Stand-Alone CMP Polisher Throughput Improvement Utilizing a Continuous Load / Unload Method

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The throughput requirements of a high volume wafer fab demand that all production equipment perform at their most efficient level. Process tools that were once comfortably utilized in batch processing mode need to be pushed to perform at even more aggressive throughput levels.

One such processing tool is a stand-alone, four input port CMP polisher. The tool's physical configuration lends itself naturally to batch processing of wafer lots. Once a processing run is started, it is not intuitive to the operator how to pause and restart the tool to avoid batch processing.

- The wafers must be transferred to dedicated cassettes prior to processing.
- The cassettes containing unprocessed and processed wafers sit submersed in DI Water.
- Wafers are processed serially, unloading from the cassette to the polisher and back again upon completion of the polish process.
- The tool's robotics must be disabled in order to load and unload cassettes.
- Processed cassettes must be transferred into a post-CMP scrubber. If none is available, the wafers, and the polisher, must wait.
- The polisher is capable of processing 40 wafers per hour, but in batch processing mode, considering load and unload time, the tool's true throughput is less than 25 wafers per hour.

A method of continuously loading and unloading the polisher was developed that results in throughput of greater than 35 wafers per hour. This method relies on minimizing the amount of time that the tool is paused for cassette transfer. All preparative operations are performed prior to pausing the tool, while the polisher is processing wafers.

By utilizing this method, Freescale CHD-Fab CMP group has been able to avoid purchasing additional Mirra polishers and has made a significant contribution to the increase in CHD-Fab CMP tool productivity.