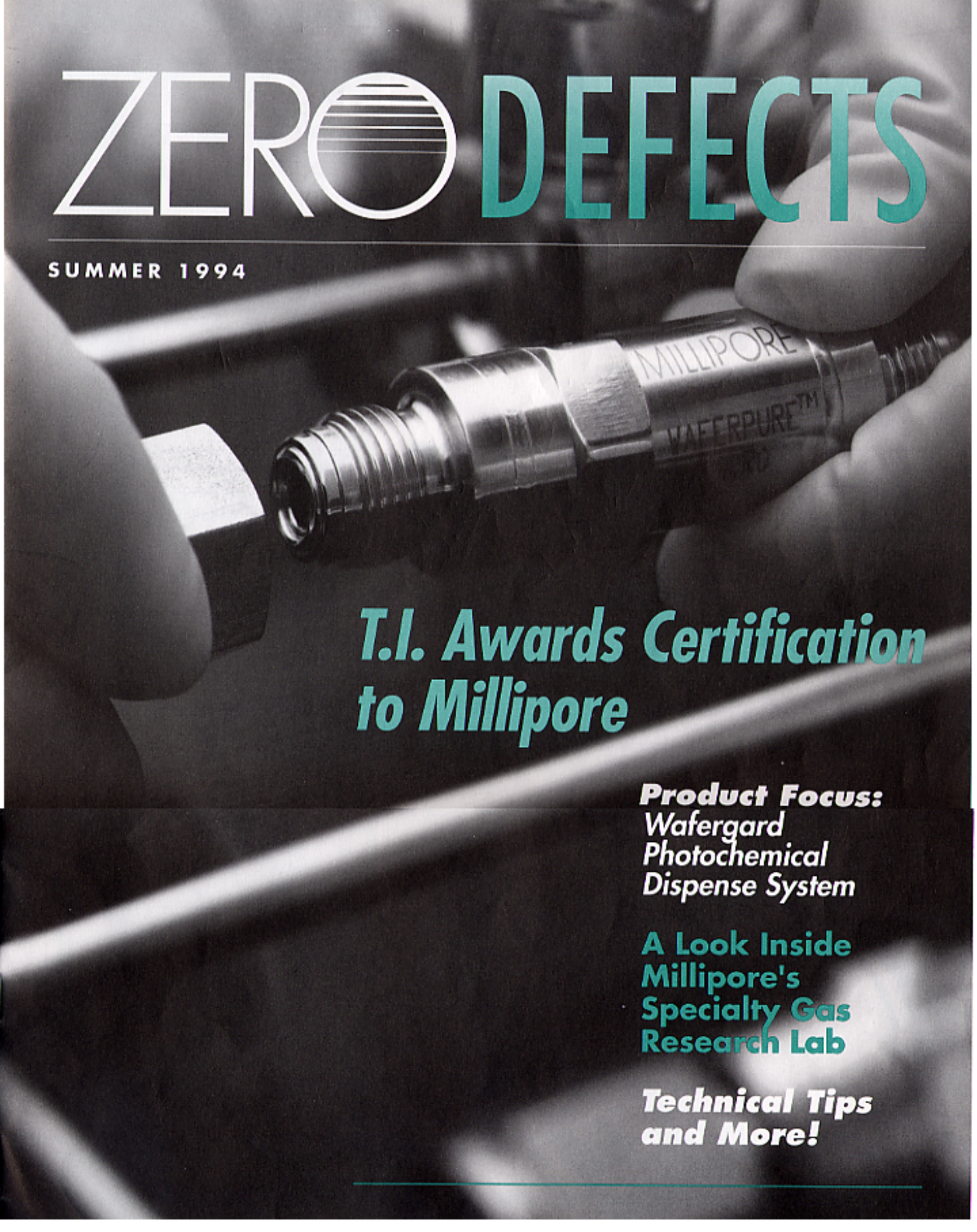
ZERO DEFECTS

SUMMER 1994



T.I. Awards Certification to Millipore

Product Focus:
Wafergard Photochemical Dispense System

A Look Inside Millipore's Specialty Gas Research Lab

Technical Tips and More!

Complete Wafergard® Photochemical Dispense Product Line Offered Worldwide

Millipore's new Wafergard chemical dispense products reflect the growing need of photolithography engineers for high precision repeatable dispense of photochemical fluids. Millipore has introduced three key products in the Wafergard chemical dispense product line this year: the Wafergard Gen-2, The Wafergard Photo-250, and the Photo-Cool.

The Wafergard Gen-2 photochemical dispense pump was developed at Millipore to provide accurate reproducible dispense of specified quantities of low-viscosity process photochemical fluids. The other two products, the Wafergard Photo-250 and the Wafergard Photo-Cool are technology acquisitions from FAS-Technologies of Dallas, Texas. The Photo-250 accurately dispenses minute quantities of high-viscosity fluids, a function now required in a wide variety of settings. The Photo-Cool chilled fluid storage and dispense system smooths the handling and storage of temperature sensitive materials while maintaining high-purity.

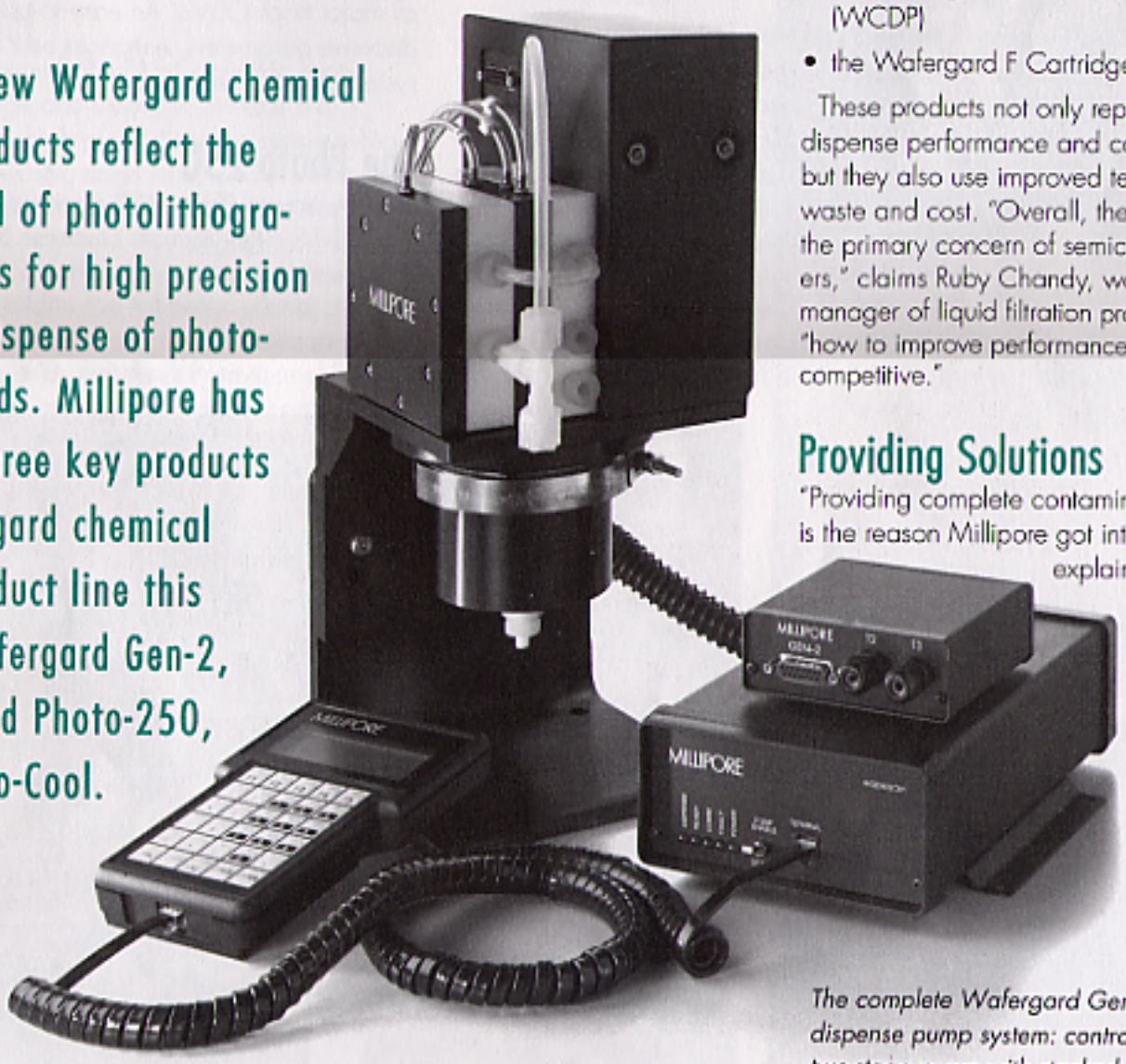
The complete Millipore Wafergard product line of pump systems and filters includes:

- the Wafergard Gen-2 Photochemical Dispense Pump
- the Wafergard Photo-250 High Viscosity Dispense Pump
- the Photo-Cool Chilled Fluid Storage & Dispense System
- the Wafergard Photochemical Dispense System (WCDS)
- the Wafergard Photochemical Dispense Pump (WCDP)
- the Wafergard F Cartridge Filters

These products not only represent state-of-the-art dispense performance and contamination control, but they also use improved technology to reduce waste and cost. "Overall, these products address the primary concern of semiconductor manufacturers," claims Ruby Chandy, worldwide marketing manager of liquid filtration products for Millipore, "how to improve performance and cut costs to stay competitive."

Providing Solutions

"Providing complete contamination control solutions is the reason Millipore got into the pump business," explains Chandy, stressing that Millipore originally entered the photochemical dispense business by selling filters to customers who bought pumps from other equipment manufacturers.



The complete Wafergard Gen-2 photochemical dispense pump system: controller, keypad and two-stage pump with stacked disc filtration.

Three configurations of the Wafergard Photochemical Dispense Pump (WCDP): precise and clean dispense of high- or low-viscosity photochemicals not requiring filtration.

"Our customers kept calling us requesting help with their dispense problems," recalls Ben Lee, photochemical product manager. "In subsequent applications research, we found that putting the filter before the pump generated microbubbles. But putting the filter after the pump created difficulties in process control conditions — you have a lack of suckback, afterdrip, and end up with poor coating uniformity."

"Eventually," Lee continues, "we concluded that the two operations, filtration and dispense, had to be integrated in order to optimize dispense performance. So we began manufacturing integrated dispense systems featuring pumps with integrated filters."

"It was the only way to solve our customers' problems," agrees Chandy. Eight years ago, Millipore introduced the first integrated filtration and dispense system, the Wafergard Chemical Dispense System, or WCDS, which quickly became the market standard.

"We are the only company which has a complete photochemical dispense product line and expertise in both filtration and dispense applications," asserts Chandy.

By the late 1980's, the continuing move to finer geometries in the semiconductor industry required higher dispense precision and even more rigorous contamination control. "We designed the Wafergard Gen-2 to satisfy these new process requirements," says Chandy. "Now as more customers are using higher viscosity photoresists and polyimides, we have added the Wafergard Photo-250 and Photo-Cool to provide high quality dispense and filtration to these applications."

The Gen-2

The Wafergard Gen-2 photochemical dispense system provides point-of-use filtration and accurate, repeatable dispense of photoresist chemicals or low-viscosity fluids up to 100 cps. In a unique patented two-stage design, Gen-2's filtration and dispense systems operate independently. The dispense rate is not dependent on the rate of filtration.

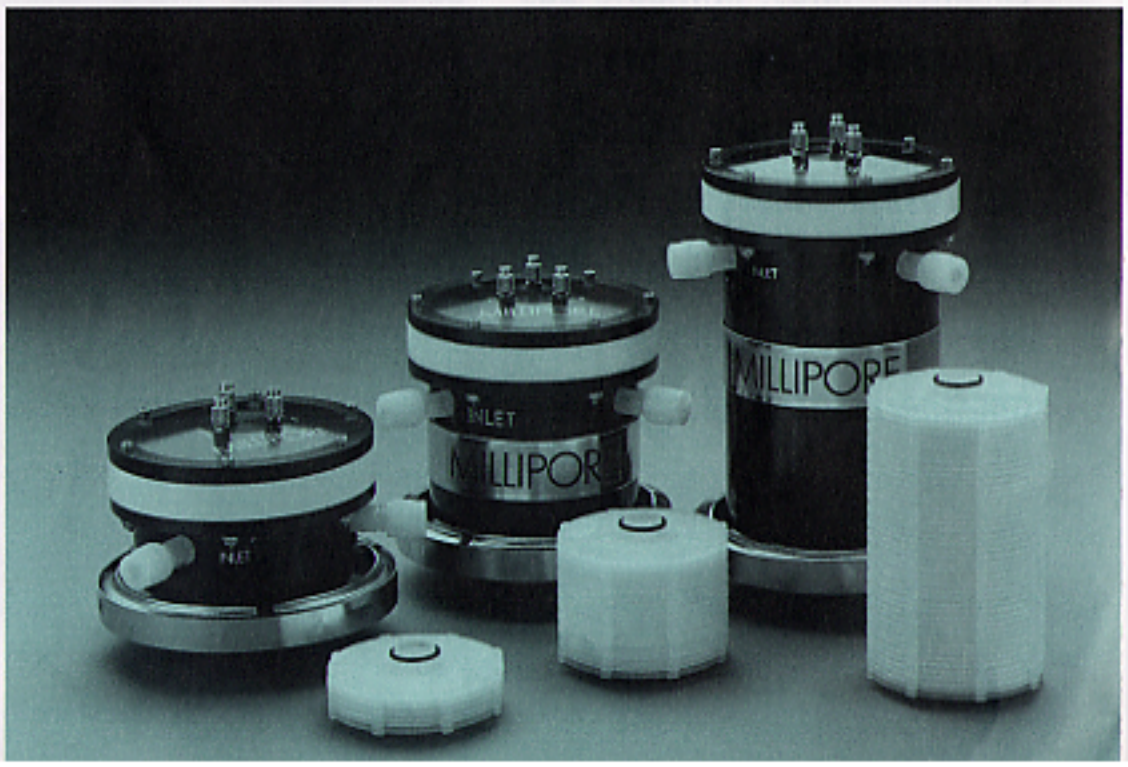
"Because of this patented design, the Gen-2 rates very highly for accuracy, repeatability, and reliability," said Lee, "Gen-2's special features ensure dispense uniformity which helps eliminate costly coating defects caused by gels, particles and microbubbles."

"Gen-2 has gained market acceptance swiftly because it provides rapid return on investment," declares Lee. "Field applications show that savings from photochemical waste reduction can pay for the unit in 4 to 6 months."

The microprocessor-controlled Gen-2 interfaces with all major track OEMs. An easy-to-use menu, listing 14 dispense parameters, enhances user flexibility. The system stores 17 recipes.

The Photo-250

The Wafergard Photo-250 dispense system (formerly the FAS-1S High Viscosity Dispense System) handles fluids with viscosities ranging from 250 cps to 30,000 cps. It is ideally suited for polyimides and viscous photoresist applications.



The Wafergard Photochemical Dispense System (WCDS). Corresponding Wafergard F 4-Stack, 16-Stack, and 40-Stack Cartridge Filters are compatible with all photochemicals and process solvents.

The Wafergard Photo-250 high viscosity dispense pump: controller, keypad and two stage pump.

Like the Gen-2, the Photo-250 has a stepper-driven motor and the patented 2-stage design noted for accuracy, repeatability and reliability.

Photo-250 dispense pumps comes with all-wetted components made of Teflon® or electropolished 316 stainless steel. The Photo-250 is microprocessor-controlled and accessible via a hand-held keypad. The microprocessor provides precise, independent control of all fluid handling functions. RS-232 and RS-422 interfaces provide optional computer access.

The Photo-Cool

The Photo-Cool (formerly the FAS-Cool High Purity Chilled Fluid Storage and Dispense System) is a turnkey, automated, high-purity dispense system which reduces chemical waste, saves time, and smooths handling of chilled fluids. Photo-Cool stores and dispenses high-purity fluids directly from their original containers.

By eliminating the need to transfer material from container to container, Photo-Cool greatly reduces the possibility of contamination and the generation of air bubbles in process fluids that result from normal handling. Suited for polyimides and other temperature-sensitive materials, the Photo-Cool operates as a stand-alone or can be installed with the Photo-250 or other fluid handling components.

The Photo-Cool storage chamber

Millipore Introduces New Wafergard Photo-250 High Viscosity Dispense Products

As of March 1, 1994, Millipore acquired the exclusive global right to market and distribute the FAS-Technologies line of high-viscosity fluid dispense systems and accessories. The FAS-1S high-viscosity chemical dispense system and its FAS-Cool high-purity chilled fluid storage and dispense system will now be marketed under the Wafergard trademark as the Wafergard Photo-250 and Photo-Cool respectively.

FAS-Technologies, Inc., located in Dallas, Texas, is the leading supplier of high-purity, high-viscosity digital fluid dispense systems in the world.

FAS-Technologies will manufacture the dispense systems exclusively for Millipore and will continue to provide turnkey solutions directly to customers when custom and/or integrated storage systems are required. Millipore and FAS will jointly develop the next generation of high-viscosity chemical dispense and handling products.

"The FAS-Tech pump has been very successful in the U.S. market," remarks Ben Lee, worldwide product manager of photochemical products for Millipore. "Millipore's strength in sales and service globally will now allow the pump to be sold and fully supported at customer sites worldwide. The Wafergard Photo-250, with its ability to repeatably dispense and filter high viscosity resists and polyimides up to 30,000 centipoise, and the Wafergard Gen-2, which is recommended for high-precision dispense of low viscosity photochemical process fluids, allow Millipore to offer a complete dispense/filtration solution for any customer need."