**PERP Program**

May 1999

Chem Systems' Process Evaluation/Research Planning program has published a new report, ***Polyvinyl Chloride (98/99-2)***.

Polyvinyl chloride (PVC) has proven to be an extremely versatile material that is used in both rigid and flexible forms. Rigid PVC applications include pipe and fittings largely for water service (supply and drainage); profiles for windows, doors, and siding; film and sheet for packaging and construction uses; and blow molded containers for household and health and beauty products. Flexible PVC, in compounds characterized by a high loading of plasticizers, is used in a variety of applications including film and sheet for packaging, coated fabrics for upholstery and wall coverings, floor coverings for institutional and home use (bathrooms and kitchens), tubing for medical and food/drink uses, and wire and cable insulation.

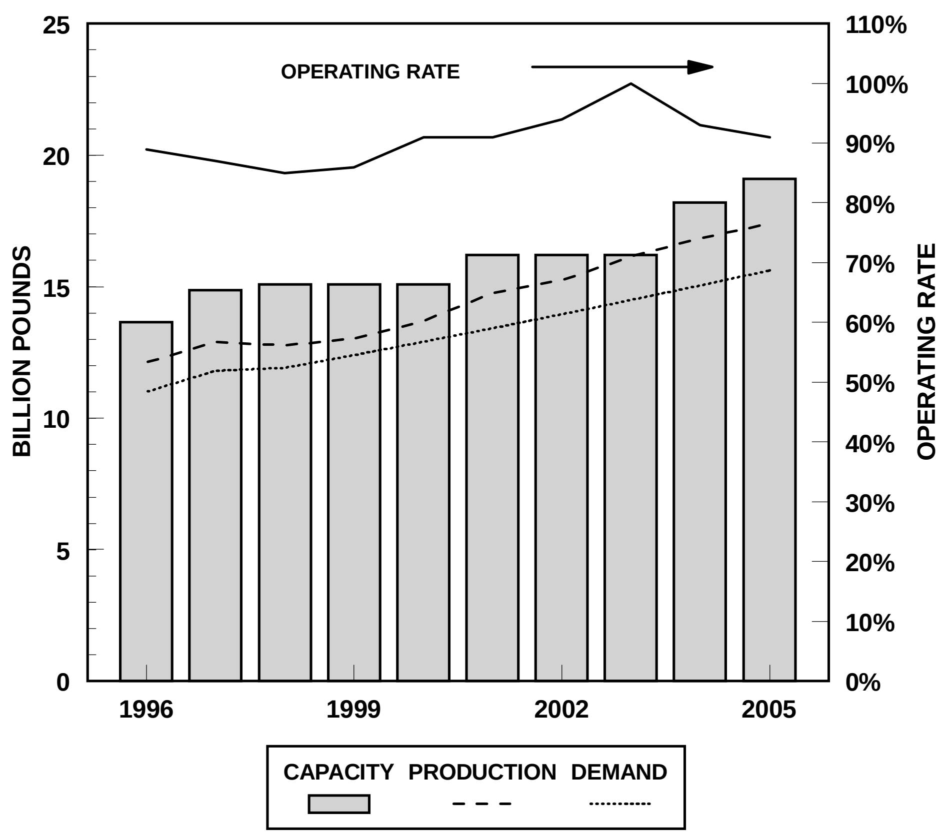
PVC is almost always converted into a compound by the incorporation of additives such as heat stabilizers, light stabilizers, lubricants, processing aids, impact modifiers, fillers, flame retardants and smoke suppressors, and, optionally, pigments. A typical rigid PVC compound can have total additives of 8 to 37 parts per 100 parts of base resin (phr). In addition, flexible PVC compounds can contain 25 to 80 phr of plasticizer.

The PVC business is presently is a state of considerable flux. Low prices and margins have resulted from considerable global overcapacity exacerbated by reduced global demand largely as a result of the Asian financial crisis. The response to low profitability has been a rash of mergers, acquisitions, and other types of cooperative business arrangements designed to reduce overcapacity, reduce unit fixed costs, and improve integration upstream and downstream of PVC production.

The major technique of polymerizing vinyl chloride monomer (VCM) to PVC is by suspension polymerization carried out in small droplets of monomer suspended in water. VCM is dispersed in water by agitation, and the droplets are stabilized by the action of a suspending agent such as a protective colloid. The activation for polymerization comes from monomer soluble initiators that generate free radicals upon thermal decomposition. Other additives such as chain transfer agents are also used, and together with the polymerization temperature, determine the polymer chain length and hence molecular weight. Since PVC is insoluble in its monomer and in water, it precipitates out as solid particles. Recovery, removal of residual monomer, and drying produce the resin product. Other processes used to a much lesser extent include microsuspension, emulsion, and solution polymerization. PVC production technology is now quite mature, and only minor ongoing improvements are being made to the established process routes.

The investment for PVC facilities is reasonably well known due to the maturity of the basic production process and equipment designs. Variations can occur, however, due to differences in detailed project scope, design standards, site conditions, owner preferences, etc. PVC facilities vary significantly in capacity, with most falling in the range of 400 million to 1,400 million (1.4 billion) pounds per year. The effects of variations in investment, VCM price, and plant capacity are illustrated by means of sensitivities to these parameters.

PVC supply/demand forecst for the U.S. is presented below. The report also includes supply/demand forecasts for Western Europe, Latin America, Japan, East Asia and the ROW.

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