

Air Products Ramps Up for Chip Industry

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By Katherine Derbyshire

Rapid growth and technological change, facts of life in semiconductor manufacturing, have repercussions throughout the supply chain. New processes require new source materials, while existing processes demand tighter specifications.

According to Joseph Stockunas, worldwide marketing manager for Air Products' Electronics Division (Allentown, PA, USA), a typical fab uses 35 distinct gases in applications ranging from dopant sources to chamber cleaning and purge gases. Air Products, which supplies 25 of these, is striving to meet exploding demand through a combination of acquisitions, partnerships, and new construction.

For example, the company recently announced a strategic alliance with Dow Corning (Midland, Michigan, USA). Dow Corning's trimethylsilane is used in chemical vapor deposition of SiCOH, a candidate low dielectric constant ($k=2.7$) material. Under the terms of the alliance, Dow Corning will continue to manufacture the gas, but will rely on Air Products for packaging in high-purity cylinders and worldwide distribution. The two companies are considering similar approaches to other products.

Stockunas explained that Air Products' partnership strategy concentrates on true integration, rather than bundling of product offerings. That is, the company looks for opportunities to reduce the customer's cost by eliminating work from the supply chain. Areas where a partnership might reduce duplication of effort include overhead, marketing, or service costs.

Trimega, a joint venture between Air Products and the Kinetics Group of US Filter (Santa Clara, CA, USA), illustrates this approach. Kinetics has a great deal of expertise in high purity piping systems, Stockunas said. In order to guarantee product purity at the point-of-use, rather than the point of delivery, Air Products needs piping expertise as well. Under the joint venture, Kinetics agrees to meet Air Products' specifications, and Air Products eliminates the need for a duplicate high purity piping team. Trimega provides valuable support for Air Products' Megasys on-site services. Stockunas said that the company owns and operates gas and chemical systems and 66 customer sites. It spends US\$2 million/day on components and piping, giving it far greater delivery time and cost leverage than any single fab.

Such value-added services help differentiate Air Products from competitors. Still, gas manufacturing and distribution remains the company's core business. Nowhere is this more evident than in the explosive growth of the NF_3 business. NF_3 is used for chamber cleans in the semiconductor industry, as a greenhouse-friendly alternative to C_2F_6 and other fluorocarbons. It dissociates more easily, Stockunas said, allowing a more efficient clean with less chamber damage and less effluent. Air Products' proprietary reactor technology improves conversion of fluorine during NF_3 manufacturing, reducing manufacturing costs. This reduction, combined with dramatic industry growth and increased attention to environmental issues, has fueled enormous demand.



**Aerial view of Air Products' Hometown,
Pennsylvania facility.**

Air Products completed a an 800,000 pound/year expansion of NF_3 capacity at its Hometown, PA site in December, 1999, but is already expanding production even further. In late May, the company announced it would more than double NF_3 production at the site to 1.75 million pounds/year by spring 2001.

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