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MATHEMATICAL MODEL AND COMPUTATION PROGRAM OF THE CHAMBER FURNACE OF BOILERS FOR AIR POLLUTION REDUCTION

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Abstract

This paper proposes a mathematical model and a computer program for computing the radiant heat transfer in the chamber furnace of steam boilers. The mathematical model allows the evaluation of the radiant heat exchange surface and temperature of outlet flue gases. This mathematical model uses the Boltzmann criterion. The mathematical model was implemented in C++. By means of the developed computer program, one can design the boilers chamber furnace for different fuel types (natural gas, heavy fuel, refinery gas, natural gas and coal etc.), for different temperatures of fuels and combustion air, montage of burners and radiant heat transfer surface etc. Also, by means of this computer program, one can simulate the behavior of different boilers with and without additives. Based on the comparison between the experimental results and the ones obtained by running our program, a good concordance was found.

Key words: boiler, chamber furnace, computer program, mathematical model

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