $A = 2(0.04)^2 + 4(0.04)(0.16) = 0.0288$ m^2.
- $V/A = 8.889$ mm, $t = 1.8 \times 10^6 \times (8.889 \times 10^{-3})^2 = 142.2$ s.

2.3

- The bar (larger V/A, 142.2 s): the riser must attach there, with an even larger V/A.

2.4

- Quenched + tempered 600°C.
- Impact energy is absorbed by plastic area: 16% elongation buys toughness the 950/8 route cannot, and 620 MPa clears the specification with margin.

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