DISTTILLATION OF AQEOUS AMMONIA

BACKGROUND

1) Ammonia is used as fertilizers either as its salts, solutions or anhydrously.
2) Ammonia is used in textile industries for treatment of cotton materials.
3) Ammonia is used in fermentation industries as a source of nitrogen.
4) Solution of ammonia are used as household cleaners.

DISCRIPTION OF FLOWSHEET

The feed enters at 5000kg/h with a mass fraction of 0.25 at 25 degree Celsius the 2nd stage of the 6 staged distillation column which is operation with 20 atm condenser and boiler pressure at a reflux ratio of1.6. The distillate obtained has 0.98 mole fraction of acetone at 1273.25kg/h and the bottoms is obtained at 3726.76kg/h. Also the distillate obtained is cooled using a cooler to give purified ammonia at 26 degree Celsius temperature as the final product. The Peng-Robinsion property package is used in the flowsheet.

RESULT

1) Purified ammonia at mole fraction of 0.982719 is obtained.
2) The distillate obtained is at a high temperature and is cooled to the required temperature of 26degree Celsius to obtain the required product.

CONCLUSION

1) The distillate concentration can be varied by varying the reflux ratio in the distillation column. By increasing the reflux ratio, higher purity of acetone can be obtained.
2) The distillate obtained is at a temperature much higher than room temperature and hence the acetone will be highly volatile and hence requires cooling.
3) Hence ammonia can be effectively recycled and used in various industries which makes this process economically viable.

REFERENCE

Principles Of Mass Transfer & Separation Process, by Binay K. Dutta, Chapter 7, Problem no.42