

ANALYSIS OF HEAT TRANSFER COEFFICIENT CHANGES IN RECUPERATIVE HEAT EXCHANGERS

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The aim of the work

A simplified model of heat transfer process in cross-flow tube recuperative heat exchangers (recuperators) was presented in this paper. One of the purpose of this investigation was to analyse changes in the values of some parameters of heat transfer in recuperators during combustion air preheating.

Research methods

The results, presented in this paper were obtained by combining an experimental techniques with an analytical method of combustion calculation of a choosen type of fuel.

Results

The results, presented in this paper, given in the form of mathematical expressions, graphs and tables, were a part of analysis of combustion and heat transfer process related to the work of a special type of walking beam furnace. The furnace is fired with the liquid fuel, and the air for combustion is preheated and enriched by O₂. The working conditions of liquid fuel combustion were defined by chemical composition of the fuel, the heat value of fuel, as well as by values interval of: excess of air ratio ($\lambda=1,00-1,18$), content of oxygen in combustion air (21-28 % O₂), the preheating air temperature (100–500 °C) and inlet temperature of the hot fluid (600–1100 °C). Inlet temperature of cold fluid was 20 °C, but the outlet temperature of the hot fluid (combustion products) was calculated. The changes in the overall heat transfer coefficient are described as functions of the air preheating temperature and the inlet temperature of the combustion products, and they are available in the form of graphs

Key words: heat exchangers, air preheating, overall heat transfer coefficient.

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