

**ELABORATION OF PROCESS DIAGRAM FOR COAL BLEND DRYING USING WASTE GASES**

© **S.A. Kravchenko**, Ph.D. in technical sciences, **V. Fomina**, **S.V. Chaplianko**, Ph.D. in technical sciences (STATE ENTERPRISE "STATE INSTITUTE FOR DESIGNING ENTERPRISES OF COKE OVEN AND BY-PRODUCT PLANTS" (SE "GIPROKOKS"), 60 Sum'ska str., Kharkiv, 61002, Ukraine)

*There were considered a processes and a technological scheme was developed for drying coal blend up to 5,5 % moisture content with the help of drum dryers using the heat of coke oven gas combustion products with the addition of waste gases from the chimney flue of the coke battery according to the following main initial requirements: coke oven battery capacity makes up 930000 tpy of dry gross coke; coal blend coarseness from 75 to 80 % of 0-3 mm grade; coal blend density – 1400 kg/m<sup>3</sup>, bulk weight – 700 kg/m<sup>3</sup>. Considering the need of drying department in coal blend with an average moisture content of 10,5 % (214078 kg/h), it is planned to install two working lines for drying the coal blend (two modules of 107039 kg/h each) and one reserve (one module).*

*To determine the equipment for one work line, there were calculated the material and heat balance. Conversation of the waste gases consumption of the coke battery chimney flue into thermal energy proved the efficiency of their use: the reduction of coke gas consumption is 43,56 % (the estimated consumption of coke gas for drying without the use of combustion gases is 1290 m<sup>3</sup>/h, with the use of 728 m<sup>3</sup>/h).*

*Mixing of combustion gases from the combustion unit of the drying drum and gases from the chimney flue of the coke battery is provided in the mixing chamber (before the drum). In this process, the flow of combustion gases is controlled: increasing the volume of gas supply from the chimney flue while simultaneously reducing the volume of gas supply from the combustion unit. It is also envisaged to introduce an automated system for technological processes control, which includes: collection and initial processing of input information; providing information to operational personnel about the course of the technological process; diagnostics of the main equipment of the system; increasing the reliability of the main equipment; optimization of system equipment operation mode; remote control of technological equipment in automatic and manual mode.*

*The economic efficiency of the coal blend drying process according to the developed scheme has been proven: the payback period, calculated based on the annual economic effect, is 2,9 years.*

Keywords: coking, coal blend, moisture, drying, heat treatment, heat carrier, exhaust gas, exhaust steam, dryer.

Corresponding author S.V. Chaplianko, e-mail: [chaplianko\\_sv@ukr.net](mailto:chaplianko_sv@ukr.net)

---