

## ABSTRAK

### PRA RANCANGAN PABRIK STIRENA (C<sub>8</sub>H<sub>8</sub>) DARI ETILBENZENA DENGAN PROSES DEHIDROGENASI KAPASITAS 75.000 TON/TAHUN (Perancangan Menara Distilasi (MD-102))

Oleh:

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Prarancangan pabrik Stirena berbahan baku Etilbenzena direncanakan akan didirikan pada kawasan industri yang berada di Kramatwatu, Kabupaten Serang, Banten. Pendirian pabrik berdasarkan atas pertimbangan ketersediaan bahan baku, unit penunjang proses, transportasi yang memadai, tenaga kerja yang mudah didapatkan, dan kondisi lingkungan yang strategis. Pabrik yang direncanakan memproduksi Stirena sebanyak 75.000 ton/tahun, dengan waktu operasi 24 jam/hari, selama 300 hari/tahun. Bahan baku yang digunakan adalah Etilbenzena sebanyak 13.083,49 kg/jam. Proses produksi stirena dari etilbenzena dilakukan pada fase gas dan bereaksi di reaktor *fixed bed single bed* pada suhu 620°C dan tekanan 1,9 atm. Proses berlangsung secara kontinyu dalam satuan jam. Penyediaan kebutuhan utilitas pabrik terdiri dari unit pengadaan air, pengadaan *steam*, pengadaan udara, unit penyediaan listrik, dan unit pengolahan limbah.

Bentuk perusahaan adalah Perseroan Terbatas (PT) menggunakan struktur organisasi perusahaan *line* dan *staff* dengan jumlah karyawan sebanyak 185 orang.

Dari analisis ekonomi diperoleh:

<i>Fixed Capital Investment</i>	(FCI) = Rp 947.123.804.349
<i>Working Capital Investment</i>	(WCI) = Rp 167.139.494.885
<i>Total Capital Investment</i>	(TCI) = Rp 1.185.592.498.364
<i>Break Even Point</i>	(BEP) = 36%
<i>Shut Down Point</i>	(SDP) = 29,65%
<i>Pay Out Time</i>	(POT) = 2,73 tahun
<i>Return on Investment before taxes</i>	(ROI) <sub>b</sub> = 28,66%
<i>Return on Investment after taxes</i>	(ROI) <sub>a</sub> = 22,92%
<i>Discounted Cash Flow</i>	(DCF) = 23%

Mempertimbangkan paparan di atas, sudah selayaknya pendirian pabrik Stirena dikaji lebih lanjut, karena memiliki keuntungan yang tinggi dimasa mendatang.

*Kata kunci : Stirena, Etilbenzena, Dehidrogenasi, Prarancangan, Kelayakan.*

## ABSTRACT

### PRELIMINARY DESIGN OF A STYRENE (C<sub>8</sub>H<sub>8</sub>) PLANT FROM ETHYLBENZENE WITH A DEHYDROGENATION PROCESS CAPACITY OF 75,000 TONS/YEAR (Design of Distillation Column (MD-102))

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The pre-design of the Styrene plant using Ethylbenzene as the raw material is planned to be established in the industrial area located in Kramatwatu, Serang Regency, Banten. The establishment of the factory is based on considerations of raw material availability, supporting process units, adequate transportation, easily accessible labor, and a strategic environmental condition. The planned factory will produce Styrene at a rate of 75.000 tons/year, with an operating time of 24 hours/day, for 300 days/year. The raw material used is Ethylbenzene at a rate of 13.083,49 kg/hour. The production process of styrene from ethylbenzene is carried out in the gas phase and reacts in a single bed fixed bed reactor at a temperature of 620°C and a pressure of 1,9 atm. The process runs continuously in hourly units. The provision of factory utility needs consists of water supply units, steam supply units, air supply units, electricity supply units, and waste treatment units.

The form of the company is a Limited Liability Company (PT) using a line and staff organizational structure with a total of 185 employees.

From the economic analysis, it is obtained:

Fixed Capital Investment	(FCI) = Rp 947.123.804.349
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Considering the above exposition, it is appropriate to further examine the establishment of the Styrene plant, as it has high future profitability.

Keywords: Styrene, Ethylbenzene, Dehydrogenation, Pre-design, Feasibility.