{Problem 3E}

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$UnitSystem ENGLISH
Vdot_air=100[ft^3/min]
T_1=80[F]
P=1*convert(atm,psi)
humidity_relative1=0.70
T_2=40[F]
T_3=60[F]

humidity_absolute1=humrat(AirH2O,P=P,T=T_1,R=humidity_relative1)
volume1=volume(AirH2O,P=P,T=T_1,R=humidity_relative1)
enthalpy1=enthalpy(AirH2O,P=P,T=T_1,R=humidity_relative1)

T_dewPoint1=dewpoint(AirH2O,P=P,T=T_1,R=humidity_relative1) {Dew Point in the Cold-Water Chiller: T_dewPoint1 = 69.34 F}
mdot_air=vdot_air/volume1 {Mass Flow Rate of the Air: mdot_air = 7.172 lb_m/min}

humidity_relative_condensate=1.0 {Humidity of WATER condensate is 1.0}
humidity_absolute_condensate=humrat(AirH2O,P=P,T=T_2,R=humidity_relative_condensate)
volume_condensate=volume(Water,P=P,T=T_2)
enthalpy_condensate=enthalpy(AirH2O,P=P,T=T_2,R=humidity_relative_condensate)

mdot_condensate=mdot_air*(humidity_absolute1-humidity_absolute_condensate) {Mass Flow Rate of Condensate: mdot_condensate = 0.07326 lb_m/min}
vdot_condensate=mdot_condensate*volume_condensate {Volumetric Flow Rate of Condensate: vdot_condensate = 0.001174 ft^3/min}

Qdot_chilledWaterCoil=mdot_air*(enthalpy1-enthalpy_condensate) {Rate of Heat Transfer to the Chilled Water Cooler: qdot_chilled = 149.8 BTU/min}
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SOLUTION

Unit Settings: Eng F psia mass deg

enthalpy1 = 36.07 [Btu/lb$_m$]	$enthalpy_{condensate}$ = 15.19 [Btu/lb$_m$]
$humidity_{absolute1}$ = 0.0154	$humidity_{absolute,condensate}$ = 0.00519
$humidity_{relative1}$ = 0.7	$humidity_{relative,condensate}$ = 1
$mdot_{air}$ = 7.172 [lb$_m$/min]	$mdot_{condensate}$ = 0.07326 [lb$_m$/min]
P = 14.7 [psi]	$Qdot_{chilledWaterCoil}$ = 149.8 [Btu/min]
T_1 = 80 [F]	T_2 = 40 [F]
T_3 = 60 [F]	$T_{dewPoint1}$ = 69.34 [F]
$Vdot_{air}$ = 100 [ft^3/min]	$vdot_{condensate}$ = 0.001174 [ft^3/min]
volume1 = 13.94 [ft^3/lb$_m$]	$volume_{condensate}$ = 0.01602 [ft^3/lb$_m$]

No unit problems were detected.

EES suggested units (shown in purple) for enthalpy1 enthalpy_condensate mdot_air mdot_condensate Qdot_chilledWaterCoil T_dewPoint1