

- 1) Compositions at which they form azeotropes:-
 Butanol-Water mixture
 Mole fraction of Butanol - 0.325
 Ethanol-Water Mixture
 Mole fraction of Ethanol - 0.575
- 2) To separate it we are using the concept of pressure drop and shifting the point where they form azeotropes.
 Using valves and multiple distillation columns for this method.
 For Example:-

For butanol and water mixture we get to see that the amount of water in the bottom product increases with the increase in the number of distillation processes.

So by doing multiple distillations we can converge to a point where both the products would be separated.

Compound	Amount
1-butanol	0.41544212
Water	0.58455788

Compound	Amount
1-butanol	0.29688917
Water	0.70311083

Similarly for Ethanol water mixture.

Compound	Amount
Ethanol	0.41835836
Water	0.58164164

Compound	Amount
Ethanol	0.4019146
Water	0.5980854

- 3) For the same pressure drop, we can see that the concentrations of ethanol and water mixture tends to change slowly and thus it would take a number of steps to separate out the azeotrope.

While in the case of Butanol water mixture, we can see that the concentrations of both the compounds are changing drastically so it would take less steps to separate out the mixture.