



3M Food Safety

A third-party study of seven ATP systems

ATP hygiene monitoring systems can help manage critical risks in food production. The results should indicate whether cleaning has been effective so you can confidently make the decision to start manufacturing. That decision must be based on information that is consistently accurate, so you need a system to rely on every time it is used.

However, all ATP systems are not alike and do not produce results of the same quality. If you are making a decision using results that are inaccurate or unreliable, you could start production when an area may not be properly cleaned or lose valuable time re-cleaning when it is not necessary.

A scientific study was commissioned by 3M to gain a better understanding of the variations in results produced by different ATP systems. Findings were to be shared with the industry to enable more informed decisions when selecting an ATP system. The study was conducted by the Cardiff Metropolitan University Zero2Five Food Industry Centre. The results were presented at the 2015 International Association for Food Protection (IAFP) European Symposium on Food Safety in Cardiff, Wales, UK,¹ and the 2015 International Association for Food Protection (IAFP) Annual Meeting in Portland, Oregon, USA.²

The study evaluated the impact of time and temperature on the stability and repeatability of results generated by seven ATP systems. Because food manufacturers operate in a range of temperatures, depending on the food they produce, tests were conducted at four temperatures: 5°C, 10°C, 20°C and 35°C.

Impact of time on ATP test results

The time it takes to do a test can differ when testing the same site from day to day or even between shifts, due to time delays or differences in technique. Time delays can be caused if technicians get distracted, have unexpected conversations or climb into areas that can be hard to reach. Also, experienced technicians may work faster than newer personnel.

Therefore, an ATP system must consistently produce accurate results despite time delays taking readings. The ability of a system to do this effectively can be measured by decay rate.

To test repeatability of results, a known amount of ATP was measured and read repeatedly over two minutes to determine how much results varied. System variation was expressed as percent signal decay per minute. A signal decay of more than 10% per minute was considered unacceptable.

Hygiene Monitoring ATP Test System	5°C	10°C	20°C	35°C
3M™ Clean-Trace™ Hygiene Monitoring System	+5.66%	-1.44%	-5.63%	-7.11%
BioControl™ LIGHTNING MVP ICON™ System	+9.82%	+19.24%	-3.21%	-38.25%
Charm® novaLUM® System	-29.80%	-24.30%	-19.29%	-98.54%
Hygiena™ Ensure™ SuperSnap™	-41.33%	-50.16%	-47.50%	-64.18%
Hygiena™ Ensure™ UltraSnap™	+98.08%	+63.52%	+3.74%	-24.06%
Kikkoman® Rapid Hygiene Monitoring System	-15.00%	-5.16%	-0.98%	-11.54%
Neogen® AccuPoint® ATP Hygiene Monitoring System	-65.93%	-55.29%	-81.40%	-94.22%

■ **Acceptable**
 (less than 10% change in signal)
 ■ **Unacceptable**
 (greater than 10% change in signal)

Conclusions

- Three ATP testing systems produced unacceptable results at all temperatures: Charm® novaLUM® System, Hygiena™ Ensure™ SuperSnap™, Neogen® AccuPoint® ATP Hygiene Monitoring System.
- Three systems produced inconsistent results, with unacceptable results at some temperatures and acceptable results at other temperatures: BioControl™ LIGHTNING MVP ICON™ System, Hygiena™ Ensure™ UltraSnap™, Kikkoman® Rapid Hygiene Monitoring System.
- Some systems had signal decay rates as large as 98% per minute at some of the temperatures tested.
- The 3M™ Clean-Trace™ Hygiene Monitoring System was the only ATP system that produced acceptable results at all temperatures.



Impact of temperature on ATP test results

You must trust that your ATP system can repeatedly provide accurate results, every time you use it.

To test repeatability of results, a known amount of ATP was measured and read repeatedly over two minutes to determine how much results varied. System variation was expressed as coefficient of variation (CV), where the larger the percent CV, the greater the risk of inaccurate and unreliable results each time the system is used. A coefficient of variation greater than 20% was considered unacceptable.

Table 2: Repeatability (%CV when read at 0 seconds)

Hygiene Monitoring ATP Test System	5°C	10°C	20°C	35°C
3M™ Clean-Trace™ Hygiene Monitoring System	18.01%	19.87%	11.33%	12.58%
BioControl™ LIGHTNING MVP ICON™ SYSTEM	49.19%	31.69%	34.02%	47.08%
Charm® novaLUM® System	20.58%	25.53%	31.33%	32.78%
Hygiena™ Ensure™ SuperSnap™	24.96%	27.76%	16.91%	20.27%
Hygiena™ Ensure™ UltraSnap™	50.92%	47.53%	19.66%	21.24%
Kikkoman® Rapid Hygiene Monitoring System	28.72%	32.93%	36.40%	19.35%
Neogen® AccuPoint® ATP Hygiene Monitoring System	86.44%	83.90%	61.53%	49.90%

Acceptable
(less than 20% CV)

Unacceptable
(greater than 20% CV)

Conclusions

- Three ATP testing systems produced unacceptable results at all temperatures: BioControl™ LIGHTNING MVP ICON™ System, Charm® novaLUM® System, Neogen® AccuPoint® ATP Hygiene Monitoring System.
- Three systems produced inconsistent results, with unacceptable results at some temperatures and acceptable results at other temperatures: Hygiena™ Ensure™ SuperSnap™, Hygiena™ Ensure™ UltraSnap™, Kikkoman® Rapid Hygiene Monitoring System.
- Some systems showed CV% as high as 86%.
- The 3M™ Clean-Trace™ Hygiene Monitoring System was the only ATP testing system to produce acceptable %CV results at all temperatures.

Overall conclusions from the study

These studies demonstrate that all ATP systems do not provide the same quality of results. The only system that was stable and repeatable across both time and temperature was the 3M™ Clean-Trace™ Hygiene Monitoring System. All other systems had unacceptable results in one or both tests.

In their conclusions, the Cardiff Metropolitan University scientists cautioned that the use of ATP systems that are **“...highly time or temperature dependent or had poor repeatability could lead to highly inaccurate and unreliable results.”** They also stated that **“It is also of paramount importance that hygiene monitoring systems provide a repeatable result to ensure consistency and accuracy of results.”**

You and your company must make the high-risk decision to start food manufacturing. Your choice in an ATP system should help you make that decision and manage risk confidently. Knowing all ATP systems are not the same, it is critical to select and use an ATP system that consistently produces accurate and reliable results.

To view the complete study posters, go to:

3M.com/SurfaceATP-TimeDependency
3M.com/SurfaceATP-Repeatability

For more information on the 3M™ Clean-Trace™ Hygiene Monitoring System, go to:

3M.com/FoodSafety/HygieneMonitoring



Cardiff
Metropolitan
University

Prifysgol
Metropolitan
Caerdydd



References

1. “Evaluation of Time Dependency of Surface ATP Test Devices at Different Environmental Temperatures.” 2015 IAFP European Symposium on Food Safety, Cardiff, Wales, UK, April 20–22, 2015. Ryan Dias (1), Bethan Rowlands (1), Helen Taylor (1), Janet Holmes (1), Virginia Winter (1) and Mark Driscoll (2). 1. Food Industry Centre, Cardiff Metropolitan University, Cardiff, CF5 2YB, UK. 2. 3M Food Safety Department, 3M Healthcare Limited, The Science Park, Bridgend, CF31 3NA, UK.
2. “Evaluation of Repeatability of Surface ATP Test Devices at Different Environmental Temperatures.” IAFP 2015, Portland, Oregon, US, July 25–28, 2015. Ryan Dias (1), Bethan Rowlands (1), Helen Taylor (1), Janet Holmes (1), Virginia Winter (1) and Mark Driscoll (2). 1. Food Industry Centre, Cardiff Metropolitan University, Cardiff, CF5 2YB, UK. 2. 3M Food Safety Department, 3M Healthcare Limited, The Science Park, Bridgend, CF31 3NA, UK.



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