

INTISARI

Proses produksi heptena dari propena dan isobutena dilakukan dengan mereaksikan propena dan isobutena fase gas pada suhu masuk 135 °C dan tekanan 38 atm. Jenis reaktor yang digunakan adalah reaktor *fixed bed* yang dilengkapi dengan air pendingin di sisi luar reaktor. Reaksi ini berjalan dengan bantuan katalis *solid phosphoric acid*.

Proses ini menghasilkan 3 jenis produk samping, yaitu oktena sebanyak 23062.4983 ton/tahun, dekena sebanyak 35789.1992 ton/tahun, dan bahan bakar berupa hidrokarbon ringan sebanyak 2925.5203 ton/tahun yang nantinya akan digunakan sendiri sebagai bahan bakar boiler. Untuk menghasilkan heptena dengan kapasitas 44.000 ton/tahun, dibutuhkan bahan baku propena sebanyak 42913.2019 ton/tahun dan isobutena sebanyak 62864.8825 ton/tahun, dengan kebutuhan katalis sebanyak 18783.4632 ton/tahun. Kebutuhan utilitas terdiri dari air pendingin sebanyak 495485.7443 kg/jam, steam sebanyak 5122.9021 kg/jam, Dowtherm A sebanyak 54293.6817 kg/jam, bahan bakar tambahan sebanyak 457.4011 kg/jam dan listrik sebesar 625.4932 kW.

Pabrik ini akan didirikan di Kecamatan Ciwandan, Kota Cilegon, Banten dengan jumlah karyawan sebanyak 178 orang. Modal tetap yang dibutuhkan pabrik ini adalah \$ 38,439,582.15 + Rp 131,863,725,011.92, sedangkan modal kerja yang dibutuhkan adalah \$ 148,548,608.26 + Rp 176,036,305,906.77. Nilai return on investment (ROI_b) dari pabrik ini adalah 66.34%, pay out time (POT_b) selama 1.3099 tahun, breakeven point sebesar 50.58 %, dan DCFRR sebesar 16.94%. Berdasarkan parameter di atas, dapat disimpulkan bahwa pabrik ini menarik dan layak didirikan.

ABSTRACT

Heptene production process from propene and isobutene is performed by reacting propene and isobutene in gas phase with temperature inlet of 135 °C and pressure of 38 atm. Reactor type used in this process is fixed bed reactor with cooling water flowing outside the reactor. This reaction is carried out using solid phosphoric acid catalyst.

This process also produces 3 types of side product such as octene as much as 23062.4983 ton/year, decene as much as 35789.1992 ton/year, and light fuel as much as 2925.5203 ton/year which will be used as boiler fuel. In order to produce 44000 ton/year heptene, as much as 42913.2019 ton/year propene and 62864.8825 ton/year isobutene is needed, along with 18783.4632 ton/year catalyst. Utility unit is required to provide cooling water as much as 495485.7443 kg/hour, steam as much as 5122.9021 kg/hour, Dowtherm A as much as 54293.6817 kg/hour, additional fuel as much as 457.4011 kg/hour and electricity as much as 625.4932 kW.

This plant is expected to be built in Ciwandan, Cilegon, Banten with 178 employees involved. Fixed capital cost required to build this plant is \$ 38,439,582.15 + Rp 131,863,725,011.92, while the working capital cost required is \$ 148,548,608.26 + Rp 176,036,305,906.77. Return on investment (ROI_b) value of this plant is 66.34%, with pay out time (POT_b) of 1.3099 years, breakeven point value of 50.58 %, and DCFRR value of 16.94%. Based on these parameters, we can infer that this heptene plant is quite interesting and economically feasible to be built.