Quickly Identifying and Resolving Particle Issues In Photolithographic Scanners

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Save Time. Save Expense. Improve Yields.

Challenges:

▶ Quickly identifying when and where airborne particles originate and the source of the contamination is challenging with traditional surface scan reticles, in-situ or hand-held methods.

▶ In addition, with these methods lacking real-time time-feedback, often "unexpected' particle sources go undetected or take a long time to finally identify.

Using Monitor Reticle and/or In-situ Scanner:

▶ A particular photolithography tool routinely had excessive particles.

▶ The in-situ particle scanner would scan monitor reticles going in clean but would intermittently exit with significant amounts of particles of unknown origin.

▶ The particle contamination was a constant source of frustration and traditional methods of particle detection (built-in, monitor reticles and bench-top particle counters) were unsuccessful in identifying the particle source.

Using ReticleSense® Particle Sensor:

▶ There are significant advantages of using the ReticleSense® Particle Sensor (APSRQ) in Photolithographic Scanners for quick particle qualification in Photo Lithography reticle environments.

▶ With all the necessary alignment and fiducial marks, APSRQ can be loaded directly into a scanner just like a reticle and travel the entire reticle path to detect in real-time when and where particles are occurring in scanners.

▶ APSRQ technology saves the time consuming task of partitioning with multiple surface scan reticles which require the high-value scanner to be brought off-line for lengthy particle source troubleshooting.

Using the APSRQ:

1. APSRQ loaded into tool. Most all sections found clean (zero particles).
2. Particle spike occurred when built-in particle scanner actually over Reticle.
3. After particle source suspected, corrective action was be taken.

BONUS ROI: Individual problem components can be replaced rather than entire kits.

Results:

Step	Particle Investigation Process or Procedure	Monitor Reticle Time Estimated	APSRQ Time Estimate*	Comment
1.	Pre-measure reticles	N/A	1 hour**	APSRQ ready immediately
2.	Load test reticles	5 minutes	5 minutes	APSRQ handles just like a normal reticle
3.	Cycle test reticles	10 minutes or until problem found	10 minutes	No waiting for APSRQ results
4.	Take reticles out	5 minutes	5 minutes	
5.	Wait for post-measure reticle inspection tool availability	2 hours**	N/A results immediate	Once APSRQ uncovers problem area, troubleshooting begins instantly
6.	Post-measure reticles	1 hour**	N/A	
7.	Analyze results	2 hours**	N/A	APSRQ results immediate, thus analysis immediate
8.	If problems found, repeat and/or partition areas of concern until problem identified and resolved	8-16 hours** Note: sometimes days until problem found with Reticle monitor	1-2 hours Note: trouble-shooting and resolution begins immediately	With APSRQ, once problem area found all possible particle sources investigated in real time, i.e, exercise moving parts. ep
9.	Summary	12 to 20 hours**	1-3 hours** Note: 10X APSRQ times savings over monitor method typical	APSRQ also requires significantly less resources such as manpower and insection tool resources not considered

** All times listed are estimates based on past user experience and used here for example purposes only.
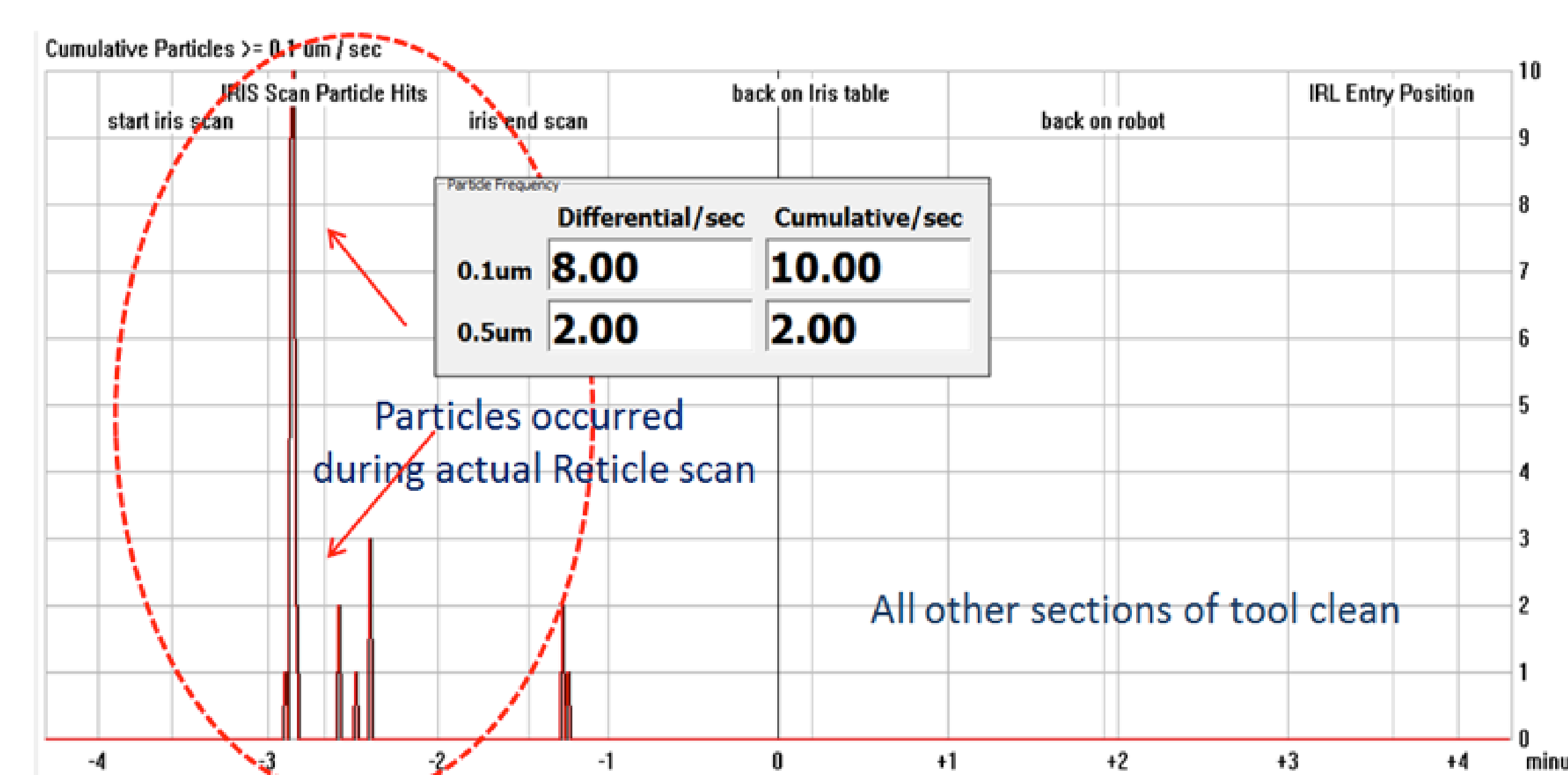
Checks the entire reticle path inside the tool, not just the reticle surface

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