

Hitachi High-Tech Launches New CD-Measurement SEM CG5000 -For development of 1Xnm generation processes and mass production of 22nm generation products and beyond-

Hitachi High-Technologies Corporation (TOKYO: 8036, Hitachi High-Tech) has developed a new high-resolution CD-SEM^{*1}, the CG5000, that meets measurement needs of leading-edge ultrafine processes for semiconductor devices. The new product will be formally announced at SEMICON Japan 2011 (December 7-9, 2011, Makuhari Messe), and sales will commence.

The device is a full model change from the current CG4000 series, updating the platform for development of 1Xnm generation processes, and mass production of 22nm generation devices and beyond. It is a state-of-the-art CD-SEM that realizes high throughput, high resolution, and high-accuracy metrology repeatability.

The manufacture of advanced semiconductor devices has seen ultrafine devices continued to evolve, with mass production of 36nm (DRAM half pitch), 32nm (MPU half pitch), and 25nm (Flash half pitch) level devices already underway. Meanwhile, preparation for development of 1Xnm generation processes and 22nm mass production is well advanced. Since CD-SEMs are key to ultrafine process pattern dimension management needed to create these new generation devices, there has been a pressing need to develop CD-SEMs with higher resolution capabilities.

The new CG5000 is designed to meet the needs for higher accuracy and versatility in development and manufacturing processes of new generation semiconductor devices. Hitachi High-Tech achieved new records^{*2} for throughput and metrology accuracy repeatability with the CG5000 by redesigning the transfer system and employing improved electron optics and image processing technologies.

Moreover, a new automatic calibration function^{*3} maintains high stability on mass production lines over the long-term, while new measurement technologies and application functions allow the machine to cope with measurement challenges posed by new processes and materials. The CG5000 thus provides a total solution to development of 1Xnm generation devices that will be a powerful aid to customers engaged in development and efforts to increase throughput in mass production lines.

Hitachi High-Tech launched its first CD-SEM, the S-6000, in 1984. Since then, the Company has shipped over 4,000 units including the CG4000 series, capturing the top share of the global market. With the launch of the new CD-SEM CG5000 model for 1Xnm generation processes, Hitachi High-Tech continues to contribute to the evolution of ultrafine semiconductor devices.

<Main Features>

1. High throughput: Complete redesign of the transfer mechanism achieves higher throughput than ever before. Approximately 40% higher than the CG4000 series (Sample used: Hitachi standard wafer)
2. High resolution: Capable of measuring ultrafine patterns with high accuracy for 1Xnm generation process development
3. Long-term stability:
 - (1) Improved repeatability: Variable pixels stabilize the optoelectronics system and optimize the measurement area to achieve high repeatability
 - (2) Improved matching performance: Machine difference between same models is minimized to achieve high efficiency with in a mass production line.



New Model High Resolution CD-SEM CG5000

< Main Specifications >

Wafersize	Φ300mm(SEMIstandardVnotchedwafer)
Resolution	1.45nm(withsignalprocessingfunction on) 1.80nm(withsignalprocessingfunctionoff) (Acceleratingvoltage800V,inHRmode)
Measurementrepeatability	0.25nm(3 σ)
Auto-loader	3FOUPcompatiblerandomaccess
Throughput	50wafers/hour(at20measurements/wafer)

(These are basic specifications. Measurements were carried out using Hitachi standard wafers and Hitachi standard procedures.)

*1 Critical Dimension (CD)-SEM: A scanning electron microscope (SEM) for measuring the microscopic circuit pattern on semiconductor wafers. This measuring system is used in the inspection processes of semiconductor device development and mass production lines and plays a vital role in process yield control.

*2 Compared with other Hitachi High Tech products

*3 A function that automatically adjusts the axis of the electron beam at regular intervals to improve long-term stability.

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