Improving Water Utilization For CMP Processes and Equipment

by

Michael Tritapoe, P.E.
Senior Staff

Environmental Operations & Manufacturing Support
Overview

- CMP project review outline
  - Tool flow measurements and water characterization
  - Balance tool conditions and maintain equal flows in process
  - Rinse optimization on tools to fit manufacturing needs
  - Work with process engineers to understand the process flow and ensure changes are to low impact elements of tool
Methodology

- Conductivity & flow measurements using an Orion Model #130 & Panametrics Ultrasonic Flow Meter
- Tool measurements taken at beginning and end of polish pad life
- Measurements of time required to recover baseline conductivity
- Trace metal, wafer particle count, TXRF analysis etc..
Conductivity vs. Time for Oxide Polishers
(Data for new and old pads)

Note: Index water table flow is 3.5 l/min.
Comparison of Tool Set Process Flowrates

Water Flow (L/min)

Process Step:
- idle
- rinse
- unload and polish
- main sprayers
- final sprayers
- blowoff
- wet mode
- unload st. fill
Note: A total of 1034 gallons of water was supplied during this time period.
Proposed Work

- SRC could possibly concentrate on increased CMP research efforts such as:
  - Wafer analysis on pre and post pad life
  - Tool manufacturers optimization & modifications of flow controls
  - Reduce & standardize tool flows
  - Possible on board tool recycling efforts
AMD - Conclusions

- Index table water is not to UPW specifications after first polish run
- Pad life is assumed to have no effect on index table water quality
- System never recovers to baseline conductivity
- Verify flows and measurements during idle & process conditions