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Question: 8-5. Air pressure in the cylinder is increased by exerting forces...

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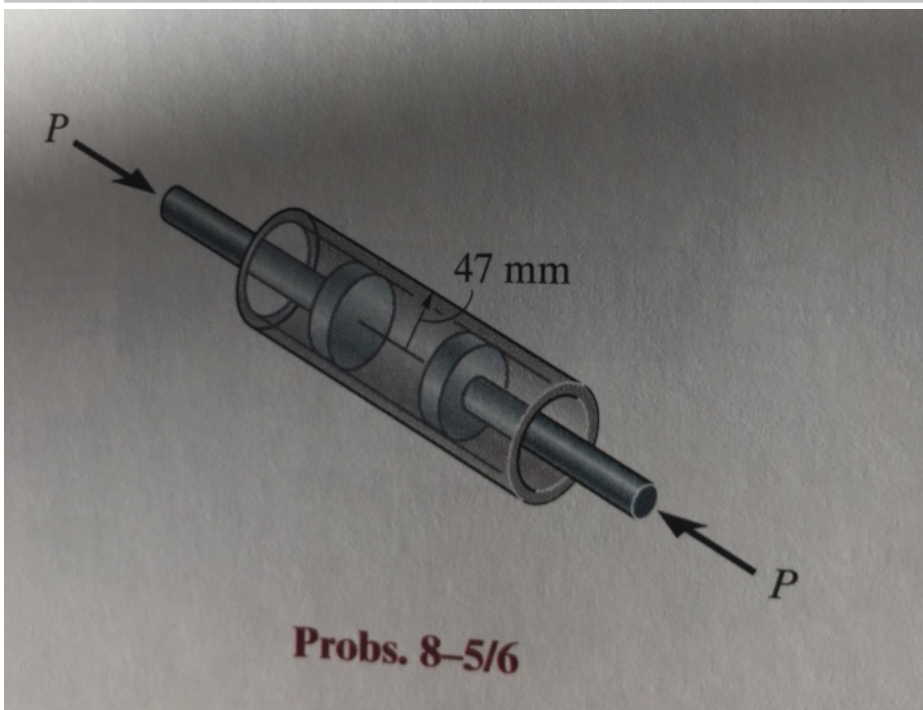
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8-5. Air pressure in the cylinder is increased by exerting forces $P = 2 \text{ kN}$ on the two pistons, each having a radius of 45 mm. If the cylinder has a wall thickness of 2 mm, determine the state of stress in the wall of the cylinder.



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Expert Answer



Henry Miller answered this
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$$= \pi \left(45 \text{ mm} \times 10^{-3} \frac{\text{m}}{\text{mm}} \right)^2$$

$$= 0.006362 \text{ m}^2$$

Calculate the pressure inside the cylinder using the following relation:

$$p = \frac{P}{A}$$

$$= \frac{\left(2 \text{ kN} \times 10^3 \frac{\text{N}}{\text{kN}} \right)}{0.006362}$$

$$= 314366.55 \text{ Pa}$$

Calculate the circumferential stress using the following relation:

$$\sigma_c = \frac{pr}{t}$$

$$= \frac{(314366.55)(45)}{2}$$

$$= 7073247.41 \text{ Pa}$$

$$= 7.073 \text{ MPa}$$

As the pressure developed inside the cylinder is supported by the two piston surfaces in the longitudinal direction. So, there will be no longitudinal stress acting on the walls of the cylinder in the longitudinal direction.

Hence, the longitudinal stress is zero.

$$\sigma_{long} = 0$$

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Q: Q. No. 1: Figuro-I shows a cylinder subjected to air pressure. Air pressure in the cylinder is increased by exerting forces P=2 kN on the two pistons, each having a radius of 45 mm. If the cylinder has a wall thickness of 2 mm, determine the state of stress in the wall of the cylinder.

A: [See answer](#)

Q: Figure 6. Problem No. 6 (Figure 6) Air pressure in the cylinder is increased by exerting forces P = 2 kN on the two pistons, each having a radius of 45 mm. If the cylinder has a wall thickness of 2 mm, determine the state of stress in the wall of the cylinder.

A: [See answer](#) 100% (3 ratings)

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12-87. The catapult is used to launch a ball such that it strikes the wall of the building at the maximum height of its trajectory. If it takes 1.5 s to travel from A to B, determine the velocity v_A at which it was launched, the angle of release θ , and the height h .



[See answer](#)

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The member has a rectangular cross-sectional area of width 0.5 in. and thickness 1 in. Determine the normal stress at point A and B. Determine the shear stress at point A and B.

A: [See step-by-step answer](#) 100% (31 ratings)

Q: Air pressure in the cylinder is increased by exerting forces $P = 3 \text{ kN}$ on the two pistons, each having a radius of 45 mm. The cylinder is shown in the figure below. If the cylinder has a wall thickness of 2 Mm, determine the circumferential stress in the wall of the cylinder. Express your answer to three significant figures and include appropriate units.

A: [See answer](#) 100% (39 ratings)

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