



**parts2
clean**

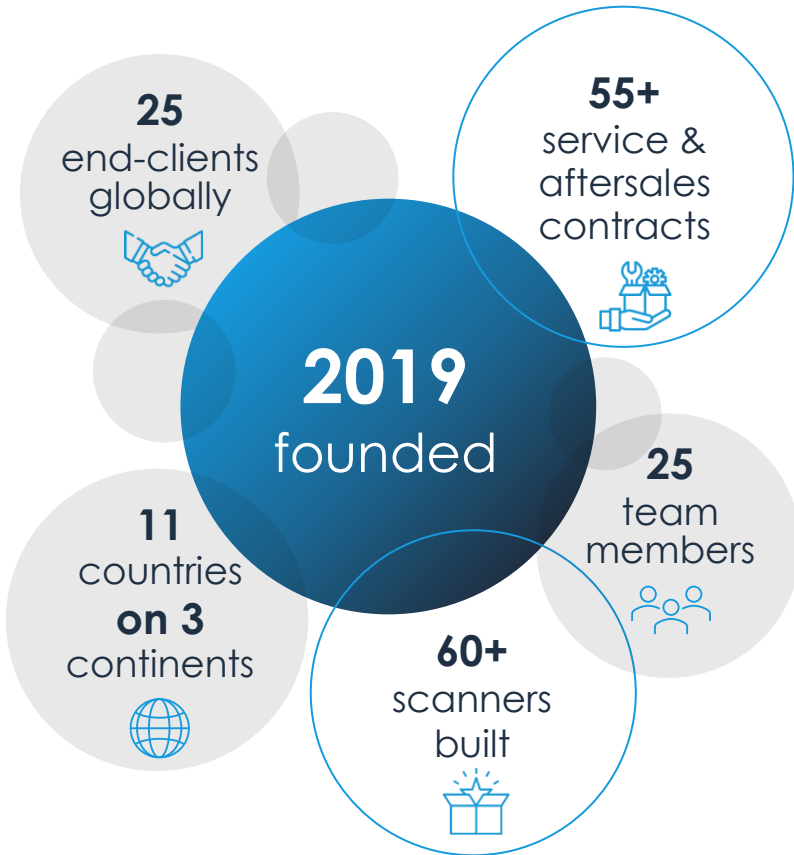
fastmicro
cleanliness control

How to quantify
**the particle cleanliness
of your surface**

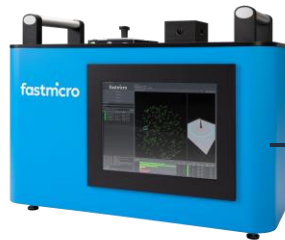
Pim de Korte

Fastmicro introduction

Growth track record



Solutions



Sample Scanner

Wafer Particle Defect Inspection System



Particle Fallout Scanner

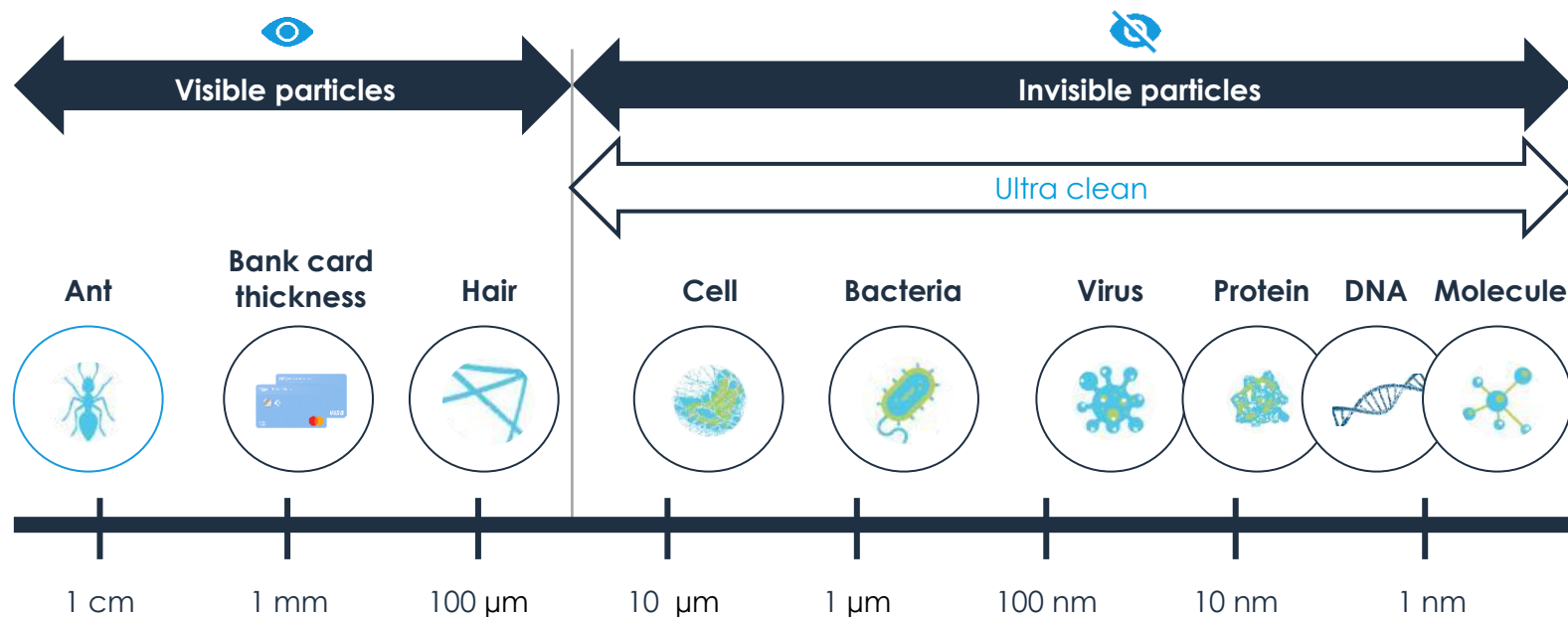


Pim de Korte
Technical Sales Manager
Fastmicro

Mechanical engineering background with over 12 years of commercial experience in high-tech industries.

When clean is in the eye of the beholder

- Human judgment is inconsistent and cannot be standardized
- Visual perception misses small but critical particles
- Results depend heavily on who, where, and how the check is performed
- Without hard data, there is no standard for comparison or improvement
- Problems are often discovered only after downstream failures, resulting in costs of non-quality



The price of non-quality

Visible costs

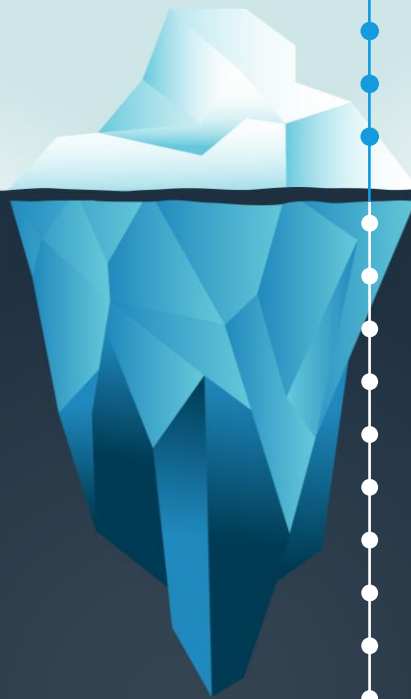
- Tangible
- Easy to measure
- Directly related to failure

- Warranty claims
- Scrap of products
- Rework of products
- Shipping costs

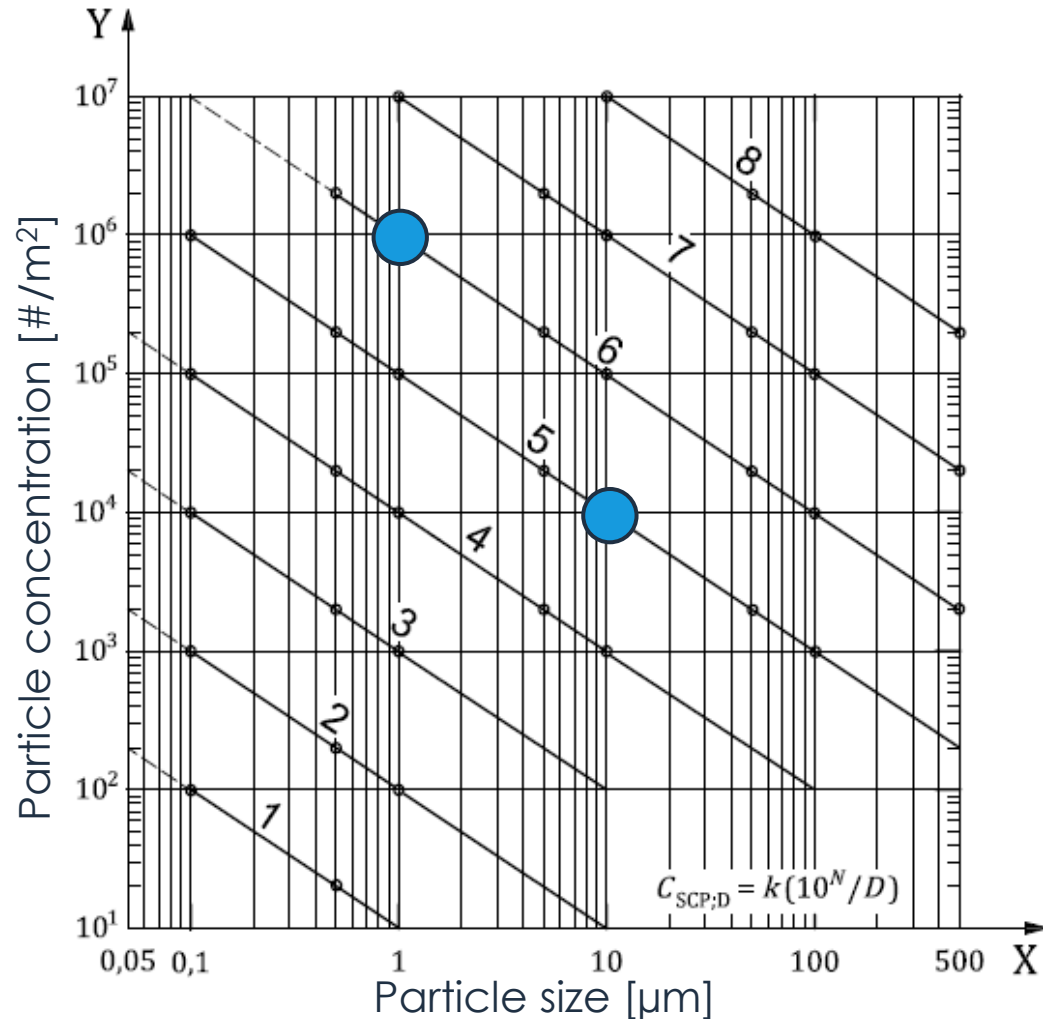
Hidden costs

- Intangible
- Difficult to measure
- Indirectly related to failure

- Lost customer trust & satisfaction
- Lost opportunities
- Damage of brand reputation
- Cost of root cause analyses
- Lower employee morale from reworks
- Costly engineering changes
- Loss of personal resources
- Strained supplier relationships (blame game)
- Sorting of defective goods
- Extra packaging & logistics costs



How to set quantitative specifications on surface cleanliness



1. Assess the risk
 - Particle sizes that affect yield or reliability
 - Particle sizes that can cause functional failures
 - Particle sizes that can be critical to the environment of use
2. Set your pass / fail limits (the specs) e.g:
 - SCP grade 6 at 1 µm (Max. 100 particles ≥ 1 µm per cm²)
 - SCP grade 5 at 10 µm (Max. 10 particles ≥ 10 µm per cm²)
3. Determine when and where to inspect the product
 - Determine at which process steps the inspection must be done (e.g. post cleaning)
 - Set inspection area size (e.g. 10 cm² per product)
 - Pick the inspection spots (e.g. 3 locations per product)

Methods



Factors Methods	Sample & Measure (Tape Lift + Light Scattering)	Sniffer (vacuum + APC)	Optical Microscopy (direct measurement)	Manual UV/Bright light Inspection
Surface Area Coverage	Small (local tape lift spot)	Medium (vacuumed area)	Very small (μm field of view)	Large (whole surface visually inspected)
Lower Detection Limit	~ 100 nm (depends on scattering sensitivity & background)	~ 100 nm (limited by pick up rate vacuum & LDL APC)	~ 200 nm (optical)	~ 50 μm (depends on operator, background & particle)
Speed	Medium (sampling + measurement in seconds)	Fast (direct readout)	Very slow (sample prep + imaging)	Fast (quick scan, but subjective)
Ease of operation	Easy-Moderate	Easy-Moderate	Hard (expertise required)	Easy
Repeatability	High	Medium	High	Low (operator dependent)
Quantified Output	Yes	Yes	Yes	No
Portability	Medium (sampler mobile + system cleanroom bond)	High (field-deployable)	Low (lab bound)	Very High
Reproducible	Yes	No	Yes	No
Surface Versatility	Good (suitable for rough/curved surfaces)	Medium (less suitable for tight, small & curved surfaces)	Limited (prepared, flat samples best)	Good (any accessible surface, but subjective)
Cross-Contamination Safety	High (if the sample does not leave a residue)	Medium (vacuum nozzle contact)	Medium (long exposure during measurement)	High (non-contact visual only)
Capex	Medium (dedicated system)	Medium (dedicated system)	High (advanced microscope)	Low (UV lamp/flashlight)
Opex	Medium (samplers & calibration)	Medium (calibration)	High (expertise user, calibration)	Very Low

Methods positioning



Sample & Measure (Tape Lift + Light Scattering)

Good balance between lower detection limit, speed, surface versatility, while ensuring repeatable quantitative results for large-scale validation.



Sniffers (Vacuum + APC)

Good for portability and fast results, however limited by particle pick up rate, surface versatility, and risky for cross contamination.



Optical microscopy

Gold standard for particle details, but impractical for large-scale validation due to cost, speed, operation, and small inspection area.

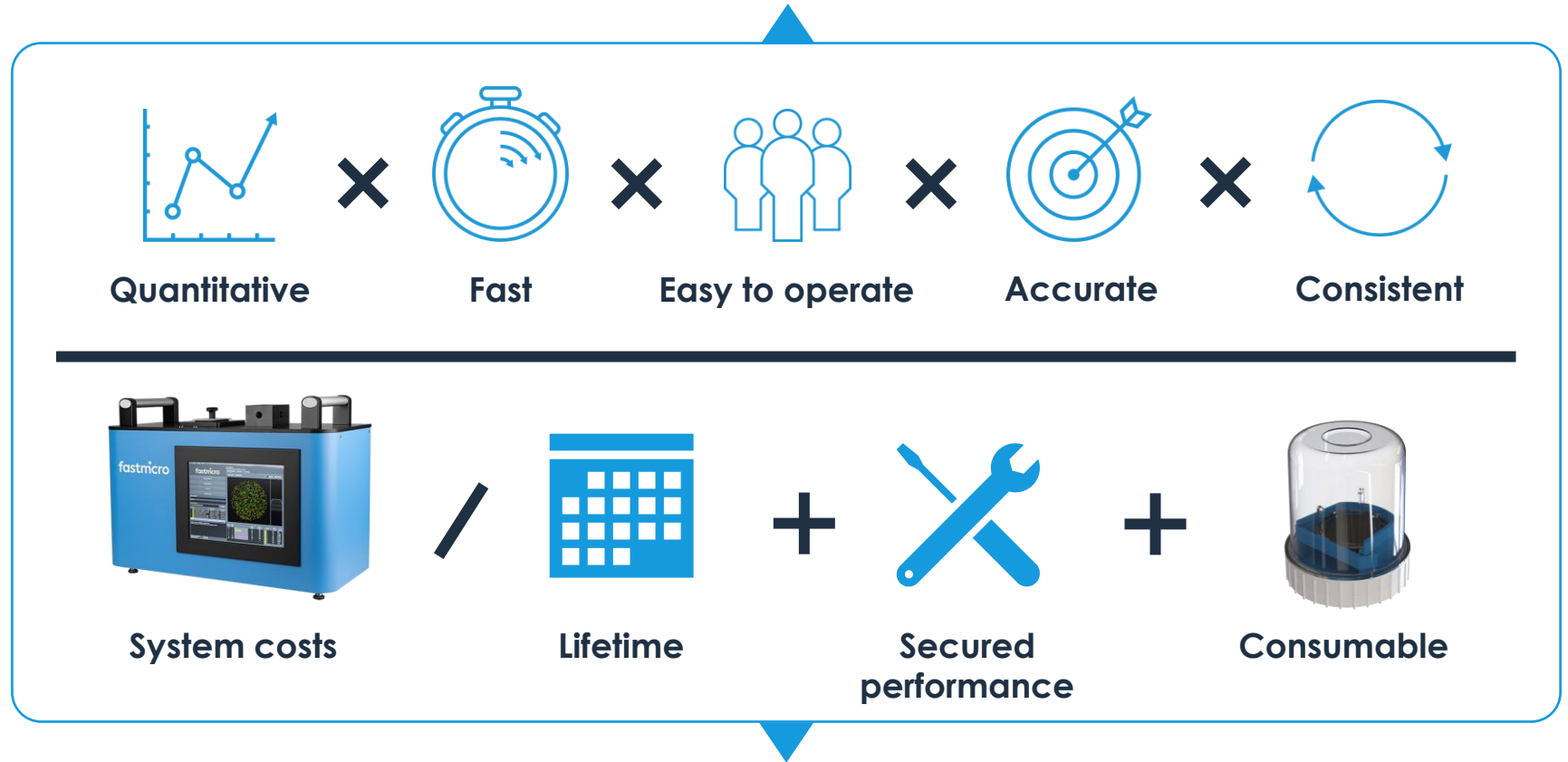


Manual UV/Bright light Inspection

Cheapest and fastest, but highly subjective and not quantitative.

We innovate on all aspects to maximize product value

Effective cleanliness control



Total cleanliness control cost

fastmicro =
cleanliness control

thank you for your attention

Find us at Booth **C55/1**
and let's explore the best fit for your needs.

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