

Exergy Analysis of Deodorization Unit at Palm Oil Refinery

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Abstract. Deodorization is one of processing unit in the palm oil refinery facilities. This unit serves to deprive the unwanted odor of Bleached Palm Oil (BPO) and separates BPO into Refined Bleach Deodorized (RBD) and Palm Fatty Acid Deodorized (PFAD). Deodorization process also reduce volatile compound such as Free Fatty Acid (FFA) and sterol (steroid alcohol or mostly known as cholesterol) [1]. In practice, there are several problem encountered related to the performance and the process of the equipment itself. Such as unnecessary heat loss, improper selection of equipment, inappropriate maintenance, and ineffective process flow. The aim of this thesis work is to analyze the performance of thermal equipment in deodorization unit using exergy analysis. Stream records in this thesis taken from a local palm oil refinery in Padang. Condition of deodorization process assume with no leaked and the pressure drop is neglected. The study only focus on thermal exergy. Changes in potential and kinetic exergy will be neglected.

The results show that the equipment with the highest efficiency is spiral heat exchanger B with 98.95%. While the equipment with the lowest efficiency is deodorized equipment with only 51.49%. The highest losses in deodorization unit is deodorized equipment with 1081.24 kW or 84.70%. It can be selected several improvement methods such as waste heat recovery and cogeneration system. Waste heat recovery steps could be added using heat exchanger to retrieve excess heat from vacuum heat exchanger or process stripper. While using cogeneration system, the use of boiler could be reduced into only one.