LIQUID-LIQUID EXTRACTION

Sample of liquid-liquid phase triangular diagram where components A and B are partially miscible

Plait point is the identical point, which divides the curve envelope into two parts, i.e. extract layer and raffinate layer.

Note 1: In this liquid-liquid phase triangular diagram, the mixtures to be separated must be inside the curve envelope. If the tie line where the mixtures located does not exist, draw an average tie line in between the existing tie lines. The resulting mixtures are at the two ends where this tie line intersects the curve envelope (extract and raffinate).
Note 2: To draw a tie line, simply from point g at extract layer, move vertically downwards through 45° line, then move horizontally to the equilibrium line and finally move vertically upwards to point i at raffinate layer. A line connecting point g and i is the tie line.

If the separation involves only one stage extraction, the mixtures location, by hook or by crook must be inside the curve envelope, for example at point h. In order to determine the tie line for this mixture, the trial and error technique should be used. This is done by drawing as much as possible tie lines that crossing point h until the right tie line is obtained using the above-mentioned procedures (Note 2). Hence, the extract and raffinate compositions for mixture h are at point g and i respectively.
Schematic diagram of counter-current-multistage-extraction-process flow diagram
Graphical method to determine number of stages using liquid-liquid phase rectangular diagram