Comparison of Thermal Efficiency and Heat Transfer Rate on the Fluidized-Bed Combustor Using Oil Palm Fuel

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Abstract Waste in oil palm biomass is one of the renewable energy sources that can be converted into energy. The availability of oil palm biomass which is a renewable energy source is currently very adequate. This research will specifically analyze the differences in the level of thermal efficiency and heat transfer rates of two different types of biomasses. In addition, this comparative analysis was also carried out when testing the modification of the perforated plate with the standard plate or without modification. The combustion test was carried out in a fluidized-bed combustor (FBC) combustion chamber with data measurements using a Digital Thermometer brand Hot-Temp HT-306. Palm oil solid waste biomass such as palm kernel shells and oil palm fronds were used as testing fuel in this study. The results show that the average level of thermal efficiency for palm kernel shell (PKS) and oil palm midrib (OPM) fuels, when tested with a modified hollow plate, is 33.59% and 28.31%, respectively. Meanwhile, the results of the average thermal efficiency at the time of testing the standard plate were 19.77% PKS and 28.29% OPM. The results of the heat transfer rate test for standard plates with PKS fuel are 7363.53 W/m^2, which is lower than after modification, which is 7762.38 W/m^2. Meanwhile, the results of combustion using OPM fuel were higher when testing the standard plate at

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