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COMPARATIVE ANALYSIS OF COAL ASH CONTENT DETERMINATION RESULTS USING AUTOMATIC AND MANUAL SAMPLING METHODS

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Domestic coke chemical enterprises use the PMM-16 mechanical pendulum sampler, which is used in automated quality control systems. The design parameters of the sampler guarantee the representativeness of the sample due to the sufficient capacity of the bucket, which prevents it from overflowing and losing material during movement. The article discusses the process of automated sampling of coal charge and the assessment of its representativeness compared to the manual method. The aim of the work was to establish the accuracy of the PMM-16 pendulum sampler in real operating conditions and to analyze the influence of the physical and mechanical properties of coal on the control results. During the study, a statistical comparison of the ash content of samples collected by two methods was carried out. The results demonstrated the absence of systematic error (p=0.724), confirming the analytical equivalence of the instrumental procedure to the manual method in terms of accuracy and precision criteria. The observed deviations are within the limits of random experimental variations. At the same time, the risks associated with mechanical fragmentation of coal during sampling are scientifically substantiated. Usually, a decrease in particle size leads to a systematic increase in ash content. The study of the mechanisms of coal particle segregation is critically important not only for improving sampling systems, but also for the technological stabilization of processing. An additional destabilizing factor is the segregation of particles during loading into the furnace, which can negate the representativeness of pre-selected samples. It was concluded that further granulometric studies are necessary to exclude the influence of raw material grinding by the working bodies of samplers on technological indicators. The results provide a basis for optimizing loading devices and improving the quality of multi-component charge preparation.

Keywords: coal concentrates, coal charge, sampling, ash content, pendulum sampler, segregation, representativeness, mechanical fragmentation.

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