Analisis kehilangan eksergi pada distilasi multikomponen di Kilang LNG = Exergy loss analysis of distillation multicomponent in LNG Plant

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Abstrak

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Tulisan ini membahas ruang lingkup tahapan pemisahan (distilasi), sebagai tahapan yang penting dalam pemisahan komponen agar mendapatkan komponen yang murni. Dalam tahapan distilasi ini, terjadi perbedaan yang dipengaruhi oleh tekanan, temperatur, konsentrasi, dan kecepatan. Penelitian ini bertujuan untuk menganalisa nilai kehilangan eksergi di setiap tray pada konfigurasi tertentu dari setiap pemisahan multikomponen. Komponen yang dipisahkan dari kilang LNG berupa metana, etana, propana, n-butana, i-butana dan i-pentana. Data eksperimen khususnya komposisi untuk komponen yang dipisahkan tersebut diperoleh dari penelitian sebelumnya. Metode perhitungan yang digunakan mengacu pada penelitian sebelumnya. Konfigurasi pemisahan komponen berdasarkan titik didih menghasilkan exergy loss sebesar 9.220,57 MW. Utility cost yang dibutuhkan untuk kondensor sebesar US$ 6.892.639 dan untuk reboiler sebesar US$ 11.054. Konfigurasi pemisahan komponen berdasarkan fraksi terbesar menghasilkan exergy loss sebesar 12.582,29 MW. Utility cost yang dibutuhkan untuk kondensor sebesar US$ 6.898.806 dan untuk reboiler sebesar US$ 19.382. Konfigurasi pemisahan komponen berdasarkan equimolar menghasilkan exergy loss sebesar 23.012,08 MW. Utility cost yang dibutuhkan untuk kondensor sebesar US$ 6.900.682 dan untuk reboiler sebesar US$ 21.939.Semakin kecil nilai exergy loss akan semakin kecil pula utility cost yang dibutuhkan.
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ABSTRACT
This research discusses the scope of phase separation (distillation), as an important stage in the separation of components in order to obtain a pure component. In this distillation stage, there is a difference which is affected by pressure, temperature, concentration, and speed. The main goals of research on the simulation of distillation is to analyze exergy loss in each configuration for multicomponent separation. Component will be separated from LNG Plant are methane, ethane, propane, n-butane, i-butane, and i-pentane. Experiment datafor composition of the separated components written by previous researcher. The method is arranged by previous researcher. Configuration component separation by boiling point has produced exergy loss of 9.220,57 MW. Utility cost required for the condenser of US$ 6.892.639 and for the reboiler of US$ 11.054. Configuration component separation by the largest fraction has produced exergy

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