ABSTRACT

Vinyl Chloride Monomer (VCM) is a substance for making Polyvinyl Chloride (PVC) which is used for making home tools, office equipment, water pipes, etc. In Indonesia, Vinyl Chloride Monomer factories are purpose-built to meet domestic requirements, even for export.

Basic material for VCM production is Ethylene Dichloride (EDC). EDC is made up from ethylene, HCL, and Oxygen. Ethylene Dichloride mechanism reaction needs oxychlorination process in reactor fixed bed non-adiabatic with CuCl 2 solid catalyst. The reaction runs at 280 °C with 11 atm pressure. It has about 99% conversion. Then, the reaction product EDC is processed in a cracking reactor furnace to make VCM. The reaction runs at 508 °C with 13.8 atm pressure. It has about 60% conversion. The product appears after separation in a distillation column than condensed. It's saved as liquid essence.

Vinyl Chloride Monomer factories will be built in Cilegon industry district at Banten with 250,000 ton/year production capacity and have 155 employees. The factory needs 155,396,076 ton/year of ethylene basic material; 156,198,240 ton/year of hydrogen chloride; and 380,609,610.5 ton/year of oxygen which is taken from the air. It also needs about 3,673,706.60 ton/year of water for the production process which is taken from the river; 3700 kw of electricity which is supplied by PLN; and 33,952,936.3 ton/year of fuel.

The factory's fixed capital is Rp 792,033,541.778.17 which is obtained from bank loans and capital investment. The factory also needs Rp 682,748,518.262.52 for working capital. It has Rp 268,681,769.375.61 profit in a year before tax, and Rp 161,209,061.625.36 in a year after tax. It's counted that return on investment (ROI) is 33.92% before tax and 20.35% after tax; pay out time (POT) is 2.27 years before tax and 3.29 years after tax; break even point (BEP) is 47.17%; shut down point (SDP) is 30.047%; and discounted cash flow rate of return (DCF) is 18.83%. Based on the economic analysis, it is concluded that the plant design of Vinyl Chloride Monomer with a capacity of 250,000 ton/year is visible to be built.