Heathcare Environmental Surfaces: How do you define “Clean”? 

When first implementing a cleaning monitoring program using ATP, one of the first questions asked is: “What is the recommended RLU value for Pass/Fail?” In other words, what is the definition of clean? Although there are a variety of methods used to assess cleaning effectiveness, there are no standards or guidelines that provide a definition as to what constitutes a clean environmental surface. Currently visual inspection is used to verify the efficacy of cleaning protocols but this method has been demonstrated to be ineffective. With the ever increasing body of evidence supporting the environmental transmission of healthcare associated infections (HAIs) there is a renewed interest in environmental cleaning and cleaning monitoring. There is an ongoing discussion on the subject with the agreement that consistent cleaning and disinfection of surfaces…

"Monitor cleaning performance to ensure consistent cleaning and disinfection of surfaces…" 

Even though there is no recommendation for standard Pass/Fail RLU levels when using ATP as a monitoring tool, benchmark values published in peer-reviewed journal literature can define a starting point against which one can measure cleaning performance.

Two Pass/Fail RLU values have been proposed in the recent literature from clinical studies employing the 3M™ Clean-Trace™ Hygiene Management System. Griffith et al.² originally proposed using 500 RLUs as the Pass/Fail value in a study published in the Journal of Hospital Infections using the Clean-Trace System. In that study, the 500 RLU value was arrived at by testing after following best practice cleaning and disinfection of 29 ward locations. They observed a mean ATP value of 266 RLUs, with aerobic bacteria, staphylococci and enterobacteria counts, as determined by culture, of less than 2.5 cfu/cm². Furthermore, in this study, Griffith also observed that:

• Over 70% of the sites tested were unacceptable after cleaning and that visual assessment was a poor indicator of cleaning efficacy with only 18% considered unacceptable.
• Sites most likely to fail in the ward were in the restroom and kitchen, areas which are frequently implicated in the spread of infectious intestinal disease.
• Operating theatre sites had lower ATP results but 61% of sites would be considered unacceptable.

In a 2007 study Griffith¹ uses the ATP test to evaluate the effectiveness of cleaning regimens at selected sites over a 14 day period. In this study, 86–100% of the tested sites fail the 500 RLU Pass/Fail value using the existing method of cleaning. After modifying their cleaning regimen, only 0–14% of the tested sites failed using the 500 RLU value.

In a follow-up study Lewis et al.³ propose a stricter 250 RLU Pass/Fail value based on the results from assessing the cleaning efficacy in a 1300 bed teaching hospital after routine and modified cleaning protocols. They note that the modified best cleaning practices could routinely achieve this lower Pass/Fail value. Importantly, they also stress the critical value of benchmarking against such Pass/Fail values (either 500 or 250 RLUs) to achieve incremental quality improvements.

In a 2009 study, Boyce et al.⁴ carried out a study consisting of two phases. In phase I, current cleaning methods at the site were evaluated. In phase II, a re-testing of the site was performed after educational sessions with cleaning services personnel. Boyce uses the Pass/Fail value of 250 RLUs suggested by Griffith in the 2007 study and quotes this reference in his paper as a recently proposed standard. Boyce et al. observe that in phase II (after educational sessions) of the study, 77% (388/503) of the tested surfaces yield values lower than 250 RLUs.

Another important study is the NHS (National Health Service – United Kingdom) report published in July 2009⁵. This report provides clinical evidence that using the Clean-Trace System, seven hospitals experienced an overall decline in the level of contamination over a six month evaluation period from an average of 568 RLUs to 194 RLUs.

The Clinical literature analysis demonstrates:

• Griffith and Lewis/Griffith are the only acknowledged researchers that proposed a standard Pass/Fail RLU value.
• Griffith originally determined the 500 RLU value by comparison to culture results of samples taken along side the ATP tests from surfaces that had been cleaned by using best practice.
• Lewis and Griffith later revised the standard to a stricter 250 RLU value noting that this could be routinely achieved by best practice methods, also suggesting that both values (500 and 250 RLUs) could be used for benchmarking.
• Subsequent studies quote either the 500 or 250 RLU Pass/Fail values (depending on which paper they cite) as “the accepted standard”.
• There is no guiding organization such as the US CDC or European CDC that has defined a Pass/Fail RLU level that is associated with adequate environment cleaning or cleanliness. Until such time, the identified RLUs noted for Pass/Fail are taken from peer reviewed published trials. Any environmental monitoring should be part of a continuous improvement initiative, including the 3M™ Clean-Trace™ Hygiene Management System.
Healthcare Environmental Surfaces: How do you define “Clean”? continued

Based on the review of current published literature as well as 3M’s clinical experience using the Clean-Trace System in a healthcare setting it is recommended that the following initial benchmark values be adopted:

Pass: <500 RLU
Caution: 501–999 RLU
Fail: >1000 RLU

It is also suggested that the 250 RLU pass value be used as a stretch goal to drive continuous improvement and best cleaning practices development.

What if it is not possible to meet the recommended benchmark Pass/Fail values?

It is important to understand that because there are so many variations in hospital surfaces and cleaning practices, published benchmark Pass/Fail values may not be achievable under all circumstances. Because each situation is different Pass/Fail RLU levels are best defined on a case by case basis. Applying one set of Pass/Fail RLU values for all end users is not recommended because an acceptable RLU value for “Pass” depends on a number of factors:

- The method of cleaning used to clean the surfaces.
- The age and condition of the surface being tested. For example, a new smooth surface will result in a lower RLU value than a surface that is older, scratched and pitted.
- The nature of the surface being tested. For example, stainless steel surfaces are easier to clean as compared to plastic and so should achieve lower RLU results after cleaning.

Improvement in cleaning effectiveness using the 3M™ Clean-Trace™ Hygiene Management System is an iterative process where Pass/Fail RLU benchmark values are lowered as cleaning practices are improved. Refer to the Hygiene Management Guide for a detailed discussion on how to set up a monitoring program and the steps to establishing Pass/Fail benchmark levels that are relevant to your facility.

The 3M™ Clean-Trace™ NGi Luminometer together with the 3M™ Clean-Trace™ Online Software allow users to set a pass and fail value based on their accumulated data. These values are defined after implementation of the system and are used to monitor day to day cleaning performance, assess new cleaning protocols, drive continuous improvement efforts as well as provide feedback on training effectiveness.

References

To learn more about the 3M™ Clean-Trace™ Hygiene Management System, call the 3M Health Care Helpline at 1-800-228-3957 or visit www.3M.com/infectionprevention.