



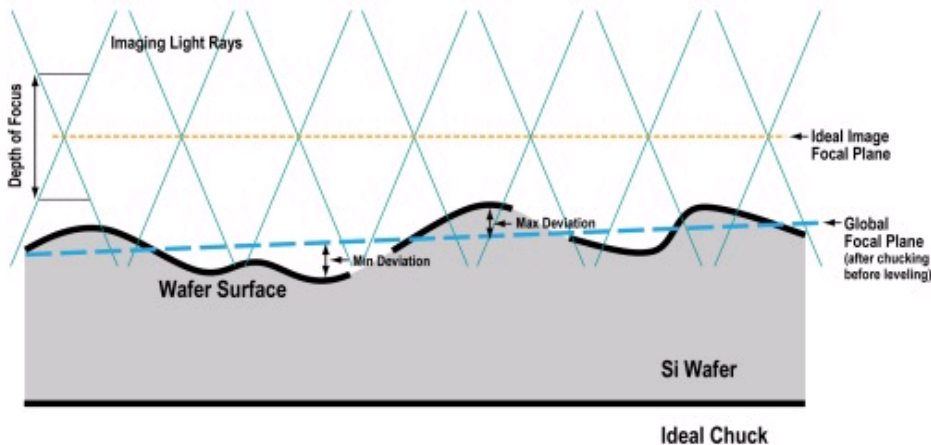
NOVELLUS

NOVELLUS' PETER WOLTERS DIVISION DEVELOPS 22nm DOUBLE-SIDED SILICON WAFER POLISH PROCESS

MicroLine® Technology Produces Extremely Flat Wafers to Meet Chip Manufacturing Lithography Requirements at 22nm And Beyond

San Jose, Calif. - June 23, 2009- To address the challenges of wafer polishing at future technology nodes, Peter Wolters GmbH, a wholly-owned subsidiary of Novellus Systems (NASDAQ:NVLS), has recently developed advanced polishing technology for its MicroLine AC 1500-P³ and AC 2000-P³ double-sided silicon wafer polishing (DSP) systems that will meet the lithography requirements for semiconductor device manufacturing at 22nm and beyond.

With current state-of-the-art semiconductor manufacturers beginning to enter 32nm high-volume manufacturing, leading manufacturers of wafer polishing equipment are already considering the planarity requirements for silicon wafers at the 22nm technology node. At these next generation nodes, extremely tight requirements are being placed on both the shape of the prime wafer and the flatness of its surface. Since semiconductor device structures are patterned using optical lithography, the achievable process window or depth of focus becomes governed by the flatness of the area being exposed by the optical beam. The "degree of silicon wafer local flatness" as measured by the Site Frontside Least Squares Focal Plane Range metric (or SFQR, see Figure 1) defines the acceptable level of silicon wafer surface planarity for use in advanced IC manufacturing. Lithography processes require the SFQR value to be much smaller than the depth of focus. To meet the current needs of 32nm lithography, the SFQR-max value is typically less than 30nm for a site size of 26 mm x 8 mm with an edge exclusion of 2 mm. A double-sided silicon wafer polish is required to achieve low SFQR values at these advanced nodes. Another significant challenge during the polishing step is to control wafer planarity (parallel front and back wafer surfaces) while preventing the pad from rounding the edge of the wafer.



SFQR = Site Frontside Least Squares Focal Plane Range

Figure 1: The degree of silicon wafer local flatness.

Peter Wolters has engineered advanced, patent-pending sensor and process control capabilities into its latest polishing systems, allowing the AC-1500 P³ and the AC-2000 P³ to achieve SFQR-max values of less than 20nm -a requirement for 22nm lithography (see Figure 2). Excellent front to backside parallelism is achieved using stress-free guidance of the wafer throughout the polish step. The process control enabled by this new technology delivers a more homogeneous polishing process with no edge rounding out to 1 mm of edge exclusion. When used for today's 4Xnm and 3Xnm production, the MicroLine's flatter wafers widen the depth of focus process window, resulting in improved critical dimension control. This larger process window increases patterning yield and lithography productivity through better scanner-to-scanner matching and reduced qualification and set-up time.

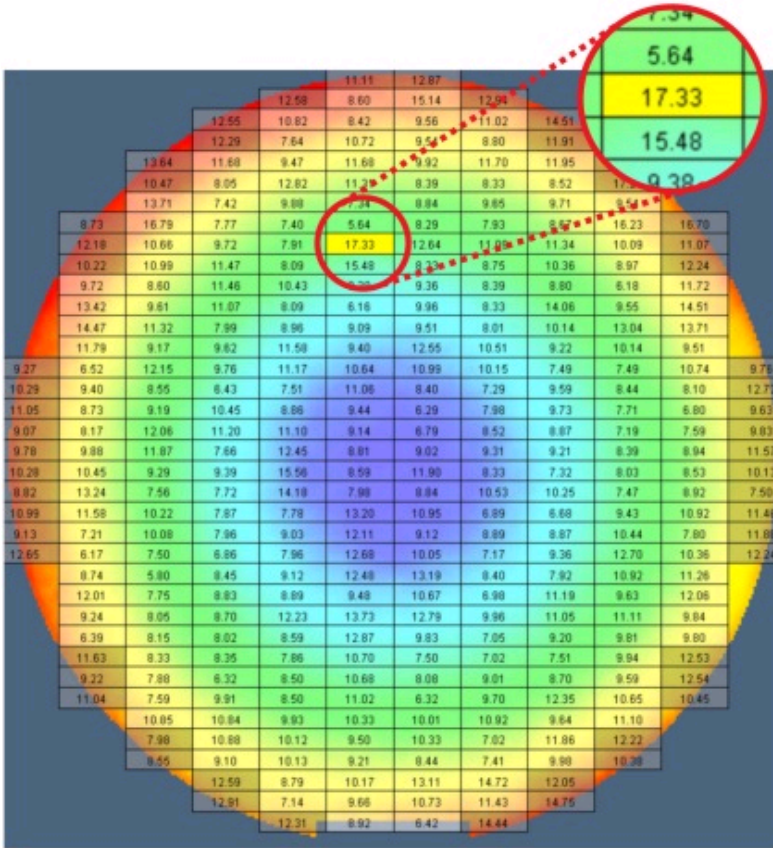


Figure 2: DSP wafer map for a 22 nm lithography process with 1 mm edge exclusion. SFQR_{max} value is 17.33 nm.

"The in-situ data obtained by the MicroLine's temperature and eddy current sensors allow us to adjust the process parameters to match the polishing consumables with the incoming wafer geometry," said Kay Petersen, executive vice president of Novellus' Industrial Applications group. "Our silicon wafer polish systems are ready today to enable 22nm lithography development."

For more information on Peter Wolters' double-sided prime wafer polishing technology, go to www.NovellusTechNews.com.

About Peter Wolters:

Peter Wolters GmbH, a component of Novellus' Industrial Applications group, is a leading manufacturer of high precision surface polishing systems for substrates made of silicon, sapphire, gallium arsenide, silicon carbide and other materials used in the manufacturing of microelectronic, micro-optical, and micromechanical devices. The company's AC-1500 P³ and AC-2000 P³ double sided polishing systems provide world class process results in terms of local and global geometry control (SFQR, GBIR) and haze removal. Peter Wolters is headquartered in Rendsburg, Germany.

About Novellus:

Novellus Systems, Inc. (Nasdaq: NVLS) is a leading provider of advanced process equipment for the global semiconductor industry. The company's products deliver value to customers by providing innovative technology backed by trusted productivity. An S&P 500 company, Novellus is headquartered in San Jose, Calif. with subsidiary offices across the globe. For more information, please visit www.novellus.com

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