



Melamine is one in a series of reports published as part of NexantECA's 2020 Technoeconomics – Energy & Chemicals (TECH) program.

### Overview

Melamine is a valuable commodity chemical with a broad range of applications, such as the manufacture of resins, plastics, coatings and flame retardants. In almost all applications, melamine is combined with formaldehyde to produce melamine formaldehyde (MF) resins, and sometimes with urea and formaldehyde to form melamine urea formaldehyde (MUF) resins. These resins are subsequently used for further processing, such as impregnating resins for laminates, and adhesive resins for wood panels, or cross linkers for coating resins.

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

- What are the main routes for melamine production? Who are the major technology holders? What are some of the differences across the various technologies?
- How do the process economics compare across processes and different geographical regions?
- What are the major applications for melamine? What does the historic and forecast global supply demand and trade outlook look like?
- What are the key developments in the area of sustainability? What areas do they apply to for a melamine manufacturer?

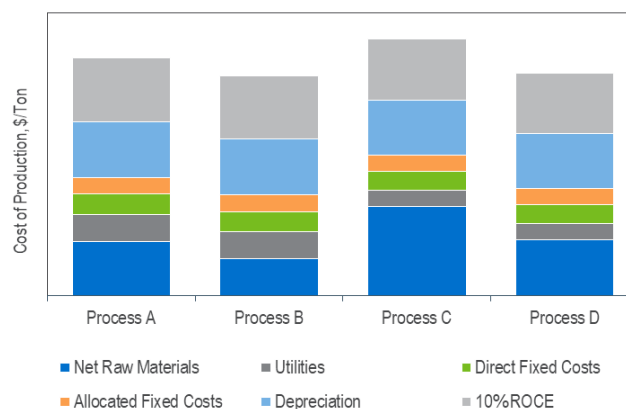
### Commercial Technologies

Urea is the primary feedstock for the commercial production of melamine. There are currently two key process routes to melamine production via a high pressure, non-catalytic process (approximately 80 bar) or a low pressure, catalytic process (approximately 10 bar). Each route includes three key stages: melamine synthesis, recovery and purification, with off-gas treatment optional.

Process technology for melamine is held by a small number of companies, although technology licensing is restricted to four key license holders.

### Process Economics

Detailed cost of production estimates for various technologies are presented for the USGC, Western Europe and China. Estimates are developed for high and low pressure processes, for plants non-integrated and integrated with upstream urea plants. Sensitivity analysis on feedstock pricing, economy of scale and capital investment were also developed.



### Market Overview

Global consumption of melamine reached about two million tons in 2019. China is by far the largest consumer of melamine globally, representing nearly 45 percent of global consumption in 2019. Nearly 50 percent of global demand is into laminates, driven primarily by the wood and furniture industries.

There are relatively few producers around the world. Following a significant increase in capacity over the last two decades, China is the largest global producer representing 65 percent of total global capacity over Western Europe in second place.

An overview of the supply, demand and trade of melamine on a global basis is provided within this TECH report, together with a global capacity listing.



## TECH 2020S4: Melamine

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- Chemistry
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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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