

## PERP Program

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Chem Systems' Process Evaluation/Research Planning program has published a new report, ***Fluidized Bed Vinyl Acetate Process (98/99S3)***.

In 1999 a total of about 4 million metric tons of VAM was produced and consumed in the world. This number is expected to increase steadily to almost 5 million metric tons in the next five to six years.

Although about 40 percent of VAM production is currently controlled by two major manufacturers, BP Amoco and Celanese, there are many producers with smaller capacities. Regardless of the individual producer's capacity, about 80 percent of the VAM production plants are more than 20 years old, and some are still using old process technology that utilizes acetylene feedstock, not ethylene.

Considering the growing demand for VAM and the relative old age and technology used in most plants, a question for the VAM industry is "What are the key success factors for VAM manufacturers in the new millennium?"

Technological innovation, which allows for improvements in expansion capability and operating reliability, will meet the growing demand for VAM and will provide a new foundation for low cost operations. It is clear that among the key strategic issues are technological issues and a key success factor is technological innovation.

BP Amoco's new fluid bed VAM process, based on a radical reactor design rather than the traditional fixed bed system, offers significant capital cost savings. The objective for this study is to examine the economic implications of BP Amoco's new VAM production technology and to place this development in commercial context.

The industrial manufacturing of VAM was first developed by Wacker via the vapor phase reaction of acetic acid and acetylene during the early 1930s. Virtually all VAM was produced by this technology until the early 1960s when the advent of selective transition metal oxidation catalysts enabled the replacement of acetylene by ethylene as the feedstock. The ethylene based routes to VAM production moved to the forefront because of the lower raw material cost, which translated into lower cost product.

In the early 1960s several liquid phase ethylene based production processes were developed and commercialized. Unfortunately, all of the liquid phase VAM plants were shut down between the late 1960s and the early 1970s due primarily to the unexpected corrosion problems that necessitated expensive equipment modifications.

The chemistry of vapor phase ethylene acetoxylation to vinyl acetate was discovered around 1960. In less than a decade, fixed bed, vapor phase ethylene acetoxylation VAM manufacturing became the process of choice. The new fluid bed process now presents another opportunity for improving the VAM manufacturing process and further decreasing production costs.

As illustrated below, Chem Systems has assessed the path of process economics improvement of ethylene based VAM processes. The improvement path crosses reactor type, economy of scale, and back integration with acetic acid production.

