

SEPARATION OF ISOBUTYL ALCOHOL AND ISOBUTYL ACETATE BY NOVEL SEPARATION TECHNIQUE PRESSURE SWING DISTILLATION

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Introduction:

Isobutyl Acetate is mainly used as a solvent in various chemical industries. It also used as Ink, Adhesives, coatings, etc. Usually IBAC and IBA forms azeotrope having non ideal mixture which are quite difficult and expensive to separate by the simple distillation. To overcome this situation several techniques like Azeotropic and extractive distillation, adsorption, reactive distillation, pressure swing distillation are available.

Background:

Isobutyl acetate is solvent widely used in chemical industry. It is used as solvent in application include coating, ink, adhesive, industrial cleaners and degreasers. The Global Isobutyl Alcohol Market was valued at 12 million USD in 2019. Isobutanol is widely used in industry, as a solvent in chemical reactions, also a useful starting material for organic synthesis Adhesives and sealant chemicals. Its additionally employed in Agricultural chemicals (non-pesticidal) Corrosion inhibitors and anti-scaling agents Fuels and fuel additives.

Flowsheet description:

Here the pressure sensitively IBAC + IBA is separated in pressure swing distillation. Operating pressure is chosen such a range that water can be used as a coolant in over head condenser and steam can be used as a heating medium for the reboiler. Thus low pressure column work at 20 KPa and high pressure column work at 101.3KPa. Here feed enter at high pressure distillation column at 101.3KPa and distillate of this column has composition that approach high pressure azeotrope. This distillate is feed to low pressure column operated at 20KPa and distillate approach low pressure azeotrope. Distillate has composition similar to feed composition and recycle and mix with feed to high pressure column.

Result:

Isobutyl acetate 99.5 mole% highly pure is produced in bottom stream from High pressure column (HPC).

Isobutyl alcohol 98.5 mole% highly pure is produced in bottom stream of Low pressure column (LPC).

DC-01 is high pressure column and DC-02 is low pressure column

Conclusion:

For small plan 12,000 Tm/year pressure swing distillation is more economical and attractive solution than others unit operation for the separation of IBAc and IBA.

Units of system used:

Pressure : kPa

Temperature : Celsius ($^{\circ}\text{C}$)

Molar Flow Rate : kmol/hr

Reference

Munoz, R., J. B. Monton, M. C. Burguet, and J. De la Torre. "Separation of isobutyl alcohol and isobutyl acetate by extractive distillation and pressure-swing distillation: Simulation and optimization." *Separation and Purification Technology* 50, no. 2 (2006): 175-183.