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ENVIRONMENTAL PROTECTION TECHNOLOGIES IN POWDER METALLURGY

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The need to expand the special properties of structural materials has led to the wide development of new technologies for their production, in particular, powder metallurgy. Its application allows to increase the efficiency and accuracy of metal production processes with various properties and various functional purposes. A particular advantage of this process is the low level of waste generation and the high level of use of resources and raw materials. At the same time, like any other production, powder metallurgy is associated with the occurrence of negative environmental impacts. An urgent task is to reduce this impact in order to increase the level of environmental safety of the industry.

Since environmental pollution at powder metallurgy enterprises includes almost all types of impacts on it, the solutions that are planned to be implemented to reduce them should be comprehensive, aimed at eliminating the maximum number of problems that arise.

In this work, the State Enterprise «Powder Metallurgy Plant», located in the city of Brovary, one of the district centers of the Kiev region, Ukraine, was used as a direct object of study. The industrial complex of the enterprise consists of the following technological areas: production of iron powder; production of sintered anti-friction and structural products based on metals

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and refractory compounds; production of sintered friction discs based on bronze; production of composite materials and products based on carbon and fiberglass; mold and tool manufacturing; shielding gas production; heat carrier production; production of consumer goods; repair and manufacturing of equipment.

The available data on the study of the environmental impact parameters of the enterprise indicate the need for a significant improvement of the environmental safety management system at the enterprise, in particular, in the direction of wastewater treatment. This task acquires special importance taking into account the immediate proximity of the enterprise to the capital of Ukraine, the city.

Water supply of the enterprise to ensure production and household needs is provided from its own artesian wells, as well as by the communal enterprise of the Kiev regional council «Brovaryvodokanal». Water treatment facilities with a pumping station are located on the territory of the enterprise. Water disposal from the enterprise is carried out under an agreement with the communal enterprise of the Kiev regional council «Brovaryvodokanal», as well as into the collector of industrial drainage sewage with a discharge to natural reservoirs, as well as to its own mono-accumulator.

The study, taking into account the current state of production and production capacity of the enterprise, made it possible to formulate proposals for improving the environmental safety management system at the enterprise by improving wastewater treatment technologies. In this direction, it is proposed to develop and introduce a technology for wastewater treatment of the enterprise according to the scheme of the reverse water supply system. In fact, the latter is a specific production system that should be implemented in the structure of the enterprise.

The reverse water supply cycle is proposed to be implemented as a complex of the following operations: separation of impurities, thickening of the residue, dehydration of the residue, disposal of the residue, withdrawal of water for replenishment, purification of the flow of water to replenish the system, water cooling, cleaning of piping systems, cleaning sedimentation tanks and filters. The last two operations should be carried out periodically in accordance with the schedule of the enterprise during periods when the wastewater treatment system does not work.

The advantage of the proposed system is the availability of thermal energy accumulated in wastewater, for its subsequent use in the technological process of the enterprise. This advantage is especially important in the winter time.