

INTISARI

Aseton sianohidrin ((CH₃)₂C(OH)CN) diproduksi dari aseton ((CH₃)₂CO) dan hidrogen sianida (HCN) dengan katalisator basa natrium hidroksida (NaOH) dalam reaktor alir berpengaduk seri 2 buah. Tekanan operasi dalam reaktor adalah 1 atm dengan suhu reaksi pada 25°C. Reaksi pembentukan aseton sianohidrin merupakan reaksi eksotermis sehingga reaktor dilengkapi dengan koil pendingin dengan pendingin berupa *chilled water*.

Pabrik aseton sianohidrin ini dirancang dengan kapasitas 100.000 ton/tahun dan direncanakan beroperasi kontinyu selama 330 hari setahun, untuk memproduksi aseton sianohidrin 99,2% diperlukan bahan baku aseton 99,5% sebanyak 68.784,41 ton/tahun, HCN 99,95% sebanyak 31.962,35 ton/tahun dan NaOH 50% sebagai katalisator sebanyak 2549,76 ton/tahun. Asam sulfat 98% sebanyak 1.669,22 ton/tahun diperlukan untuk menetralkan NaOH.

Kebutuhan utilitas meliputi air sebanyak 83.835,4 ton/tahun, *steam* 32.177,8 ton/tahun, udara 1.188.000 m³/tahun, *fuel oil* 7.461,76 ton/tahun dan listrik 303,03 kVA.

Pabrik ini direncanakan akan dibangun di daerah industri Pelintung, Dumai, Riau pada tahun 2020. Luas tanah yang dibutuhkan seluas 119.700 m² dan membutuhkan tenaga kerja sebanyak 215 orang, dengan 101 karyawan *shift* dan 104 karyawan *non shift*.

Modal tetap yang perlu diinvestasikan sebesar US \$ 23.548.561,80+Rp 129.518.807 dan modal kerja sebesar US \$ 63.389.760,97+Rp 27.897.063.578. Hasil evaluasi ekonomi menunjukkan keuntungan sebelum pajak sebesar Rp 244.896.189.778 dan sesudah pajak Rp 122.448.094.889. Return on Investment (ROI) sebelum pajak sebesar 54,04 % dan ROI sesudah pajak sebesar 27,02 %. Pay Out Time (POT) sebelum pajak 1,64 tahun dan sesudah pajak 2,93 tahun. *Discounted Cash Flow Rate of Return* (DCFRR) 26,34 %, Break Even Point (BEP) pada kapasitas pabrik sebesar 44,91 % dan Shut Down Point (SDP) pada kapasitas pabrik 33,94 %. Berdasarkan hasil evaluasi ekonomi tersebut, dapat disimpulkan pabrik ini menarik untuk dikaji lebih lanjut.

ABSTRACT

Acetone cyanohydrin($(\text{CH}_3)_2\text{C}(\text{OH})\text{CN}$) is produced from acetone ($(\text{CH}_3)_2\text{CO}$) and hydrogen cyanide (HCN) with base catalyst sodium hydroxide (NaOH) in a stirred flow reactor series 2 pieces. The operating pressure in the reactor is 1 atm with the reaction temperature at 25 ° C. The formation reaction of acetone cyanohydrin is exothermic reaction so that reactors are equipped by cooling coil with chilled water.

The Factory is designed with 100,000 tons/year capacity and it is planned to operate continuously for 330 days/year. The raw materials to produce acetone cyanohydrin 99% required are acetone 99.5% as much as 68.784,41 tons/year, HCN 99.95% as much as 31.962,35 tons/year and 50% NaOH as a catalyst as much as 2.549,76 tons/year. Sulfuric acid 98% as much as 1.669,22 tons /year is required to neutralize NaOH.

Utilities supporting processes require water as much as 83.835,4 tons /year, steam as much as 32.177,8 tons/year, compressed air as much as 1.188.000 m³/year, fuel oil as much as 7.461,76 tons/year and electricity as much as 303,03 kVA.

The factory is planned to be built in the industrial area Pelintung, Dumai, Riau in 2020. The factory requires land area as 119.700 m² and requires a workforce of 215 employees, consist of 101 shift and 104 non-shift staff.

Fixed capital needed is US \$ 23.548.561,80+Rp 129.518.807.361 and working capital of US \$ 63.389.760,97+Rp 27.897.063.578. The results of an economic evaluation showed a profit before tax is Rp244.896.189.778 and after taxes is Rp 122.448.094.889. Return on Investment (ROI) before tax amounted to 54,04% and the ROI after tax of 27,02%. Pay Out Time (POT) before tax is 1,64 years and 2,93 years for after tax. Discounted Cash Flow Rate of Return (DCFRR) is 26,34%, Break Even Point (BEP) at 44,91% and Shut Down Point (SDP) at 33.94% of plant capacity. Based on the results of the economic evaluation, the plant is deserved to be studied further.