INFLUENCE OF WATER QUALITY ON THE PREPARATION OF WATER-FUEL CAPACITANCE

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The experience of operating diesel plants using water-fuel emulsion (WFE) has shown that the quality of the water used to prepare WFE directly affects the wear of fuel equipment and the central piston group. This effect is stronger with sulfurous fuels, because the combustion of WPE produces water vapor, which, in turn, when interacting with sulfur, forms sulfuric and sulfuric acids on the surfaces. Deposition of water-soluble salts in the form of scale is also possible. The chemical composition of the water (salt concentration) used to prepare the water-oil emulsion (WOE) determines the boiling point of water in its droplets, the nature of their micro-explosions, which affects the combustion process, the composition and quality of the gas flow, the size and quantity of solid particles, the mineral composition of the deposits and, consequently, the intensity of low-temperature (LT) and high-temperature (HT) corrosion.

In addition, the presence of water significantly changes the corrosion mechanism from chemical to electrochemical. Therefore, the water used to prepare the WFE must meet the relevant requirements, namely the complete absence of corrosive activity and salts of general hardness. In order for the water quality to meet these requirements, a certain water treatment technology is needed. Among other water treatment methods, electromagnetic water treatment should be highlighted. When the water content in the emulsion increases above 20% by volume, the quality of the combustion process decreases compared to the combustion of pure fuel. However, if we take into account that the WFE combustion process is quite stable at a higher water content (up to 40-50%), depending on the type of fuel, it opens up the possibility of destruction (fire neutralization) of liquid wastewater from production. At the same time, it is proposed to use waste liquids from industrial consumers in the preparation of WFE, even if they do not contain combustibles, can be used as an aqueous phase in fuel oil emulsions and burned, with the main task being their destruction, rather than the thermophysical parameters of the process.

The use of a homogenized water-oil mixture allows to increase the efficiency of fuel combustion, save fuel oil and reduce harmful NO_2 and CO_2 emissions into the atmosphere during combustion. Thus, water treatment is carried out in an electromagnetic installation. As a result of the participation of ions in the transfer of current during electrophysical water treatment, they are concentrated in the corresponding products of the electrode zones, which leads to changes in the physical and chemical properties of water. As a result of this operation, water is divided into two components: catholyte, which has alkaline properties, and anolyte, which has acidic properties.

References:

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