PRE-DESIGN OF A PROPYLENE GLYCOL PRODUCTION FROM PROPYLENE OXIDE VIA HYDRATION PROCESS.

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SUMMARY

Indonesia is currently facing a significant increase in demand for propylene glycol, with domestic needs reaching 49,899 tons in 2023. Unfortunately, domestic production capacity is still zero, requiring full reliance on imports. Propylene glycol is a vital component in various industries, including cosmetics, pharmaceuticals, and food, making its availability crucial to support downstream industrial growth in Indonesia. The pre-design of a Propylene Glycol plant using Propylene Oxide as the raw material is planned with a production capacity of 60,000 tons per year. The production process involves two main stages: hydration reaction and purification. The reaction takes place in a continuous stirred tank reactor under operating conditions of 2 MPa pressure and 125°C temperature, achieving a 90% conversion and 99.5% product purity. Purification is conducted via distillation to separate the product from the reaction mixture. The plant is proposed to be located in the Kabil industrial area, Batam, to reduce logistical costs by being close to raw material sources and primary markets. The total capital investment for this project is estimated at IDR 223,770,538,068.53. With an ROI of 75.73%, a DCFR of 51.11%, a BEP of 60%, and an SDP of 15%, the plant is economically viable for implementation.

***Keywords**: Distillation, Hydration, Propylene Glycol, Continuous Stirred Tank Reactor.*