

COKE SEGREGATION IN THE DRY COKE QUENCHING UNIT

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In this work are considered the main reasons for the appearance of coke segregation when it is loaded into the chamber of a dry coke quenching unit (DCQU) are considered. The formation of the distribution of coke particles of different size along the height and cross-section of the quenching chamber begins already when the coke is unloaded into the DCQU prechamber and is determined by segregation processes. In the quenching chamber, zones with coke of different fractional composition and with different hydraulic resistance are formed, which, in the end, leads to different final temperatures of the quenched coke and, as a rule, to the need to increase the flow rate of the coolant. It is shown that the segregation of coke is already formed when it is discharged from the coking chamber into the coke carrier and then transferred to the DCQU prechamber. Methods for suppressing coke segregation occurring in a coke carrier when loading into a prechamber were tested on a scale model of the DCQU.

One of the main conditions for the stable operation of the DCQU is the uniformity of the movement of coke in the quenching chamber from loading to unloading and the uniformity of distribution of the cooling coolant in the coke layer. The speed of coke movement is determined by the productivity of the DCQU or the frequency of coke unloading. The uniformity of the distribution of the coolant, in our opinion, is directly related to the laying of pieces of coke in the prechamber of the DCQU during its loading. Since the coke is not homogeneous in terms of its granulometric composition, the segregation factor should be taken into account, especially with a significant difference in size (by analogy with the segregation of coal). Segregation of coke leads to the emergence of zones with different grain-size distributions in the DCQU quenching chamber, respectively, with different porosity of coke packing, which manifests itself in the formation of zones of different hydraulic resistance, including those that prevent the passage of the coolant through the coke layer, and the creation of conditions for deteriorating technical-economic characteristics of the DCQU operation due to the increase in coke waste. The issues of coke burnout during its quenching in the DCQU are covered in sufficient detail in.

The lack of study of the process of segregation according to the granulometric composition of coke in the quenching chamber of the DCQU is evidenced by the fact that none of the more than 150 sources of information, about the segregation of coke during dry quenching in the DCQU is mentioned in any one.

Earlier, at the stage of development and subsequent modernization of the technology of dry quenching of coke in the DCQU, segregation factors were taken into account in general, in particular, when calculating the time of quenching of coke. It was assumed that coke having a different fractional composition is conventionally evenly distributed over the volume of the DCQU quenching chamber, and the average diameter of a piece of coke was used for calculation.