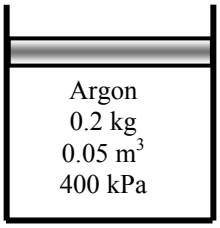
4-84 A piston-cylinder device containing argon undergoes an isothermal process. The final pressure is to be determined.

Assumptions At specified conditions, argon behaves as an ideal gas.

Properties The gas constant of argon is $R = 0.2081$ kJ/kg·K (Table A-1).



Analysis Since the temperature remains constant, the ideal gas equation gives

$$m = \frac{P_1 V_1}{RT} = \frac{P_2 V_2}{RT} \longrightarrow P_1 V_1 = P_2 V_2$$

which when solved for final pressure becomes

$$P_2 = P_1 \frac{V_1}{V_2} = P_1 \frac{V_1}{2V_1} = 0.5P_1 = 0.5(400\ \text{kPa}) = \mathbf{200\ kPa}$$

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