



Advanced Cleaning Materials

Chuck Cleaning Wafer

In-situ wafer chuck cleaning for improved tool performance and reduced downtime.

In semiconductor manufacturing, even microscopic contamination on wafer chucks can lead to significant yield loss, tool inefficiencies, and costly downtime.

The Chuck Cleaning Wafer (CCW) is a purpose-engineered solution designed to remove particles

directly within the process chamber—eliminating the need for time-consuming manual cleaning. By enabling fast, in-situ cleaning, CCW helps fabs reduce downtime, maintain stable chuck conditions and return chambers to production in minutes rather than hours.

THE CHALLENGE

Particle contamination on wafer chucks remains a persistent and costly challenge in semiconductor manufacturing. Contaminants originate from multiple sources—including wafer backsides, process residues, chamber flaking, and routine handling—and can significantly impact yield. Even small particles can interfere with proper wafer seating, disrupt thermal transfer, and compromise gas sealing. The result is defectivity, process variability and reduced tool efficiency. Traditional wet

cleaning methods require opening the chamber, resulting in extended downtime and the potential introduction of new contaminants.

As fabs move toward higher volumes and tighter process controls, there is a growing need for faster, more frequent, and less disruptive cleaning solutions that can maintain tool performance without impacting productivity.



Sources of Contamination

Particles from wafer backsides, process residues, chamber flaking, handling and yield loss



Impact on Tool Performance

Chuck contaminants increase defectivity through interference with wafer contact, heat transfer, and gas sealing



Challenges of Traditional Cleaning

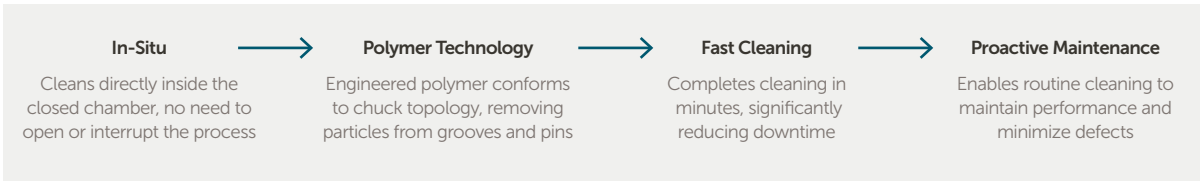
Opening the chamber for wet cleaning requires extended downtime



Need for Innovative Solutions

Fabs require fast, frequent and low-disruption solutions

THE SOLUTION



The Chuck Cleaning Wafer (CCW) provides an innovative in-situ chuck cleaning approach that removes particles directly within the closed process chamber. Its engineered polymer layer conforms to the chuck surface to capture particles from grooves, pin structures, and complex topologies. Cleaning cycles can be completed in just minutes, significantly reducing downtime compared to traditional methods.

By enabling frequent, low-impact cleaning, CCW supports a proactive maintenance strategy that helps keep chuck surfaces clean, minimize defects, and sustain optimal tool performance. Because the process is fast and non-disruptive, fabs can clean more frequently without opening the chamber or relying on manual wet cleaning.

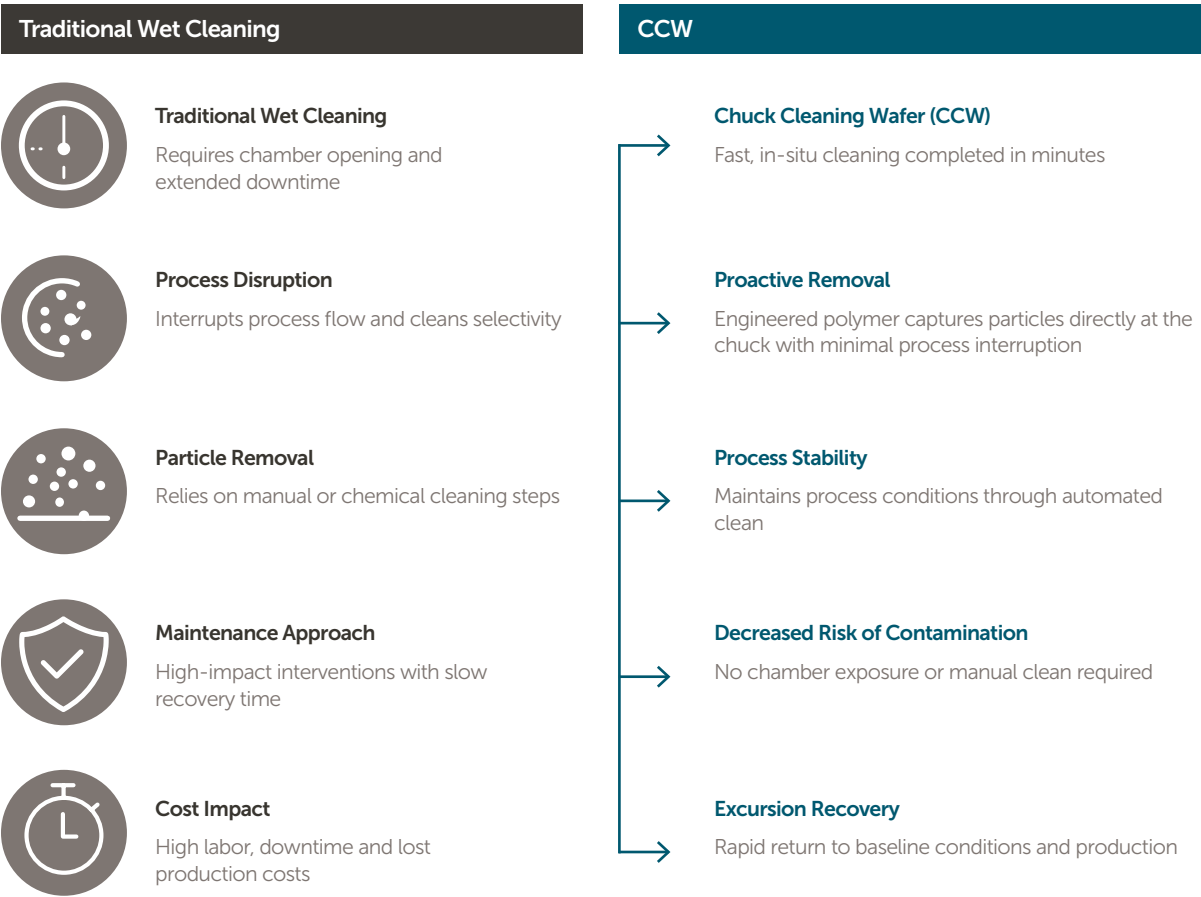
HOW IT WORKS

The Chuck Cleaning Wafer (CCW) operates seamlessly within existing tool workflows, using standard wafer handling and loading procedures without requiring any additional hardware or modifications.



KEY BENEFITS FOR FAB OPERATIONS

A comparison of traditional wet cleaning methods versus CCW highlights the shift from disruptive, reactive maintenance to fast, in-situ process control.



BUSINESS IMPACT AND COST SAVINGS

CCW reduces downtime, improves yield, and lowers operating costs by enabling fast, in-situ cleaning that minimizes disruptions and defect-related losses. With fewer wet cleans and faster recovery from excursions, fabs can increase throughput, reduce maintenance costs, and free engineering resources to focus on process optimization.

Proven Impact at the Tool and Fab Level

Reduction in Cleaning Downtime	Significant Defectivity Reduction	Yield Improvement Across Critical Layers	Lower Cost per Wafer	Faster Excursion Recovery
Reduce chamber cleaning enabling faster return to production and higher tool availability	Removes particles at the chuck interface to reduce random defects and improve overall process stability	Cleaner chuck surfaces support consistent wafer seating and thermal performance, driving measurable yield gains	Decrease scrap, reduce rework and extend time between frequent wet cleans, delivering meaningful savings across high-volume	Restore baseline tool performance in minutes, minimizing lost lots and accelerating return to stable operation

APPLICATIONS ACROSS SEMICONDUCTOR TOOLS



Electrostatic (ESC) chuck applications

Dry Etch Applications

CCW removes particles from chuck topology, reducing backside helium leak and improving wafer contact to ensure temperature stability.

Deposition Tools

CCW reduces contamination that causes backside pressure faults and film non-uniformity, maintaining consistent deposition performance.



Vacuum chuck applications

Lithography Tools

CCW reduces particles on vacuum chucks to prevent focus defects and hot spots critical in advanced patterning.

Probe, Test, and Metrology

CCW keeps chuck surfaces clean to protect wafers from contamination and mechanical damage during testing and measurement.

PRODUCT SPECIFICATIONS AND FORMATS



Wafer Sizes

200 mm and 300 mm standard formats
Compatible with leading semiconductor tools



Ultra-Pure Materials

SEMI standard silicon substrates are coated with engineered cleaning polymers to deliver consistent performance



Custom Configurations

Specialized packaging options available to integrate into fab environments



Reusable Performance

Designed for multiple cleaning cycles*
Maintains contamination control while reducing cost

WHY CHOOSE ENTEGRIS

Entegris delivers a proven chuck cleaning solution designed to improve uptime, enhance yield, and increase operational efficiency with minimal disruption to existing processes. The Chuck Cleaning Wafer (CCW) integrates seamlessly into current fab workflows, supported by a global network of local representatives and technical experts who provide guidance on evaluation, implementation, and optimization.

By enabling fast, in-situ cleaning, CCW helps reduce downtime, protect critical yield, and sustain consistent tool performance—giving manufacturers a clear competitive advantage in high-volume semiconductor production.



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