

Case Study I

Eaton NV-10 Ion Planter

Process and Machine Problems

Electron-shower failure caused wafer charging. About 1000 wafers with zero yield were run before the damage was detected at a routine test. It took another 24 hours to understand the cause of the failure. (Wafer charge damage can only be detected using an electrical test).

The damage was calculated as follows:

Cost of scrapped wafers -	1000 wafers @ \$300/wafer	\$300,000
Machine downtime to find the cause and fix -	24hours @ \$500/hour	\$12,000
Process and maintenance work -	50 Hours @ \$100/hour	\$5,000
Cost of test wafers -	30 wafers @ \$20/wafer	\$600
Delayed product, re-catch production, est. -	1000 wafers @ \$50/wafer	\$50,000
Other equipment idling, 1% low overall fab utilization –	24hours @ \$600/hour	\$14,400
	Total one-case loss	\$382,000

The TadiGuard Solutions

After the catastrophic occurrence, a TadiGuard was immediately installed. The outputs of the DCM (Discharge Current Monitor) voltage, the Electron-shower currents and voltages were connected to the TadiGuard and alarm levels were set.

In addition, the end-station is fully monitored, the acceleration and extraction voltage and current are monitored, the AMU number, vacuum levels, sliding seals and many other parameters are now in full control.

Ultimate Results

- A crash situation like the one mentioned above can not happen again, since the machine will be stopped if a critical parameter deviates from pre-set boundaries.
- Wafers that were previously in doubt (end-station 'freeze', with risk of double implant or no-implant) are now easily moved-on with no risk.
- "Crashes" are now minimized.
- Less engineering work, tests, test wafers and maintenance adjustments are needed.

Over-All Fab Yield, Capacity And Profitability Were Increased!