

## **Low gloss powder coatings based on new acrylic resins with improved properties**

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In this presentation the work of MEGARA during the last year to consolidate the results of WP1, 2 and 3 towards new powder coatings formulation-production technologies and benchmark trials addressing specific performance targets and market sectors is presented. A critical step has been the upscaling of the lab-scale synthetic processes and validation of the final products (resins, polymer and nano-composite powders, final coating films) obtained at semi-industrial scale. The new resins developed by MEGARA were up-scaled at Megara's pilot reactor in quantities sufficient for the validation trials performed in collaboration with IBT and its powder coating customer producers. Results obtained from the characterization of the scaled-up resins (Glow 3P, Glow 4P and Glow 5P) in terms of viscosity, glass transition temperature (T<sub>g</sub>), epoxy equivalent weight (EEW) as well as results obtained from Size Exclusion Chromatography analysis in terms of molecular weight (M<sub>n</sub>, M<sub>p</sub> and Polydispersity Index) are presented. The new resins were used for the preparation of powder coating binder systems through extensive extrusion trials, using appropriate mixtures of the new resins with a conventional polyester powder coating resin grade produced and marketed by MEGARA under the name Pudralac® 1883, Primid crosslinker XL-552 and the necessary additives, in order to validate their performance.

Extrusion trials using the acrylic resin Glow 3P for the preparation of matte powder coatings with improved properties were performed in order to monitor the coating performance in terms of gloss @ 60° and mechanical properties. In the last series of experiments, semi matt powder coatings with excellent mechanical properties were obtained. Especially, the powder coating films based on formulations 55/45 exhibited excellent mechanical properties and gloss values @ 60°C within the desired range, i.e. between 20 - 40. Systematic extrusion trials led to the production of low-gloss powder coatings with reproducibility and confirmed the results obtained at lab-scale but also at pilot-scale performed at Megara and SBS.