

INTISARI

Pabrik Toluene-2,4-diamine (diaminotoluene, TDA) dari 2,4 dinitrotoluene (DNT) dan gas hydrogen dirancang dengan kapasitas 55.000 ton/tahun dan beroperasi secara kontinyu selama 330 hari/tahun. Pada proses pembuatannya, DNT yang dilarutkan ke dalam methanol direaksikan dengan gas hidrogen dengan bantuan katalis raney-nickel dalam *agitated slurry reactor with sparger* yang bekerja secara kontinyu. Selanjutnya hasil keluaran reaktor dimurnikan dan pelarut methanol dikembalikan atau direcycle untuk digunakan kembali.

Dalam prarancangan pabrik yang menghasilkan produk Toluene diamin sebanyak 55.000 ton/tahun dibutuhkan bahan baku dinitro toluen sebanyak 87.754,39 ton/tahun, gas hidrogen sebanyak 5.629,85 ton/tahun, pelarut methanol 99,98 % sebanyak 66.592,55 ton/tahun sedangkan untuk air proses dan air utilitas yang diperlukan adalah air sebanyak 21170,44 kg/jam yang diperoleh dari air sungai, listrik 0,6 MW dan bahan bakar sebanyak 1057,6013 kg/jam.

Pabrik yang direncanakan berdiri pada tahun 2020 di Cilegon, Banten dengan alasan lokasi yang dekat dengan pelabuhan laut diatas tanah seluas 50.000 m² dan karyawan sebanyak 207 orang. Dari perhitungan evaluasi ekonomi diperoleh *fixed capital* sebesar US\$ 33,058,931.86 ,*working capital* sebesar US\$ 52,333,765.04; ROI sebelum pajak 83,63%, ROI setelah pajak 41,81%, POT sebelum pajak 1,07 tahun, POT setelah pajak 1,93 tahun, BEP sebesar 59,32% , SDP sebesar 23,97% dan DCFRR sebesar 26,19%. Dari hasil perhitungan di atas, maka Pabrik Toluendiamin dari Dinitrotoluen dan Hidrogen menarik untuk dikaji lebih lanjut.

ABSTRACT

Toluene-2,4-diamine plant (diaminotoluenen, TDA) made of 2,4 dinitrotoluene (DNT) and hydrogen gas is designed to operate continuously for 330 days / year with a capacity of 55,000 tons / year. In the manufacturing process, dissolved DNT in methanol is reacted with hydrogen gas in the presence of Raney-nickel in agitated slurry reactors with sparger which work continuously. The obtained TDA produced is separated from the solvent, water and unreacted DNT by distillation. Crystallization process and reduction of the liquid concentration process is performed next in order to obtain a solid product of TDA with a minimum purity of 95%.

For producing 55.000 tonnes of TDA/ year, the amount of required DNT and hydrogen gas 87.754,39tonnes/year and5.629,85tonnes/year respectively. In addition to that, 66.592,55tonnes/year 99,98% methanol solution is needed to dissolve DNT. As for the utility and process, 21170,44kg/hr of water required is obtained from river water, 0,6 MW of electricity and 1057,6013 kg/hr fuel are also needed.

The factory is planned to be established in 2020 in Cilehon, Banten. The location of the plant is near the sea port in an area of 50,000 m² and a staff of 288 people. From the calculation of the economic evaluation, fixed capital calculated US\$ 33,058,931.86, working capital calculated US\$ 52,333,765.04; ROI before taxes 83,63%, ROI after taxes 41,81%, POT before taxes 1,07 years, POT after tax 1,93 years, BEP of 59,32%, SDP of 23,97% and DCFRR calculated 26,19%. From the calculation above, toluene diamine plant from 2,4-dinitrotoluene and hydrogen gas which categorized as high risk plant is interesting to be studied further.