

ABSTRAK

Methyl Acrylate adalah salah satu bahan kimia yang digunakan sebagai bahan baku dalam berbagai industri kimia dibidang polimer (poliakrilat). Biasanya *Methyl Acrylate* digunakan sebagai bahan baku pembuatan cat (*coating*), bahan perekat, dan *binder* untuk industri kulit, kertas, dan tekstil serta untuk komponen kopolimer dari *acrylic fiber* agar indonesia tidak import bahan tersebut dan mengurangi tingkat pengangguran di indonesia. Pendirian pabrik *methyl acrylate* direncanakan akan didirikan di daerah Cilegon, Banten, Jawa Barat. Hal ini karena lokasi tersebut dekat dengan bahan baku pembuatan *methyl acrylate* yaitu asam akrilat dan metanol. Pada pra rancangan ini proses pembuatan *methyl acrylate* dengan melalui proses esterifikasi asam akrilat dan metanol dengan bantuan katalis asam sulfat. Tekanan operasi 1 atm dan temperatur operasi sebesar 55°C. Proses reaksi berlangsung pada fase cair-cair menggunakan jenis reaktor *Continous Stirer Tank Reactor* (CSTR) pada kondisi isothermal. Proses pemisahan menggunakan dekanter dan dua buah menara distilasi. Produk *Methyl Acrylate* yang merupakan hasil atas menara distilasi kedua mempunyai kemurnian sebesar 99,5%.

Pendirian pabrik diperkirakan pada tahun 2023, didirikan di atas tanah seluas 21.100 m². Pabrik beroperasi selama 24 jam per hari dan 330 hari per tahun dengan kebutuhan bahan baku asam akrilat sebesar 2.627,503 kg/jam dan metanol sebesar 1.374,055 kg/jam. Jumlah tenaga kerja yang dibutuhkan sebanyak 150 orang. Kebutuhan utilitas meliputi air pendingin sebanyak 29.535 kg/jam, air konsumsi umum dan sanitasi sebanyak 11.000 kg/jam dan *makeup boiler* sebanyak 6.255 kg/jam, bahan bakar sebanyak 380 L/jam dan kebutuhan listrik sebesar 367,56 KW.

Evaluasi ekonomi menunjukkan bahwa *Percent Return on Investment* (ROI) sebelum pajak 27,4%, sesudah pajak 13,15%, *Pay Out Time* (POT) sebelum pajak 2,67 tahun, setelah pajak 4,32 tahun. *Break Event Point* (BEP) 50,24%, *Shut Down Point* (SDP) 28,39%, dan *Discounted Cash Flow* (DCF) 8,524%. Dari hasil evaluasi ekonomi, pabrik *Methyl Acrylate* dari asam akrilat dan metanol dengan kapasitas 24.000 ton/tahun layak untuk direalisasikan pembangunannya di Indonesia.

Kata-kata kunci: *Methyl Acrylate*, polimer, CSTR

ABSTRACT

Methyl acrylic ($\text{CH}_2\text{CHCOOCH}_3$) is one of the many chemicals used as raw material for the chemical industries, usually used as raw, material for the procuton of polymers. These polymers are used as paint (coating), binder, and a binder for the leather industry, paper and textiles as well as to the components of copolymer of acrylic fiber so that Indonesia no need to import that ingridients. The location of establishment of the planned factory in industrial area Cilegon,Banten. Raw materials used in the manufacture of methyl acrylic acid and acrylic is methanol. Methyl acrylic acid by esterification of acrylic and methanol in liquid phase with temperature of $55\text{ }^\circ\text{C}$ and 1 atm pressure in the reactor tank with flow series mounted on the condition of isothermal. Separation process with decanter and two distillation tower. The down phase of the decanter streamed toward the first distillation tower for the recycle of sulphuric acid is fed back into reactor. Top phase decanter fed into the second distillation tower to purify the product so has specs 99,5 % by weight.

The factory was planned to stand by 2023, built on the land with an area of 21.100 m^2 . The factory operates 24 hours per day and 330 days per year with acrylic acid raw materials needs of $2.627,503\text{ kg/h}$ and methanol $1.374,055\text{ kg/h}$. The number of labor needs as many as 150 people. The needs of utilities includes water cooling as much as 29.535 kg/h , water sanitation and public consumption as much as 11.000 kg/h boiler and make up as much as 6.225 kg/h . fuel as much as 380 L/h and electricity needs of $367,56\text{ KW}$

Economic Evaluation showed the percent return on investmen (ROI) before tax $27,4\%$, after tax pay out time $13,15\%$ before tax $2,67$ years after the tax $4,32$ years,break event point (BEP) $50,24\%$, shut down point (SDP) $31,06\%$ and discounted cash flow (DCF) are $8,524\%$. From the result of economic evaluation,methyl acrylic, acrylic acid and methanol with the capacity 24.000 tons/year deserve to be realized during the construction in Indonesia

Keywords : methyl acrylic,polymer,CSTR

