

ABSTRACT

A preliminary plant design always based on the chosen process. The chosen process is always easy to made generally and can produce the many products. This Triethylene Glycol from Ethylene Oxide Preliminary Plant Design used hydrolysis process, so water is reacted with Ethylene Oxide to produce Monoethylene Glycol (MEG). MEG then is reacted with Ethylene Oxide to produce Diethylene Glycol. At last, it will produce Triethylene Glycol. This process uses Sulfuric Acid as its catalyst because hydrolysis reaction is fast in acid condition.

For the selection of location and capacity, are based on national and world references as the function of world`s need for product. This basis claims so it got the capacity of 70.000 ton/year for 10 years worth operating time that situated on the best location at Cilegon City, Banten Province, Indonesia that have the best utility water source from Java Sea, guaranteed sources of materials (there are local producent for feed, enough supply of electric and oil; great sources of man power, good infrastructure, friendly geographic – season and disaster condition, and also comfortable economics – society and law condition.

The triethylene glycol product will be sold at US\$2,5/kg with 99,99% purity to adapt with market price. This 70.000 ton/year of triethylene glycol chemical plant will need 71.451,70 ton/ year raw material of ethylene oxide. This raw material is bought from PT. Chandra Asri Petrochemical with price of US\$ 0,9/kg. For requirement of water (water for process and utility) can be obtained from Java Sea for 12.190,55 m³/hour. The requirement of fuel oil for plant (718,66 kg/hour) can be obtained from PT. Pertamina.

To start the process, the plant will need fixed capital costs \$ 29.271.762,95 + Rp 17.828.266.803,97 and working capital costs \$ 51.417.301,68 + Rp 3.433.706.086,08. Based on the economical feasibility study, this triethylene glycol plant is classified high risk chemical plant with 54,64% of ROI (before taxes); 1,55 year of POT (before taxes); 42,43% of BEP; 29,16 % of SDP; and 24,03% of DCFRR. Based on the data, it can be concluded that preliminary design of this plant is worthy to be studied further.