

## Abstract of the PhD Thesis

with title “*Obtaining and characterization of new phosphated layers on iron support with anticorrosive and lubricant properties*” by Mr. Eng. Andrei Victor SANDU, under guidance of Prof. univ. dr. eng. Costic BEJINARIU

The PhD thesis takes part to efforts solving scientific and technological problems related to obtaining of phosphate thin layers with corrosion protection and lubrication role, used in plastic processing, and as protection of the finished piece.

The thesis has 170 pages with 99 figures, 18 tables, 7 appendix, 184 references, out of which 26 as author (11) or co-author (15).

Following successful scientific work, are the following original contributions were done:

- an extensive bibliographical study on obtaining phosphate layers and the methods and techniques for the characterization of surfaces;
- development of experimental protocol concerning selection of additive systems, cations and active surface agents;
- development of experimental protocol on involvement of modern methods and techniques of scientific investigation in order to evidenciate the structure and composition of obtained layers;
- development of two new technologies sent for patenting, with high fiability and eco-friendly;
- for the first time were done optical and electronical microscopy –for observation of the structure and the composition of the layer, in order to elucidate the mechanisms of formation of optimal layers;
- we have done for the first time the highlighting the composition of the phosphated layer by XRD, microFTIR, 3D profilometry, in order to evaluate roughness, the surface structure distribution, tribological behaviour, which have revealed a 35% lower force required for plastic drawing.
- modeling the formation of phosphate coatings with theoretical approach of reactions;
- obtaining new phosphated layer with good anticorrosive and lubricat properties and excelent price/quality ratio;
- development on the basis PhD topic of several scientific collaborations with foreign collective - *Universite de Technologie Belfort-Montbeliard* and - *Universitatea „Alexandru Ioan Cuza” din Ia i*;
- dissemination of results through publication of scientific papers in ISI and BDI, and two patent applications;
- participation to scientific events and invention shows, where the research was evaluated and awarded by Croation Invention Association, Technical University of Moldova and Technical University of Cluj-Napoca.