36.28 In a refrigeration cycle, R-134a leaves the evaporator at $20 psia$ with $20°F$ of superheat. What is the entropy of the refrigerant entering the compressor?

A. $0.03 \frac{Btu}{lb°F}$

B. $0.22 \frac{Btu}{lb°F}$

C. $0.24 \frac{Btu}{lb°F}$

D. $106 \frac{Btu}{lb°F}$

In the Reference Handbook, search for Properties of Refrigerants and use the phrase: Pressure Versus Enthalpy. Find the chart for Refrigerant 134a.

Following a horizontal line at a pressure of $20 psia$ to the rightmost edge of the saturation curve, corresponding to a saturated vapor condition. Continue horizontally to the right to account for the additional $20°F$ of superheat. Note that to the right of the saturation curve, lines of constant temperature are curved downward (nearly vertical). This is the compressor entering condition, typically noted as State 1 of the refrigeration cycle.

Once the state point has been identified, read off the entropy from the chart. Note that lines of constant entropy run roughly southwest/northeast on the diagram.

$$s \approx 0.235 \frac{Btu}{lb°F}$$

Answer C