



Building Health Check is a Division of Pure Air Control Services, Inc.

Building Health Check Report
Prepared for

**Darryl Blair,
Energy Management Facilites Planning
Sarasota County Government
1001 Sarasota Center Blvd
Sarasota, FL 34240
941-861-0868**

Date of Study: December 23, 2015
Date of Report: January 6, 2016

Report # 3929-19392

**Sarasota County Government
Venice Library
300 S. Nokomis Ave.
Venice, FL 34285**

Prepared By

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January 6, 2016



Darryl Blair,
Energy Management Facilities Planning
Sarasota County Government
1001 Sarasota Center Blvd
Sarasota, FL 34240



**Re: Venice Public Library
Building Health Check Report 3929-19392**

Darryl Blair,

It is Pure Air Control Services, Inc. (Pure Air) privilege to submit this report that describes the Building Health Check evaluation undertaken at the Venice Library, 300 S. Nokomis Ave., Venice, FL for your review. Field assessments were completed on December 23, 2015 to address concerns related to the quality of the indoor air.



*Publisher of the
IEQ Review*

Thank you for providing Pure Air this opportunity to assist you with your indoor air quality concerns. If you should have any questions regarding this report provided, please call me at 1-800-422-7873, ext. 201.



Respectfully Submitted,

PURE AIR CONTROL SERVICES, INC.

Aaron Hallam

HVAC FL License
#CACO57992

Aaron Hallam
Building Scientist



Member



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INTRODUCTION

This report describes the Building Health Check evaluation undertaken at Venice Library, 300 S. Nokomis Ave., Venice, FL. The assessment was completed on December 23, 2015 at the request of Mr. Darryl Blair of Sarasota County Government to address occupant concerns related to the quality of the indoor air.

BACKGROUND

Over the years the Venice Library has had numerous water intrusion events believed to be related to moisture infiltrating through the slab and/or at grade from water accumulation outside the building. Pure Air, an independent firm was called to perform a due diligence study on behalf of Sarasota County Government to ascertain the general health and quality of the indoor air. They are in the process of relocating the contents and staff with the hopes of being done in next 4-5 months. The library will stay open until that time. The results for such due diligence assessment are the subject of this report.

SCOPE OF WORK

The assays performed in this study included:

- Cultures for the assessment of viable bacterial and fungal concentrations suspended in the air.
- Spore Traps to determine the concentrations of fungal structures suspended in the air.
- Surface Tape Preparations to assess the distribution of fungal structures settled on the environment.
- Measurements of temperature and relative humidity for the assessment of comfort and conditions that might support microbial proliferation and chemical interactions.
- Measurements of carbon dioxide as a surrogate measure for ventilation adequacy.
- Particle counting of respirable-size as an indicator of air filtration efficiency and/or unusual dust levels.
- Infrared scan and direct contact moisture measurements for the detection of damp building materials.
- The assessment also included a visual inspection of the air handler and the air distribution system to address any potential sanitary conditions that may need attention.



ENVIRONMENTAL SUMMARY REPORT

Environmental assays were performed in 10 representative zones throughout the library. When pertinent, outside air samples were collected for comparative and control purposes. These environmental samples were submitted to the Environmental Diagnostics Laboratory (EDL), for analysis. The results derived from each assay were compared against the corresponding Guidelines to determine acceptability and were tabulated on the following page. Please note that the figures highlighted in yellow (if any) contain values moderately outside the recommended level and are treated as a transition gradient from a normal condition to abnormal or vice versa. Figures highlighted in red (if any) indicate with certainty that an abnormal or detrimental condition exists.



Air Quality

Matrix	Aspect	Unit	Guideline*	Ref.	Workroom Area	Large Print Area	Information Area	Reading Area	Genealogy Area	Youth Progam Area	Outside Air
Cultures	Bacteria	CFU/m ³	≤175 or 1/3 OA	3	12	36	36	95	12	36	143
	Fungi	CFU/m ³	≤350 or 1/3 OA	3	24	60	24	BDL	36	60	631
Spore Traps	Opaque Particles	cts/m ³	≤35,000 or 1/3 OA	3	17,500	51,400	6,520	1,070	7,930	22,800	4,810
	Skin Cell Fragments	cts/m ³	≤7,500	3	222	1,780	400	66	911	1,040	44
	Insect Biodetritus	cts/m ³	≤200 or 1/3 OA	3	BDL	BDL	BDL	BDL	BDL	BDL	BDL
	Fibers	cts/m ³	≤500	3	BDL	BDL	BDL	BDL	22	22	BDL
	Fiberglass fibers	cts/m ³	≤5	3	BDL	BDL	BDL	BDL	BDL	22	BDL
	Pollen	cts/m ³	≤15 or 1/3 OA	3	BDL	BDL	BDL	BDL	BDL	BDL	BDL
	Fungal Elements	cts/m ³	≤1000 or 1/3 OA	3	BDL	110	66	22	BDL	BDL	1,060
	Other	cts/m ³	≤6000 or 1/3 OA	3	22,600	50,000	7,900		6,400	5,560	
Particle	Respirable size	p/l	≤25,000 or 1/3 OA	3	9,856	8,867	9,581	9,299	9,342	10,404	50,115
Comfort	Temperature	°F	72 to 78	1	73.4	75	73.4	74.1	74.6	71.5	74.8
	Relative Humidity	%	30 to 60	1	65.8	67	65.9	68.5	66.9	75.1	90.4
	Carbon Dioxide	ppm	700+OA	2	415	403	361	343	345	365	333

Settled Aerosols in the Occupiable Space

Matrix	Aspect	Unit	Guideline*	Ref.	Top of Cabinet	Top of Bookshelf	Bookshelf	Newspaper Stand	Red Book 3rd Edition	N/A	NA
Tape Prep	Opaque Particles	cts/cm ²	≤3000	3	3,930	7,050		421	2,100		
	Skin Cell Fragments	cts/cm ²	≤600	3	1,380	687		64	673		
	Insect Biodetritus	cts/cm ²	≤4	3	BDL	BDL		BDL	BDL		
	Fibers	cts/cm ²	≤120	3	216	176	388	84	168		
	Fibergalss Fibers	cts/cm ²	≤4	3	4	4	4	4	16		
	Pollen	cts/cm ²	≤4	3	8	8		BDL	BDL		
	Fungal Elements	cts/cm ²	≤50	3	24	24		BDL	8		
	Other	cts/cm ²	≤650	3	1,390	928		220	280		

Foot Notes

Units	Units	Reference	Notes	Notes
CFU/m ³ = Colony Forming Units per Cubic Meter of Air	°F = Degrees Fahrenheit	1. ASHRAE 55 - 2010	BDL = Below Detectable Limit	NA = Not Applicable
cts/m ³ = Counts per Cubic Meter of Air	% = Percent	2. ASHRAE 62.1 - 2013	OA = Outside Air	* = See Guidelines Section
cts/cm ² = Counts per square centimeter	ppm = Parts per Million	3. Pure Air Control Services, Inc.	Red = Abnormal/Detrimental	
p/l = Particles per liter of Air		4. Molhave 1990	Yellow = Moderately elevated	



Air Quality

Matrix	Aspect	Unit	Guideline*	Ref.	Juvenile Non Fiction	Teen & Youth Area	Book Store	Lobby Area	Meeting Room	Outside Air
Cultures	Bacteria	CFU/m ³	≤175 or 1/3 OA	3		83	48	71	24	143
	Fungi	CFU/m ³	≤350 or 1/3 OA	3		36	24	36	BDL	631
Spore Traps	Opaque Particles	cts/m ³	≤35,000 or 1/3 OA	3		10,700	18,100	58,900	13,200	4,810
	Skin Cell Fragments	cts/m ³	≤7,500	3		667	933	267	178	44
	Insect Biodetritus	cts/m ³	≤200 or 1/3 OA	3		BDL	BDL	BDL	BDL	BDL
	Fibers	cts/m ³	≤500	3		44	22	22	BDL	BDL
	Fiberglass fibers	cts/m ³	≤5	3		BDL	BDL	22	BDL	BDL
	Pollen	cts/m ³	≤15 or 1/3 OA	3		BDL	BDL	BDL	BDL	BDL
	Fungal Elements	cts/m ³	≤1000 or 1/3 OA	3		44	88	88	10,500	1,060
	Other	cts/m ³	≤6000 or 1/3 OA	3		7,650	15,800	48,000	20,900	
Particle	Respirable size	p/l	≤25,000 or 1/3 OA	3		8,905	6,996	10,485	11,665	50,115
Comfort	Temperature	°F	72 to 78	1		74	74	75.2	73.4	74.8
	Relative Humidity	%	30 to 60	1		69.5	64	65.9	74.7	90.4
	Carbon Dioxide	ppm	700+OA	2		358	420	345	336	333

Settled Aerosols in the Occupiable Space

Matrix	Aspect	Unit	Guideline*	Ref.	Bookshelf	Desk Chair	Bookshelf	Bookshelf	NA	NA
Tape Prep	Opaque Particles	cts/cm ²	≤3000	3	558	2,010	15,100	11,700		
	Skin Cell Fragments	cts/cm ²	≤600	3	76	1,160	7,100	2,650		
	Insect Biodetritus	cts/cm ²	≤4	3	BDL	BDL	BDL	BDL		
	Fibers	cts/cm ²	≤120	3	16	416	332	660		
	Fiberglass Fibers	cts/cm ²	≤4	3	BDL	12	8	8		
	Pollen	cts/cm ²	≤4	3	BDL	8	44	60		
	Fungal Elements	cts/cm ²	≤50	3	BDL	320	20	60		
	Other	cts/cm ²	≤650	3	284	1,170	5,580	4,000		

Foot Notes

Units	Units	Reference	Notes	Notes
CFU/m ³ = Colony Forming Units per Cubic Meter of Air	°F = Degrees Fahrenheit	1. ASHRAE 55 - 2010	BDL = Below Detectable Limit	NA = Not Applicable
cts/m ³ = Counts per Cubic Meter of Air	% = Percent	2. ASHRAE 62.1 - 2013	OA = Outside Air	* = See Guidelines Section
cts/cm ² = Counts per square centimeter	ppm = Parts per Million	3. Pure Air Control Services, Inc.	Red = Abnormal/Detrimental	
p/l = Particles per liter of Air		4. Molhave 1990	Yellow = Moderately elevated	



CONCLUSIONS

Based on the results derived from the environmental samples collected no imminent health concerns were collected. However, large areas with moisture intrusion underneath the carpets and dusty environmental conditions exist throughout the library that some hypersensitive individuals may not find it suitable.

Air samples collected using the culture method for the assessment of microbial concentrations suspended in the air revealed levels of bacteria well within the recommended guideline in all of the representative zones evaluated. The levels of fungi suspended in the air were well within the recommended guidelines in all of the representative zones evaluated and raised no significant health concerns.

Air samples collected with the spore trap method (Air-O-Cell Cassettes) for the assessment of fungal structures suspended in the air revealed levels well within the recommended guideline in all zones assessed in the library. No concerns were raised by this assay method.

Surface tape preparations were collected to assess the settled distribution of fungal structures and other allergens. The analytical results for the surface tape preparations collected from all representative areas tested revealed markedly dusty conditions; however, the fungal content (settlement) was elevated only in one (1) of the nine (9) representative zones sampled.

Dust particles whose overall diameter ranges from 0.3 to 5.0 microns are recognized as respirable-size particles. Respirable-size particles are generated by a broad variety of processes and activities and there are increasingly more studies linking associations between the concentrations of particles and health effects. In this case, the respirable-size particle concentrations detected in all of the zones evaluated were well within the recommended levels, which raised no concerns at this time.

The ventilation requirement for most buildings is supplied by the HVAC system and/or by infiltration of the outside air. Carbon dioxide (CO₂) concentrations are used as surrogate measure to roughly assess the adequacy of the ventilation system. The results for the CO₂ measurements made at the time of the field evaluation were well within the recommended guideline. No concerns were raised by this assay method.

Temperature and relative humidity measurements of the ambient air were used to assess comfort, as well as an environmental factor that may increase the prevalence of indoor air quality problems (e.g. microbial activity, indoor allergens, viral infections, allergic rhinitis, asthma, ozone production, odors, etc.). There is no specific set of



CONCLUSIONS (continued)

recommended values for temperature and relative humidity; however, comfort depends principally on these two factors combined. For indoor air quality and health reasons it is recommended that the relative humidity be maintained in the range of 30 to 60%. With some exceptions the temperature in the cooling mode needs to be maintained at a set point in the range of 73 to 79 °F and between 68 to 74 °F during the winter (see Standard Effective Temperature and ASHRAE Comfort Zone illustration provided for details). In this assessment, the relative humidity was well above the recommended levels for comfort and the control of allergens production. The temperature readings were within comfort ranges throughout the library.

Air handlers and duct systems that contain excessive dust, debris, and moisture are places where bacteria and fungi may proliferate and release odors and potentially other contaminants into the air stream. In this case, the air handler located in the Meeting Room, AHU-2 was inspected to assess the hygienic condition. In general, the air handlers are relatively new, but are beginning to show dust impactions on the cooling coils and blower wheels which appears to be a deficiency with the air filtration. Also, air handler 2 was found with the insulation liner delaminated from the access panel which may release fiberglass fibers into the air stream.



RECOMMENDATIONS

No new recommendations to add as everything has been covered by Pure Air's prior reports, those recommendations were designed to resolve issues described in the two (2) previous reports. No prioritization was implied by this listing, however, it was anticipated all items discussed would be addressed.

General

- ❖ Set the thermostats (and any other relevant controls) to maintain the temperature and relative humidity within the ASHRAE recommended levels of 73 to 79 °F (summer) 68 to 74 °F (winter). Relative humidity should be maintained in the range of 30 and 60%.



Sarasota County Government

Venice Library

Report # 3929-19392

PHOTOGRAPHS

Workroom



1) Workroom area was assessed.
The sanitary condition of the area was poor to moderate.



2) Upper cabinets revealed a significant layer of dust buildup.



3) Ceiling tiles at the wall between the Workroom
and Lobby revealed significant water stains.



4) View supply grille reveals ghosting.

Large Print



5) Large Print Area was assessed.



6) Large Print Area was assessed.

blank

blank

7)

8)

Information Area



9) Information area was assessed.



10) Information area was assessed..



11) No evidence of suspect visible mold growth under the desks



12) Significant amount of dust build up on desk chair.

Other Library Areas Tested



13) The Youth Program Room was assessed.



14) Teen and Youth Wing was Assessed



15) The Reading Room was assessed.



16) Genealogy Area was assessed.

Other Library Areas Tested



17) The Lobby was assessed.



18) The Bookstore was assessed.

blank

blank

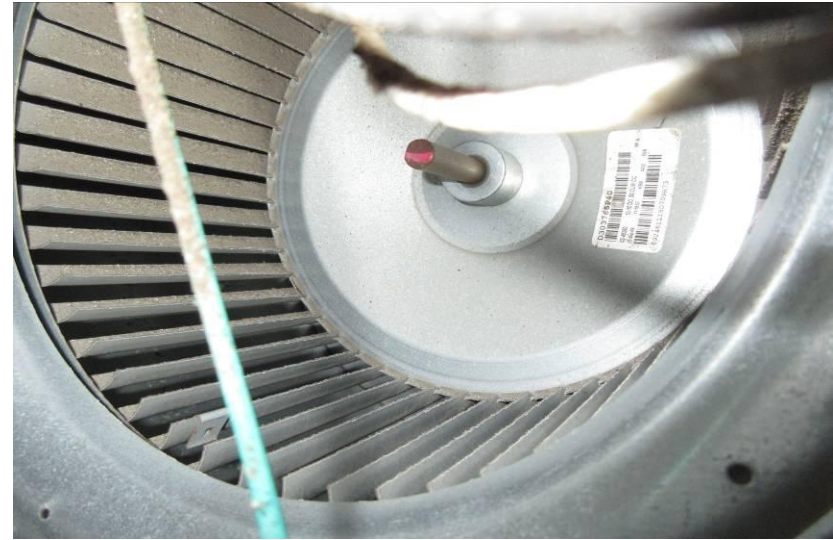
19)

20)

AHU-2



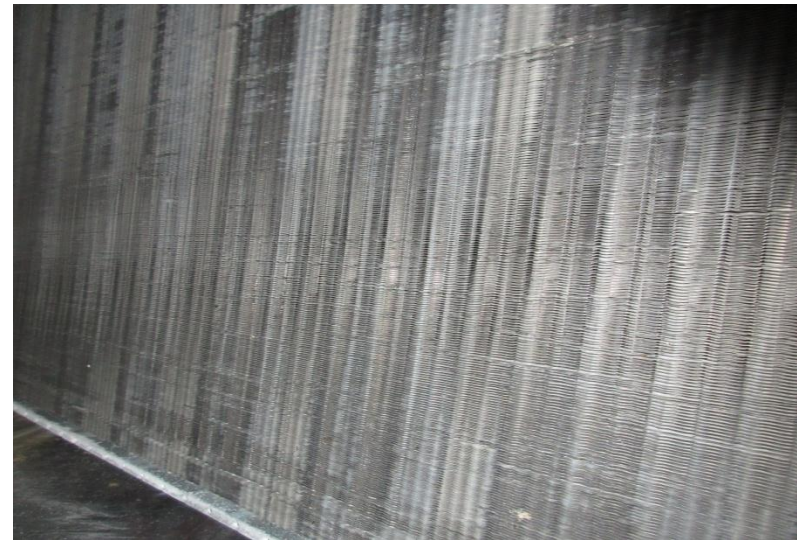
21) AHU-2 was assessed.



22) The blower wheel fin appears to be fair sanitary condition.



23) The upstream side of the coil appears to be in good sanitary condition.



24) The downstream side of the coil appears to be in good sanitary condition. Impactions are beginning to form on the fins.



Sarasota County Government

Venice Library

Report # 3929-19392

LABORATORY RESULTS



Laboratory Analysis Report Bacteria / Fungi Identified From Culture

Client : **Sarasota County Government**
 Jobsite : **Venice Public Library**
 Location : **300 Nokomis Ave S**

PACS ID # : **03929**
 Work Order # : **019392**
 Project Date : **12/23/2015**
 Date Issued : **1/5/2016**

Location of Test	Sample Information	Isolated Organisms																
Unit: N/A Zone: Book Store Testsite: N/A Run #: 1 Sample Type: Air	Field Sample #: 031 Lab Sample #: 134712 Sample Date: 12/23/2015 Sample Time: 21:20 Date Lab Rec'd.: 12/24/2015 Date Analyzed: 1/5/2016	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Identification</th> <th style="width: 10%;">Raw Count</th> <th style="width: 10%;">CFU/m³</th> <th style="width: 20%;">% of Total</th> </tr> </thead> <tbody> <tr> <td colspan="4">Bacteria</td> </tr> <tr> <td>Bacterial Colony</td> <td style="text-align: center;">4</td> <td style="text-align: center;">48</td> <td style="text-align: center;">66.7 %</td> </tr> <tr> <td>Total Bacteria</td> <td style="text-align: center;">4</td> <td style="text-align: center;">48</td> <td style="text-align: center;">66.7 %</td> </tr> </tbody> </table>	Identification	Raw Count	CFU/m ³	% of Total	Bacteria				Bacterial Colony	4	48	66.7 %	Total Bacteria	4	48	66.7 %
	Identification	Raw Count	CFU/m ³	% of Total														
	Bacteria																	
	Bacterial Colony	4	48	66.7 %														
	Total Bacteria	4	48	66.7 %														
	Field Sample #: 032 Lab Sample #: 134713 Sample Date: 12/23/2015 Sample Time: 21:25 Date Lab Rec'd.: 12/24/2015 Date Analyzed: 1/5/2016	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Identification</th> <th style="width: 10%;">Raw Count</th> <th style="width: 10%;">CFU/m³</th> <th style="width: 20%;">% of Total</th> </tr> </thead> <tbody> <tr> <td colspan="4">Fungi</td> </tr> <tr> <td>Fungal Colony</td> <td style="text-align: center;">2</td> <td style="text-align: center;">24</td> <td style="text-align: center;">33.3 %</td> </tr> <tr> <td>Total Fungi</td> <td style="text-align: center;">2</td> <td style="text-align: center;">24</td> <td style="text-align: center;">33.3 %</td> </tr> </tbody> </table>	Identification	Raw Count	CFU/m ³	% of Total	Fungi				Fungal Colony	2	24	33.3 %	Total Fungi	2	24	33.3 %
	Identification	Raw Count	CFU/m ³	% of Total														
	Fungi																	
	Fungal Colony	2	24	33.3 %														
	Total Fungi	2	24	33.3 %														
B:F Ratio : 2.00 : 1		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">Total Microorganisms :</td> <td style="width: 10%; text-align: center;">71</td> <td style="width: 10%;"></td> <td style="width: 20%; text-align: center;">100%</td> </tr> </table>	Total Microorganisms :	71		100%												
Total Microorganisms :	71		100%															
Unit: N/A Zone: Genealogy Area Testsite: N/A Run #: 1 Sample Type: Air	Field Sample #: 019 Lab Sample #: 134700 Sample Date: 12/23/2015 Sample Time: 19:40 Date Lab Rec'd.: 12/24/2015 Date Analyzed: 1/5/2016	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Identification</th> <th style="width: 10%;">Raw Count</th> <th style="width: 10%;">CFU/m³</th> <th style="width: 20%;">% of Total</th> </tr> </thead> <tbody> <tr> <td colspan="4">Bacteria</td> </tr> <tr> <td>Bacterial Colony</td> <td style="text-align: center;">1</td> <td style="text-align: center;">12</td> <td style="text-align: center;">25.0 %</td> </tr> <tr> <td>Total Bacteria</td> <td style="text-align: center;">1</td> <td style="text-align: center;">12</td> <td style="text-align: center;">25.0 %</td> </tr> </tbody> </table>	Identification	Raw Count	CFU/m ³	% of Total	Bacteria				Bacterial Colony	1	12	25.0 %	Total Bacteria	1	12	25.0 %
	Identification	Raw Count	CFU/m ³	% of Total														
	Bacteria																	
	Bacterial Colony	1	12	25.0 %														
	Total Bacteria	1	12	25.0 %														
	Field Sample #: 020 Lab Sample #: 134701 Sample Date: 12/23/2015 Sample Time: 19:50 Date Lab Rec'd.: 12/24/2015 Date Analyzed: 1/5/2016	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Identification</th> <th style="width: 10%;">Raw Count</th> <th style="width: 10%;">CFU/m³</th> <th style="width: 20%;">% of Total</th> </tr> </thead> <tbody> <tr> <td colspan="4">Fungi</td> </tr> <tr> <td>Fungal Colony</td> <td style="text-align: center;">3</td> <td style="text-align: center;">36</td> <td style="text-align: center;">75.0 %</td> </tr> <tr> <td>Total Fungi</td> <td style="text-align: center;">3</td> <td style="text-align: center;">36</td> <td style="text-align: center;">75.0 %</td> </tr> </tbody> </table>	Identification	Raw Count	CFU/m ³	% of Total	Fungi				Fungal Colony	3	36	75.0 %	Total Fungi	3	36	75.0 %
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	Fungi																	
	Fungal Colony	3	36	75.0 %														
	Total Fungi	3	36	75.0 %														
B:F Ratio : 00.33 : 1		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">Total Microorganisms :</td> <td style="width: 10%; text-align: center;">48</td> <td style="width: 10%;"></td> <td style="width: 20%; text-align: center;">100%</td> </tr> </table>	Total Microorganisms :	48		100%												
Total Microorganisms :	48		100%															

Method of Analysis: EDLAB SOP-7/04001

CFU/m³ = Colony Forming Units per cubic meter of air
 BDL = Below Detection Limit
 N/A = Not Applicable

The results in this report apply only to the sample(s) specifically listed above and tested at Environmental Diagnostics Laboratory. Unless otherwise noted, samples were received in good condition. Laboratory-prepared Quality Control (QC) samples are analyzed with the samples routinely; however, unless a blank (control) is received, the result for the control is not compared. Quantitative data is based on 3 significant figures; Grand Total may not equal 100% due to rounding.

Quality Controlled By :
 Approved By :
 Rajiv R. Sahay, Ph.D.



Laboratory Analysis Report Bacteria / Fungi Identified From Culture

Client : **Sarasota County Government**
 Jobsite : **Venice Public Library**
 Location : **300 Nokomis Ave S**

PACS ID # : **03929**
 Work Order # : **019392**
 Project Date : **12/23/2015**
 Date Issued : **1/5/2016**

Location of Test	Sample Information	Isolated Organisms																
Unit: N/A Zone: Information Area Testsite: N/A Run #: 1 Sample Type: Air	Field Sample #: 011 Lab Sample #: 134692 Sample Date: 12/23/2015 Sample Time: 4:40 Date Lab Rec'd.: 12/24/2015 Date Analyzed: 1/5/2016	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Identification</th> <th style="width: 10%;">Raw Count</th> <th style="width: 10%;">CFU/m³</th> <th style="width: 20%;">% of Total</th> </tr> </thead> <tbody> <tr> <td colspan="4">Bacteria</td> </tr> <tr> <td>Bacterial Colony</td> <td style="text-align: center;">3</td> <td style="text-align: center;">36</td> <td style="text-align: center;">60.0 %</td> </tr> <tr> <td>Total Bacteria</td> <td style="text-align: center;">3</td> <td style="text-align: center;">36</td> <td style="text-align: center;">60.0 %</td> </tr> </tbody> </table>	Identification	Raw Count	CFU/m ³	% of Total	Bacteria				Bacterial Colony	3	36	60.0 %	Total Bacteria	3	36	60.0 %
	Identification	Raw Count	CFU/m ³	% of Total														
	Bacteria																	
	Bacterial Colony	3	36	60.0 %														
	Total Bacteria	3	36	60.0 %														
	Field Sample #: 012 Lab Sample #: 134693 Sample Date: 12/23/2015 Sample Time: 18:50 Date Lab Rec'd.: 12/24/2015 Date Analyzed: 1/5/2016	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Identification</th> <th style="width: 10%;">Raw Count</th> <th style="width: 10%;">CFU/m³</th> <th style="width: 20%;">% of Total</th> </tr> </thead> <tbody> <tr> <td colspan="4">Fungi</td> </tr> <tr> <td>Fungal Colony</td> <td style="text-align: center;">2</td> <td style="text-align: center;">24</td> <td style="text-align: center;">40.0 %</td> </tr> <tr> <td>Total Fungi</td> <td style="text-align: center;">2</td> <td style="text-align: center;">24</td> <td style="text-align: center;">40.0 %</td> </tr> </tbody> </table>	Identification	Raw Count	CFU/m ³	% of Total	Fungi				Fungal Colony	2	24	40.0 %	Total Fungi	2	24	40.0 %
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B:F Ratio : 1.50 : 1		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">Total Microorganisms :</td> <td style="width: 10%; text-align: center;">60</td> <td style="width: 10%;"></td> <td style="width: 20%; text-align: center;">100%</td> </tr> </table>	Total Microorganisms :	60		100%												
Total Microorganisms :	60		100%															
Unit: N/A Zone: Larg Print Testsite: N/A Run #: 1 Sample Type: Air	Field Sample #: 007 Lab Sample #: 134688 Sample Date: 12/23/2015 Sample Time: 18:15 Date Lab Rec'd.: 12/24/2015 Date Analyzed: 1/5/2016	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Identification</th> <th style="width: 10%;">Raw Count</th> <th style="width: 10%;">CFU/m³</th> <th style="width: 20%;">% of Total</th> </tr> </thead> <tbody> <tr> <td colspan="4">Bacteria</td> </tr> <tr> <td>Bacterial Colony</td> <td style="text-align: center;">3</td> <td style="text-align: center;">36</td> <td style="text-align: center;">37.5 %</td> </tr> <tr> <td>Total Bacteria</td> <td style="text-align: center;">3</td> <td style="text-align: center;">36</td> <td style="text-align: center;">37.5 %</td> </tr> </tbody> </table>	Identification	Raw Count	CFU/m ³	% of Total	Bacteria				Bacterial Colony	3	36	37.5 %	Total Bacteria	3	36	37.5 %
	Identification	Raw Count	CFU/m ³	% of Total														
	Bacteria																	
	Bacterial Colony	3	36	37.5 %														
	Total Bacteria	3	36	37.5 %														
	Field Sample #: 008 Lab Sample #: 134689 Sample Date: 12/23/2015 Sample Time: 18:20 Date Lab Rec'd.: 12/24/2015 Date Analyzed: 1/5/2016	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Identification</th> <th style="width: 10%;">Raw Count</th> <th style="width: 10%;">CFU/m³</th> <th style="width: 20%;">% of Total</th> </tr> </thead> <tbody> <tr> <td colspan="4">Fungi</td> </tr> <tr> <td>Fungal Colony</td> <td style="text-align: center;">5</td> <td style="text-align: center;">60</td> <td style="text-align: center;">62.5 %</td> </tr> <tr> <td>Total Fungi</td> <td style="text-align: center;">5</td> <td style="text-align: center;">60</td> <td style="text-align: center;">62.5 %</td> </tr> </tbody> </table>	Identification	Raw Count	CFU/m ³	% of Total	Fungi				Fungal Colony	5	60	62.5 %	Total Fungi	5	60	62.5 %
	Identification	Raw Count	CFU/m ³	% of Total														
	Fungi																	
	Fungal Colony	5	60	62.5 %														
	Total Fungi	5	60	62.5 %														
B:F Ratio : 00.60 : 1		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">Total Microorganisms :</td> <td style="width: 10%; text-align: center;">95</td> <td style="width: 10%;"></td> <td style="width: 20%; text-align: center;">100%</td> </tr> </table>	Total Microorganisms :	95		100%												
Total Microorganisms :	95		100%															

Method of Analysis: EDLAB SOP-7/04001

CFU/m³ = Colony Forming Units per cubic meter of air
 BDL = Below Detection Limit
 N/A = Not Applicable

The results in this report apply only to the sample(s) specifically listed above and tested at Environmental Diagnostics Laboratory. Unless otherwise noted, samples were received in good condition. Laboratory-prepared Quality Control (QC) samples are analyzed with the samples routinely; however, unless a blank (control) is received, the result for the control is not compared. Quantitative data is based on 3 significant figures; Grand Total may not equal 100% due to rounding.

Quality Controlled By :
 Approved By :
 Rajiv R. Sahay, Ph.D.



Laboratory Analysis Report Bacteria / Fungi Identified From Culture

Client : **Sarasota County Government**
 Jobsite : **Venice Public Library**
 Location : **300 Nokomis Ave S**

PACS ID # : **03929**
 Work Order # : **019392**
 Project Date : **12/23/2015**
 Date Issued : **1/5/2016**

Location of Test	Sample Information	Isolated Organisms																
Unit: N/A Zone: Lobby Testsite: N/A Run #: 1 Sample Type: Air	Field Sample #: 035 Lab Sample #: 134716 Sample Date: 12/23/2015 Sample Time: 21:40 Date Lab Rec'd.: 12/24/2015 Date Analyzed: 1/5/2016	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Identification</th> <th style="width: 10%;">Raw Count</th> <th style="width: 10%;">CFU/m³</th> <th style="width: 20%;">% of Total</th> </tr> </thead> <tbody> <tr> <td colspan="4">Bacteria</td> </tr> <tr> <td>Bacterial Colony</td> <td style="text-align: center;">6</td> <td style="text-align: center;">71</td> <td style="text-align: center;">66.7 %</td> </tr> <tr> <td>Total Bacteria</td> <td style="text-align: center;">6</td> <td style="text-align: center;">71</td> <td style="text-align: center;">66.7 %</td> </tr> </tbody> </table>	Identification	Raw Count	CFU/m ³	% of Total	Bacteria				Bacterial Colony	6	71	66.7 %	Total Bacteria	6	71	66.7 %
	Identification	Raw Count	CFU/m ³	% of Total														
	Bacteria																	
	Bacterial Colony	6	71	66.7 %														
	Total Bacteria	6	71	66.7 %														
	Field Sample #: 036 Lab Sample #: 134717 Sample Date: 12/23/2015 Sample Time: 21:50 Date Lab Rec'd.: 12/24/2015 Date Analyzed: 1/5/2016	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Identification</th> <th style="width: 10%;">Raw Count</th> <th style="width: 10%;">CFU/m³</th> <th style="width: 20%;">% of Total</th> </tr> </thead> <tbody> <tr> <td colspan="4">Fungi</td> </tr> <tr> <td>Fungal Colony</td> <td style="text-align: center;">3</td> <td style="text-align: center;">36</td> <td style="text-align: center;">33.3 %</td> </tr> <tr> <td>Total Fungi</td> <td style="text-align: center;">3</td> <td style="text-align: center;">36</td> <td style="text-align: center;">33.3 %</td> </tr> </tbody> </table>	Identification	Raw Count	CFU/m ³	% of Total	Fungi				Fungal Colony	3	36	33.3 %	Total Fungi	3	36	33.3 %
	Identification	Raw Count	CFU/m ³	% of Total														
	Fungi																	
	Fungal Colony	3	36	33.3 %														
	Total Fungi	3	36	33.3 %														
B:F Ratio : 2.00 : 1		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">Total Microorganisms :</td> <td style="width: 10%; text-align: center;">107</td> <td style="width: 10%;"></td> <td style="width: 20%; text-align: center;">100%</td> </tr> </table>	Total Microorganisms :	107		100%												
Total Microorganisms :	107		100%															
Unit: N/A Zone: Meeting Room Testsite: N/A Run #: 1 Sample Type: Air	Field Sample #: 039 Lab Sample #: 134720 Sample Date: 12/23/2015 Sample Time: 22:20 Date Lab Rec'd.: 12/24/2015 Date Analyzed: 1/5/2016	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Identification</th> <th style="width: 10%;">Raw Count</th> <th style="width: 10%;">CFU/m³</th> <th style="width: 20%;">% of Total</th> </tr> </thead> <tbody> <tr> <td colspan="4">Bacteria</td> </tr> <tr> <td>Bacterial Colony</td> <td style="text-align: center;">2</td> <td style="text-align: center;">24</td> <td style="text-align: center;">100 %</td> </tr> <tr> <td>Total Bacteria</td> <td style="text-align: center;">2</td> <td style="text-align: center;">24</td> <td style="text-align: center;">100 %</td> </tr> </tbody> </table>	Identification	Raw Count	CFU/m ³	% of Total	Bacteria				Bacterial Colony	2	24	100 %	Total Bacteria	2	24	100 %
	Identification	Raw Count	CFU/m ³	% of Total														
	Bacteria																	
	Bacterial Colony	2	24	100 %														
	Total Bacteria	2	24	100 %														
	Field Sample #: 040 Lab Sample #: 134721 Sample Date: 12/23/2015 Sample Time: 22:25 Date Lab Rec'd.: 12/24/2015 Date Analyzed: 1/5/2016	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Identification</th> <th style="width: 10%;">Raw Count</th> <th style="width: 10%;">CFU/m³</th> <th style="width: 20%;">% of Total</th> </tr> </thead> <tbody> <tr> <td colspan="4">Fungi</td> </tr> <tr> <td>Total Fungi</td> <td style="text-align: center;">BDL</td> <td style="text-align: center;">BDL</td> <td style="text-align: center;">-</td> </tr> </tbody> </table>	Identification	Raw Count	CFU/m ³	% of Total	Fungi				Total Fungi	BDL	BDL	-				
	Identification	Raw Count	CFU/m ³	% of Total														
	Fungi																	
	Total Fungi	BDL	BDL	-														
	Detection Limit* : 12 CFU/m ³ (Flow rate: 28.00 lpm, Exposure Time: 3 minutes) *Detection limits may vary with flow rate, exposure time and the type of impactor.																	
B:F Ratio : N/A		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">Total Microorganisms :</td> <td style="width: 10%; text-align: center;">24</td> <td style="width: 10%;"></td> <td style="width: 20%; text-align: center;">100%</td> </tr> </table>	Total Microorganisms :	24		100%												
Total Microorganisms :	24		100%															

Method of Analysis: EDLAB SOP-7/04001

CFU/m³ = Colony Forming Units per cubic meter of air
 BDL = Below Detection Limit
 N/A = Not Applicable

The results in this report apply only to the sample(s) specifically listed above and tested at Environmental Diagnostics Laboratory. Unless otherwise noted, samples were received in good condition. Laboratory-prepared Quality Control (QC) samples are analyzed with the samples routinely; however, unless a blank (control) is received, the result for the control is not compared. Quantitative data is based on 3 significant figures; Grand Total may not equal 100% due to rounding.

Quality Controlled By :
 Approved By :
 Rajiv R. Sahay, Ph.D.



Laboratory Analysis Report Bacteria / Fungi Identified From Culture

Client : **Sarasota County Government**
 Jobsite : **Venice Public Library**
 Location : **300 Nokomis Ave S**

PACS ID # : **03929**
 Work Order # : **019392**
 Project Date : **12/23/2015**
 Date Issued : **1/5/2016**

Location of Test	Sample Information	Isolated Organisms																
Unit: N/A Zone: Outside Testsite: N/A Run #: 1 Sample Type: Air	Field Sample #: 042 Lab Sample #: 134723 Sample Date: 12/23/2015 Sample Time: 23:40 Date Lab Rec'd.: 12/24/2015 Date Analyzed: 1/5/2016	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Identification</th> <th style="width: 10%;">Raw Count</th> <th style="width: 10%;">CFU/m³</th> <th style="width: 20%;">% of Total</th> </tr> </thead> <tbody> <tr> <td colspan="4">Bacteria</td> </tr> <tr> <td>Bacterial Colony</td> <td style="text-align: center;">12</td> <td style="text-align: center;">143</td> <td style="text-align: center;">18.5 %</td> </tr> <tr> <td>Total Bacteria</td> <td style="text-align: center;">12</td> <td style="text-align: center;">143</td> <td style="text-align: center;">18.5 %</td> </tr> </tbody> </table>	Identification	Raw Count	CFU/m ³	% of Total	Bacteria				Bacterial Colony	12	143	18.5 %	Total Bacteria	12	143	18.5 %
	Identification	Raw Count	CFU/m ³	% of Total														
	Bacteria																	
	Bacterial Colony	12	143	18.5 %														
	Total Bacteria	12	143	18.5 %														
	Field Sample #: 043 Lab Sample #: 134724 Sample Date: 12/23/2015 Sample Time: 23:50 Date Lab Rec'd.: 12/24/2015 Date Analyzed: 1/5/2016	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Identification</th> <th style="width: 10%;">Raw Count</th> <th style="width: 10%;">CFU/m³</th> <th style="width: 20%;">% of Total</th> </tr> </thead> <tbody> <tr> <td colspan="4">Fungi</td> </tr> <tr> <td>Fungal Colony</td> <td style="text-align: center;">53</td> <td style="text-align: center;">631</td> <td style="text-align: center;">81.5 %</td> </tr> <tr> <td>Total Fungi</td> <td style="text-align: center;">53</td> <td style="text-align: center;">631</td> <td style="text-align: center;">81.5 %</td> </tr> </tbody> </table>	Identification	Raw Count	CFU/m ³	% of Total	Fungi				Fungal Colony	53	631	81.5 %	Total Fungi	53	631	81.5 %
	Identification	Raw Count	CFU/m ³	% of Total														
	Fungi																	
	Fungal Colony	53	631	81.5 %														
	Total Fungi	53	631	81.5 %														
B:F Ratio : 00.23 : 1		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">Total Microorganisms :</td> <td style="width: 10%; text-align: center;">774</td> <td style="width: 10%;"></td> <td style="width: 20%; text-align: center;">100%</td> </tr> </table>	Total Microorganisms :	774		100%												
Total Microorganisms :	774		100%															
Unit: N/A Zone: Reading Area Testsite: N/A Run #: 1 Sample Type: Air	Field Sample #: 015 Lab Sample #: 134696 Sample Date: 12/23/2015 Sample Time: 19:10 Date Lab Rec'd.: 12/24/2015 Date Analyzed: 1/5/2016	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Identification</th> <th style="width: 10%;">Raw Count</th> <th style="width: 10%;">CFU/m³</th> <th style="width: 20%;">% of Total</th> </tr> </thead> <tbody> <tr> <td colspan="4">Bacteria</td> </tr> <tr> <td>Bacterial Colony</td> <td style="text-align: center;">8</td> <td style="text-align: center;">95</td> <td style="text-align: center;">100 %</td> </tr> <tr> <td>Total Bacteria</td> <td style="text-align: center;">8</td> <td style="text-align: center;">95</td> <td style="text-align: center;">100 %</td> </tr> </tbody> </table>	Identification	Raw Count	CFU/m ³	% of Total	Bacteria				Bacterial Colony	8	95	100 %	Total Bacteria	8	95	100 %
	Identification	Raw Count	CFU/m ³	% of Total														
	Bacteria																	
	Bacterial Colony	8	95	100 %														
	Total Bacteria	8	95	100 %														
	Field Sample #: 016 Lab Sample #: 134697 Sample Date: 12/23/2015 Sample Time: 19:20 Date Lab Rec'd.: 12/24/2015 Date Analyzed: 1/5/2016	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Identification</th> <th style="width: 10%;">Raw Count</th> <th style="width: 10%;">CFU/m³</th> <th style="width: 20%;">% of Total</th> </tr> </thead> <tbody> <tr> <td colspan="4">Fungi</td> </tr> <tr> <td>Total Fungi</td> <td style="text-align: center;">BDL</td> <td style="text-align: center;">BDL</td> <td style="text-align: center;">-</td> </tr> </tbody> </table>	Identification	Raw Count	CFU/m ³	% of Total	Fungi				Total Fungi	BDL	BDL	-				
	Identification	Raw Count	CFU/m ³	% of Total														
	Fungi																	
	Total Fungi	BDL	BDL	-														
	Detection Limit* : 12 CFU/m ³ (Flow rate: 28.00 lpm, Exposure Time: 3 minutes) *Detection limits may vary with flow rate, exposure time and the type of impactor.																	
B:F Ratio : N/A		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">Total Microorganisms :</td> <td style="width: 10%; text-align: center;">95</td> <td style="width: 10%;"></td> <td style="width: 20%; text-align: center;">100%</td> </tr> </table>	Total Microorganisms :	95		100%												
Total Microorganisms :	95		100%															

Method of Analysis: EDLAB SOP-7/04001

CFU/m³ = Colony Forming Units per cubic meter of air
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Quality Controlled By :
 Approved By :
 Rajiv R. Sahay, Ph.D.



Laboratory Analysis Report Bacteria / Fungi Identified From Culture

Client : **Sarasota County Government**
 Jobsite : **Venice Public Library**
 Location : **300 Nokomis Ave S**

PACS ID # : **03929**
 Work Order # : **019392**
 Project Date : **12/23/2015**
 Date Issued : **1/5/2016**

Location of Test	Sample Information	Isolated Organisms																
Unit: N/A Zone: Teen & youth Wing Testsite: N/A Run #: 1 Sample Type: Air	Field Sample #: 027 Lab Sample #: 134708 Sample Date: 12/23/2015 Sample Time: 20:45 Date Lab Rec'd.: 12/24/2015 Date Analyzed: 1/5/2016	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Identification</th> <th style="width: 10%;">Raw Count</th> <th style="width: 10%;">CFU/m³</th> <th style="width: 20%;">% of Total</th> </tr> </thead> <tbody> <tr> <td colspan="4">Bacteria</td> </tr> <tr> <td>Bacterial Colony</td> <td style="text-align: center;">7</td> <td style="text-align: center;">83</td> <td style="text-align: center;">70.0 %</td> </tr> <tr> <td>Total Bacteria</td> <td style="text-align: center;">7</td> <td style="text-align: center;">83</td> <td style="text-align: center;">70.0 %</td> </tr> </tbody> </table>	Identification	Raw Count	CFU/m ³	% of Total	Bacteria				Bacterial Colony	7	83	70.0 %	Total Bacteria	7	83	70.0 %
	Identification	Raw Count	CFU/m ³	% of Total														
	Bacteria																	
	Bacterial Colony	7	83	70.0 %														
	Total Bacteria	7	83	70.0 %														
	Field Sample #: 028 Lab Sample #: 134709 Sample Date: 12/23/2015 Sample Time: 20:55 Date Lab Rec'd.: 12/24/2015 Date Analyzed: 1/5/2016	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Identification</th> <th style="width: 10%;">Raw Count</th> <th style="width: 10%;">CFU/m³</th> <th style="width: 20%;">% of Total</th> </tr> </thead> <tbody> <tr> <td colspan="4">Fungi</td> </tr> <tr> <td>Fungal Colony</td> <td style="text-align: center;">3</td> <td style="text-align: center;">36</td> <td style="text-align: center;">30.0 %</td> </tr> <tr> <td>Total Fungi</td> <td style="text-align: center;">3</td> <td style="text-align: center;">36</td> <td style="text-align: center;">30.0 %</td> </tr> </tbody> </table>	Identification	Raw Count	CFU/m ³	% of Total	Fungi				Fungal Colony	3	36	30.0 %	Total Fungi	3	36	30.0 %
	Identification	Raw Count	CFU/m ³	% of Total														
	Fungi																	
	Fungal Colony	3	36	30.0 %														
	Total Fungi	3	36	30.0 %														
B:F Ratio : 2.33 : 1		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">Total Microorganisms :</td> <td style="width: 10%; text-align: center;">119</td> <td style="width: 10%;"></td> <td style="width: 20%; text-align: center;">100%</td> </tr> </table>	Total Microorganisms :	119		100%												
Total Microorganisms :	119		100%															
Unit: N/A Zone: Workroom Area Testsite: N/A Run #: 1 Sample Type: Air	Field Sample #: 003 Lab Sample #: 134684 Sample Date: 12/23/2015 Sample Time: 17:55 Date Lab Rec'd.: 12/24/2015 Date Analyzed: 1/5/2016	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Identification</th> <th style="width: 10%;">Raw Count</th> <th style="width: 10%;">CFU/m³</th> <th style="width: 20%;">% of Total</th> </tr> </thead> <tbody> <tr> <td colspan="4">Bacteria</td> </tr> <tr> <td>Bacterial Colony</td> <td style="text-align: center;">1</td> <td style="text-align: center;">12</td> <td style="text-align: center;">33.3 %</td> </tr> <tr> <td>Total Bacteria</td> <td style="text-align: center;">1</td> <td style="text-align: center;">12</td> <td style="text-align: center;">33.3 %</td> </tr> </tbody> </table>	Identification	Raw Count	CFU/m ³	% of Total	Bacteria				Bacterial Colony	1	12	33.3 %	Total Bacteria	1	12	33.3 %
	Identification	Raw Count	CFU/m ³	% of Total														
	Bacteria																	
	Bacterial Colony	1	12	33.3 %														
	Total Bacteria	1	12	33.3 %														
	Field Sample #: 004 Lab Sample #: 134685 Sample Date: 12/23/2015 Sample Time: 18:00 Date Lab Rec'd.: 12/24/2015 Date Analyzed: 1/5/2016	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Identification</th> <th style="width: 10%;">Raw Count</th> <th style="width: 10%;">CFU/m³</th> <th style="width: 20%;">% of Total</th> </tr> </thead> <tbody> <tr> <td colspan="4">Fungi</td> </tr> <tr> <td>Fungal Colony</td> <td style="text-align: center;">2</td> <td style="text-align: center;">24</td> <td style="text-align: center;">66.7 %</td> </tr> <tr> <td>Total Fungi</td> <td style="text-align: center;">2</td> <td style="text-align: center;">24</td> <td style="text-align: center;">66.7 %</td> </tr> </tbody> </table>	Identification	Raw Count	CFU/m ³	% of Total	Fungi				Fungal Colony	2	24	66.7 %	Total Fungi	2	24	66.7 %
	Identification	Raw Count	CFU/m ³	% of Total														
	Fungi																	
	Fungal Colony	2	24	66.7 %														
	Total Fungi	2	24	66.7 %														
B:F Ratio : N/A		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">Total Microorganisms :</td> <td style="width: 10%; text-align: center;">36</td> <td style="width: 10%;"></td> <td style="width: 20%; text-align: center;">100%</td> </tr> </table>	Total Microorganisms :	36		100%												
Total Microorganisms :	36		100%															

Method of Analysis: EDLAB SOP-7/04001

CFU/m³ = Colony Forming Units per cubic meter of air
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Laboratory Analysis Report Bacteria / Fungi Identified From Culture

Client : **Sarasota County Government**
 Jobsite : **Venice Public Library**
 Location : **300 Nokomis Ave S**

PACS ID # : **03929**
 Work Order # : **019392**
 Project Date : **12/23/2015**
 Date Issued : **1/5/2016**

Location of Test	Sample Information	Isolated Organisms				
		Identification	Raw Count	CFU/m ³	% of Total	
Unit: N/A Zone: Youth Program Room Testsite: N/A Run #: 1 Sample Type: Air	Field Sample #: 023	Bacteria				
	Lab Sample #: 134704	Bacterial Colony	3	36	37.5 %	
	Sample Date: 12/23/2015	Total Bacteria	3	36	37.5 %	
	Sample Time: 20:05					
	Date Lab Rec'd.: 12/24/2015					
	Date Analyzed: 1/5/2016					
	Field Sample #: 024	Fungi				
	Lab Sample #: 134705	Fungal Colony	5	60	62.5 %	
	Sample Date: 12/23/2015	Total Fungi	5	60	62.5 %	
	Sample Time: 20:15					
	Date Lab Rec'd.: 12/24/2015					
	Date Analyzed: 1/5/2016					
	B:F Ratio :	00.60 : 1	Total Microorganisms :	95	100%	

Method of Analysis: EDLAB SOP-7/04001

CFU/m³ = Colony Forming Units per cubic meter of air
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 N/A = Not Applicable

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Quality Controlled By :
 Approved By :
Rajiv R. Sahay, Ph.D.

Bacteria Identified from Environmental Specimens

Client : **Sarasota County Government**

Jobsite : **Venice Public Library**

PACS ID # : **03929**

Work Order # : **019392**

Bacterial Colony

Bacteria recovered from the environmental specimen (Air/Water/Bulk) on synthetic growth media under laboratory conditions have been referred to as a bacterial colony. They come in various shapes, sizes and colors. No further identification has been made. However, some common shapes are rod (bacillus), spherical (coccus), helix (spirilla), etc. Bacteria play a significant role in the ecosystem. Some of the bacteria are beneficial to us like streptomyces, etc., which yield life saving medicines and powerful antibiotics. Several others can convert gaseous nitrogen from the atmosphere into usable nitrogen which can be absorbed by plants to manufacture protein and nucleic acids. Still some others are important for food industries. Bacteria are also responsible for causing plant and animal diseases. Some bacteria can produce exotoxins and/or endotoxins which affect our health in adverse. Bacterial toxin formation is highly influenced by their growth pattern beside environmental factors.

A number of factors are responsible for the growth of bacteria in indoor sites. It is essential to take prompt action to prevent/remediate contaminated materials from bacteria in order to maintain a clean and healthy environment.

Fungi Identified from Environmental Specimens

Client : **Sarasota County Government**
Jobsite : **Venice Public Library**

PACS ID # : **03929**
Work Order # : **019392**

Fungal Colony

Fungi recovered from the environmental specimen (air/water/surface/bulk etc.) on synthetic growth media under the laboratory condition have been referred as Fungal Colony. Fungi as a group are a very large and very diverse assemblage of organisms. There are 72,065 species of fungi acknowledged in the latest edition of the dictionary of Fungi 8th Ed., with perhaps as many as one million species, which have not yet been described in the scientific literature (Hawkesworth 1995).

Fungi include some of the most important organisms both in terms of their ecological and economic roles. Some of the Fungi are responsible for breaking down dead organic materials to continue the cycle of nutrients through the eco-system. Other fungi provide numerous drugs such as penicillin and other antibiotics, foods like mushrooms, used in fermentation etc. Some fungi are responsible for causing a number of plant and animal diseases besides mold problems. Fungi in buildings may cause or initiate symptoms of allergies (such as wheezing, chest tightness, shortness of breath, nasal congestion and eye irritation etc.). They are also capable of producing a group of toxic substance identified as "mycotoxins." Mycotoxins may be responsible for causing building-related illness beside several other health problems.

It is essential to take prompt action to prevent/remediate the contaminated materials fungi/mold in order to maintain the clean and healthy environment.



Laboratory Analysis Report

Aerobiology

Spore Trap Assay

Client : **Sarasota County Government**
 Jobsite : **Venice Public Library**
 Location : **300 Nokomis Ave S**

PACS ID# : **03929**
 Work Order # : **019392**
 Project Date : **12/23/2015**

Unit : N/A	Lab Sample# : 134686	Date Lab. Rec'd. : 12/24/2015
Zone : Workroom Area	Field Sample# : 5	Date Analyzed : 1/4/2016
Test Site : N/A	Sample Date : 12/23/2015	Date Issued : 1/5/2016
Diagnostic Tech : LAB	Sample Time : 6:00 PM	Sample Serial # : 22129388
Sample Type : Microscopic Particle Assay (SporeTrap)		Sampling Device: AirOCell

<u>Particle Identification</u>	<u>Raw Count</u>	<u>Total Count (Cts/m³)</u>	<u>Percent of Total Count</u>
Opaque Particles	104	17500	43.4 %
Skin Cell Fragments	10	222	0.551 %
Insect Biodetritus	BDL	BDL	N/A
Total Fibers	BDL	BDL	N/A
Total Pollen	BDL	BDL	N/A
Total Fungal Elements/Spores	BDL	BDL	N/A
Total "Other"	112	22600	56.1 %
Black Particles	112	22600	56.1 %
Total Counts:	226	40,300	99.9 %

Comments :

Method of Analysis: EDLAB SOP-7/05001

Detection Limits* : 22 Cts/m³ (Flow rate: 15.00 lpm, Exposure Time: 3.00 minutes, with 45 traverses under 400x Magnification)

*Detection limits may vary with flow rate, exposure time and microscopic fields observed for particle count at a defined magnification.

BDL = Below Detection Limits **N/A** = Not Applicable

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Quality Controlled By :

Approved By :
Rajiv R. Sahay, Ph.D.



Laboratory Analysis Report

Aerobiology

Spore Trap Assay

Client : **Sarasota County Government**
 Jobsite : **Venice Public Library**
 Location : **300 Nokomis Ave S**

PACS ID# : **03929**
 Work Order # : **019392**
 Project Date : **12/23/2015**

Unit : N/A	Lab Sample# : 134690	Date Lab. Rec'd. : 12/24/2015
Zone : Larg Print	Field Sample# : 9	Date Analyzed : 1/4/2016
Test Site : N/A	Sample Date : 12/23/2015	Date Issued : 1/5/2016
Diagnostic Tech : LAB	Sample Time : 6:20 PM	Sample Serial # : 22229412
SampleType : Microscopic Particle Assay (SporeTrap)		Sampling Device: AirOCell

<u>Particle Identification</u>	<u>Raw Count</u>	<u>Total Count (Cts/m³)</u>	<u>Percent of Total Count</u>
Opaque Particles	153	51400	49.9 %
Skin Cell Fragments	80	1780	1.73 %
Insect Biodetritus	BDL	BDL	N/A
Total Fibers	BDL	BDL	N/A
 Total Pollen	 BDL	 BDL	 N/A
 Total Fungal Elements/Spores	 5	 110	 0.107 %
Dematiaceous Fungal Spore Elements	2	44	0.0427 %
Fungal Spore Elements	2	44	0.0427 %
Helminthosporium species	1	22	0.0214 %
 Total "Other"	 149	 50000	 48.5 %
Black Particles	149	50000	48.5 %
 Total Counts:	 387	 103,000	 99.7 %

Comments :

Method of Analysis: EDLAB SOP-7/05001

Detection Limits* : 22 Cts/m³ (Flow rate: 15.00 lpm, Exposure Time: 3.00 minutes, with 45 traverses under 400x Magnification)

*Detection limits may vary with flow rate, exposure time and microscopic fields observed for particle count at a defined magnification.

BDL = Below Detection Limits **N/A** = Not Applicable

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Quality Controlled By :

Approved By :
Rajiv R. Sahay, Ph.D.



Laboratory Analysis Report

Aerobiology

Spore Trap Assay

Client : **Sarasota County Government**
 Jobsite : **Venice Public Library**
 Location : **300 Nokomis Ave S**

PACS ID# : **03929**
 Work Order # : **019392**
 Project Date : **12/23/2015**

Unit : N/A	Lab Sample# : 134694	Date Lab. Rec'd. : 12/24/2015
Zone : Information Area	Field Sample# : 13	Date Analyzed : 1/4/2016
Test Site : N/A	Sample Date : 12/23/2015	Date Issued : 1/5/2016
Diagnostic Tech : LAB	Sample Time : 6:50 PM	Sample Serial # : 22129404
SampleType : Microscopic Particle Assay (SporeTrap)		Sampling Device: AirOCell

<u>Particle Identification</u>	<u>Raw Count</u>	<u>Total Count (Cts/m³)</u>	<u>Percent of Total Count</u>
Opaque Particles	110	6520	43.8 %
Skin Cell Fragments	18	400	2.68 %
Insect Biodetritus	BDL	BDL	N/A
Total Fibers	BDL	BDL	N/A
 Total Pollen	 BDL	 BDL	 N/A
 Total Fungal Elements/Spores	 3	 66	 0.443 %
Fungal Spore Elements	2	44	0.295 %
Dematiaceous Fungal Spore Elements	1	22	0.148 %
 Total "Other"	 102	 7900	 53.0 %
Black Particles	102	7900	53.0 %
 Total Counts:	 233	 14,900	 100 %

Comments :

Method of Analysis: EDLAB SOP-7/05001

Detection Limits* : 22 Cts/m³ (Flow rate: 15.00 lpm, Exposure Time: 3.00 minutes, with 45 traverses under 400x Magnification)

*Detection limits may vary with flow rate, exposure time and microscopic fields observed for particle count at a defined magnification.

BDL = Below Detection Limits **N/A** = Not Applicable

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Quality Controlled By :

Approved By :
Rajiv R. Sahay, Ph.D.



Laboratory Analysis Report

Aerobiology

Spore Trap Assay

Client : **Sarasota County Government**
 Jobsite : **Venice Public Library**
 Location : **300 Nokomis Ave S**

PACS ID# : **03929**
 Work Order # : **019392**
 Project Date : **12/23/2015**

Unit : N/A	Lab Sample# : 134698	Date Lab. Rec'd. : 12/24/2015
Zone : Reading Area	Field Sample# : 17	Date Analyzed : 1/4/2016
Test Site : N/A	Sample Date : 12/23/2015	Date Issued : 1/5/2016
Diagnostic Tech : LAB	Sample Time : 7:20 PM	Sample Serial # : 22129373
SampleType : Microscopic Particle Assay (SporeTrap)		Sampling Device: AirOCell

<u>Particle Identification</u>	<u>Raw Count</u>	<u>Total Count (Cts/m³)</u>	<u>Percent of Total Count</u>
Opaque Particles	48	1070	92.2 %
Skin Cell Fragments	3	66	5.69 %
Insect Biodetritus	BDL	BDL	N/A
Total Fibers	BDL	BDL	N/A
 Total Pollen	 BDL	 BDL	 N/A
 Total Fungal Elements/Spores	 1	 22	 1.90 %
Cladosporium species	1	22	1.90 %
 Total Counts:	 52	 1,160	 100 %

Comments :


Method of Analysis: EDLAB SOP-7/05001

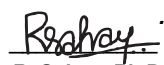
Detection Limits* : 22 Cts/m³ (Flow rate: 15.00 lpm, Exposure Time: 3.00 minutes, with 45 traverses under 400x Magnification)

*Detection limits may vary with flow rate, exposure time and microscopic fields observed for particle count at a defined magnification.

BDL = Below Detection Limits **N/A** = Not Applicable

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Quality Controlled By : 

Approved By : 
Rajiv R. Sahay, Ph.D.



Laboratory Analysis Report

Aerobiology

Spore Trap Assay

Client : **Sarasota County Government**
 Jobsite : **Venice Public Library**
 Location : **300 Nokomis Ave S**

PACS ID# : **03929**
 Work Order # : **019392**
 Project Date : **12/23/2015**

Unit : N/A	Lab Sample# : 134702	Date Lab. Rec'd. : 12/24/2015
Zone : Genealogy Area	Field Sample# : 21	Date Analyzed : 1/4/2016
Test Site : N/A	Sample Date : 12/23/2015	Date Issued : 1/5/2016
Diagnostic Tech : LAB	Sample Time : 7:50 PM	Sample Serial # : 22129413
SampleType : Microscopic Particle Assay (SporeTrap)		Sampling Device: AirOCell

<u>Particle Identification</u>	<u>Raw Count</u>	<u>Total Count (Cts/m³)</u>	<u>Percent of Total Count</u>
Opaque Particles	126	7930	51.8 %
Skin Cell Fragments	41	911	5.95 %
Insect Biodetritus	BDL	BDL	N/A
Total Fibers	1	22	0.144 %
Manmade Fibers	1	22	0.144 %
Total Pollen	BDL	BDL	N/A
Total Fungal Elements/Spores	BDL	BDL	N/A
Total "Other"	108	6400	41.8 %
Black Particles	108	6400	41.8 %
Total Counts:	276	15,300	100 %

Comments :

Method of Analysis: EDLAB SOP-7/05001

Detection Limits* : 22 Cts/m³ (Flow rate: 15.00 lpm, Exposure Time: 3.00 minutes, with 45 traverses under 400x Magnification)

*Detection limits may vary with flow rate, exposure time and microscopic fields observed for particle count at a defined magnification.

BDL = Below Detection Limits **N/A** = Not Applicable

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Quality Controlled By :

Approved By :
Rajiv R. Sahay, Ph.D.



Laboratory Analysis Report

Aerobiology

Spore Trap Assay

Client : **Sarasota County Government**
 Jobsite : **Venice Public Library**
 Location : **300 Nokomis Ave S**

PACS ID# : **03929**
 Work Order # : **019392**
 Project Date : **12/23/2015**

Unit : N/A	Lab Sample# : 134706	Date Lab. Rec'd. : 12/24/2015
Zone : Youth Program Room	Field Sample# : 25	Date Analyzed : 1/4/2016
Test Site : N/A	Sample Date : 12/23/2015	Date Issued : 1/5/2016
Diagnostic Tech : LAB	Sample Time : 8:15 PM	Sample Serial # : 22129411
SampleType : Microscopic Particle Assay (SporeTrap)		Sampling Device: AirOCell

<u>Particle Identification</u>	<u>Raw Count</u>	<u>Total Count (Cts/m³)</u>	<u>Percent of Total Count</u>
Opaque Particles	113	22800	77.6 %
Skin Cell Fragments	47	1040	3.54 %
Insect Biodetritus	BDL	BDL	N/A
Total Fibers	1	22	0.0748 %
Fiberglass	1	22	0.0748 %
Total Pollen	BDL	BDL	N/A
Total Fungal Elements/Spores	BDL	BDL	N/A
Total "Other"	116	5560	18.9 %
Black Particles	116	5560	18.9 %
Total Counts:	277	29,400	99.9 %

Comments :

Method of Analysis: EDLAB SOP-7/05001

Detection Limits* : 22 Cts/m³ (Flow rate: 15.00 lpm, Exposure Time: 3.00 minutes, with 45 traverses under 400x Magnification)

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Quality Controlled By :

Approved By :
Rajiv R. Sahay, Ph.D.



Laboratory Analysis Report

Aerobiology

Spore Trap Assay

Client : **Sarasota County Government**
 Jobsite : **Venice Public Library**
 Location : **300 Nokomis Ave S**

PACS ID# : **03929**
 Work Order # : **019392**
 Project Date : **12/23/2015**

Unit : N/A	Lab Sample# : 134710	Date Lab. Rec'd. : 12/24/2015
Zone : Teen & youth Wing	Field Sample# : 29	Date Analyzed : 1/4/2016
Test Site : N/A	Sample Date : 12/23/2015	Date Issued : 1/5/2016
Diagnostic Tech : LAB	Sample Time : 8:55 PM	Sample Serial # : 22129381
SampleType : Microscopic Particle Assay (SporeTrap)		Sampling Device: AirOCell

<u>Particle Identification</u>	<u>Raw Count</u>	<u>Total Count (Cts/m³)</u>	<u>Percent of Total Count</u>
Opaque Particles	128	10700	56.0 %
Skin Cell Fragments	30	667	3.49 %
Insect Biodetritus	BDL	BDL	N/A
Total Fibers	2	44	0.230 %
Manmade Fibers	2	44	0.230 %
Total Pollen	BDL	BDL	N/A
Total Fungal Elements/Spores	2	44	0.230 %
Dematiaceous Fungal Spore Elements	2	44	0.230 %
Total "Other"	114	7650	40.1 %
Black Particles	114	7650	40.1 %
Total Counts:	276	19,100	100.0 %

Comments :

Method of Analysis: EDLAB SOP-7/05001

Detection Limits* : 22 Cts/m³ (Flow rate: 15.00 lpm, Exposure Time: 3.00 minutes, with 45 traverses under 400x Magnification)

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Quality Controlled By :
 Approved By :
Rajiv R. Sahay, Ph.D.



Laboratory Analysis Report

Aerobiology

Spore Trap Assay

Client : **Sarasota County Government**
 Jobsite : **Venice Public Library**
 Location : **300 Nokomis Ave S**

PACS ID# : **03929**
 Work Order # : **019392**
 Project Date : **12/23/2015**

Unit : N/A	Lab Sample# : 134714	Date Lab. Rec'd. : 12/24/2015
Zone : Book Store	Field Sample# : 33	Date Analyzed : 1/4/2016
Test Site : N/A	Sample Date : 12/23/2015	Date Issued : 1/5/2016
Diagnostic Tech : LAB	Sample Time : 9:25 PM	Sample Serial # : 22129422
SampleType : Microscopic Particle Assay (SporeTrap)		Sampling Device: AirOCell

<u>Particle Identification</u>	<u>Raw Count</u>	<u>Total Count (Cts/m³)</u>	<u>Percent of Total Count</u>
Opaque Particles	108	18100	51.9 %
Skin Cell Fragments	42	933	2.67 %
Insect Biodetritus	BDL	BDL	N/A
Total Fibers	1	22	0.0630 %
Manmade Fibers	1	22	0.0630 %
Total Pollen	BDL	BDL	N/A
Total Fungal Elements/Spores	4	88	0.252 %
Basidiospores	2	44	0.126 %
Dematiaceous Fungal Hyphal Elements	1	22	0.0630 %
Dematiaceous Fungal Spore Elements	1	22	0.0630 %
Total "Other"	110	15800	45.3 %
Black Particles	110	15800	45.3 %
Total Counts:	265	34,900	99.9 %

Comments :

Method of Analysis: EDLAB SOP-7/05001

Detection Limits* : 22 Cts/m³ (Flow rate: 15.00 lpm, Exposure Time: 3.00 minutes, with 45 traverses under 400x Magnification)

*Detection limits may vary with flow rate, exposure time and microscopic fields observed for particle count at a defined magnification.

BDL = Below Detection Limits **N/A** = Not Applicable

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Quality Controlled By :
 Approved By :
Rajiv R. Sahay, Ph.D.



Laboratory Analysis Report

Aerobiology

Spore Trap Assay

Client : **Sarasota County Government**
 Jobsite : **Venice Public Library**
 Location : **300 Nokomis Ave S**

PACS ID# : **03929**
 Work Order # : **019392**
 Project Date : **12/23/2015**

Unit : N/A	Lab Sample# : 134718	Date Lab. Rec'd. : 12/24/2015
Zone : Lobby	Field Sample# : 37	Date Analyzed : 1/4/2016
Test Site : N/A	Sample Date : 12/23/2015	Date Issued : 1/5/2016
Diagnostic Tech : LAB	Sample Time : 9:50 PM	Sample Serial # : 22129392
SampleType : Microscopic Particle Assay (SporeTrap)		Sampling Device: AirOCell

<u>Particle Identification</u>	<u>Raw Count</u>	<u>Total Count (Cts/m³)</u>	<u>Percent of Total Count</u>
Opaque Particles	117	58900	55.0 %
Skin Cell Fragments	12	267	0.250 %
Insect Biodetritus	BDL	BDL	N/A
Total Fibers	1	22	0.0206 %
Fiberglass	1	22	0.0206 %
Total Pollen	BDL	BDL	N/A
Total Fungal Elements/Spores	4	88	0.0822 %
Aspergillus/Penicillium-Like Spores	3	66	0.0617 %
Dematiaceous Fungal Spore Elements	1	22	0.0206 %
Total "Other"	143	48000	44.9 %
Black Particles	143	48000	44.9 %
Total Counts:	277	107,000	99.7 %

Comments :

Method of Analysis: EDLAB SOP-7/05001

Detection Limits* : 22 Cts/m³ (Flow rate: 15.00 lpm, Exposure Time: 3.00 minutes, with 45 traverses under 400x Magnification)

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Quality Controlled By :
 Approved By :
Rajiv R. Sahay, Ph.D.



Laboratory Analysis Report

Aerobiology

Spore Trap Assay

Client : **Sarasota County Government**
 Jobsite : **Venice Public Library**
 Location : **300 Nokomis Ave S**

PACS ID# : **03929**
 Work Order # : **019392**
 Project Date : **12/23/2015**

Unit : N/A	Lab Sample# : 134722	Date Lab. Rec'd. : 12/24/2015
Zone : Meeting Room	Field Sample# : 41	Date Analyzed : 1/4/2016
Test Site : N/A	Sample Date : 12/23/2015	Date Issued : 1/5/2016
Diagnostic Tech : LAB	Sample Time : 10:25 PM	Sample Serial # : 22129398
SampleType : Microscopic Particle Assay (SporeTrap)		Sampling Device: AirOCell

<u>Particle Identification</u>	<u>Raw Count</u>	<u>Total Count (Cts/m³)</u>	<u>Percent of Total Count</u>
Opaque Particles	105	13200	29.5 %
Skin Cell Fragments	8	178	0.397 %
Insect Biodetritus	BDL	BDL	N/A
Total Fibers	BDL	BDL	N/A
 Total Pollen	 BDL	 BDL	 N/A
 Total Fungal Elements/Spores	 473	 10500	 23.4 %
Aspergillus/Penicillium-Like Spores	468	10400	23.2 %
Cladosporium species	5	111	0.248 %
 Total "Other"	 106	 20900	 46.7 %
Black Particles	104	20900	46.7 %
"Talc-Like" Particles	2	44	0.0982 %
 Total Counts:	 692	 44,800	 100 %

Comments :

Method of Analysis: EDLAB SOP-7/05001

Detection Limits* : 22 Cts/m³ (Flow rate: 15.00 lpm, Exposure Time: 3.00 minutes, with 45 traverses under 400x Magnification)

*Detection limits may vary with flow rate, exposure time and microscopic fields observed for particle count at a defined magnification.

BDL = Below Detection Limits **N/A** = Not Applicable

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Quality Controlled By :
 Approved By :
Rajiv R. Sahay, Ph.D.



Laboratory Analysis Report

Aerobiology

Spore Trap Assay

Client : **Sarasota County Government**
 Jobsite : **Venice Public Library**
 Location : **300 Nokomis Ave S**

PACS ID# : **03929**
 Work Order # : **019392**
 Project Date : **12/23/2015**

Unit : N/A	Lab Sample# : 134725	Date Lab. Rec'd. : 12/24/2015
Zone : Outside	Field Sample# : 44	Date Analyzed : 1/4/2016
Test Site : N/A	Sample Date : 12/23/2015	Date Issued : 1/5/2016
Diagnostic Tech : LAB	Sample Time : 11:50 PM	Sample Serial # : 22129382
SampleType : Microscopic Particle Assay (SporeTrap)		Sampling Device: AirOCell

<u>Particle Identification</u>	<u>Raw Count</u>	<u>Total Count (Cts/m³)</u>	<u>Percent of Total Count</u>
Opaque Particles	105	4810	81.4 %
Skin Cell Fragments	2	44	0.745 %
Insect Biodetritus	BDL	BDL	N/A
Total Fibers	BDL	BDL	N/A
Total Pollen	BDL	BDL	N/A
Total Fungal Elements/Spores	48	1060	17.9 %
Basidiospores	19	422	7.14 %
Fungal Spore Elements	14	311	5.26 %
Ganoderma species	6	133	2.25 %
Dematiaceous Fungal Spore Elements	2	44	0.745 %
Fusarium species	2	44	0.745 %
Rust spores	2	44	0.745 %
Cercospora species	1	22	0.372 %
Curvularia species	1	22	0.372 %
Pseudocercospora	1	22	0.372 %
Basidiomycetes (No further identification)	0	0	0
Capronia species	0	0	0
Total Counts:	155	5,910	99.9 %

Comments :

Method of Analysis: EDLAB SOP-7/05001

Detection Limits* : 22 Cts/m³ (Flow rate: 15.00 lpm, Exposure Time: 3.00 minutes, with 45 traverses under 400x Magnification)

*Detection limits may vary with flow rate, exposure time and microscopic fields observed for particle count at a defined magnification.

BDL = Below Detection Limits **N/A** = Not Applicable

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Quality Controlled By :
 Approved By :
Rajiv R. Sahay, Ph.D.

Opaque Particles Identified from Spore Trap Assays

Client : **Sarasota County Government**
Jobsite : **Venice Public Library**

PACS ID# : **03929**
Work Order # : **019392**

Opaque Particles

These particles may originate from inorganic or organic sources in nature. However, it appears opaque when observed under light microscopy. It has various shape and sizes. It may be regular or irregular in shape. On an average it can be measured less than one micron to well over fifty microns with some exceptions. Commonly these particles include but are not limited to dust & debris, paint, combustions, emission, ash, silica and others.

These particulates are significant from a health/allergy point of view especially in case of respiratory disorder.

Fibers Identified from Spore Trap Assays

Client : **Sarasota County Government**
Jobsite : **Venice Public Library**

PACS ID# : **03929**
Work Order # : **019392**

Fiberglass

Fiberglass is a material made from extremely fine fibers of glass. In indoor environment it is used as an insulating material for HVAC systems. It appears as a smooth-walled, elongated tube-like structure under the microscope with varying size ranges (avg, range 1-micron to over 1000 -microns).

It is listed as an irritant.

Manmade Fibers

Man-made fibers may come from natural raw materials like cellulose or from synthetic chemicals like rayon, nylon, etc. In indoor environments, some important sources of man made fiber include carpet, cellulose based building materials, clothing, paper and paper products, etc. Size of these fibers varies from a few microns to a several centimeters; however, an average size range may be 1 micron to over 500 microns.

Health implications of these particles are not well described, however some of the man-made fibers are important from an allergy point of view especially for dermal allergy.

Spores / Fungal Elements Identified from Spore Trap Assays

Client : **Sarasota County Government**
Jobsite : **Venice Public Library**

PACS ID# : **03929**
Work Order # : **019392**

Basidiomycetes (No further identification)

A class of fungi composed of mushrooms, toadstools, puffballs, stinkhorns, shelf fungi, bracket fungi, bird's nest fungi, smuts, rusts, and the jelly fungi. They produce their spores (basidiospores) on the outside of a specialized spore-producing structure, the basidium. The higher basidiomycetes produce their basidia in highly organized fruiting bodies called basidiocarps.

Dematiaceous Fungal Hyphal Elements

Fungal hyphae that are brown to black. No identification to genus level can be made.

Dematiaceous Fungal Spore Elements

Fungal spores that are brown to black. No identification to genus level can be made.

Fungal Spore Elements

Fungal spores that are hyaline or colorless. No identification to genus level can be made.

Aspergillus/Penicillium-Like Spores

Conidia that are characteristic of the following genera: Aspergillus, Penicillium, Paecilomyces, Scopulariopsis, and Gliocladium. Identification to genus level can not be made.

Basidiospores

Basidiospores are those produced from the basidium of Basidiomycetes. They are almost always produced as four spores / basidium. The most reliable feature that separates basidiospores from ascospores and deuteromycetes spores is the presence of an off-center apiculus where the spores was attached to the basidium. Apart from that basidiospores may be rough or smooth, darkly pigmented or completely clear, spherical, oval, ellipsoidal or hot-dog shaped. Basidiospores seldom exceed 18um in length. Some common basidiospore-producing fungi are rusts, smuts, jelly fungi, and puffball mushrooms. Most of the Basidiomycetes fungi are decomposers where some of them are pathogenic to plant and animals or allergenic in nature.

Capronia species

Capronia is a saprophytic fungi which belongs to the class ascomycetes. The ascospores are also reported from the ambient air. The size of the spores varies from 13 - 15 microns and it is ovoid in shape.

Cercospora species

Cercospora species are weak parasites on dead, dying or physiologically diseased plant tissues with occasional serious injury to healthy plants. They cause round, brown leaf spots on celery, beet, tobacco and other crops. One of the more than 3,800 named species, *Cercospora apii*, is believed to be the cause of one case of cutaneous and subcutaneous lesions.

Cladosporium species

Cladosporium species are found worldwide and are among the most common fungi found in the air, soil, foodstuffs, paint, textiles, bird feathers, and on plants. The hyphae, conidiophores, and conidia are pigmented olivaceous-brown (dematiaceous). Rarely, they can be an opportunist human pathogen causing chromoblastomycosis. They can cause a hypersensitivity pneumonitis known as "hot tub lung disease" and an immediate-type hypersensitivity-type I (IgE-mediated) extrinsic asthma.

Spores / Fungal Elements Identified from Spore Trap Assays

Client : **Sarasota County Government**
Jobsite : **Venice Public Library**

PACS ID# : **03929**
Work Order # : **019392**

Curvularia species

Curvularia species are found worldwide and are very common. The hyphae, conidiophores, and conidia are pigmented olivaceous-brown (dematiaceous). They can be isolated from the air, plants (especially grasses), sand dune soil, and soil. Rarely, they can be an opportunist human pathogen causing allergic reactions, eye (corneal) infections, mycetoma, and infections in immunocompromised patients.

Fusarium species

Fusarium species are found worldwide and are commonly isolated from plants, soil, caves, salt marshes, mangrove mud, insects, gerbils, bird feathers, water, wooden furniture, and wood pulp. Some isolates produce the mycotoxin trichothecene which can cause disease in humans and animals. Trichothecene targets the circulatory, alimentary, skin, and nervous systems. Some isolates produce the mycotoxin vomitoxin on cereal grains which produce disease by either ingestion or inhalation of the contaminated grains. It can be an opportunist human pathogen causing allergic disease, eye, skin, and nail infections.

Ganoderma species

Ganoderma species are found worldwide and are common. They are commonly referred to as a "shelf fungus" They are isolated from the air, dead and decaying wood. There have not been any reports of Ganoderma causing infections.

Helminthosporium species

Helminthosporium species is found worldwide and is very common. It can be isolated from the air, plants, and soil. Rarely, it can be an opportunist human pathogen causing eye (corneal ulcers) infections and subcutaneous or systemic disease.

Pseudocercospora

Pseudocercospora belongs to class deuteromycetes of fungi. Conidia are also reported from the air. It is elongated, multiseptate and needle like in structure.

Rust spores

The spores of a parasite fungus (Basidiomycetes) that form orangish-red or dark colored spots on the leaves and stems of plants. It is called "rust" because of its color. Rust thrives in cool, moist weather, however, reproduction of rust spores occurs throughout the summer months. The fungus usually is not lethal to its host, but may cause stunting and discoloration of the plant. It is not established as a human pathogen.

Other Material Identified from Spore Trap Assays

Client : **Sarasota County Government**
Jobsite : **Venice Public Library**

PACS ID # : **03929**
Work Order # : **019392**

"Talc-Like" Particles

These are thin disk-like particles of variable size range (10 to 50 micron). It may be organic or inorganic in nature. In indoor environment these particles mainly come from cornmeal, other grain flour, talcum powder etc. Some of these particles may adversely influence the health of dweller (example talcum powder).

Black Particles

These microscopic particles may originate from an organic source material. They greatly vary in their shape and sizes depending on their origin. However, an average size ranges between 1-micron to 5-micron with some exceptions. It may be regular or irregular in shape. In the indoor environment some important source/cause of these particles includes but are not limited to combustion, burning of oil & candles, chimney shoot, automobile exhaust, neoprene (rubber compound that applied to the inside surface of fiber glass duct liner), and other organic materials emitted by copier machines, printers, abraded paints etc.

These particles may influence health and hygienic condition of dwellers.

Laboratory Analysis Report Surface Microscopy Tape Prep Assay

Client : **Sarasota County Government**
 Jobsite : **Venice Public Library**
 Location : **300 Nokomis Ave S**

PACS ID# : **03929**
 Work Order # : **019392**
 Project Date : **12/23/2015**

Unit : **N/A**
 Zone : **Workroom Area**
 Test Site : **Top of Cabient**
 Diagnostic Tech : **LAB**
 Sample Type: **TapePrep Assay**

Lab Sample# : **134687**
 Field Sample# : **6**
 Sample Date: **12/23/2015**
 Sample Time: **6:05 PM**

Date Lab. Rec'd. : **12/24/2015**
 Date Analyzed: **1/6/2016**
 Date Issued : **01/05/16**
 Sample Serial #: **52496**

<u>Particle Identification</u>	<u>Raw Count</u>	<u>Total Count (Cts/cm²)</u>	<u>Percent of Total Count</u>
OpaqueParticles	118	3,930	56.5 %
Skin Cell Fragments	110	1,380	19.9 %
Insect Biodetritus	BDL	BDL	N/A
Total Fibers	54	216	3.11 %
Fiberglass	1	4	0.0576 %
Manmade Fibers	53	212	3.05 %
Total Pollen	2	8	0.115 %
Pollen Grains	2	8	0.115 %
Total Fungal Elements/Spores	6	24	0.345 %
Dematiaceous Fungal Hyphal Elements	1	4	0.0576 %
Basidiospores	1	4	0.0576 %
Dematiaceous Fungal Spore Elements	2	8	0.115 %
Cladophialophora species	2	8	0.115 %
Total "Other"	168	1,390	20.0 %
Reddish-Brown Particles	33	132	1.90 %
"Talc-Like" Particles	34	136	1.96 %
Black Particles	101	1,120	16.12 %
Total Counts:	458	6,950	100 %

Method of Analysis: EDLAB SOP-7/13001

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Quality Controlled By : 
 Approved By : 
Rajiv R. Sahay, Ph.D.

Laboratory Analysis Report Surface Microscopy Tape Prep Assay

Client : **Sarasota County Government**
 Jobsite : **Venice Public Library**
 Location : **300 Nokomis Ave S**

PACS ID# : **03929**
 Work Order # : **019392**
 Project Date : **12/23/2015**

Unit : **N/A**
 Zone : **Larg Print**
 Test Site : **Top of Book Shelf**
 Diagnostic Tech : **LAB**
 Sample Type: **TapePrep Assay**

Lab Sample# : **134691**
 Field Sample# : **10**
 Sample Date: **12/23/2015**
 Sample Time: **6:05 PM**

Date Lab. Rec'd. : **12/24/2015**
 Date Analyzed: **1/6/2016**
 Date Issued : **01/05/16**
 Sample Serial #: **52525**

<u>Particle Identification</u>	<u>Raw Count</u>	<u>Total Count (Cts/cm²)</u>	<u>Percent of Total Count</u>
OpaqueParticles	141	7,050	79.5 %
Skin Cell Fragments	103	687	7.75 %
Insect Biodetritus	BDL	BDL	N/A
Total Fibers	44	176	1.98 %
Fiberglass Fibers	1	4	0.0451 %
Manmade Fibers	43	172	1.94 %
Total Pollen	2	8	0.0902 %
Pollen Grains	2	8	0.0902 %
Total Fungal Elements/Spores	6	24	0.271 %
Curvularia species	1	4	0.0451 %
Dematiaceous Fungal Hyphal Elements	5	20	0.225 %
Total "Other"	170	928	10.5 %
Reddish-Brown Particles	22	88	0.99 %
"Talc-Like" Particles	38	152	1.71 %
Black Particles	110	688	7.76 %
Total Counts:	466	8,870	100.0 %

Method of Analysis: EDLAB SOP-7/13001

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Quality Controlled By : 
 Approved By : 
Rajiv R. Sahay, Ph.D.



Laboratory Analysis Report

Surface Microscopy

Tape Prep Assay

Client : **Sarasota County Government**
 Jobsite : **Venice Public Library**
 Location : **300 Nokomis Ave S**

PACS ID# : **03929**
 Work Order # : **019392**
 Project Date : **12/23/2015**

Unit : **N/A**
 Zone : **Information Area**
 Test Site : **N/A**
 Diagnostic Tech : **LAB**
 Sample Type: **TapePrep Assay**

Lab Sample# : **134695**
 Field Sample# : **14**
 Sample Date: **12/23/2015**
 Sample Time: **6:05 PM**

Date Lab. Rec'd. : **12/24/2015**
 Date Analyzed: **1/6/2016**
 Date Issued : **01/05/16**
 Sample Serial #: **52496**

<u>Particle Identification</u>	<u>Raw Count</u>	<u>Total Count (Cts/cm²)</u>	<u>Percent of Total Count</u>
	97		
Plant Fibers	1	4	
Fiberglass	1	4	
Manmade Fibers	95	380	
	1		
Pinaceae (Pine) Species	1	4	
	7		
Dematiaceous Fungal Hyphal Elements	1	4	
Dematiaceous Fungal Spore Elements	6	24	
	167		
Reddish-Brown Particles	27	108	
"Talc-Like" Particles	31	124	
Black Particles	109	495	
Total Counts:	272	BDL	

Method of Analysis: EDLAB SOP-7/13001

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Quality Controlled By : 
 Approved By : 
Rajiv R. Sahay, Ph.D.

Laboratory Analysis Report Surface Microscopy Tape Prep Assay

Client : **Sarasota County Government**
 Jobsite : **Venice Public Library**
 Location : **300 Nokomis Ave S**

PACS ID# : **03929**
 Work Order # : **019392**
 Project Date : **12/23/2015**

Unit : **N/A**
 Zone : **Reading Area**
 Test Site : **Newspaper Stand**
 Diagnostic Tech : **LAB**
 Sample Type: **TapePrep Assay**

Lab Sample# : **134699**
 Field Sample# : **18**
 Sample Date: **12/23/2015**
 Sample Time: **6:05 PM**

Date Lab. Rec'd. : **12/24/2015**
 Date Analyzed: **1/6/2016**
 Date Issued : **01/05/16**
 Sample Serial #: **52516**

<u>Particle Identification</u>	<u>Raw Count</u>	<u>Total Count (Cts/cm²)</u>	<u>Percent of Total Count</u>
OpaqueParticles	101	421	53.4 %
Skin Cell Fragments	16	64	8.11 %
Insect Biodetritus	BDL	BDL	N/A
Total Fibers	21	84	10.6 %
Fiberglass	1	4	0.507 %
Manmade Fibers	20	80	10.1 %
Total Pollen	BDL	BDL	N/A
Total Fungal Elements/Spores	BDL	BDL	N/A
Total "Other"	55	220	27.9 %
"Talc-Like" Particles	12	48	6.08 %
Black Particles	43	172	21.80 %
Total Counts:	193	789	100 %

Method of Analysis: EDLAB SOP-7/13001

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Quality Controlled By : 
 Approved By : 
Rajiv R. Sahay, Ph.D.



Laboratory Analysis Report Surface Microscopy Tape Prep Assay

Client : **Sarasota County Government**
 Jobsite : **Venice Public Library**
 Location : **300 Nokomis Ave S**

PACS ID# : **03929**
 Work Order # : **019392**
 Project Date : **12/23/2015**

Unit : **N/A**
 Zone : **Genealogy Area**
 Test Site : **Red Book 3rd Ed**
 Diagnostic Tech : **LAB**
 Sample Type: **TapePrep Assay**

Lab Sample# : **134703**
 Field Sample# : **22**
 Sample Date: **12/23/2015**
 Sample Time: **6:05 PM**

Date Lab. Rec'd. : **12/24/2015**
 Date Analyzed: **1/6/2016**
 Date Issued : **01/05/16**
 Sample Serial #: **52517**

<u>Particle Identification</u>	<u>Raw Count</u>	<u>Total Count (Cts/cm²)</u>	<u>Percent of Total Count</u>
OpaqueParticles	105	2,100	65.0 %
Skin Cell Fragments	101	673	20.8 %
Insect Biodetritus	BDL	BDL	N/A
Total Fibers	42	168	5.20 %
Fiberglass	4	16	0.495 %
Manmade Fibers	38	152	4.71 %
Total Pollen	BDL	BDL	N/A
Total Fungal Elements/Spores	2	8	0.248 %
Dematiaceous Fungal Spore Elements	2	8	0.248 %
Total "Other"	70	280	8.67 %
"Talc-Like" Particles	1	4	0.12 %
Black Particles	69	276	8.54 %
Total Counts:	320	3,230	100 %

Method of Analysis: EDLAB SOP-7/13001

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Quality Controlled By : 
 Approved By : 
 Rajiv R. Sahay, Ph.D.



Laboratory Analysis Report

Surface Microscopy

Tape Prep Assay

Client : **Sarasota County Government**
 Jobsite : **Venice Public Library**
 Location : **300 Nokomis Ave S**

PACS ID# : **03929**
 Work Order # : **019392**
 Project Date : **12/23/2015**

Unit : **N/A**
 Zone : **Juvenile Non-fiction**
 Test Site : **Boohshelf**
 Diagnostic Tech : **LAB**
 Sample Type: **TapePrep Assay**

Lab Sample# : **134707**
 Field Sample# : **26**
 Sample Date: **12/23/2015**
 Sample Time: **6:05 PM**


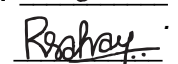
Date Lab. Rec'd. : **12/24/2015**
 Date Analyzed: **1/6/2016**
 Date Issued : **01/05/16**
 Sample Serial #: **52524**

<u>Particle Identification</u>	<u>Raw Count</u>	<u>Total Count (Cts/cm²)</u>	<u>Percent of Total Count</u>
OpaqueParticles	106	558	59.7 %
Skin Cell Fragments	19	76	8.14 %
Insect Biodetritus	BDL	BDL	N/A
Total Fibers	4	16	1.71 %
Manmade Fibers	4	16	1.71 %
Total Pollen	BDL	BDL	N/A
Total Fungal Elements/Spores	BDL	BDL	N/A
Total "Other"	71	284	30.4 %
"Talc-Like" Particles	2	8	0.86 %
Black Particles	69	276	29.55 %
Total Counts:	200	934	100 %

Method of Analysis: EDLAB SOP-7/13001

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Quality Controlled By : 
 Approved By : 
Rajiv R. Sahay, Ph.D.

Laboratory Analysis Report Surface Microscopy Tape Prep Assay

Client : **Sarasota County Government**
 Jobsite : **Venice Public Library**
 Location : **300 Nokomis Ave S**

PACS ID# : **03929**
 Work Order # : **019392**
 Project Date : **12/23/2015**

Unit : **N/A**
 Zone : **Teen & youth Wing**
 Test Site : **Desk Chair**
 Diagnostic Tech : **LAB**
 Sample Type: **TapePrep Assay**

Lab Sample# : **134711**
 Field Sample# : **30**
 Sample Date: **12/23/2015**
 Sample Time: **9:05 PM**

Date Lab. Rec'd. : **12/24/2015**
 Date Analyzed: **1/6/2016**
 Date Issued : **01/05/16**
 Sample Serial #: **52497**

<u>Particle Identification</u>	<u>Raw Count</u>	<u>Total Count (Cts/cm²)</u>	<u>Percent of Total Count</u>
OpaqueParticles	141	2,010	39.6 %
Skin Cell Fragments	104	1,160	22.8 %
Insect Biodetritus	BDL	BDL	N/A
Total Fibers	104	416	8.19 %
Fiberglass	3	12	0.236 %
Manmade Fibers	101	404	7.95 %
Total Pollen	2	8	0.157 %
Pollen Grains	2	8	0.157 %
Total Fungal Elements/Spores	80	320	6.30 %
Curvularia species	1	4	0.0787 %
Dematiaceous Fungal Hyphal Elements	2	8	0.157 %
Dematiaceous Fungal Spore Elements	3	12	0.236 %
Aspergillus/Penicillium-Like Spores	74	296	5.83 %
Total "Other"	274	1,170	23.0 %
"Talc-Like" Particles	78	312	6.14 %
Black Particles	93	372	7.32 %
Reddish-Brown Particles	103	490	9.65 %
Total Counts:	705	5,080	99.9 %

Method of Analysis: EDLAB SOP-7/13001

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Quality Controlled By : 
 Approved By : 
 Rajiv R. Sahay, Ph.D.

Laboratory Analysis Report Surface Microscopy Tape Prep Assay

Client : **Sarasota County Government**
 Jobsite : **Venice Public Library**
 Location : **300 Nokomis Ave S**

PACS ID# : **03929**
 Work Order # : **019392**
 Project Date : **12/23/2015**

Unit : **N/A**
 Zone : **Book Store**
 Test Site : **Bookshelf**
 Diagnostic Tech : **LAB**
 Sample Type: **TapePrep Assay**

Lab Sample# : **134715**
 Field Sample# : **2130**
 Sample Date: **12/23/2015**
 Sample Time: **9:30 PM**

Date Lab. Rec'd. : **12/24/2015**
 Date Analyzed: **1/6/2016**
 Date Issued : **01/05/16**
 Sample Serial #: **52523**

<u>Particle Identification</u>	<u>Raw Count</u>	<u>Total Count (Cts/cm²)</u>	<u>Percent of Total Count</u>
OpaqueParticles	151	15,100	53.5 %
Skin Cell Fragments	142	7,100	25.2 %
Insect Biodetritus	BDL	BDL	N/A
Total Fibers	83	332	1.18 %
Plant Fibers	1	4	0.0142 %
Fiberglass	2	8	0.0284 %
Manmade Fibers	80	320	1.13 %
Total Pollen	11	44	0.156 %
Pollen Grains	11	44	0.156 %
Total Fungal Elements/Spores	5	20	0.0709 %
Chaetomium spores	1	4	0.0142 %
Dematiaceous Fungal Hyphal Elements	4	16	0.0567 %
Total "Other"	337	5,580	19.8 %
Bird Feathers	1	4	0.01 %
Reddish-Brown Particles	102	785	2.78 %
"Talc-Like" Particles	115	821	2.91 %
Black Particles	119	3,970	14.08 %
Total Counts:	729	28,200	100 %

Method of Analysis: EDLAB SOP-7/13001

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Quality Controlled By : 
 Approved By : 
 Rajiv R. Sahay, Ph.D.

Laboratory Analysis Report Surface Microscopy Tape Prep Assay

Client : **Sarasota County Government**
 Jobsite : **Venice Public Library**
 Location : **300 Nokomis Ave S**

PACS ID# : **03929**
 Work Order # : **019392**
 Project Date : **12/23/2015**

Unit : **N/A**
 Zone : **Lobby**
 Test Site : **Bookshelf**
 Diagnostic Tech : **LAB**
 Sample Type: **TapePrep Assay**

Lab Sample# : **134719**
 Field Sample# : **38**
 Sample Date: **12/23/2015**
 Sample Time: **9:55 PM**

Date Lab. Rec'd. : **12/24/2015**
 Date Analyzed: **1/6/2016**
 Date Issued : **01/05/16**
 Sample Serial #: **52509**

<u>Particle Identification</u>	<u>Raw Count</u>	<u>Total Count (Cts/cm²)</u>	<u>Percent of Total Count</u>
OpaqueParticles	117	11,700	61.3 %
Skin Cell Fragments	106	2,650	13.9 %
Insect Biodetritus	BDL	BDL	N/A
Total Fibers	165	660	3.46 %
Hair, Animal	1	4	0.0209 %
Plant Fibers	1	4	0.0209 %
Fiberglass	2	8	0.0419 %
Manmade Fibers	161	644	3.37 %
Total Pollen	15	60	0.314 %
Pollen Grains	15	60	0.314 %
Total Fungal Elements/Spores	15	60	0.314 %
Chaetomium spores	1	4	0.0209 %
Tetraploa species	1	4	0.0209 %
Curvularia species	2	8	0.0419 %
Dematiaceous Fungal Spore Elements	3	12	0.0628 %
Dematiaceous Fungal Hyphal Elements	8	32	0.168 %
Total "Other"	326	4,000	20.9 %
"Talc-Like" Particles	105	750	3.93 %
Reddish-Brown Particles	107	973	5.09 %
Black Particles	114	2,280	11.94 %
Total Counts:	744	19,100	99.8 %

Method of Analysis: EDLAB SOP-7/13001

BDL = Below Detection Limit: No particles were reported from the microscopically observed area on the specimen slide (at 10x10 or 10x40 magnification).

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Quality Controlled By : 
 Approved By : 
Rajiv R. Sahay, Ph.D.



Opaque Particles Identified from Tape Prep Assays

Client : **Sarasota County Government**
Jobsite : **Venice Public Library**

PACS ID# : **03929**
Work Order # : **019392**

Opaque Particles

These particles may originate from inorganic or organic sources in nature. However, it appears opaque when observed under light microscopy. It has various shape and sizes. It may be regular or irregular in shape. On an average it can be measured less than one micron to well over fifty microns with some exceptions. Commonly these particles include but are not limited to dust & debris, paint, combustions, emission, ash, silica and others.

These particulates are significant from a health/allergy point of view especially in case of respiratory disorder.

Fibers Identified from Tape Prep Assays

Client : **Sarasota County Government**
Jobsite : **Venice Public Library**

PACS ID# : **03929**
Work Order # : **019392**

Fiberglass Fibers

Fiberglass is a material made from extremely fine fibers of glass. In indoor environments, it is used as an insulating material for HVAC systems. It appears as a smooth-walled, elongated, tube-like structure under the microscope with varying size ranges (avg. range 1-micron to over 1000-microns).

It is listed as an irritant.

Hair, Animal

Plant Fibers

Technically, Plant fibers are known as Plant Trichomes. A Plant Trichome is the hairy out growth from the aerial part of the plant. Not all plants can produce plant trichomes. Plant trichomes vary greatly in their size and shape. On an average, these structures measure from a few microns to well over a few millimeters. It may be a simple unicellular elongated structure or a complex multi-cellular structure. Sometimes also filled with various biochemicals.

Plant trichomes are significant from an allergenic/disease point of view especially eczema and other dermal allergies.

Fiberglass

Fiberglass is a material made from extremely fine fibers of glass. In indoor environment it is used as an insulating material for HVAC systems. It appears as a smooth-walled, elongated tube-like structure under the microscope with varying size ranges (avg, range 1-micron to over 1000 -microns).

It is listed as an irritant.

Manmade Fibers

Man-made fibers may come from natural raw materials like cellulose or from synthetic chemicals like rayon, nylon, etc. In indoor environments, some important sources of man made fiber include carpet, cellulose based building materials, clothing, paper and paper products, etc. Size of these fibers varies from a few microns to a several centimeters; however, an average size range may be 1 micron to over 500 microns.

Health implications of these particles are not well described, however some of the man-made fibers are important from an allergy point of view especially for dermal allergy.

Pollen Species Identified from Tape Prep Assays

Client : **Sarasota County Government**
Jobsite : **Venice Public Library**

PACS ID# : **03929**
Work Order # : **019392**

Pinaceae (Pine) Species

There are six genera of evergreens that are found primarily in North America: fir (*Abies*); larch, tamarack (*Larix*); spruce (*Picea*); pine (*Pinus*); Douglas fir (*Pseudotsuga*); and hemlock (*Tsuga*). Abundant pollen is produced in the spring and early summer. The large pollen have air bladders which permit them to travel great distances. Rarely does it cause pollinosis [an allergic reaction (hay fever) resulting in a type I antibody-mediated hypersensitivity].

Pollen Grains

Pollen grains are the male reproductive unit of flowering plant usually produced by anthers. They are microscopic particles of various shape (mostly spheroidal or ellipsoidal), sizes (5 micron to more than 200 micron). Pollen grains may also have furrows or pore or both on their surface that helps in their identification.

They can be air-borne and remain in the ambient air depending upon their buoyancy. They may be carried some distance from the immediate vicinity of the parent. Some pollen grains are allergenic in nature.

Spores / Fungal Elements Identified from Tape Prep Assays

Client : **Sarasota County Government**
Jobsite : **Venice Public Library**

PACS ID# : **03929**
Work Order # : **019392**

Dematiaceous Fungal Hyphal Elements

Fungal hyphae that are brown to black. No identification to genus level can be made.

Dematiaceous Fungal Spore Elements

Fungal spores that are brown to black. No identification to genus level can be made.

Aspergillus/Penicillium-Like Spores

Conidia that are characteristic of the following genera: *Aspergillus*, *Penicillium*, *Paecilomyces*, *Scopulariopsis*, and *Gliocladium*. Identification to genus level can not be made.

Basidiospores

Basidiospores are those produced from the basidium of Basidiomycetes. They are almost always produced as four spores / basidium. The most reliable feature that separates basidiospores from ascospores and deuteromycetes spores is the presence of an off-center apiculus where the spores was attached to the basidium. Apart from that basidiospores may be rough or smooth, darkly pigmented or completely clear, spherical, oval, ellipsoidal or hot-dog shaped. Basidiospores seldom exceed 18um in length. Some common basidiospore-producing fungi are rusts, smuts, jelly fungi, and puffball mushrooms. Most of the Basidiomycetes fungi are decomposers where some of them are pathogenic to plant and animals or allergenic in nature.

Chaetomium spores

Chaetomium spores are reported from indoor air frequently. Chaetomium sps. found worldwide and may produce an earthy odor. They are an important cause of decay of cotton and other cellulose materials; causes soft rot in wood and fruit rot; and is an important component in the decomposition of plant material in composts. They can be isolated from dung, straw, bird feathers, soil and plants. They may be associated with allergic disease.

Cladophialophora species

Cladophialophora is a genus black, yeast-like fungus. The natural habitat of these fungi is soil and disintegrating plant materials, especially in tropical and sub-tropical regions. Some species of these fungi are discovered originating from soft drinks, alkylbenzene-polluted soil and infected patients. Under laboratory conditions, it can be cultured on microbiological media such as Malt Extract Agar (MEA), Potato Dextrose Agar (PDA), etc., with an optimum incubating temperature at 25°C; however, it can grow at temperatures as high as 42-43°C with a few exceptions in which the growth is restricted beyond 35-36°C. Colony color is variable from olivaceous green to black from the front and black from the reverse. Hyphae are brown and septate while conidiophores are not differentiated from the vegetative hyphae. Conidia are pale to dark brown and frequently arranged in a chain.

Some members of this genus are known human pathogens. They may cause phaeohyphomycosis, chromoblastomycosis and mycetoma.

Curvularia species

Curvularia species are found worldwide and are very common. The hyphae, conidiophores, and conidia are pigmented olivaceous-brown (dematiaceous). They can be isolated from the air, plants (especially grasses), sand dune soil, and soil. Rarely, they can be an opportunist human pathogen causing allergic reactions, eye (corneal) infections, mycetoma, and infections in immunocompromised patients.



Spores / Fungal Elements Identified from Tape Prep Assays

Client : **Sarasota County Government**
Jobsite : **Venice Public Library**

PACS ID# : **03929**
Work Order # : **019392**

Tetraploa species

Tetraploa species are found worldwide and are common. The hyphae, conidiophores, and conidia are pigmented olivaceous-brown (dematiaceous). It can be isolated from plants and soil. There has been one report of Tetraploa species causing a corneal infection.

Other Material Identified from Tape Prep Assays

Client : **Sarasota County Government**
Jobsite : **Venice Public Library**

PACS ID # : **03929**
Work Order # : **019392**

"Talc-Like" Particles

These are thin disk-like particles of variable size range (10 to 50 micron). It may be organic or inorganic in nature. In indoor environment these particles mainly come from cornmeal, other grain flour, talcum powder etc. Some of these particles may adversely influence the health of dweller (example talcum powder).

Bird Feathers

Black Particles

These microscopic particles may originate from an organic source material. They greatly vary in their shape and sizes depending on their origin. However, an average size ranges between 1-micron to 5-micron with some exceptions. It may be regular or irregular in shape. In the indoor environment some important source/cause of these particles includes but are not limited to combustion, burning of oil & candles, chimney shoot, automobile exhaust, neoprene (rubber compound that applied to the inside surface of fiber glass duct liner), and other organic materials emitted by copier machines, printers, abraded paints etc.

These particles may influence health and hygienic condition of dwellers.

Reddish-Brown Particles

These microscopic particles may originate from in-organic or organic source materials. In indoor environments these particles mainly come by rusting, coarse, weathering of materials etc. They may also be released into the environment due to deterioration of wood or wood products, art and sculpture work etc. These particles greatly vary in their shape and sizes. It can be measured from a few micron to over 100-microns. This particle may be the indicator of moisture problem in indoor environment.

The health implications of this material are not well established however; it may be significant from a health and hygiene point of view.



Laboratory Analysis Report "Other" Samples

Client: **Sarasota County Government**
 Jobsite: **Venice Public Library**
 Location: **300 Nokomis Ave S**

PACS ID #: **03929**
 Work Order #: **019392**
 Project Date: **12/23/2015**
 Date Issued: **1/5/2016**

Mech. Unit: **N/A**
 Zone: **Book Store**
 Test Site: **N/A**

Sample #	Sample Type	Date	Time	Results	Units
134712	Carbon Dioxide (CO2)	12/23/2015	9:20 pm	420	ppm
134712	Laser Diode Particle Analysis (Respirable Differential)	12/23/2015	9:20 pm	6,996	p/l
134712	Relative Humidity (RH) Reading	12/23/2015	9:20 pm	63.9	%
134712	Temperature Reading	12/23/2015	9:20 pm	74	°F

Mech. Unit: **N/A**
 Zone: **Genealogy Area**
 Test Site: **N/A**

Sample #	Sample Type	Date	Time	Results	Units
134700	Carbon Dioxide (CO2)	12/23/2015	7:40 pm	345	ppm
134700	Laser Diode Particle Analysis (Respirable Differential)	12/23/2015	7:40 pm	9,342	p/l
134700	Relative Humidity (RH) Reading	12/23/2015	7:40 pm	66.9	%
134700	Temperature Reading	12/23/2015	7:40 pm	74.6	°F

Mech. Unit: **N/A**
 Zone: **Information Area**
 Test Site: **N/A**

Sample #	Sample Type	Date	Time	Results	Units
134692	Carbon Dioxide (CO2)	12/23/2015	6:40 pm	361	ppm
134692	Laser Diode Particle Analysis (Respirable Differential)	12/23/2015	6:40 pm	9,581	p/l
134692	Relative Humidity (RH) Reading	12/23/2015	6:40 pm	65.9	%
134692	Temperature Reading	12/23/2015	6:40 pm	73.4	°F

ND = None Detected. Results are less than the method detection limit.

<= Less Than or Equal To. The analyte was detected but at a level too low to be accurately quantitated. The actual amount is less than or equal to the reported value.

* The VOC's and Formaldehyde analyses are not covered under the scope of EDLab.

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Quality Controlled By: _____

Approved By: Rajiv R. Sahay
 Rajiv R. Sahay, Ph.D.



Laboratory Analysis Report "Other" Samples

Client: **Sarasota County Government**
 Jobsite: **Venice Public Library**
 Location: **300 Nokomis Ave S**

PACS ID #: **03929**
 Work Order #: **019392**
 Project Date: **12/23/2015**
 Date Issued: **1/5/2016**

Mech. Unit: **N/A**
 Zone: **Larg Print**
 Test Site: **N/A**

Sample #	Sample Type	Date	Time	Results	Units
134688	Carbon Dioxide (CO2)	12/23/2015	6:15 pm	403	ppm
134688	Laser Diode Particle Analysis (Respirable Differential)	12/23/2015	6:15 pm	8,867	p/l
134688	Relative Humidity (RH) Reading	12/23/2015	6:15 pm	67.2	%
134688	Temperature Reading	12/23/2015	6:15 pm	74.8	°F

Mech. Unit: **N/A**
 Zone: **Lobby**
 Test Site: **N/A**

Sample #	Sample Type	Date	Time	Results	Units
134716	Carbon Dioxide (CO2)	12/23/2015	9:40 pm	345	ppm
134716	Laser Diode Particle Analysis (Respirable Differential)	12/23/2015	9:40 pm	10,485	p/l
134716	Relative Humidity (RH) Reading	12/23/2015	9:40 pm	65.9	%
134716	Temperature Reading	12/23/2015	9:40 pm	75.2	°F

Mech. Unit: **N/A**
 Zone: **Meeting Room**
 Test Site: **N/A**



Sample #	Sample Type	Date	Time	Results	Units
134720	Carbon Dioxide (CO2)	12/23/2015	10:20 pm	336	ppm
134720	Laser Diode Particle Analysis (Respirable Differential)	12/23/2015	10:20 pm	11,665	p/l
134720	Relative Humidity (RH) Reading	12/23/2015	10:20 pm	74.7	%
134720	Temperature Reading	12/23/2015	10:20 pm	73.4	°F

ND = None Detected. Results are less than the method detection limit.

<= Less Than or Equal To. The analyte was detected but at a level too low to be accurately quantitated. The actual amount is less than or equal to the reported value.

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Quality Controlled By: 
 Approved By: 
Rajiv R. Sahay, Ph.D.



Laboratory Analysis Report "Other" Samples

Client: **Sarasota County Government**
 Jobsite: **Venice Public Library**
 Location: **300 Nokomis Ave S**

PACS ID #: **03929**
 Work Order #: **019392**
 Project Date: **12/23/2015**
 Date Issued: **1/5/2016**

Mech. Unit: **N/A**
 Zone: **Outside**
 Test Site: **N/A**

Sample #	Sample Type	Date	Time	Results	Units
134723	Carbon Dioxide (CO2)	12/23/2015	11:40 pm	333	ppm
134723	Laser Diode Particle Analysis (Respirable Differential)	12/23/2015	11:40 pm	50,115	p/l
134723	Relative Humidity (RH) Reading	12/23/2015	11:40 pm	90.4	%
134723	Temperature Reading	12/23/2015	11:40 pm	74.8	°F

Mech. Unit: **N/A**
 Zone: **Reading Area**
 Test Site: **N/A**

Sample #	Sample Type	Date	Time	Results	Units
134696	Carbon Dioxide (CO2)	12/23/2015	7:10 pm	343	ppm
134696	Laser Diode Particle Analysis (Respirable Differential)	12/23/2015	7:10 pm	9,299	p/l
134696	Relative Humidity (RH) Reading	12/23/2015	7:10 pm	68.5	%
134696	Temperature Reading	12/23/2015	7:10 pm	74.1	°F

Mech. Unit: **N/A**
 Zone: **Teen & youth Wing**
 Test Site: **N/A**



Sample #	Sample Type	Date	Time	Results	Units
134708	Carbon Dioxide (CO2)	12/23/2015	8:45 pm	358	ppm
134708	Laser Diode Particle Analysis (Respirable Differential)	12/23/2015	8:45 pm	8,905	p/l
134708	Relative Humidity (RH) Reading	12/23/2015	8:45 pm	69.5	%
134708	Temperature Reading	12/23/2015	8:45 pm	74	°F

ND = None Detected. Results are less than the method detection limit.

<= Less Than or Equal To. The analyte was detected but at a level too low to be accurately quantitated. The actual amount is less than or equal to the reported value.

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Quality Controlled By: 
 Approved By: 
Rajiv R. Sahay, Ph.D.



Laboratory Analysis Report "Other" Samples

Client: **Sarasota County Government**
 Jobsite: **Venice Public Library**
 Location : **300 Nokomis Ave S**

PACS ID # : **03929**
 Work Order # : **019392**
 Project Date : **12/23/2015**
 Date Issued : **1/5/2016**

Mech. Unit : **N/A**
 Zone : **Workroom Area**
 Test Site : **N/A**

Sample #	Sample Type	Date	Time	Results	Units
134684	Carbon Dioxide (CO2)	12/23/2015	5:55 pm	415	ppm
134684	Laser Diode Particle Analysis (Respirable Differential)	12/23/2015	5:55 pm	9,856	p/l
134684	Relative Humidity (RH) Reading	12/23/2015	5:55 pm	65.8	%
134684	Temperature Reading	12/23/2015	5:55 pm	73.4	°F

Mech. Unit : **N/A**
 Zone : **Youth Program Room**
 Test Site : **N/A**



Sample #	Sample Type	Date	Time	Results	Units
134705	Carbon Dioxide (CO2)	12/23/2015	8:05 pm	365	ppm
134705	Laser Diode Particle Analysis (Respirable Differential)	12/23/2015	8:05 pm	10,404	p/l
134705	Relative Humidity (RH) Reading	12/23/2015	8:05 pm	75.1	%
134705	Temperature Reading	12/23/2015	8:05 pm	71.5	°F

ND = None Detected. Results are less than the method detection limit.

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Quality Controlled By : 
 Approved By : 
 Rajiv R. Sahay, Ph.D.



METHODS

Microbiology:

To quantify the extent of **airborne** microbial contamination, an Anderson N6 single-stage cascade impactor was employed. The impactor was sanitized with Isopropyl alcohol at each test site prior to sampling. Collection was performed at a flow rate of 28 liters per minute. This rate was verified in the field utilizing an in line flowmeter manufactured by Dwyer Instruments, Inc. Malt Extract Agar (MEA) and Tryptic Soy Agar (TSA) media were used respectively to culture and determine fungal and bacterial counts. Cultures were properly sealed with parafilm tape and safely transported to the laboratory in a thermally protected container. Culture plates were incubated up to five days at 25°C for fungi, and up to three days, at 30°C for bacteria. (14 days at 25°C for fungi, and seven days at 30°C for bacteria for characterization and speciation). Results were reported in colony forming units per cubic meter of air (CFU/m³).

Microscopy:

Countable bioaerosols concentrations were determined by Microscopy using two procedures: Spore Trap Assays and Tape Lift Preparations.

Spore Trap Assays (Air-O-Cell cassettes) employ a gel-coated glass slide inside an air sampling cassette and a constant flow pump calibrated at 15 liters per minute. This rate was verified in the field utilizing an in line flowmeter. Air was passed over the coated slide causing airborne particles to adhere to the gel. Direct microscopy evaluation at 200X and 400X magnification of stained gels provided insight into the composition and identification of the airborne particles. Results were reported in counts per cubic meter of air (cts/m³).

Surface Tape Preparations (Bioscan) provided insight into the identification and composition of surface pollutants. Clear adhesive tape was applied to the surface of interest and then transferred to a microscope slide. Microscopy evaluations were conducted at 200X and 400X magnification of the trapped particles. The results were reported as counts per square centimeter (cts/cm²).

Temperature, Relative Humidity, and Carbon Dioxide:

Real time measurements of temperature, relative humidity, carbon dioxide were obtained using a TSI Data Logger Model #9565-P. Prior to using, the instrument values were compared against a Bacharach Model U4Q (12-7011) Sling Psychrometer and Sensidyne Gastec colorimetric tubes.



METHODS (continued)

Respirable-size Particle Counts:

Respirable-size particle counts were determined using a Laser Diode Particle Counter manufactured by Met One, Model GT-321. Calibration was checked in the field using a purge filter. Cumulative counts for particle range of 0.3, 0.5, 1, 2, and 5 microns were reported as total particles per liter of air p/l.

Mechanical and Building Hygiene Assessments:

Hygiene assessments of the heating, venting and air-conditioning (HVAC) equipment and building environment were completed by qualified technical personnel. Photographic documentation was provided using flash assisted digital technology and color print reproduction.

Moisture content levels of different construction materials were completed utilizing a TRAMEX Moisture Encounter along with a Flir B-50 Infrared Camera. The TRAMEX instrument is sensitive to A/C electrical conductivity and radio waves by at least six orders of magnitude when a given material contains moisture. The moisture content is provided on a relative scale (%) and the results are then compared against the readings obtained from materials known to be dry. The instrument provides sensitivity levels for different material such as wood, drywall and masonry plaster.

In brief, the Infrared Camera uses a highly specialized technology able to detect the infrared from the electromagnetic spectrum creating images based on the amount of heat energy all objects radiate.



GUIDELINES FOR INDOOR AIR QUALITY

At present, federal, state, or local standards for unacceptable airborne or surface microbial concentrations do not exist, principally because some individuals are more susceptible to fungal antigens and the allergenicity of each microbe differs. In most cases however, it is expected the prevalence of indoor species identified from the air be similar or identical to the outdoors, albeit in lower concentrations.

Over the past 18 years, over 123,000 samples have been analyzed by the Environmental Diagnostics Laboratory (EDL) and processed in the proprietary database (Computer Assisted Air Management Program: CAAMP) which includes evaluations of over 7,200 buildings, 47,200 test sites, covering 54 states (4/12). EDL recommends the following Indoor Air Quality Guidelines that pertain to non-industrial or non-specialized environments e.g. offices, homes, schools, hotels, assisted living facilities, etc.

The guidelines are considered to be representative of “normal” indoor environments and are subject to the investigators discretion to interpret the environmental conditions based on the sampling results, as well as the conditions that existed at the time of the evaluation. In the event recognized pathogenic microorganisms are detected in any assay, the numeric guidelines play a secondary role in the acceptability of the environment and the situation needs to be addressed individually.

Culturable Fungi from Air:

Airborne fungal concentration and characterization is determined using culture plates. It is expected that the indoor concentration and types of fungi suspended in the air would be of similar biodiversity but in concentrations of approximately one-third the outdoor air level. However, when the outdoor air concentration is less than 1,050 CFU/m³, the indoor air concentration should be approximately 350 CFU/m³ or less.

Culturable Bacteria from Air:

Airborne bacterial concentration and characterization is determined using culture plates method. It is expected that human and environmental source bacteria would be present in the indoor air in combined concentrations of approximately 175 CFU/m³. However, when the outdoor air concentration is greater than 525 CFU/m³, the indoor air biodiversity should be similar but in concentrations of approximately one-third of the outdoor air level.

Non-Culturable Fungi from Air:

The types and concentrations of fungal structures suspended in the air are collected using a non-culturable test method known as Spore Trap Assay. This assay is analyzed by direct microscopy to determine the concentration of airborne fungal structures. It is expected that the indoor concentration and types of fungi suspended



GUIDELINES FOR INDOOR AIR QUALITY (continued)

in the air would be of similar biodiversity to the outside air, but in concentrations of approximately one-third the outdoor air level. However; when the outdoor air fungal concentration is less than 3,000 cts/m³, the indoor air concentrations should be approximately 1000 cts/m³ or less.

Nuisance Dust from Air:

Nuisance dust suspended in the air is collected using the Spore Trap Assay, which is analyzed by direct microscopy to determine the types and concentration of airborne aerosols. Aerosols such as pollen, insect biodetritus, opaque particles, and “others” are mostly derived from the outside environment. It is expected that the indoor air concentrations of these aerosols would be approximately one-third the concentration of the outdoor air. However, when the outdoor air concentrations of pollen, insect biodetritus, opaque particles and “others” are less than 45, 600, 105,000, and 18,000 cts/m³ respectively, the indoor air concentrations should be approximately 15, 200, 35,000 and 6,000 cts/m³ respectively, or less. Aerosols, such as fibers and skin cells, are mostly derived from the indoor environment; therefore, the concentrations expected in the indoor air are not dependent of the outdoor air levels. It is expected that the concentrations of skin cells fragments and fibers would be approximately 7,500 and 500 cts/m³, respectively, or less.

Fungal Structures and Nuisance Dust from Surface Tape Imprints collected in the Living Space:

Surface tape imprints collected within the living space are useful in determining extent of fungal matter settled in the environment. It is expected that surfaces in the living space and where routine maintenance and housekeeping is performed would contain traces of fungal structures of approximately 50 counts per square centimeter (50 cts/cm²). Nuisance dust (Opaque Particles, Skin Cell Fragments, Insect Parts, Fibers, Pollen and Others) settled in the living space is assessed using the Surface Tape Preparation, which is analyzed by direct microscopy. It is expected that surfaces in the living space and where routine maintenance and housekeeping is performed, the levels of Opaque Particles, Skin Cell Fragments, Insect Parts, Fibers, Pollen and Others would be present in trace levels of approximately 3,000, 600, 4, 120, 4, and 650 counts per square centimeter (cts/cm²), respectively.

Fungal Structures and Nuisance Dust from Surface Tape Imprints collected from the Non-Living Space:

Surfaces within a building but not in the living space (e.g. overhead spaces, air conveyance systems, wall cavities, etc) are expected to contain higher dust levels



GUIDELINES FOR INDOOR AIR QUALITY (continued)

than those present in the living space. Fungal structures below 100 cts/cm² are considered normal. Nuisance dust (Opaque Particles, Skin Cell Fragments, Insect Parts, Fibers, Pollen and Others) settled in the Non-Living Space is assessed using the Surface Tape Preparation, which is analyzed by direct microscopy. Due to the settlement of dust over the course of time, it is anticipated that surfaces in the Non-Living Space would contain higher concentrations of dust than those in the conditioned space. The expected levels of Opaque Particles, Skin Cell Fragments, Insect Parts, Fibers, Pollen and Others settled in the Non-Conditioned Space are 5,000, 450, 20, 200, 24, and 1,900 counts per square centimeter (cts/cm²), respectively.

Respirable-size Particulate:

In general, the concentration of respirable-size particles in buildings with good maintenance, air filtration, and acceptable air quality range from 10,000 to 25,000 cts/l. However when the outside air concentrations exceed 75,000 cts/l, the indoor air should contain approximately one-third of the outside air levels.

Comfort:

There is no specific set of enforceable values for temperature and relative humidity; however, comfort depends principally on these two factors combined. For minimizing the prevalence of indoor air quality problems (e.g. microbial activity, indoor allergens, viral infections, allergic rhinitis, asthma, ozone production, odors, etc.) and preserving the integrity of the building and its contents, Pure Air recommends that the relative humidity be maintained in the range of 30 to 60% and below 70% for the prevention of mold proliferation. The temperature for the most part is a preference of the occupants and depends on the level of clothing insulation; however, most people at rest will find the environment comfortable somewhere in the range of 72 to 78 °F.

Ventilation:

Carbon dioxide concentrations were used as surrogate measure to roughly assess the adequacy of the ventilation system. The American Society of Heating, Refrigeration, and Air-conditioning Engineers (ASHRAE) Standard 62.1-2013 suggests that a space with maintained concentrations not greater than 700 ppm above outdoor air levels will be properly ventilated with respect to human bioeffluents (body odor).



GUIDELINES FOR INDOOR AIR QUALITY (continued)

Moisture Content:

Drywall with moisture readings in the range of 0 to 35% is considered normal. Readings in the range of 35 to 50% suggest a potential problem. Readings above 50% suggest with a reasonable level of certainty that moisture problems exist.



INDOOR AIR QUALITY CONSIDERATIONS

Biological Factors:

Water is essential to all life, and the chemical reactions that lead to biological growth depend on an adequate water supply¹. Fungi are ubiquitous in the environment, although they particularly thrive in wet or moist environments where there is a nutrient source, and the temperature ranges from 40° to 100°F². Fungi can grow on surfaces and within pores of building materials and can give rise to odor perception problems and health concerns. Although only a few species of fungi produce toxigenic metabolites that invade living cells and cause infectious disease³, many of these strains do not routinely produce mycotoxins,⁴ and the potential to be exposed to such substances is controversial. However, most fungi do produce proteins that are antigenic and can cause hypersensitivity in predisposed individuals⁵.

Research conducted throughout the world has reported associations between moisture in buildings and fungal contamination⁶. All building materials contain moisture at some degree; however, the control of excessive moisture is crucial in the prevention of microbial colonization and substrate physical degradation. Limiting the water availability (a_w) of materials in buildings to ≤ 0.75 (ideally ≤ 0.65) should be a primary goal in the prevention of microbial amplification. Maintaining the relative humidity of the ambient air between 30 and 60% does not necessarily guarantee that the building materials are dry and foster no microbial growth. Cold spots and air infiltration tend to reach the dew point and increase the a_w sufficiently to support microbial growth. Because a_w is such an important factor for microbial growth and survival, the moisture content in building materials is the prime indicator of potential microbial activity.

Allergens:

Allergens are any substance of chemical or biological nature that can elicit an immune mediated response, commonly referred to as an allergic reaction or type 1

¹ ACGIH, *Bioaerosols-Assessment and Control*, American Conference of Governmental Industrial Hygienists, Cincinnati, 1999.

² EPA/NIOSH, *Building Air Quality: A guide for Building Owners and Facility Managers*, U.S. Government Office, Washington D.C. 1991.

³ Ibid

⁴ ACGIH, *Guidelines for the Assessment of Bioaerosols in the Indoor Environment*, American Conference of Governmental Industrial Hygienists, Cincinnati, 1989.

⁵ Burge HA, Airborne Allergenic Fungi – Classification, Nomenclature, and Distribution, *Immunol. Clin. Nort Am.*, 9(2):307.1989.

⁶ Anonymous, *Task Force Update*, *The Synergist*, 10(2)L37, 1999.



INDOOR AIR QUALITY CONSIDERATIONS (continued)

immediate hypersensitivity. The initial exposure of an individual to an allergen in sufficient concentrations such that manifestation of hypersensitivity occurs in subsequent exposures is called sensitization. As with any other substance the risk of exposure depends on the allergenicity and concentration of the substance, the duration of exposure, and most importantly host susceptibility. Fungal elements, fecal pellets and dried body fragments of dust mites and cockroach, as well as skin dander and saliva from cat are the most common and problematic allergens in indoor environments.

Ventilation:

Carbon dioxide concentrations are typically measured as a surrogate value to assess outdoor air ventilation rates in occupied buildings. Briefly, in the absence of sources of combustion, the human occupants of a building are the primary generators of carbon dioxide. If a person enters a room the concentration of carbon dioxide will begin to rise. If the population of the room remains constant, the concentration of carbon dioxide will eventually stabilize and reach equilibrium.

The equilibrium concentration of carbon dioxide in an occupied space is thus a function of the amount of carbon dioxide generated by the occupants and the rate of outdoor air ventilation. Therefore, carbon dioxide concentrations measured in an occupied space can be used as a rough indication of the adequacy of outdoor air ventilation⁷. The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) has indicated that, "Comfort (odor) criteria is likely to be satisfied if the ventilation rate is set so that the indoor air concentrations do not rise more than 700 ppm over the outdoor air levels ppm"⁸.

Comfort:

People have varying thermal comfort zones and varying sensitivity to temperature relative humidity and, as such, finding a thermal environment that will suit every one may be virtually impossible. There are several perspectives from authors on the effects of temperature and relative humidity on comfort and health. The American Society of Heating, Refrigeration, and Air-conditioning Engineers (ASHRAE) Standard 55-2013 describes the comfort zone as a range of operative temperatures based on humidity ratio, air speed (< 40 fpm), metabolic rate (met) between .1 and

⁷ Environmental Protection Agency (EPA), *IAQ Diagnostics: Hands-On Assessment of Building Ventilation and Pollutant Transport (Course Manual)*, prepared by University of Tulsa, Dept. of Chemical Engineering.

⁸ ASHRAE Standard 62-2013. *Ventilation for Acceptable Indoor Air Quality*. Atlanta GA: American Society of Heating, Refrigerating, and Air-Conditioning Engineers, 1989.

INDOOR AIR QUALITY CONSIDERATIONS (continued)

1.3, clothing insulation (clo) between .5 and 1, in which the majority of the occupants (approximately 80%) find the environment comfortable (see Graph provided)

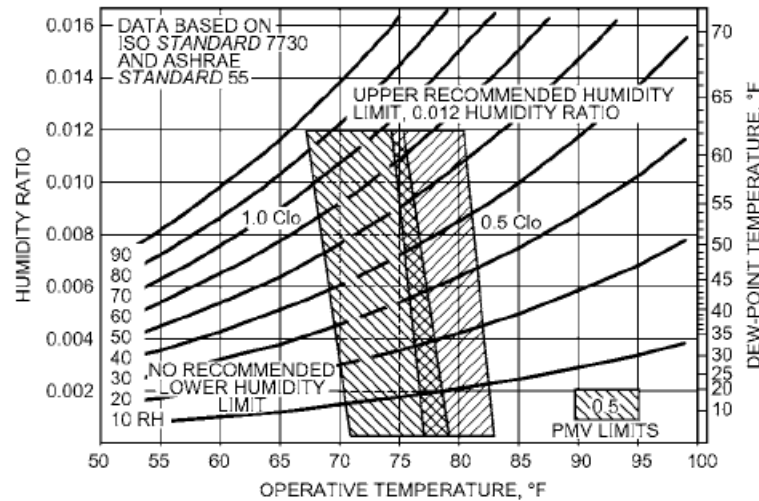


Fig. 5 ASHRAE Summer and Winter Comfort Zones

[Acceptable ranges of operative temperature and humidity with air speed ≤ 40 fpm for people wearing 1.0 and 0.5 clo clothing during primarily sedentary activity (≤ 1.1 met).]

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The 2011 ASHRAE Handbook HVAC Applications recommends design criteria for temperature and relative humidity based on the type of facilities. For instance, they recommend summer (cooling) design conditions for office buildings of 74 to 78 °F and 50 to 60% relative humidity; and 70 to 74 °F and 20 to 30% relative humidity for winter (heating).

The 2013 ASHRAE Handbook Fundamentals p 10.17 suggests that thermal comfort for a person at rest is experienced at 75 °F \pm 3 °F. Additionally they provide a table with various human responses to the thermal environment (see table below) where a neutral comfortable sensation is experienced approximately in the range of 74 to 80 °F.

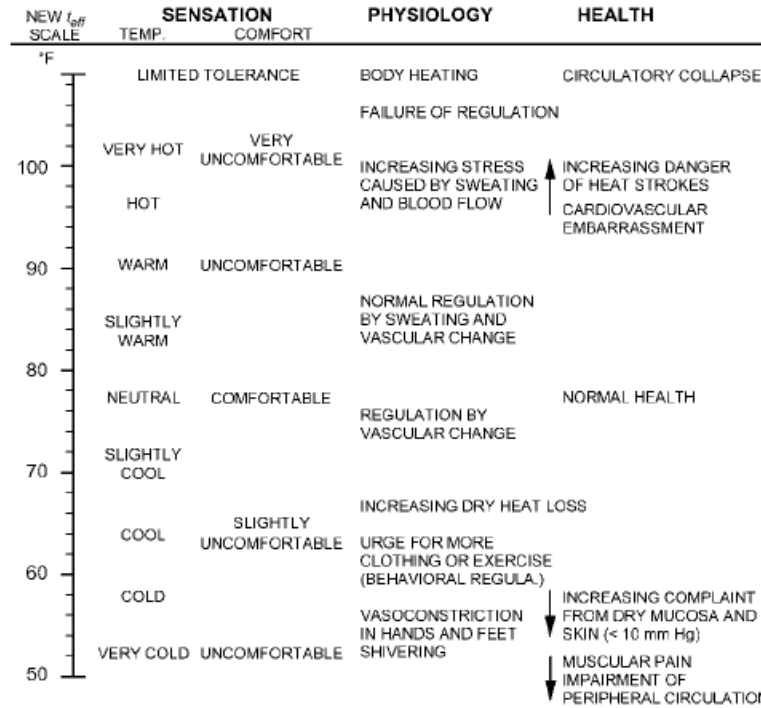


Fig. 1 Related Human Sensory, Physiological, and Health Responses for Prolonged Exposure

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For residential settings the Air-conditioning Contractors of America (ACCA) 8th Edition Manual J recommends design conditions of 75 °F and 50% for cooling and 70 °F for heating.



DISCLAIMERS

The results addressed in this report represent the building environmental conditions at the time the evaluation was undertaken. These conditions may change over the course of time as a result of dynamic and/or seasonal factors such as but not limited to occupancy rates, building operations, mechanical performance, weather, sporulation cycles, etc.

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