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Study of the Effectiveness of Water-Cal Fuel in Boiler Units

Ukraine belongs to the energy deficient countries and provides its needs from its own resources only by 40%. One of the areas for coal power may be a shift from the direct combustion of coal in various furnace devices to preparation from coals of various grades, including waste coal, hydrocarbon fuel. Hydrocarbon fuel can replace solid, liquid or gaseous fuel in various fuel-consuming units, and if necessary, it can be used together with other fuels – fuel oil, coal and gas.

Advantages of hydrocarbon fuel:

- safety at all technological stages of its preparation and transportation;
- possibility of using low-grade and waste coals for manufacture of hydrocarbon fuel and its transportation as a continuous stream through pipelines;
- technology of coal-water fuel preparation is well combined with the enrichment and demineralization of coal;
- use of cheap and efficient chemical admixtures and additives;
- possibility of increasing the energy potential of hydrocarbon fuel;
- reduction of transportation losses and atmosphere pollution with coal dust compared to the transportation of coal by rail;
- if necessary, can be used together with other fuels -fuel oil, coal, gas.
- due to the fact that the hydrocarbon fuel is a composition fuel - its final composition and the property are set by the consumer.

Technological properties of hydrocarbon fuel are determined by the following parameters: solids (coal); dispersion of the solid phase (particle size distribution and specific surface area of coal from mineral impurities); viscosity and its dependence on the velocity and temperature of transportation; stability - dynamic (during transport through pipes and tankers) and statistical (in tanks); composition, properties and the necessary concentration of chemical additives - surfactants (stabilizers and dispersants); amount and composition of impurities, including environmentally harmful as sulfur and other toxic substances.

Analysis of the properties and characteristics of hydrocarbon fuel and its products has shown its importance for power engineering. However, the transfer of gas, coal and fuel oil-fired boilers for hydrocarbon fuel burning may require substantial investment, especially in the first stage of their industrial use. It may be:

- radical reconstruction and modernization of the existing boilers with changing of heat transfer surfaces, cross sections for the passage of heat transfer and replacement of draft equipment;
- selection of the required operating parameters for boilers without major reconstruction.