Abstract

Process Economics Program Report 31B

HEXAMETHYLENEDIAMINE

(March 1997)

This report, Supplement B to PEP Report 31, *Hexamethylene Diamine* (September 1972), reviews the technology for producing hexamethylenediamine (HMDA), one of the two precursors for the production of nylon 6,6. We also present the economics for the following alternative routes to HMDA:

- **HMDA from butadiene via adiponitrile (ADN) by hydrocyanation**
- **HMDA from acrylonitrile via ADN by electrohydrodimerization**
- **HMDA from adipic acid via ADN by ammoniation and hydrogenation.**

World production of HMDA in 1995 was estimated at 1.19 million tons (2.62 billion pounds), of which 90% was accounted for by demand in the United States, Western Europe, Japan, and Canada. The average growth in HMDA demand through 2001, is estimated at 2.2%/yr in the United States, 2.5% in Western Europe, 2.4% in Japan, and 2.3% in Canada. As of January 1996, world HMDA production capacity was estimated at 1.33 million t/yr (2.93 billion lb/yr).

In addition to its use in the production of nylon 66 fibers and resins, HDMA is reacted with other dicarboxylic acids to make nylon 69, nylon 610, and nylon 612. In addition, HMDA can be used as a hardener for epoxy resins, in the production of hexamethylene diisocyanate for weather-resistant polyurethane, and of HDMA carbamate as an accelerator in fluorinated and polyacrylate elastomer vulcanization.

This report will be of interest to those involved with the production of nylon fiber and resins,and the hardener business in epoxy resin production. The report provides both a technology review and the economics for HMDA production.

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