

	moles	P° (180 °F)	X
n-butane	1	160	0.5
n-pentane	1	54	0.5

P _T =	95
------------------	----

$$x_1 = \frac{P_T - P_2^\circ}{P_1^\circ - P_2^\circ}$$

$$x_2 = \frac{P_T - P_1^\circ}{P_2^\circ - P_1^\circ}$$

Liquid composition calculations:

X ₁ =	0.3868
X ₂ =	0.6132

$$y_1 = \frac{P_1}{P_T} = \frac{x_1 P_1^\circ}{P_T}$$

$$y_2 = \frac{P_2}{P_T} = \frac{x_2 P_2^\circ}{P_T}$$

Vapor composition calculations:

Y ₁ =	0.6514
Y ₂ =	0.3486

$$P_T = \frac{-P_2^\circ}{\frac{y_1}{P_1^\circ} [P_1^\circ - P_2^\circ] - 1}$$

Dew point pressure calculations:

Y ₁ =	0.50
Y ₂ =	0.50
P _T =	80.75

Composition of the liquid at dew point:

X ₁ =	0.2523
X ₂ =	0.7477

n-Butane
mole fraction

X	P	Y	P
0.0000	54.00	0.0000	54.00
0.2523	80.75	0.5000	80.75
0.3868	95.00	0.6514	95.00
0.5000	107.00	0.7477	107.00
1.0000	160.00	1.0000	160.00

Bubble point pressure calculations:

X ₁ =	0.50
X ₂ =	0.50
P _T =	107

Composition of the vapor at bubble point:

Y ₁ =	0.7477
Y ₂ =	0.2523

