



Plainfield Municipal Courthouse ActivePure Air System Study

December 2021



Table Of Contents

- 1. <u>Overview</u>
- 2. About Us
- 3. Executive Summary
- 4. Biological Testing Process
- 5. Additional Considerations
- 6. <u>Conclusion</u>
- 7. Biological Testing Results Before
- 8. Biological Testing Results After
- 9. Summary of Biological Testing

Overview

Thank you again for the opportunity to partner with the Plainfield Municipal Courthouse to ensure the cleanest, safest possible environment for your facility staff and patrons. We have outlined our study of the efficacy of the ActivePure system as adjunct technology with your current standard disinfection protocols. Comprehensive biological testing was completed by our team, providing you with data to support your decision making for future use of the continuous air and surface pathogen removal system.

The Lighthouse team conducted tests of 8 indoor air samples and 13 surface test samples prior to the installation of the devices to establish baseline bacteria levels and fungal levels, and again 7 days after the installation. For an effective analysis of the ActivePure technology, the same processes and controls were used for all tests.

Resinnova Lab, one of the top microbiological labs in the United States, who processed all biological samples, completed all laboratory analysis, and generated the test result findings.

We look forward to continue working with you in your efforts to ensure the safest and healthiest possible environment for your facility. We will work side by side with you, every step of the way.

John LaRochelle Lighthouse Environmental Infection Prevention President

Dr. Matthew Hardwick RessInova Labs CEO

About Us

Lighthouse Environmental Infection Prevention (Lighthouse) is the world-wide leader in Environmental Infection Prevention. Our solutions are best-in-class, and represent years of research, development and successful use in 500+ healthcare clients, 2000+ retail operations, professional sports teams, academia, conference centers and amusement parks.

EIP Advisory Board



John M. Boyce, MD

- President of J.M. Boyce Consulting
- Yale-New Haven Hospital Director of Hospital Epidemiology & Infection Control, Retired
- Yale University School of Medicine Professor of Medicine, Retired



Bruce Mitchell, MD

- Director of the Immunology Laboratory, Blackrock Clinic
- Fellow of the Royal College of Physicians in Ireland and the Royal College of Physicians in Canada
- Diplomat to the American Board of Allergy and Immunology



CAPT David Bacon, PhD, US Navy

- Director, Joint Programs, US Navy Bureau of Medicine and Surgery
- US Navy Liaison Officer to Military Infectious Disease Research
 Program



Shari L. Solomon, Esq.

- President and founder of CleanHealth Environmental
- 20+ years in environmental consulting and federal regulatory experience



Dr. Rodney E. Rohde, PhD

- Professor and Clinical Chair for the Clinical Laboratory Science Program in the College of Health Professions at Texas State University
- Associate Dean of Research
- Board certified specialist in Virology, Microbiology and Molecular Biology

About Us Cont.

About ResInnova Labs

ResInnova Laboratories is one of the top laboratories in the country, run by one of the most respected microbiologists, Matthew Hardwick, PhD. Their laboratory is certified by the International Antimicrobial Council (IAC), providing the highest quality testing. They implement the most current testing standards established by AATCC, ASTM, ISO and JIS and develop custom testing specific to our customers' needs. This strategy of combining standards and unique testing delivers usable data of the highest quality.

Dr. Hardwick has over 20 years of academic research experience at Georgetown University, where he completed his PhD in Cell Biology, and at Johns Hopkins University, where he completed two postdoctoral fellowships, one in the Bloomberg School of Public Health and the second in the James Buchanan Brady Urological Institute.



Matthew Hardwick, PhD, is an expert in antimicrobial surface technologies and the role of contamination on infection rates. With over 20 years of experience, he is widely published in the field of infection prevention.

Executive Summary

We have outlined our study of the efficacy and safety profile of the ActivePure system being utilized by the Plainfield Municipal Courthouse.

The results of our testing revealed:

Surface Results: Aerobic Bacteria Counts (CFU's) were reduced by: 90.8% Fungal/Mold CFU Counts were reduced by: 98.1%

Air Results: Aerobic Bacteria Counts (CFU's) were reduced by: 74.3% Fungal/Mold CFU Counts were reduced by: 75.8%

Biological Testing Process

Preparation

- Label each pre-moistened sampling sponge bag with test location using permanent marker
- Complete Collection Worksheet with corresponding test location
 and assign each location an ID number

Swabbing the surface

- Applying firm pressure, swipe the entire sampling are vertically with one side of the sponge
- Then flip the sponge over and swipe the entire sampling area horizontally
- Cover an area approximately a 5"x5" (25sq inches) square
- Holding the used sponge over the original open bag, release the sponge by squeezing the quick-release grips on the handle
- Discard the handle
- To close the bag, roll starting from bottom to top and secure with wire twist-ties
- Place all sponges back into one of mylar zip-bags and seal

Air sampling

 Collections of air samples will be performed using a portable hand-held air sampler onto nutrient agar plate











Additional Considerations

There are many factors that contribute to the overall bacterial and fungal/mold levels in any environment. Although the results from the ActivePure system were excellent, a few simple procedural changes related to cleaning / disinfection will drive the reduction levels even higher.

Re-usable mops and wipes: Clinical studies show that the use of re-useable mops and wipes can contribute to both air and surface contamination. The current cleaning system may be contributing to bacterial and fungal CFU counts.

Non-carpeted floors: Clinical studies show that floors contribute to both air and surface contamination. The current mopping system may be contributing to bacterial and fungal CFU counts.

Carpeted floors: Clinical studies show that carpets can contribute to both air and surface contamination. The current vacuuming system may be contributing to bacterial and Fungal CFU counts.

Additional Considerations cont.

Quat Binding: A study by Dr. John Boyce showed the binding of quaternary ammonium (quats) chemicals to cotton and microfiber cloths, robbing the amount of disinfectant that is transferred to the surfaces. Observed quats being used with cotton and microfiber mops throughout the facility.



Floors and the spread of pathogens: A clinical study by Dr. Curtis Donskey revealed that pathogens can quickly move from floors to surfaces and travel throughout a building.



% patient hands contaminated

Koganti, S., Alhmidi, H., Tomas, M. E., Cadnum, J. L., Jencson, A., & Donskey, C. J. (2016). Evaluation of Hospital Floors as a Potential Source of Pathogen Dissemination Using a Nonpathogenic Virus as a Surrogate Marker. Infection control and hospital epidemiology, 37(11), 1374–1377. https://doi.org/10.1017/ice.2016.181

Conclusion

A study was conducted of the effectiveness of the ActivePure system by measuring pathogen / fungal levels in the air and on surfaces. The significant reduction of pathogen levels on both the surfaces and in the air achieved by the ActivePure technology prove to be a robust solution for a healthier environment for the Plainfield Municipal Courthouse.

Biological Testing Results Before



CONFIDENTIAL TEST REPORT No. LH-147a December 1, 2021

LIGHTHOUSE John LaRochelle

Microbial Evaluation of Sampling Sponges - Plainfield Courthouse - 22 NOV 2021

Test Method Details			
Collection	Samples collected by sterile sponge in situ, then shipped on ice		
	packs overnight to microbiology laboratory.		
Recovery	Each sponge was recovered in 10 mL sterile buffer solution of		
	phosphate buffered saline (1x) + Triton X-100 (0.1%) surfactant		
	and homogenized for 1 minute.		
Growth Conditions	Each recovery solution was then serially diluted and plated onto:		
	 Nutritive (tryptic soy) agar for Total Aerobic Microbial 		
	Counts, and		
	 Selective (Sabouraud dextrose) agar for Total Fungal 		
	Counts.		
	• All agar plates incubated at 30°C or 37°C (as applicable) for		
	48-96 hours before counting the resulting colonies.		
Evaluation	Serial dilution plate counts were used to calculate the Colony		
	Forming Units (CFU) per sponge for each media type.		
	 Note: The limit of detection is 10 CFU/sponge for 		
	each evaluation.		

ResInnova Laboratories 8807 Colesville Rd, 3rd Floor Silver Spring, MD 20910





Sponge ID#	Description	Total Aerobic Count	Total Fungal Count	
3432	Office Area Copier	2,980	670	
3433	Desk #1	647	500	
3434	Phone #1	880	420	
3435	Computer #1	4,200	770	
3436	Desk #2	954	None Detected	
3437	Phone #2	3,670	12	
3438	Computer #2	1,100	14	
3439	Desk #3	495	22	
3440	Phone #3	7,400	110	
3441	Computer #3	8,750	211	
3442	Admin Armrest	784	None Detected	
3443	Admin Phone	4,200	520	
3444	Admin Computer	687	93	
3445	Armrest #1	3,470	151	
3446	Armrest #2	1,000	2	

Results – Total CFUs per Sponge (Plainfield Courthouse - 22 NOV 2021)

Results – Air Samples Total CFUs per Plate (Plainfield Courthouse - 22 NOV 2021)

Plate ID#	Description	Total Aerobic Count	Total Fungal Count
3447	Office Area	88 25	
3448	Office Area	59 16	
3449	Office Area	84 12	
3450	File Rm	72 28	
3451	Payment Window	41	10
3452	Admin Office	56 18	
3453	Plant Office	32 11	
3454	Outside Air	579 240	

J 240.485.8973

🖵 RESINNOVALABS.COM

SERVICES@RESINNOVALABS.COM





Biological Testing Results After



CONFIDENTIAL TEST REPORT No. LH-148a December 7, 2021

LIGHTHOUSE John LaRochelle

Microbial Evaluation of Sampling Sponges – Plainfield Courthouse – 29 NOV 2021

Test Method Details				
Collection	Samples collected by sterile sponge <i>in situ</i> , then shipped on ice packs overnight to microbiology laboratory.			
Recovery	Each sponge was recovered in 10 mL sterile buffer solution of phosphate buffered saline (1x) + Triton X-100 (0.1%) surfactant and homogenized for 1 minute.			
Growth Conditions	 Each recovery solution was then serially diluted and plated onto: Nutritive (tryptic soy) agar for Total Aerobic Microbial Counts, and Selective (Sabouraud dextrose) agar for Total Fungal Counts. All agar plates incubated at 30°C or 37°C (as applicable) for 48-96 hours before counting the resulting colonies. 			
Evaluation	 Serial dilution plate counts were used to calculate the Colony Forming Units (CFU) per sponge for each media type. Note: The limit of detection is 10 CFU/sponge for each evaluation. 			

ResInnova Laboratories 8807 Colesville Rd, 3rd Floor Silver Spring, MD 20910





Sponge ID#	Description	Total Aerobic Count	Total Fungal Count	
3455	Office Area Copier	1,790	None Detected	
3456	Desk #1	530	None Detected	
3457	Phone #1	21	None Detected	
3458	Computer #1	194	None Detected	
3459	Desk #2	142	None Detected	
3460	Phone #2	47	None Detected	
3461	Computer #2	28	None Detected	
3462	Desk #3	49	11	
3463	Phone #3	52	2	
3464	Computer #3	198	51	
3465	Admin Computer	15	None Detected	
3466	Admin Desk	190	None Detected	
3467	Admin Armrest	127	None Detected	
Results – Air Samples Total CFUs per Plate (Plainfield Courthouse - 29 NOV 2021)				

Results – Total CFUs per Sponge (Plainfield Courthouse – 29 NOV 2021)

Plate ID#	Description	Total Aerobic Count Total Fung		
3468	3468 Office Area 19		7	
3469	Office Area	6	3	
3470	Office Area	10	3	
3471	File Rm	24	5	
3472	Payment Window	25	6	
3473	Admin Office	9 1		
3474	Plant Office	18 4		
3475	Outside Air	33	24	





Summary of Biological Testing

	Area Location	CFU Totals		
	Area Location	Test 1 (Nov 22)	Test 2 (Nov 29)	% Change
	Office Area Copier	2,980	1,790	39.9
	Desk #1	647	530	18.1
	Phone #1	880	21	97.6
	Computer #1	4,200	194	95.4
	Desk #2	954	142	85.1
	Phone #2	3,670	47	98.7
Office Area	Computer #2	1,100	28	97.5
	Desk #3	495	49	90.1
	Phone #3	7,400	52	99.3
	Computer #3	8,750	198	97.7
	Admin Armrest	784	127	83.8
	Admin Phone	4,200	190	95.5
	Admin Computer	687	15	97.8
	Office Area	88	19	78.4
	Office Area	59	6	89.8
	Office Area	84	10	88.1
	File Rm	72	24	66.7
Air Samples	Payment Window	41	25	39.0
	Admin Office	56	9	83.9
	Plant Office	32	18	43.8
	Outside Air	579	33	94.3
	Surface CFU Total	36,747	3,383	90.8
	Air Samples	432	111	74.3

Summary of Biological Testing Cont.

	Area Location	Fungal Totals		
	Area Location	Test 1 (Nov 22)	Test 2 (Nov 29)	% Change
	Office Area Copier	670	0	100.0
	Desk #1	500	0	100.0
	Phone #1	420	0	100.0
	Computer #1	770	0	100.0
	Desk #2	0	0	0.0
	Phone #2	12	0	100.0
Office Area	Computer #2	14	0	100.0
	Desk #3	22	11	50.0
	Phone #3	110	2	98.2
	Computer #3	211	51	75.8
	Admin Armrest	0	0	0.0
	Admin Phone	520	0	100.0
	Admin Computer	93	0	100.0
	Office Area	25	7	72.0
	Office Area	16	3	81.3
	Office Area	12	3	75.0
	File Rm	28	5	82.1
Air Samples	Payment Window	10	6	40.0
	Admin Office	18	1	94.4
	Plant Office	11	4	63.6
	Outside Air	240	24	90.0
	Surface Fungal Total	3,342	64	98.1
	Air Samples	120	29	75.8

Summary of Biological Testing Cont.





Summary of Biological Testing Cont.





