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*. Pendirian pabrik *methyl acrylate* direncakan 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^{o}C. Proses reaksi berlangsung pada fase cair-cair menggunakan jenis reaktor *Continous Stirer Tank Reactor* (CSTR) pada kondisi isotermal. 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 m^2. Pabrik beroperasi selama 24 jam per hari dan 330 hari per tahun dengan kebutuhan bahan baku asam akrilat sebesar 2.627 kg/jam dan metanol sebesar 1.374 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 368 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) 53,24%, *Shut Down Point* (SDP) 31,06%, dan *Discounted Cash Flow* (DCF) 15,37%. 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 acrylate is one of chemical materials that is used as raw material in various chemical industries of polymer (polyacrylate). In general, methyl acrylate is used as raw material of making paint (coating), adhesive, and binder for leather industry, paper industry, and textile industry. Also, it is used as component of copolymer from acrylic fiber. The factory of methyl acrilate will be built in Cilegon, Banten, West Java because the location is close to the raw materials of methyl acrylate which are acrylate acid and methanol. On the pre-design, the process of making methyl acrylate through esterification of acrylate acid and methanol is supported by sulfat acid catalyst. The operation pressure is 1 atm and the operation temperature is 55 celcius degree. The reaction process occurs in the phase of fluid-fluid using the Continous Strirer Tank Reactor (CSTR) in the isothermal condition. The separation process uses dekanter and two distillation towers. The product of methyl acrylate as the result of the second distillation tower has the purity in the amount of 99.5%.

The factory will be operated in 2023 on 21.100 meters of land. The factory will operate for 24 hours per day and 330 days per year with the consuming of methyl acrylate in the amount of 2. 627, 503 kg/hour and methanol in the amount of 1.374, 055 kg/hour. Total of labors is 150. The amount of utility needs, such as cooling water is 29.535 kg/hour, public consuming water and sanitation is 11000 kg/hour and make up boiler is 6255 kg/hour, fuel is 380 L/hour, electricity is 367,56 KW.

Economic evaluation shows that Percent Return on Investment (ROI) before tax is 27.4%, after tax is 13.15%, Pay Out Time (POT) before tax is 2.67 years, after tax is 4.32 years. The percentage of Break Event Point (BEP) is 53.24%, shut down point (SDP) is 31.06%, and Discounted Cash Flow (DCF) is 15.37%. Based on the result of economic evaluation, methy acrylate factory from acrylate acid and methanol with the capacity in the amout of 24000 tons/ year is feasible to be realized in Indonesian.

Keywords : methyl acrylic,polymer,CSTR