



TECH 2023-8: Toluene Diisocyanate (TDI)

Toluene Diisocyanate (TDI) is one in a series of reports published as part of NexantECA's 2023 Technoeconomics – Energy & Chemicals (TECH) program.

Overview

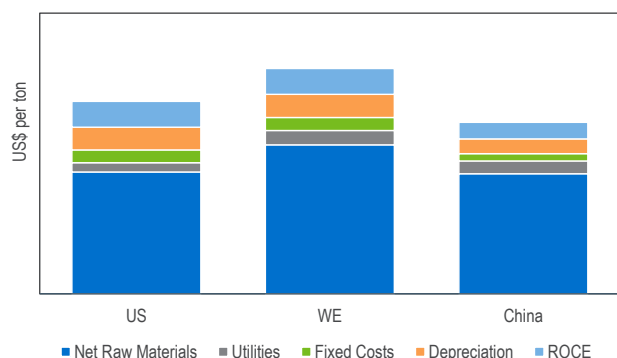
Toluene Diisocyanate (TDI) and Methylene Diphenyl Diisocyanate (MDI) are isocyanates commonly used in the production of polyurethanes. Polyurethanes can be used in a variety of materials such as paints, coatings, insulation, and plastics. Materials such as polyurethane produce long-lasting gloss finishes, show resistance to wear and to many chemicals; they work well indoors, outdoors, and in harsh industrial environments. The majority of TDI produced is used to make flexible polyurethane foams. NexantECA estimates the global consumption of TDI at 2.5 million tons in 2023.

Toluene Diisocyanate (TDI) is most commonly used as a mixture of two isomers: 2,4-TDI and 2,6-TDI. However, other grades of TDI are also commercially available. The 80/20 grade is the most used and is commonly reacted with polyether polyols to make flexible foams as well as to produce polyurethanes used in CASE applications.

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

- What are the technologies used to produce TDI, and dinitrotoluene (DNT)? And what other auxiliary technologies are required?
- How much does it cost to produce TDI and what are the costs to produce its precursor?
- What are the key end-uses and market drivers for TDI currently?

Cost of TDI Production by Geography
Capacity – 300 ktpa, 2023-Q2



Commercial Technologies

NexantECA has analyzed the process technologies required to produce TDI, DNT and auxiliary chemicals. As well as process descriptions, commentary around the availability of technologies to license by third parties has been made.

Process Economics

The economic analysis provides an overview of production costs for TDI as well as DNT in Western Europe, the United States and China in 2Q 2023. An overview of the carbon intensity of the TDI value chain is also presented.

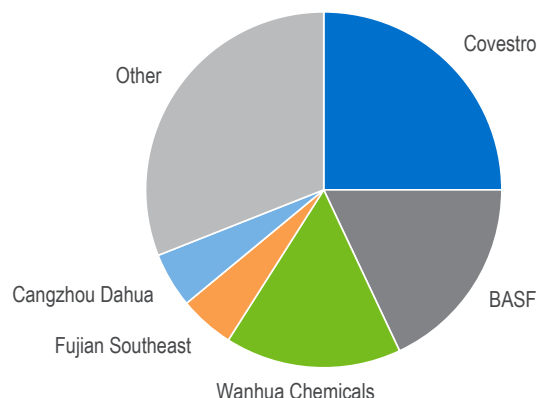
Commercial Overview

TDI is used almost exclusively to produce polyurethanes. TDI is primarily used in flexible foams for automotive and comfort applications while a smaller amount is also used in the CASE industry in more specialist applications.

The furniture and bedding sectors are the major end-use sectors for TDI and the strongest drivers of global demand growth for TDI. Both sectors are dominated by flexible foams, which makes up the largest application area of TDI.

The market for TDI is analyzed on a global and regional basis for capacity with commentary made around the key developments.

Global TDI Capacity by Marketer
3.3 million tons per year, 2023





TECH 2023-8: Toluene Diisocyanate (TDI)

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 technologies 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@NexantECA.com or www.NexantECA.com



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), 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: +1 914 609 0300
44 S Broadway,
5th Floor White Plains
NY 10601-4425
USA

Europe, Middle East & Africa
Tel: +44 20 7950 1600
110 Cannon Street
London EC4N 6EU
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