



1990s

SMIF for wafer transfer

~ Discrete Semiconductor/Others ~

SMIF (Standard Mechanical Interface) is a mechanism in semiconductor manufacturing in which wafers are enclosed in a closed storage pod, conveyed between processes, and taken in and out of the manufacturing equipment through a load port. This system was developed by Hewlett Packard in the 1980s, and SMIF pods and load ports were commercialized by Asyst Technologies.

Since the 1960s, wafers had been stored in cassettes and conveyed between process steps in semiconductor manufacturing. Since the cassette was an open type, the wafers were contaminated with impurities and particles in room air during the convey process, and the cleanliness of the clean room improved according to advances of miniaturization. The SMIF system sealed this cassette to prevent contamination from surrounding air. The SMIF system was adopted in some parts of the United States and Taiwan as the fabrication technology entered the era of submicron region where higher cleanliness was required in the 1990s.

On the other hand, the largest source of contamination for wafers are derived from working people. Therefore, automation of semiconductor manufacturing began in the 1980s. It was a method that did not involve humans, the source of the pollution, in which AGVs (Automatic Guided Vehicles) and overhead conveyer systems were used to carry wafer cassettes to the processing equipment and cassettes stored wafers were loaded and unloaded into and out of the processing equipment by robots. The SMIF was a suitable system that could be adapted to the automation of the manufacturing process.

Standardization of the 300 mm wafer process began in the latter half of the 1990s and SEMI standard for SMIF wafer pods (FOUP; Front-Opening Unified Pod) and load ports were established. The 300 mm wafer process lines throughout the world, which began full scale production since 2000s, had been constructed with this standardized SMIF system.