

### Improving Heat Recovery for Ethyl Benzene Process

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Chemical plants generally consume much energy to convert raw materials into products. The energy cost contributes a significant portion of the total operating cost. Especially because of the ever-rising energy cost, energy saving is an important issue to chemical industries. This study deals with retrofitting heat exchanger network (HEN) as to save energy.

The target process of this study is manufacturing ethyl-benzene. It is manufactured by alkylation of ethylene and benzene, and the ethyl-benzene is used to manufacture styrene monomer process. Annual energy cost of the ethyl-benzene process is about 7 billion won. To find a possibility for additional heat recovery, the current heat exchanger network was analyzed using the pinch analysis. After the analysis, the possibility was found in a column and its proximity and an improved HEN was proposed. However, the new HEN shows annual saving of 200 million won on the current operating conditions. To increase the heat recovery, new column operating conditions are proposed together with the new HEN.