Problem 2.2

Scroll compressor R-22
45F evapor
120F (Saturation) discharge temp

Table 2.4 for 20F superheat
15F liquid subcooling

Table find q_r = 43.1 MBtu/h "cooling capacity"
"compressor input power" kW = 3.26 kW = m_r x \(\frac{Btu}{w-h}\)

\[ E\text{-}C\text{-}R = \frac{q_r}{kW} = \frac{43.1 \text{ MBtu/h}}{3.2 \text{ kW}} = \frac{(\text{Btu})}{(w-h)} \]

\[ P_{\text{sat, in}} = P_{\text{sat, 120F}} \]
\[ P_{\text{discharge}} = P_{\text{sat, 45F}} \]
Problem 2.3

Change in EER is
lower Tcond to 100F
lower Super heat to 10F

(Recall CARNOT COP = \( \frac{\theta_c}{\theta_{in} - \theta_c} = \frac{T_c}{T_{in} - T_c} \))

New: \( q_p = 47.8 \)
\( kw = 2.49 \)

Lower superheat?

Since \( q_r = m_\infty \text{ (super)} \)

\( m = g \phi \)

\( \frac{\dot{m}_{\text{new}}}{\dot{m}_{\text{table}}} = \frac{\dot{m}_{\text{new}}}{\dot{m}_{\text{table}}} = \frac{U_{\text{table}}}{U_{\text{new}}} \)

\( U_{\text{table}} = U \)

\( P = P_{\text{stat}} \text{ Temp} \)
\( T = \text{ Temp} + 20F \)
Problem 2.6: What is $M_{\text{fis}}$ for the compressor?

Refrigerant Numbering System

R-22 $\rightarrow$ ?
R-134 $\rightarrow$ ?
R-703 $\rightarrow$ ?

3 digits #1  C - 1
#2  H + 1
#3  F1

R-022 $\rightarrow$ F1 = 2

MIXTURES → Zeotropic - during phase change

R-4XX temperature glide
A Zeotropic - characteristic similar to pure substance
($T =$ constant during phase change)
R-6 xx Miscellaneous organic compounds
R-7 xx Inorganic compounds ("organic" to carbon containing)
R-703 = water ???

Chapt 3 Heat Transfer Fundamentals
Conduction - in solids
Convection - at surfaces
Conduction - resistance analogy

\[ T_{oi}, T_{hi} \quad \uparrow \uparrow \quad k \quad \uparrow \uparrow \quad T_{so}, T_{oo} \]

\[ T_{ei} \quad \frac{1}{hi} \quad \frac{\Delta x}{k} \quad T_{so} \quad \frac{1}{ho} \]

\[ \frac{1}{U} = \frac{1}{hi} + \frac{\Delta x}{k} + \frac{1}{ho} \]
Overall heat transfer coefficient is the net conductance between two temperatures.

\[ UA = \frac{1}{\frac{1}{h_iA} + \frac{A_x}{kA} + \frac{1}{h_oA}} \]