GIVEN: Water at $T = 300°F$, $p = 500$ psia
FIND: v, ρ, u, h, s

GIVEN: R-22 at $T = 200°F$, $p = 120$ psia
FIND: v, u, h

GIVEN: Ammonia at $T = -30°F$
FIND: The vapor pressure, p_{sat} and h_{fg}

GIVEN: R-134a
FIND: The normal boiling point

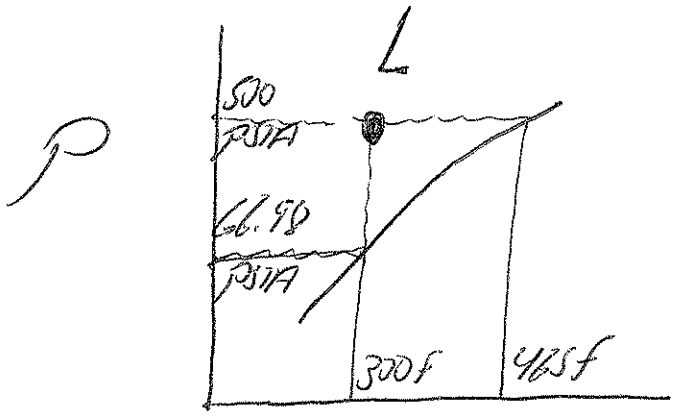
GIVEN: Water at $p = 200$ psia, $x = 0.36$
FIND: v, h

GIVEN: Ammonia at $T = 200°F$, $h = 700$ Btu/lbm
FIND: p

GIVEN: R-22 at $T = 10°F$, $p = 60$ psia
FIND: v, u, h

Given: Water @ 300F, 500psia

Find: v, ρ, u, h, s



T_{sat} @ 500psia (C.2a)

By interpolation...

$T_{sat} \approx 465F$

P_{sat} @ 300F (C.1a)

$P_{sat} = 66.98$ psia

Since $P > P_{sat}$ @ 300F

We need to use C.4a

(Compressed Liquid Table)

From C.4a 300F, 500psia

$v = .017416$ ft^3/lbm

$\rho = 1/v = 57.418$ lbm/ft^3

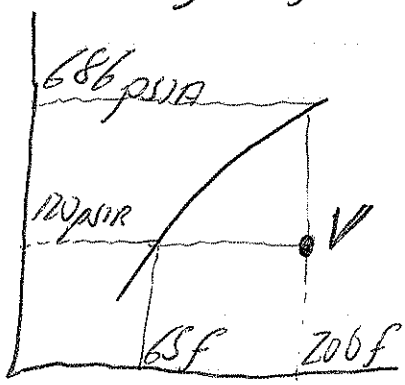
$u = 268.92$ BTU/lbm

$h = 270.53$ BTU/lbm

$s = 0.4364$ BTU/lbm-°R

GIVEN: R22 @ 200F, 120 psia

FIND: v, u, h



T_{SAT} @ 120 psia (C.9a)

$T_{SAT} \approx 65F$

P_{SAT} @ 200F (C.9a)

$P_{SAT} \approx 686.36$ psia

FROM TABLE C.10a

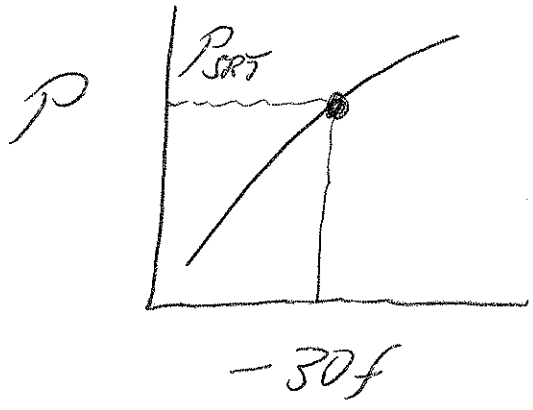
$v = .64036$ ft³/lbm

$u = 121.16$ BTU/lbm

$h = 135.38$ BTU/lbm

GIVEN: AMMONIA @ -30f

FIND: VAPOR PRESSURE AND h_{fg}



FROM TABLE (C.5a)

$P_{SAT} = 13.90$ psia

$h_{fg} = 590.7$ BTU/LBM

(ALSO FROM h_f AND h_g)

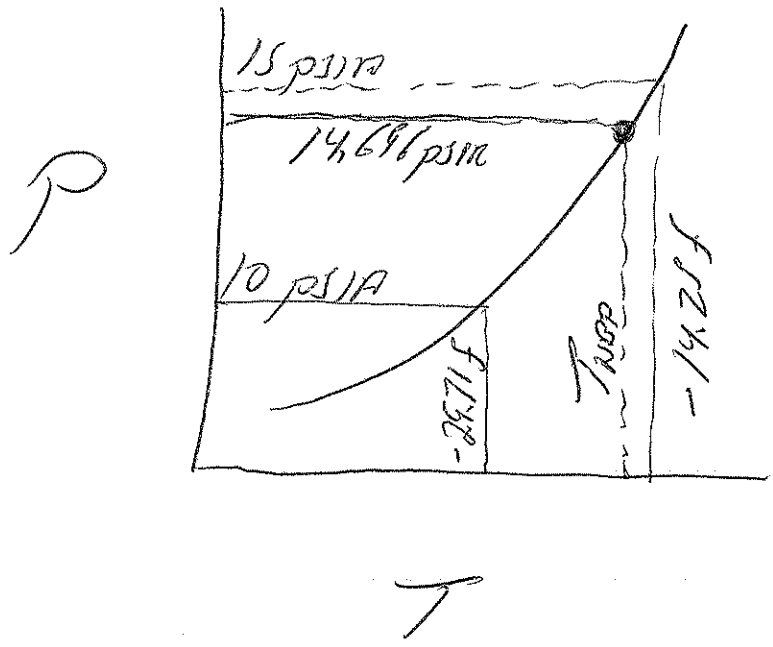
$h_g = 601.4$ BTU/LBM

$-h_f = -10.7$ BTU/LBM

$h_{fg} = 590.7$ BTU/LBM

GIVEN: R-134a + NORMAL BOILING POINT

FIND: T_{NBP}



NEED TO INTERPOLATE...

P (psia)	T (°F)
10	-29.71
14.696	T_{NBP}
15	-14.25

$$T_{NBP} = -29.71\,F + (14.696-10)\,psia\,\frac{(-14.25-(-29.71))\,^{\circ}F}{(15-10)\,psia}$$

$$T_{NBP} = -15.19\,^{\circ}F$$

GIVEN: WATER @ 200 psia, $x = 0.36$

FIND: v, h

$v = (1-x)\,v_f + x\,v_g$

$v = .8358 \text{ ft}^3/\text{lbm}$

$v_f = .01839 \text{ ft}^3/\text{lbm}$

$v_g = 2.289 \text{ ft}^3/\text{lbm}$

$h = (1-x)\,h_f + x\,h_g$

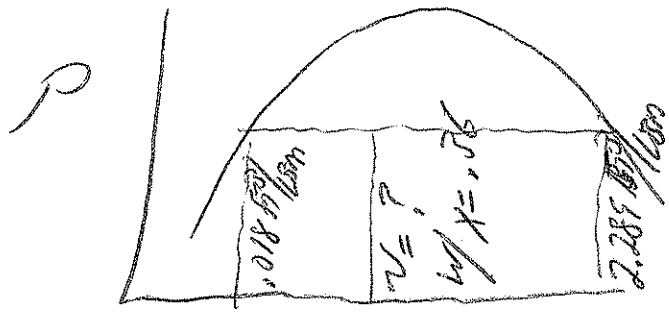
$h = 659.33 \text{ BTU/lbm}$

$h_f = 355.6 \text{ BTU/lbm}$

$h_g = 1197.3 \text{ BTU/lbm}$

OR $h = h_f + x\,h_{fg}$

$h_{fg} = 843.7 \text{ BTU/lbm}$



GIVEN: AMMONIA @ 200°F, $h = 700$ BTU/LBM

FIND: P

TABLE C.5a → ONLY GOES TO 120°F

TABLE C.12a → $T_c = 729.8°R = 270.13°F$

∴ C.5a IS ONLY A PARTIAL TABLE

SO, GO TO TABLE C.6a AND SCAN 200°F BETWEEN

h (BTU/LBM)	P (PSIA)
701.9	220
700	P?
699.8	240

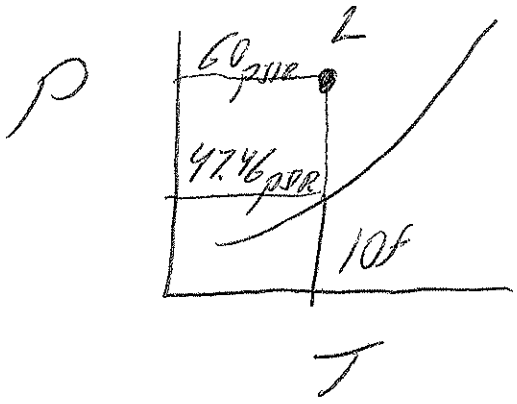
INTERPOLATING...

$$P = 220\ \text{psia} + (700 - 701.9)\ \text{BTU/LBM} \left(\frac{(240 - 220)\ \text{psia}}{(699.8 - 701.9)\ \text{BTU/LBM}}\right)$$

$$P = \underline{\underline{238\ \text{psia}}}$$

GIVEN: R-22 @ 10°F, 60 psia

FIND: v, u, h



BUT compressed liquid tables don't exist in supplement!

Assume incompressible fluid model...

$$v = v_{sat} @ 10F = .01209\ ft^3/lbm$$

$$u = u_{sat} @ 10F = 13.00\ BTU/lbm$$

$$h_{sat} = u_{sat} + v_{sat} P_{sat} =$$

$$13.00 \frac{BTU}{lbm} + .01209 \frac{ft^3}{lbm}\left(47.46 \frac{lbf}{in^2}\right)\left(144 \frac{in^2}{ft^2}\right)\left(\frac{BTU}{778\ ft\text{-}lbf}\right)$$

$$h_{sat} = 13.10\ BTU/lbm$$

$$h(60\ psia) = h_{sat} + v_{sat}\,\Delta P$$

$$= 13.10 \frac{BTU}{lbm} + \left(.01209 \frac{ft^3}{lbm}\right)(60 - 47.1\ psia)\left(144 \frac{in^2}{ft^2}\right)\left(\frac{BTU}{778\ ft\text{-}lbf}\right)$$

$$= 13.10 + .03 = \underline{13.13\ BTU/lbm}$$