FPS Metrology Sampling Optimizer (MSO)

Intelligently allocate metrology capacity to optimize coverage and improve product quality

INFICON

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SMART integrated metrology sampling

The FPS Metrology Sampling Optimizer (MSO) manages all your sampling needs to ensure maximum equipment coverage with no over-sampling. MSO provides baseline sampling using time and percentage-based sampling rules. MSO also provides critical event-based sampling to identify substrates for measurement after a tool down or qualification event. For all sampling rules, MSO actively minimizes the number of measurements needed to satisfy all configured rules.

ADVANTAGES AT A GLANCE

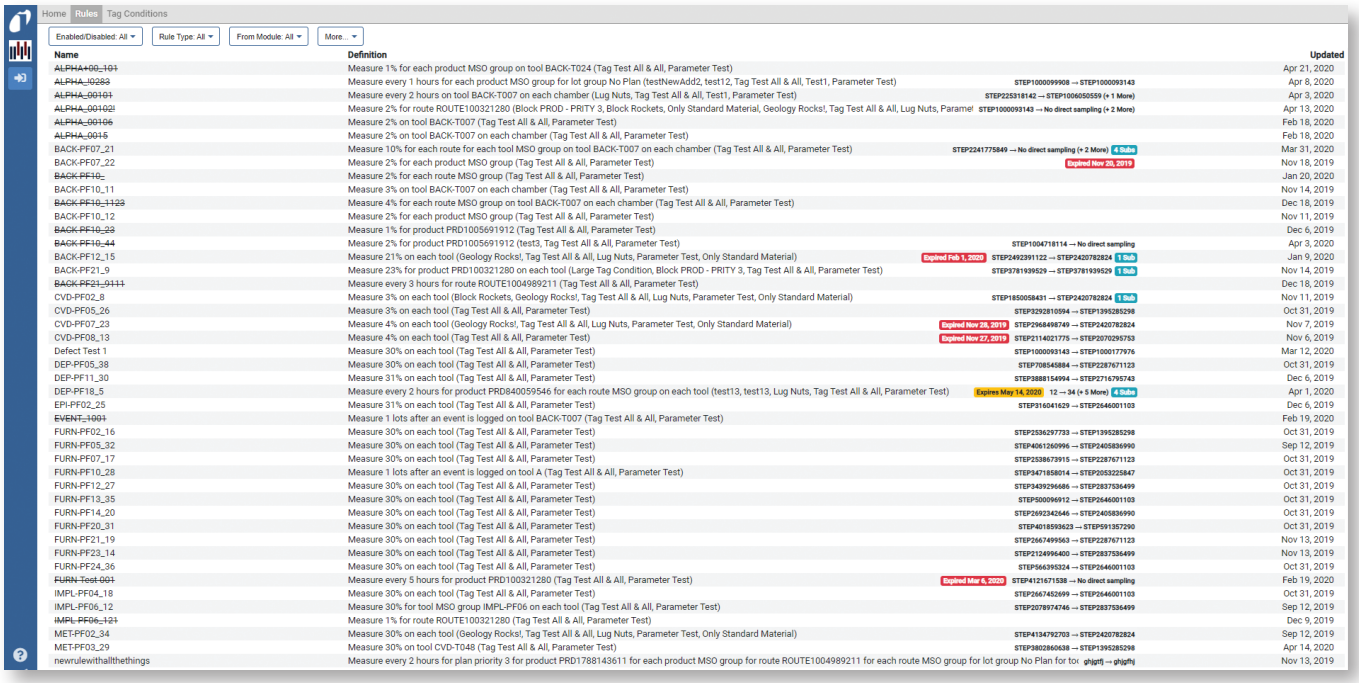
- Intelligently allocate and optimize metrology capacity where it is needed most
- Factory directed rules for managing coverage
- Automatic metrology queue management
- Real-time visual representation of coverage and risk
- Enables reduction of metrology capital investments
- Uses real-time measurements to adapt metrology sampling plans to maximize yields

MINIMIZE SAMPLING

Legacy sampling systems are limited. They apply rules in isolation and fail to adapt to important tool events and changing factory conditions. Applying rules in isolation results in over sampling of some products and under sampling of others, placing the factory at risk for increased cycle time and risk to product.

MSO minimizes sampling by evaluating all related rules whenever a rule triggers sampling. All related rules that would be cleared by sampling the same lot are reset even though they were not yet due. This guarantees that all rules are satisfied with the minimum level of sampling. For example, if two sampling rules, one for photolithography and one for etch, are applied to the same product

Tool Group Summary



MSO Rules Dashboard

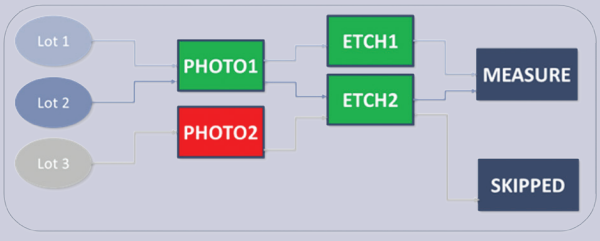
measurement and the etch rule becomes due, the Metrology Sampling Optimizer will also consider the photolithography rule satisfied for the particular scanner on which the same lot ran, assuming it meets all of the appropriate rule criteria, and vice versa. The sampling plan is satisfied and metrics are updated in real time as each new measurement is recorded.

Another protection against over sampling is the creation of process linkages. Processes that are related can share the same measurement data. For example, a process link is created from Gate Lithography to Gate Etch to Gate Metrology. As the material moves from lithography to etch, defects generated or added to the substrates by specific tools or chambers are measured in metrology and attributed to the specific etch and lithography tools. Properly allocating measurement data to the tools in the process link reduces the chance that over sampling will occur.

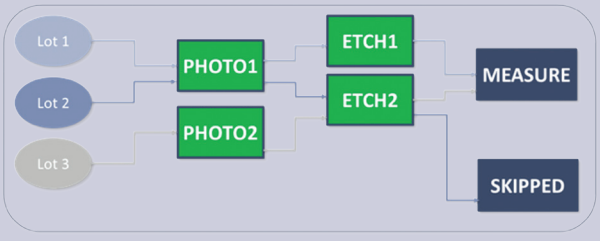
MAXIMIZE COVERAGE

Under sampling can be a problem when legacy sampling systems apply rules too generally. Typically, a factory would set a sampling rule that measures 30% of a specific process. If a single tool ran the bulk of this process, there is a chance that all of the defect measurements would be selected from that specific tool. Other tools may not be evaluated for defects and that situation can place product at risk. MSO solves this problem by automatically ensuring that any tool that processes wafers will be sampled.

The Metrology Sampling Optimizer also allows rule generation by factor or tool event. This capability sets the conditions when more sampling should be utilized. For example, a PVD tool has just completed a target change. The first five product lots following the target change should always be measured for defects. The system can be configured with special rules to tailor the sampling plan to the risk level of the process.



Legacy random sampling. Coverage for PHOTO2 missed.



MSO controlled sampling. All linked tools covered.

MSO Factory Dashboard

SMART INTEGRATION WITH FACTORY SYSTEMS

The Metrology Sampling Optimizer provides integration to help optimize work-in-process scheduling and provide superior excursion management. Integration with the scheduling system allows the WiP scheduler and MSO to work together to drive high priority material or material blocking production through sampling as quickly as possible.

Integration with Fault Detection Systems or Excursion Management Systems is done to identify material that could be at risk when a defect excursion occurs. This accelerates identification of at-risk material and provides tools for minimizing the excursion impact.

EASY TO USE DASHBOARDS

MSO Dashboard shows you where to focus your sampling efforts at a quick glance. By using the MSO Factory Dashboard or the Summaries like the Tool group Summary, MSO provides visibility of coverage, current state of sampling, and real-time monitoring. Simple to interpret graphics help you determine the metrology and defect scan coverage, the mean time to excursion detection, and the number of at-risk lots or substrates. Take immediate action directly from the MSO Dashboard to manage sampling and excursions.

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