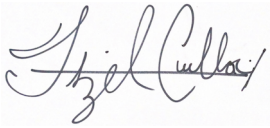
eurofins | Built Environment Testing

Report for:

Kyle Cotton
Ideal Environmental Engineering, Inc.
2904 Tractor Lane
Bloomington, IL 61704

Regarding: Eurofins Built Environment Testing Central, LLC
Project: Beecher CUSD 200U; Beecher Elem School
EML ID: 4190238

Approved by:



Business Unit Manager
Itzel Cuellar

Dates of Analysis:
Spore trap analysis: 08-18-2025

Service SOPs: Spore trap analysis (EB-MY-S-1038)
AIHA LAP, LLC accredited service, Lab ID #176641

All samples were received in acceptable condition unless noted in the Report Comments portion in the body of the report. Due to the nature of the analyses performed, field blank correction of results is not applied. The results relate only to the samples as received and tested. Information supplied by the client which can affect the validity of results: sample air volume.

Eurofins Built Environment Testing Central, LLC
1815 West Diehl Road, Suite 800, Naperville, IL 60563
(866) 871-1984 www.eurofinsus.com/Built

Client: Ideal Environmental Engineering, Inc.
C/O: Kyle Cotton
Re: Beecher CUSD 200U; Beecher Elem School

Date of Sampling: 08-17-2025
Date of Receipt: 08-18-2025
Date of Report: 08-18-2025

SPORE TRAP REPORT: NON-VIABLE METHODOLOGY

Location:	1R: 1st Grade classroom			ZZ: Outside air control		
Comments (see below)	None			None		
Lab ID-Version‡:	20939453-1			20939454-1		
Analysis Date:	08/18/2025			08/18/2025		
	raw ct.	% read	spores/m3	raw ct.	% read	spores/m3
Ascospores				41	25	1,100
Basidiospores				81	25	2,200
Botrytis						
Chaetomium						
Cladosporium				9	25	240
Curvularia						
Epicoccum						
Fusarium						
Myrothecium						
Nigrospora						
Other colorless						
Penicillium/Aspergillus types†	7	25	190			
Pithomyces						
Rusts				2	100	13
Smuts, Periconia, Myxomycetes						
Stachybotrys						
Stemphylium						
Torula						
Ulocladium						
Zygomycetes						
Background debris (1-4+)	2+			3+		
Hyphal fragments/m3	< 7			< 7		
Pollen/m3	< 7			< 7		
Skin cells (1-4+)	1+			< 1+		
Sample volume (liters)	150			150		
§ TOTAL SPORES/m3			190			3,500

Comments:

Spore types listed without a count or data entry were not detected during the course of the analysis for the respective sample, indicating a raw count of <1 spore.
† The spores of *Aspergillus* and *Penicillium* (and others such as *Acremonium*, *Paecilomyces*) are small and round with very few distinguishing characteristics. They cannot be differentiated by non-viable sampling methods. Also, some species with very small spores are easily missed, and may be undercounted.
††Background debris indicates the amount of non-biological particulate matter present on the trace (dust in the air) and the resulting visibility for the analyst. It is rated from 1+ (low) to 4+ (high). Counts from areas with 4+ background debris should be regarded as minimal counts and may be higher than reported. It is important to account for samples volumes when evaluating dust levels.

The analytical sensitivity is the spores/m^3 divided by the raw count, expressed in spores/m^3, per spore and per sample.

For more information regarding analytical sensitivity, please contact QA by calling the laboratory.
‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".
§ Total Spores/m3 has been rounded to two significant figures to reflect analytical precision.

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PROJECT ANALYST AND SIGNATORY REPORT

Project Analyst

Analyst: Kimberly Bugarin

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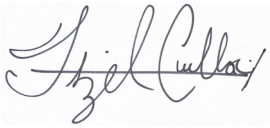

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	raw ct.	spores/m3	raw ct.	spores/m3
Ascospores			41	1,100
Basidiospores			81	2,200
Bipolaris/Drechslera group				
Botrytis				
Chaetomium				
Cladosporium			9	240
Curvularia				
Epicoccum				
Fusarium				
Myrothecium				
Nigrospora				
Other colorless				
Penicillium/Aspergillus types†	7	190		
Pithomyces				
Rusts			2	13
Smuts, Periconia, Myxomycetes				
Stachybotrys				
Stemphylium				
Torula				
Ulocladium				
Zygomycetes				
Background debris (1-4+)	2+		3+	
Hyphal fragments/m3	< 7		< 7	
Pollen/m3	< 7		< 7	
Skin cells (1-4+)	1+		< 1+	
Sample volume (liters)	150		150	
§ TOTAL SPORES/m3		190		3,500

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Project Analyst

Analyst: Kimberly Bugarin

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MoldRANGE™, Local Climate; Extended Outdoor Comparison

Outdoor Location: ZZ, Outside air control

Fungi Identified	Outdoor data	Typical Outdoor Data for: August in Central† EMLab Regional Climate code¹ A Annual Temp, A Elev., B Rain, A Temp. Range (n‡=368)						Typical Outdoor Data for: The entire year in Central† EMLab Regional Climate code¹ A Annual Temp, A Elev., B Rain, A Temp. Range (n‡=2999)					
Project zip code 61704	spores/m3	very low	low	med	high	very high	freq %	very low	low	med	high	very high	freq %
Generally able to grow indoors*													
Alternaria	-	27	40	110	240	400	87	13	27	67	200	320	62
Bipolaris/Drechslera group	-	7	7	13	27	27	24	7	13	13	27	40	13
Chaetomium	-	-	-	-	-	-	4	7	7	13	20	27	4
Cladosporium	240	230	740	2,100	5,200	8,400	97	80	190	910	3,400	6,200	90
Curvularia	-	7	13	20	53	97	42	7	13	13	40	69	15
Nigrospora	-	13	13	27	53	80	45	7	13	27	53	93	23
Penicillium/Aspergillus types	-	53	80	320	750	1,200	55	53	53	160	480	910	49
Stachybotrys	-	-	-	-	-	-	< 1	7	7	13	56	170	< 1
Torula	-	7	13	13	40	56	14	7	13	27	40	53	10
Seldom found growing indoors**													
Ascospores	1,100	190	320	1,000	2,500	4,000	98	53	110	480	1,900	3,700	76
Basidiospores	2,200	320	620	1,900	6,100	11,000	98	53	110	750	3,800	7,700	87
Rusts	13	13	13	27	67	110	39	13	13	27	93	190	24
Smuts, Periconia, Myxomycetes	-	13	20	47	110	160	77	13	20	53	160	280	65
§ TOTAL SPORES/m3	3,500												

¹EMLab Regional Climate codes are a climate classification scheme for regional geographic areas containing multiple states. The MoldRANGE™ Local Climate report uses the sampling location zip code to identify the EMLab Regional Climate code in that area. Using information available from the NOAA weather database, the EMLab Regional Climate code sharpens the precision of the MoldRANGE™reporting system, providing more reliable estimates of the range and average concentrations of the different airborne fungal spore types for each region. Additional information on the EMLab Regional Climate code system can be found on the last page of this report.

†The Typical Outdoor Data represents the typical outdoor spore levels across the region's group of states for the time period and EMLab Regional Climate code indicated. The last column represents the frequency of occurrence. The very low, low, med, high, and very high values represent the 10, 20, 50, 80, and 90 percentile values of the spore type when it is detected. For example, if the frequency of occurrence is 63% and the low value is 53, it would mean that the given spore type is detected 63% of the time and, when detected, 20% of the time it is present in levels above the detection limit and below 53 spores/m3. These values are updated periodically and if not enough data is available to make a statistically meaningful assessment, it is indicated with a dash.

‡ n is the sample size used to calculate the MoldRANGE™ Local Climate data summarized in the table.

* The spores in this category are generally capable of growing on wet building materials in addition to growing outdoors. Building related growth is dependent upon the fungal type, moisture level, type of material, and other factors. *Cladosporium* is one of the predominant spore types worldwide and is frequently present in high numbers. *Penicillium/Aspergillus* species colonize both outdoor and indoor wet surfaces rapidly and are very easily dispersed. Other genera are usually present in lesser numbers.

** These fungi are generally not found growing on wet building materials. For example, the rusts and smuts are obligate plant pathogens. However, in each group there are notable exceptions. For example, agents of wood decay are members of the basidiomycetes and high counts of a single morphological type of basidiospore on an inside sample should be considered significant.

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Understanding EMLab Regional Climate Codes

Outdoor airborne spore concentrations are strongly influenced by climate and weather patterns, often resulting in pronounced seasonal and diurnal cycles (Burge 1995). The seasonal climatic changes directly affect the growth cycle of plants, thereby influencing fungal growth, spore maturation, and release cycles. By evaluating outdoor spore concentrations across similar climatic zones rather than for the state as a whole, it is possible to provide a more representative estimate of typical outdoor spore levels and frequency of occurrence for different airborne fungal spore types in a given area.

The EMLab Regional Climate code system is a novel classification system that uses data from the NOAA - National Oceanic and Atmospheric Administration database to define unique climate zones. The following climate variables, for each regional zip code, are obtained from NOAA and assigned a letter code of A (above the regional average for that variable) or B (below the regional average for that variable):

1. Annual High Temperature
2. Elevation
3. Rainfall/Precipitation
4. Monthly Temperature Range

The result is a 4-character code assigned to each statewide zip code, referred to as the Regional Climate Code. Below are some examples of decoded Regional Climate Codes:

AAAA = Above avg. Annual High Temperature, Above avg. Elevation, Above avg. Rainfall/Precipitation, Above avg. Monthly Temperature Range
AABB = Above avg. Annual High Temperature, Above avg. Elevation, Below avg. Rainfall/Precipitation, Below avg. Monthly Temperature Range
BBAA = Below avg. Annual High Temperature, Below avg. Elevation, Above avg. Rainfall/Precipitation, Above avg. Monthly Temperature Range

The actual outdoor air sample data from matching regional climate codes in each group of states are then compiled in a manner relating typical spore concentrations and frequency of occurrence.

The data presented in this report is from the Central Region which includes the states of: IL, IN, KY, MO, OH, TN, and WV

The NOAA regional climate variables were selected by mapping data points from a subset of approximately 145,000 weather and geographic database entries to over 80,000 outdoor spore trap samples with known zip codes and assessing them using orthogonal array experimental design techniques. The results were then compared to the typical ranges of spore types found when grouping zip codes using the Koppen-Geiger climatic classification system; a commonly used climatic system that provides an objective numerical definition in terms of climatic elements such as temperature, rainfall, and other seasonal characteristics . The EMLab Regional Climate codes showed improved granularity and refinement of the zip code groupings, implying a better representation of the expected range of spore types to be found within an individual zip code.

The values on this report were calculated by obtaining the four variables listed above from the over 585 million data points of weather and geographic information available in the NOAA database, and determining the frequencies and percentile values of spore types by utilizing over 180,000 Eurofins Built Environment Testing outdoor spore trap samples with known zip codes.

This report groups regional zip codes in relation to these EMLab Regional Climate codes and summarizes MoldRANGE™ data by month and year within each EMLab Regional Climate code.

References:
Burge, Harriet, A. Bioaerosols: Boca Raton: Lewis Publishers, pp. 163-171, 1995.

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MoldRANGE™, Local Climate; Extended Outdoor Comparison

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Project Analyst

Analyst: Kimberly Bugarin

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MoldSTAT™: Supplementary Statistical Spore Trap Report

Outdoor Summary: ZZ: Outside air control

Species detected	Outdoor sample spores/m3 <100 1K 10K >100K	Typical outdoor ranges (North America)	Freq. %
Ascospores	1,100	13 - 210 - 5,200	73
Basidiospores	2,200	13 - 370 - 22,000	88
Cladosporium	240	27 - 440 - 7,800	88
Penicillium/Aspergillus types	< 7	13 - 190 - 2,600	59
Rusts	13	7 - 22 - 320	15
Smuts, Periconia, Myxomycetes	< 7	7 - 53 - 690	61
Total	3,500		

The "Typical outdoor ranges" and "Freq. %" columns show the typical low, medium, and high spore counts per cubic meter and the frequency of occurrence for the given spore type. The low, medium, and high values represent the 2.5, 50, and 97.5 percentile values when the spore type is detected. For example, if the low value is 53 and the frequency of occurence is 63%, it would mean that we typically detect the given spore type on 63 percent of all outdoor samples and, when detected, 2.5% of the time it is present in levels below 53 spores/m3.

Indoor Samples

Location: 1R: 1st Grade classroom

% of outdoor total spores/m3	Friedman chi-square* (indoor variation)	Agreement ratio** (indoor/outdoor)	Spearman rank correlation*** (indoor/outdoor)	MoldSCORE**** (indoor/outdoor)
Result: 5%	dF: N/A Result: N/A Critical value: N/A Inside Similar: N/A	Result: 0.0000	dF: 5 Result: -0.2500 Critical value: 0.8000 Outside Similar: No	Score: 130 Result: Low

Species Detected	Spores/m3 <100 1K 10K >100K
Penicillium/Aspergillus types	190
Total	190

* The Friedman chi-square statistic is a non-parametric test that examines variation in a set of data (in this case, all indoor spore counts). The null hypothesis (H0) being tested is that there is no meaningful difference in the data for all indoor locations. The alternative hypothesis (used if the test disproves the null hypothesis) is that there is a difference between the indoor locations. The null hypothesis is rejected when the result of the test is greater than the critical value. The critical value that is displayed is based on the degrees of freedom (dF) of the test and a significance level of 0.05.

** An agreement ratio is a simple method for assessing the similarity of two samples (in this case the indoor sample and the outdoor summary) based on the spore types present. A score of one indicates that the types detected in one location are the same as that in the other. A score of zero indicates that none of the types detected indoors are present outdoors. Typically, an agreement of 0.8 or higher is considered high.

*** The Spearman rank correlation is a non-parametric test that examines correlation between two sets of data (in this case the indoor location and the outdoor summary). The null hypothesis (H0) being tested is that the indoor and outdoor samples are unrelated. The alternative hypothesis (used if the test disproves the null hypothesis) is that the samples are similar. The null hypothesis is rejected when the result of the test is greater than the critical value. The critical value that is displayed is based on the degrees of freedom (dF) of the test and a significance level of 0.05.

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MoldSTAT™: Supplementary Statistical Spore Trap Report

**** MoldSCORE™ is a specialized method for examining air sampling data. It is a score between 100 and 300, with 100 indicating a greater likelihood that the airborne indoor spores originated from the outside, and 300 indicating a greater likelihood that they originated from an inside source. The Result displayed is based on the numeric score given and will be either Low, Medium, or High, indicating a low, medium, or high likelihood that the spores detected originated from an indoor source. Eurofins Built Environment Testingreserves the right to, and may at anytime, modify or change the MoldScore algorithm without notice.

Interpretation of the data contained in this report is left to the client or the persons who conducted the field work. This report is provided for informational and comparative purposes only and should not be relied upon for any other purpose. "Typical outdoor ranges" are based on the results of the analysis of samples delivered to and analyzed by Eurofins Built Environment Testing Testing and assumptions regarding the origins of those samples. Sampling techniques, contaminants infecting samples, unrepresentative samples and other similar or dissimilar factors may affect these results. With the statistical analysis provided, as with all statistical comparisons and analyses, false-positive and false-negative results can and do occur. Eurofins Built Environment Testing hereby disclaims any liability for any and all direct, indirect, punitive, incidental, special or consequential damages arising out of the data contained in, or any actions taken or omitted in reliance upon, this report.

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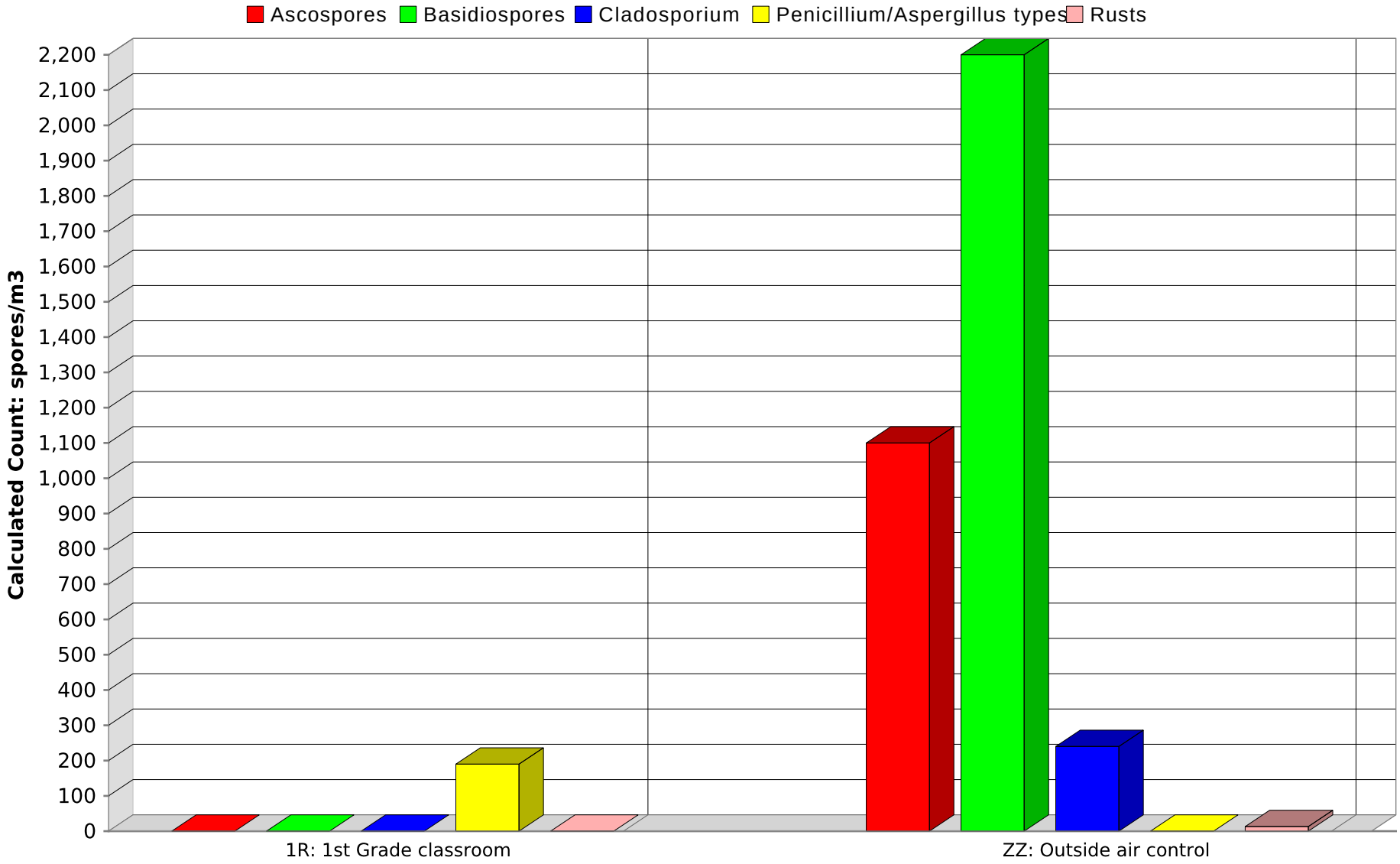
SPORE TRAP REPORT: NON-VIABLE METHODOLOGY



Comments:

Note: Graphical output may understate the importance of certain "marker" genera.