

## GREEN PROCESSING OF ACRYLIC POWDER COATINGS

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Polymeric powder coatings based on crosslinkable thermosetting polymers are used to provide environmental and corrosion protection to a variety of substrates for civilian and military applications. Environmental/energy issues in the manufacturing process of powder coated items are related to the three distinct steps of: a) preparation of the base polymer resin, b) incorporation of additives by melt mixing and, c) subsequent application of the powder by electrostatic spraying on the substrate followed by cross-linking by thermal or radiation means. The common perception of the advantages of using powder coatings on miscellaneous substrates vs. solvent based coatings are usually tied in only with the application stage, which may include minimal or low volatile emissions, high transfer efficiency, high solid content and superior final performance. However, there are still many elements in the lifecycle of powder coated products from manufacturing to application, which are excessive in energy consumption, solvent usage and corresponding environmental risks. In this presentation we will demonstrate a) the development of a screening methodology to estimate the energy requirements and environmental impact of subsystems based on a model system of significant commercial importance, i.e. cross-linkable powdered acrylic resins and b) the development and preliminary analysis of a conceptual, novel manufacturing process that integrates steps that have been shown to be separately feasible on an experimental level. The latter process involving UV curable powders, prepared in solventless, continuous systems has the potential of lower energy requirements and environmental impact than solvent based, thermally curable systems, attributes of particular interest to the coatings industries.