

ABSTRAK

Pabrik Ammonium Sulfat memberikan prospek yang sangat baik, mengingat kebutuhan Ammonium Sulfat di Indonesia yang semakin meningkat. Desain awal pabrik Ammonium Sulfat dari Amonia dan Asam Sulfat direncanakan dibangun di Kesamben, Jombang, Jawa Timur dengan luas area 32.000 m² dengan kapasitas produksi 200.000 ton/tahun. Pabrik kimia ini akan dioperasikan selama 330 hari atau 24 jam sehari dengan total 150 karyawan.

Ammonium Sulfat dibuat dengan cara mereaksikan amonia dan asam sulfat fasa gas dan cair di dalam reaktor *Slurry Bubble Column* (reaktor gelembung). Reaksi berlangsung pada suhu 107 °C dan tekanan 1 atmosfer. Reaksi bersifat eksotermis dan menghasilkan konversi sebesar 98%. Bahan baku Amonia yang diperlukan mempunyai kemurnian 99.5% sebanyak 6.517,713 kg/jam, dan Asam Sulfat dengan kemurnian 98% sebanyak 18.748,087 kg/jam.

Utilitas yang diperlukan berupa air sebanyak 31.463,532 kg/jam, listrik 489,199 KW, udara tekan sebanyak 56,074 m³/jam, bahan bakar sebanyak 545,949 kg/jam. Untuk pendirian dan pengoperasian pabrik ini diperlukan modal tetap sebesar Rp 538.215.898.963, Modal kerja sebesar Rp 213.783.129.155 biaya produksi sebesar Rp 821.038.238.320 pengeluaran umum sebesar Rp 296.320.558.470, keuntungan sebelum pajak sebesar Rp 232.641.203.210, keuntungan setelah pajak Rp 174.480.902.408, ROI sebelum pajak 24 % ,ROI setelah pajak 18 %, POT sebelum pajak 2,9 tahun, POT sesudah pajak 3,5 tahun, BEP sebesar 48 % kapasitas, SDP sebesar 27 % kapasitas, dan DCF sebesar 24 %. Berdasarkan evaluasi ekonomi tersebut, maka pabrik Ammonium Sulfat dari Amonia dan Asam Sulfat dengan kapasitas 200.000 ton/tahun ini menarik untuk dikaji lebih lanjut.

Kata-Kata Kunci : Ammonium sulfat, Amonia, Asam Sulfat, Prarancangan Pabrik, Reaktor Gelembung.

ABSTRACT

Ammonium Sulfate plant gives very good prospect, considering the needs for Ammonium Sulfate in Indonesia that progressively increase. Preliminary design of Ammonium Sulfate plant from Ammonia and Sulfuric Acid were planned to built in Kesamben, Jombang, Jawa Timur with a total area of 32,000 m², with production capacity 200,000 tons/year. This chemical plant will be operated for 330 days or 24 hours a day with total employees of 150.

Ammonium sulfate was made by reacting ammonia gas and sulfuric acid solution in Slurry Bubble Column reactor (Bubble Reactor). The reaction proceed at temperature 107 °C with pressure of 1 atmosphere. The reaction was exothermic and the amount of conversion was 98%. Ammonia raw material needed has a purity of 99.5% as much as 6,517.713 kg / hour, and Sulfuric Acid with a purity of 98% as much as 18,748.087 kg / hour.

The utility required were water as much as 31,463.532 kg / hour, electricity 489.199 KW, compressed air 56.074 m³ / hour, fuel as much as 545.949 kg / hour. To establish and operate this plant required fixed capital Rp 538,215,898,963. working capital of Rp 213,783,129,155. Production costs Rp 821,038,238,320. general expenses Rp 296,320,558,470. profit before tax Rp 232,641,203,210. profit after tax Rp 174,480,902,408. Return On Investment (ROI) before and after tax are 30 %, and 22 % respectively while Pay Out Time (POT) before and after tax were 2.9 years and 3.5 years respectively. Break Even Point (BEP) was 48 % capacity, and Shut Down Point (SDP) was 27 % capacity. Finally, Discounted Cash Flow Rate of Return DFCR was 24 %. Based on the economic evaluation, Ammonium Sulphate of Ammonia and Sulfuric Acid plant with a capacity of 200,000 tons / year was interesting for further investigation.

Keywords : Ammonium Sulfate, Ammonia, Sulfuric Acid, Preliminary design, Bubble Reactor