



# TECH 2018-5: Methyl Methacrylate (MMA)

**Methyl Methacrylate (MMA) is one in a series of reports published as part of Nexant's 2018 Technoeconomics – Energy & Chemicals (TECH) program.**

## Overview

Methyl methacrylate (MMA) is a key intermediate chemical, due to its ability to undergo polymerization and copolymerization. Polyacrylates, a family of clear and relatively durable thermoplastics, are the major source for the consumption of MMA.

MMA is an established mature market that is characterized by a number of well-established international players. Producers and / or technology developers are continuously improving MMA technologies in response to more efficient processes, downstream consumer applications, environmental issues, sustainability, etc.

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

- What are the major technologies for MMA production? Who are the major technology holders? Which technologies are available for license? What are some of the differences across the various technologies?
- How do the process economics compare across processes and different geographic regions?
- What is the major application for MMA? How does growth compare in different regions? Which region will drive future growth? Where is most of the supply centered?

## Production Technologies

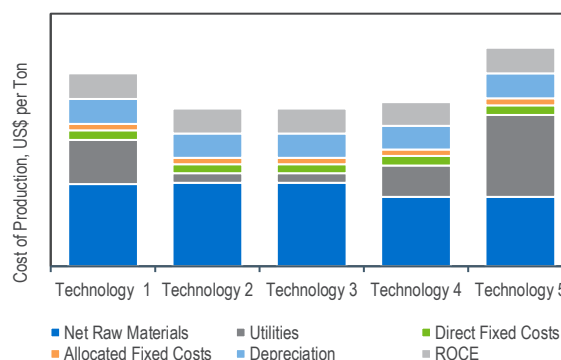
Three primary processes have been commercialized to produce MMA. These are based on ACH (C<sub>3</sub> feedstock chain), the i-C<sub>4</sub> route, and Lucite's Alpha process (C<sub>2</sub> feedstock chain). Several adaptations of the three main commercial MMA processes have also been developed to improve the process economics and reduce waste streams. Overall, the penetration of alternative technologies varies by region and is largely driven by feedstock cost differences. Mitsubishi has developed and commercialized an ACH HCN recycle process. BASF commercialized a process to produce methacrolein from ethylene and syngas, then used a standard direct oxidation process to produce MMA from methacrolein. Asahi Chemical's direct route to MMA is based on the oxidation of isobutylene (or TBA) to

methacrolein followed by its esterification to MMA. Evonik's new LiMA™ process begins with ethylene and methanol.

## 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 seven commercial routes to MMA. Sensitivity analyses on economy scale and feed pricing were also developed. Additionally, a historical analysis of the cash cost of production over the last five years is provided for the routes and regions studied in this report.

Japan Summary of Methyl Methacrylate Production Costs



## Commercial Overview

Global MMA consumption was approximately 3.6 million tons in 2017, with PMMA resin for molding and extrusion being the largest end-use. The MMA market is greatly influenced by general economic conditions and the development of new technologies and products. Demand is expected to grow above 3 percent annually driven by the automotive, construction, and electronics sectors.

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



## TECH 2018-5: Methyl Methacrylate (MMA)

### 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

**For more information please contact**  
**[Technology@nexant.com](mailto:Technology@nexant.com) or [www.nexantsubscriptions.com](http://www.nexantsubscriptions.com)**



**Nexant Subscriptions** and 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, Nexant provides solutions that our clients have relied upon for over 50 years.

**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.

Nexant serves its clients from over 30 offices located throughout the Americas, Europe, the Middle East, Africa and Asia.

#### Corporate Headquarters

Tel: +1 415 369 1000  
101 2nd St Suite 1000  
San Francisco  
CA 94105-3651  
USA

#### Americas

Tel: +1 914 609 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@nexant.com](mailto:Technology@nexant.com) or [www.nexantsubscriptions.com](http://www.nexantsubscriptions.com)**