

ABSTRAK

Pabrik silikon dioksida dirancang untuk memenuhi kebutuhan silikon dioksida di dalam maupun di luar negeri. Kapasitas yang direncanakan sebesar 200.000 ton/tahun. Pabrik ini beroperasi secara kontinyu selama 330 hari dalam setahun. Pabrik ini direncanakan berdiri di Kecamatan Telukjambe, Kabupaten Karawang, Jawa Barat diatas tanah seluas 164.600 m². Proses pembuatan silikon dioksida dilakukan dalam Reaktor Alir Tangki Berpengaduk (RATB). Pada reaktor ini reaksi berlangsung pada fase cair-cair, irreversible, eksotermis, isothermal pada suhu 90 °C dan tekanan 1 atm, sehingga untuk menjaga suhu reaksi digunakan koil. Untuk memproduksi silikon dioksida sebesar 200.000 ton/tahun (25.075 kg/jam) diperlukan bahan baku asam sulfat sebesar 12.730 kg/jam dan sodium silikat sebesar 176.597 kg/jam. Utilitas pendukung proses meliputi penyediaan air proses sebesar 237.708 kg/jam, air pendingin sebesar 573.879 kg/jam, penyediaan saturated steam sebesar 62.658 kg/jam, penyediaan udara tekan sebesar 47 m³/jam, penyediaan listrik sebesar 4.968 kW diperoleh dari PLN dan 1 buah generator sebesar 3.500 kW sebanyak 344 kg/jam, dan kebutuhan fuel oil sebanyak 4.705 kg/jam. Dari analisis ekonomi terhadap pabrik ini menunjukkan keuntungan sebelum pajak Rp 405.263.606.617 /tahun setelah dipotong pajak 50 % keuntungan mencapai Rp 202.631.803.308 /tahun. Percent Return On Investment (ROI) sebelum pajak 40 % dan setelah pajak 20 %. Pay Out Time (POT) sebelum pajak selama 2,2 tahun dan setelah pajak 3,6 tahun. Break Even Point (BEP) sebesar 47,30 %, dan Shut Down Point (SDP) sebesar 34,13 %. Discounted Cash Flow Rate (DCFR) terhitung sebesar 8,71 %. Dari data analisa kelayakan di atas disimpulkan, bahwa pabrik ini menguntungkan dan layak dipertimbangkan untuk pendirian di Indonesia.

Kata- kata kunci: Asam sulfat, Sodium silikat, Silikon dioksida, RATB

ABSTRACT

The silicon dioxide plant is designed to meet the needs of silicon dioxide at home and abroad. The planned capacity is 200,000 tons/hr. This plant operates continuously for 330 days a year. This plant is planned to be established in Telukjambe Subdistrict, Karawang Regency, West Java on an area of 164.600 m². The process of making silicon dioxide is carried out in a Stirred Tank Flow Reactor (RATB). In this reactor the reaction takes place in the liquid-liquid phase, irreversible, exothermic, isothermal at a temperature of 90 ° C and a pressure of 1 atm so that the coil temperature is used. To produce silicon dioxide of 200,000 tons / year (25.075 kg / hr), sulfuric acid is needed as much as 12.730 kg / hr and sodium silicate is 176.597 kg / hr. Process supporting utilities include process water supply of 237.708 kg / hr, cooling water of 573.879 kg / hr, provision of saturated steam of 62.658 kg / hr, supply of compressed air of 47 m³ / hr, supply of electricity of 4.968 kW obtained from PLN and 1 generator of 3500 kW as much as 344 kg / hr, and the need for fuel oil is 4.705 kg / hr. From the economic analysis of the plant, it shows a pre-tax profit of Rp. 405,263,606,617 / year after tax deduction of 50% profit reaches Rp. 202,631,803,308 / year. Percent Return On Investment (ROI) before tax 40% and after-tax 20%. Pay Out Time (POT) before tax for 2.2 years and after-tax 3.6 years. Break Even Point (BEP) is 47.30% and Shut Down Point (SDP) is 34.13%. Discounted Cash Flow Rate (DCFR) is calculated at 8.71%. From the feasibility analysis data above, it was concluded that this factory was profitable and worth considering for the establishment in Indonesia.

Keywords: Sulfuric acid, Sodium silicate, Silicon dioxide, RATB