Abstract of the Ph.D. dissertation entitled

"Technology of applying manganese phosphate coatings: process optimization"

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Manganese phosphate coatings are widely used in the automotive industry due to their corrosion resistance properties. Because of their properties, they are used extensively in the production of car brake components, elevator brakes, and wind turbine drive system components.

The main aim of this work was to modify the manganese phosphate coating and evaluate the application of specific modifiers with the use of barium, calcium, cadmium, cerium, copper, molybdenum, strontium and zinc compounds, to analyze their influence on the structure and the corrosion resistance obtained. In addition, a particular element of the work was the development of an improved method of managing wastewater generated in the manganese phosphating process. The new method does not generate extra production costs, it is relatively simple and effective in itself, and thus turns out to be quite beneficial for the natural environment.

The paper presents an insightful characteristic of the manganese phosphate coating. In the first part of the research, the influence of the phosphating process conditions and the effect of adding a new element to the phosphating bath were determined and explained. The substances that were candidates for the title of coating modifiers were selected for comparative purposes. On the basis of instrumental measurements, the most effective modifier of the phosphate coating was determined. The corrosion resistance of the coating was significantly increased, and according to the corrosion rate tests of the obtained coating, zinc is the best modifier of the manganese coating.

In the second part of the research, the process of purifying the generated wastewater was improved with the use of the effective Fenton method and application of hydrogen peroxide solution, thanks to which the amount of nitrogen compounds was significantly reduced. On the basis of spectrophotometric studies, the effective dose of hydrogen peroxide was

determined as 2-3 ml of peroxide / 500 ml of sewage, i.e. from 4 to 6 dm^3 for each $1m^3$ of produced sewage.

The research carried out as part of the Ph.D. dissertation has undoubtedly expanded the scope of useful technical knowledge with its specific application aiming to improve the corrosion resistance properties of the produced manganese phosphate coatings. The analysis of the literature and experimental research included in this work presents an effective and cheap method of modifying the manganese coating and, most importantly, describes and defines the resulting structural and quality features.