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Effects that the Electrostatic Fields have in a Coating Process on Irregular Surfaces

OL Luévano-Cabrales¹ and M Cantú-Sifuentes²

¹Corporación Mexicana de Investigación en Materiales, S.A., Universidad Politécnica de Gómez Palacio

²Corporación Mexicana de Investigación en Materiales, S.A.

Corresponding author's Email: olga.luevano@comimsa.com

Abstract: The quality of the surface finishes at industrial electrostatic coating processes, it depends on the interaction among the particles of coating material and the electric field, and the process parameters. When the application surface is irregular, effects of electrical fields in regions with depression or vertices hinder the required results of appearance and thickness in these regions. Namely, these effects are: the edges and the Faraday cage. Although such effects cannot be eliminated, they can be minimized through the control of process parameters. In this paper, it was carried out the simulation of the distribution of the electric field and the equipotential lines, with a finite element method (FEM) on irregular surfaces based on the electrostatic Poisson equation, it takes into account the density of the particles, compares the theoretical information with experimental results of the process on each of four irregular geometries, seeks to relate the thickness measurement with information from FEM.

Keywords: Electric fields, irregular surfaces, electrostatic coating