

## ABSTRAK

Pabrik gipsum dirancang untuk memenuhi kebutuhan gipsum di dalam maupun di luar negeri. Kapasitas yang direncanakan sebesar 500.000 ton/tahun. Pabrik ini beroperasi secara kontinyu selama 330 hari dalam setahun. Pabrik ini direncanakan berdiri di Tuban, Jawa Timur diatas tanah seluas 137.425 m<sup>2</sup>. Gipsum memiliki rumus molekul CaSO<sub>4</sub>.2H<sub>2</sub>O. Gipsum berfungsi sebagai cement retarder, wallboard, kapur tulis, campuran cat dan lain-lain. Proses pembuatan Gipsum dilakukan dalam Reaktor Alir Tangki Berpengaduk (RATB). Pada reaktor ini reaksi berlangsung pada fase cair-padat, irreversible, eksotermis, isothermal pada suhu 93 °C dan tekanan 1 atm, sehingga untuk menjaga suhu reaksi digunakan koil. Pabrik ini digolongkan pabrik beresiko rendah (low risk) karena kondisi operasi relatif rendah. Untuk memproduksi gipsum sebesar 500.000 ton/tahun diperlukan bahan baku asam sulfat sebesar 34.553 kg/jam dan batuan kapur sebesar 38.016 kg/jam. Utilitas pendukung proses meliputi penyediaan air proses sebesar 8.148 kg/jam, air pendingin sebesar 1.117.621 kg/jam, penyediaan saturated steam sebesar 13.342 kg/jam, penyediaan udara tekan sebesar 47 m<sup>3</sup>/jam, penyediaan listrik sebesar 1.203 kW diperoleh dari PLN dan 1 buah generator sebesar 2.000 kW dan bahan bakar sebanyak 197 kg/jam. Pabrik Gipsum ini direncanakan beroperasi pada tahun 2020 dengan menggunakan modal tetap sebesar Rp 1.212.695.273.449 dan modal kerja sebesar Rp 2.976.215.371.436. Dari analisis ekonomi terhadap pabrik ini menunjukkan keuntungan sebelum pajak Rp 342.701.819.604 /tahun setelah dipotong pajak 50 % keuntungan mencapai Rp 171.350.909.802 /tahun. Percent Return On Investment (ROI) sebelum pajak 28,26 % dan setelah pajak 14,13 %. Pay Out Time (POT) sebelum pajak selama 2,72 tahun dan setelah pajak 4,42 tahun. Break Even Point (BEP) sebesar 45,79 %, dan Shut Down Point (SDP) sebesar 23,73 %. Discounted Cash Flow Rate (DCFR) terhitung sebesar 7,40 %. Dari data analisa kelayakan di atas disimpulkan, bahwa pabrik ini menguntungkan dan layak dipertimbangkan untuk pendirian di Indonesia.

Kata- kata kunci:Gipsum , RATB, Asam Sulfat, Batuan Kapur

## ABSTRACT

*Gypsum factory is designed to meet the needs of gypsum at home and abroad. The planned capacity is 500.000 tons / year. This plant operates continuously for 330 days a year. The plant is planned to be located in Tuban, East Java on an area of 137.425 m<sup>2</sup>. Gypsum has the molecular formula CaSO<sub>4</sub>.2H<sub>2</sub>O. Gypsum serves as a cement retarder, wallboard, chalk, paint mixture and others. The process of making Gypsum is carried out in a Stirred Tank Flow Reactor (RATB). In this reactor the reaction takes place in the liquid-solid phase, irreversible, exothermic, isothermal at a temperature of 93 °C and a pressure of 1 atm so that to maintain the reaction temperature the coil is used. This plant is classified as a low risk (low risk) factory due to relatively low operating conditions. To produce gypsum of 500.000 tons / year, sulfuric acid is needed as much as 34.553 kg / hour and limestone is 38.016 kg / hour. The process supporting capacity includes the provision of process water of 8.148 kg / hour, cooling water of 1.117.621 kg / hour, the supply of saturated steam is 13.342 kg / hour, the supply of compressed air is 47 m<sup>3</sup>/ hour, the supply of electricity is 1.203 kW obtained from PLN and 1 generator is 2.000 kW and fuel is 197 kg/hour. The Gypsum Plant is planned to operate in 2020 by using the fixed capital of Rp 1.212.695.273.449 and working capital of Rp 2.976.215.371.436. From the economic analysis of this factory, it shows a pre-tax profit of Rp 342.701.819.604 / year after tax deduction of 50% profit reaches Rp 171.350.909.802 / year. Percent Return On Investment (ROI) before tax 28,26 % and after-tax 14,13 %. Pay Out Time (POT) before tax for 2,72 years and after-tax 4,42 years. Break Even Point (BEP) is 45,79 % and Shut Down Point (SDP) is 23,73 %. Discounted Cash Flow Rate (DCFR) is calculated as 7,40 %. From the feasibility analysis data above, it was concluded that this factory was profitable and worth considering for the establishment in Indonesia.*

*Keywords: Gypsum, RATB, Sulfuric Acid, Limestone*