

ABSTRAK

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Program Studi : Teknik Kimia
Judul : Pra Rancangan Pabrik Vinil Asetat Monomer dari Asam
Asetat, Etilen, dan Oksigen dengan Kapasitas 100.000 Ton
per Tahun

Vinil asetat monomer atau biasa dikenal dengan nama dagang VAM yang banyak digunakan dalam industri cat berbasis air, perekat, serat akrilik, dan pelapis kertas. Vinil asetat monomer biasanya dibuat melalui reaksi antara etilen, asam asetat, dan oksigen dengan katalis Pd-Al pada suhu 155°C dan tekanan 8,88 atm di dalam reaktor *fixed bed multitube*. Namun hingga saat ini, pemenuhan kebutuhan vinil asetat monomer di Indonesia masih dilakukan dengan cara impor dari beberapa negara, seperti Singapura dan China. Pendirian pabrik vinil asetat monomer di Indonesia diharapkan mampu mencukupi kebutuhan vinil asetat monomer dalam negeri maupun luar negeri dan mendorong berkembangnya industri kimia lain dengan bahan baku vinil asetat monomer.

Berdasarkan hasil evaluasi, didapatkan kesimpulan bahwa kebutuhan vinil asetat monomer mengalami peningkatan, oleh karena itu ditetapkan kapasitas produksi pabrik vinil asetat monomer ini sebesar 100.000 kg/tahun. Vinil asetat monomer yang dihasilkan akan digunakan untuk memenuhi kebutuhan dalam negeri sebesar 36.404,84 ton/tahun, sedangkan sisanya yaitu sebesar 63.595,16 ton/tahun akan diekspor khususnya ke Korea Selatan dan Thailand. Adapun kebutuhan sarana penunjang pada pabrik vinil asetat monomer antara lain: kebutuhan air pendingin sebesar 165.000 kg/jam, kebutuhan *steam* 12.400 kg/jam, kebutuhan air domestik 702 kg/jam, kebutuhan listrik sebesar 138 kW/jam, dan kebutuhan bahan bakar solar 37 kg/hari. Bentuk badan hukum dari perusahaan ini

adalah perseroan terbatas (PT) dengan nama PT. VAM Nusantara, dan struktur organisasi yang dipakai adalah *line and staff system*. Perusahaan dipimpin oleh Direktur Utama yang membawahi 126 orang karyawan. Karyawan bekerja sesuai dengan jam kerja yang terdiri dari karyawan *shift* dan karyawan *non-shift*. Pabrik direncanakan beroperasi selama 330 hari dalam setahun dengan waktu kerja 24 jam per hari. Hasil analisis ekonomi yang telah dilakukan adalah sebagai berikut:

1. Total Modal Investasi = Rp2.960.000.000.000
 - a. Modal sendiri (73%) = Rp2.187.000.000.000
 - b. Pinjaman Bank (26%) = Rp773.000.000.000
2. Suku bunga per tahun = 10,5%
3. Jangka waktu peminjaman = 5 tahun (*grace period* 1 tahun)
4. *Internal Rate of Investment* (IRR) = 27,91%
5. MPP (*Minimal Payback Period*) = 4 tahun 9 bulan
6. *Net Cash Flow Present Value* (NCFPV) pada bunga bank sebesar 10,5% = Rp3.278.815.386.383 (positif)

Kata kunci: Vinil asetat monomer, VAM, asam asetat, etilen, oksigen.

ABSTRACT

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Study Program : Chemical Engineering
Title : Pre-designed Vinyl Acetate Monomer Plant from Acetic
Acid, Ethylene, and Oxygen with a Capacity of 100,000
Tons per Year

Vinyl acetate monomer or commonly known by the trade name VAM which is widely used in the water-based paint industry, adhesives, acrylic fibers, and paper coatings. Vinyl acetate monomers are usually made through the reaction between ethylene, acetic acid, and oxygen with a Pd-Al catalyst at 155°C and a pressure of 8.88 atm in a multitube fixed bed reactor. But until now, the fulfillment of vinyl acetate monomer needs in Indonesia is still done by importing from several countries, such as Singapore and China. The establishment of a vinyl acetate monomer plant in Indonesia is expected to be able to meet the needs of vinyl acetate monomers domestically and abroad and encourage the development of other chemical industries with vinyl acetate monomer raw materials.

Based on the results of the evaluation, it was concluded that the need for vinyl acetate monomers has increased, so the vinyl acetate monomer's production capacity is set at 100,000 kg/year. Vinyl acetate monomer produced will be used to meet domestic needs about 36.404,84 tons/year, while the remaining about 63.595,16 tons/year will be exported especially to South Korea and Thailand. The needs of supporting facilities at the vinyl acetate monomer plant include: cooling water requirements 165.000 kg/hour, steam needs 12.400 kg/hour, domestic water needs 702 kg/hour, electricity needs are 138 kW/hour, and 37 kg of diesel fuel per day. The legal entity form of this company is a limited liability company (PT) under the name PT. Vamindo, and the organizational structure used is the line and

staff system. The company is led by the President Director who oversees 126 employees. Employees work according to hours of work consisting of shift employees and non-shift employees. The plant is planned to operate 330 days a year with 24-hour work hours per day. The results of the economic analysis that have been carried out are as follows:

1. Total Investment Capital = Rp2.960.000.000.000
 - a. Own capital (73,3%) = Rp2.187.000.000.000
 - b. Bank Loans (26,7%) = Rp773.000.000.000
2. Annual interest rate = 10.5%
3. Loan period = 5 years (grace period 1 year)
4. Internal Rate of Investment (IRR) = 27,91%
5. Minimum Payback Period (MPP) = 4 years 9 months
6. Net Cash Flow Present Value (NCFPV) on bank interest of 10.5% = Rp3.278.815.386.383 (positive)

Keywords: Vinyl acetate monomer, VAM, acetic acid, ethylene, oxygen.

