

ABSTRAK

PRARANCANGAN PABRIK PABRIK PROPILLEN GLIKOL ($C_3H_8O_2$) DARI PROPILLEN OKSIDA (C_3H_6O) DAN AIR (H_2O) DENGAN KATALIS ASAM SULFAT (H_2SO_4) KAPASITAS 45.000 TON/TAHUN (Tugas Khusus Perancangan Reaktor (RE-201))

Oleh

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Propilen glikol (1,2-Propadienol, 1,2-Dihydroexpropane atau 1,2-Propilen glikol) merupakan salah satu produk *intermediet* yang digunakan pada berbagai industri seperti cat, *antifreeze*, hingga kosmetik. Proses pembuatan Propilen glikol yang digunakan adalah dengan mereaksikan bahan baku Propilen oksida dan air menggunakan katalis asam sulfat dengan melalui beberapa proses diantaranya (1) Proses hidrasi Propilen oksida menjadi Propilen glikol (2) Proses pemurnian produk, dan (3) Proses penyimpanan produk. Penyediaan kebutuhan utilitas pabrik berupa sistem pengolahan dan penyediaan air, sistem penyediaan *steam*, *chilled water*, dan sistem pembangkit tenaga listrik.

Kapasitas produksi pabrik direncanakan 45.000 ton/tahun dengan 330 hari kerja dalam 1 tahun. Lokasi pabrik direncanakan didirikan di kawasan industri *Java Integrated Industrial Port Estate* (JIPE), Desa Tebalo, Kecamatan Manyar, Kabupaten Gresik, Provinsi Jawa Timur. Tenaga kerja yang dibutuhkan sebanyak 127 orang dengan bentuk badan usaha Perseroan Terbatas (PT) yang dipimpin oleh seorang Direktur Utama yang dibantu oleh Direktur Produksi dan Direktur Keuangan dengan struktur organisasi *line and staff*.

Dari analisis ekonomi diperoleh:

<i>Fixed Capital Investment</i>	(FCI)	= Rp 437.273.184.766
<i>Working Capital Investment</i>	(WCI)	= Rp 77.165.856.135
<i>Total Capital Investment</i>	(TCI)	= Rp 514.439.040.901
<i>Break Even Point</i>	(BEP)	= 43,27%
<i>Shut Down Point</i>	(SDP)	= 24,28%
<i>Pay Out Time before taxes</i>	(POT) _b	= 1,86 years
<i>Pay Out Time after taxes</i>	(POT) _a	= 2,22 years
<i>Return on Investment before taxes</i>	(ROI) _b	= 37,15%
<i>Return on Investment after taxes</i>	(ROI) _a	= 29,72%
<i>Discounted cash flow</i>	(DCF)	= 25,25%

Mempertimbangkan rangkuman di atas, penulis menyimpulkan bahwa pabrik Propilen glikol ini dapat dikaji lebih lanjut karena mempunyai prospek yang baik.

Kata kunci: propilen glikol, propilen oksida, asam sulfat

ABSTRACT

PRE-DESIGN OF A PROPYLENE GLYCOL (C₃H₈O₂) FROM PROPYLENE OXIDE (C₃H₆O) AND WATER (H₂O) BY USING SULFURIC ACID (H₂SO₄) CATALYST WITH A CAPACITY OF 45,000 TONS/YEAR (Reactor Design (RE-201))

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Propylene glycol or as known as ,2-Propadienol, 1,2-Dihydroexpropane or 1,2-Propylene glycol is an intermediate product used in various chemical industry such as solvent in paint, antifreeze, and cosmetics. The process for making Propylene glycol is by reacting the raw materials Propylene oxide and water using a sulfuric acid catalyst through several processes including (1) Propylene oxide hydration process to become Propylene glycol (2) Product purification process, and (3) Product storage process. This factory's utilities provides the supply of water treatment system, steam system, chilled water system, and power generation system.

The factory's production capacity is planned to be 45,000 tons per year, with 330 working days in a year. The factory location is planned to be established in the industrial Java Integrated Industrial Port Estate (JIPE) area, Gresik, East Java. The required workforce is 127 people in the form of a Limited Liability Company (PT) business entity led by a Main director, who is assisted by the Director of Production and the Director of finance, with a line and staff organizational structure.

From the economic analysis obtained:

<i>Fixed Capital Investment</i>	(FCI)	= Rp 437.273.184.766
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Considering the summary above, the authors conclude that this Propylene glycol factory can be studied further because it has good prospects.

Keyword: propylene glycol, propylene oxide, water, sulfuric acid