

Numerical study of heat loss from boiler using different ratios of fibre-to-shell from palm oil wastes

ABSTRACT

This study presents effect of excess air and fibre-to-shell (F/S) ratio on heat losses. Five heat losses are computed based on ASME standard (heat loss) and STANJAN code (flue gases). Heat loss due to dry flue gas is major heat loss in boiler and has been found statistically affected by the amount of excess air and F/S ratio, whereas other heat losses are somehow negligible, except heat loss due to moisture and hydrogen in fuel, which is mainly related to variation of F/S ratio. Boiler efficiency may reach 85% practically if global optimisation based on excess air and F/S ratios are considered with respect to combustion efficiency (low CO) and thermal efficiency (less heat losses).

Keyword: Dry flue gas; Excess air; Heat losses; Palm oil wastes; Ratio of fibre-to-shell; Fibre to shell ratio