



TECH 2019-2: Acrylic Acid and Esters

Acrylic Acid and Esters is one in a series of reports published as part of Nexant's 2019 Technoeconomics – Energy & Chemicals (TECH) program.

Overview

Acrylic acid is mostly consumed in the production of acrylate esters and super absorbent polymers (SAPs). The acrylate esters market can be divided into two main categories: commodity acrylates and specialty acrylates. From the perspective of a new entrant in the acrylic acid and esters business, key factors that have to be taken into consideration include the end-use applications in a wide range of well-established markets, access to propylene feedstock, and the availability of technology for licensing.

This TECH report provides an updated overview of the technological, economic, and market aspects of acrylic acid and esters. The following issues are addressed in this report:

- What are the major technologies for acrylic acid and esters production? Who are the major technology holders? What are some of the developing or alternative technologies?
- Which region has the most economical advantage? Which technology has the lowest cost of production?
- What is the major application for acrylic acid and acrylates? How does growth compare in different regions? Where will future capacity additions take place?

Production Technologies

The production of acrylic acid via two-stage oxidation propylene has become the dominant and preferred method of manufacture for the largest acrylic acid producers, globally. However, there are additional petrochemical and bio-based technologies which provide alternative routes to acrylic acid.

The technologies used to produce purified glacial acrylic acid can vary enormously, with both crystallization and distillation commonly used.

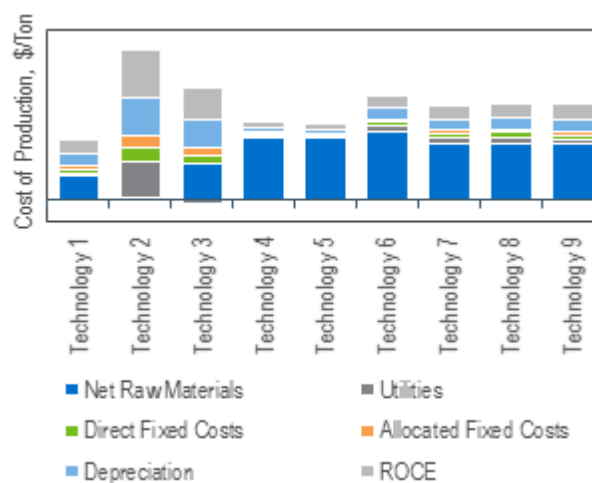
Commercially, the synthesis of commodity acrylate esters occurs through the esterification of acrylic acid and an alcohol such as *n*-butanol, ethanol, 2-ethylhexanol, or methanol.

Acrylic acid and esters technologies are tightly held by key producers and licensors. Most of the technology developers do not license their technologies. However, there a few that do or seem to license to third parties via joint ventures.

Process Economics

Detailed cost of production estimates for various technologies are presented for USGC, Western Europe, China, Japan, and Southeast Asia locations. Estimates are developed for production routes to crude and glacial acrylic acid and four esters. Sensitivity analyses on economy scale and feed pricing are also presented.

Acrylic Acid and Esters Production Costs



Commercial Overview

Global acrylic acid consumption was approximately 6.4 million tons in 2018, with acrylate esters production being the largest end-use. At the same time, the global commodity acrylate ester market is estimated at 4.2 million tons. Demand for acrylic acid and esters is expected to grow close to 3 percent annually, each, driven by Asia (the largest consuming region globally).

An overview of the supply, demand, and trade of acrylic acid and esters on a global and regional (North America, Europe, Asia Pacific, and Rest of the World) basis is provided in this report.



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- Process economics – comparative costs of production estimates for different technologies across various geographic regions
- Overview of product applications and markets for new as well as established products
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Technology and Costs comprises the Technoeconomics – Energy & Chemicals (TECH) program (formerly known as PERP), the Biorenewable Insights program (BI), the Sector Technology Analysis, and the new Cost Curve Analysis. These programs provide comparative economics of different process routes and technologies in various geographic regions.

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