Client: EMLab P&K (QA) Date of Sampling: 01-15-2015
C/O: Mr. Quality Control Date of Receipt: 01-15-2015
Re: Sample Report Date of Report: 01-15-2015

MoldRANGE™, Local Climate; Extended Outdoor Comparison
Outdoor Location: 1, Outside Reference

Fungi Identified	Outdoor data	Typical Outdoor Data for: January in Arizona† EMLab Local Climate code[1] A Annual Temp, B Elev., B Rain, A Temp. Range (n‡=222)						Typical Outdoor Data for: The entire year in Arizona† EMLab Local Climate code[1] A Annual Temp, B Elev., B Rain, A Temp. Range (n‡=2613)					
Project zip code 85027	spores/m3	very low	low	med	high	very high	freq %	very low	low	med	high	very high	freq %
Generally able to grow indoors*													
Alternaria	13	13	13	20	40	51	44	13	13	27	53	89	55
Bipolaris/Drechslera group	-	13	13	13	27	28	32	13	13	22	53	89	42
Chaetomium	-	7	7	13	40	44	11	7	13	13	27	44	16
Cladosporium	1,200	27	53	130	550	820	92	40	67	190	480	760	94
Curvularia	-	-	-	-	-	-	3	13	13	13	44	80	18
Epicoccum	13	-	-	-	-	-	4	7	9	13	22	40	3
Fusarium	13	-	-	-	-	-	< 1	-	-	-	-	-	< 1
Nigrospora	-	-	-	-	-	-	4	7	13	13	22	25	4
Penicillium/Aspergillus types	640	27	53	150	350	530	86	27	53	130	330	530	89
Stachybotrys	-	-	-	-	-	-	2	13	13	22	40	44	3
Torula	-	-	-	-	-	-	5	13	13	22	44	67	9
Ulocladium	13	-	-	-	-	-	3	13	13	13	21	32	1
Seldom found growing indoors**													
Ascospores	320	13	13	44	110	130	45	13	20	53	120	200	68
Basidiospores	750	13	22	53	190	310	75	22	40	110	290	590	87
Botrytis	27	-	-	-	-	-	1	13	13	13	32	53	2
Pyricularia	13	-	-	-	-	-	< 1	-	-	-	-	-	< 1
Rusts	13	-	-	-	-	-	< 1	7	13	13	27	40	4
Smuts, Periconia, Myxomycetes	40	13	13	22	44	57	57	13	13	33	80	140	68
§ TOTAL SPORES/m3	3,000												

[1]EMLab Local Climate codes are a climate classification scheme for statewide geographic areas. The MoldRANGE™ Local Climate report uses the sampling location zip code to identify the EMLab Local Climate code in that area. Using information available from the NOAA weather database, the EMLab Local 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 Local 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 state for the time period and EMLab Local 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.

§ Total Spores/m3 has been rounded to two significant figures to reflect analytical precision.

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Understanding EMLab Local 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 Local Climate code system is a novel classification system that uses data from the NOAA - National Oceanic and Atmospheric Administration database to define unique climate regions by state. The following local climate variables, for each statewide zip code, are obtained from NOAA and assigned a letter code of A (above the statewide average for that variable) or B (below the statewide 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 Local Climate Code. Below are some examples of decoded Local 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 local climate codes in each state are then compiled in a manner relating typical spore concentrations and frequency of occurrence.

The NOAA local 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 Local 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 EMLab P&K outdoor spore trap samples with known zip codes.

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

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