NexantECA

Technology and Costs

TECH 2021S3: Super Absorbent Polymers (SAP)

Super Absorbent Polymers (SAP) is one in a series of reports published as part of NexantECA's 2021 Technoeconomics – Energy & Chemicals (TECH) program.

Overview

Super absorbent polymers (SAP) are a sub-set of polymers that can absorb liquids many times their own weight. Consequently, the predominant uses for these polymers are in hygiene products such as diapers, feminine hygiene products and adult incontinence products.

SAP is a specialized product and technology for its production has historically been tightly held by a handful of global players, which gives them control over quality and protection for their proprietary technology. These include Nippon Shokubai, BASF, Evonik, SDP Global (formerly San-Dia Polymer), Sumitomo Seika Chemicals and LG Chem. These producers together accounted for around 70 percent of total capacity in 2020, although this has fallen since Chinese producers entered the market with their own technology.

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

- What are the technologies used by the world's top main SAP producers? What are some of the recent technology improvements implemented by these producers?
- How do the process economics compare across processes and different geographic regions?
- What are the supply-demand balances for SAP globally and in the key regions in the next five years?

Commercial Technologies

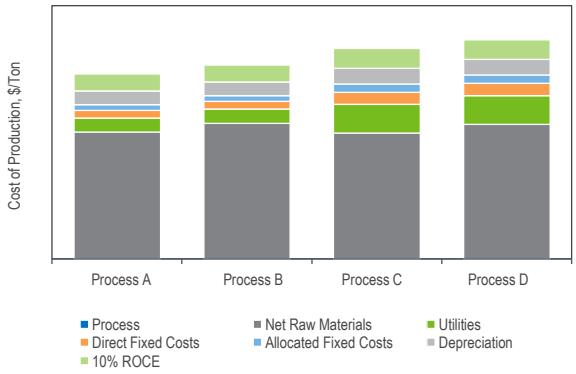
SAPs are made using one of two primary methods: suspension polymerization or solution polymerization of acrylic acid in water. Each process has certain advantages and disadvantages over the other, although solution polymerization is currently the most commonly used method.

SAP processes appear to have largely converged from the point of view of major process steps. However, there are undoubtedly considerable differences between producers within the major process steps, which are a result of the wide number of variables in SAP processes. These include starting acrylic acid purity, percent acrylic acid neutralized prior to polymerization, initiator(s) utilized, crosslinker(s), curing agent(s), reactor configuration, and extruder and dryer design, plus of course temperatures, pressures, and residence times in all of the various pieces of process equipment.

Process Economics

Detailed cost of production estimates for SAP are presented for USGC, Western Europe, China, and Japan locations. Estimates are developed for the solution and suspension polymerization processes, on both a standalone and back-integrated plant basis. Sensitivity analyses on feed pricing and economy of scale were also developed.

SAP Production Costs



Commercial Overview

The global super absorbent polymer market was just above 3.0 million tons in 2020. SAP demand into diapers accounts for 70 percent of the total consumption. Growth for SAP consumption into diapers will be strongest in countries where diaper penetration is currently low, countries where GDP is increasing, and where birth rates are high, i.e., Asia Pacific.

An overview of the supply, demand, and trade of SAP on a global and regional (North America, Western Europe, and Asia Pacific) basis is provided in this TECH report.

For more information. please contact
Technology@NexantECA.com or www.NexantECA.com

NexantECA

Technology and Costs

TECH 2021S3: Super Absorbent Polymers (SAP)

Subscribe to TECH

The TECH program (formerly known as PERP) is globally recognized as the industry standard source of process evaluations of existing, new and emerging of interest to the energy and chemical industries.

TECH's comprehensive studies include detailed technology analyses, process economics, as well as commercial overviews and industry trends. Reports typically cover:

- Trends in chemical technology
- Strategic/business overviews
- Process Technology:
- Chemistry
- Process flow diagrams and descriptions of established/conventional, new and emerging processes
- 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
- Regional supply and demand balances for product, including capacity tables of plants in each region
- Regulatory and environmental issues where relevant

Subscription Options

A subscription to TECH comprises:

- PDF reports including detailed technology analyses, process economics, as well as commercial overviews and industry trends
- Cost of production tables in spreadsheet format
- Consultation time with the project team

An annual subscription to TECH includes twenty reports published in a given program year. Reports can also be purchased on an individual basis, including reports from previous program years.

NexantECA

NexantECA Subscriptions & Reports provide clients with comprehensive analytics, forecasts and insights for the chemicals, polymers, energy and cleantech industries. Using a combination of business and technical expertise, with deep and broad understanding of markets, technologies and economics, NexantECA provides solutions that our clients have relied upon for over 50 years.

Technology and Costs comprises the Technoeconomics – Energy & Chemicals (TECH) program, 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.

NexantECA serves its clients from over 10 offices located throughout the Americas, Europe, the Middle East, Africa, and Asia.

Americas
Tel: + 914 609 0300
44 S Broadway, 5th Floor
White Plains
NY 10601-4425
USA

Europe, Middle East & Africa
Tel: +44 20 7950 1600
1 King's Arms Yard
London EC2R 7AF
United Kingdom

Asia Pacific
Tel: +662 793 4600
22nd Floor, Rasa Tower I
555 Phahonyothin Road
Kwaeng Chatuchak
Khet Chatuchak
Bangkok 10900
Thailand

For more information. please contact
Technology@NexantECA.com or www.NexantECA.com