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PERP Report 2016-4: Vinyl Acetate

“Vinyl Acetate” is one in a series of reports published as part of the 2016 Process Evaluation/Research Planning (PERP) Program.

Report Overview

Vinyl acetate (VAM) is a key derivative of acetic acid. It is a highly versatile and important intermediate used in the production of a variety of polymers such as polyvinyl acetate (PVAc), polyvinyl alcohol (PVOH), ethylene-vinyl acetate copolymer (EVA) and polyvinyl butyral (PVB).

Although the VAM industry today is mature, incremental improvements in process technologies continue to be made. The chemistry for producing VAM is well understood and developments on catalyst performance are fairly advanced. As with most other commodity chemicals, the profit margin of VAM producers is highly dependent on the cost of the raw materials. Alternative process technologies, including renewable feedstock technology routes, may become attractive if the ethylene price increases.

This PERP report provides an overview of VAM technology, including a discussion of both generic and proprietary commercialized production routes. The production economics as well as market conditions for major regions are included. The following issues are addressed in the report:

- What are the major vinyl acetate production routes and how do they differ?
- How competitive are the different routes for new entrants from a production economics standpoint?
- What is the current market environment for VAM?
- How is the capacity of VAM plants distributed in major regions of the world today?

Commercial and Developing Technologies

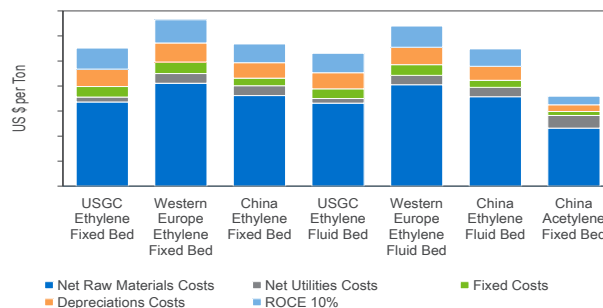
The industrial process for the manufacture of VAM has evolved over the last century. Currently, the two main commercial routes to produce vinyl acetate are (i) acetylene-based vapor phase process using a heterogeneous catalyst system and (ii) ethylene-based vapor phase process using a heterogeneous catalyst system. Mainstream producers today employ a fixed bed reactor system, with some producers having their own proprietary catalyst formulation to achieve optimized productivity specifically for their reaction conditions.

This PERP report covers both acetylene- and ethylene-based technologies as well as various commercial technologies employed by established chemical players such as Celanese, LyondellBasell and Showa Denko. The fluidized bed reactor system developed by INEOS, as well as new developments in VAM technologies, are also discussed.

Process Economics

Detailed cost of production estimates for commercial acetylene- and ethylene-based VAM technologies are presented for different regions. The fluidized bed technology, which is no longer employed commercially, is included to provide an objective comparison of the production economics.

COMPARATIVE COST OF PRODUCTION OF VARIOUS VAM TECHNOLOGIES IN NORTH AMERICA, WESTERN EUROPE AND CHINA



Commercial Market Review

Global VAM demand was approximately 6.6 million tons in 2015 and is forecast to grow at a modest rate over the next five years. Polyvinyl acetate and polyvinyl alcohol are the two largest derivative applications for VAM. Together they represented 87 percent of the total VAM consumption in 2015. This PERP report provides an overview of the supply, demand, and trade of VAM on both a global and regional basis, and includes a capacity listing for each region.

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