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DRYING OF COAL BLEND USING WASTE STEAM OF DRY COKE COOLING LANTP

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In order to increase the energy efficiency of blast coke and by-product manufacturing processes, a technological scheme was developed for coal blend drying to 5,5 % (on average) moisture content using a steam tube drum dryer (by STD scheme design) using the heat of the spent steam after the turbogenerators of the coke dry cooling plants on 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^3, bulk weight – 700 kg/m^3. 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. Each process line has the following main units: wet coal blend bin; dosing devices of continuous action, shell-and-tube heat exchangers; sluice feeders (4 nos.); unit of condensate tapping; fan; smoke fan; cyclofilters of three purification stages; pipeline fittings, throttle valves (2 nos.). The common units for three process lines are: belt conveyor, belt conveyor with flat belt, two-position valve with screw drive, double-sided drag plough and belt conveyor for dried coal blend.

The process diagram provides for implementation of automated control system of technological processes, use of instrumentation and microprocessor equipment. Transformer substation is envisaged for power supply of electric consumers of drying department.

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 under 2,9 years.

Keywords: coking, coal blend, drying, energy efficiency, steam tube drum dryer, waste steam, dry coke quenching installation.

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