Rancang Bangun Perforated Tray pada Alat Distilasi Bertingkat Bioethanol Skala Laboratorium

(Design of Perforated Tray on a Laboratory-Scale Ethanol Distillation Apparatus)

Izza Auliya a Mukholidi
Study Program of Renewable Engineering
Majoring of Technic
Program Studi Teknik Energi Terbarukan
Jurusan Teknik

ABSTRACT

Design module of perforated tray is commonly intended for large-scale production with column diameter of 1-6 meters, while the design of the plate for small column diameter (0.1 m or below) with relatively low flow rate (below 2 litre/hour) needs further research. The research quoestions discussed in this thesis is how dimensions of perforated tray in laboratory scale. First, how performance of perforated tray on purifying ethanol with some variations of the number of trays and initial concentration of ethanol. Second, the comparison of perforated tray to baffle tray with the same amount of tray in purifying ethanol. Dimensions of design on baffle tray is 95 mm in diameter; perforated tray is 95 mm in diameter; 1 mm in hole diameter and 1 mm in thickness with alumunium material. The sample was taken with batch process of 1 litre on distillation column. Reflux ratio operated at 1:1. Methods used in this thesis is pycnometer (50 ml) with Indian standard: 3506-1967. The result shows that more number of perforated tray increase purity of ethanol with best result is 16 trays of perforated tray and 50% feed with 93,7 % purity of ethanol. Thus, Highest volume produced is 8 trays and 30% feed with 325 ml volume. The fastest distillation process is 8 trays and 50% feed with 64 minutes elapsed time.

Keywords: Bioethanol , Distillation, Fractionation, Perforated Tray