

R410A Ref: Paoli-Teja equation and Daifeng SI/VA 9100

DTU, Department of Energy Engineering
 v in [kg/kg], v in [m³/kg], T in [°C]
 M.J. Storrup & H.J.H. Knudsen, 23-02-11

Cycle info [One stage], Refrigerant: R410A

Select cycle number:

Values:
 Evaporating temperature [°C]: 10,00 Condensing temperature [°C]: 50,00
 Superheat [K]: 5,00 Subcooling [K]: 5,00
 Dp evaporator [bar]: 0,00 Dp condenser [bar]: 0,00
 Dp suction line [bar]: 0,00 Dp liquid line [bar]: 0,00
 Dp discharge line [bar]: 0,00
 Isentropic efficiency [0-1]: 1,00

Delete cycle

Calculated:
 Qe [kJ/kg]: 152,248
 Qc [kJ/kg]: 181,220
 COP: 5,25
 W [kJ/kg]: 28,972
 Pressure ratio [-]: 2,804

Dimensioning:
 Qe [kW]: 5,000
 Qc [kW]: 5,951
 m [kg/s]: 0,03283852
 V [m³/h]: 2,9985
 W [kW]: 0,951
 Q loss [kW]: 0,000

Volumetric efficiency:
 n_vol: 0,00
 Displacement [m³/h]: 0

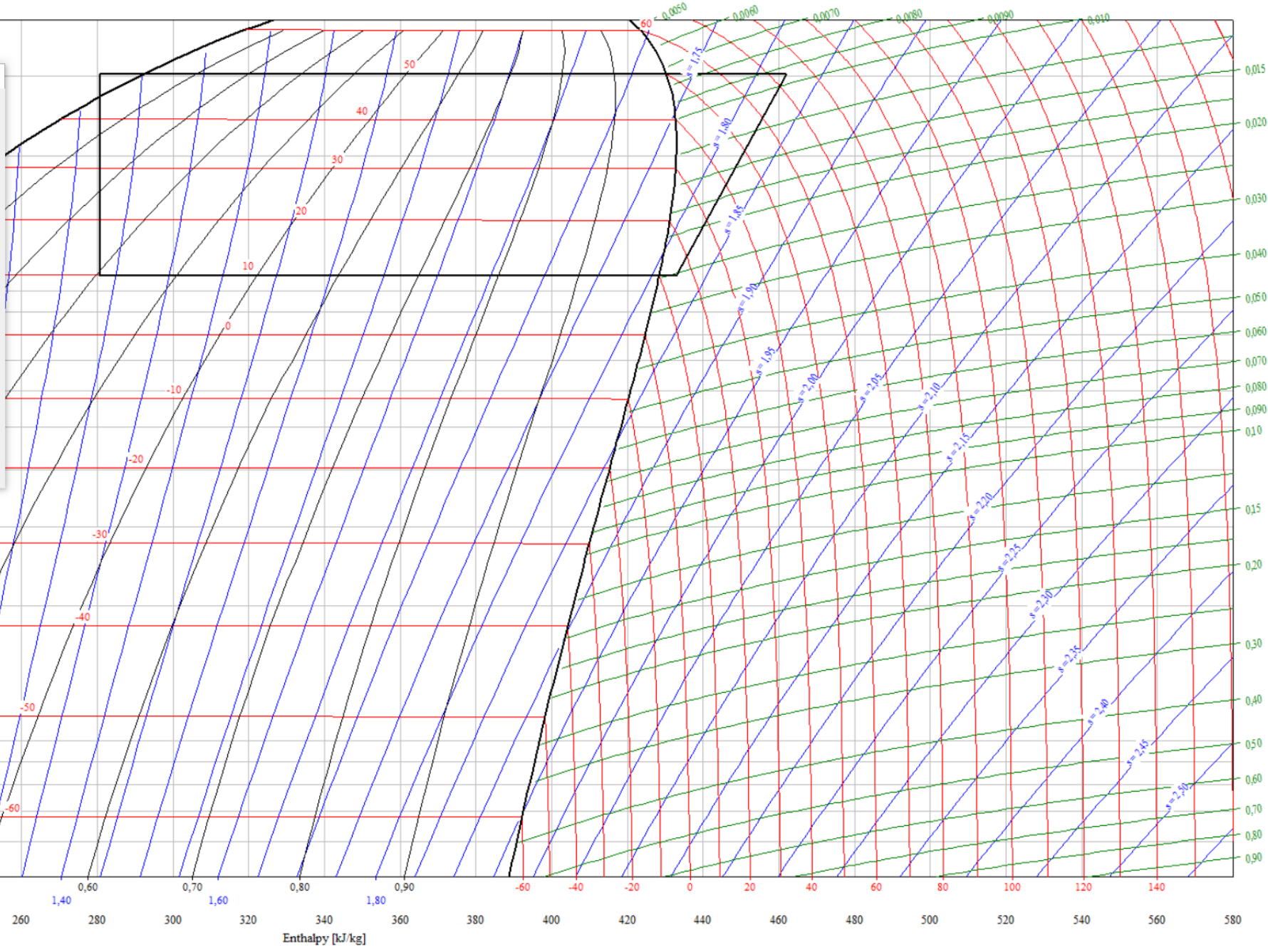
OK Coordinates of points... Print Copy Update Help

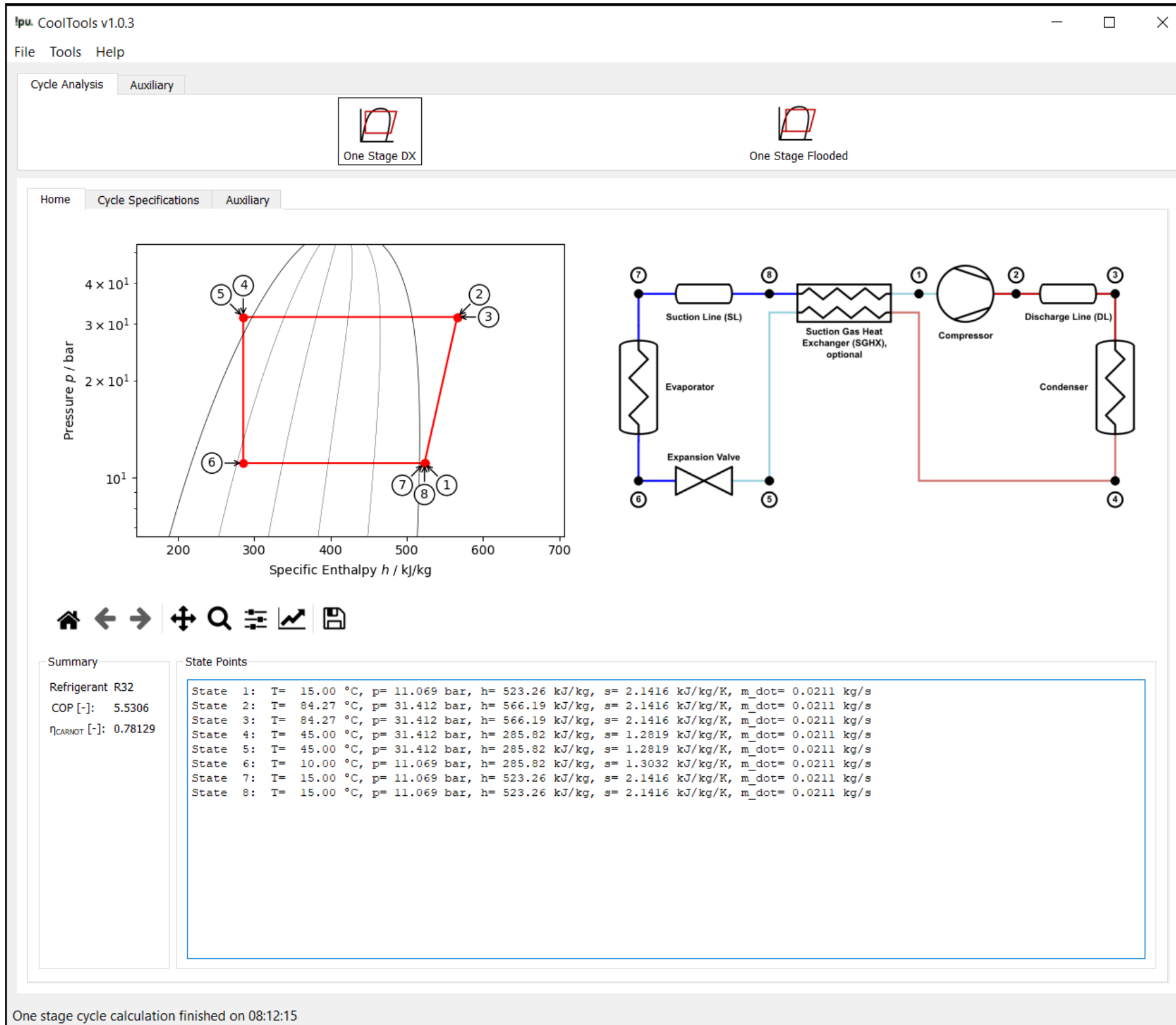
Values at points in cycle

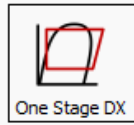
Values at points 1-6,15 for the selected one stage cycle

Point	T [°C]	P [bar]	v [m³/kg]	h [kJ/kg]	s [kJ/(kg K)]
1	15,009	10,817	0,025364	432,964	1,8230
2	73,914	30,333	0,009411	461,936	1,8230
3	73,914	30,333	0,009411	461,936	1,8230
4	44,833	30,333	N/A	280,716	N/A
5	N/A	10,817	N/A	280,716	N/A
6	15,009	10,817	0,025364	432,964	1,8230
15	N/A	30,333	N/A	280,716	N/A

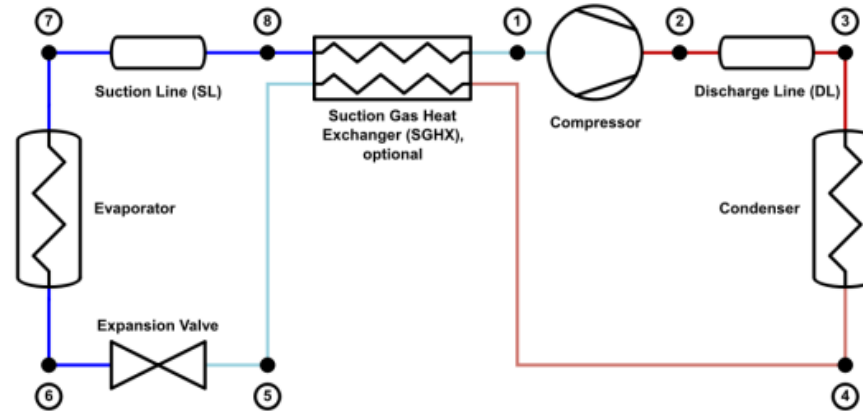
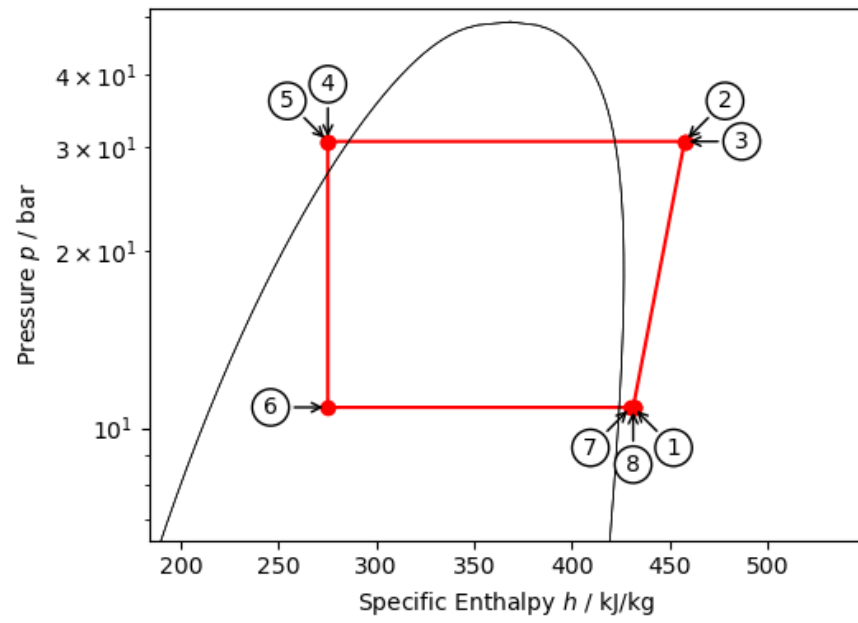
OK Print Copy Help







One Stage Flooded



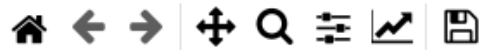
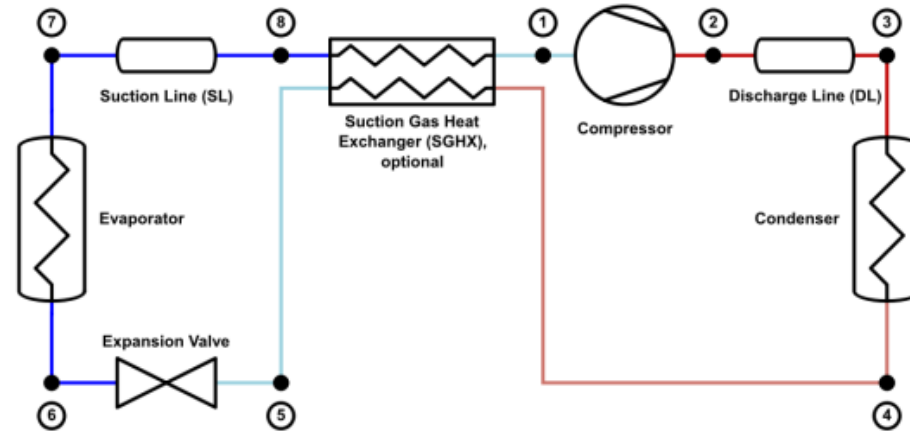
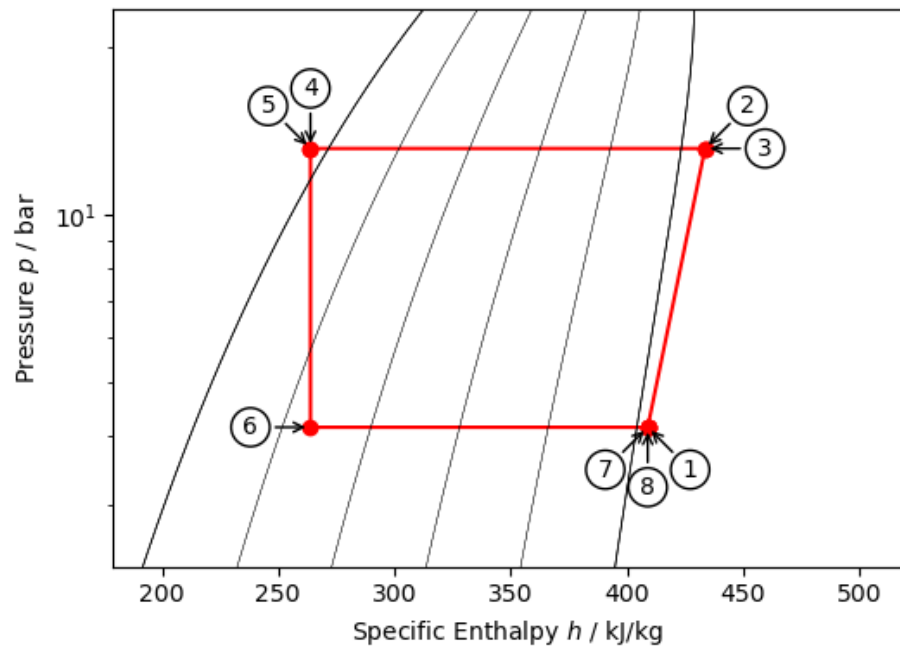
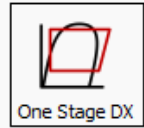
x=521.593 y=14.1353

Summary

Refrigerant R410A
 COP [-]: 5.3048
 $\eta_{\text{CARNOT}} [-]: 0.75498$

State Points

State 1:	T= 16.00 °C,	p= 10.848 bar,	h= 431.17 kJ/kg,	s= 1.8163 kJ/kg/K,	m_dot= 0.0323 kg/s
State 2:	T= 70.60 °C,	p= 30.711 bar,	h= 457.43 kJ/kg,	s= 1.8079 kJ/kg/K,	m_dot= 0.0323 kg/s
State 3:	T= 70.60 °C,	p= 30.711 bar,	h= 457.43 kJ/kg,	s= 1.8079 kJ/kg/K,	m_dot= 0.0323 kg/s
State 4:	T= 45.00 °C,	p= 30.711 bar,	h= 275.24 kJ/kg,	s= 1.2471 kJ/kg/K,	m_dot= 0.0323 kg/s
State 5:	T= 45.00 °C,	p= 30.711 bar,	h= 275.24 kJ/kg,	s= 1.2471 kJ/kg/K,	m_dot= 0.0323 kg/s
State 6:	T= 9.92 °C,	p= 10.848 bar,	h= 275.24 kJ/kg,	s= 1.2658 kJ/kg/K,	m_dot= 0.0323 kg/s
State 7:	T= 15.00 °C,	p= 10.848 bar,	h= 430.02 kJ/kg,	s= 1.8123 kJ/kg/K,	m_dot= 0.0323 kg/s
State 8:	T= 16.00 °C,	p= 10.848 bar,	h= 431.17 kJ/kg,	s= 1.8163 kJ/kg/K,	m_dot= 0.0323 kg/s



Summary

Refrigerant R134a
 COP [-]: 5.8823
 η_{CARNOT} [-]: 0.83098

State Points

State 1:	T= 15.00 °C, p= 4.146 bar, h= 409.01 kJ/kg, s= 1.7386 kJ/kg/K, m_dot= 0.0345 kg/s
State 2:	T= 58.53 °C, p= 13.179 bar, h= 433.69 kJ/kg, s= 1.7386 kJ/kg/K, m_dot= 0.0345 kg/s
State 3:	T= 58.53 °C, p= 13.179 bar, h= 433.69 kJ/kg, s= 1.7386 kJ/kg/K, m_dot= 0.0345 kg/s
State 4:	T= 45.00 °C, p= 13.179 bar, h= 263.90 kJ/kg, s= 1.2134 kJ/kg/K, m_dot= 0.0345 kg/s
State 5:	T= 45.00 °C, p= 13.179 bar, h= 263.90 kJ/kg, s= 1.2134 kJ/kg/K, m_dot= 0.0345 kg/s
State 6:	T= 10.00 °C, p= 4.146 bar, h= 263.90 kJ/kg, s= 1.2262 kJ/kg/K, m_dot= 0.0345 kg/s
State 7:	T= 15.00 °C, p= 4.146 bar, h= 409.01 kJ/kg, s= 1.7386 kJ/kg/K, m_dot= 0.0345 kg/s
State 8:	T= 15.00 °C, p= 4.146 bar, h= 409.01 kJ/kg, s= 1.7386 kJ/kg/K, m_dot= 0.0345 kg/s

