TDC Part III

Practical (Lab Work)

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TOPIC:- Distillation assembly

Distillation assembly

Distillation process is used to separate the two different organic compounds having different boiling points. In this process, a homogenous mixture of different liquids heated to convert it into vapour and the liquid which one has lower boiling point converted into vapour first followed by liquid having higher boiling point. After this, these vapours are condensed into liquid by passing cold water into distillation assembly. Repeating the process on the collected liquid to improve the purity of the product is called double distillation. Distillation is used for many commercial processes, such as the production of gasoline, distilled water, xylene, alcohol, paraffin, kerosene, and many other liquids. Gas may be liquefied and separated. For example: nitrogen, oxygen, and argon are distilled from air. Diagrammatic representation of general distillation assembly is shown in Figure 1.2.

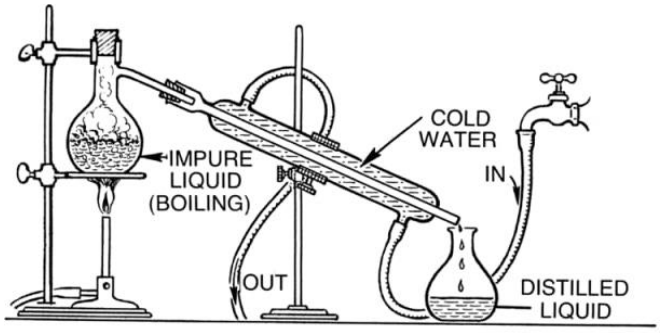

Figure 1.2. General distillation assembly

There are different types of distillation processes or assemblies such as;

Simple distillation ,

1.3.2.2 Steam distillation,

1.3.2.3 Fractional distillation,

1.3.2.4 vapour distillation

Simple distillation

Simple distillation is mainly used to separate liquids having quiet significance difference in their boiling points especially to separate liquids from solids or non-volatile compounds.

Steam distillation

Steam distillation is used to separate heat-sensitive components. Steam is added to the mixture, causing some of it to vaporize. This vapour is cooled and condensed into two liquid fractions.

Fractional distillation

Fractional distillation is used when the boiling points of the components of a mixture are close to each other, as determined using Raoult's law. A fractionating column is used to separate the components in a series of distillations called rectification. In fractional distillation, a mixture is heated so that vapour rises and enters into the fractionating column. As the vapour cools, it condenses on the packing material of the column. The heat of rising vapour causes this liquid to vaporize again, moving it along the column and eventually yielding a higher purity sample of the more volatile component of the mixture.

Vacuum distillation

Vacuum distillation is used to separate components that have high boiling points. Lowering the pressure of the apparatus also lowers boiling points. Otherwise, the process is similar to other forms of distillation. Vacuum distillation is particularly useful when the normal boiling point exceeds the decomposition temperature of a compound.