

Analysis of formation harmful substances formed as a result of burning the low-grade coal in the combustion chamber of the industrial boiler of Kazakhstan using CFD-code FLOREAN

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Nowadays in the world folds the new structure of economic relations, based on the quality of formation of favorable relations with the countries - owners of the energy resources necessary for the further development of the economic potential of many developed countries of the world. Countries with the necessary resources and are able to develop long-term plans of using them receive clear competitive advantages. In turn, Kazakhstan's integration in the global economy causes the steady tendencies of growth of prices on energy and material resources.

For power system and other allied industries the task of reducing the cost on obtaining the desired product is paramount. Become the relevant question selection, operation, and primarily the creation of new, highly efficient energy- saving technologies and energy processes. This requires the implementation of a set of measures, the most important of which is the use of the most accurate methods for calculating heat and power processes.

Despite the fact that the processes of heat and mass transfer in high temperature and chemically reacting flows in general, inherently contain empirical regularities, the study of these laws are the most important scientific and technical problem.

Now, the only way to realize the complex research of processes pulverized coal combustion in the combustion chamber boilers industrial facilities are numerical methods and computer experiment using three-dimensional modeling techniques and modern computer equipment involving computer technology and software package.

The authors of this research examines the processes of heat and mass energy by burning fuel in the combustion chamber of industrial energy facilities with the main stages of burning coal: volatile, burning coke formation and degradation of harmful dust and gas emissions.

According to the results of computational experiments using a software package FLOREAN, the authors obtained new results of theoretical research, mathematical and computer modeling of turbulent heat and mass transfer by burning the pulverized coal in the combustion chamber of the boiler industry of Kazakhstan.

On the basis of numerical solution of the equations of convective heat, taking into account the kinetics of chemical reactions, the two-phase flow, nonlinear effects of convective and the radiation heat transfer, and three-dimensional modeling techniques, identified the concentration characteristics over the entire volume of the combustion chamber in the form of three-dimensional and two-dimensional distributions.

The results of computational experiments can be used in the design of new and improvement of existing combustors industrial boilers using solid fuels, because these used models are the most complete, modern and optimal for a given level of development of science. This, in turn, at the same time would solve the problem of the process intensification of burning energy consumption, increasing efficiency of low-grade coal combustion and reducing harmful dust and gas emissions into the environment.