

Cleaning verification and validation - ATP hygiene monitoring

Jonathan Walsh
18th May 2016

Agenda

- Why verify cleaning?
- An introduction to ATP
- The value of data
- The importance of sampling
- Introducing...

The background is a complex, abstract pattern of overlapping triangles and polygons in various shades of green, ranging from light lime green to dark forest green. The shapes are irregular and create a dynamic, faceted appearance.

Why verify cleaning?

Why is cleaning important?

- First line of defence against cross contamination
- Removes product residue and biofilms
- Equipment must be cleaned to be effectively sanitized
- Cleaning & sanitation improves product quality, shelf life, and reduces the risk of product recall
- Meets legal and due diligence requirements

Cleaning & monitoring the process environment

Study suggests ...

if an organism is found in the environment there is a **70% chance** of it getting into the food.

IAFP Rome 2007

Why verify cleaning?

- Cleaning is a prerequisite to the establishment of a HACCP program
 - Good hygienic practice is essential
 - If you are unable to measure performance then you cannot control a process
 - Therefore, controls / verification of cleaning should be in place
-
- To consider a cleaning programme effective you need to have measures in place

Note on Validation and Verification in relation to cleaning

Validation

- Refers to confirmation that a particular cleaning procedure is capable of cleaning to the defined and required standard in terms of removal of the food safety hazard
- Likely to require testing of samples by an accredited laboratory
- Validation demonstrates a cleaning procedure can eliminate either allergen, microbial or organic residues that may impact on food safety
- Validation may also include measurement of parameters such as time, temperature, pH and chemical concentration. ATP testing may also be included as a component of the validation procedure but not the only one
- Once a cleaning procedure is validated, validation only needs to be repeated according to a schedule e.g. once every 12 months or if there any changes to the cleaning procedure or new products are being produced

Note on Validation and Verification in relation to cleaning

Verification

- Once a cleaning system has been validated, verification methods can be used on a routine basis
- 3M hygiene monitoring tests are verification tools i.e. they are designed to routinely measure the control and consistency of an existing validated cleaning procedure

A number of clauses in the British Retail Consortium Global Standard for Food Safety V.7 (BRC 7) document can be related to routine verification

BRC 7 – clauses related to hygiene testing

- Clauses may not always specifically mention hygiene
- Applicable to three main sections:
 - Housekeeping and Hygiene (4.11)
 - Management of allergens (5.3)
 - Corrective and Preventable actions (3.7)
- Also, mentioned in other clauses, such as:
 - 2.11 – Establish a corrective action plan
 - 2.12 – Establish verification procedures
 - 2.13 – HACCP documentation and record keeping

How to verify cleaning?

Need a practice that:

- Supports your business and is appropriate to your needs
- Meets audit requirements

Options include visual confirmation, microbiological tests, adenosine triphosphate (ATP) bioluminescence detection, protein detection

Is a visual check a true measure of effective cleaning?

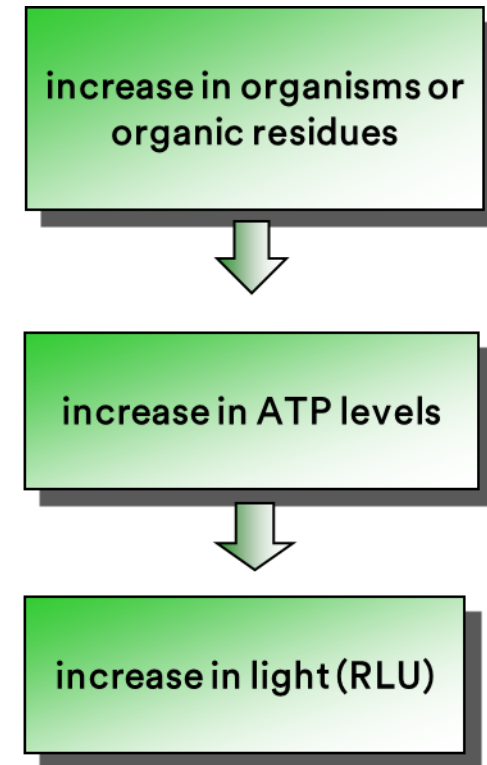
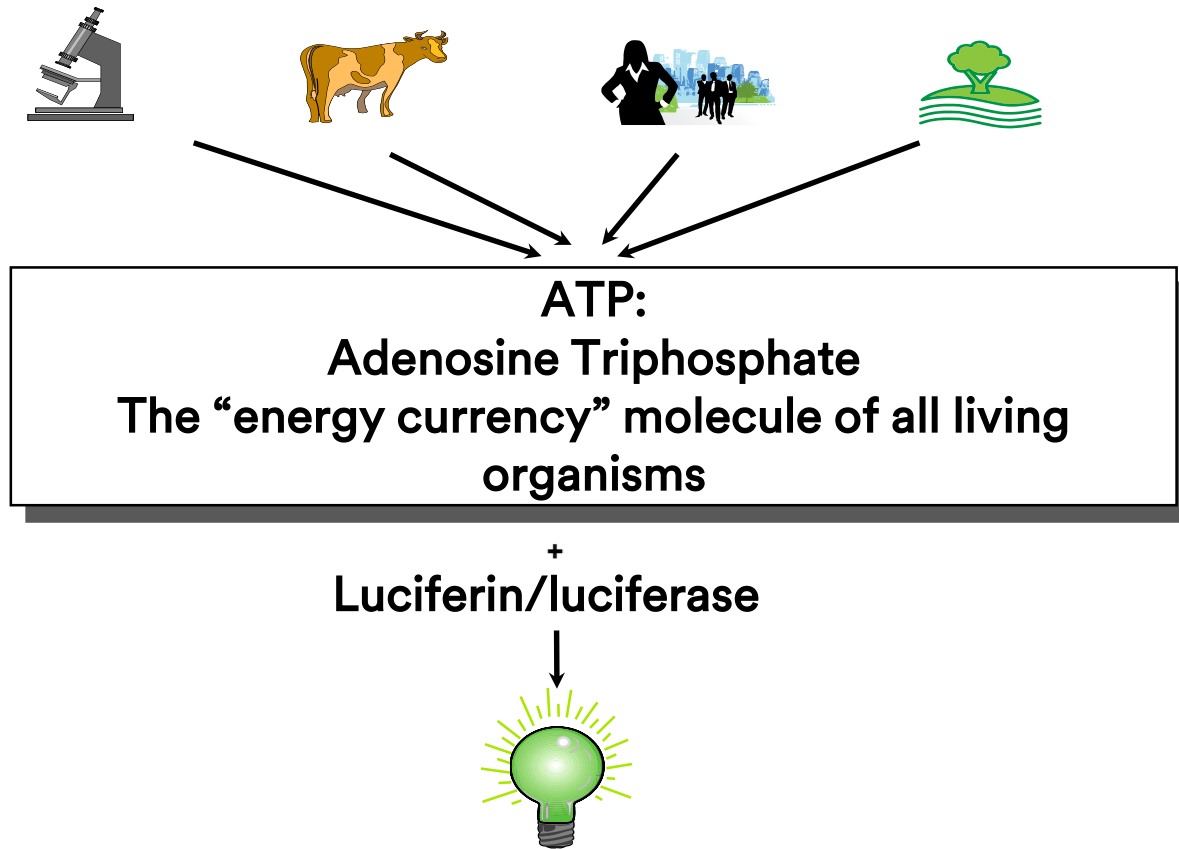
Do environmental swabs give you information to act on in real-time?

What data will you need in order to demonstrate an effective cleaning programme to your auditor on their next visit?

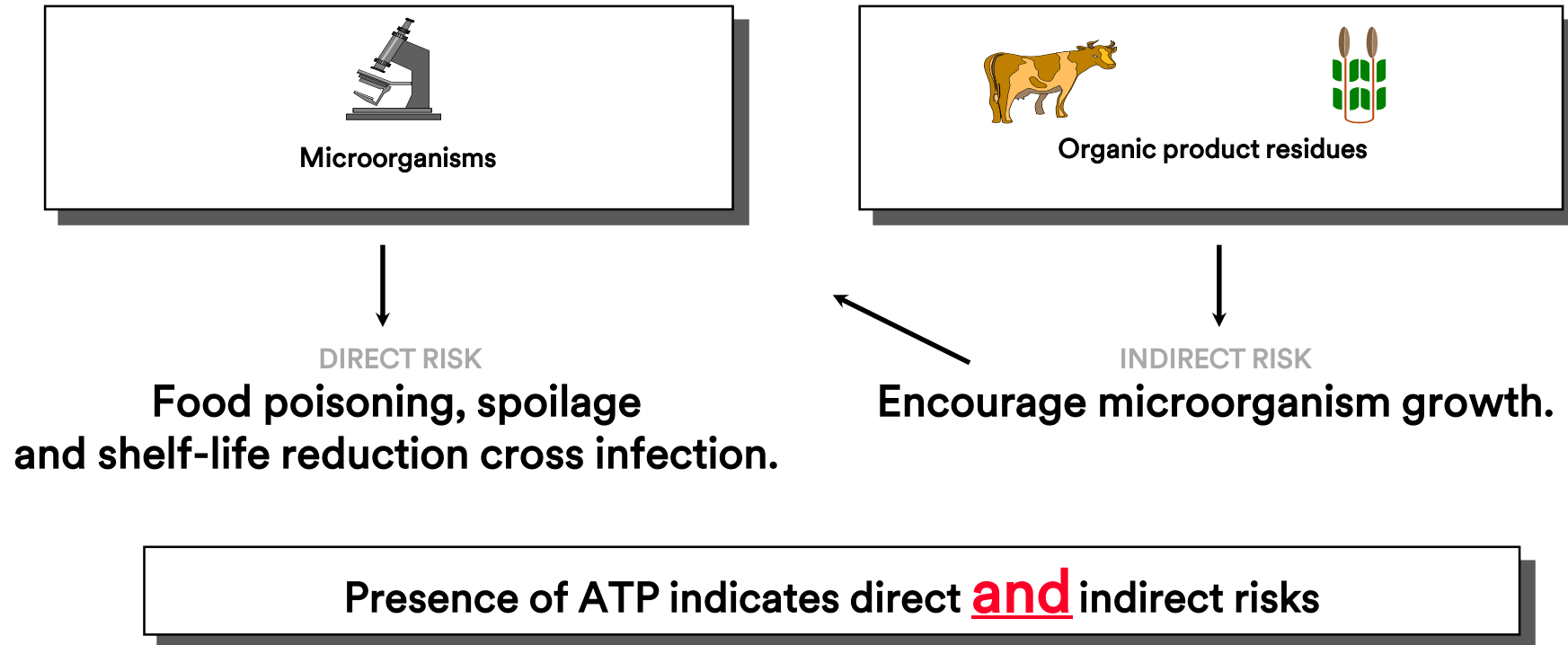
The background consists of a complex, abstract pattern of overlapping, semi-transparent green polygons in various shades, creating a dynamic, crystalline effect. The colors range from light lime green to deep forest green.

An introduction to ATP bioluminescence detection

Principle behind ATP bioluminescence



Benefits of using ATP as a “risk” indicator



Benefits of ATP rapid hygiene monitoring

- Supports HACCP and Quality management
- Basis for maintenance and improvement of hygiene standards
- Total hygiene monitoring - identifies the presence of organic and microbial residues that are not visible on plant surfaces
- Reduces risk to product safety and quality due to poor cleaning, ineffective sanitation and cross contamination.
- Proactive - identify one-off issues where there is a need to re-clean prior to the processing of products - rapid results allow for immediate Corrective and Preventative action

Benefits of ATP rapid hygiene monitoring

- Identify where there are persistent problems and a need to make changes in cleaning regime or possibly a need to replace equipment. Preventative action
- Allows for corrective procedures to be instigated where 'Fail' results are recorded e.g. re-cleaning and re-testing
- Provides data to show due diligence and for audit reports
- Supports drive for continuous improvement
- Helping to instil a positive hygiene culture
 - provides a method of sharing hygiene results with key stakeholders through easy to interpret reports

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The value of data

Collecting data - test points and sample plans

Test Point: the individual hygiene sample points contained within a sample plan, each test point will have a Pass and Fail value

Sample Plan: a collection of hygiene test points that are related to a specific area e.g. a production line

Setting Pass, Caution, Fail levels

Consider consistency in cleaning. Are results variable? Is cleaning in control?

1. Collect & review data (important to demonstrate process of implementation)
2. Set initial Pass and Fail values based on results obtained
3. Introduce corrective action procedure and implement
4. Review data again - any improvement? can Pass and Fail levels be reduced?
5. Reset levels and review regularly – driving continuous improvement

Examples of typical Pass and Fail Levels found in the Food industry

Product Surface	Pass	Caution	Fail
Raw Meat			
Abattoirs	<1000	1001-1999	>2000
Butchery	<500	501-999	>1000
Cooked Meat Products (Meats, Pies, Pastry Products)			
Low Risk	<500	501-999	>1000
High Risk	<250	251-499	>500
White Fish Production	<300	301-599	>600
Shellfish eg. Prawns	<1000	1001-1999	>2000
Cheese Production	<250	251-499	>500
Convenience Foods/Ready Meals			
High Risk	<300	301-599	>600
Low Risk	<500	501-999	>1000
Vegetable/Fruit Processing			
High Risk	<250	251-499	>500
Low Risk	<500	501-999	>1000
Baked Desserts/Cakes			
Low Risk	<300	301-599	>600
High Risk	<200	201-399	>400

Note: For CIP cleaning regimes where more aggressive cleaning regimes are used then typically a 150 RLU – 300 RLU setting is used.

What to do with Pass, Caution, and Fail

Pass

No action required – continue with production

Caution

Low Risk area – continue with production, but monitor more closely in the future

High Risk area – re-clean and re-test

Note: Caution zone isn't necessary, just set one limit if preferred

Fail

Re-clean and Re-test

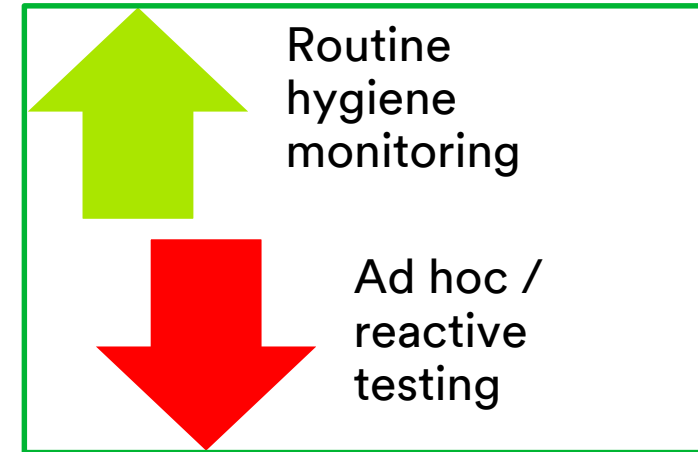
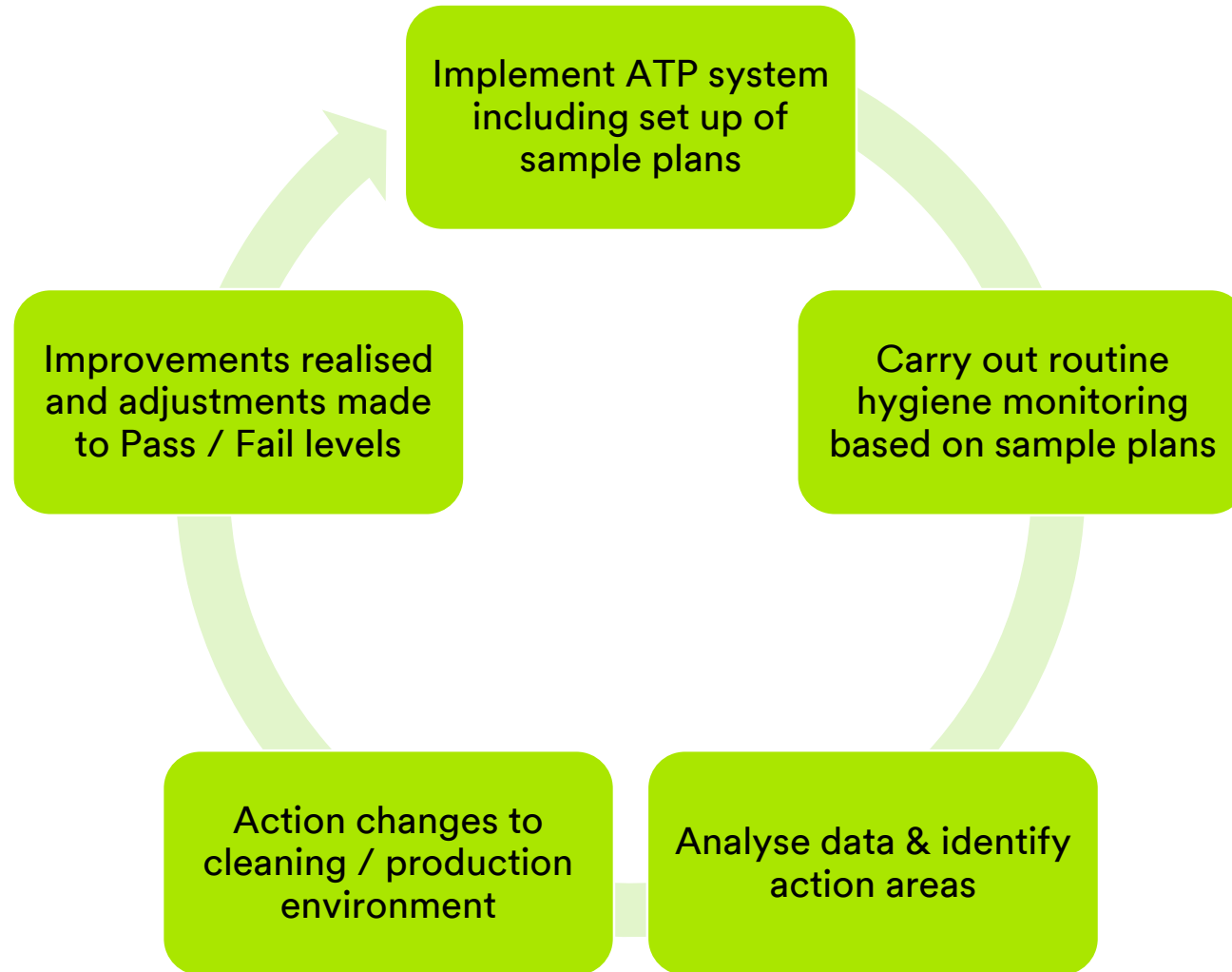
The factory might have to examine the sanitation procedure – Corrective and Preventative action steps (CAPA)

Every test point result is a piece of data, use your data and you have information, your information can tell a story...

The value of data trending

- Trended results provide long term feedback of cleaning performance
- Indicates areas that are showing a higher frequency of poor cleaning performance
- Indicates adverse trends in cleaning performance
- Can be used in optimisation of cleaning regimes
- Helps measure overall consistency and control of the cleaning regime
- Provide evidence of corrective and preventative action to auditors
- Demonstrate adherence to regulatory clauses e.g. BRC 7
- Helps to demonstrate positive trends in cleaning efficiency as part of a **continuous improvement** approach to hygiene management

Data drives continuous improvement



The background consists of a complex, abstract pattern of overlapping, semi-transparent green polygons in various shades, ranging from light lime green to dark forest green. The shapes are irregular and angular, creating a dynamic, crystalline effect.

Gathering data you can trust ...

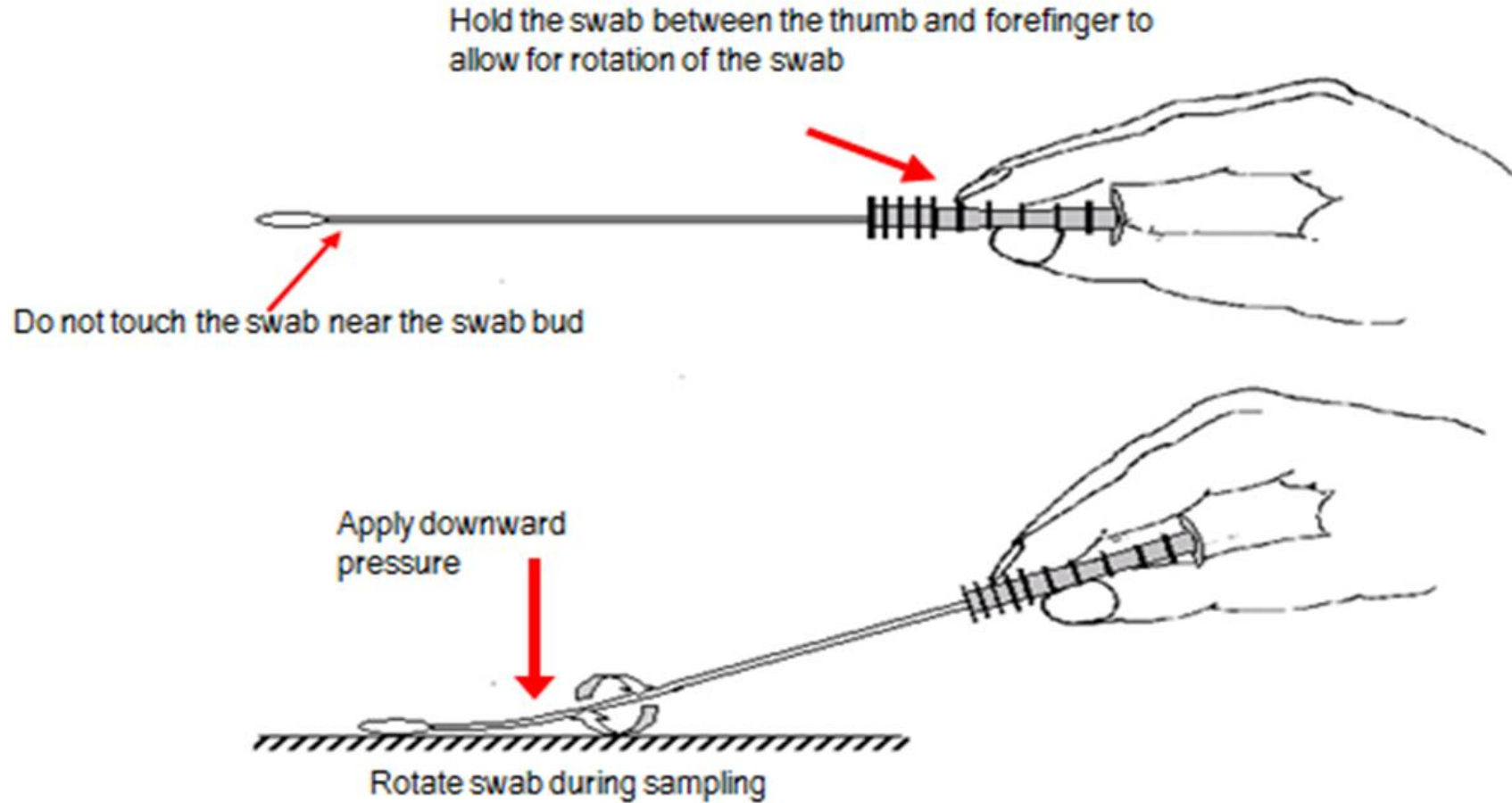
The importance of sampling

Sampling – surface swab or water test?

- Where surfaces are accessible, take swab samples.
- Where surfaces are inaccessible, e.g. inside large tanks on Clean In Place (CIP) systems, take a final rinse water sample

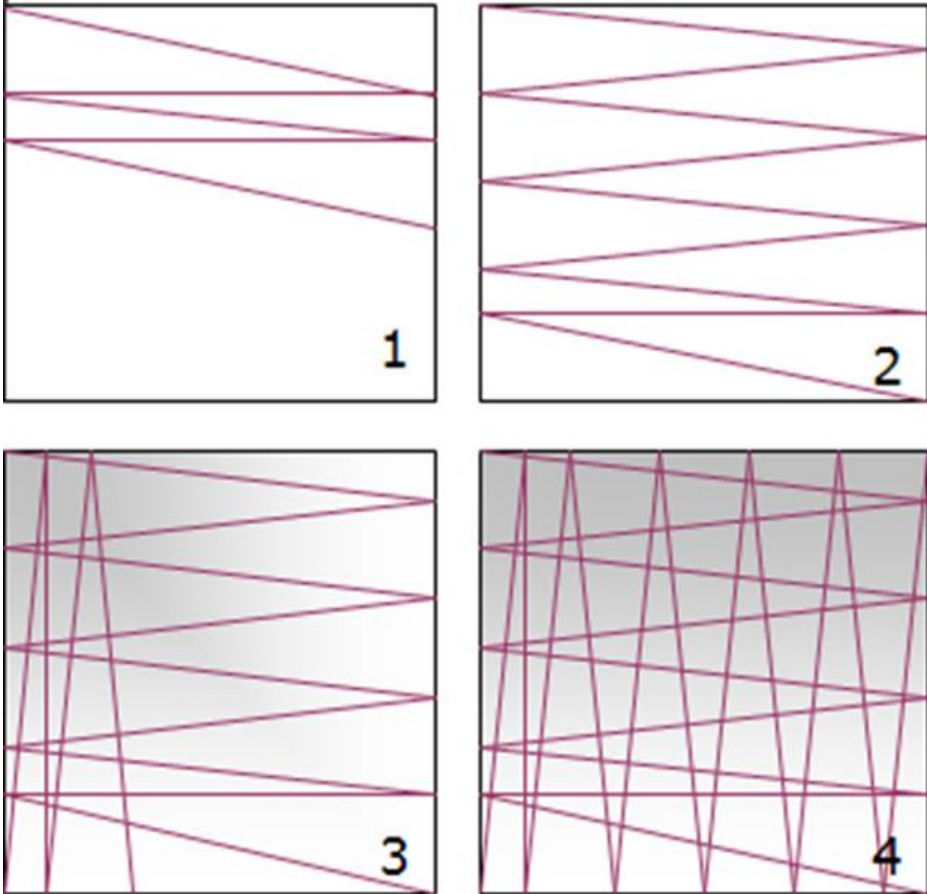


Swabbing guide



Sampling procedure

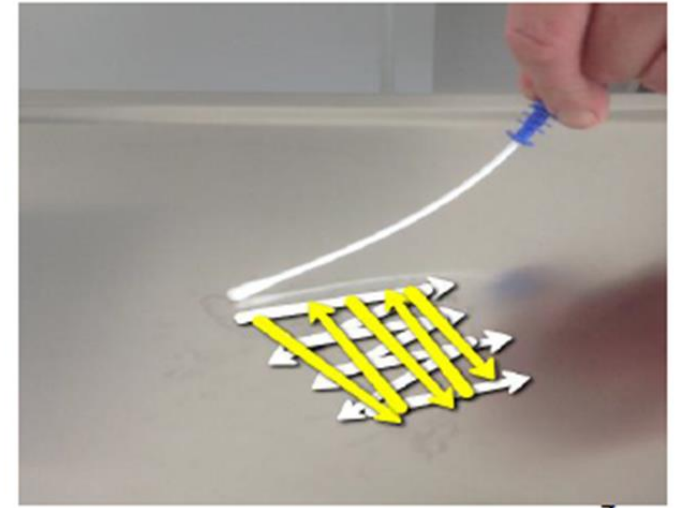
10cm x 10cm / 4" x 4" on a flat surface



1. Switch on the luminometer and allow it to make its background measurement
2. Swab horizontally from one side to the other
3. Continue to swab across the whole surface
4. Repeat the procedure vertically from top to bottom

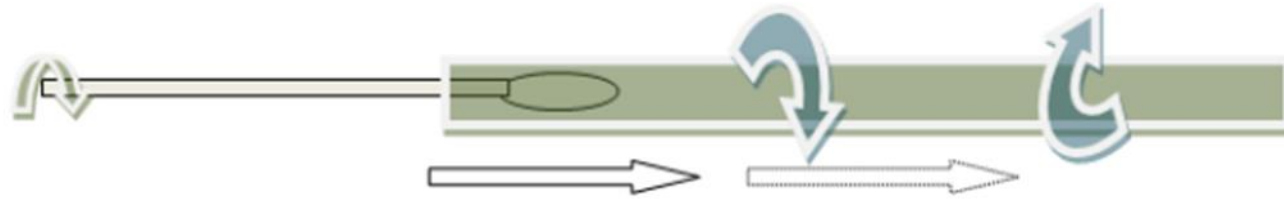
Note:

- If pooled water on surface try to swab a drier area avoiding the pools
- For tight spaces like filler heads swab consistently as possible and swab from the opening as far as the swab length or space will allow



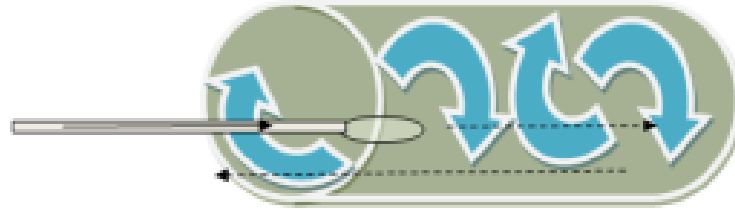
Sampling non-flat surfaces

- Not all test point surfaces will be flat
- Accessible surfaces, sample equivalent to 10x10cm where possible
- Area such as filling tubes, slightly twist the swab so the bud rotates around the internal surface, continue to do this whilst moving the swab into the filling tube as far as it can go, repeating as pulling out of the tube



Sampling non-flat surfaces contd.

- Larger pipes, swab around internal surface in circular motion, count five rotations moving into pipe and repeat five rotations as removing swab

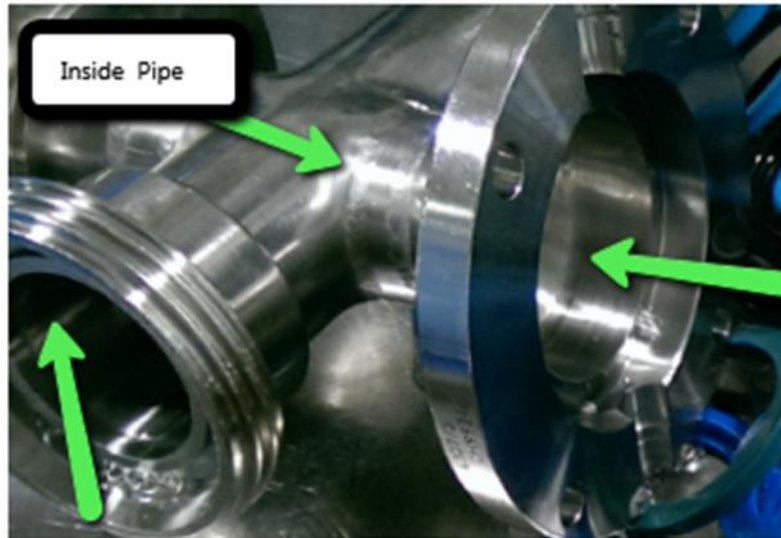
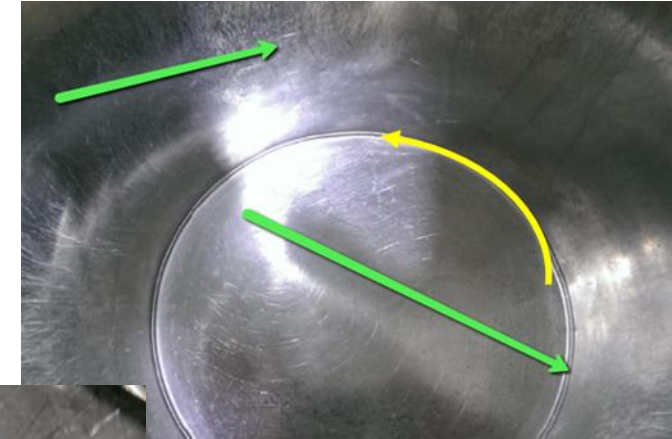


- For large surface areas where the whole surface is not being sampled, avoid testing the same area each time or day swabs are taken, try to vary as much as possible. This will ensure over time results will be representative of the whole area
- A sample plan should include difficult to clean areas
- Consistency of swabbing and that operators all swab in the same way is important

Examples of sampling sites



- Screw thread
- Inside pipe
- Pipe top / ridge



- Good contact
- At least 5 rotations around internal surface

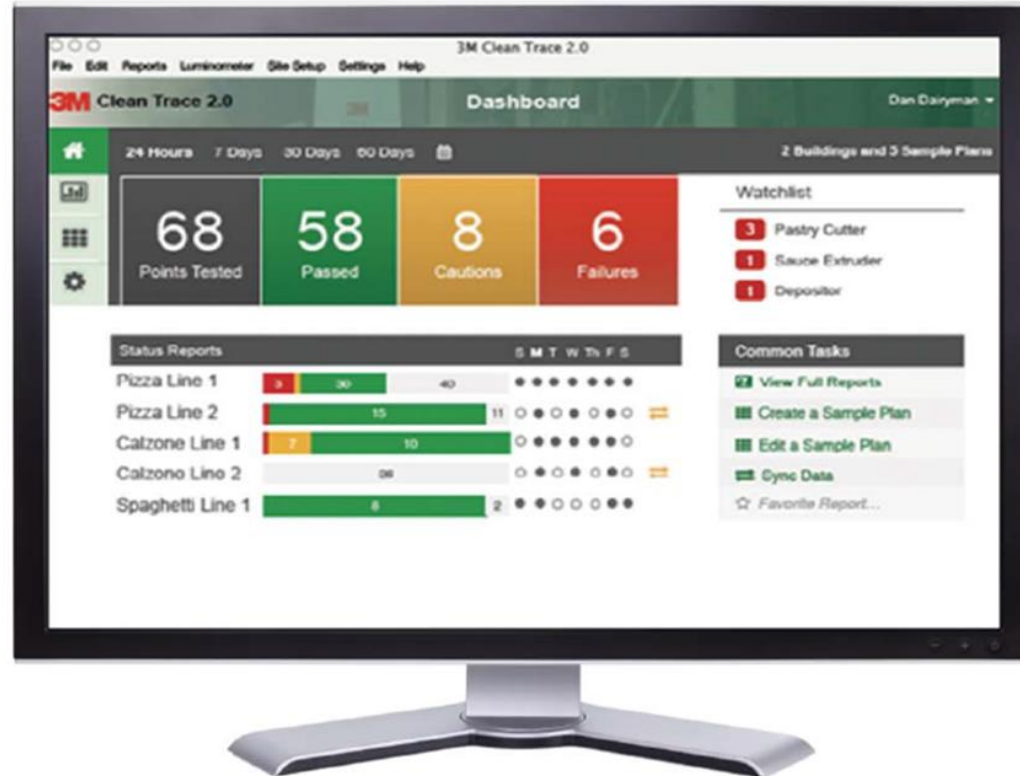


- Inside bucket - graduation marks
- Bottom side and junction
- Small parts - swab as much of surface as possible e.g. top and inside of seal
NB: Take care not to contaminate the swab

Introducing...

**The NEW 3M™ Clean-Trace™ Hygiene
Monitoring and Management System**

3M™ Clean-Trace™ Hygiene Monitoring and Management System



The complete system:

- New lightweight, ergonomic luminometer design with user-friendly touchscreen and one-handed operation
- Pre-moistened swabs are easy to activate for increased efficiency
- Intuitive, user-friendly software with redesigned dashboard helps you collect, store and retrieve test results for reports

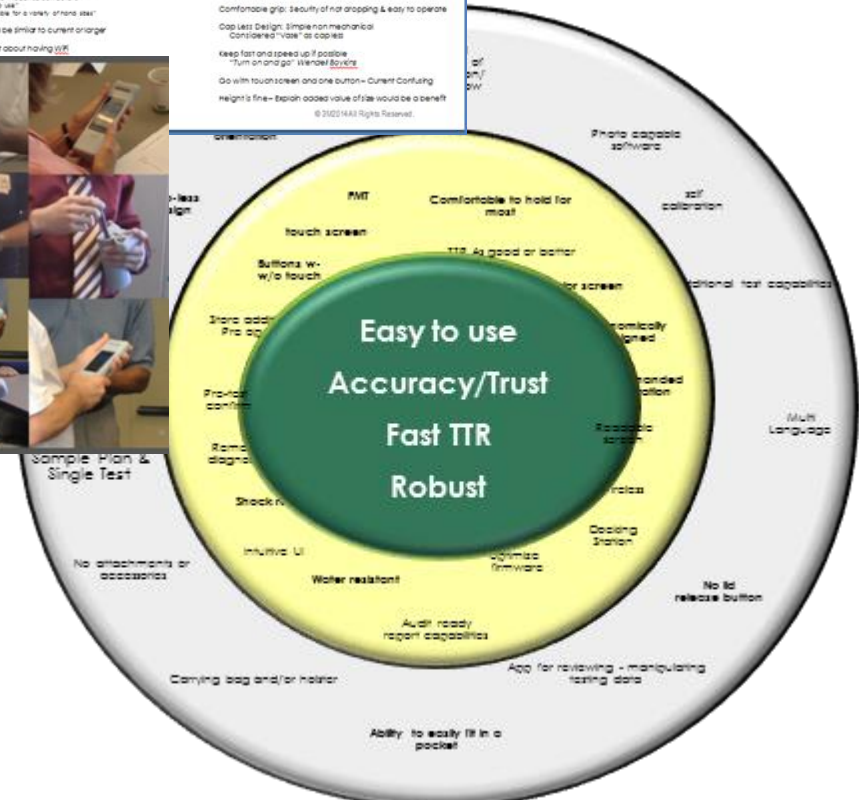
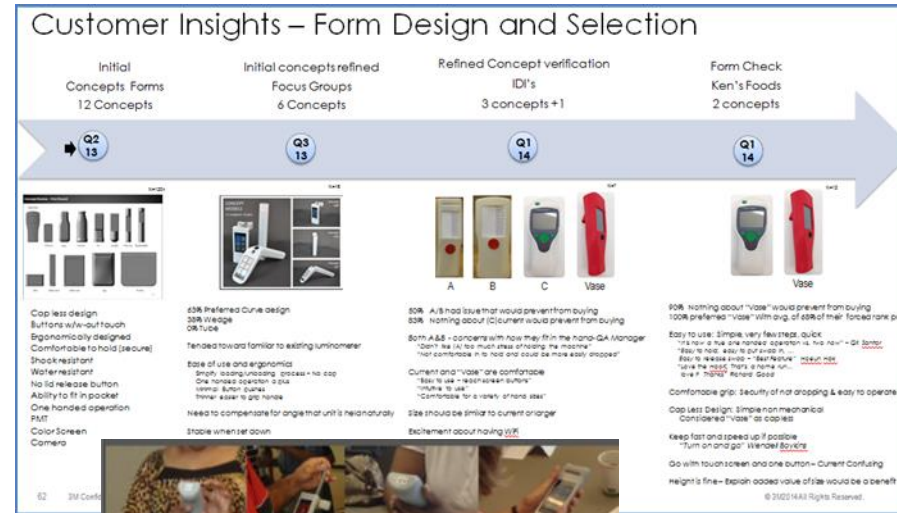
A journey with our customers...

Continuing to lead with technology

Global customer input

- Improving accuracy
- Focusing on ease of use
- Improving time to result

Advancements to the complete system



...to meet your needs

Accuracy

- Improved performance (CV%)
- PMT, optimised alignment
- Self calibration check on start up
- Remote diagnostics
- Secure data on luminometer

Robust

- No chamber cap
- Able to survive drop
- Water resistant / spray proof



Ease of Use

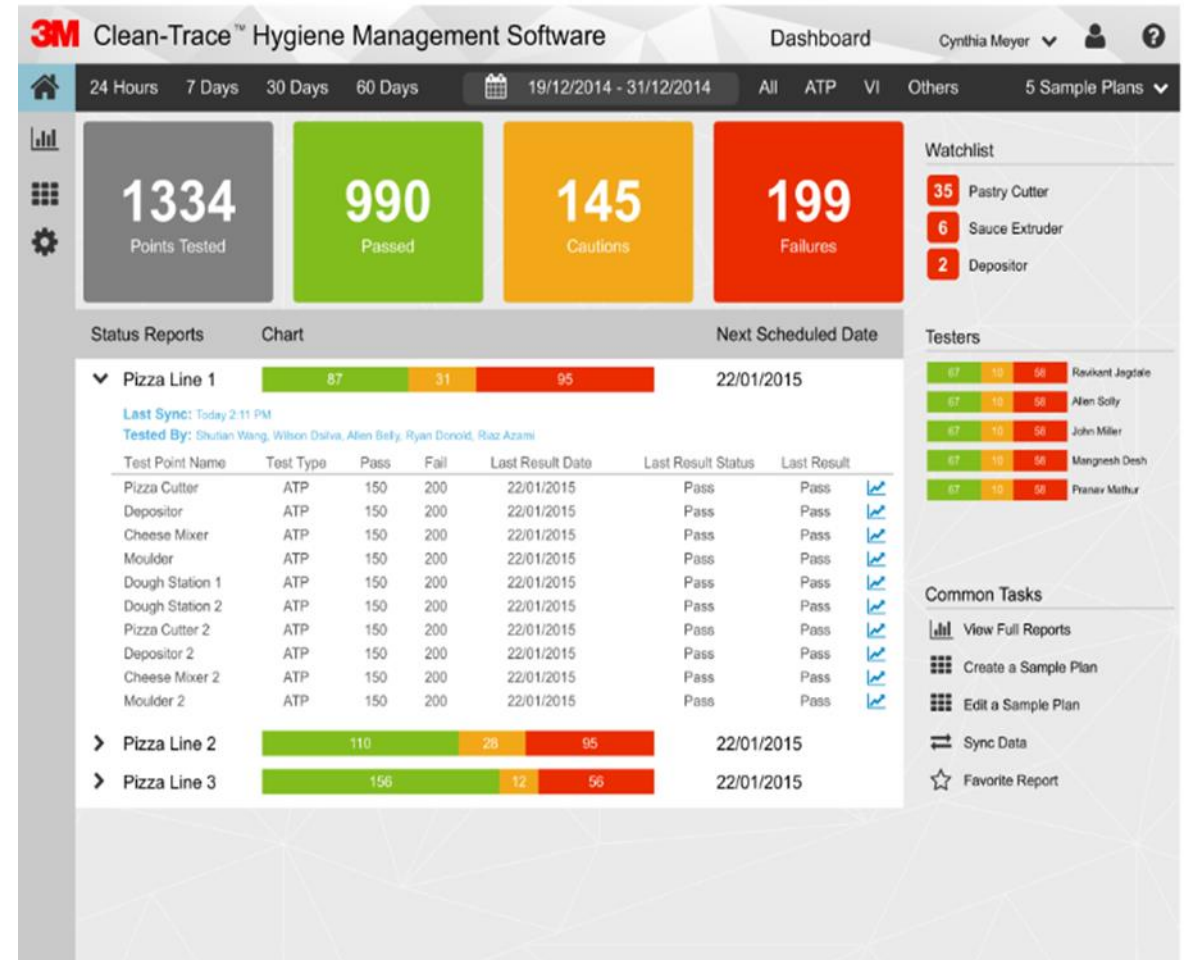
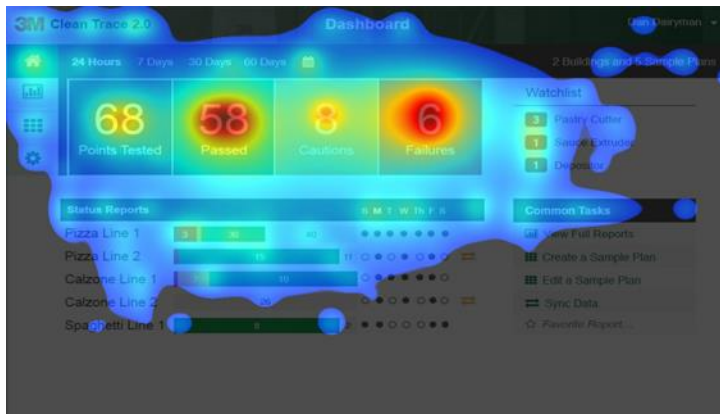
- One handed operation
- Comfortable to hold
- Ease of navigation - intuitive menu
- Touchscreen + buttons
- Colour screen
- Connectivity with software via USB, Wi-Fi and Bluetooth

Time to Result

- Improved time to result
- Audit ready results

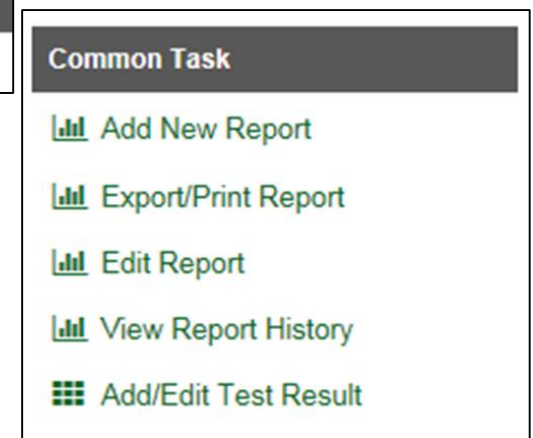
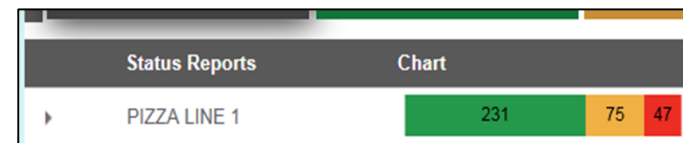
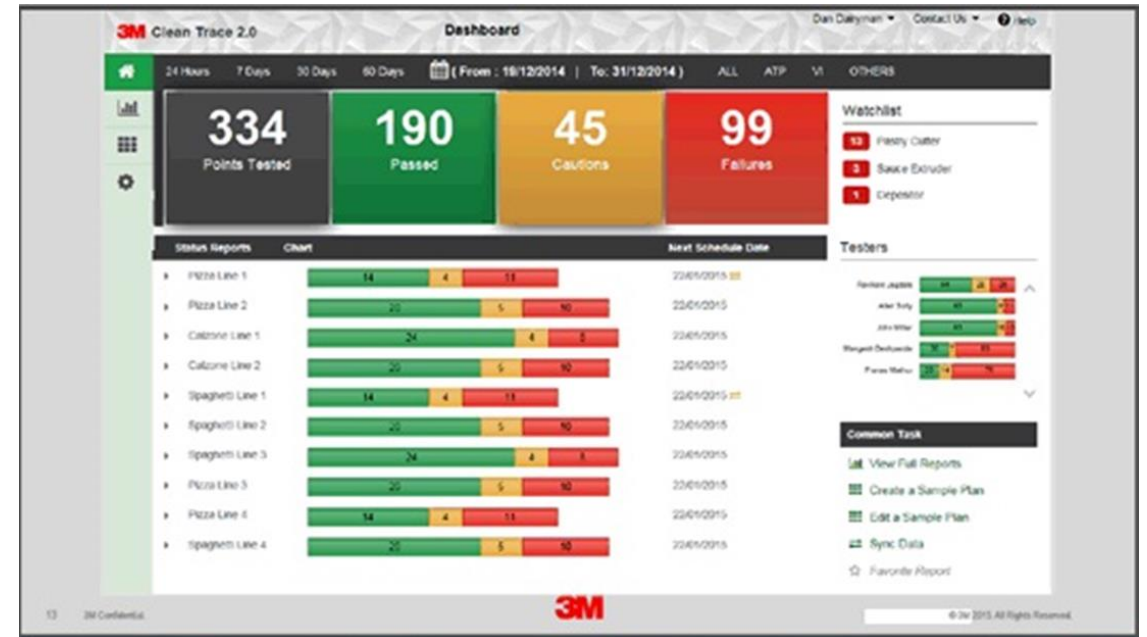
3M™ Clean-Trace™ Hygiene Management Software

- Easy to use, intuitive
- Dashboard – quick access to consolidated data
- Everything is one-click away
- Increased functionality
- Rapid report generation



3M™ Clean-Trace™ Hygiene Management Software

- Additional dashboard features
 - Watch list, Common tasks, Favourite reports, Status reports of each sample plan
 - Favourite reports
- Capture CAPA (Corrective and Preventative Action) comments
- Assign roles, users and security levels
- Intuitive set up of sample plans and test points
- Upload existing Clean-Trace system data



3M™ Clean-Trace™ Hygiene Management Software

- Easy management of daily reporting
- Simplifies basic reporting
- Quick audit preparation
 - Scheduled and unplanned
 - Internal and external
- During audits, reports let you:
 - Present detailed, organised electronic documents
 - Demonstrate diligence in hygiene monitoring

The screenshot displays the 3M Clean-Trace software interface, which is divided into several key sections:

- All Results Overview:** A table showing test results for different equipment.

Test #	Test Name	Points (#)	Points (%)	Results
1	1st Test	278	100%	50 Pass, 35 Caution, 167 Fail
2	Retest (1)	50	18%	20 Pass, 20 Caution, 10 Fail
3	Final Retest	20	7%	18 Pass, 2 Caution, 0 Fail
- Daily Master Sanitation Schedule:** A grid showing scheduled sanitation points for various equipment (Pastry cutter, Cheese grater, Depositor, Cheese Mixer, Moulder, Dough station 1, Dough toss 1, Mixer 1, Mixer 2, Grinder, Depositor 2, Depositor 1, Moulder 2, Cheese grinder, Moulder 2, Moulder 3) across a weekly cycle (Su to W).
- Results Report:** A detailed view of a specific test report for the Pizza Department, showing a 60% pass rate for Pizza Line 1. It includes a summary of 278 points tested, 167 passed, 35 cautions, and 50 failures.
- Summary Options:** A section providing quick access to various report types and filters, including report information, test summaries, and status filters (Pass, Caution, Fail, Untested).
- Summary Report:** A pie chart showing the overall performance: 65% Pass, 13% Fail, and 21% Caution.
- Run Trend Report:** A line graph showing the performance trend over time, with a shaded area indicating the target range.

Master Sanitation Schedule

Immediately know where to align your limited resources

- Detailed view at a sample plan level
- Quickly identify locations of current and potential issues
- Visualize trends
 - By sample point
 - By particular day or week

All Results Overview

Test #	Test Name	Points (#)	Points (%)	Results
1	1st Test	278	100%	50 (Fail) 35 (Caution) 167 (Pass) 26 (Untested)
2	Retest (1)	50	18%	20 (Caution) 20 (Pass)
3	Final Retest	20	7%	18 (Pass)

Daily Master Sanitation Schedule

Test Point	Su 12	M 13	Tu 14	W 15	Th 16	F 17	Sa 18	Su 19	M 20	Tu 21	W 22	Th 23	F 24	Sa 25	Su 26	M 27	Tu 28	W 29
Pastry outter	89	179	123	123	34	358	68	89	28	262	149	143	148	111	102	58	79	145
Cheese grater	234	65	178	197	345	1	245	78	37	66	231	199		78	81	199	232	456
Depositor	203	143	65	69	23	78	37	198	9	89	25	49	75	81	23	123	48	66
Cheese Mixer	56	23	56	45	48	25	45	25	24	156	32	67	37	56	82	14	22	69
Moulder	12	14	51	32	45	101	67	85	15	564	12	54	62	95	32	75	76	11
Dough station 1	45	6	5	8	12	65	45	12	9	5	48	23	2	45	2	15	65	45
Dough toss 1	98	100	101	87	45	65	20	15		89		97	45	85	86	12	45	86
Mixer 1	64	91	200	80	95	91	24	86	32	84	75	1	6	8	45	54	78	52
Mixer 2	98	654	32	48	19	27	83	64	58	98	73	71	81	97	95	48	56	84
Grinder	P	P	P	C	P	P	P	P	P	P	P	P	P	P	F	P	P	P
Depositor 2	15	1	4	3	9	50	7	6	5	90	4	8	3	1	4	8	6	4
Depositor 2	78	82	94	76	80	54	80	90	64	125	36	1	65	75	84	64	21	45
Moulder	100	105	90	89	87	86	8	9	4	890	78	72	91	83	49	76	5	4
Cheese grinder	P	P	P	P	P	P	P	P	P	F	P	P	P	P	P	P	P	P
Moulder 2	P	P	P	P	P	F	P	P	P	C	P	P	P		P		P	P
Moulder 3	1	7	3	5	6	759	2	9	5	8	6	4	5	3	2	9	4	7

Legend

Pass	Caution	Fail	Untested
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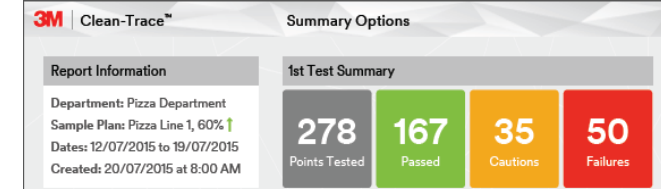
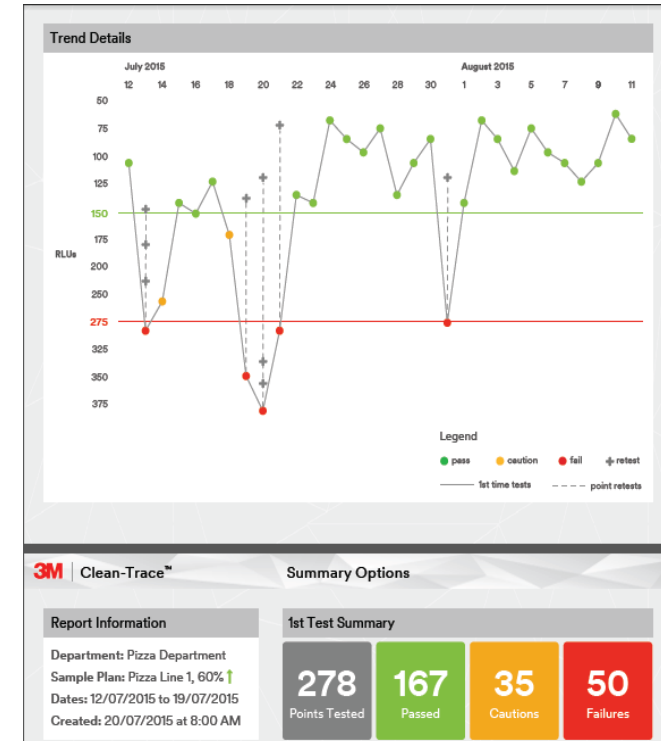
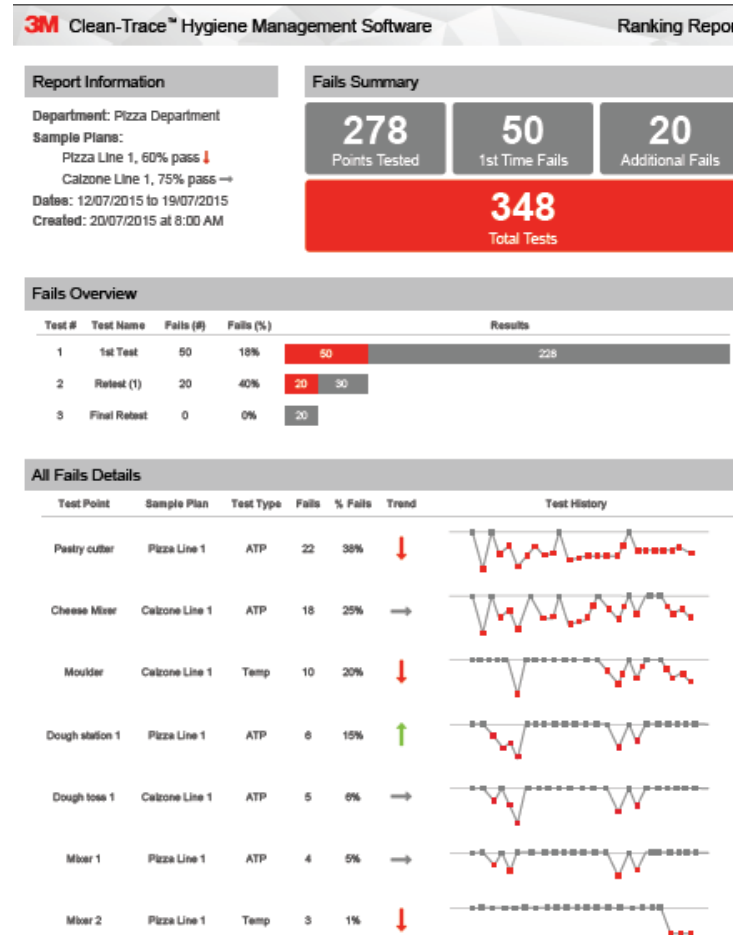
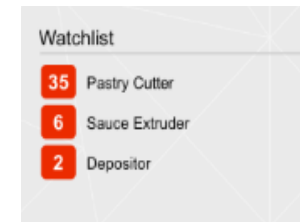
Note: this chart shows only 1st test results

Ranking and Trending Reports

Immediately identify cost savings

Identify potential increased costs

- Detailed view at a sample plan level
- Visualize trends
 - By sample point
 - By particular day or week
- Easy to interpret
- Align resources
- Justify resources
- Justify new resources



Daily Results Reports

- Quick and easy daily report generation
- Quick audit preparation
 - Scheduled and unplanned
 - Internal and external
- During audits, reports let you:
 - Present detailed, organized electronic documents
 - Demonstrate diligence in hygiene monitoring
 - More easily pass audits

3M Clean-Trace™ Results Report

Report Information

Department: Pizza Department
 Sample Plan: Pizza Line 1, 60% ↑
 Dates: 12/07/2015 to 19/07/2015
 Created: 20/07/2015 at 8:00 AM

1st Test Summary

278
Points Tested

167
Passed

35
Cautions

50
Failures

All Results Overview

Test #	Test Name	Points (#)	Points (%)	Results
1	1st Test	278	100%	<div style="display: flex; justify-content: space-between; width: 100px;"> <div style="width: 20%; background-color: #F44336; text-align: center;">50</div> <div style="width: 10%; background-color: #FFC107; text-align: center;">35</div> <div style="width: 60%; background-color: #4CAF50; text-align: center;">167</div> <div style="width: 5%; background-color: #808080; text-align: center;">26</div> </div>
2	Retest (1)	50	18%	<div style="display: flex; justify-content: space-between; width: 100px;"> <div style="width: 20%; background-color: #F44336; text-align: center;">20</div> <div style="width: 10%; background-color: #FFC107; text-align: center;">20</div> <div style="width: 60%; background-color: #4CAF50; text-align: center;">10</div> </div>
3	Final Retest	20	7%	<div style="display: flex; justify-content: space-between; width: 100px;"> <div style="width: 100%; background-color: #4CAF50; text-align: center;">18</div> </div>

All Results Details

Test Point	Status	Time	Test Type	P Value	F Value	Result	Comment
Pastry cutter	✘	1/15/2015 1:20 AM	ATP	150	170	175	
Retest (1)	✔	-----	---	---	---	149	
Depositor	✔	1/15/2015 1:25 AM	Visual	—	—	Pass	Clean of visible debris
Cheese Mixer	✔	1/15/2015 1:30 AM	ATP	1500	1750	1400	
Moulder	!	1/15/2015 1:31 AM	Temp	40 C	45 C	43 C	
Dough station 1	✔	1/15/2015 1:31 AM	ATP	200	220	190	
Dough toss 1	✔	1/15/2015 1:50 AM	ATP	101	102	0	
Mixer 1	✔	1/15/2015 1:51 AM	ATP	1200	1250	900	
Mixer 2	✔	1/15/2015 1:52 AM	Temp	40 C	45 C	38 C	
Depositor 2	!	1/15/2015 1:59 AM	ATP	100	105	103	
Cheese grinder	✔	1/15/2015 2:05 AM	ATP	800	801	779	

Report Information

Department: Pizza Department
 Sample Plan: Pizza Line 1, 60% ↑
 Dates: 12/07/2015 to 19/07/2015
 Created: 20/07/2015 at 8:00 AM



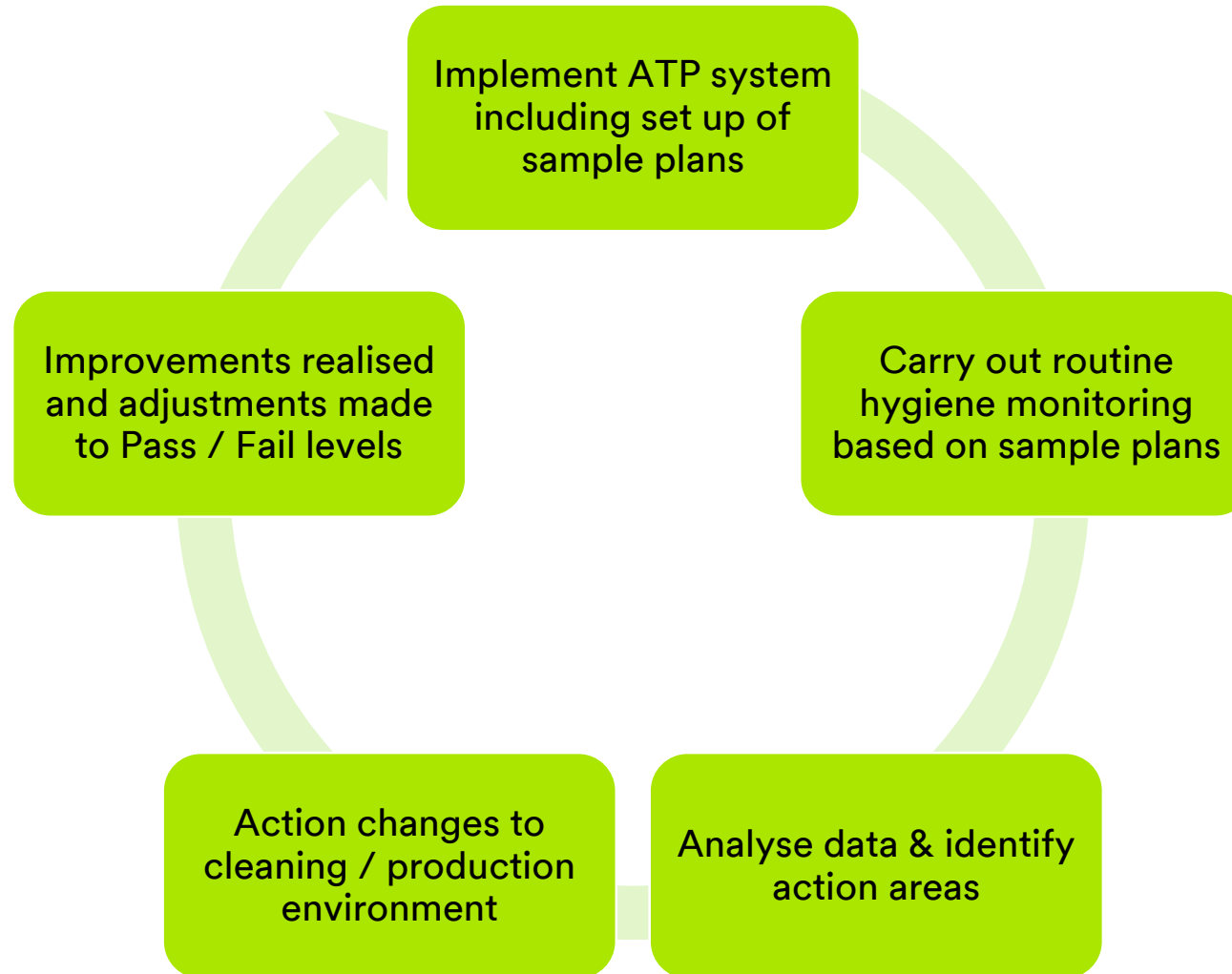
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In conclusion

Summary

- Cleaning is critical, cleaning verification is also critical!
- ATP bioluminescence detection offers rapid tool for the assessment of cleaning
- The 3M™ Clean-Trace™ Hygiene Monitoring and Management System provides two fold benefits:
 1. **Rapid results**
 - provides immediate feedback after completion of cleaning
 - allows for corrective and preventative procedures where 'Fail' results are recorded
 2. **Data trending**
 - trended results provide long term feedback of cleaning performance
 - helps measure overall consistency of the cleaning regime
 - Provides the means to record and secure hygiene data
 - helps to demonstrate positive trends in cleaning efficiency as part of a **continuous improvement** approach to hygiene management.

Data drives continuous improvement in hygiene monitoring



Meet the new guardian of the line.

Introducing the 3M™ Clean-Trace™ Hygiene Monitoring and Management System

When it comes to hygiene monitoring, you've got a lot on the line — and accurate information is critical. But not all systems are the same. Keep things moving with the 3M™ Clean-Trace™ Hygiene Monitoring and Management System, now redesigned and more reliable. It helps you quickly prepare for and pass your audits. It's designed to give you peace of mind with improved accuracy and breakthrough technology that's beyond anything on the market. It's go time.



Contact 3M to learn more!

The background is a complex, abstract pattern of overlapping, semi-transparent green polygons. The colors range from a bright, vibrant lime green to a deeper, forest green, creating a sense of depth and movement. The shapes are irregular and angular, resembling a low-poly or crystalline structure.

Thank you