

Overcoming the Limits of Semiconductor Manufacturing Technologies



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AGAINST the background of a recovering IT industry and a massive Asia market, device makers are gearing up for the mass production of advanced semiconductor devices. The Hitachi Group is working to improve productivity in fine processes below 90 nm by offering “Best Solutions” through manufacturing, inspection, and analysis systems that make full use of advanced technologies. In these times of corporate reorganization and the forming of alliances and consortiums, the Hitachi Group is proposing new technologies and new systems that anticipate next-generation device manufacturing technologies.

First, for 90-nm nodes and beyond, as the production process margin becomes increasingly severe, a means must be found to speed up development from prototyping to mass production while maintaining high levels of quality. Solving this problem will require high-precision processing above and beyond critical dimensions as well as improved equipment performance and accelerated product development. To meet these needs, the Hitachi Group is developing high-speed, high-precision inline inspection functions using nano-technologies and a system that enables those functions to be applied effectively within the manufacturing line. It is also working to develop various types of manufacturing equipment having a wide process window that can support finely structured system LSIs

(large-scale integrations).

At the same time, increasing return on investment (ROI) has become a major challenge for device makers in an increasingly difficult investment environment. This situation has promoted various technical developments toward the realization of “e-manufacturing” in semiconductor plants making use of ITs. The objective here is to raise the actual operation rate of equipment that contributes to chip production, and to this end, APC (advanced process control) is a key technology for maintaining and controlling processes in a stable and optimal manner.

Another key technology here is remote diagnosis, which can be quite effective in identifying faults and maintaining equipment thereby improving equipment operation rate. In short, e-manufacturing can be viewed as a huge service system for determining how to utilize current technologies to achieve maximum effect.

In light of the above, the mission of an equipment supplier is to support the expansion of e-manufacturing technologies and promote industry standardization to lower costs while providing total service up to and including operations and maintenance.

From now and into the future, the Hitachi Group will work to provide Best Solutions for the production of advanced semiconductor devices to meet diversified customer needs.