



## INTISARI

Heptena diproduksi dengan cara kodimerisasi senyawa propena dan butena dengan katalisator Ni-Alumina. Reaksi berjalan pada fase cair di dalam *fixed bed multi stage* dengan suhu 45 °C dan tekanan 15 bar. Panas yang timbul dari reaksi diambil dengan air pendingin di dalam *heat exchanger* tiap *stage*-nya.

Pembuatan heptena dengan kapasitas 25.000 ton per tahun memerlukan bahan baku berupa propena sebesar 21,659.89 ton/tahun dan butena sebanyak 61,236.49 ton/tahun. Kebutuhan katalis sebesar 22.13 ton per tahun. Kebutuhan utilitas meliputi air pendingin sebanyak 1,301,076.93 ton/tahun, steam sebanyak 199,749.45 ton/tahun, bahan bakar 30,418.53 m<sup>3</sup>/tahun, dan listrik sebesar 175.24 kJ/s. Pabrik heptena ini direncanakan akan didirikan di Cilegon, Banten dengan tenaga kerja yang diperlukan sebanyak 210 orang.

Modal tetap yang diperlukan sebesar US\$ 67,974,493.06 + Rp 157,135,252,661.30 sedangkan modal kerjanya sebesar US\$ 43,821,458.11 + Rp 7,731,140,223.75. Manufacturing cost sebesar US\$ 120,971,212.07 + Rp 45,558,504,889.93. General expense sebesar US\$ 27,669,252.22 + Rp 13,962,425,453.18. Hasil evaluasi ekonomi menunjukkan keuntungan sebelum pajak sebesar US\$ 26,074,937.92 dan sesudah pajak sebesar US\$ 13,037,468,96. Return of Investment sebelum pajak sebesar 32.57 % dan sesudah pajak sebesar 16.28 %. Pay Out Time sebelum pajak sebesar 2.35 tahun dan setelah pajak sebesar 3.80 tahun. Break Event Point (BEP) dari pabrik ini sebesar 44.63 % dengan Shut Down Point sebesar 22.53 %. Hasil analisa Discounted Cash Flow Rate of Return (DCFRR) sebesar 26.75 %.

Berdasarkan hasil evaluasi ekonomi pabrik heptena dari propena dan butena dengan kapasitas 25,000 ton/tahun ini cukup menarik dan layak didirikan karena memenuhi analisis kelayakan ekonomi yaitu ROI<sub>b</sub>, POT<sub>b</sub>, BEP, dan DCFRR.



## ABSTRACT

Heptena is produced with co-dimerization method of propylene and butane with Ni-Alumina catalyst. Reaction takes place in liquid phase in a fixed bed multi stage reactor with operating conditions of 45 OC and 15 bar. Heat of reaction is taken from the system using a heat exchanger in each stage.

Heptene production with capacity of 25,000 tons per year requires raw materials such as Propylene as much 21,659.89 tons/year and butylenes as much 61,236.49 tons/year. The catalyst requirement is 22.13 tons/year. Utility needs including cooling water as much 1,301,076.93 tons/year, steam as much 199,749.45 tons/year, and fuel as much 30,418.53 m<sup>3</sup>/year, and electricity as much 175.24 kJ/s. This factory is planned to be build in Cilegon, Banten with 210 employees to operate this factory.

Fixed capital required to build this factory is US\$ 67,974,493.06 + Rp 157,135,252,661.30, while the working capital required is US\$ 43,821,458.11 + Rp 7,731,140,223.75, total Manufacturing cost as much US\$ 120,971,212.07 + Rp 45,558,504,889.93, and General expense as much US\$ 27,669,252.22 + Rp 13,962,425,453.18. The result of economic evaluation indicates that the profit before tax is US\$ 26,074,937.92 and the profit after tax is US\$ 13,037,468,96..Return of Investment before tax of 32.57% and after tax of 16.28%. Pay Out Time before tax of 2.35 years and 3.80 years after tax. Break Event Point (BEP) of this plant amounted to 44.63% with the Shut Down Point amounted to 22.53%. Results of analysis Discounted Cash Flow Rate of Return (DCFRR) amounted to 26.75%.

Based on the results of the economic evaluation of plant heptane of propene and butene with a capacity of 25,000 tons / year is quite interesting and worth is established as meet the economic feasibility analysis is ROIb, POTb, BEP, and DCFRR.