

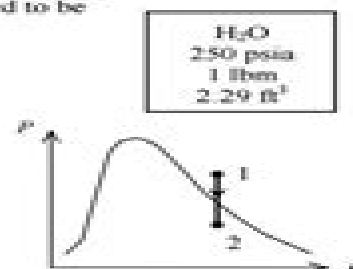
3-32E A rigid container that is filled with water is cooled. The initial temperature and final pressure are to be determined.

Analysis The initial state is superheated vapor. The temperature is determined to be

$$\left. \begin{array}{l} P_1 = 250 \text{ psia} \\ v_1 = 2.29 \text{ ft}^3/\text{lbm} \end{array} \right\} T_1 = \mathbf{550^\circ\text{F}} \quad (\text{Table A - 6E})$$

This is a constant volume cooling process ($v = V/m = \text{constant}$). The final state is saturated mixture and thus the pressure is the saturation pressure at the final temperature:

$$\left. \begin{array}{l} T_2 = 100^\circ\text{F} \\ v_2 = v_1 = 2.29 \text{ ft}^3/\text{lbm} \end{array} \right\} P_2 = P_{\text{sat @ } 100^\circ\text{F}} = \mathbf{0.9505 \text{ psia}} \quad (\text{Table A - 4E})$$



3-33 A piston-cylinder device that is filled with R-134a is heated. The final volume is to be determined.

Analysis The initial specific volume is

$$v_1 = \frac{V_1}{m} = \frac{0.14 \text{ m}^3}{1 \text{ kg}} = 0.14 \text{ m}^3/\text{kg}$$

This is a constant-pressure process. The initial state is determined to be a mixture, and thus the pressure is the saturation pressure at the given temperature

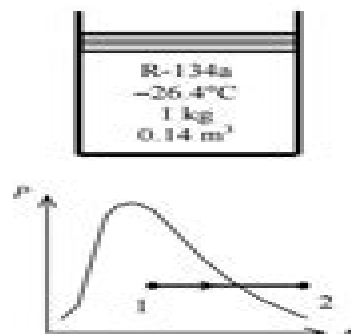
$$P_1 = P_2 = P_{\text{sat @ } -26.4^\circ\text{C}} = 100 \text{ kPa} \quad (\text{Table A - 12})$$

The final state is superheated vapor and the specific volume is

$$\left. \begin{array}{l} P_2 = 100 \text{ kPa} \\ T_2 = 100^\circ\text{C} \end{array} \right\} v_2 = 0.30138 \text{ m}^3/\text{kg} \quad (\text{Table A - 13})$$

The final volume is then

$$V_2 = m v_2 = (1 \text{ kg})(0.30138 \text{ m}^3/\text{kg}) = \mathbf{0.30138 \text{ m}^3}$$



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web core concepts some reactions will go fast and some will go slow the speed of the reaction is its reaction rate which is dictated by a rate law in this article we will learn about reaction rates rate laws the rate constant and the reaction order

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