ABSTRAK

Kebutuhan produksi asetaldehid di Indonesia akan terus meningkat seiring dengan berkembangnya kegiatan perindustrian, perdagangan dan jasa, serta pertambahan penduduk di Indonesia. Asetaldehid merupakan senyawa organik yang banyak digunakan di industri kimia sebagai bahan intermediat untuk menghasilkan bahan kimia yang lain, seperti bahan baku pembuatan asam asetat, n-butanol, krotonaldehid, asetat anhidrat, dan sebagainya.

Pabrik asetaldehid dari etilen dan oksigen ini dirancang dengan kapasitas 50.000 ton/tahun dan beroperasi secara kontinyu selama 330 hari/tahun dan 24 jam/hari. Bahan baku yang digunakan merupakan etilen 99,9% sebanyak 5.627,6250 kg/jam dan oksigen 99,5% sebanyak 3434,3746 kg/jam. Proses yang dilakukan adalah reaksi oksidasi etilen dengan katalis palladium klorida yang terlarut dalam air. Reaksi dijalankan pada reaktor gelembung dengan suhu operasi 120 ^{o}C, tekanan 3 atm, dan rasio berat etilen terhadap oksigen 670:410.

Pabrik direncanakan untuk didirikan di Cilegon, Banten dengan luas lahan sebesar 19,5 ha dan mempekerjakan 242 orang karyawan. Kebutuhan energi untuk menjalankan pabrik ini meliputi kebutuhan listrik sebanyak 1,3174 MWh, kebutuhan air sebanyak 39.887,2957 kg/jam, dan kebutuhan udara instrumen sebanyak 320 m^3/jam.

Untuk menjalankan produksi, pabrik ini membutuhkan modal tetap sebesar Rp 2.358.494.879.230,55 + $ 23.707.835,52 dan modal kerja sebesar Rp 53.144.683.991,28 + $ 75.244.671,83. Pabrik asetaldehid ini tergolong high risk dengan ROI before tax 46,25% dan after tax 23,12%, POT before tax 1,81 tahun dan after tax 3,10 tahun, BEP 42,21%, SDP 27,53%, dan DCRR 30,30%. Berdasarkan evaluasi ekonomi tersebut, pabrik ini dinilai menarik dan layak untuk dikaji lebih lanjut.

Kata kunci : asetaldehid, etilen, oksigen

ABSTRACT

The need for acetaldehyde production in Indonesia will continue to increase along with the development of industrial activities, trade and services, as well as population growth in Indonesia. Acetaldehyde is an organic compound that is widely used in the chemical industry as an intermediate material to produce other chemicals, such as raw materials for making acetic acid, n-butanol, crotonaldehyde, acetic anhydrous, and so on.

The acetaldehyde plant from ethylene and oxygen is designed with a capacity of 50,000 tons / year and operates continuously for 330 days / year and 24 hours / day. The raw material used are ethylene 99,9% as much as 5,627.6250 kg / hour and 99,5% oxygen as much as 829.7203 kg / hour. The process that is carried out is the oxidation reaction of ethylene with palladium chloride catalyst dissolved in water. The reaction is carried out in a bubble reactor with an operating temperature of 120 ^oC, a pressure of 3 atm, and a weight ratio of ethylene to oxygen of 670:410.

The plant is planned to be built in Cilegon, Banten with an area of 19,5 ha and employs 242 employees. The energy required to run the plant includes 1.3174 MWh of electricity, 39.887.2957 kg / hour of water, and 320 m^3 / hour instrument air.

To start production, this factory requires fixed capital of Rp 2,358,494,879,230.55 + $ 23,707,835.52 and working capital of Rp 53,144,683,991.28 + $ 75,244,671.83. This acetaldehyde plant is classified as high risk with ROI before tax 46.25% and after tax 23.12%, POT before tax 1.81 years and after tax 3.10 years, BEP 42.21%, SDP 27.53%, and DCRR 30.30%. Based on the economic evaluation, this plant is considered interesting and worthy of further study.

Keywords: acetaldehyde, ethylene, oxygen