



# Sanitise Case Study



Author | Michael Lamont

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Aktivora 10%   Aktivora 5%   Zoono   Cribersol Dry San Oxy

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<b>Index:</b> .....	<b>page 1</b>
<b>Company Contact Details:</b> .....	<b>page 2</b>
<b>Trial Personnel:</b> .....	<b>page 3</b>
<b>Introduction &amp; Methodology:</b> .....	<b>page 4-11</b>
<b>Ref 1A &amp; 1B:</b> .....	<b>page 12-13</b>
<b>Interpreting Lab Reports:</b> .....	<b>page 14&amp;15</b>
<b>PH Review:</b> .....	<b>page 16-18</b>
<b>Overview of Results Sue McGrath:</b> .....	<b>page 19-26</b>
<b>Appendix 1: Sue McGrath:</b> .....	<b>page 27-34</b>
<b>Overview of Results MSL:</b> .....	<b>page 35-39</b>
<b>Individual Lab Reports:</b> .....	<b>page 40-54</b>
<b>Executive Summary Susan McGrath BSc Hons PGCE CEEd DASE MEd FInstP</b>	<b>page 55</b>

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**Locations |**

Train - Fortwilliam Depot

Bus & Office - Engineering Milewater Road

## Introduction

Lamont Cleaning & Support Services are an accredited, Northern Ireland based cleaning & support services company. Some of our specialist services, delivered by our highly experienced and committed team, include Deep Cleaning & Sanitisation | Commercial and Industrial Window Cleaning | Chewing Gum and Graffiti Removal | High Pressure Jetting | Steam Cleaning | Flood Damage Clean Ups

With the current COVID-19 Coronavirus outbreak now effecting UK and Ireland's transport industry, businesses, schools and universities our Coronavirus cleaning and Antiviral Sanitisation Services have been expanded to include:

- Coronavirus deep cleaning, disinfecting and decontamination
- Electrostatic fogging
- Back to work deep cleaning and disinfecting
- Workplace decontamination

We have used our industry knowledge and experience to source effective disinfectant products. All detergents used satisfactorily meet the requirements of BS EN 1276 standards – the European standard for chemical disinfectants. To pass this standard, products must prove a germ kill rate of 99.999% within a 5-minute contact time.

**The aim of this case study is to firstly evaluate the disinfectants effectiveness in eliminating pathogens over a 14-day period based on microbiological analysis and secondly determining the best cleaning method.**

## Methodology of Case Study

This study uses three cleaning methods (Manual spray and clean, Electrostatic and Fogging) in three separate Translink areas: Train, Bus & Office.

### **What are Electrostatic and Fogging in terms of cleaning?**

***Electrostatic spraying and fogging of disinfectants and sanitisers are new to the cleaning industry, but they are not new technology.***

**Electrostatics** have been used quite successfully in spraying of paints and coatings. It is highly useful for coating complex shapes with a highly uniform film with little or no overspray. Farmers have used electrostatic sprayers to apply pesticides to crops because of the ability to cover the top and bottom of foliage to insure complete crop protection.

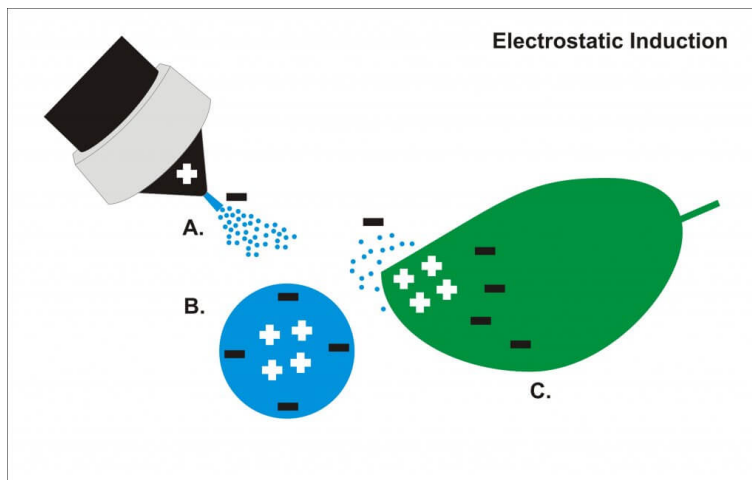
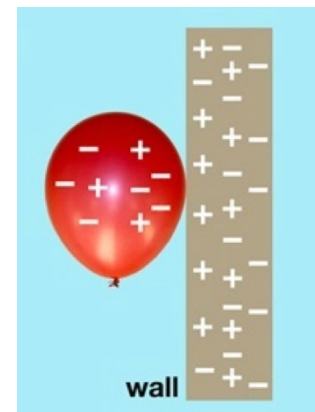


Figure 1 Objects round or flat can be coated evenly using electrostatic technology

Within the nozzle of the sprayer atomised droplets pass an electrode. This means the droplets leaving the nozzle are now charged; imagine rubbing a balloon on hair; the balloon and hair become charged. The balloon negatively (gained electrons) and the hair positively (lost electrons). When the balloon is lowered down close to the hair the hair will be pulled upwards against gravity, due to the fact that opposite charges attracted each other. If the charged balloon is brought close to a surface such as a wall it will 'stick' to it. The excess negative charge pushes away the free to move electrons on the atoms on the surface of the wall, leaving the wall positively charged – opposites attract – hence it sticks to the wall. This is the technology used in electrostatic spraying. The force of electrostatic attraction is greater than the pulling force of gravity, **hence hidden surfaces are coated by the chemicals**. The positively charged droplets are carried in air streams towards the surface; electrostatic induction occurs and they then stick to the surface.



Electrostatic technology insures hidden or shadowed surfaces get covered with a highly uniform film.

**Within the cleaning industry this method atomises cleaning solutions to produce an electrically charged spray able to wrap around surfaces of all types for an even coating.** As a chemical exits the electrostatic sprayer, it is given a positive charge. When this charged droplet comes close to a surface it induces an opposite negative charge, through electrostatic induction, the drop is then attracted to the surface, the whole surface, of the object evenly. The disinfectant chemicals in the droplet then kill any unwanted bacteria, viruses, and other pathogens.

The sprayer is pressurised so the droplets leave the sprayer not only charged but moving within the air jet produced by the sprayer.

**For desktops, floors and walls that need to be absolutely spotless, electrostatic spray cleaning is the best option.** The same goes for equipment and hard to reach places; if a piece of equipment is heavily trafficked such as those on trains and buses, electrostatic spray cleaning is the most comprehensive way to remove germs and dirt.

Effective electrostatic sprayers can cover a larger area in minutes and because surfaces are coated evenly wiping is not required regularly, only periodically to keep surfaces polished.

**Fogging** uses a machine which creates a fog or mist which contains the chemical disinfectants. This system also uses air streams to disperse the disinfectant aerosol to reduce the numbers of airborne microorganisms and also to apply disinfectant to surfaces which are difficult to reach. The fogger uses pressure to create a fine mist which is applied to the target areas, the spray density typically being moderated by a manual valve to ensure optimum effect. The fine fog can reach into corners and difficult areas and may also penetrate porous surfaces. Again, using the appropriate disinfecting formula, fogging can kill a wide range of pathogens, leaving surfaces clean and safe for human contact.

**The main features and benefits of electrostatic spray and fogging disinfection include:**

- Reduces the time it takes to cover and disinfect surfaces and hard-to-reach places by 50% compared to manual spray and clean methods.
- Improves infection control and the spread of viruses such as influenza, MRSA, HIV and many others – During this COVID-19 pandemic your choice of disinfectant solution needs to meet BS & EU testing standards.
- Applies chemicals in a more efficient, controlled manner, eliminating the dangers of overuse.

**Electrostatic disinfection will cover 360-degrees of applied surfaces.**

Fogging disinfecting utilises nearly the same technology as electrostatic, without charging the cleaning molecules when they leave the machine. Additionally, fogging-cleaning uses larger droplets, compared to an electrostatic cleaning process.

**Fogging covers more surface area with disinfectant per square centimetre, based on the larger micron size of the droplets.**

Translink tested, over a 14-day period, 5 different disinfectants within 3 working areas; an office, a bus and a train – these 3 areas were in normal operational use over this period.

The 5 disinfectants are Aktivora 10% | Aktivora 5% | Zoono | Crebisol and DrySan Oxy.

Three cleaning methods were also tested: Spray and Clean, Fogging and Electrostatic spraying.

**The aim of the report is to firstly evaluate the disinfectants effectiveness in eliminating pathogens over a 14-day period based on microbiological analysis and secondly determining the best cleaning method.**

Within each a risk assessment was carried out in each of the testing areas and 3 levels where chosen and labelled High, Medium and Low.

Testing Zone	High Level	Medium Level	Low Level
Train	Luggage rack	Vertical hand rail*	Arm rest
Bus	Horizontal rail	Vertical rail	Arm rest
Office	Inside door handle	Back of chair	Desk top

- Train carriage 3412: DrySan Oxy’s Medium Zone was a toilet door handle beside seat; Zoono’s Medium Zone was a window sill – A vertical hand rail was not present in these locations.

These reports are available on request.

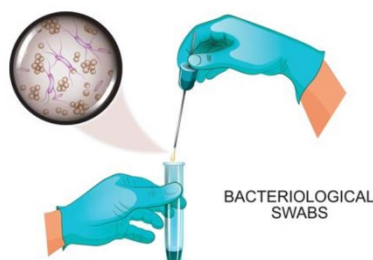
All swab tests were applied by Lamont Cleaning & Support Services in the presence of Translink staff. The swabs were supplied by MSL who carried out the microbiological analysis of all swab results.

2 tests were done on day 1. **Day 1 Before** are the results from the test areas before any cleaning disinfectant was applied. **Day 1 After** are the swab results taken within 30 minutes of the first swab.

All areas were then re swabbed after 24 hours, 72 hours, 7 day and 14 days.

## Swabbing Method

Our swabbing procedure used a sterile viscose swab pre dosed with a neutralising solution to remove any microorganisms from surface of approximately 10 cm<sup>2</sup> where practical. The swab was then returned to the sterile sheath, labelled and then sent to MSL laboratories. Here the swab was vortexed in sterile diluent and subbed onto an agar plate of a selective and non-selective growth medium which allows all aerobic mesophilic organisms to grow. The agar plates were incubated for 3 days at a temperature of 32<sup>o</sup>C. & 30<sup>o</sup>C. The Total



Colony Count (colony forming units (cfu)/swab) was then reported back to us.

A colony forming unit or CFU is defined as a single, viable propagule that produces a single colony (a population of the cells visible to the naked eye) on an appropriate growth medium.

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<b>Methodology Live Study</b>	Train   Bus   Office
<b>Cleaning Methods</b>	Spray & Clean Manually   Electrostatic   Fogging
<b>Sanitise Products</b>	Aktivora 5%   Aktivora 10%   Zoono   Crebirsol   DrySan Oxy

Train & Bus used within case study remained in service, as did offices, with cleaning staff instructed not to clean test areas which were clearly marked with coloured tape.

**Day 1 21st July 2020 - Train number 3012** selected | Spray & Clean & Electrostatic Clean

Michael Lamont, Matthew McKinstry LC&SS & Gareth Williams Translink present.

A Risk Analysis of train was carried out to establish three frequently touched areas, at high level, medium level & low level, to give a good spread of testing for each product & each cleaning method.

The three areas were: **high-level: luggage rack, medium level: vertical handrail & low-level: armrest.** In the main, these areas were used for each product with just 2 variations. **Where a vertical handrail was not present within the same location for Zoono & Dry San Oxy at medium level we used a window sill for Zoono & toilet door handle for Dry San Oxy.**

All areas were clearly marked using different coloured tape & cross referenced on a separate spreadsheet, with carriage numbers & seat numbers taken, in the event tape was removed we had exact areas for each test. (sample Ref 1A)

A different carriage was used for each product to ensure that when using electrostatic equipment there was no overspray from product to product.

Throughout the period of the trial only one piece of tape had been removed this was on last day of bus trial, all others remained intact on Train Bus & Office's.

For each method of cleaning on train, bus & office a spreadsheet was pre-written and cross referenced with test tubes (sample Ref 1B)

All testing was carried out in a systematic manner throughout the trial, in the product order as follows: 1<sup>st</sup> Aktivora 5% | 2<sup>nd</sup> Aktivora 10% | 3<sup>rd</sup> Zoono | 4<sup>th</sup> Crebirsol | 5<sup>th</sup> DrySan Oxy

Pre-clean swab tests were carried out for both spray & clean & electrostatic clean as follows:

Matthew gave Michael test tube. Michael called back number & area.

A swab of each area was taken, by rotating it over the surface in an area of approximately 10cm<sup>2</sup> where practical to ensure complete removal of cells, the swab was then put back into sheath ensuring top securely fastened & past to Gareth to bag.

This was carried out until the 15 pre-tests of spray & clean areas had been completed. Matthew then gave Gareth accompanying spreadsheet which was bagged with test tubes & spreadsheet sealed & put away.

This system was then repeated for electrostatic clean areas.

Spray & clean commenced, with Michael spraying product onto surface then cleaning off using disposable blue 2 ply paper roll, with a separate piece of paper used for each clean, thus ensuring no cross contamination.

On cleaning all 15 marked areas, a post swab was immediately carried out, using the same systematic process.

Swabs bagged sealed with spreadsheet & put away.

Electrostatic clean commenced using Translink sprayer, all areas were treated to ensure good coverage of each product. In between each product Gareth emptied the sprayer & thoroughly rinsed out to ensure no cross contamination of products.

On completion of all areas a post swab was carried out, bagged with spreadsheet sealed & put away.

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### **Day 1 21<sup>st</sup> July 2020 - Bus registration number: HGZ 8217 Bus number 3217 selected | Spray & Clean**

Gareth passed us to Gerard Brady to oversee this part of study

A Risk Analysis of bus was carried out to establish three frequently touched areas, at high level, medium level & low level, to give a good spread of testing for each product.

The three areas were **high-level: horizontal handrail, medium level: vertical handrail & low-level: armrest**. These areas were used for each product.

All areas were clearly marked using different coloured tape & cross referenced on separate spreadsheet, with seat numbers taken from front to back on right side of bus as you enter. In the event tape was removed we had exact areas for each test. (sample Ref 1A)

Pre-clean swab tests were carried out as follows.

Matthew gave Michael test tube. Michael called back number & area.

A swab of each area was taken, by rotating it over the surface in an area of approximately 10cm<sup>2</sup> where practical to ensure complete removal of cells, then put back into sheath ensuring top securely fastened & past to Gerard to bag.

This was carried out until the 15 pre-tests of spray & clean areas had been carried out. Matthew then gave Gerard accompanying spreadsheet which was bagged with test tubes & spreadsheet sealed & put away.

Spray & clean commenced, with Michael spraying product onto surface then cleaning off using disposable blue 2 ply paper roll, with a separate piece of paper used for each clean, thus ensuring no cross contamination.

On cleaning all 15 marked areas, a post swab was immediately carried out, using same systematic process.

Swabs bagged sealed with spreadsheet & put away. All day 1 swab tests were sent in sealed envelopes first class recorded delivery on the same day.

It had been pre-agreed with Translink to carry out further tests after 24 hours, 72 hours, 7 days & 14 days to establish the on-going performance of sanitising/disinfecting products. These were carried out as per post swab methodology.

Gareth Williams & Gerard Brady oversaw the 24-hour & 72-hour tests, with John Allison taking over the 7 day & 14 day tests for Train & Bus. On completion of each day's testing all swabs were sent on the same day via first class recorded delivery. The practical element of testing was completed on the 4<sup>th</sup> August for Train & Bus.

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### **Day 1 28th July 2020 – Offices Milewater | Fogging Clean**

Owen Cormican oversaw this part of study

A Risk Analysis of offices was carried out to establish three frequently touched areas, at high level, medium level & low level, to give a good spread of testing for each product.

The three areas were **high-level internal door handle, medium level back of chair (hard surface) & low-level desk**. These same areas were used for each product, with a different office used for each product to ensure no cross contamination of products, whilst fogging.

All areas were clearly marked using different coloured tape & cross referenced on separate spreadsheet, with office numbers taken. In the event tape was removed we had exact areas for each test. (sample Ref 1A)

Pre-clean swab tests were carried out as follows;

Matthew gave Michael test tube. Michael called back number & area.

Swab of each area was taken, with bud being twisted / spun to ensure complete coverage, bud then put back into tube ensuring top securely fastened & past to Owen to bag.

This was carried out until the 15 pre-tests of areas had been carried out.

Matthew then gave Owen accompanying spreadsheet which was bagged with test tubes & spreadsheet, sealed & put away.

Fogging clean commenced using LC&SS's equipment, all offices & areas within were treated to ensure good coverage of each product. In between each product Michael emptied the fogging machine & thoroughly rinsed out to ensure no cross contamination of products.

On completion of all areas a post swab was carried out, bagged with spreadsheet sealed & put away.

All test tubes were placed into bags which were then sealed and were then subsequently sent in a larger sealed envelope and posted first class recorded delivery the same day.

It had been pre-agreed with Translink to carry out further tests after 24 hours, 72 hours 7 days & 14 days. These were carried out as per post swab methodology – see table below:

Person in charge of testing	Company	Area tested	Periods tested
Gareth Williams	Translink	Train	24 hours & 72 hours
Gerald Brady	Translink	Bus	24 hours & 72 hours
Owen Cormincan	Translink	Offices	All
John Allison	Translink	Train & Bus	7 Day & 14 Day

On completion of each days testing all swabs were sent same day first class recorded delivery. The practical element of testing was completed 11th August for all areas

On receiving the Day 1 test results Michael Lamont, (commercial manager) personally contacted the laboratory as he had concerns with some results. The laboratory's advice was to carry out re-tests within areas of concern and explained that it is not unknown within the field of microbiology for misnomers to occur.

On 4<sup>th</sup> August re-tests were carried out for train spray & clean, Results within table. Lamont Cleaning and Support Services were unable to carry out electrostatic re-tests as the sprayer was not available.

**Ref 1A Day 1 Train after Spray Clean Test**

STANDARD SWAB SUBMISSION FORM		DATE:	21st July 2020
COMPANY NAME: Lamont Cleaning & Support Services		PURCHASE ORDER NO: (must be included)	
COMPANY ADDRESS: Translink Case Study		NUMBER OF SAMPLES:	15
TEST TUBE SITE = Day 1 - Train After Spray & Clean Test (Train Number 3012)		RESULTS EMAIL:	<a href="mailto:michael@lamontcss.com">michael@lamontcss.com</a>
TEST TUBE NO = SAMPLE NO		TEL:	797345904
		CONTACT:	Michael Lamont
Please note any information submitted on this form is transferred onto the final report.			
Sample No.	Sample Description	Reference	T/C @ 30°C
1	Carriage (3312) 1 Aktiva 5% High	Train	
2	Carriage (3312) 1 Aktiva 5% Medium	Train	Carriage 3312 / Seat W-14 - A-13 - Luggage Wreck / Green Tape 5%
3	Carriage (3312) 1 Aktiva 5% Low	Train	Carriage 3312 / Seat W-14 - A-13 - Arm Rest / Green Tape 5%
4	Carriage (3512) 2 Aktiva 10% High	Train	Carriage 3512 / Seat W-24 - A-23 - Luggage Wreck / Green Tape 10%
5	Carriage (3512) 2 Aktiva 10% Medium	Train	Carriage 3512 / Seat W-24 - A-23 - Vertical Hand Rail / Green Tape 10%
6	Carriage (3512) 2 Aktiva 10% Low	Train	Carriage 3512 / Seat W-24 - A-23 - Arm Rest / Green Tape 10%
7	Carriage (3512) 3 Zoono High	Train	Carriage 3512 / Seat W-62 - A-61 - Luggage Wreck / Yellow Tape
8	Carriage (3512) 3 Zoono Medium	Train	Carriage 3512 / Seat W-62 - A-61 - Vertical Hand Rail / Yellow Tape
9	Carriage (3512) 3 Zoono Low	Train	Carriage 3512 / Seat W-62 - A-61 - Arm Rest / Yellow Tape
10	Carriage (3412) 4 Cibeorsol High	Train	Carriage 3412 / Seat W-19 - A-20 - Luggage Wreck / Blue Tape
11	Carriage (3412) 4 Cibeorsol Medium	Train	Carriage 3412 / Seat W-19 - A-20 - Vertical Hand Rail / Blue Tape
12	Carriage (3412) 4 Cibeorsol Medium	Train	Carriage 3412 / Seat W-19 - A-20 - Arm Rest / Blue Tape
13	Carriage (3412) 5 Dry Sanox High	Train	Carriage 3412 / Seat W-2 - A-1 - Luggage Wreck / White Tape
14	Carriage (3412) 5 Dry Sanox Medium	Train	Carriage 3412 / Seat W-2 - A-1 - Toilet Door Handle beside seat / White Tape
15	Carriage (3412) 5 Dry Sanox Low	Train	Carriage 3412 / Seat W-2 - A-1 - Arm Rest / White Tape

**Ref 1B Day 1 – Bus before Spray Clean Test**

A	B	C	D	E	F	G	H	I	J	K	L	M
<b>STANDARD SWAB SUBMISSION FORM</b>												DATE: 21st July 2020
COMPANY NAME: Lamont Cleaning & Support Services												PURCHASE ORDER NO: (must be included)
COMPANY ADDRESS: Translink Case Study												NUMBER OF SAME: 15
TEST TUBE SITE = Day 1 - Bus before Spray & Clean (S&C) Test												RESULTS EMAIL: <a href="mailto:michael@lamontcss.com">michael@lamontcss.com</a>
TEST TUBE NO = SAMPLE NO												TEL: 790345904
CONTACT: Michael Lamont												
<b>Please note any information submitted on this form is transferred onto the final report.</b>												
Sample No.	Sample Description	Reference	TVC @ 30°C	Comments/Additional Information								
1	Aktivra 5% High	Bus										
2	Aktivra 5% Medium	Bus										
3	Aktivra 5% Low	Bus										
4	Aktivora 10% High	Bus										
5	Aktivora 10% Medium	Bus										
6	Aktivora 10% Low	Bus										
7	Zoono High	Bus										
8	Zoono Medium	Bus										
9	Zoono Low	Bus										
10	Cribersol High	Bus										
11	Cribersol Medium	Bus										
12	Cribersol Medium	Bus										
13	Dry Sanoxy High	Bus										
14	Dry Sanoxy Medium	Bus										
15	Dry Sanoxy Low	Bus										
16												
17												
18												
19												
20												
OFFICE USE ONLY: LAB REF:				BOOKED IN BY:								
Please note that swabs need to be tested within 24 hours of sampling to achieve accurate results.				Microbiological Solutions Ltd								
				Gollinrod								
				Walmerstley								
				Bury								
				Lancashire								
				BL9 5NB (Royal Mail) or BL9 5NA (Courier & Sat Nav)								
				0844 824 6003								
				<a href="mailto:technical@microbiologicalsolutions.com">technical@microbiologicalsolutions.com</a>								
TF 5.8.17 Issue 2												

## Interpreting Lab Reports

1. All reports are converted into a single digit to the power of  $10^n$ .
2.  $10^n$  is represented by E+(N) on the report
3. The detection limit of the test is 1-300 so you will not have a result out of that range. 3000 limit.

Examples explaining point 1 and 2

$$300 = 3.00 \times 10^2 = 3.0 \text{ E}+02$$

$$50 = 5.00 \times 10^1 = 5.0 \text{ E}+01$$

$$4.0 = 4.00 \times 10^0 = 4 \text{ E}+00$$

The symbol > means greater than

The symbol < means less than

For example  $5 > 3$

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## Variability in Antimicrobial Testing

Scientific fields such as physics and mathematics are considered to be exact sciences. Biology, including microbiology, is different. Microbiological systems possess a greater number of uncontrollable variables which results in increased experimental complexity and decreased experimental accuracy. The great number of variables at play in a given microbiological study arise from the inherent complexity of living systems. Each variable contributes a certain degree of error which, depending on the system, may propagate linearly or non-linearly. The more variables involved, the more errors expected, resulting in changes to the outcome of a given study. Practicing microbiologists are used to – even count on – such variability in their studies. All microbiologists expect inherent variability in antimicrobial testing. Bearing this in mind as you are assessing the efficacy of the test results you will primarily be comparing pre and post swab results against each other. Therefore, as microbiology is based on living things and because there is an inherent variability with testing, significant changes (> 0.3 log change) should be considered more than any lesser change.

For example, if the study report from our laboratory's findings indicate a 2.5 log reduction, it corresponds to a percent reduction somewhere between 99% and 99.9%. However, because of the way log scales work, a 2.5 log reduction does not equal a 99.5% reduction.

Mathematically scientists use formulas to help them calculate log reduction.

**Percent Reduction Calculation**

$$\text{Percent Reduction} = \frac{(A - B) \times 100}{A}$$

Where:

A is the number of viable microorganisms before treatment,  
B is the number of viable microorganisms after treatment.

**Log Reduction Calculation**

$$\text{Log Reduction} = \log_{10}(A/B) \text{ or}$$

$$\text{Log Reduction} = \log_{10}(A) - \log_{10}(B)$$

Where:

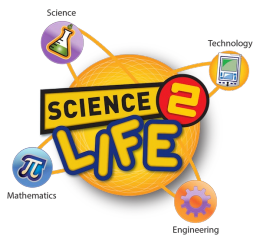
A is the number of viable microorganisms before treatment,  
B is the number of viable microorganisms after treatment.

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**MSL Lab note after day 1**

As this study is in vivo, (the office, train and bus had a through put of different humans on a daily basis), there is an inherent variability for results post “Day 1 After” which increases as time goes on. The main variability is the volume of contamination in each carriage, each carriage will have had a different level of travellers, of different ages, sizes and cleanliness, and therefore the number of times our designated swab test areas are contaminated will vary substantially. The time difference between the ‘Day 1 Before’ and the ‘Day 1 after’ for each sample testing area is 30 minutes and the initial contamination - all initial contamination (with the exception of 2 sites\*) - was < (less than) 3.48 log making for a much fairer test.

There are 4 results in particular that may warrant a retest (testing in duplicate/repeating tests to show consistency is a common practice for experimentation), these are: Train Electrostatic Aktivora 10% High | Train Electrostatic Zoono High | Train spray & clean Aktivora 5% medium | Train spray & clean Zoono medium



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## pH Test Report

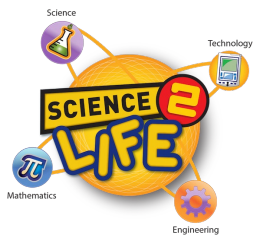
### General Information

<b>Venue</b>	<b>Translink Engineering</b> <b>Milewater Road - Belfast</b>	
Persons Present	Susan McGrath Mark Forsythe Michael Lamont Owen Cormican	Science2Life Aktivora Lamont Cleaning & Support Services Facilities Manager, Translink Engineering
Type of Analysis	pH Test	
Date of Test	4 <sup>th</sup> August	

### Summary of the testing performed by Susan McGrath

All products tested were alcohol-free and supplied by Translink.

Type of Analysis	Products Tested	pH
<b>pH Test</b>	Calibration Buffer pH 4.01	4.01
	Tap water	7.77
	DrySan Oxy	1.40
	Zoono	4.70
	Aktivora 10%	7.00
	Aktivora 5%	7.07
	Crebisol	11.5



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## What is pH?

- pH is a measure of the relative amount of free hydrogen and hydroxyl ions in the solution.
- The pH range goes from 0 – 14, with 7 being neutral.
- pH's **of less than 7** (more free hydrogen ions) indicate **acidity**, whereas pH of **greater than 7** (more free hydroxyl ions) indicates a **base**.
- pH is reported in 'logarithmic units'. Each number represents a 10-fold change in the acidity/basicness of the solution tested.
- A solution with a pH of 5 is ten times more acidic than a solution having a pH of 6.
- For comparisons lemon juice and vinegar have a pH of 2, bleaches have a pH of 13.5 whilst baking soda has a pH of 9.5.

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## Importance of pH

The pH of a solution determines the solubility and biological availability of chemical constituents such as nutrients and heavy metals. In the case of heavy metals, the degree to which they are soluble determines their toxicity. Metals tend to be more toxic at lower pH because they are more soluble.

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## Remarks

Alcohol-free sanitisers make use of chemicals with antiseptic properties to exert the antimicrobial effects. These chemicals have a different mode of action and function according to their chemical groups:

- Chlorine compounds
- Iodine compounds
- Quaternary ammonia compounds
- Peroxygens
- (Bis) phenols
- Triclosan
- Biguandie
- Chlorhexidine

With this in mind having a wide range of pH values is to be expected. Each sanitiser tested are composed of a different set of chemicals hence it is not unusual for them to have different pH values.

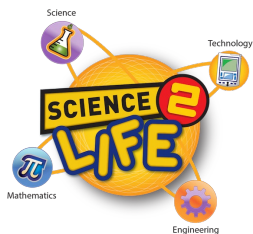
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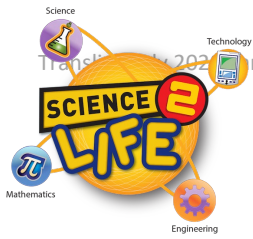
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### Cross Reference of Test Disinfectants Ingredients

Cleaning Product	pH	Key Ingredients* % of ingredients are not listed due to trade secrets	Bioicide	Alcohol	Oxidiser	Acidic (Reducer)	Quaternary Ammonium Salt	Surfactant	Foam Booster	Stabiliser	Safety Notes
Aktivora 10%	7	Quaternary ammonium compounds, benzyl-Cl2-16-alkyldimethyl chlorides	Yes				Yes	Yes	Yes		
		Didecylmethylammonium chloride	Yes				Yes				
		polyhexamethylene biguanide	Yes								
		Alcohol ethoxylate with 9neo						Yes			
Aktivora 5%	7.07	1-propanaminium, 3-amino-n-(carboxymethyl)-n,-dimethyl-n-coco acyl derivatives, hydroxides inner salts						Yes			
		Alcohol ethoxylate with 9neo					Yes				
		Quaternary ammonium compounds, benzyl-Cl2-16-alkyldimethyl chlorides	Yes				Yes	Yes	Yes		
		Didecylmethylammonium chloride	Yes				Yes				
Zoono*	4.7	polyhexamethylene biguanide	Yes								
		3-Trimethoxysilyl Propyl Dimethyl Octadecyl Ammonium Chloride	Yes	Yes		Yes	Yes				
		Benzalkonium Chloride (BKC)	Yes				Yes	Yes			Optimal at high pH values; Soluble in alcohol.
Crebisoil X 10	11.5	di-n-decyl(dimethyl) ammonium chloride (0.154% w/w)					Yes	Yes			
		Propan-2-ol (isopropyl alcohol)		percentage not given on SDS							Avoid Strong Acids and Strong Oxidising Agents
Dryoxy San	1.4	Hydrogen Peroxide			Yes						
		Phosphoric Acid				Yes				Yes	Not recommended for use on copper and it's alloys such as brass



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## Analysing the Case Study Results

### Translink Sanitiser Case Study | Spray & Clean Test

Bus	Day 1 Before	Day 1 After	24 Hour	72 Hour	7 days	14 Days
Aktivora 5% High	570	<1	<1	<1	80	>3000
Aktivora 5% Med	<1	<1	>3000	<1	<1	>3000
Aktivora 5% Low	50	<1	530	2600	120	70
Aktivora 10% High	>3000	<1	<1	<1	>3000	100
Aktivora 10% Med	>3000	<1	<1	1800	<1	>3000
Aktivora 10% Low	38	<1	<1	40	40	>3000
Zoono High	<1	<1	1100	1900	>3000	>3000
Zoono Med	90	<1	>3000	>3000	>3000	>3000
Zoono Low	<1	<1	1800	680	83	>3000
Cribersol High	440	<1	<1	>3000	>3000	>3000
Cribersol Med	60	<1	<1	<1	>3000	50
Cribersol Low	20	<1	<1	2500	>3000	>3000
Dry San Oxy High	1800	<1	>3000	>3000	>3000	280
Dry San Oxy Med	240	<1	<1	2300	<1	110
Dry San Oxy Low	20	<1	<1	2900	40	>3000

Taking into account the values highlighted in yellow I would question if a clean took place between 72 hour and the subsequent 7 day cleaning.



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If no cleaning took place – then reading the results as displayed the spray and clean method is not very effective beyond 24 hours. Aktivora 5% Aktivora 10% and Crebisol all show excellent results up to 72 hours ; Aktivora 5% , Aktivora 10% and DrySan Oxy all perform well at the medium level up to 7 days.



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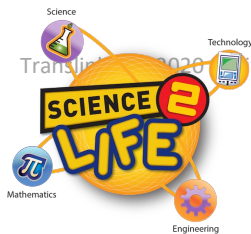
## Translink Sanitiser Case Study | Spray & Clean Test

Train	Day 1 Before	Day 1 After	24 Hour	72 Hour	7 days	14 Days
Aktivora 5% High	40	<1	<1	<1	<1	<1
Aktivora 5% Med	<1	<1	<1	40	40	20
Aktivora 5% Low	<1	<1	890	2300	<1	10
Aktivora 10% High	<1	<1	<1	50	<1	<1
Aktivora 10% Med	<1	<1	<1	>3000	<1	<1
Aktivora 10% Low	<1	<1	<1	<1	<1	<1
Zoono High	<1	<1	180	<1	<1	<1
Zoono Med	<1	<1	<1	<1	<1	<1
Zoono Low	<1	20	<1	<1	1	<1
Cribersol High	<1	20	>3000	1700	120	<1
Cribersol Med	2600	10	<1	<1	30	290
Cribersol Low	<1	<1	<1	<1	<1	<1
Dry San Oxy High	<1	<1	<1	<1	<1	<1
Dry San Oxy Med	<1	<1	<1	<1	440	<1
Dry San Oxy Low	<1	<1	730	<1	<1	220

High level – luggage rack | Medium Level – vertical rail | Low Level – arm rest

Looking at the results (high lighted in yellow) I would query if a clean took place between the 24 hour and 7 day readings – if a clean did take place the cleaners are doing a really good job.

**Apart from Cribisol, all high level cleaning results are good. Plus taking into consideration the fact that the train is in daily operation a fluctuation in colony forming units (cfu's) is to be expected however to go down from more than 3000 to less than 1 is questionable.**

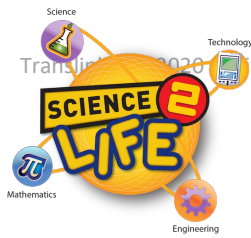


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## Translink Sanitiser Case Study | Electro-static Clean Test

Train (ES)	Day 1 Before	Day 1 After	24 Hour	72 Hour	7 days	14 Days
Aktivora 5% High	<1	<1	>3000	<1	<1	<1
Aktivora 5% Med	<1	<1	1900	<1	<1	20
Aktivora 5% Low	50	<1	830	<1	<1	50
Aktivora 10% High	180	140 retest	640	30	<1	30
Aktivora 10% Med	20	<1	480	>3000	430	10
Aktivora 10% Low	<1	<1	530	300	<1	<1
Zoono High	2400	>3000 retest	810	740	<1	90
Zoono Med	1800	<1	>3000	>3000	<1	>3000
Zoono Low	10	<1	230	840	<1	<1
Cribersol High	<1	<1	70	<1	<1	<1
Cribersol Med	<1	<1	90	20	<1	<1
Cribersol Low	<1	<1	<1	740	<1	<1
Dry San Oxy High	<1	<1	<1	<1	<1	<1
Dry San Oxy Med	<1	<1	>3000	<1	<1	<1
Dry San Oxy Low	<1	<1	60	<1	<1	<1

High level – luggage rack | Medium Level – vertical rail | Low Level – arm rest



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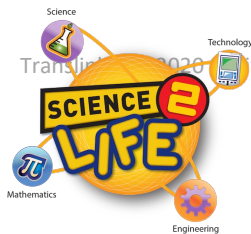
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LC&SS picked up anomalies for Akivora 10% and Zoono in the High-level areas (highlighted in pink) – unfortunately these couldn't be retested due to the unavailability of the Electrostatic sprayer. My analysis of this table will therefore not include these two disinfectants in these levels.

It is very important to remember that the train is operational. The swab tests after 24 hours could have been taken just after passengers left the carriage. If this was the case it would explain why the cfu count is so high. However, it could also be indicative of all areas being inadvertently cleaned.

Looking at the table as a whole and looking at the yellow highlighted sections you can see very low cfu counts going to high counts and then low again if the train had not been cleaned the results could be interpreted as evidence that the disinfectant cleaners have coated the surfaces and continue to kill the microorganisms landing on them through touch or respiratory methods.

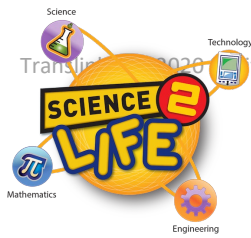


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## Translink Sanitiser Case Study | Office Fogging Clean Test

Office	Day 1 Before	Day After	24 Hour	72 Hour	7 Day	14 Day
Aktivora 5% High	<1	<1	<1	<1	<1	<1
Aktivora 5% Med	10	<1	<1	<1	<1	<1
Aktivora 5% Low	>3000	<1	<1	<1	<1	<1
Aktivora 10% High	30	<1	<1	<1	30	<1
Aktivora 10% Med	60	<1	<1	<1	<1	<1
Aktivora 10% Low	400	<1	<1	300	<1	<1
Zoono High	310	10	<1	<1	60	<1
Zoono Med	30	<1	<1	<1	<1	<1
Zoono Low	>3000	<1	<1	31	<1	<1
Cribersol High	250	<1	>3000	300	<1	300
Cribersol Med	<1	<1	<1	<1	40	10
Cribersol Low	>3000	430	>3000	300	<1	16
Dry San Oxy High	550	<1	840	300	<1	4
Dry San Oxy Med	220	<1	<1	<1	<1	1
Dry San Oxy Low	350	<1	100	300	<1	300

High Level: Inside door handle | Medium Level: Back of Chair | Low Level: Desk Top



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Just looking at the medium level results across the 14 days: Aktivora 10% Aktivora 5% and Zoono perform extremely well

Across all levels Aktivora shows the best results - the result from the desk top is particularly good due to the very high contamination starting point of >3000 cfu's

However, looking at the results in total and especially the numbers highlighted in yellow I would question as to whether there was a possibility of the areas being cleaned between the 24 and 72 hour time frame. If this was the case it would explain why the large cfu counts on the 24 hour testing routine were found to be reduced in the 72 hour results.

On this basis – I feel I can only really give a comment for the period up to and including 24 hours. **Aktivora 10%, Aktivora 5% and Zoono worked equally well.**

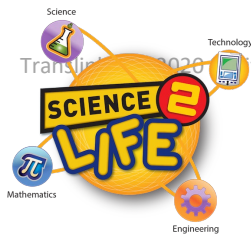
## In Conclusion

It would have been easier to make comparisons if a second set of controlled readings were taken along the in vivo readings.

Comparing the 4 case study tables with respect to the **cleaning methods**, if cleaning staff did not go into the test zones in between testing periods, it is very clear that the electrostatic spray method keeps the counts down for the longest period of time.

Again, it is very important to point out that some test spaces may have had lots of people in them and others not. This is why a controlled set of results would have been good to have as a reference point.

Test zone	Cleaning method	Best disinfectants	Testing Period
Bus	Spray and Clean	Aktivora 10% Crebisol	24 hours*
Train	Spray and Clean	Aktivora 10% Zoono	14 days**
Train	Electrostatic	All	14 days***
Office	Fogging	Akitora 5%, Aktivora 10%, Zoono	14 days



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\* Looking at the results it lends to the possibility that the bus was cleaned by Translink staff between the 72 hour and 7 day testing periods. The high number of cfu counts after 72 hours shows that the spray and clean method is not as good as fogging and electrostatic. The electrostatic being better due to the fact that the whole surface gets coated.

\*\* If there is a doubt as to whether Translink cleaning staff did inadvertently clean the train between the 24 hour and 72 hour testing sessions the **Aktivora 10%** is the only disinfectant with <1 readings across all levels.

\*\*\* The fact that the cfu counts are up and then down could be evidence that the coatings of these disinfectants do continue to act on bacteria, viruses, yeasts, moulds and other microorganisms with effect for 14 or more days – again only a controlled test zone – office, bus and train not in normal operation but being ‘infected’ equally could lead to this statement being tested fully.

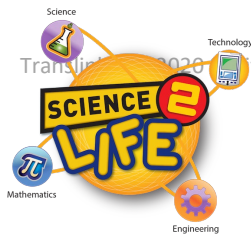
It is now important to mention the pH test. If the disinfectant is too acidic or too alkaline and these chemicals are corrosive meaning they will eat away at the surface.

**In fact, the safety data sheet for DrySan Oxy states not to be used on copper or copper alloys such as brass.** Its pH was 1.4. DrySan Oxy’s main ingredient is hydrogen peroxide ( $H_2O_2$ ); phosphoric acid is added to help stabilise the  $H_2O_2$ . See the **Cross Reference of Test Disinfectants Ingredients** table following the pH report.

Strong alkaline cleaners also effect surfaces for example wood. Wood has a natural pH of between 4 – 6 – it contains acidic components such as tannic acid. Whenever something that is acidic comes in contact with something alkaline and water is present one thing that is certain is that a chemical reaction will occur. If we are dealing with only two or three inorganic compounds the reactions are fairly predictable but wood consists of a multitude of organic compounds which differ from species to species. Even within individual species the chemistry may be influenced by the nutrients in the soil where the tree was grown or it may vary from heartwood to sapwood in the same log. In other words, whenever the surface of wood is exposed to a substance with a high pH something is going to happen, and it may not always be predictable.

Both DrySan Oxy and Zoonia are **acidic** cleaners.

Crebisol on the other hand is **alkaline** with a similar pH to Ammonia.



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Acids (or reducers) and alkalis play an important role in killing microorganisms however, it is also important to take into consideration the surfaces they are sprayed onto and the long-term corrosive effects they will have on those surfaces.

**Aktivora 5% and Aktivora 10% were the only 2 disinfectants which tested pH neutral. Good for surfaces, including skin.**

A highly acidic product — with a pH below 2 for example — may prove corrosive and destroy or damage materials it comes in contact with. A formulation that is highly alkaline – perhaps a pH of 12 or above – might be corrosive and burn or dissolve materials.

**pH neutral cleaners are less likely to harm surfaces, and are more likely to be safer for the uses and the environment.**

## Recommendations

**The aim of the report was to firstly evaluate the disinfectants effectiveness in eliminating pathogens over a 14-day period based on microbiological analysis and secondly determining the best cleaning method.**

Knowing the effectiveness of electrostatic spraying in industry and farming plus comparing the 4 case studies using Spray and Clean, Fogging and Electrostatics I would recommend using an electrostatic sprayer to disinfect all working spaces within Translink.

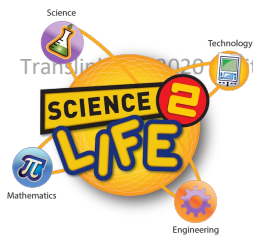
Examining the swab results from Microbiological Solutions Ltd the pH testing and the active ingredients within the disinfectants I am recommending **Aktivora 10%**

A handwritten signature in black ink, appearing to read 'Susan McGrath'.

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ust 2020



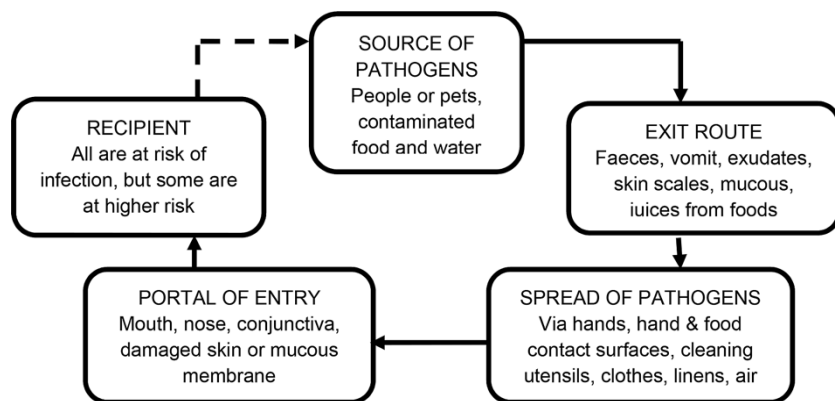
## Appendix 1: Why is 99.999% so Important?

To answer this question, we firstly need to know about the cleaning process and then the process microbiologists use to report back their findings.

The skin on our hands contain a combination of transient and resident bacteria.

*We need the resident bacteria for our natural defence system. However, it is common to find as many as 10 million transient bacteria cells and other possible pathogens (viruses, fungi and protozoa) on the end of just one finger!*

These transient microbes are ‘picked up’ from contaminated air spaces and surfaces, and are the cause of infectious illness in humans.



Once they are on our skin they can then be easily spread to other surfaces.

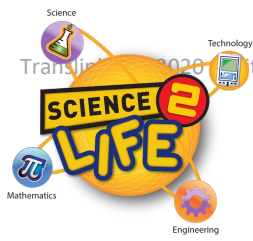
Depending on the pathogen and the surface they can survive for many hours or even days on these surfaces.

There are 3 general types of cleaning products that can be used to kill or remove pathogens from the skin and surfaces.

1. Cleaning with soaps/detergents – rinsed off with water.
2. Cleaning with antibacterial soaps/detergents - rinsed off with water.
3. Leave on sanitisers or disinfectants – no rinsing off required.

**Cleaning** is the removal of debris such as organic and inorganic material (often called “soil”) from objects and surfaces. **Sanitising** is the reduction, not killing, of organisms on a surface. **Disinfecting** will “kill” the microscopic organisms on a surface.

Cleaning with simple soaps, a mechanical action, can normally be expected to remove around 90% of the number of transient pathogens. The choice of cleaning fluid is essential



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at this stage to lift and suspend the pathogens prior to rinsing with clean water, however it is also essential to use a proper cleaning technique to ensure all parts of the surfaces are thoroughly cleansed. For hands we need to create lots of soapy foam, the foam lifts and suspends the pathogens prior to rinsing and for this reason this process should take 20 seconds or more to perform.

General purpose antibacterial soaps/detergents can normally be expected to remove/kill around 99% or 99.9% of the pathogens. They work by chemical and/or physical action as well as mechanical action. These soaps/detergents still need the mechanical effect however, the antibacterial chemicals provide **microbiological action** by chemical (for example denaturation of proteins, DNA, RNA ..) and/or physical (for example solubilisation of the membranes phospholipids) action.

They work by directly dissolving the bacterial and viral membranes and by denaturing the constitutive proteins and enzymes, killing the cells extremely quickly, without risk of inducing antibacterial resistance.

Sanitisers work in a similar way but usually kill up to 99.99% or 99.999% of pathogens.

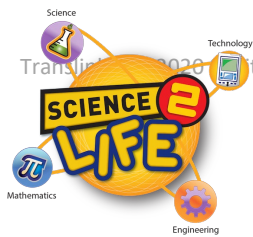
**Some sanitisers go beyond the kill phase and actually leave behind a protective barrier on the "just cleaned" surface that will continue to kill any new contamination of that site for many hours after the initial clean & kill. It is this property that is predominantly explored in this case study.**

For many common illnesses, counts of just 10 – 100 cells may be enough to cause illness. In microbiology speak the minimum count capable of causing infection is termed **the infectious dose (ID)**. In addition, the risk of spreading bacteria to others increases as the number on the host increases.

With very minor contamination levels, a single dirty hand is capable of making 100,000 people sick, if that hand contamination could be 'delivered' uniformly to that number of people within the window of opportunity for transmission, based on survival characteristics of the microbe in question. Some microbes die off quickly in the environment while others survive well or even, if the growth conditions are good (body temperature, nutrients and moisture) double in number every 15 - 20 minutes. Therefore, in less than just eight hours one cell can potentially multiply to over 10 million.

### **Log and Percent Reductions in Microbiology and Antimicrobial Testing**

10 000 000 is a very large number so the microbiologists, to keep the individual numbers manageable, report back the results of the antimicrobial testing using scientific notation and when calculating the magnitude of the change in cell number they often use a logarithmic scale (log scale). Simply speaking, taking the log value of a large number, such as the number of cells killed in a disinfectant test, transforms it into a smaller one that is easier to work with.



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Potential for reducing the risk of disease transmission				
Product type examples	Kill Rate	Log <sub>10</sub> Reduction	No. Bacteria remaining	No. People Infected with ID = 100
No Treatment	0%	0	1 000 000	10 000
Simple Soap <sup>(1, 3)</sup>	90%	1	100 000	1 000
General Antibacterial Soap <sup>(2, 3)</sup>	99%	2	10 000	100
Specialist Antibacterial Soap <sup>(4)</sup>	99.9%	3	1 000	10
Antibacterial Soap & Hand Sanitisers <sup>(5)</sup>	99.99%	4	100	1
Specialist Hand Sanitisers <sup>(6, 7)</sup>	99.999%	5	10	0

For example, a surface such as a hand or a table top, with 1,000,000 bacteria on it, treated with a product that kills 99.9% of bacteria would still have 1000 bacteria remaining. If the surface was treated with a product that kills 99.999% of bacteria only 10 would remain.

### What are Log Reductions and why are they important?

‘Log’ stands for logarithm, which is the exponent of 10. For example, 2 Log represents 10<sup>2</sup> or 10 x 10 or 100.

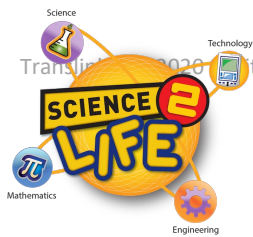
5 Log represents 10<sup>5</sup> or 10 x 10 x 10 x 10 x 10 or 100 000

Log reduction stands for a 10-fold (one decimal) or 90% reduction in numbers of live bacteria. From the table above we can see that 1 Log reduction would reduce the number of bacteria by 90%.

5 log reduction is equivalent to 99.999% reduction and the term used in European Standard Test Methods – The number of germs is 100 000 times smaller after treatment.

In terms of infection control, Log Reductions convey how effective a product is at reducing pathogens. The greater the log reduction the more effective the product is at killing bacteria and other pathogens that can cause infections.

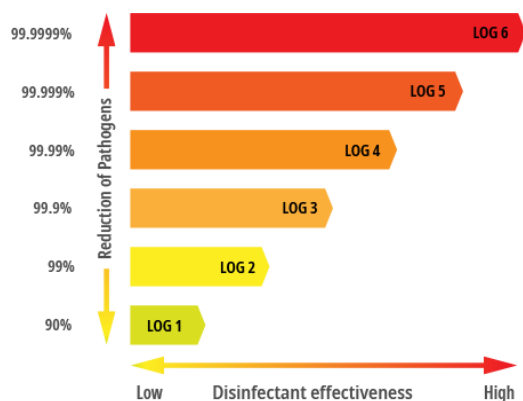
During product efficacy testing, the microbiological laboratories count the number of colony forming units (CFU’s) of the given pathogens present at the start of the test. They then apply the disinfection product being tested, alongside a control product and wait the required test time before recounting the number of CFU’s present.



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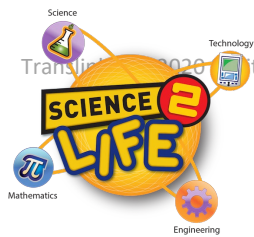
The result of the difference between the control and the test product is then expressed as a Log reduction. For example, if the number of CFUs in the control was found to be 1,000,000 (or  $10^6$ ) and the end result using the product was only 1,000 ( $10^3$ ), that would be a Log reduction of 3 or a reduction of 99.9%.

Log reduction	Number of CFU's	% reduction	Times smaller
0 Log	1 000 000	0%	-
1 Log	100 000	90%	x 1
2 Log	10 000	99%	x 100
3 Log	1 000	99.9%	x 1 000
4 Log	100	99.99%	x 10 000
5 Log	10	99.999%	x 100 000
6 Log	1	99.9999%	x 1 000 000



### Why is it important to reduce bacteria numbers to as low a number as possible?

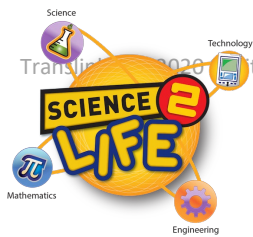
It is important to note that the presence of bacteria does not automatically lead to infection, the vulnerability of the person and the infectious dose ID (number of bacteria required to cause an infection) are vitally important. Susceptible individuals such as the very young, elderly and sick are more at risk from an opportunistic infection. Some bacteria will cause an infection with less than 100 cells ingested or introduced into cuts or wounds others might only need 10. For this reason, it is important to reduce numbers of harmful bacteria to the lowest number possible whenever the risk of infection is high.



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7. D. F. Bloomfield, M Exner, C. Signorelli, K. J. Nath & E. A. Scott. **The chain of infection transmission in the home and everyday life settings, and the role of hygiene in reducing the risk of infection. International Scientific Forum on Home Hygiene** (2012)



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## Appendix 2: What are Pathogens?

### Viruses

With the exception of newly discovered prions, viruses are the smallest agents of infectious disease. Most viruses are exceedingly small (about 20 - 200 nanometres in diameter) and essentially round in shape. They consist of little more than a small piece of genetic material surrounded by a thin protein coating. Some viruses are also surrounded by a thin, fatty envelope.

**1 nanometre = 1 000 millionth of a metre.**

Viruses are different from all other infectious microorganisms because they are the only group of microorganisms that cannot replicate outside of a host cell. Because viruses do not eat food - instead they seize materials and energy from the host cells by hijacking cellular machinery - some scientists argue that they are more like complex molecules rather than living creatures. Viruses are known to infect nearly every type of organism on Earth. Some viruses, called bacteriophages, even infect bacteria.

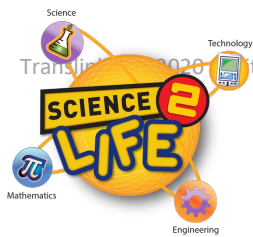
There is much to learn about the novel coronavirus (SARS-CoV-2) that causes [coronavirus disease 2019](#) (COVID-19). Based on what is currently known about COVID-19, the spread from person-to-person of this virus happens most frequently among close contacts (within about 2 m). This type of transmission occurs via respiratory droplets. On the other hand, transmission of novel coronavirus to persons from surfaces contaminated with the virus has not been documented. Recent studies indicate that people who are infected but do not have symptoms likely also play a role in the spread of COVID-19. Transmission of coronavirus occurs much more commonly through respiratory droplets than through objects and surfaces, like doorknobs, countertops, keyboards, toys, etc. Current evidence suggests that SARS-CoV-2 may remain viable for hours to days on surfaces made from a variety of materials. Cleaning of visibly dirty surfaces followed by disinfection is a best practice measure for prevention of COVID-19 and other viral respiratory illnesses in households and community settings.

It is unknown how long the air inside a room occupied by someone with confirmed COVID-19 remains potentially infectious. Facilities will need to consider factors such as the size of the room and the ventilation system design (including flowrate [air changes per hour] and location of supply and exhaust vents) when deciding how long to close off rooms or areas used by ill persons before beginning disinfection. Taking measures to improve ventilation in an area or room where someone was ill or suspected to be ill with COVID-19 will help shorten the time it takes respiratory droplets to be removed from the air.

### Bacteria

Bacteria are 10 to 100 times larger than viruses. They are typically 1 to 3 microns in length and take the shape of a sphere or rod. Most bacteria consist of a ring of DNA surrounded by cellular machinery, all contained within a fatty membrane.

**1 micron (micrometre) = 1 millionth of a metre.**



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They acquire energy from the same essential sources as humans, including sugars, proteins, and fats. Some bacteria live and multiply in the environment while others are adapted to life within human or animal hosts. Some bacteria can double in number every fifteen minutes, while others take weeks or months to multiply.

Bacteria cause many types of diseases, ranging from mild skin irritation to lethal pneumonia.

### Parasites

Parasites are part of a large group of organisms called eukaryotes. Parasites are different from bacteria or viruses because their cells share many features with human cells including a defined nucleus.

Parasites are usually larger than bacteria, although some environmentally resistant forms are nearly as small. Some parasites only replicate within a host organism, but some can multiply freely in the environment. Parasites can be made of one cell, as in the case of *Giardia*, or many cells, as with parasitic worms.

In developing countries unicellular parasites, such as *Plasmodium*, the cause of malaria, are a major source of disease. *Dientamoeba fragilis* and *Blastocystis hominis* are the commonest parasites that we find in the UK and Ireland. The former should be relatively easy to eradicate; the latter can be extremely stubborn.

There are three main classes of parasites that can cause disease in humans: protozoa, helminths, and ectoparasites.

### Fungi

Fungi are diverse in terms of their shape, size and means of infecting humans. Fungi are eukaryotes, meaning that like parasites, their cells have a true nucleus and complex internal structures.

They are most commonly found as environmentally resistant spores and moulds, but can cause disease in humans in the form of yeasts. Fungi most often cause skin infections and

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Founder of Science2Life: Science Education Specialist & Consultant

## Translink Sanitiser Case Study | Spray & Clean Test

Bus	Day 1 Before	Day 1 After	24 Hour	72 Hour	7 days	14 Days
Aktivora 5% High	570	<1	<1	<1	80	>3000
Aktivora 5% Med	<1	<1	>3000	<1	<1	>3000
Aktivora 5% Low	50	<1	530	2600	120	70
Aktivora 10% High	>3000	<1	<1	<1	>3000	100
Aktivora 10% Med	>3000	<1	<1	1800	<1	>3000
Aktivora 10% Low	38	<1	<1	40	40	>3000
Zoono High	<1	<1	1100	1900	>3000	>3000
Zoono Med	90	<1	>3000	>3000	>3000	>3000
Zoono Low	<1	<1	1800	680	83	>3000
Cribersol High	440	<1	<1	>3000	>3000	>3000
Cribersol Med	60	<1	<1	<1	>3000	50
Cribersol Low	20	<1	<1	2500	>3000	>3000
Dry San Oxy High	1800	<1	>3000	>3000	>3000	280
Dry San Oxy Med	240	<1	<1	2300	<1	110
Dry San Oxy Low	20	<1	<1	2900	40	>3000

There are 2 aims being evaluated in this project

1. Cleaning & disinfection using a surface spray and manual wipe
2. Disinfection using Electrostatic disinfection and fogging disinfection

The latter should be carried out post a manual clean down of surfaces to achieve the best results. The reason for this is to eliminate any debris, dirt and dust which could adversely affect the activity of the disinfectant once it lands on the surface. To this end, method 1 should always provide the best results short term but may not provide any kind of effect over longer periods. It is also fair to say that long term surface protection is rarely achieved by using surface sanitisers alone. A combination of methods would always be the better option.

The data in the above table clearly demonstrates surfaces were clean on day 1 as all results were <1cfu/swab. After a 24 hour period surfaces became contaminated in the most used areas such as the medium place which was the hand rail. It is unknown from the data, how much use the sample points had during this exercise, i.e how many people touched them. It is quite possible that a high count of >300cfu could have been transferred from 1 person or 10 people. Subsequent counts of <1 for the same sample point could easily be caused by someone wearing gloves for example and removing any contamination that was previously seen.

The only way to eliminate any errors or misinterpretation is to carry out repeats of the test over time noting usage of the areas and ensuring the exact same swab sites are tested and the swabs are taken by the same person.

Once the disinfection method has been chosen this would be the next phase to validate how long the sample point remains within acceptable levels of cfu/swab.

From the data above on a bus the Aktivora @10% concentration and the Cribersol performed best giving excellent protection for up to 24 hours.

### Translink Sanitiser Case Study | Spray & Clean Test

Train	Day 1 Before	Day 1 After	24 Hour	72 Hour	7 days	14 Days
Aktivora 5% High	40	<1	<1	<1	<1	<1
Aktivora 5% Med Re-test result	<1 10	>3000 retest <1	<1	40	40	20
Aktivora 5% Low	<1	<1	890	2300	<1	10
Aktivora 10% High	<1	<1	<1	50	<1	<1
Aktivora 10% Med	<1	<1	<1	>3000	<1	<1
Aktivora 10% Low	<1	<1	<1	<1	<1	<1
Zoono High	<1	<1	180	<1	<1	<1
Zoono Med Re-test result	<1 460	>3000 retest <1	<1	<1	<1	<1
Zoono Low	<1	20	<1	<1	1	<1
Cribersol High	<1	20	>3000	1700	120	<1
Cribersol Med	2600	10	<1	<1	30	290
Cribersol Low	<1	<1	<1	<1	<1	<1
Dry San Oxy High	<1	<1	<1	<1	<1	<1
Dry San Oxy Med	<1	<1	<1	<1	440	<1
Dry San Oxy Low	<1	<1	730	<1	<1	220

The results from the train samples using Aktivora @10% exhibited the same results as the bus, however, the Cribersol maintained a high level of protection for up to 72 hours therefore on this occasion demonstrating longer protection. It is worth noting that if the carriage was unused during this period this could explain sustained efficacy and the <1 result..

## Translink Sanitiser Case Study | Electro-static Clean Test

Train (ES)	Day 1 Before	Day 1 After	24 Hour	72 Hour	7 days	14 Days
Aktivora 5% High	<1	<1	>3000	<1	<1	<1
Aktivora 5% Med	<1	<1	1900	<1	<1	20
Aktivora 5% Low	50	<1	830	<1	<1	50
Aktivora 10% High	180	140 retest	640	30	<1	30
Aktivora 10% Med	20	<1	480	>3000	430	10
Aktivora 10% Low	<1	<1	530	300	<1	<1
Zoono High	2400	>3000 retest	810	740	<1	90
Zoono Med	1800	<1	>3000	>3000	<1	>3000
Zoono Low	10	<1	230	840	<1	<1
Cribersol High	<1	<1	70	<1	<1	<1
Cribersol Med	<1	<1	90	20	<1	<1
Cribersol Low	<1	<1	<1	740	<1	<1
Dry San Oxy High	<1	<1	<1	<1	<1	<1
Dry San Oxy Med	<1	<1	>3000	<1	<1	<1
Dry San Oxy Low	<1	<1	60	<1	<1	<1

Efficacy of the Cribersol was better over a 24 hour period, however, unexpectedly, efficacy improved after 72 hours. This is difficult to explain if the carriage had not been used or cleaned during this period. If it had been cleaned, the 14 day result would be in reality be a 7day result and would demonstrate again that the Cribersol performed well over a 24 hour period also using Electro-static method the Dry San Oxy performed well over the same period.

### Translink Sanitiser Case Study | Office Fogging Clean Test

Office	Day 1 Before	Day After	24 Hour	72 Hour	7 Day	14 Day
Aktivora 5% High	<1	<1	<1	<1	<1	<1
Aktivora 5% Med	10	<1	<1	<1	<1	<1
Aktivora 5% Low	>3000	<1	<1	<1	<1	<1
Aktivora 10% High	30	<1	<1	<1	30	<1
Aktivora 10% Med	60	<1	<1	<1	<1	<1
Aktivora 10% Low	400	<1	<1	300	<1	<1
Zoono High	310	10	<1	<1	60	<1
Zoono Med	30	<1	<1	<1	<1	<1
Zoono Low	>3000	<1	<1	31	<1	<1
Cribersol High	250	<1	>3000	300	<1	300
Cribersol Med	<1	<1	<1	<1	40	10
Cribersol Low	>3000	430	>3000	300	<1	16
Dry San Oxy High	550	<1	840	300	<1	4
Dry San Oxy Med	220	<1	<1	<1	<1	1
Dry San Oxy Low	350	<1	100	300	<1	300

Using the fogging method, the results clearly indicate that Aktivora @ 5% would provide adequate protection over a 14 day period. It is assumed that the office was under “normal” use during the test. The surfaces chosen are also generally more porous due the materials they are made from and therefore once coated could assist in prolonged disinfection. Highly polished surfaces are subject to creating surface tension of droplets and therefore could easily be removed under normal use.

## Translink Sanitiser Case Study | Re-Tests

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Aktivora 5% Bus Before Spray & Clean	10	Aktivora 5% Bus After Spray & Clean	<1
Zoono Bus Before Spray & Clean	460	Zoono Bus After Spray & Clean	<1

Comments by: Angela Davies

Position: CEO/Managing Director  
Microbiological Solutions Ltd.

**Lab Report Index**

Day 1	Bus Before Spray & Clean
Day 1	Bus After Spray & Clean
Day 1	Train Before Spray & Clean
Day 1	Train After Spray & Clean
Day 1	Tran Before Clean Electrostatic
Day 1	Train After Clean Electrostatic
Day 1	Office Before Fogging Clean
Day 1	Office After Fogging Clean
24 Hour	Bus Spray & Clean
24 Hour	Train Spray & Clean
24 Hour	Tran Clean Electrostatic
24 Hour	Office Fogging Clean
72 Hour	Bus Spray & Clean
72 Hour	Train Spray & Clean
72 Hour	Train Clean Electrostatic
72 Hour	Office Fogging Clean
7 Day	Bus Spray & Clean
7 Day	Train Spray & Clean
7 Day	Tran Clean Electrostatic
7 Day	Office Fogging Clean
14 Day	Bus Spray & Clean
14 Day	Train Spray & Clean
14 Day	Tran Clean Electrostatic
14 Day	Office Fogging Clean
Re-Test	Bus Spray & Clean Aktivora 5% Medium
Re-Test	Bus Spray & Clean Zoono Medium



Report Date: 29-Jul-2020



## Standard Swabs Test Report

**Customer:** Lamont Cleaning Support Services

**Contacts:** Michael Lamont  
Angela Davies

**Customer PO:**

**Address:** 402 Lisburn Enterprise Centre

**Lab No:** 20/05230

Ballinderry Road

**No of Samples:** 15

Lisburn

**Date Received:** 22-Jul-20

BT28 2BP

**Phone No:**

**Email:** michael@lamontcss.com  
angela.davies@msl.io

**Special Instructions/  
Comments**

Day 1 - Bus Before Spray & Clean Test

**Authorised By:**

Ben Elmadi

BD Microbiologist

cfu : colony forming units

All samples are tested as received and are deemed to be satisfactory unless customer informed.

Retention of Records - All documents including Test Results will be kept in archive by Microbiological Solutions Ltd for a minimum of 10 years.

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## Standard Swabs Test Report

### Swabs - Total Colony Count (3 days @ 30°C)

Sample Number	Sample Description	Reference	Swabs - Total Colony Count (3 days @ 30°C) cfu/swab
20/05230/001	Aktivra 5% High	Bus	5.7E+02
20/05230/002	Aktivra 5% Medium	Bus	<1
20/05230/003	Aktivra 5% Low	Bus	5.0E+01
20/05230/004	Aktivora 10% High	Bus	>3.0 E+03
20/05230/005	Aktivora 10% Medium	Bus	>3.0 E+03
20/05230/006	Aktivora 10% Low	Bus	3.8E+01
20/05230/007	Zoono High	Bus	<1
20/05230/008	Zoono Medium	Bus	9.0E+01
20/05230/009	Zoono Low	Bus	<1
20/05230/010	Cribersol High	Bus	4.4E+02
20/05230/011	Cribersol Medium	Bus	6.0E+01
20/05230/012	Cribersol Low	Bus	2.0E+01
20/05230/013	Dry Sanoxy High	Bus	1.8E+03
20/05230/014	Dry Sanoxy Medium	Bus	2.4E+02
20/05230/015	Dry Sanoxy Low	Bus	2.0E+01

Report Date: 29-Jul-2020



## Standard Swabs Test Report

**Customer:** Lamont Cleaning Support Services

**Contacts:** Michael Lamont  
Angela Davies

**Customer PO:**

**Address:** 402 Lisburn Enterprise Centre

**Lab No:** 20/05232

Ballinderry Road

**No of Samples:** 15

Lisburn

**Date Received:** 22-Jul-20

BT28 2BP

**Phone No:**

**Email:** michael@lamontcss.com  
angela.davies@msl.io

**Special Instructions/  
Comments**

Day 1 - Bus After Spray & Clean Test

**Authorised By:**

Ben Elmadi

BD Microbiologist

cfu : colony forming units

All samples are tested as received and are deemed to be satisfactory unless customer informed.

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## Standard Swabs Test Report

### Swabs - Total Colony Count (3 days @ 30°C)

Sample Number	Sample Description	Reference	Swabs - Total Colony Count (3 days @ 30°C) cfu/swab
20/05232/001	Aktivra 5% High	Bus	<1
20/05232/002	Aktivra 5% Medium	Bus	<1
20/05232/003	Aktivra 5% Low	Bus	<1
20/05232/004	Aktivora 10% High	Bus	<1
20/05232/005	Aktivora 10% Medium	Bus	<1
20/05232/006	Aktivora 10% Low	Bus	<1
20/05232/007	Zoono High	Bus	<1
20/05232/008	Zoono Medium	Bus	<1
20/05232/009	Zoono Low	Bus	<1
20/05232/010	Cribersol High	Bus	<1
20/05232/011	Cribersol Medium	Bus	<1
20/05232/012	Cribersol Low	Bus	<1
20/05232/013	Dry Sanoxy High	Bus	<1
20/05232/014	Dry Sanoxy Medium	Bus	<1
20/05232/015	Dry Sanoxy Low	Bus	<1

Report Date: 29-Jul-2020



## Standard Swabs Test Report

**Customer:** Lamont Cleaning Support Services

**Contacts:** Michael Lamont  
Angela Davies

**Customer PO:**

**Address:** 402 Lisburn Enterprise Centre

**Lab No:** 20/05234

Ballinderry Road

**No of Samples:** 15

Lisburn

**Date Received:** 22-Jul-20

BT28 2BP

**Phone No:**

**Email:** michael@lamontcss.com  
angela.davies@msl.io

**Special Instructions/  
Comments**

Day 1 - Train Before Spray & Clean (S&C) Test

**Authorised By:**

Ben Elmadi

BD Microbiologist

cfu : colony forming units

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## Standard Swabs Test Report

**Swabs - Total Colony Count (3 days @ 30°C)**

Sample Number	Sample Description	Reference	Swabs - Total Colony Count (3 days @ 30°C) cfu/swab
20/05234/001	Carrige 1 Aktivra 5% High		4.0E+01
20/05234/002	Carrige 1 Aktivra 5% Medium		<1
20/05234/003	Carrige 1 Aktivra 5% Low		<1
20/05234/004	Carrige 2 Aktivora 10% High		<1
20/05234/005	Carrige 2 Aktivora 10% Medium		<1
20/05234/006	Carrige 2 Aktivora 10% Low		<1
20/05234/007	Carrige 3 Zoono High		<1
20/05234/008	Carrige 3 Zoono Medium		<1
20/05234/009	Carrige 3 Zoono Low		<1
20/05234/010	Carrige 4 Cribersol High		<1
20/05234/011	Carrige 4 Cribersol Medium		2.6E+03
20/05234/012	Carrige 4 Cribersol Low		<1
20/05234/013	Carrige 5 Dry Sanoxy High		<1
20/05234/014	Carrige 5 Dry Sanoxy Medium		<1
20/05234/015	Carrige 5 Dry Sanoxy Low		<1

## Standard Swabs Test Report

**Customer:** Lamont Cleaning Support Services

**Contacts:** Michael Lamont  
Angela Davies

**Customer PO:**

**Address:** 402 Lisburn Enterprise Centre

**Lab No:** 20/05235

Ballinderry Road

**No of Samples:** 15

Lisburn

**Date Received:** 22-Jul-20

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**Phone No:**

**Email:** michael@lamontcss.com  
angela.davies@msl.io

**Special Instructions/  
Comments**

Day 1 - Train After Spray & Clean (S&C) Test

**Authorised By:**



Ben Elmadi

BD Microbiologist

cfu : colony forming units

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## Standard Swabs Test Report

**Swabs - Total Colony Count (3 days @ 30°C)**

Sample Number	Sample Description	Reference	Swabs - Total Colony Count (3 days @ 30°C) cfu/swab
20/05235/001	Carrige 1 Aktivra 5% High		<1
20/05235/002	Carrige 1 Aktivra 5% Medium		>3.0 E+03
20/05235/003	Carrige 1 Aktivra 5% Low		<1
20/05235/004	Carrige 2 Aktivora 10% High		<1
20/05235/005	Carrige 2 Aktivora 10% Medium		<1
20/05235/006	Carrige 2 Aktivora 10% Low		<1
20/05235/007	Carrige 3 Zoono High		<1
20/05235/008	Carrige 3 Zoono Medium		>3.0 E+03
20/05235/009	Carrige 3 Zoono Low		2.0E+01
20/05235/010	Carrige 4 Cribersol High		2.0E+01
20/05235/011	Carrige 4 Cribersol Medium		1.0E+01
20/05235/012	Carrige 4 Cribersol Low		<1
20/05235/013	Carrige 5 Dry Sanoxy High		<1
20/05235/014	Carrige 5 Dry Sanoxy Medium		<1
20/05235/015	Carrige 5 Dry Sanoxy Low		<1

## Standard Swabs Test Report

**Customer:** Lamont Cleaning Support Services

**Contacts:** Michael Lamont  
Angela Davies

**Customer PO:**

**Address:** 402 Lisburn Enterprise Centre

**Lab No:** 20/05231

Ballinderry Road

**No of Samples:** 15

Lisburn

**Date Received:** 22-Jul-20

BT28 2BP

**Phone No:**

**Email:** michael@lamontcss.com  
angela.davies@msl.io

**Special Instructions/  
Comments**

Day 1 - Train Before Electro Static (ES) Clean Test

**Authorised By:**



Ben Elmadi

BD Microbiologist

cfu : colony forming units

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## Standard Swabs Test Report

### Swabs - Total Colony Count (3 days @ 30°C)

Sample Number	Sample Description	Reference	Swabs - Total Colony Count (3 days @ 30°C) cfu/swab
20/05231/001	Carrige 1 Aktivra 5% High		<1
20/05231/002	Carrige 1 Aktivra 5% Medium		<1
20/05231/003	Carrige 1 Aktivra 5% Low		5.0E+01
20/05231/004	Carrige 2 Aktivora 10% High		1.8E+02
20/05231/005	Carrige 2 Aktivora 10% Medium		2.0E+01
20/05231/006	Carrige 2 Aktivora 10% Low		<1
20/05231/007	Carrige 3 Zoono High		2.4E+03
20/05231/008	Carrige 3 Zoono Medium		1.8E+03
20/05231/009	Carrige 3 Zoono Low		1.0E+01
20/05231/010	Carrige 4 Cribersol High		<1
20/05231/011	Carrige 4 Cribersol Medium		<1
20/05231/012	Carrige 4 Cribersol Low		<1
20/05231/013	Carrige 5 Dry Sanoxy High		<1
20/05231/014	Carrige 5 Dry Sanoxy Medium		<1
20/05231/015	Carrige 5 Dry Sanoxy Low		<1

Report Date: 11-Aug-2020



## Standard Swabs Test Report

**Customer:** Lamont Cleaning Support Services

**Contacts:** Michael Lamont  
Angela Davies

**Customer PO:**

**Address:** 402 Lisburn Enterprise Centre

**Lab No:** 20/05401

Ballinderry Road

**No of Samples:** 15

Lisburn

**Date Received:** 29-Jul-20

BT28 2BP

**Phone No:**

**Email:** michael@lamontcss.com  
angela.davies@msl.io

**Special Instructions/  
Comments**

Day 1 - Office Before Fogging (FOG) Clean Test

**Authorised By:**

Ben Elmadi

BD Microbiologist

cfu : colony forming units

All samples are tested as received and are deemed to be satisfactory unless customer informed.

Retention of Records - All documents including Test Results will be kept in archive by Microbiological Solutions Ltd for a minimum of 10 years.

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## Standard Swabs Test Report

### Swabs - Total Colony Count (3 days @ 30°C)

Sample Number	Sample Description	Reference	Swabs - Total Colony Count (3 days @ 30°C) cfu/swab
20/05401/001	Aktivra 5% High	Office	<1
20/05401/002	Aktivra 5% Medium	Office	1.0E+01
20/05401/003	Aktivra 5% Low	Office	>3.0 E+03
20/05401/004	Aktivora 10% High	Office	3.0E+01
20/05401/005	Aktivora 10% Medium	Office	6.0E+01
20/05401/006	Aktivora 10% Low	Office	4.0E+02
20/05401/007	Zoono High	Office	3.1E+02
20/05401/008	Zoono Medium	Office	3.0E+01
20/05401/009	Zoono Low	Office	>3.0 E+03
20/05401/010	Cribersol High	Office	2.5E+02
20/05401/011	Cribersol Medium	Office	<1
20/05401/012	Cribersol Low	Office	>3.0 E+03
20/05401/013	Dry Sanoxy High	Office	5.5E+02
20/05401/014	Dry Sanoxy Medium	Office	2.2E+02
20/05401/015	Dry Sanoxy Low	Office	3.5E+02

## Standard Swabs Test Report

**Customer:** Lamont Cleaning Support Services

**Contacts:** Michael Lamont  
Angela Davies

**Customer PO:**

**Address:** 402 Lisburn Enterprise Centre

**Lab No:** 20/05401

Ballinderry Road

**No of Samples:** 15

Lisburn

**Date Received:** 29-Jul-20

BT28 2BP

**Phone No:**

**Email:** michael@lamontcss.com  
angela.davies@msl.io

**Special Instructions/  
Comments**

Day 1 - Office Before Fogging (FOG) Clean Test

**Authorised By:**



Ben Elmadi

BD Microbiologist

cfu : colony forming units

All samples are tested as received and are deemed to be satisfactory unless customer informed.

Retention of Records - All documents including Test Results will be kept in archive by Microbiological Solutions Ltd for a minimum of 10 years.

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## Standard Swabs Test Report

### Swabs - Total Colony Count (3 days @ 30°C)

Sample Number	Sample Description	Reference	Swabs - Total Colony Count (3 days @ 30°C) cfu/swab
20/05401/001	Aktivra 5% High	Office	<1
20/05401/002	Aktivra 5% Medium	Office	1.0E+01
20/05401/003	Aktivra 5% Low	Office	>3.0 E+03
20/05401/004	Aktivora 10% High	Office	3.0E+01
20/05401/005	Aktivora 10% Medium	Office	6.0E+01
20/05401/006	Aktivora 10% Low	Office	4.0E+02
20/05401/007	Zoono High	Office	1.0E+01
20/05401/008	Zoono Medium	Office	3.0E+01
20/05401/009	Zoono Low	Office	>3.0 E+03
20/05401/010	Cribersol High	Office	2.5E+02
20/05401/011	Cribersol Medium	Office	<1
20/05401/012	Cribersol Low	Office	4.3E+02
20/05401/013	Dry Sanoxy High	Office	5.5E+02
20/05401/014	Dry Sanoxy Medium	Office	2.2E+02
20/05401/015	Dry Sanoxy Low	Office	<1

## Standard Swabs Test Report

**Customer:** Lamont Cleaning Support Services

**Contacts:** Michael Lamont  
Angela Davies

**Customer PO:**

**Address:** 402 Lisburn Enterprise Centre

**Lab No:** 20/05403

Ballinderry Road

**No of Samples:** 15

Lisburn

**Date Received:** 29-Jul-20

BT28 2BP

**Phone No:**

**Email:** michael@lamontcss.com  
angela.davies@msl.io

**Special Instructions/  
Comments**

Day 1 - Office After Fogging Clean Test

**Authorised By:**



Ben Elmadi

BD Microbiologist

cfu : colony forming units

All samples are tested as received and are deemed to be satisfactory unless customer informed.

Retention of Records - All documents including Test Results will be kept in archive by Microbiological Solutions Ltd for a minimum of 10 years.

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## Standard Swabs Test Report

**Swabs - Total Colony Count (3 days @ 30°C)**

Sample Number	Sample Description	Reference	Swabs - Total Colony Count (3 days @ 30°C) cfu/swab
20/05403/001	Aktivra 5% High	Office	<1
20/05403/002	Aktivra 5% Medium	Office	<1
20/05403/003	Aktivra 5% Low	Office	<1
20/05403/004	Aktivora 10% High	Office	<1
20/05403/005	Aktivora 10% Medium	Office	<1
20/05403/006	Aktivora 10% Low	Office	<1
20/05403/007	Zoono High	Office	3.1E+02
20/05403/008	Zoono Medium	Office	<1
20/05403/009	Zoono Low	Office	<1
20/05403/010	Cribersol High	Office	<1
20/05403/011	Cribersol Medium	Office	<1
20/05403/012	Cribersol Low	Office	>3.0 E+03
20/05403/013	Dry Sanoxy High	Office	<1
20/05403/014	Dry Sanoxy Medium	Office	<1
20/05403/015	Dry Sanoxy Low	Office	3.5E+02

Report Date: 29-Jul-2020



## Standard Swabs Test Report

**Customer:** Lamont Cleaning Support Services

**Contacts:** Michael Lamont  
Angela Davies

**Customer PO:**

**Address:** 402 Lisburn Enterprise Centre

**Lab No:** 20/05290

Ballinderry Road

**No of Samples:** 15

Lisburn

**Date Received:** 23-Jul-20

BT28 2BP

**Phone No:**

**Email:** michael@lamontcss.com  
angela.davies@msl.io

**Special Instructions/  
Comments**

24 Hour - Bus Spray & Clean Test

**Authorised By:**

Ben Elmadi

BD Microbiologist

cfu : colony forming units

All samples are tested as received and are deemed to be satisfactory unless customer informed.

Retention of Records - All documents including Test Results will be kept in archive by Microbiological Solutions Ltd for a minimum of 10 years.

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## Standard Swabs Test Report

### Swabs - Total Colony Count (3 days @ 30°C)

Sample Number	Sample Description	Reference	Swabs - Total Colony Count (3 days @ 30°C) cfu/swab
20/05290/001	Aktivra 5% High	Bus	<1
20/05290/002	Aktivra 5% Medium	Bus	>3.0 E+03
20/05290/003	Aktivra 5% Low	Bus	5.3E+02
20/05290/004	Aktivora 10% High	Bus	<1
20/05290/005	Aktivora 10% Medium	Bus	<1
20/05290/006	Aktivora 10% Low	Bus	<1
20/05290/007	Zoono High	Bus	1.1E+03
20/05290/008	Zoono Medium	Bus	>3.0 E+03
20/05290/009	Zoono Low	Bus	1.8E+03
20/05290/010	Cribersol High	Bus	<1
20/05290/011	Cribersol Medium	Bus	<1
20/05290/012	Cribersol Low	Bus	<1
20/05290/013	Dry Sanoxy High	Bus	>3.0 E+03
20/05290/014	Dry Sanoxy Medium	Bus	<1
20/05290/015	Dry Sanoxy Low	Bus	<1

Report Date: 29-Jul-2020



## Standard Swabs Test Report

**Customer:** Lamont Cleaning Support Services

**Contacts:** Michael Lamont  
Angela Davies

**Customer PO:**

**Address:** 402 Lisburn Enterprise Centre

**Lab No:** 20/05289

Ballinderry Road

**No of Samples:** 15

Lisburn

**Date Received:** 23-Jul-20

BT28 2BP

**Phone No:**

**Email:** michael@lamontcss.com  
angela.davies@msl.io

**Special Instructions/  
Comments**

24 Hour - Train Spray & Clean Test

**Authorised By:**

Ben Elmadi

BD Microbiologist

cfu : colony forming units

All samples are tested as received and are deemed to be satisfactory unless customer informed.

Retention of Records - All documents including Test Results will be kept in archive by Microbiological Solutions Ltd for a minimum of 10 years.

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## Standard Swabs Test Report

### Swabs - Total Colony Count (3 days @ 30°C)

Sample Number	Sample Description	Reference	Swabs - Total Colony Count (3 days @ 30°C) cfu/swab
20/05289/001	Aktivra 5% High	Bus	<1
20/05289/002	Aktivra 5% Medium	Bus	<1
20/05289/003	Aktivra 5% Low	Bus	8.9E+02
20/05289/004	Aktivora 10% High	Bus	<1
20/05289/005	Aktivora 10% Medium	Bus	<1
20/05289/006	Aktivora 10% Low	Bus	<1
20/05289/007	Zoono High	Bus	1.8E+02
20/05289/008	Zoono Medium	Bus	<1
20/05289/009	Zoono Low	Bus	<1
20/05289/010	Cribersol High	Bus	>3.0 E+03
20/05289/011	Cribersol Medium	Bus	<1
20/05289/012	Cribersol Low	Bus	<1
20/05289/013	Dry Sanoxy High	Bus	<1
20/05289/014	Dry Sanoxy Medium	Bus	<1
20/05289/015	Dry Sanoxy Low	Bus	7.3E+02

Report Date: 29-Jul-2020



## Standard Swabs Test Report

**Customer:** Lamont Cleaning Support Services

**Contacts:** Michael Lamont  
Angela Davies

**Customer PO:**

**Address:** 402 Lisburn Enterprise Centre

**Lab No:** 20/05291

Ballinderry Road

**No of Samples:** 15

Lisburn

**Date Received:** 23-Jul-20

BT28 2BP

**Phone No:**

**Email:** michael@lamontcss.com  
angela.davies@msl.io

**Special Instructions/  
Comments**

24 Hour - Train Electro Static (ES) Test

**Authorised By:**

Ben Elmadi

BD Microbiologist

cfu : colony forming units

All samples are tested as received and are deemed to be satisfactory unless customer informed.

Retention of Records - All documents including Test Results will be kept in archive by Microbiological Solutions Ltd for a minimum of 10 years.

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## Standard Swabs Test Report

### Swabs - Total Colony Count (3 days @ 30°C)

Sample Number	Sample Description	Reference	Swabs - Total Colony Count (3 days @ 30°C) cfu/swab
20/05291/001	Aktivra 5% High	Bus	>3.0 E+03
20/05291/002	Aktivra 5% Medium	Bus	1.9E+03
20/05291/003	Aktivra 5% Low	Bus	8.3E+02
20/05291/004	Aktivora 10% High	Bus	6.4E+02
20/05291/005	Aktivora 10% Medium	Bus	4.8E+02
20/05291/006	Aktivora 10% Low	Bus	5.3E+02
20/05291/007	Zoono High	Bus	8.1E+02
20/05291/008	Zoono Medium	Bus	>3.0 E+03
20/05291/009	Zoono Low	Bus	2.3E+02
20/05291/010	Cribersol High	Bus	7.0E+01
20/05291/011	Cribersol Medium	Bus	9.0E+01
20/05291/012	Cribersol Low	Bus	<1
20/05291/013	Dry Sanoxy High	Bus	<1
20/05291/014	Dry Sanoxy Medium	Bus	>3.0 E+03
20/05291/015	Dry Sanoxy Low	Bus	6.0E+01

## Standard Swabs Test Report

**Customer:** Lamont Cleaning Support Services

**Contacts:** Michael Lamont  
Angela Davies

**Customer PO:**

**Address:** 402 Lisburn Enterprise Centre

**Lab No:** 20/05429

Ballinderry Road

**No of Samples:** 15

Lisburn

**Date Received:** 30-Jul-20

BT28 2BP

**Phone No:**

**Email:** michael@lamontcss.com  
angela.davies@msl.io

**Special Instructions/  
Comments**

24 Hour Office Fogging Clean Test

**Authorised By:**



Ben Elmadi

BD Microbiologist

cfu : colony forming units

All samples are tested as received and are deemed to be satisfactory unless customer informed.

Retention of Records - All documents including Test Results will be kept in archive by Microbiological Solutions Ltd for a minimum of 10 years.

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## Standard Swabs Test Report

### Swabs - Total Colony Count (3 days @ 30°C)

Sample Number	Sample Description	Reference	Swabs - Total Colony Count (3 days @ 30°C) cfu/swab
20/05429/001	Aktivra 5% High	Office	<1
20/05429/002	Aktivra 5% Medium	Office	<1
20/05429/003	Aktivra 5% Low	Office	<1
20/05429/004	Aktivora 10% High	Office	<1
20/05429/005	Aktivora 10% Medium	Office	<1
20/05429/006	Aktivora 10% Low	Office	<1
20/05429/007	Zoono High	Office	<1
20/05429/008	Zoono Medium	Office	<1
20/05429/009	Zoono Low	Office	<1
20/05429/010	Cribersol High	Office	>3.0 E+03
20/05429/011	Cribersol Medium	Office	<1
20/05429/012	Cribersol Low	Office	>3.0 E+03
20/05429/013	Dry Sanoxy High	Office	8.4E+02
20/05429/014	Dry Sanoxy Medium	Office	<1
20/05429/015	Dry Sanoxy Low	Office	1.0E+02

Report Date: 10-Aug-2020



## Standard Swabs Test Report

**Customer:** Lamont Cleaning Support Services

**Contacts:** Michael Lamont  
Angela Davies

**Customer PO:**

**Address:** 402 Lisburn Enterprise Centre

**Lab No:** 20/05349

Ballinderry Road

**No of Samples:** 15

Lisburn

**Date Received:** 27-Jul-20

BT28 2BP

**Phone No:**

**Email:** michael@lamontcss.com  
angela.davies@msl.io

**Special Instructions/  
Comments**

72 Hour - Bus Spray & Clean Test

**Authorised By:**

Ben Elmadi

BD Microbiologist

cfu : colony forming units

All samples are tested as received and are deemed to be satisfactory unless customer informed.

Retention of Records - All documents including Test Results will be kept in archive by Microbiological Solutions Ltd for a minimum of 10 years.

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## Standard Swabs Test Report

### Swabs - Total Colony Count (3 days @ 30°C)

Sample Number	Sample Description	Reference	Swabs - Total Colony Count (3 days @ 30°C) cfu/swab
20/05349/001	Aktivra 5% High	Bus	<1
20/05349/002	Aktivra 5% Medium	Bus	<1
20/05349/003	Aktivra 5% Low	Bus	2.6E+03
20/05349/004	Aktivora 10% High	Bus	<1
20/05349/005	Aktivora 10% Medium	Bus	1.8E+03
20/05349/006	Aktivora 10% Low	Bus	4.0E+01
20/05349/007	Zoono High	Bus	1.9E+03
20/05349/008	Zoono Medium	Bus	>3.0 E+03
20/05349/009	Zoono Low	Bus	6.8E+02
20/05349/010	Cribersol High	Bus	>3.0 E+03
20/05349/011	Cribersol Medium	Bus	<1
20/05349/012	Cribersol Low	Bus	2.5E+03
20/05349/013	Dry Sanoxy High	Bus	>3.0 E+03
20/05349/014	Dry Sanoxy Medium	Bus	2.3E+03
20/05349/015	Dry Sanoxy Low	Bus	2.9E+03

Report Date: 10-Aug-2020



## Standard Swabs Test Report

**Customer:** Lamont Cleaning Support Services

**Contacts:** Michael Lamont  
Angela Davies

**Customer PO:**

**Address:** 402 Lisburn Enterprise Centre

**Lab No:** 20/05348

Ballinderry Road

**No of Samples:** 15

Lisburn

**Date Received:** 27-Jul-20

BT28 2BP

**Phone No:**

**Email:** michael@lamontcss.com  
angela.davies@msl.io

**Special Instructions/  
Comments**

72 Hour - Train Spray & Clean Test

**Authorised By:**

Ben Elmadi

BD Microbiologist

cfu : colony forming units

All samples are tested as received and are deemed to be satisfactory unless customer informed.

Retention of Records - All documents including Test Results will be kept in archive by Microbiological Solutions Ltd for a minimum of 10 years.

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## Standard Swabs Test Report

### Swabs - Total Colony Count (3 days @ 30°C)

Sample Number	Sample Description	Reference	Swabs - Total Colony Count (3 days @ 30°C) cfu/swab
20/05348/001	Aktivra 5% High	Bus	<1
20/05348/002	Aktivra 5% Medium	Bus	4.0E+01
20/05348/003	Aktivra 5% Low	Bus	2.3E+03
20/05348/004	Aktivora 10% High	Bus	5.0E+01
20/05348/005	Aktivora 10% Medium	Bus	>3.0 E+03
20/05348/006	Aktivora 10% Low	Bus	<1
20/05348/007	Zoono High	Bus	<1
20/05348/008	Zoono Medium	Bus	<1
20/05348/009	Zoono Low	Bus	<1
20/05348/010	Cribersol High	Bus	1.7E+03
20/05348/011	Cribersol Medium	Bus	<1
20/05348/012	Cribersol Low	Bus	<1
20/05348/013	Dry Sanoxy High	Bus	<1
20/05348/014	Dry Sanoxy Medium	Bus	<1
20/05348/015	Dry Sanoxy Low	Bus	<1

## Standard Swabs Test Report

**Customer:** Lamont Cleaning Support Services

**Contacts:** Michael Lamont  
Angela Davies

**Customer PO:**

**Address:** 402 Lisburn Enterprise Centre

**Lab No:** 20/05350

Ballinderry Road

**No of Samples:** 15

Lisburn

**Date Received:** 27-Jul-20

BT28 2BP

**Phone No:**

**Email:** michael@lamontcss.com  
angela.davies@msl.io

**Special Instructions/  
Comments**

72 Hour - Train Electro Static (ES) Test

**Authorised By:**



Ben Elmadi

BD Microbiologist

cfu : colony forming units

All samples are tested as received and are deemed to be satisfactory unless customer informed.

Retention of Records - All documents including Test Results will be kept in archive by Microbiological Solutions Ltd for a minimum of 10 years.

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## Standard Swabs Test Report

### Swabs - Total Colony Count (3 days @ 30°C)

Sample Number	Sample Description	Reference	Swabs - Total Colony Count (3 days @ 30°C) cfu/swab
20/05350/001	Aktivra 5% High	Bus	<1
20/05350/002	Aktivra 5% Medium	Bus	<1
20/05350/003	Aktivra 5% Low	Bus	<1
20/05350/004	Aktivora 10% High	Bus	3.0E+01
20/05350/005	Aktivora 10% Medium	Bus	>3.0 E+03
20/05350/006	Aktivora 10% Low	Bus	3.0E+02
20/05350/007	Zoono High	Bus	7.4E+02
20/05350/008	Zoono Medium	Bus	>3.0 E+03
20/05350/009	Zoono Low	Bus	8.4E+02
20/05350/010	Cribersol High	Bus	<1
20/05350/011	Cribersol Medium	Bus	2.0E+01
20/05350/012	Cribersol Low	Bus	7.4E+02
20/05350/013	Dry Sanoxy High	Bus	<1
20/05350/014	Dry Sanoxy Medium	Bus	<1
20/05350/015	Dry Sanoxy Low	Bus	<1

Report Date: 17-Aug-2020



## Standard Swabs Test Report

**Customer:** Lamont Cleaning Support Services

**Contacts:** Michael Lamont  
Angela Davies

**Customer PO:**

**Address:** 402 Lisburn Enterprise Centre

**Lab No:** 20/05743

Ballinderry Road

**No of Samples:** 15

Lisburn

**Date Received:** 13-Aug-20

BT28 2BP

**Phone No:**

**Email:** michael@lamontcss.com  
angela.davies@msl.io

**Special Instructions/  
Comments**

72 Hours - Office After Fogging Clean Test

**Authorised By:**

Louise Boneheyo

Quality Manager

cfu : colony forming units

All samples are tested as received and are deemed to be satisfactory unless customer informed.

Retention of Records - All documents including Test Results will be kept in archive by Microbiological Solutions Ltd for a minimum of 10 years.

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## Standard Swabs Test Report

### Swabs - Total Colony Count (3 days @ 30°C)

Sample Number	Sample Description	Reference	Swabs - Total Colony Count (3 days @ 30°C) cfu/swab
20/05743/001	Aktivra 5% High	Office	<1
20/05743/002	Aktivra 5% Medium	Office	<1
20/05743/003	Aktivra 5% Low	Office	<1
20/05743/004	Aktivora 10% High	Office	<1
20/05743/005	Aktivora 10% Medium	Office	<1
20/05743/006	Aktivora 10% Low	Office	>3.0 E+02
20/05743/007	Zoono High	Office	<1
20/05743/008	Zoono Medium	Office	<1
20/05743/009	Zoono Low	Office	3.1E+01
20/05743/010	Cribersol High	Office	>3.0 E+02
20/05743/011	Cribersol Medium	Office	<1
20/05743/012	Cribersol Low	Office	>3.0 E+02
20/05743/013	Dry Sanoxy High	Office	>3.0 E+02
20/05743/014	Dry Sanoxy Medium	Office	<1
20/05743/015	Dry Sanoxy Low	Office	>3.0 E+02

## Standard Swabs Test Report

**Customer:** Lamont Cleaning Support Services

**Contacts:** Michael Lamont  
Angela Davies

**Customer PO:**

**Address:** 402 Lisburn Enterprise Centre

**Lab No:** 20/05402

Ballinderry Road

**No of Samples:** 15

Lisburn

**Date Received:** 29-Jul-20

BT28 2BP

**Phone No:**

**Email:** michael@lamontcss.com  
angela.davies@msl.io

**Special Instructions/  
Comments**

7 Day - Bus Spray & Clean Test

**Authorised By:**



Ben Elmadi

BD Microbiologist

cfu : colony forming units

All samples are tested as received and are deemed to be satisfactory unless customer informed.

Retention of Records - All documents including Test Results will be kept in archive by Microbiological Solutions Ltd for a minimum of 10 years.

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## Standard Swabs Test Report

### Swabs - Total Colony Count (3 days @ 30°C)

Sample Number	Sample Description	Reference	Swabs - Total Colony Count (3 days @ 30°C) cfu/swab
20/05402/001	Aktivra 5% High	Bus	8.0E+01
20/05402/002	Aktivra 5% Medium	Bus	<1
20/05402/003	Aktivra 5% Low	Bus	1.2E+02
20/05402/004	Aktivora 10% High	Bus	>3.0 E+03
20/05402/005	Aktivora 10% Medium	Bus	<1
20/05402/006	Aktivora 10% Low	Bus	4.0E+01
20/05402/007	Zoono High	Bus	>3.0 E+03
20/05402/008	Zoono Medium	Bus	>3.0 E+03
20/05402/009	Zoono Low	Bus	8.3E+01
20/05402/010	Cribersol High	Bus	>3.0 E+03
20/05402/011	Cribersol Medium	Bus	>3.0 E+03
20/05402/012	Cribersol Low	Bus	>3.0 E+03
20/05402/013	Dry Sanoxy High	Bus	>3.0 E+03
20/05402/014	Dry Sanoxy Medium	Bus	<1
20/05402/015	Dry Sanoxy Low	Bus	4.0E+00

## Standard Swabs Test Report

**Customer:** Lamont Cleaning Support Services

**Contacts:** Michael Lamont  
Angela Davies

**Customer PO:**

**Address:** 402 Lisburn Enterprise Centre

**Lab No:** 20/05399

Ballinderry Road

**No of Samples:** 15

Lisburn

**Date Received:** 29-Jul-20

BT28 2BP

**Phone No:**

**Email:** michael@lamontcss.com  
angela.davies@msl.io

**Special Instructions/  
Comments**

7 Day - Train Spray & Clean Test

**Authorised By:**



Ben Elmadi

BD Microbiologist

cfu : colony forming units

All samples are tested as received and are deemed to be satisfactory unless customer informed.

Retention of Records - All documents including Test Results will be kept in archive by Microbiological Solutions Ltd for a minimum of 10 years.

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## Standard Swabs Test Report

**Swabs - Total Colony Count (3 days @ 30°C)**

Sample Number	Sample Description	Reference	Swabs - Total Colony Count (3 days @ 30°C) cfu/swab
20/05399/001	Aktivra 5% High	Bus	<1
20/05399/002	Aktivra 5% Medium	Bus	4.0E+01
20/05399/003	Aktivra 5% Low	Bus	<1
20/05399/004	Aktivora 10% High	Bus	<1
20/05399/005	Aktivora 10% Medium	Bus	<1
20/05399/006	Aktivora 10% Low	Bus	<1
20/05399/007	Zoono High	Bus	<1
20/05399/008	Zoono Medium	Bus	<1
20/05399/009	Zoono Low	Bus	1.0E+00
20/05399/010	Cribersol High	Bus	1.2E+02
20/05399/011	Cribersol Medium	Bus	3.0E+01
20/05399/012	Cribersol Low	Bus	<1
20/05399/013	Dry Sanoxy High	Bus	<1
20/05399/014	Dry Sanoxy Medium	Bus	4.4E+02
20/05399/015	Dry Sanoxy Low	Bus	<1

Report Date: 7-Aug-2020



## Standard Swabs Test Report

**Customer:** Lamont Cleaning Support Services

**Contacts:** Michael Lamont  
Angela Davies

**Customer PO:**

**Address:** 402 Lisburn Enterprise Centre

**Lab No:** 20/05400

Ballinderry Road

**No of Samples:** 15

Lisburn

**Date Received:** 29-Jul-20

BT28 2BP

**Phone No:**

**Email:** michael@lamontcss.com  
angela.davies@msl.io

**Special Instructions/  
Comments**

7 Day - Train Electro Static (ES) Test

**Authorised By:**

Ben Elmadi

BD Microbiologist

cfu : colony forming units

All samples are tested as received and are deemed to be satisfactory unless customer informed.

Retention of Records - All documents including Test Results will be kept in archive by Microbiological Solutions Ltd for a minimum of 10 years.

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## Standard Swabs Test Report

### Swabs - Total Colony Count (3 days @ 30°C)

Sample Number	Sample Description	Reference	Swabs - Total Colony Count (3 days @ 30°C) cfu/swab
20/05400/001	Aktivra 5% High	Bus	<1
20/05400/002	Aktivra 5% Medium	Bus	<1
20/05400/003	Aktivra 5% Low	Bus	<1
20/05400/004	Aktivora 10% High	Bus	<1
20/05400/005	Aktivora 10% Medium	Bus	4.3E+02
20/05400/006	Aktivora 10% Low	Bus	<1
20/05400/007	Zoono High	Bus	<1
20/05400/008	Zoono Medium	Bus	<1
20/05400/009	Zoono Low	Bus	<1
20/05400/010	Cribersol High	Bus	<1
20/05400/011	Cribersol Medium	Bus	<1
20/05400/012	Cribersol Low	Bus	<1
20/05400/013	Dry Sanoxy High	Bus	<1
20/05400/014	Dry Sanoxy Medium	Bus	<1
20/05400/015	Dry Sanoxy Low	Bus	<1

Report Date: 13-Aug-2020



## Standard Swabs Test Report

**Customer:** Lamont Cleaning Support Services

**Contacts:** Michael Lamont  
Angela Davies

**Customer PO:**

**Address:** 402 Lisburn Enterprise Centre

**Lab No:** 20/05547

Ballinderry Road

**No of Samples:** 15

Lisburn

**Date Received:** 5-Aug-20

BT28 2BP

**Phone No:**

**Email:** michael@lamontcss.com  
angela.davies@msl.io

**Special Instructions/  
Comments**

Day 7 - Office After Fogging Clean Test

**Authorised By:**

Ben Elmadi

BD Microbiologist

cfu : colony forming units

All samples are tested as received and are deemed to be satisfactory unless customer informed.

Retention of Records - All documents including Test Results will be kept in archive by Microbiological Solutions Ltd for a minimum of 10 years.

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## Standard Swabs Test Report

**Swabs - Total Colony Count (3 days @ 30°C)**

Sample Number	Sample Description	Reference	Swabs - Total Colony Count (3 days @ 30°C) cfu/swab
20/05547/001	Aktivora 5% High	Office	<1
20/05547/002	Aktivora 5% Medium	Office	<1
20/05547/003	Aktivora 5% Low	Office	<1
20/05547/004	Aktivora 10% High	Office	3.0E+01
20/05547/005	Aktivora 10% Medium	Office	<1
20/05547/006	Aktivora 10% Low	Office	<1
20/05547/007	Zoono High	Office	6.0E+01
20/05547/008	Zoono Medium	Office	<1
20/05547/009	Zoono Low	Office	<1
20/05547/010	Cribersol High	Office	<1
20/05547/011	Cribersol Medium	Office	4.0E+01
20/05547/012	Cribersol Low	Office	<1
20/05547/013	Dry Sanoxy High	Office	<1
20/05547/014	Dry Sanoxy Medium	Office	<1
20/05547/015	Dry Sanoxy Low	Office	<1

Report Date: 13-Aug-2020



## Standard Swabs Test Report

**Customer:** Lamont Cleaning Support Services

**Contacts:** Michael Lamont  
Angela Davies

**Customer PO:**

**Address:** 402 Lisburn Enterprise Centre

**Lab No:** 20/05550

Ballinderry Road

**No of Samples:** 15

Lisburn

**Date Received:** 5-Aug-20

BT28 2BP

**Phone No:**

**Email:** michael@lamontcss.com  
angela.davies@msl.io

**Special Instructions/  
Comments**

Day 14 - Bus Spray & Clean Test

**Authorised By:**

Ben Elmadi

BD Microbiologist

cfu : colony forming units

All samples are tested as received and are deemed to be satisfactory unless customer informed.

Retention of Records - All documents including Test Results will be kept in archive by Microbiological Solutions Ltd for a minimum of 10 years.

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## Standard Swabs Test Report

### Swabs - Total Colony Count (3 days @ 30°C)

Sample Number	Sample Description	Reference	Swabs - Total Colony Count (3 days @ 30°C) cfu/swab
20/05550/001	Aktivra 5% High	Bus	>3.0 E+03
20/05550/002	Aktivra 5% Medium	Bus	>3.0 E+03
20/05550/003	Aktivra 5% Low	Bus	7.0E+01
20/05550/004	Aktivora 10% High	Bus	1.0E+02
20/05550/005	Aktivora 10% Medium	Bus	>3.0 E+03
20/05550/006	Aktivora 10% Low	Bus	>3.0 E+03
20/05550/007	Zoono High	Bus	>3.0 E+03
20/05550/008	Zoono Medium	Bus	>3.0 E+03
20/05550/009	Zoono Low	Bus	>3.0 E+03
20/05550/010	Cribersol High	Bus	>3.0 E+03
20/05550/011	Cribersol Medium	Bus	5.0E+01
20/05550/012	Cribersol Low	Bus	>3.0 E+03
20/05550/013	Dry Sanoxy High	Bus	2.8E+02
20/05550/014	Dry Sanoxy Medium	Bus	1.1E+02
20/05550/015	Dry Sanoxy Low	Bus	>3.0 E+03

Report Date: 13-Aug-2020



## Standard Swabs Test Report

**Customer:** Lamont Cleaning Support Services

**Contacts:** Michael Lamont  
Angela Davies

**Customer PO:**

**Address:** 402 Lisburn Enterprise Centre

**Lab No:** 20/05549

Ballinderry Road

**No of Samples:** 15

Lisburn

**Date Received:** 5-Aug-20

BT28 2BP

**Phone No:**

**Email:** michael@lamontcss.com  
angela.davies@msl.io

**Special Instructions/  
Comments**

Day 14 - Train Spray & Clean Test

**Authorised By:**

Ben Elmadi

BD Microbiologist

cfu : colony forming units

All samples are tested as received and are deemed to be satisfactory unless customer informed.

Retention of Records - All documents including Test Results will be kept in archive by Microbiological Solutions Ltd for a minimum of 10 years.

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## Standard Swabs Test Report

**Swabs - Total Colony Count (3 days @ 30°C)**

Sample Number	Sample Description	Reference	Swabs - Total Colony Count (3 days @ 30°C) cfu/swab
20/05549/001	Aktivora 5% High	Bus	<1
20/05549/002	Aktivora 5% Medium	Bus	2.0E+01
20/05549/003	Aktivora 5% Low	Bus	1.0E+01
20/05549/004	Aktivora 10% High	Bus	<1
20/05549/005	Aktivora 10% Medium	Bus	<1
20/05549/006	Aktivora 10% Low	Bus	<1
20/05549/007	Zoono High	Bus	<1
20/05549/008	Zoono Medium	Bus	<1
20/05549/009	Zoono Low	Bus	<1
20/05549/010	Cribersol High	Bus	<1
20/05549/011	Cribersol Medium	Bus	2.9E+02
20/05549/012	Cribersol Low	Bus	<1
20/05549/013	Dry Sanoxy High	Bus	<1
20/05549/014	Dry Sanoxy Medium	Bus	<1
20/05549/015	Dry Sanoxy Low	Bus	2.2E+02

Report Date: 13-Aug-2020



## Standard Swabs Test Report

**Customer:** Lamont Cleaning Support Services

**Contacts:** Michael Lamont  
Angela Davies

**Customer PO:**

**Address:** 402 Lisburn Enterprise Centre

**Lab No:** 20/05548

Ballinderry Road

**No of Samples:** 15

Lisburn

**Date Received:** 5-Aug-20

BT28 2BP

**Phone No:**

**Email:** michael@lamontcss.com  
angela.davies@msl.io

**Special Instructions/  
Comments**

Day 14 - Train Electro Static (ES) Test

**Authorised By:**

Ben Elmadi

BD Microbiologist

cfu : colony forming units

All samples are tested as received and are deemed to be satisfactory unless customer informed.

Retention of Records - All documents including Test Results will be kept in archive by Microbiological Solutions Ltd for a minimum of 10 years.

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## Standard Swabs Test Report

### Swabs - Total Colony Count (3 days @ 30°C)

Sample Number	Sample Description	Reference	Swabs - Total Colony Count (3 days @ 30°C) cfu/swab
20/05548/001	Aktivra 5% High	Bus	<1
20/05548/002	Aktivra 5% Medium	Bus	2.0E+01
20/05548/003	Aktivra 5% Low	Bus	5.0E+01
20/05548/004	Aktivora 10% High	Bus	3.0E+01
20/05548/005	Aktivora 10% Medium	Bus	1.0E+01
20/05548/006	Aktivora 10% Low	Bus	<1
20/05548/007	Zoono High	Bus	9.0E+01
20/05548/008	Zoono Medium	Bus	>3.0 E+03
20/05548/009	Zoono Low	Bus	<1
20/05548/010	Cribersol High	Bus	<1
20/05548/011	Cribersol Medium	Bus	<1
20/05548/012	Cribersol Low	Bus	<1
20/05548/013	Dry Sanoxy High	Bus	<1
20/05548/014	Dry Sanoxy Medium	Bus	<1
20/05548/015	Dry Sanoxy Low	Bus	<1

Report Date: 17-Aug-2020



## Standard Swabs Test Report

**Customer:** Lamont Cleaning Support Services

**Contacts:** Michael Lamont  
Angela Davies

**Customer PO:**

**Address:** 402 Lisburn Enterprise Centre

**Lab No:** 20/05713

Ballinderry Road

**No of Samples:** 15

Lisburn

**Date Received:** 12-Aug-20

BT28 2BP

**Phone No:**

**Email:** michael@lamontcss.com  
angela.davies@msl.io

**Special Instructions/  
Comments**

Day 14 - Office Fogging (FOG) Test

**Authorised By:**

Louise Boneheyo

Quality Manager

cfu : colony forming units

All samples are tested as received and are deemed to be satisfactory unless customer informed.

Retention of Records - All documents including Test Results will be kept in archive by Microbiological Solutions Ltd for a minimum of 10 years.

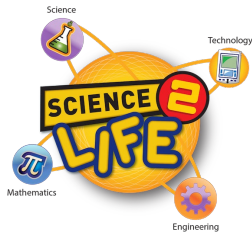
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## Standard Swabs Test Report

### Swabs - Total Colony Count (3 days @ 30°C)

Sample Number	Sample Description	Reference	Swabs - Total Colony Count (3 days @ 30°C) cfu/swab
20/05713/001	Aktivora 5% High	Bus	<1
20/05713/002	Aktivora 5% Medium	Bus	<1
20/05713/003	Aktivora 5% Low	Bus	<1
20/05713/004	Aktivora 10% High	Bus	<1
20/05713/005	Aktivora 5% Medium	Bus	<1
20/05713/006	Aktivora 5% Low	Bus	<1
20/05713/007	Zoono High	Bus	<1
20/05713/008	Zoono Medium	Bus	<1
20/05713/009	Zoono Low	Bus	<1
20/05713/010	Cribersol High	Bus	>3.0 E+02
20/05713/011	Cribersol Medium	Bus	1.0E+01
20/05713/012	Cribersol Low	Bus	1.6E+01
20/05713/013	Dry Sanoxy High	Bus	4.0E+00
20/05713/014	Dry Sanoxy Medium	Bus	1.0E+00
20/05713/015	Dry Sanoxy Low	Bus	>3.0 E+02



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## EXECUTIVE SUMMARY

**The aim of this case study was to firstly evaluate the disinfectant effectiveness of four cleaning products in eliminating pathogens over a 14-day period based on microbiological analysis, pH testing and the chemical's Material Safety Data Sheets (MSDS) and secondly determining the best cleaning method.**

A rigorous scientific investigation was conducted into the effectiveness of four different cleaning products used in three different cleaning processes:

1. Direct spray and clean
2. Via a fogging machine
3. Via an electrostatic spray cleaning method.

The tests were conducted by staff from Lamont Cleaning & Support Services and Translink across multiple-locations on bus, train and office environments. All environments were in normal operation over this testing period.

The Microbiological Testing Laboratory (MSL Solution Providers) analysed the swab results taken from the test environments at the time of the initial clean then after 24 hours, 72 hours, 7 days and 14 days.

pH tests were conducted and analysed by Science2Life.

Each company provided the MSDS sheets for their cleaning products.

Having analysed all data provided the results of the investigation lead to a recommendation that Translink should use AKTIVORA as both a surface cleaner and as the cleaning agent in the electrostatic spray guns. The results also indicate a cleaning period of 7 days with this product.

A handwritten signature in black ink, appearing to read 'S. McGrath'.

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Susan McGrath BSc Hons PGCE CEEd DASE MEd FInstP

Founder of Science2Life: Science Education Specialist & Consultant