

## ABSTRAK

Asam Format merupakan bahan kimia yang dapat digunakan di berbagai industri seperti industri karet, kulit, farmasi, tekstil dan lain-lain. Untuk memenuhi kebutuhan dalam negeri dan luar negeri, maka dilakukan Pra Rancangan Pabrik Asam Format dari Metil Format dan Air dengan kapasitas 12.000 ton/tahun. Pabrik direncanakan didirikan di Gresik, Jawa Timur dengan luas tanah 22.025 m<sup>2</sup>. Pabrik ini direncanakan beroperasi pada tahun 2023 dengan waktu kerja 24 jam sehari selama 330 hari/tahun.

Reaksi pembuatan Asam Format terjadi di dalam Reaktor Alir Pipa pada fase cair-cair. Reaksi bersifat adiabatik Reaktor bekerja pada suhu 90°C dan tekanan 20 atm. Kebutuhan Metil Format sebanyak 1680,4676 kg/jam dan air 731,6565 kg/jam. Untuk mendukung proses produksi maka dibutuhkan unit penyediaan air, steam, listrik dan bahan bakar. Sedangkan untuk menjaga mutu bahan baku dan kualitas produk maka diperlukan adanya laboratorium. Laboratorium dibagi menjadi 3, yaitu laboratorium pengamatan, laboratorium analitis serta laboratorium penelitian dan pengembangan.

Hasil yang diperoleh melalui uji kelayakan ekonomi menunjukkan bahwa jumlah *Fixed Capital Investment* Rp. 163.189.339.906, jumlah *Working Capital* Rp. 42.587.866.831, keuntungan sebelum pajak Rp. 37.921.641.441, keuntungan sesudah pajak Rp. 18.202.387.892, *Return of Investment (ROIa)* sebelum pajak 23,24%, *Return of Investment (ROIb)* sesudah pajak 11,15%, *Pay Out Time (POTa)* sebelum pajak 3,6 tahun, *Pay Out Time (POTb)* sesudah pajak 5 tahun, *Break Even Point (BEP)* sebesar 44,36% dan *Shut Down Point (SDP)* sebesar 20,42%. Berdasarkan perhitungan evaluasi tersebut, dapat disimpulkan bahwa Pabrik Asam Format dari Metil format dan Air dengan kapasitas 12.000 ton/tahun sangat layak untuk didirikan.

***Kata-Kata Kunci*** : Asam Format, Metil Format, Reaktor Alir Pipa, adiabatik.

## ABSTRACT

Formic acid is a chemical that can be used in various industries such as rubber, leather, pharmaceuticals, textiles and others. To fulfill the import and export needs, “Preliminary Plant Design of Formic Acid from Methyl Formate and Water” is carried out with a capacity of 12.000 tons/year. The plant will be planned to be established in Gresik, East Java with a land area of 22,025 m<sup>2</sup> and operate in 2023 with working hours about 24 hours a day for 330 days / year.

The reaction of Formic Acid occurs in Plug Flow Reactor in liquid-liquid phase. The reaction process is *adiabatic*. The reactor works at a temperature of 90°C and a pressure of 20 atm. The process need 1680,4676 kg/hour of Methyl Format and 731,6565 kg/hour of Water. To support the production process, a water, steam, electricity and fuel supply unit is needed. Meanwhile, to maintain the qualities of raw materials and product, a laboratory is needed. The laboratory is divided into 3, namely observation laboratories, analytical laboratories and research and development laboratories.

The results obtained through calculation of the economic feasibility show that the number of Fixed Capital Investment (FCI) is Rp. 163,189,339,906, Working Capital (WC) of Rp. 42,587,866,831, pre-tax profit of Rp. 37,921,641,441, profit after tax of Rp. 18,202,387,892, ROI before tax is 23,24%, ROI after tax is 11,15%, 3,6 years POT before tax, 5 years POT after tax, Break Even Point (BEP) of 44,36% and Shut Down Point (SDP) of 20,42%. Based on the economic evaluation calculations, it can be concluded that the Format Acid Plant of Methyl format and Water with a capacity of 12,000 tons / year is very feasible to be established.

**Keywords :** *Formic acid, Methyl Formate, Plug Flow Reactor, Adiabatis*