

Opening Up New Possibilities in Semiconductor Device Fabrication Technologies



Wasuke Nakano

*Executive Managing Director & COO
Device Manufacturing Systems Business Group
Hitachi High-Technologies Corporation*

THE market surrounding semiconductor devices—key components of the IT (information technology) and electronics industries—is beginning to look brighter as new consumer demand grows. Responding to this situation, the field of semiconductor fabrication is trying simultaneously to pursue development of technologies for sub-100-nm high integration and production improvements to further lower costs.

The above-mentioned development of technologies for semiconductor fabrication is centered on the utilization of 300-mm-diameter wafers. Moreover, the need for high-speed image processing, wireless-function support, and mixed-IP (intellectual property) in semiconductor devices is leading to demands for fabrication technologies that support high-precision manufacturing at CDs (critical dimensions) as well as improvements in the capability of fabrication equipment and speeding up of product development.

Under these circumstances, Hitachi Group is responding to these needs by making existing in-line inspection functions (which makes full use of nanotechnology) faster and higher quality and by establishing systems that will utilize this in-line inspection function effectively on the production line. In addition, we are focusing on developing various types of fabrication equipment that will allow the so-called process window for the miniaturization of

system LSIs to be widened.

Meanwhile, in the current severely depressed investment environment, a big concern for device manufacturers is how to increase their ROI (return on investment). With this in mind, manufacturers are pursuing various technological developments aiming at introducing “e-manufacturing”—namely, the effective utilization of IT—in their semiconductor plants. The target of such technologies is to somehow increase the utilization rate of fabrication equipment, which contributes to chip productivity. The key technology to hit this target is APC (advanced process control)—which combines sensors and monitors with the “engine” of fabrication equipment to provide the setting and control for the optimum process conditions. In short, APC is said to be a huge service system that can comprehensively pursue the most effective ways to apply current technologies. We think our missions as an equipment supplier are to provide a total service (right up to the point of establishing production operations, including maintenance) to our customers and to promote advanced technologies as well as reduce costs according to industry standards.

Hitachi Group’s future aim is to provide “Best Solutions”—individualized to meet the customer needs—for realizing the production of leading-edge semiconductor devices in a timely fashion.