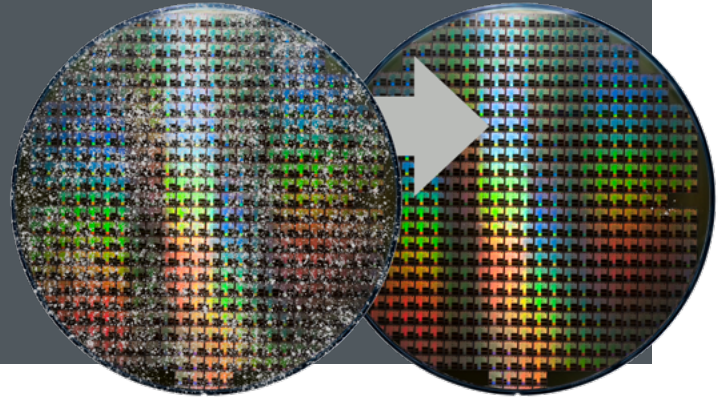




# Wafer & Mask Cleaning Equipment Qualification Standards



## Highly accurate standard to characterize Particle Removal Efficiency (PRE)

As the cost of semiconductor substrates continue to rise across the value chain, it is more important than ever to make sure your wafer and mask cleaning systems are optimized for the highest yield. Particle Removal Efficiency (PRE) measures the amount of unwanted debris on the substrate before and after cleaning to demonstrate proper cleaning equipment operation or optimize the cleaning process.

### Applications

- Process development
- Tool development
- Continuous improvement and optimization
- Process control and improvement
- Qualification for final factory acceptance
- First in fab kit for site acceptance testing
- Requalification post-preventative maintenance or tool down
- Ongoing tool validation

### Features & Benefits

- Customizable recipes
- Dry particle deposition process means less morphology over time
- Range of particles sizes and types to tailor to equipment specifications or process
- Consistent standards from qualification to qualification and run to run
- Replicate results across sites and tools
- Reliable and uniform particle counts and size distributions
- Can deposit via DMA or direct based on application or need
- No more introducing chemicals into clean fabs and waiting weeks to dry and age
- Cost effective consumable and recyclable parts
- NIST traceable process
- Can easily be annealed for different levels of adherence
- Triple wrapped and ready to ship with tools or to end user

## Specifications

# Wafer & Mask Cleaning Equipment Qualification Standards

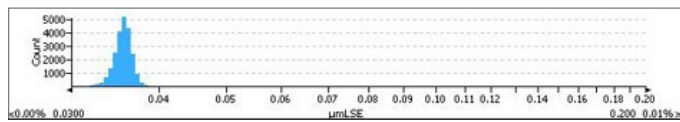
### Standard Wafer & Mask Offerings

	Standard Wafer*	Standard Mask*	Specifications
Material Type	SiO <sub>2</sub> or PSL		Modal Particle Size <sup>†</sup> ± 5 %
Particle Size	40 – 1500 nm		Count ± 40 %
Deposit Type	Full area or single spot		Spot Diameter ± 35 %
Particle Count	400 – 20,000		*Direct dep available for wider particle size distributions, large particle is full suspension distribution deposit
MoQ	25	5	
Substrate Type	User 300 mm wafer	User blank or patterned mask	
Inspection	1/recipe, no report		

\*Common non-standard options: MSP provides substrates/carriers, 200 mm wafers, inspection summary, smaller particle size, larger particle size, pellicles, multispot.

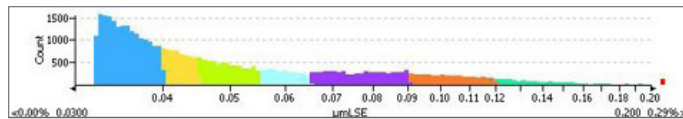
### Particle Size Distribution Options

Narrow Particle Size (DMA deposition)



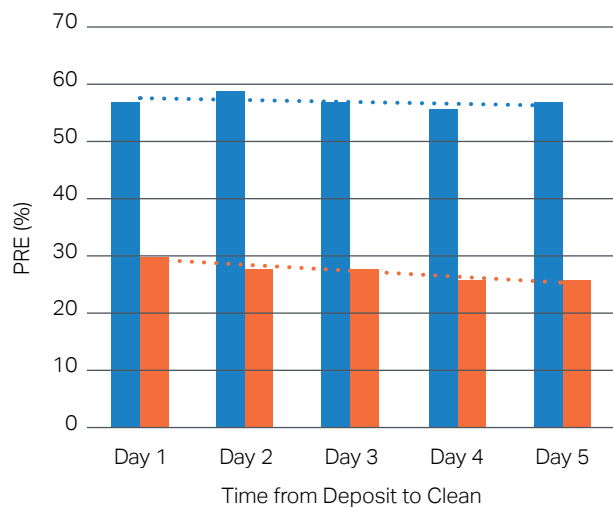
Allows evaluation of PRE spatial dependence without interference from other particle sizes

Broad Particle Size (Direct deposition)



Allows PRE size dependence to be evaluated more efficiently and cost-effectively

### Aging Comparison Between Dry & Wet Depositions



■ Dry Depositions      ⋯ Linear (Dry Depositions)  
■ Wet Depositions      ⋯ Linear (Wet Depositions)

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