

INTISARI

Amonium sulfat ($(\text{NH}_4)_2\text{SO}_4$) adalah senyawa garam anorganik yang umumnya digunakan sebagai pupuk di Indonesia. Pabrik amonium sulfat ini dirancang dengan kapasitas 250.000 ton/tahun. Bahan baku yang diperlukan adalah amonia 99,5% sebanyak 65.520,94 ton/tahun dan asam sulfat 98% sebanyak 193.411,86 ton/tahun yang diperoleh dari PT Petrokimia Gresik. Amonium sulfat dihasilkan dari reaksi netralisasi antara larutan asam sulfat dan gas amonia, Reaksi yang bersifat eksotermis ini berlangsung di dalam reaktor gelembung pada suhu 105 °C dan tekanan 2 atm.

Pabrik amonium sulfat beroperasi secara kontinyu selama 330 hari/tahun dan 24 jam/hari, memiliki kebutuhan utilitas berupa air sebanyak 83022,95 kg/jam, *steam* sebanyak 20.036,91 kg/jam, listrik sebanyak 1065,41 kW, udara tekan sebanyak 90 m³/jam, dan bahan bakar sebanyak 1,648 m³/jam.

Pabrik ini akan didirikan di daerah Gresik, Jawa Timur dengan pertimbangan ketersediaan bahan baku, dimana lokasinya yang tidak terlalu jauh dengan PT Petrokimia Gresik sebagai produsen dari kedua bahan baku utama pabrik amonium sulfat ini.

Perhitungan evaluasi ekonomi menghasilkan besar modal tetap yang dibutuhkan sebesar US\$ 23.826.501, dan modal kerja sebesar US\$ 29.238.447. Pada kapasitas produksi 100%, diperoleh ROI sebelum pajak sebesar 32,28%, ROI setelah pajak sebesar 16,14%, POT sebelum pajak sebesar 3,9 tahun, POT setelah pajak sebesar 2,4 tahun, BEP sebesar 49,21%, SDP sebesar 31,48%, dan DCFRR sebesar 15,64%. Berdasarkan hasil evaluasi ekonomi tersebut pabrik amonium sulfat dengan kapasitas 250.000 ton/tahun ini menarik untuk dikaji lebih lanjut.

Kata kunci: amonium sulfat, amonia, asam sulfat, reaktor gelembung.

ABSTRACT

Ammonium sulfate ((NH₄)₂SO₄) is an inorganic salt compound commonly used as fertilizer in Indonesia. This ammonium sulfate plant was designed with a capacity of 250.00 tons/year. The raw materials needed are 99,5% ammonia as much as 64.652,1558 tons/year and sulfuric acid as much as 190.463,9832 tons/year from PT Petrokimia Gresik. Ammonium sulfate is produced from a neutralization reaction between sulfuric acid solution and ammonia gas, this exothermic reaction takes place in a bubble reactor at a temperature of 105 °C and a pressure of 2 atm.

Ammonium sulfate plant operates continuously for 330 days/year and 24 hours/day, has utility needs in the form of water as much as 83022,95 kg/hour, steam as much as 20.036,91 kg/hour, electricity as much as 1065,41 kVa, compressed air as much as 90 m³/hour, and fuel oil as much as 1,648 m³/hour.

This plant will be established in the Gresik area, East Java with consideration of the availability of raw materials, where the location is not too far from PT Petrokimia Gresik as the producer of the two main raw materials of this ammonium sulfate plant.

Economic evaluation calculation results the amount of fixed capital needed as much as US\$ 23.826.501 and working capital required as much as US\$ 29.238.447. At 100% production capacity, the values obtained for pre-tax ROI is 32,28%, after-tax ROI is 16,14%, pre-tax POT is 2,4 years, after-tax POT is 3,9 years, BEP at 49,21%, SDP at 31,48%, and DCFRR at 15,64%. Based on the economic evaluation results, the ammonium sulfate plant with a capacity of 250,000 tons/year is feasible for further studies.

Keywords: ammonium sulfate, ammonia, sulfuric acid, bubble reactor.