

## QIII+® SURFACE PARTICLE DETECTOR

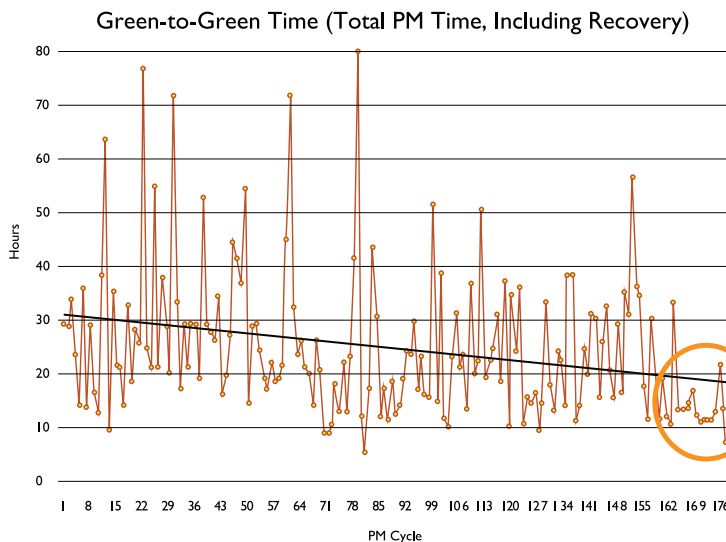
### Redefine Productivity

How do you measure cleanliness of the tool after a PM? Pentagon Technologies' QIII+® can dramatically reduce PM recovery time, green-to-green time, and increase the overall throughput of the fab.

Using the QIII+®, you can immediately detect particles to 0.3 micron and localize them within a production tool. This proactive approach to PM cycles will result in savings of up to 30% on PM times and a reduction in particle adders by 50% or more. The result of starting clean is first-time recovery with dramatically lower adders at all particle sizes making your process tools significantly more productive.

### Benefits

- Predictable, first time tool recovery, every time
  - > Reduce recovery time by 25-50%
  - > Reduce seasoning and test wafers
  - > Reduce pump-purge cycles
- Increase MTBC by 4x or more
- Increase tool availability
- Reduce PM cycle time
- Reduce troubleshooting events



- 50% reduction in recovery time
- 10% increase in tool availability
- Consistently low green-to-green time

QIII+® implemented into PM

## First Time PM recovery

PM recovery time can be reduced by 50% or more, and particle adders can be reduced by an order of magnitude or less by proactively detecting and cleaning particles during the normal PM. As an example, the following equation examines how region-specific cleaning, resulting in a reduction of pump/purge cycles from each PM, can significantly impact annual returns.

(Chambers x PMs x 12 months) x (Time saved x Value/hr.) = Annual savings  
Chambers in fab = 63 (21 tools; 3 process chambers each)  
PMs/month/chamber = 1  
Time saved per PM = 1.5 hours (1.5 pump/purge cycles eliminated; 1 hour each)  
Value per hour of tool time = \$10,000  
Annual savings = \$11,340,000  
(63 x 1 x 12) x (1.5 x \$10,000) = \$11,340,000

## Increased MTBC

By incorporating the QIII+® in the PM process to control particles, Mean Time Between Cleans (MTBC) can be increased.

Example 1: 300mm Dielectric Etch tool  
MTBC pre-QIII+®: 174 rf hrs  
MTBC post-QIII+®: 300 rf hrs  
CoO savings per tool per month: \$13,200  
ROI: 3.6 months

Example 2: 300mm Metal etch tool  
MTBC pre-QIII+®: 40 rf hrs  
MTBC post-QIII+®: 110 rf hrs  
CoO savings per tool per month: \$85,200  
ROI: 0.6 months

\* CoO calculated using Tool Cool software from Wright Williams & Kelly, Inc.



## Troubleshooting

A 300 mm PECVD tool was down for 2 months with particle problems. Following months of component replacement and repeated wet cleans; the problem was escalated to the OEM. The QIII+® was used to map the chamber particles to identify the high particle areas. Focused troubleshooting was performed based on QIII+® data. RESULT: Problem resolved in 2 days using QIII+ and tool returned to production immediately.

## Technical Data

- Size: 9.4" W x 17" D x 12" H
- Input power: 100-240 VAC, 50/60 Hz
- Display: 6.5" FPD with touch screen
- GUI: Windows CE
- Sensor: Laser diode with 0.3 sensitivity
- Output: Ethernet
- Probe Faceplate Material: Vespel
- Particle Analysis Module (optional)

## Probe Options

Standard:

- 1/2" Right Angle and 5/8" Pencil Probe or
- 1/2" Right Angle and 2" Straight

Optional:

- 3" Straight; 2" and 3" Right Angle
- 65 mm Cassette
- Custom available on request

