

3-57:

2

$$\dot{Q} - \dot{W} = \dot{m} \left[\Delta h + \frac{v_2^2 - v_1^2}{2g_c} + g \Delta z \right]$$

$$= 4000 \cdot \frac{1 \text{bm}}{\text{h}} \left[-260 \cdot \frac{\text{B}}{1 \text{bm}} + \frac{1}{2 \times 32.2} (24000^2 - 6000^2) \right]$$

A

$$\dot{W} = A - \dot{Q}$$

$$= A - 14,000 \frac{\text{B}}{\text{h}}$$

$$= 10140000 \text{ B/h} = 3984 \text{ hp}$$

4-94:

$$h_1 = 129.16 \text{ B/lbm}$$

$$h_2 = \cancel{231.93} 231.93 \text{ B/lbm}$$

$$\dot{Q} - \dot{W} = \dot{m} \cdot \Delta h$$

$$\dot{Q} = \dot{m} \cdot 102.77 + \dot{W}$$

Calculate \dot{m} :

$$\dot{m} = \frac{v}{v} = \frac{\cancel{RT/p} v}{RT/p} = \frac{38,000 \times \frac{1}{60}}{53.3 \times 537 / 14.7 \times 144}$$

$$= 46.84 \text{ lbm/s}$$

$$\Rightarrow \dot{Q} = \left(46.84 \cdot \frac{1 \text{bm}}{\text{s}} \times 3600 \cdot \frac{\text{s}}{\text{h}} \right) \times 102.77 \cdot \frac{\text{B}}{1 \text{bm}} + 3860 \cdot \text{hp} \cdot \frac{2545 \frac{\text{B}}{\text{h}}}{1 \text{hp}}$$

$$= 2.7 \times 10^7 \frac{\text{B}}{\text{h}}$$