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PERP 2016S7 - Acrylic Latex Resins for Coatings

"Acrylic Latex Resins for Coatings" is one in a series of reports published as part of the 2016 Process Evaluation/ Research Planning (PERP) Program.

Report Overview

Acrylic latex resins are colloidal dispersions of sub-micron polymer particles in water. These resins are co-polymers, made via emulsion polymerization from two or more monomers, often including butyl acrylate, ethyl acrylate and/or methyl methacrylate. However, monomer choices include dozens of other acrylic monomers, which can be polymerized to produce pure acrylic latex resin. Styrene or vinyl acetate monomers can also be co-polymerized with acrylic monomers to adjust the cost and properties, producing styrene acrylic latex and vinyl acrylic latex, respectively.

In addition to monomer choice, latex polymers offer a number of "dials to turn" to optimize properties including molecular weight, production process, particle morphology and surface chemistry. For coatings, consumers and painters prefer low VOC acrylic latex coatings because in addition to easy application and outstanding durability, they offer other benefits during the application process such as: lower odor, better safety/lower fire hazard, and the ability to occupy indoor space more quickly.

This PERP report provides a clear, up-to-date overview of the market, economic, and technological aspects of acrylic latex resins and latex coatings. The following issues are addressed in the report:

- What is the current market environment for acrylic latex and latex coatings?
- What types of acrylic latex are commonly used in various applications and why?
- What are the production economics and barriers to entry for acrylic latex resins?
- How do acrylic resin producers select monomers for producing latex?
- How has consolidation impacted the latex industry and the downstream coatings market?
- · How are latex coatings formulated and produced?
- What are the current and likely future states of regulatory threats to the acrylic latex industry?

Commercial and Developing Technologies

Commercial acrylic latex manufacturing requires relatively simple equipment and can be carried out using a variety of different feed methods from batch to continuous. Despite the simplicity of the equipment, the major players in acrylic latex have significant intellectual property that has been developed over years of industry experience. This PERP report covers the selection of monomers, surfactants and initiators, as well as the chemistry and kinetics of free radical emulsion polymerization to produce acrylic latex. Production methodologies including: batch, semi-batch, seeded, power feed, shot growth and continuous processes are reviewed, and the applications and advantages of each are explained.

Process Economics

Detailed cost of production estimates for three different geographic regions are presented for the three primary types of acrylic latex resin:

- Pure Acrylic Latex Resin
- Styrene Acrylic Latex Resin
- Vinyl Acrylic Latex Resin

COMPARATIVE COST OF PRODUCTION OF ACRYLIC LATEX RESIN



Commercial Market Review

In addition to coatings, acrylic latex has a number of other important applications, including adhesives, sealants, textiles and non-wovens, with a total dry volume of 5.4 million dry tons per year in 2015. This PERP report reviews coatings applications for acrylic latex by region and summarizes the other key applications. In addition, the report provides historical and projected supply, demand and trade of the three major types of acrylic latex on a global and regional basis. A list of key producers in each region is also provided.

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