

Session 1

(Answers to Classroom Work Problems)

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Refrigerants

- Classroom Problems – Use Refrigerant R134a Saturation Tables
 - > T=40°F, P=40 psig
 - ✓ For P=40 psig, saturation temperature = 44.92°F
 - ✓ Actual temperature T=40°F < Saturation temperature
 - ✓ State – Sub-cooled Liquid
 - > T=135°F, P=124 psig
 - ✓ For P=124 psig, saturation temperature = 99.89°F
 - ✓ Actual temperature T=135°F >> Saturation temperature
 - ✓ State – Superheated Vapor (Location - Compressor Discharge)
 - > T=89.8, P=104 psig
 - ✓ For P=104 psig, saturation temperature = 89.8°F
 - ✓ Actual temperature T=89.8°F = Saturation temperature
 - ✓ State – Saturated conditions (could be liquid or vapor; Location – downstream of expansion device; in the evaporator; compressor suction)

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Refrigerants

- Classroom Problems – Use Refrigerant R123 Saturation Tables
 - Determine saturation pressure for $T=37.2^{\circ}\text{F}$
 - ✓ Saturation pressure = $-9.18\text{ psig} = 5.52\text{ psia}$
 - Determine saturation pressure for $T=100^{\circ}\text{F}$
 - ✓ Saturation pressure $\sim 6.10\text{ psig}$

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Refrigerants

- Classroom Problems – Use Refrigerant R134a Saturation Tables
 - Determine density, volume and latent heat of vaporization at the following state point: $P=36\text{ psig}$
 - ✓ All saturated conditions
 - ✓ Liquid density = 79.81 lb/ft^3
 - ✓ Vapor volume = $0.9364\text{ ft}^3/\text{lb}$
 - ✓ Liquid enthalpy = 25.17 Btu/lb
 - ✓ Vapor enthalpy = 108.90 Btu/lb
 - ✓ Latent heat = Vapor enthalpy – Liquid enthalpy
 $= 108.90 - 25.17$
 $= 83.73\text{ Btu/lb}$

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