

SOLUTION:

From a global energy balance on a refrigeration system, the heat rejected at the condenser must equal the refrigeration effect plus the compressor work:

$$q_{\text{cond}} = q_r + w_{\text{comp}} \tag{1}$$

Since the given operating conditions match exactly those of the table (same compressor suction superheat, same condenser discharge liquid subcooling, etc.) the two parameters on the right hand side of equation (1) can be read directly from the table:

$$q_r = 39.1 \cdot 10^3 \text{ Btu/hr}; \quad w_{\text{comp}} = 3.22 \text{ kW}$$

Therefore:

$$q_{\text{cond}} = 39.1 \cdot 10^3 \text{ Btu/hr} + 3.22 \text{ kW} \cdot \left| \frac{3.412 \cdot 10^3 \text{ Btu/hr}}{1 \text{ kW}} \right|$$

$$q_{\text{cond}} = 39.1 \cdot 10^3 \text{ Btu/hr} + 10.9 \cdot 10^3 \text{ Btu/hr}$$

$$q_{\text{cond}} = 50 \cdot 10^3 \text{ Btu/hr}$$

THE CORRECT ANSWER IS (C)

