

THE HUMIDITY OF COALS (REVIEW)

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The article is devoted to the actual problem of the presence of excessive moisture in coal, which leads to a decrease in its operational properties.

The types and properties of moisture in coal have been considered. Mathematical equations and a statistical evaluation of the effect of the maximum moisture content on the quality indicators of coals are given. The relationship between the pore volume and the maximum moisture content in coals of a various degrees of metamorphism has been analyzed. It is shown that safe humidity depends on the grade of coal and on the size class for most coal marks.

The effect of moisture on the bulk density of coal concentrates and coal charges has been determined, the changes in moisture during the coal defrosting and preparation for coking have been analyzed, and the effect of moisture on the flowability of coal charges was confirmed.

The moisture content in the coal charge significantly affects on the thermal regime of the coke oven battery and on the heat consumption for coking. Moisture also changes the thermal properties of the coal charge during loading: for wet material, the thermal conductivity coefficient is much higher than for the dry material and the water separately.

It has been shown that the maximum moisture content depends upon the nature of coal and the degree of its metamorphism, expressed by such indicators as the yield of volatile substances, the reflection of vitrinite, the content of carbon and hydrogen, as well as the calorific capacity. With the transforming of coal from a coarse size class to a fine one, the maximum moisture capacity increases due to an increasing of the specific surface area of coal. The maximum moisture capacity practically does not depend on the coal degree of oxidation and the chemical composition of coal ash.

It has been established that the bulk density reaches a maximum for dry coal and decreases to a minimum depending on the size of the pieces at a moisture content of 6-10 %.

The classification of coal charges according to moisture index has been developed.

An increase of the moisture content in coal leads to a decrease of its grindability and reduces the coal fluidity. An increase of the moisture content of the coal charge leads to an increase of the calorific value of coke oven gas, to the formation of coke of uneven size, to an increase of its porosity and a decrease of mechanical strength, and also leads to a decrease of the service life of coke ovens.

Keywords: moisture, coal, coking, preparation scheme, coke oven gas, mathematical equations.

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