January 7, 2019

Clemson University
310 Klugh Avenue
Clemson, South Carolina 29634

Attn: Mr. W. Robert Newberry, IV
E-mail: wnewber@clemson.edu

Re: Limited Mold and Allergen Investigation Report
Clemson University
Holzendorf Hall, Office M15D
Clemson, South Carolina
Terracon Project No. 86187189D

Dear Mr. Newberry:

Terracon Consultants, Inc. (Terracon) conducted a limited mold and allergen investigation in the Office M15D of Holzendorf Hall in Clemson, South Carolina. This service was conducted in general accordance with our Master Service Agreement with Clemson University.

PROJECT DESCRIPTION

Scope of Services

At the request of Clemson University, Terracon conducted a limited mold and allergen investigation in the Office M15D of Holzendorf Hall on November 16, 2018. Reportedly, mold growth was observed on the piping and HVAC unit in the office, and Clemson wishes to test the area for mold and allergens.

On our November 16th visit, Terracon made measurements of temperature and relative humidity and conducted airborne mold sampling which consisted of collecting spore trap air samples in two locations inside the office suite and the collection of two additional samples outside for comparison. We also collected one composite microvac dust sample for allergen analysis along with three dust swab samples for surface mold analysis.

Standard of Care

This limited mold and allergen investigation was conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions in the same locale. Terracon did not attempt to identify every potential exposure or hazard present in the subject building. The results, findings, conclusions and recommendations expressed in this report are based on conditions observed during our sampling. Many factors, such as weather conditions, building occupancy, ventilation patterns and seasonal variations in fungal concentrations, can affect the conditions observed. The information contained in this report should not be relied upon to represent conditions that existed prior to or after this sampling. Terracon does not warrant the services of regulatory agencies, laboratories or other third parties supplying information that may have been used in the preparation of this report.

SAMPLING CRITERIA AND METHODS

Mold and Allergen Sampling

Total mold spore trap samples were collected using Air-O-Cell™ spore trap cassettes specifically designed for the collection of airborne mold spores. Air samples were collected using a calibrated Zefon Bio-Pump™ at a flow rate of 15 liters per minute (LPM) for 5 minutes at each location.

After collection, the spore trap samples were delivered by overnight courier to EMSL in Cinnaminson, New Jersey. EMSL is accredited by the AIHA® Laboratory Accreditation Programs, LLC under the Environmental Microbiology Laboratory Accreditation Program (EMLAP), Accreditation #100194. Air samples were analyzed by direct microscopic examination and results are reported in spores per cubic meter of air (spores/m^3).

To help interpret the mold sampling results, we compared indoor air and outdoor air measurements. High variability in airborne fungal spore concentrations can exist in different geographic locations, during different seasons, and weather patterns, and over the course of a given day. As a general rule, indoor air fungal spore concentrations in a heating, ventilation and air-conditioning (HVAC)-supplied building are typically less than, but qualitatively similar to, fungal spore concentrations found in the outside environment.

No state or federal exposure limits have been established for fungal aerosols. Regulatory standards, medically based threshold limit or dose-response relationships have not been established for exposure to airborne or surface concentrations of mold spores. Terracon relies upon experience, professional judgment, current scientific literature, guidelines and recommendations made by professional organizations and experts, and statistical methods in interpreting mold sampling results.

One composite allergen dust sample was collected from carpeting in Office M15D using a high volume air sampling pump in conjunction with a 3-piece 37 millimeter dust sampling cassette preloaded with a 5.0 micrometer polyvinyl chloride (PVC) filter.

After composite dust sample collection, the allergen sample was shipped by overnight courier to EMSL in Cinnaminson, New Jersey. EMSL is accredited by the AIHA® Laboratory Accreditation Programs, LLC under the Environmental Microbiology Laboratory Accreditation Program (EMLAP), Accreditation #100194. Allergen samples were analyzed by direct microscopic examination for allergens from dust mites, mouse, rat, cat, dog, and cockroach. Allergen results are reported in micrograms per gram of dust (µg/g). Additionally the samples were analyzed for mold spores.

Two three swab samples were collected from various areas where visible mold was identified using a HealthLink Transporter sterile swab. These samples were also sent to EMSL for mold spore identification by direct microscopic examination.

Temperature and Relative Humidity

Indoor air temperature and relative humidity are physical conditions important to the perception of comfort. The American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) has published recommendations regarding thermal comfort. ASHRAE Standard 55, Thermal Environmental Conditions for Human Occupancy, identifies six primary factors that affect comfort: metabolic rate (affected by the activity being performed); clothing insulation; air temperature; radiant temperature; air speed; and humidity.

Although the relationships are complex, a temperature range between 73 and 79 degrees Fahrenheit (°F) with relative humidity between roughly 20 and 60 percent (%) are recommended for persons in a conditioned setting wearing light summer clothing. Higher temperatures require lower humidity for comfort. For persons in winter clothing, temperatures can range between 68 and 75°F, with relative humidity between 20% and 60%, with preferred conditions falling between 30% and 50% for both winter and summer temperatures. EPA recommends maintaining indoor humidity below 60%, ideally 30-50%, if possible.

Readings of temperature and relative humidity were collected with an Extech Model 445580 IAQ instrument which was calibrated by the manufacturer.

FINDINGS

General Observations

- Office M15D appeared to be clean and uncluttered during the time of assessment.
- Office M15C also appeared to be clean and uncluttered during the time of assessment.
- A musty odor was noted in Office M15C open entering the space, however this smell quickly dissipated.
- Small areas of mold growth and moisture staining were observed on steam/condensate piping in both offices.
- Assessment of the small packaged terminal air conditioning (PTAC) units on both offices revealed areas of mold growth on various surfaces within the units.
- Photographs from the assessment are attached.

Mold Air Sampling

On the afternoon of November 16, 2018, Terracon collected three mold spore trap samples inside the building and two samples in outdoor locations for comparison. The results of the total spore count samples analyses are summarized in Table 1 below:

Table 1: Summary of Total Spore Count Analyses in the Air – November 16, 2018

Sample #	M15-A1	M15-A2	M15-A3	M15-O1	M15-O2
Location Description	**Office M15D**	**Office M15C**	**Office Foyer**	**Outdoors #1**	**Outdoors #2**
Spore Type	**Spores/m^3**	**Spores/m^3**	**Spores/m^3**	**Spores/m^3**	**Spores/m^3**
Ascospores	--	80	--	200	100
Aspergillus/Penicillium	19,500	156,000	30,000	300	780
Basidiospores	80	1,300	200	2,100	2,400
Cladosporium	--	10,100	1,900	200	200
Curvularia	--	--	30	10	--
Epicoccum	--	10	--	--	--
Myxomycetes	--	--	--	200	80
Arthrospores	--	5,460	1,500	--	--
Chromelosporium	40	--	--	--	--
Pestalotia/Pestalotiopsis	--	40	--	--	--
Torula-like	--	80	--	--	--
Total	**19,620**	**173,070**	**33,630**	**3,010**	**3,560**
Temperature (degrees F.)	71.0	67.1	73.2	59.5	55.7
Relative Humidity (%)	36.6	38.1	32.1	34.5	46.0

The total mold spore levels indoors were greater than the outdoor levels. With the predominant mold type identified indoors as Aspergillus/Penicillium like spores. The predominant spore type identified outdoors was Basidiospores like spores. The laboratory analytical report is attached.

Swab Sampling

Three swab samples were collected from the offices and analyzed to determine spore type. Samples M15-S1 and M15-S2 were collected from Office M15D and indicated the presence of medium to high levels of Cladosporium like spores. Sample M15-S3 was collected from Office M15C and appeared to have low amounts of Aspergillus/Penicillium like spores.

Temperature and Relative Humidity

The average indoor temperature was 70.4ºF and the relative humidity was 35.6%. The average outdoor temperature was 57.6ºF and the relative humidity was 40.3%.

Allergen Sampling

On November 19, 2018, Terracon collected one dust sample from the carpeting in Office M15D. The samples were analyzed for allergens from dust mites, mouse, rat, cat, dog, and cockroach.

Allergens were identified in the samples. Table 2 below summarizes the laboratory results. The laboratory analytical report is attached and references additional information.

Table 2: Summary of Allergen Analyses – November 19, 2018

Sample #	PA91-5	
Location Description	**Rear of Room 240**	
Allergen Type/Antigen	**Concentration (ug/g)**	**Laboratory assigned risk factor**
Dust Mites / Der fl	0.97	Low
Dust Mites / Der pl	0.02	Low
Mouse / Mus ml	ND	Low
Rat / Rat nl	ND	N/A
Cat / Fel dl	1.94	Moderate
Dog / Can fl	0.06	Low
Cockroach / Bla G2	ND	Low

Note: ug = microgram (10^{-6} grams), NA = Not Applicable, ND = not detected

CONCLUSIONS/RECOMMENDATIONS

The following conclusions/recommendations are provided based on our assessment:

- Based upon visual observations, Offices M15D and M15C overall appeared to be clean and had signs of moisture storage/mold growth. The moisture appeared to be related to the PTAC units and their associated steam/condensate piping. Terracon recommends the piping and its insulation be assessed to determine if it is adequate to prevent continual condensation issues.
- Visible mold should be cleaned until the piping insulation can either replaced or the piping system adjusted to reduce condensation on the piping. The PTAC units should also be cleaned. Additionally air scrubbers should be placed in the offices to reduce spore levels and musty odors in the interim.
- Temperature and humidity analysis showed the indoors were typically within the ASHRAE recommended ranges for fall/winter heating and cooling cycles. However, these ranges can vary due to comfort levels of the individuals occupying the building. Continue to maintain relative humidity levels below 60%.
- Results of the spore trap sampling, showed that the indoors had mold spores at a higher concentration compared to the outdoors. This may be contributed to the condensation issues on the pipe systems.
- Carpet vacuum samples indicated moderate level allergens (cat) were observed within the area tested, and could present allergic sensitization to occupants of the office space. The remaining allergens were either below detectable limits or were characterized as a low risk level.

Terracon appreciates the opportunity to provide this service to Clemson University. If you have any questions regarding this limited mold and allergen investigation report, please contact the undersigned at 864-292-2901.

Sincerely,
Terracon Consultants, Inc.

Stephen N. Ellis
Staff Industrial Hygienist

Jeffrey A. Gurrie, CIH
Senior Industrial Hygienist

Attachments: Photographs
Laboratory Results

Photographs



Photo #1 General view of Office M15D.



Photo #2 Typical view of mold growth and residual moisture staining on piping in Office M15D.



Photo #3 View of the clean coils and drain pan in the PTAC unit of Office M15D.



Photo #4 View of the dirt and debris on the condenser in the PTAC unit of Office M15D.



Photo #5 General view of Office M15C.



Photo #6 Typical view of mold growth and residual moisture staining on piping in Office M15C.



Photo #7 View of the dirty coils and drain pan in the PTAC unit of Office M15C.



Photo #8 View of the mold growth on the front cover of the PTAC unit of Office M15D.

Laboratory Results

EMSL Analytical, Inc.

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http://www.EMSL.com / cinnmicrolab@emsl.com

EMSL Order: 371821424
Customer ID: GTER78
Customer PO: 86187189D
Project ID:

Attn: Jeff Gurrie
Terracon Consultants, Inc.
72 Pointe Circle
Greenville, SC 29615

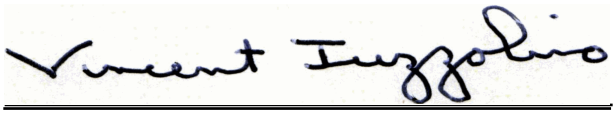
Phone: (864) 360-7572
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Collected: 11/16/2018
Received: 11/19/2018
Analyzed: 11/20/2018

Project: 86187189D / Holzendorf M15B

Test Report: Air-O-Cell(™) Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods MICRO-SOP-201, ASTM D7391)

Lab Sample Number:	371821424-0001			371821424-0002			371821424-0003		
Client Sample ID:	M15-A1			M15-A2			M15-A3		
Volume (L):	75			75			75		
Sample Location	Office M15D			Office M15C			Main Foyer		
Spore Types	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**
Alternaria (Ulocladium)	-	-	-	-	-	-	-	-	-
Ascospores	-	-	-	2	80	0	-	-	-
Aspergillus/Penicillium	476	19500	99.4	3790	156000	90.1	732	30000	89.2
Basidiospores	2	80	0.4	32	1300	0.8	6	200	0.6
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	-	-	-	245	10100	5.8	47	1900	5.6
Curvularia	-	-	-	-	-	-	2*	30*	0.1
Epicoccum	-	-	-	1*	10*	0	-	-	-
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycetes++	-	-	-	-	-	-	-	-	-
Pithomyces++	-	-	-	-	-	-	-	-	-
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Arthrospores	-	-	-	133	5460	3.2	36	1500	4.5
Chromelosporium++	1	40	0.2	-	-	-	-	-	-
Pestalotia/Pestalotiopsis	-	-	-	1	40	0	-	-	-
Torula-like	-	-	-	2	80	0	-	-	-
Total Fungi	**479**	**19620**	**100**	**4206**	**173070**	**100**	**823**	**33630**	**100**
Hyphal Fragment	1	40	-	2*	30*	-	2	80	-
Insect Fragment	-	-	-	-	-	-	-	-	-
Pollen	-	-	-	-	-	-	-	-	-
Analyt. Sensitivity 600x	-	41	-	-	41	-	-	41	-
Analyt. Sensitivity 300x	-	13*	-	-	13*	-	-	13*	-
Skin Fragments (1-4)	-	2	-	-	2	-	-	2	-
Fibrous Particulate (1-4)	-	1	-	-	1	-	-	1	-
Background (1-5)	-	2	-	-	1	-	-	2	-

++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.



Vincent Iuzzolino, M.S., Laboratory Manager
or other approved signatory

High levels of background particulate can obscure spores and other particulates leading to underestimation. Background levels of 5 indicate an overloading of background particulates, prohibiting accurate detection and quantification. Present = Spores detected on overloaded samples. Results are not blank corrected unless otherwise noted. The detection limit is equal to one fungal spore, structure, pollen, fiber particle or insect fragment. "*" Denotes particles found at 300X. "-" Denotes not detected. Due to method stopping rules, raw counts in excess of 100 are extrapolated based on the percentage analyzed. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ AIHA-LAP, LLC--EMLAP Lab 100194

Initial report from: 11/20/2018 10:32:07

For information on the fungi listed in this report, please visit the Resources section at www.emsl.com

EMSL Analytical, Inc.

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EMSL Order: 371821424
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Phone: (864) 360-7572
Fax: (864) 292-6361
Collected: 11/16/2018
Received: 11/19/2018
Analyzed: 11/20/2018

Project: 86187189D / Holzendorf M15B

371821424-0001 - Aspergillus conidiophores present in sample.
371821424-0002 - Aspergillus conidiophores present in sample.

Test Report: Air-O-Cell(™) Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods MICRO-SOP-201, ASTM D7391)

Lab Sample Number:	371821424-0004			371821424-0005			371821424-0006		
Client Sample ID:	M15-O1			M15-O2			Blank		
Volume (L):	75			75					
Sample Location	Outdoors 1			Outdoors 2			Blank		
Spore Types	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**
Alternaria (Ulocladium)	-	-	-	-	-	-	-	-	-
Ascospores	6	200	6.6	3	100	2.8	-	-	-
Aspergillus/Penicillium	8	300	10	19	780	21.9	-	-	-
Basidiospores	51	2100	69.8	58	2400	67.4	-	-	-
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	4	200	6.6	6	200	5.6	-	-	-
Curvularia	1*	10*	0.3	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycetes++	4	200	6.6	2	80	2.2	-	-	-
Pithomyces++	-	-	-	-	-	-	-	-	-
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Arthrospores	-	-	-	-	-	-	-	-	-
Chromelosporium++	-	-	-	-	-	-	-	-	-
Pestalotia/Pestalotiopsis	-	-	-	-	-	-	-	-	-
Torula-like	-	-	-	-	-	-	-	-	-
Total Fungi	**74**	**3010**	**100**	**88**	**3560**	**100**	**-**	**No Trace**	**-**
Hyphal Fragment	1	40	-	-	-	-	-	-	-
Insect Fragment	-	-	-	-	-	-	-	-	-
Pollen	1*	10*	-	-	-	-	-	-	-
Analyt. Sensitivity 600x	-	41	-	-	41	-	-	0	-
Analyt. Sensitivity 300x	-	13*	-	-	13*	-	-	0*	-
Skin Fragments (1-4)	-	1	-	-	1	-	-	-	-
Fibrous Particulate (1-4)	-	1	-	-	1	-	-	-	-
Background (1-5)	-	1	-	-	1	-	-	-	-

++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.

Vincent Iuzzolino

Vincent Iuzzolino, M.S., Laboratory Manager
or other approved signatory

High levels of background particulate can obscure spores and other particulates leading to underestimation. Background levels of 5 indicate an overloading of background particulates, prohibiting accurate detection and quantification. Present = Spores detected on overloaded samples. Results are not blank corrected unless otherwise noted. The detection limit is equal to one fungal spore, structure, pollen, fiber particle or insect fragment. "*" Denotes particles found at 300X. "-" Denotes not detected. Due to method stopping rules, raw counts in excess of 100 are extrapolated based on the percentage analyzed. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted.

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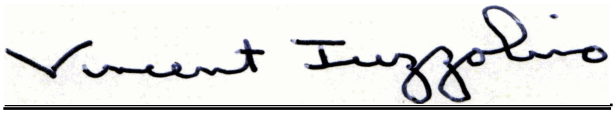
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Proj: 86187189D / Holzendorf M15B

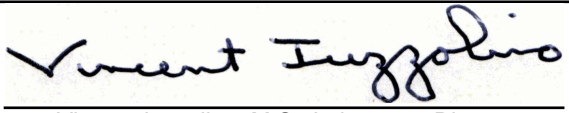
Test Report: Microscopic Examination of Fungal Spores, Fungal Structures, Hyphae, and Other Particulates from Swab Samples (EMSL Method MICRO-SOP-200)

Lab Sample Number:	371821424-0007	371821424-0008	371821424-0009		
Client Sample ID:	M15-S1	M15-S2	M15-S3		
Sample Location:	Piping In M15D	Top Of PTAC In M15D	Piping In M15C		
Spore Types	Category	Category	Category	-	-
Alternaria (Ulocladium)	-	Rare	-	-	-
Ascospores	-	Rare	-	-	-
Aspergillus/Penicillium	-	-	Low	-	-
Basidiospores	-	-	-	-	-
Bipolaris++	-	-	-	-	-
Chaetomium	-	-	-	-	-
Cladosporium	*Medium*	*High*	-	-	-
Curvularia	-	Rare	-	-	-
Epicoccum	-	Rare	-	-	-
Fusarium	-	-	-	-	-
Ganoderma	-	-	-	-	-
Myxomycetes++	-	Rare	-	-	-
Pithomyces++	-	Rare	-	-	-
Rust	-	-	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-
Zygomycetes	-	-	-	-	-
Nigrospora	-	Rare	-	-	-
Sporidesmium-like	-	Rare	-	-	-
Tetraploa	-	Rare	-	-	-
Hyphal Fragment	-	-	-	-	-
Insect Fragment	-	-	-	-	-
Pollen	-	-	-	-	-
Fibrous Particulate	-	Rare	-	-	-

Category: Count/per area analyzed - Rare: 1 to 10 Low: 11 to 100 Medium: 101 to 1000 High: >1000

- Denotes Not Detected.
++ = Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.
* = Sample contains fruiting structures and/or hyphae associated with the spores.

No discernable field blank was submitted with this group of samples.



Vincent Iuzzolino, M.S., Laboratory Director
or Other Approved Signatory

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EMSL Order #:	**371821424**
Customer ID:	**GTER78**
Customer PO:	**86187189D**

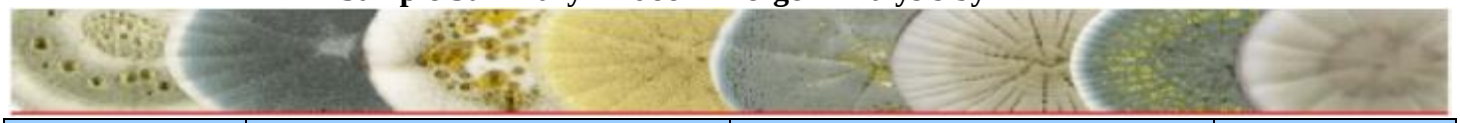
Attn: **Jeff Gurrie**
Terracon Consultants, Inc.
72 Pointe Circle
Greenville, SC 29615

Phone: **864-292-2901**
Fax: **864-292-6361**

Project: **86187189D / Holzendorf M15B**

Date Collected: **11/16/2018**
Date Received: **11/19/2018**
Date Analyzed: **11/26/2018**

Sample Summary -Indoor Allergen Analysis by MARIA®



Lab Sample Number	Client Sample ID	Sample Location	Sample Type
371821424-0010	M15-CV	Carpet In M15D	Bulk

Report Date	Report Revision	Revision Comments
11/27/2018	R0	Initial Report

Vincent Iuzzolino, M.S., Laboratory Director
or approved EMSL Analytical, Inc. signatory

About Us

EMSL Analytical, Inc. offers a full line of analytical solutions for over 30 years across North America. For more information about our nationally accredited locations, vast line of testing services, and our food safety solutions please visit www.EMSL.com or call



Disclaimers

All samples were collected by and all sampling data was provided by the client. The results are valid only for those samples analyzed, and only for those samples collected in accordance with the appropriate methodology as determined by the client. The results herein do not denote or represent a medical or clinical diagnosis or conclusion. In the event that sample(s) were submitted in opened, used, non-sterile or otherwise adulterated condition, EMSL shall not be responsible or liable. EMSL Analytical (Cinnaminson, NJ) is accredited by the American Industrial Hygiene Association (AIHA) in the EMLAP accreditation program for specified Field(s) of Testing as documented on the scope of accreditation.

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Project: **86187189D / Holzendorf M15B**

Date Collected: **11/16/2018**
Date Received: **11/19/2018**
Date Analyzed: **11/26/2018**

EMSL Sample #: **371821424-0010**
Client ID: **M15-CV**
Location: **Carpet In M15D**

Sample Type: **Bulk**
Sample Size: **92**
Sample Units: **mg**

Analytical Results -Indoor Allergen Analysis by MARIA®

Test Parameter	*Antigens*	*Detection Limits*		*Concentrations*		*Allergen Risk Levels*
Dust Mites Allergen	Der f1	0.012	µg/g	**0.97**	µg/g	☑
Dust Mites Allergen	Der p1	0.012	µg/g	**0.02**	µg/g	☑
Mouse Allergen	Mus m1	0.002	µg/g	**ND**	µg/g	☑
Rat Allergen	Rat n1	0.004	µg/g	**ND**	µg/g	†
Cat Allergen	Fel d1	0.004	µg/g	**1.94**	µg/g	⚠
Dog Allergen	Can f1	0.012	µg/g	**0.06**	µg/g	☑
Cockroach Allergen	Bla g2	0.024	µg/g	**ND**	µg/g	☑

†Sufficient evidence is not available for risk levels.

Allergen Risk Levels:

High -Risk of acute asthmatic attack.

Moderate -Risk for sensitization and bronchial hyperactivity.

Low -Not sufficient to cause symptoms or ND (None Detected); Indicates that the amount of allergen in the sample is below the detection limits.

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Report Date	**Report Revision**	**Revision Comments**
11/27/2018	R0	Initial Report

Vincent Iuzzolino, M.S., Laboratory Director
or approved EMSL Analytical, Inc. signatory

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Attn: **Jeff Gurrie**
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Greenville, SC 29615

Phone: **864-292-2901**
Fax: **864-292-6361**

Project: **86187189D / Holzendorf M15B**

Date Collected: **11/16/2018**
Date Received: **11/19/2018**
Date Analyzed: **11/26/2018**

Guidelines to Interpretation

	µg/g											
Allergens	<DL	<1	1	2	3	4	5	6	7	8	9	>10
Fel d1	ND	Low	Mod	Mod	Mod	Mod	Mod	Mod	Mod	High	High	High
Can f1	ND	Low	Low	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	High
Der p1	ND	Low	Low	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	High
Der f1	ND	Low	Low	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	High
Mus m1	ND	Low	Mod	Mod	Mod	High	High	High	High	High	High	High

	µg/m3	
Rat n1	ND	<0.7 µg /m3 = Not associated with increased risk of asthma

	µg/g											
	<DL	<0.08	0.08	0.09	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
Bla g2 †	ND	Low	Mod	Mod	Mod	Mod	Mod	Mod	High	High	High	High

† *Suggested levels. Not officially established.*

Note: *This report and guidelines furnish information only. Whether an individual suffers allergic symptoms or not depends on his/her medical history and previous exposure.*

References

Journal of Allergy and Clinical Immunology 1989; 83:416-427
Journal of Allergy and Clinical Immunology 1995; 96:449-456
The American review of respiratory disease 1990; 141:361-367
The American review of respiratory disease 1993; 147:573-578
Environmental Health Perspectives 2002; 110:419-425
Clinical and Experimental Allergy 1998; 28(5):537-44
Pediatric allergy-principles and practice. Mosby Inc 2003: 261-268.

Terminology

ELISA	Enzyme-linked Immunosorbent Assay
MARIA®	Multiplex Array for Indoor Allergens
Allergen	A substance which reacts with the body's immune system to produce an allergic reaction.
Antigen	A substance, foreign to the body, which stimulates the production of antibodies by the immune system.
Bla g2	*Blattella germanica* (Cockroach) allergen 2
Can f1	*Canis familiaris* (Dog) allergen 1
Der f1	*Dermatophagoides farinae* (Dust Mites) allergen 1
Der p1	*Dermatophagoides pteronyssinus* (Dust Mites) allergen 1
Detection Limits	DL is the smallest amount of a substance, in this case antigens, which can be measured.
Fel d1	*Felis domesticus* (Cat) allergen 1
Mus m1	*Mus musculus* (Mouse) allergen 1
ND	None detected, if any allergens are present they are below the detection limits.
Rat n1	*Rattus norvegicus* (Rat) allergen 1

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Project: **86187189D / Holzendorf M15B**

Date Collected: **11/16/2018**
Date Received: **11/19/2018**
Date Analyzed: **11/26/2018**

Important Terms, Conditions, and Limitations

A. Sample Retention
Samples analyzed by EMSL will be retained for 60 days after analysis date. Storage beyond this period is available for a fee with written request prior to the initial 30 day period. Samples containing hazardous/toxic substances which require special handling will be returned to the client immediately. EMSL reserves the right to charge a sample disposal fee or return samples to the client.

B. Change Orders and Cancellation
All changes in the scope of work or turnaround time requested by the client after sample acceptance must be made in writing and confirmed in writing by EMSL. If requested changes result in a change in cost the client must accept payment responsibility. In the event work is cancelled by a client, EMSL will complete work in progress and invoice for work completed to the point of cancellation notice. EMSL is not responsible for holding times that are exceeded due to such changes.

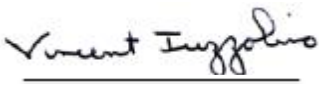
C. Warranty
EMSL warrants to its clients that all services provided hereunder shall be performed in accordance with established and recognized analytical testing procedures and with reasonable care in accordance with applicable federal, state and local laws. The foregoing express warranty is exclusive and is given in lieu of all other warranties, expressed or implied. EMSL disclaims any other warranties, express or implied, including a warranty of fitness for particular purpose and warranty of merchantability.

D. Limits of Liability
In no event shall EMSL be liable for indirect, special, consequential, or incidental damages, including, but not limited to, damages for loss of profit or goodwill regardless of the negligence (either sole or concurrent) of EMSL and whether EMSL has been informed of the possibility of such damages, arising out of or in connection with EMSL's services thereunder or the delivery, use, reliance upon or interpretation of test results by client or any third party. We accept no legal responsibility for the purposes for which the client uses the test results. EMSL will not be held responsible for the improper selection of sampling devices even if we supply the device to the user. The user of the sampling device has the sole responsibility to select the proper sampler and sampling conditions to insure that a valid sample is taken for analysis. Any resampling performed will be at the sole discretion of EMSL, the cost of which shall be limited to the reasonable the original sample delivery group (SDG) samples. In no event shall EMSL be liable to a client orvalue of any third party, whether based upon theories of tort, contract or any other legal or equitable theory, in excess of the amount paid to EMSL by client thereunder.

E. Indemnification
Client shall indemnify EMSL and its officers, directors and employees and hold each of them harmless for any liability, expense or cost, including reasonable attorney's fees, incurred by reason of any third party claim in connection with EMSL's services, the test result data or its use by client.

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Report Date	Report Revision	Revision Comments
11/27/2018	R0	Initial Report



Vincent Iuzzolino, M.S., Laboratory Director
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OrderID: 371821424

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EMSL
CINNAMINSON, N.J.
2018 NOV 19 A 10:47

Microbiology Chain of Custody

EMSL Order Number (*Lab Use Only*): 371821424

Company Name: Terracon Consultans, Inc.	**EMSL-Bill to:** ☐ Same ☐ Different If Bill to is Different note instructions in Comments** *Third Party Billing requires written authorization from third party*
Street: 72 Pointe Circle	
City: Greenville **State/Province:** SC	**Zip/Postal Code:** 29615 **Country:** US
Report To (Name): Jeff Gurrie	**Telephone #:** 864.292.2901
Email Address: jeff.gurrie@terracon.com	**Fax #:** 864.292.6361 **Purchase Order:**
Project Name/Number: 86187189D Holzendorf M15B	**Please Provide Results:** ☐ Fax ☐ Email
U.S. State Samples Taken: SC **Project Zip Code:**	**Connecticut Samples:** ☐ Commercial ☐ Residential

**Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide. TATs are subject to methodology requirements*

Sterile, Sodium Thiosulfate Preserved Bottle Used: ☐ **Biocide Used in Source (specify):** _____ ☐

Public Water Supply Samples: ☐ **Note: All results may automatically be reported to DOH if required by state.**

Turnaround Time (TAT) Options * - Please Check

☐ 3 Hour	☐ 6 Hour	■ 24 Hour	☐ 48 Hour	☐ 72 Hour	☐ 96 Hour	■ 1 Week	☐ 2 Week

AOC & Swabs — VAC

Microbiology Test Codes

M001 Air-O-Cell
M030 Micro 5
M174 MoldSnap
M032 Allergenco-D
M041 Fungal Direct Examination
M169 Pollen ID & Enumeration
M280 Dust Characterization Level-1
M281 Dust Characterization Level-2
M005 Viable Fungi- Air Samples (Genus ID & Count)
M006 Viable Fungi- Air Samples (Includes *Penicillium, Aspergillus, Cladosporium, Stachybotrys* Species ID & Count)
M007 Culturable fungi - Surface Samples (Genus ID & Count)
M008 Culturable fungi - Surface Samples (Includes *Penicillium, Aspergillus, Cladosporium, Stachybotrys* Species ID & Count)
M009 Bacteria Culture Gram Stain & Count
M010 Bacteria Count & ID - 3 Most Prominent
M011 Bacteria Count & ID - 5 Most Prominent
M012 Pseudomonas aeruginosa (P/A***)

M024 Pseudomonas aeruginosa (MFT*)
M015 Heterotrophic Plate Count
M017 Total Coliform & E. coli (Colilert P/A***)
M018 Total Coliform & E. coli (MFT*)
M114 Total Coliform & E. coli Enumeration (Colilert MPN**)
M019 Fecal Coliform (MFT*)
M020 Fecal Streptococcus (MFT*)
M029 Enterococci (MFT*)
M129 Enterococci (Enterolert P/A***)
M180 Real Time qPCR-ERMI 36 Panel
M025 Sewage Screen –Water (MFT*)

M115 Sewage Screen - Water (P/A***)
M116 Sewage Screen - Water (MPN**)
M117 Sewage Screen - Swab (P/A***)
M013 Sewage Screen - Swab (MFT*)
M133 Methicillin-resistant Staph. aureus (MRSA)
M031 Rapid-growing non-TB Mycobacteria Detection & Enumeration
M014 Endotoxin Analysis
M044 Group Allergen (Cat, Dog, Cockroach, Dust Mite)
Other See Analytical Price Guide
Legionella Analysis Please use EMSL Legionella COC

*MFT= Membrane Filtration Technique
**MPN= Most Probable Number
***P/A= Presence/Absence

Name of Sampler: Stephen Ellis **Signature of Sampler:**

Sample #	Sample Location/Description	Sample Type	Potable/ NonPotable (only for waters)	Test Code	Volume/ Area	Date/Time Collected	Temperature (°C) (Lab Use Only)
Example A1	Kitchen Sink/Tap	Water	☒ P ☐ NP	M017	100 mL	9/1/13 4:00 PM	
M15-A1	Office M15D	Air	☐ P ☐ NP	M001	75L	11-16-18	
M15-A2	Office M15C	Air	☐ P ☐ NP	M001	75L	11-16-18	
M15-A3	Main Foyer	Air	☐ P ☐ NP	M001	75L	11-16-18	
M15-O1	Outdoors 1	Air	☐ P ☐ NP	M001	75L	11-16-18	
M15-O2	Outdoors 2	Air	☐ P ☐ NP	M001	75L	11-16-18	
Blank	Blank	Air	☐ P ☐ NP	M001	UL	11-16-18	

Client Sample # (s): - **Total # of Samples:** 10 **Samples Received Chilled? Yes / No**

Relinquished (Client): **Date:** 11-16-18 **Time:** 1700

Received (Lab): **Date:** 11-19-18 **Time:** 09.50

Comments/Special Instructions:

** - Please analyze for dust Rat/Mouse Allergens M254

Controlled Document – COC-34 Micro R7.2 8/23/2017

OrderID: 371821424

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Microbiology Chain of Custody

EMSL Order Number (*Lab Use Only*): 371821424

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200 Route 130 North
Cinnaminson, NJ 08077
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FAX: (856) 786-5974

Additional Pages of the Chain of Custody are only necessary if needed for additional sample information

Sample #	Sample Location/Description	Sample Type	Potable/ NonPotable	Test Code	Volume/ Area	Date/Time Collected	Temperature (°C) (Lab Use Only)
M15-S1	Piping in M15D	Dust	☐ P ☐ NP	M041	N/A	11-16-18	
M15-S2	Top of PTAC in M15D	Dust	☐ P ☐ NP	M041	N/A	11-16-18	
M15-S3	Piping in M15C	Dust	☐ P ☐ NP	M041	N/A	11-16-18	
M15-CV	Carpet in M15D	Vac	☐ P ☐ NP	M044**	N/A	11-16-18	
			☐ P ☐ NP				
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Comments/Special Instructions:

** - Please analyze for dust Rat/Mouse Allergens M254