



LOOP 2

---"
 r\$='R134A'

"! Compressor 1"

W_dot_c1 = 57.8 [kW]*convert(kW,Btu/hr)
 P[15] = 35 [psia]
 T[15] = 33.2 [F]
 P[14] = 97.2 [psia]
 T[14] = 97.1 [F]
 h[15] = Enthalpy(r\$, P=P[15], T=T[15])
 h[14] = Enthalpy(r\$, P=P[14], T=T[14])
 W_dot_c1 = m_dot_c1*(h[14] - h[15])

"! Compressor 2"

W_dot_c2= 57.8 [kW]*convert(kW,Btu/hr)
 P[17] = 34.7 [psia]
 T[17] = 35 [F]
 P[16] = 98.1 [psia]
 T[16] = 96.7 [F]
 h[17] = Enthalpy(r\$, P=P[17], T=T[17])
 h[16] = Enthalpy(r\$, P=P[16], T=T[16])
 W_dot_c2 = m_dot_c2*(h[16] - h[17])

"! Compressor 3"

W_dot_c3= 60.3 [kW]*convert(kW,Btu/hr)
 P[19] = 35.3 [psia]
 T[19] = 33.2 [F]
 P[18] = 100.9 [psia]
 T[18] = 97.4 [F]
 h[19] = Enthalpy(r\$, P=P[19], T=T[19])
 h[18] = Enthalpy(r\$, P=P[18], T=T[18])
 W_dot_c3 = m_dot_c3*(h[18] - h[19])

"! Compressor 4"

W_dot_c4= 58.3 [kW]*convert(kW,Btu/hr)
 P[21] = 35.5 [psia]
 T[21] = 33.8 [F]
 P[20] = 98.8 [psia]
 T[20] = 96.6 [F]
 h[21] = Enthalpy(r\$, P=P[21], T=T[21])
 h[20] = Enthalpy(r\$, P=P[20], T=T[20])
 W_dot_c4 = m_dot_c4*(h[20] - h[21])

"! Mass Flow Rate Chiller One"

m_dot_ch1 = SUM(m_dot_c1, m_dot_c2, m_dot_c3, m_dot_c3)
 f_c1 = m_dot_c1/m_dot_ch1
 f_c2 = m_dot_c2/m_dot_ch1
 f_c3 = m_dot_c3/m_dot_ch1
 f_c4 = m_dot_c4/m_dot_ch1

"! State 10"

P[10] = (f_c1*P[14]) + (f_c2*P[16]) + (f_c3*P[18]) + (f_c4*P[20]) "Assumption"
 T[10] = (f_c1*T[14]) + (f_c2*T[16]) + (f_c3*T[18]) + (f_c4*T[20]) "Assumption"
 h[10] = Enthalpy(r\$, P=P[10], T=T[10])
 x[10] = Quality(r\$, P=P[10], T=T[10])

"! State 11"

P[11] = P[10]
 x[11] = 0 "Assumption"
 T[11] = Temperature(r\$, P=P[11], x=x[11])
 h[11] = Enthalpy(r\$, P=P[11], x=x[11])

"! State 12"

$h[12] = h[11]$
 $P[12] = P[13]$
 $T[12] = \text{Temperature}(r\$, P=P[12], h=h[12])$
 $x[12] = \text{Quality}(r\$, P=P[12], h=h[12])$

"! State 13"

$P[13] = (f_{c1} \cdot P[15]) + (f_{c2} \cdot P[17]) + (f_{c3} \cdot P[19]) + (f_{c4} \cdot P[21])$ "Assumption"
 $T[13] = (f_{c1} \cdot T[15]) + (f_{c2} \cdot T[17]) + (f_{c3} \cdot T[19]) + (f_{c4} \cdot T[21])$ "Assumption"
 $h[13] = \text{Enthalpy}(r\$, P=P[13], T=T[13])$
 $x[13] = \text{Quality}(r\$, P=P[13], T=T[13])$

"! Condenser Chiller One"

$Q_{\text{dot_Cond_ch1}} = m_{\text{dot_ch1}} \cdot (h[10] - h[11])$

"! First Law of Loop 2 Chiller One"

$Q_{\text{dot_Evap_ch1}} = Q_{\text{dot_Cond_ch1}} - (W_{\text{dot_c1}} + W_{\text{dot_c2}} + W_{\text{dot_c3}} + W_{\text{dot_c4}})$

SOLUTION

Unit Settings: Eng F psia mass deg

$f_{c1} = 0.2394$	$f_{c2} = 0.2537$
$f_{c3} = 0.2535$	$f_{c4} = 0.2493$
$\dot{m}_{c1} = 20065 \text{ [lb}_m\text{/hr]}$	$\dot{m}_{c2} = 21255 \text{ [lb}_m\text{/hr]}$
$\dot{m}_{c3} = 21238 \text{ [lb}_m\text{/hr]}$	$\dot{m}_{c4} = 20889 \text{ [lb}_m\text{/hr]}$
$\dot{m}_{ch1} = 83797 \text{ [lb}_m\text{/hr]}$	$\dot{Q}_{\text{Cond, ch1}} = 6.759\text{E}+06 \text{ [Btu/hr]}$
$\dot{Q}_{\text{Evap, ch1}} = 5.960\text{E}+06 \text{ [Btu/hr]} \{496.6 \text{ [Ton]}\}$	$r\$ = \text{'R134A'}$
$\dot{W}_{c1} = 197222 \text{ [Btu/hr]}$	$\dot{W}_{c2} = 197222 \text{ [Btu/hr]}$
$\dot{W}_{c3} = 205752 \text{ [Btu/hr]}$	$\dot{W}_{c4} = 198928 \text{ [Btu/hr]}$

No unit problems were detected.

KEY VARIABLES

$\dot{Q}_{\text{Evap, ch1}} = 5.960\text{E}+06 \text{ [Btu/hr]} \{496.6 \text{ [Ton]}\}$

Predicted Chilling Capacity