

Solution The solution is shown graphically in Figure 8-4. The initial state is A . The final state is B and is located such that the tie line intersects the dew line at $y_1 = 0.9$. The corresponding pressure is read off the graph and is found to be $P_B = 1.01$ bar. The final system consists of two phases, a vapor that contains the desired 90% in heptane and a liquid that contains 50% heptane.

The amounts of the two phases are calculated from the lever rule:

$$L = \frac{0.9 - 0.8}{0.9 - 0.5} = 0.25,$$

$$V = 1 - L = 0.75.$$

Comments By choosing the pressure in the flash drum we can achieve different levels of separation. If the pressure is closer to the bubble line, we obtain a vapor that is highly enriched in heptane but the amount that is collected is small.

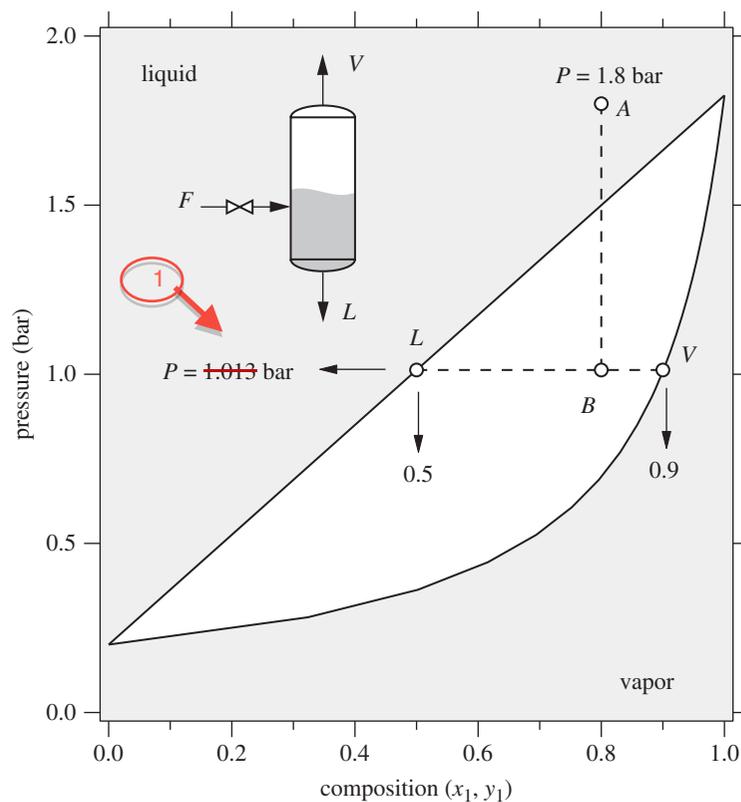


Figure 8-4: Flash separation (Example 8.4).