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AED-BTX PROCESS FOR AROMATICS RECOVERY

INTRODUCTION

Recovering aromatic hydrocarbons from reformate or pyrolysis-gasoline (pygas) feedstocks is typically achieved via Liquid-Liquid Extraction (LLE) or Extractive Distillation (ED). While LLE process has been widely used in the industry for over forty years, the trend in recent years has shifted toward ED process as it requires less equipment and smaller plot space, consumes lower energy, can handle wider aromatic concentration range, and easily operates with great flexibility.

Despite the advantages of extractive distillation, conventional ED processes require proprietary solvents, are limited to narrow feedstock boiling-range (applicable to Benzene or Benzene/Toluene recovery only), and frequently accumulate heavy hydrocarbons in lean solvent, which resulted in high CAPEX and OPEX.

AMT International, in collaboration with CPC Corporation Taiwan, has developed a new ED process, known as the ***AED-BTX Process,*** which eliminates the shortcomings encountered in conventional ED processes. Specifically, the AED-BTX Process uses the original Sulfolane as extractive distillation solvent *WITHOUT* special, proprietary solvents.

PROCESS SCHEMATIC

Extractive distillation employs a solvent to alter the relative volatilities of various hydrocarbons in such a way that Aromatics can be separated from Non-Aromatics by simple distillation. The figure below shows the general schematic of the AED-BTX Process.

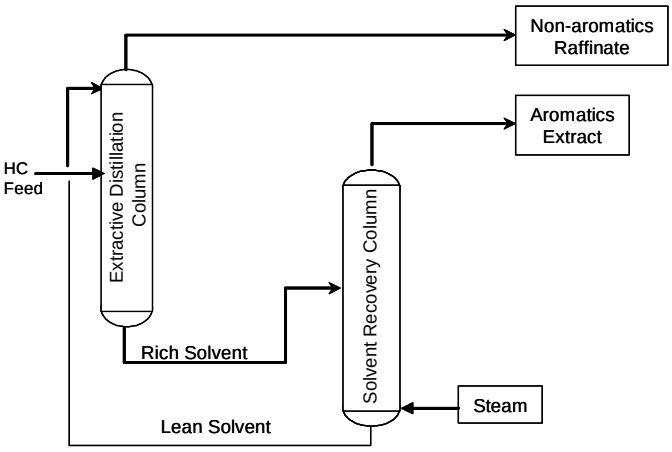

Figure 1. Schematic of AED-BTX Process

PROCESS DESCRIPTION

As shown in Fig. 1, the hydrocarbon feed is sent to the middle of ED Column, while lean solvent (Sulfolane) is fed to the top of the column. After extractive distillation, the non-aromatics (Raffinate) exits from the top of the column, while the rich solvent, which contains aromatics (Extract) and lean solvent, exits from the bottom. The rich solvent is then fed to the Solvent Recovery Column to separate Extract from lean solvent. Extract exits the overhead as Aromatics product, while lean solvent leaves the bottom, after series of heat recoveries, returns to ED Column as ED solvent.

ADVANTAGES

The AED-BTX Process offers following advantages and benefits:

- No proprietary solvent required. Use commercially available Sulfolane as the extractive solvent.
- Low energy consumption and operating costs.
- No anti-forming agents required.
- Applicable to Benzene, Benzene/Toluene, and full-range (C6-C8) reformate or pygas feedstocks

Additionally, the application of AMT proprietary mass transfer equipment in AED-BTX Process has provided effective three-phase (L+L+V) extractive distillation and allowed further energy savings in the ED process.

COMMERCIAL APPLICATION

AMT has demonstrated the superiority of its AED-BTX Process with successful revamp in an Aromatics Recovery Unit of a major petrochemical producer in Korea in 2013.

With the application of AED-BTX Process, the revamp objectives were not only achieved but also exceeded. They include:

- Reduced steam consumption by 35-38% (compared to that of the extractive stripper in prior LLE unit under same throughput)
- Increased unit production by 12% (only limited by feedstock availability and reused equipment capacities)
- Met all Raffinate, Benzene, and Toluene product purities and recoveries
- Eliminated anti-foaming agent usage

By reusing the existing Sulfolane solvent and most of the LLE equipment, the payback period of the project is less than six (6) months.