

Programming The Inverse Thermal Balance For A Bagasse-Fired Boiler, Including The Application Of A Optimization Method In MATLAB

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Abstract

Thermal balance of steam boilers can be done by two ways, the direct or indirect method; the direct method is not accurate. The reason why it is not accurate is that some operating parameters of biomass boilers cannot be obtained by direct measurements, like the measurement of fuel flow. These facts make it difficult to apply the direct method in the heat balance and force to use indirect one to determine these parameters and the boiler efficiency; hence, the indirect method is generally used for heat balance. Indirect method provides more accurate values and additionally, quantifies each of the energy losses, allowing to determinate causes of low efficiency of the equipment. Large amount of data involved implies the use of more affective calculation means; being iterative, assumed values for fuel flow must be compared with a value calculated until both match. In this work, the indirect method has been programmed in MATLAB; and for the preliminary fuel flow evaluation an optimization method could be used to prevent having to assume a value. Calculation details and a MATLAB algorithm are also presented.

Keywords

Boiler; MATLAB; Thermal Balance.