

Engineering design of second distillation column of IPA

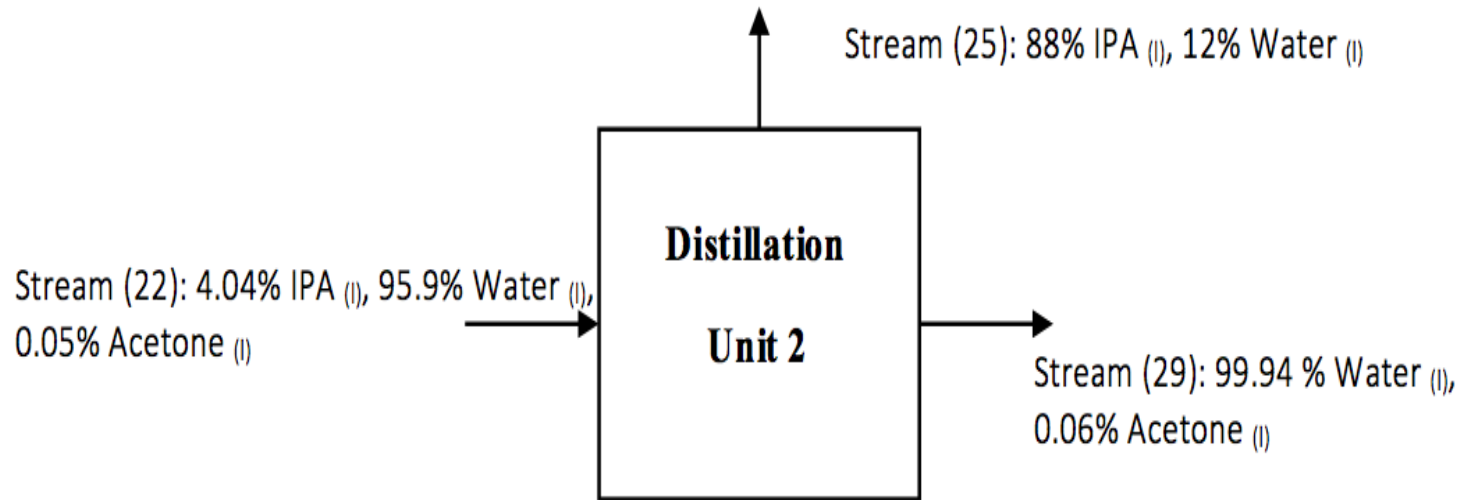
Bamatov Ibragim Musaevich

- Design of second distillation column in a continuous flow process for isopropylalcohol (88% purity) producing (Cumene process) for industry.
- Differences between tray and packed column were observed and the preferences were given to the one with most advantageous abilities.

Introduction

- Distillation plays the separation role of liquid mixtures
- At least one feed going in and at least two outputs (top and bottom operating flows)
- Choose of distillation column
- Packed distillation column
- Tray distillation process
- Counter – current trays without down – comers
- Cross – flow trays with down – comers

Distillation column



Stream 22 (in), Stream 25 (out/top), Stream 29 (out/bottom)

Results and Discussion

- Calculating R_{MIN} with using an Underwood's Equation
- $R_{\text{MIN}} + 1 = \alpha * D \alpha^{-\theta} \rightarrow R_{\text{MIN}} + 1 = 4.38$
- $R_{\text{MIN}} = 3.38$
- From Gilland Correlation table number of stage $N - 13$ stage
- Tray Spacing:
- $FLV_{\text{top}} = 0.03$
- $FLV_{\text{bottom}} = 0.05$

Results and Discussion

- The vapour liquid equilibrium curve was plotted with $x_D = 78\%$ of IPA and $x_W = 22\%$ of water
- by using the Gilland Correlation table, the number of stages were calculated to be 13.
- Tray spacing was calculated by using liquid – vapour flow factor K_1 as 0.147 at 0.45mm spacing.

Conclusion
