



TECH 2021S9: Ammonium Nitrates

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

Overview

Ammonium nitrate (AN) is commonly used as a direct application fertilizer, a mixer for other fertilizers (calcium ammonium nitrate (CAN), urea ammonium nitrate (UAN), NPKs), or as an explosive. Ammonium nitrate's properties as an oxidizer allow its extensive use as an explosive, typically in the mining industry. However over the last 20 years, this same property has caused concern across most developed markets after both accidental and intentional explosions involving ammonium nitrate. As a result, more inherently safe fertilizers such as urea, CAN, and UAN have overtaken ammonium nitrate in terms of market share.

Ammonia and nitric acid are typically used as feedstocks for the production of AN, and for this reason, most ammonium nitrate producers are well integrated with ammonia and nitric acid processes upstream. Most ammonium nitrate technologies are differentiated based on their method of neutralization for ammonia and nitric acid. Similarly, most ammonium nitrate producers are positioned to operate as "swing plants" and possess the capability to produce other products such as UAN or CAN, as well as different grades of pure AN, allowing the producers to shift production campaigns to take advantage of market dynamics.

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

- What are the main routes for ammonium nitrate production? Are technologies available to license?
- What are the barriers to entry for a party interested in investing in ammonium nitrate?
- How do the process economics compare across processes and different geographic regions?
- What is the current market environment for ammonium nitrate? What applications will drive growth?

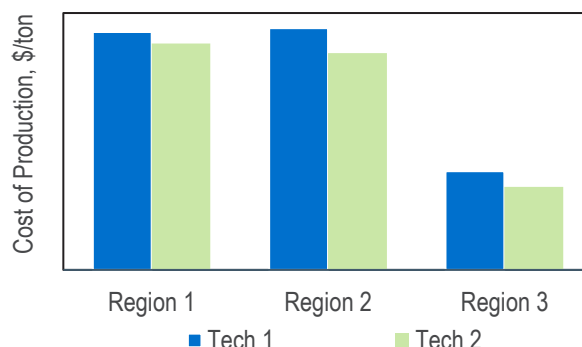
Commercial Technologies

Technology for ammonium nitrate production via ammonia and nitric acid neutralization, as well as for production of calcium ammonium nitrate and urea ammonium nitrate, is readily available from multiple licensors and technology providers. The choice of process depends on many factors, including desired product properties, level of integration with feedstock facilities or other fertilizer production, and regulation regarding AN in the region.

Process Economics

Detailed cost of production estimates for the two primary production routes for pure ammonium nitrate, as well as for urea ammonium nitrate and calcium ammonium nitrate, are presented for USGC, China and Western Europe location. Estimates are developed for vacuum neutralization and pressure neutralization, as well as estimates for UAN and CAN provided in the report.

Cost of Production Comparison for Ammonium Nitrate



Commercial Overview

Ammonium nitrate is commonly used as a fertilizer or explosive. For safety concerns in many geographic regions, alternatives to pure ammonium nitrate are preferred as fertilizers, including calcium ammonium nitrate and urea ammonium nitrate. The global ammonium nitrate capacity was approximately 85 million tons per year in 2020. Demand growth will be driven by explosives and mining sector growth, primarily in the Americas. An overview of the current and forecast capacity and demand for ammonium nitrate is provided on a global and regional (North America, Western Europe, and Asian Pacific) basis in this TECH report.



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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

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- Consultation time with the project team

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Technology and Costs comprises the Technoeconomics – Energy & Chemicals (TECH) program, the Biorenewable Insights program (BI), 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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