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Question 4 continued.

b) if I were to choose one of these materials, I would choose aluminium, because its low density, strong, ductile, and a proven performer in applications of high stress such as aircraft.

c) ?

d) i) $t = \frac{2Pd}{\sigma_{\text{yield}}}$

$$P = 20 \times 10^6 \text{ Pa}$$

$$d = 100 \times 10^{-6} \text{ m}$$

$$\sigma = 241 \times 10^6 \text{ Pa. (Al)}$$

$$= \frac{2 \times 20 \times 10^6 \times 100 \times 10^{-6}}{241 \times 10^6}$$

$$= \frac{2 \times 2000}{241 \times 10^6}$$

$$= \frac{4000}{241 \times 10^6} = 16.6 \times 10^{-6} \text{ m} / 16.6 \text{ mm.}$$

ii) End caps $1 \text{ kg} + 1 \text{ kg} = 2 \text{ kg}$ total.

Circumference $C = \pi d = \pi \times 100 \times 10^{-6}$
 $= 1.885 \times 10^{-6}$

Please ignore.