Metrolinx

Surface Protection Program™ - 3 Month Efficacy Testing

Dated: Tuesday, September 1, 2020

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1 Metrolinx – Surface Protection Program Efficacy Study

1.1 Study Summary

The AEGIS Microbe Shield was applied to the Metrolinx train fleet and stations in February 2020 to reduce surface microbial contamination as part of a broader microbial control strategy.

To provide a means of demonstrating AEGIS efficacy pre- and post-AEGIS treatment surface microbial counts were taken at different Metrolinx sites using an ATP meter and compared to the total microbial count reduction from the train studies conducted in February 2020.

The table below summarizes the study findings comparing the initial ATP findings from the untreated control train to treated sites both 2 weeks and 3 months after the initial treatment. Both linear and geometric mean reductions have been calculated for discussion. A linear reduction provides a direct comparison of pre- and post-treatment microbial counts while a geometric mean comparison provides a more statistically accurate calculation by reducing the influence of anomalies.

	Control	**2 Weeks After Treatment**	**3 Months After Treatment**			
Summary	Untreated Trains	Treated Trains	Oshawa Station	Pickering Station	Oakville Station	Burlington Station
Microbial Counts	2,633	438	1,102	476	2,387	1,257
Linear Reduction	N/A	83%	58%	82%	9%	52%
Geometric Mean Reduction	N/A	91%	56%	89%	33%	64%

1.2 Interior Station Surface Observations

Interior surfaces were visibly cleaner than exterior surfaces at each station. A0EGIS treated interior high-touch surfaces demonstrated the most significant reductions at all four stations. These 3-month station findings support the findings from the train study conducted 2 weeks after AEGIS treatment.

1.3 Exterior Station Surface Observations

Many exterior surfaces had a light coating of dust which likely contributed to consistently higher microbial counts across all stations. The control sample did not include exterior surfaces making these two studies less of a direct comparison. It is possible that if exterior surfaces were included in the control study the exterior surface results may have been greater than the approximately 50% microbial reduction.

1.4 Closing Comments

Surfaces treated with AEGIS showed a significant reduction in microbial counts. Interior trains and station interiors showed higher microbial reductions than exterior surfaces. Oakville station was visibly less clean and proven less clean that the other tested stations. The microbial reduction findings from the Pickering station were the highest amongst all tested stations and most like the initial 2-week post-AEGIS treatment train test results.

All tests demonstrated positive results overall. A follow up AEGIS treatment study is scheduled in three months from this study date.

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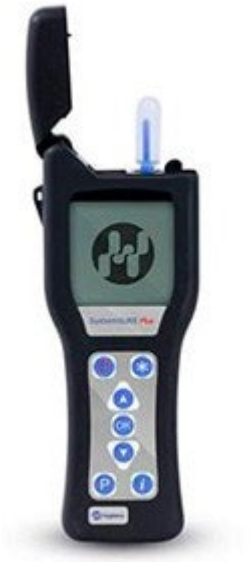
2 Appendix A: Sample Selection and Testing Equipment

2.1 Sample Selection

25 high-touch sites surfaces were selected at each site to provide a representative sample of location and material types.

2.2 ATP Testing

Testing was completed using an Hygiena ATP meter.



ATP monitoring is a rapid testing method used by food and beverage processors to quickly assess the cleanliness of surfaces or liquid samples from such places as CIP systems. Adenosine Triphosphate (ATP) is present in all organic material and is the universal unit of energy used in all living cells. ATP is produced and/or broken down in metabolic processes in all living systems. Processes such as photosynthesis in plants, muscle contraction in humans, respiration in fungi, and fermentation in yeast are all driven by ATP. Therefore, most foods and microbial cells will contain some level of naturally occurring ATP.

Hygiena luminometers (in conjunction with ATP swabs) use bioluminescence to detect residual ATP as an indicator of surface cleanliness. The presence of ATP on a surface indicates improper cleaning and the presence of contamination, including food residue, allergens and/or bacteria. This implies a potential for the surface to harbor and support bacterial growth.

ATP monitoring is used in food and beverage facilities to confirm that ATP presence is eliminated or minimized by effective sanitation procedures. ATP monitoring prevents cross-contamination, ensures product integrity, potentially improves product shelf life, protects brand reputation, and complies with GMP standards and HACCP requirements.[1]

1 https://www.hygiena.com/frequent-asked-questions-food-and-beverage.html

3 Appendix B: Study Data

		February 7, 2020	February 21, 2020	August 4, 2020	
	Coach 4135 & 2006	Microbial Counts	Microbial Counts	Oshawa Station	Microbial Counts
#	Location	Untreated	Treated	Location	Treated
1	Coach 4135 - Exit handle DL1	39	11	Entry door	18
2	Coach 4135 - Stanchion AN LL	52	2	Arm rest	42
3	Coach 4135 - AN LLR head rest	20	5	Arm rest	74
4	Coach 4135 - Stanchion ll-l2	52	8	Door handle	7
5	Coach 4135 - Handrail NS	51	17	Presto pad	20
6	Coach 4135 - A end door pad	70	17	Check in counter	44
7	Coach 4135 - A end head rest LL-L5	70	2	Vending machine	54
8	Coach 4135 - A end IL to up L handrail	90	13	Bathroom door entry	215
9	Coach 4135 - UL-L6 Headrest	156	11	Bathroom sink	23
10	Coach 4135 - UL L2 seat handle 1L	79	7	Check in counter	23
11	Coach 4135 - B end handrail 1L	79	17	Check in keypad	20
12	Coach 4135 - Exit handle DL 5	121	69	Boarding pass pad	32
13	Coach 2006 - B end 1L R2 armrest	15	13	Arm rest	31
14	Coach 2006 - B end 1L-R2 Arm rest	59	29	Fountain button	44
15	Coach 2006 - Washroom grab bar	144	21	Arm rest	16
16	Coach 2006 - toilet flush button	114	12	Arm rest	8
17	Coach 2006 - 1L R2 head rest	7	0	Arm rest	29
18	Coach 2006 - Exit handle DL 1	35	13	Vending machine	57
19	Coach 2006 - LL seat by DL1	36	1	Shelter bench handle	118
20	Coach 2006 - UL L8 handrail R/S	293	74	Shelter bench handle	62
21	Coach 2006 - UL L8 window ledge	120	58	Shelter door button	8
22	Coach 2006 - UL L5 seat	114	3	Outdoor presto pad	31
23	Coach 2006 - UL L4 stanchion	316	35	Outdoor bench handle	60
24	Coach 2006 - UL L3 Seat	122	0	Outdoor Bench handle	27
25	Coach 2006 - UL L1 Stanchion	379	0	Outdoor Presto Pad	39
	Total Microbial Count	2633	438		1102
	Linear Reduction (%)		83%		58%
	GEOMEAN Average	73	7		32
	GEOMEAN Reduction (%)		91%		56%

	August 4, 2020		August 6, 2020		August 6, 2020	
	Pickering Station	Microbial Counts	Oakville Station	Microbial Counts	Burlington Station	Microbial Counts
#	Location	Treated	Location	Treated	Location	Treated
1	Entry door	2	Exit Door (inside)	49	Main entrance door (exterior)	70
2	Arm rest	23	Wheelchair door button	42	Seat Arm Rest	71
3	Door Push	9	Presto Machine	48	Main Door Central	6
4	Door Push	10	Presto Machine #2 Reload	50	Seat Arm Rest	48
5	Presto pad	0	Seat Arm Rest	142	Main Exit Door central	7
6	Presto pad	2	Men's restroom sink	51	Seat arm rest	7
7	Presto Machine	23	Men's restroom stall door	74	To tracks handrail	6
8	Door Button	10	Platform door bar	149	Elevator Button - 1	94
9	F.Driver Washroom Handle	5	Platform door push bar	54	To tracks handrail	5
10	M.Driver Washroom Handle	16	Track 2 handrail	449	Elevator Button - 2	94
11	Check in keypad	17	Track 2 handrail	199	Track 3 Rail	55
12	Boarding pass pad	33	Track 1 handrail	56	Platform Rest	83
13	Arm rest	17	Track 2 elevator	128	Platform Chair arm rest	49
14	Stair Rail	4	Platform rap handle (3/4)	95	Platform chair arm rest	55
15	Arm rest	7	Track level presto machine	9	Platform door inside	0
16	Arm rest	6	Presto self-serve reload	11	Handrail platform 2	83
17	Arm rest	51	Parking lot stair rail	41	handrail track 3	164
18	Stair Rail	1	Elevator Button	13	Inside handrail	37
19	Shelter bench handle	5	Presto tap machine	7	Inside handrail	27
20	Platform 2 Stair Rail	17	Track 2 outdoor bench	284	Inside handrail	62
21	Platform Door Handle	13	Track 2 outdoor bench #2	288	Main door	136
22	Bathroom Sink	0	Platform 2 wheelchair ramp handle	115	Main door	28
23	Platform 2 stair rail	87	Track 2 door handle-outside	2	Interior east door	51
24	Platform 1 Stair Rail	64	Track 2 door handle-inside	21	Interior east door	6
25	Platform 1 Stair Rail	54	Track 3 door handle-outside	10	Mens washroom door	13
	Total Microbial Count	476.2		2387		1257.1
	Linear Reduction (%)	82%		9%		52%
	GEOMEAN Average	8		49		26
	GEOMEAN Reduction (%)	89%		33%		64%