
Case study Liquid Guard

Signo NanoCare UK Ltd

1. Testing Objectives

Determination of Liquid Guard's efficacy on frequently used items through use of ATP measurement; and subsequent assessment of method limitations.

2. Test items

Surfaces of daily used items coated with Liquid Guard:

- Telephone handset
- Computer keyboard
- Door entry button panel
- Door handle
- Children's toy

All testing carried out at the business premises of Jesmonite, Shropshire, UK. The toy belonging to the son of the MD of that company.

3. Test method and process

Method:

Determination of the degree of hygiene by detecting microbiological residues on surfaces coated with Liquid Guard by using an ATP test device.

Process:

1. Initial ATP measurement of untreated test items.
2. Coating of test items with Liquid Guard via 2-step application process.
3. ATP measurement of treated test objects after coating and a period of use.

4. Results and Conclusions

Table 1: RLU values of test items before and after treatment with Liquid Guard.

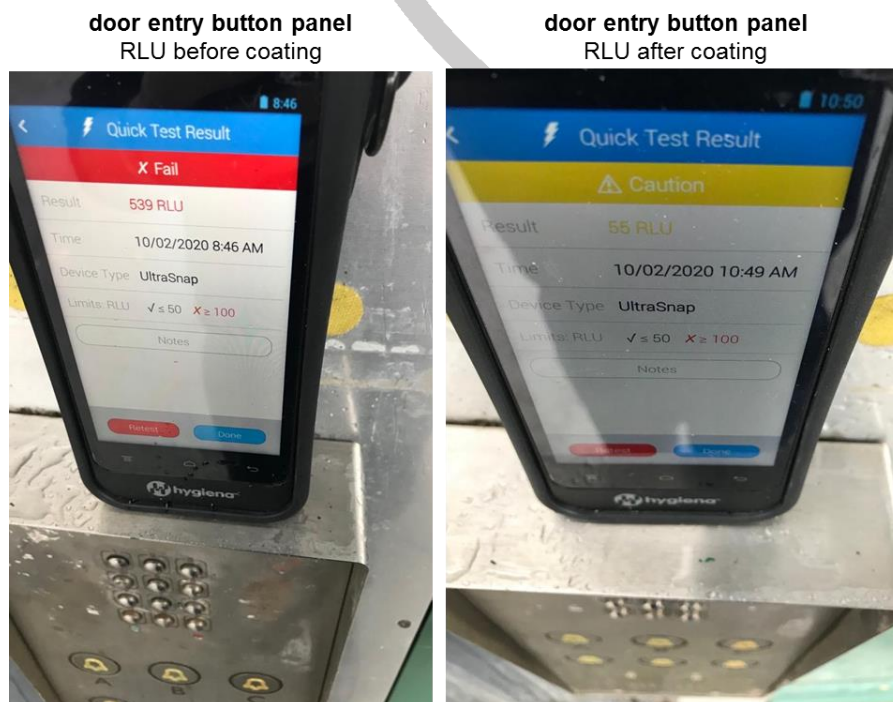
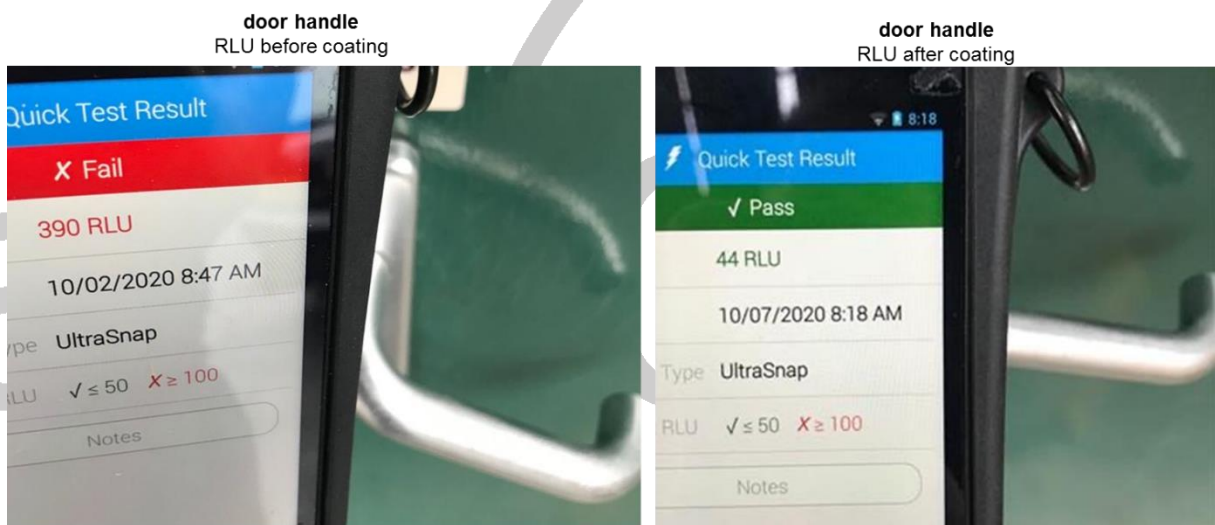
Test items	Untreated			treated		
	Date	RLU	Status	Date	RLU	Status
Telephone handset	05.09.2020	939	Fail	06.09.2020	15	Pass
Computer keyboard	28.09.2020	442	Fail	02.10.2020	34	Pass
Door entry button panel	02.10.2020	539	Fail	07.10.2020	55	Caution
Door handle	02.10.2020	390	Fail	07.10.2020	44	Pass
Children's toy	27.09.2020	1529	Fail	06.10.2020	6	Pass

ATP device settings - limit of relative light unit (RLU):

- Pass: ≤ 50
- Caution: 50-100
- Fail: ≥ 100

Remark: The limit to pass the test is set at a level recommended for areas in which hygiene is of utmost importance (e.g. hospital public areas). On this basis, values within the “caution” zone might still be considered as having passed.

Images of the test items and corresponding measurement results:



The RLU (relative light unit) of all test objects was determined before the surfaces had been treated with Liquid Guard antimicrobial coating. As seen in Table 1, initial RLU values for all surfaces exceed the determined pass levels (50 or 100). These results illustrate that all surfaces had low levels of hygiene. After the determination of the initial RLU values (the initial hygiene conditions) all test surfaces were treated with Liquid Guard following which the surfaces have been used in normal daily use. After one to nine days of use, the RLU values of the test surfaces were re-measured. For all test surfaces, a significant drop of the RLU value in comparison with the initial RLU value was observed. For example, on the children's toy, the RLU value was determined 9 days after the coating was applied with the value dropping from 1529 to 6. This result, along with all others, show that the application of the coating led to a significant increase in the hygienic condition of the respective surface.

This study showed the potency of Liquid Guard antimicrobial coating in daily life on frequently used objects, and the use of ATP devices to determine the microbial-killing-effect. Once applied, the hygienic condition of the treated surface has been significantly improved, reflected by a drop of the RLU values to pass the hygienic assessment.

However, when ATP devices are used to determine the function of the antimicrobial coating, factors which can negatively influence the ATP readings should be borne in mind. ATP, the energy source of living cells, is not only present in contamination in the form of microorganisms. For example, contact of the test swab with the skin can alter the results, since human cells can influence the ATP readings. Furthermore, food residues can likewise lead to an increased RLU value. Besides this, other visible or even invisible contamination of the surface can negatively influence the results. Those include grease (e.g. transferred to the surface due to use of hand cream) or sweat, which can not only influence the RLU value itself, but also shadow the function of the antimicrobial coating. If the surface, and consequently the coating, is not cleaned regularly, the function of the coating is hampered since it will be overlaid with dirt.

In summary, the following points should be borne in mind if ATP measurement devices are used to check the function of Liquid Guard:

- Dirt (e.g. sweat / grease) negatively influence the RLU values and overlay the coating
→ regular cleaning is mandatory
- It can only determine the degree of hygiene – not a totally accurate determination of the level of micro-organism.