

CORPORATE STRATEGIES

Eastman Chemical's EastaPure now comprises eight high purity products for photoresist stripping and semiconductor etching.

Eastman Chemical (Kingsport, TN) has long been an expert in acetate- and ketone-based paint binders and solvents. But it was a market study that predicted "\$3.7 million sales to this industry in 1992 with growth projected for the future," that gave Eastman the inspiration to enter the electronic chemicals market, says Mike Quillen, advanced technical representative, performance chemicals and intermediates at Eastman Chemical. The company then realized the full marketing potential of its high purity chemicals.



Quillen: high purity is critical.

Members of an electronic team were selected in 1995 from the company's production, quality assurance, R&D, technical service, and marketing divisions, Quillen says. The company then launched the EastaPure line of wet chemicals for the electronics market in 1997 under its performance chemicals business. The line was originally acetate- and ketone-based, aimed at etching and solvent applications during chip fabrication. Quillen says today most of the EastaPure products are utilized in photoresist formulas for edge-bead removal and photoresist stripping, or as etchants.

"To satisfy the demands of Moore's Law—doubling the speed of processors and halving the size of circuits etched into a silicon chip every 18 to 24 months—formulators and fabricators will continue to require higher-purity chemicals for use in critical photoresist processing, stripping and etching steps," says Quillen.

The first two EastaPure products were developed in 1995 and launched in 1997—high purity acetic acid, which tested trace metals at the parts per thousands level, and MAK Special Grade (methyl amyl ketone),

which tested for sodium at the 10 parts per billion level. Four more EastaPure products were added in 1998—EastaPure Acetic Acid, EastaPure n-Butyl Acetate, EastaPure MAK (methyl n-amyl ketone) and EastaPure PM Acetate. Quillen says today Eastman offers eight EastaPure products, "providing chemicals with rare degrees of high-purity—20 parts per billion or less for 21 critical trace metals," he says.

Eastman most recently launched the EastaPure PM Acetate Stabilized product line in early 2003, a high-purity solvent. Butylated hydroxy toluene (BHT) minimizes the possibilities of peroxides forming during all phases of production, from warehousing to transportation. It is ideal for electronic circuits and computer chips, and aids in uniformly distributing the photoresist onto the silicon wafer. Quillen says some customers prefer this stabilized form.

"Each product we offer in this family of electronic chemicals has been identified and nurtured by our team of experts to satisfy the electronics industry's most current and sensitive applications," he says. "We are committed to developing and expanding our product line for emerging electronic chemicals needs. Our newest product, EastaPure PM Acetate Stabilized, is such an example."

Quillen says new EastaPure products on the horizon include Eastman MIBK (methyl isobutyl ketone) solvent, Eastman DE (diethylene glycol monoethyl ether) solvent, Eastman EEP (ethyl 3-ethoxypropionate), and Eastman EAA (ethyl acetoacetate).

"We are always monitoring the industry in an effort to provide products that formulators and their customers will need and these products are currently being utilized in electronic chemical applications," Quillen says.

Six of the eight EastaPure products are produced in Kingsport. EastaPure DB and EastaPure Ethyl Acetate are produced in Eastman's Longview, TX facility. The company has a large clientele in Asia, however no manufacturing sites.

"Most of the significant growth in the electronics industry has occurred in Asia," he says. "This is a major concern for companies that do not have assets built in the region. As the Asian demand for electronic chemicals continues to grow, we intend to grow with it." He did not provide further details.

Due to the trend to reduce trace elements concentration to manufacture faster chips for smaller, yet

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more powerful, electronic devices, Eastman Chemical also offers purity testing.

Eastman offers a Class 1000 clean room at its main manufacturing center in Kingsport, which was built at the launch of EastaPure. Eastman has since expanded its labs to analyze trace metals to issue certificates of analysis (COAs) on every shipment. It continues to complete analysis within 24 hours. Metal ion content is measured on an Inductively Coupled Plasma Mass Spectrometer (ICPMS). For example, Quillen says it can test the sodium content in its MAK product to meet trace requirements.

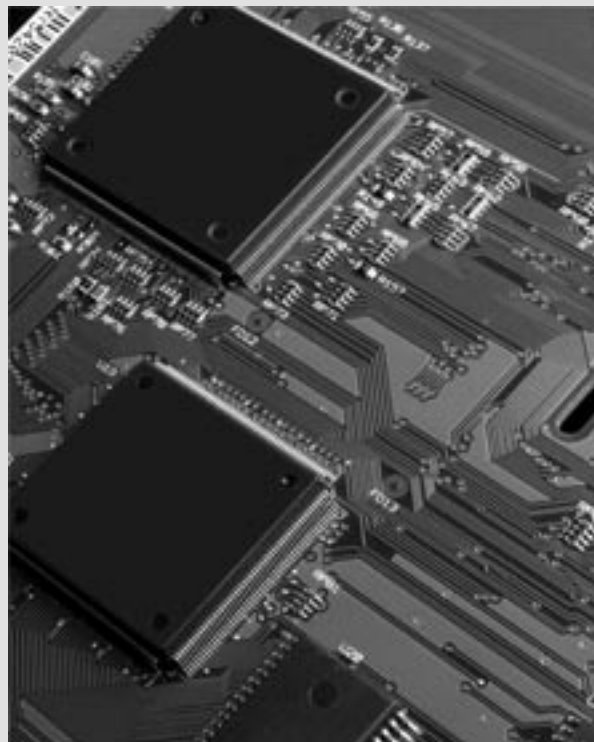
"This reduces the need for our customers to spend time and money on quality control verification upon arrival of our products," he says.

Quillen adds that Eastman offers special filtering, handling, dedicated transfer equipment, and storage, which "are essential to ensure product purity." Special packaging containers are used for samples for drum, bulk, tank trucks and railcar orders, and all EastaPure samples are provided in clean-room, high-density polyethylene (HDPE) containers. Quillen says some EastaPure electronics chemicals, such as DB solvent, are supplied in HDPE drums. Tank trucks also undergo a systematic high purity cleaning process before material transferring. Additionally, he says Eastman provides dedicated technical service for its EastaPure electronic chemicals product line from its Kingsport headquarters, as well as at technical centers around the world.

Eastman Chemical has faced some challenges lately relating to the high costs of major raw materials and feedstocks that the company purchases. Quillen says they are "near a historical high today." Eastman says it issued a price increase on November 1, 2004 for EastaPure Acetic Acid, which raised the price \$0.05 per pound in North America.

Quillen says the future of the electronic wet chemicals industry will be ever-increasing technology and purity.

"The high-tech industry has realized a market turnaround and companies jockeying for strategic advantage realize that high-purity, high-value chemicals are essential to implementing new technologies," he insists. "As electronic manufacturers aggressively seek to place increasing amounts of data on a single chip, current specification levels of parts per billion trace elements will continue to



Upcoming EastaPure products include MIBK, DE, EEP, and EEA to help etch circuits onto semiconductors.

*Eastman
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change. Also, the fast-paced electronics industry faces accelerated time-to-market goals."

He says Eastman is well equipped to meet these goals, and offers advantages such as COA testing to smooth the chemical buying process.

Eastman reported net income for the fourth-quarter ended last December jumped nearly six-fold, to \$54 million, excluding certain items, on sales up 16% to \$1.6 billion, compared to the year-ago period. External sales in the performance chemicals and intermediates division grew 31% to \$373 million during the quarter. Eastman says external sales of performance chemicals and intermediates grew 23% to \$1.3 billion for the full year of fiscal 2004.

Eastman says it expects first-quarter earnings to come in at the "high end of Wall Street expectations" when results are released on April 28. The company cites higher selling prices and reduced volatility in raw material and energy costs. First quarter margins are also expected to rise in all operating segments due to continued strong sales volume and cost reduction measures.