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INDUSTRIAL EXPERIENCE IN STARTING UP A TUBULAR FURNACE FOR HIGH-EFFICIENCY HEATING OF ABSORBENT OIL

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The start-up of a new tube furnace based on Krupp Koppers technology in June 2025 enabled the modernization of the distillation stage and the stabilization of thermal parameters. Thanks to the furnace's radiation-convection design and the combustion of coke oven gas, uniform distribution of heat fluxes is ensured. This eliminated local overheating of the coils, reduced thermal coking in the oil, and prevented equipment clogging with carbon deposits, thereby extending the time between maintenance intervals. Calculations have shown that an oil flow rate of at least 147 m³/h is required to reduce benzene hydrocarbon losses to 3 g/m³. By reconfiguring the pumps, the absorbent circulation to the scrubbers and the column was effectively increased to 170 m³/h. During the accompanying repairs, damage to the linings of the two lower trays of the distillation column was repaired. Cleaning the oil coolers of crystalline anthracene deposits and replacing the dephlegmator seals with paronite ones allowed for precise regulation of steam flow and stabilization of the oil heating temperature upstream of the column within the optimal range of 155–165 °C. The implementation of this set of repair works ensured the normalization of the system's heat balance and the optimization of the desorption temperature gradient; at the same time, the temperature difference between the rich (inlet) and partially benzene-stripped (outlet) absorbent oil increased to the optimal range of 10–15 °C, which directly indicates the high evaporation intensity of the removed benzene hydrocarbons. The implementation of a set of measures made it possible to fully normalize the operating conditions and reduce benzene hydrocarbon losses in coke oven gas to below the design level of 3 g/m³.

Keywords: coking, coke oven gas purification, benzene hydrocarbons, absorption oil, tube furnace, radiative-convective heat transfer, desorption.

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