



# HYGIENETECH

Hygiene Technologies International, Inc.

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October 14, 2010

State of California  
Board of Equalization  
450 N Street  
Sacramento, California 94279

Document No. 21009001.1

Attention: David Gau

Regarding: Limited Indoor Air Quality Survey  
20<sup>th</sup> Floor Pre-Occupancy Assessment

Dear Mr. Gau:

On September 28, 2010, industrial hygienists with Hygiene Technologies International, Inc. (HygieneTech) conducted a limited indoor air quality survey on the 20<sup>th</sup> Floor of the State of California Board of Equalization (BOE) building located at the above mentioned address. This survey was performed in response to BOE's need to reoccupy the 20<sup>th</sup> Floor subsequent to fungal growth remediation and other renovation work performed under the direction of the State of California Department of General Services (DGS) on that floor. At the time of the survey, various samples were collected and direct-reading instruments were used to assess the general indoor air quality. I have enclosed our report, which included general observations, sample and direct-reading results, a discussion of the data, conclusions, and recommendations.

If you have any comments or questions regarding the information contained in this report, please do not hesitate to contact our offices directly at (310) 370-8370.

Sincerely,

**HYGIENE TECHNOLOGIES INTERNATIONAL, INC.**

Brian P. Daly, CIH, PE  
President



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**LIMITED INDOOR AIR QUALITY SURVEY  
PRE-OCCUPANCY ASSESSMENT – 20<sup>TH</sup> FLOOR**

**450 N STREET  
SACRAMENTO, CALIFORNIA**

**PREPARED FOR:**

**STATE OF CALIFORNIA  
BOARD OF EQUALIZATION  
450 N STREET  
SACRAMENTO, CALIFORNIA**

**PREPARED BY:**

**HYGIENE TECHNOLOGIES INTERNATIONAL, INC.  
3625 DEL AMO BOULEVARD, SUITE 180  
TORRANCE, CALIFORNIA**

**OCTOBER 14, 2010**



## **1.0 BACKGROUND**

On September 28, 2010, industrial hygienists with Hygiene Technologies International, Inc. (HygieneTech) conducted a limited indoor air quality survey on the 20<sup>th</sup> Floor of the State of California Board of Equalization (BOE) building located at 450 N Street in Sacramento, California. This survey was performed in response to BOE's need to reoccupy the 20<sup>th</sup> Floor subsequent to fungal growth remediation and other renovation work performed under the direction of the State of California Department of General Services (DGS) on that floor. During the survey, a variety of samples were collected and direct-reading instruments were used to assess the general indoor air quality on the 20<sup>th</sup> Floor of the subject building. Various air samples were collected in order to assess fungal growth exposure potentials. In addition, air samples were collected throughout the floor for fibrous dust, 4-phenylcyclohexene, formaldehyde, and total dust analysis. Direct-reading instruments were also used to determine airborne volatile organic compounds (VOCs), carbon dioxide (CO<sub>2</sub>), air temperature, and relative humidity.

## **2.0 OBSERVATIONS**

The interior building materials of the 20<sup>th</sup> Floor included, but were not limited to, metal window frames; painted gypsum board and/or metal windowsills; metal doorjambs and door frames; painted gypsum board walls in the general work areas; tile covered walls and painted gypsum board ceilings in the restrooms; suspended 2' by 4' ceiling tiles and or gypsum board ceilings in the general work areas; ceramic or vinyl tile flooring in the restrooms and break rooms; and carpet flooring in the general work areas.

The floor was unoccupied on the survey date but was furnished with typical office desks, upholstered chairs, shelves, fabric covered cubicles, and other general office items. Note that new carpet had been installed and fresh paint had been applied throughout the floor in the weeks preceding the survey date.

## **3.0 SAMPLING AND ANALYSIS**

Air samples were collected and subsequently analyzed for fungi (including yeasts, molds, rusts, smuts, and mushrooms) by trained and experienced microbiologists at a laboratory accredited by the American Industrial Hygiene Association (AIHA) and that successfully participates in the AIHA Environmental Microbiology Proficiency Analytical Testing (EMPAT) Program. Other samples were collected for airborne fibers, 4-phenylcyclohexene, fibers, formaldehyde, and total dust determinations using the appropriate sampling media. Pump flow rates were established and verified using a BIOS DryCal DC-Lite primary flow meter. Those samples were collected and analyzed along with blanks (identical sampling media through which no air was drawn) at laboratories accredited by the American Industrial Hygiene Association (AIHA) through successful participation in the National Institute for Occupational Safety and Health (NIOSH) Proficiency Analytical Testing Program. Direct-reading instruments were used to determine airborne VOC levels, the results of which appear in Table 21009001-6 in Appendix A of this report. A discussion of the airborne CO<sub>2</sub> data, along with air temperature and relative humidity results, appears in Section 4.0 of this report. Additional information concerning the specific sampling and analytical methods appears below.



### **3.0 SAMPLING AND ANALYSIS (CONTINUED)**

#### **3.1 Airborne Total Fungi**

Air samples for airborne total (viable and nonviable) fungi determinations were collected using a Zefon brand Bio-Pump™ equipped with Air-O-Cell™ cassettes. All such samples were collected at various indoor locations and two samples were collected outdoors for comparison purposes. The resultant data, which are presented in spores per cubic meter of air (spores/M<sup>3</sup>), appear in Table 21009001-1.

#### **3.2 Airborne Fibrous Dust**

Area air samples for fibrous dust were collected at stationary locations on 25-millimeter diameter, 0.8-micrometer pore size, mixed cellulose ester filters. The samples were analyzed by phase contrast microscopy (PCM) in accordance with the NIOSH Method 7400. These data are presented in fibers per cubic centimeter (f/cc) of air in Table 21009001-2.

#### **3.3 Airborne Total Dust**

Area air samples for total dust determination were collected at stationary locations on filter cassettes containing pre-weighed 37-millimeter diameter, polyvinyl chloride filters having a pore size of five micrometers. The samples were analyzed by gravimetric method in accordance with the NIOSH Method 0500. These data are presented in milligrams per cubic meter of air (mg/M<sup>3</sup>) and appear in Table 21009001-3.

#### **3.4 Formaldehyde**

Area air samples were collected for formaldehyde determinations using DNPH silica gel sorbent tubes. The analyses were performed by high performance liquid chromatography using an ultraviolet detector in accordance with a modified NIOSH Method 2016. These data are presented in parts per million (ppm) and appear in Table 21009001-4.

#### **3.5 Airborne 4-Phenylcyclohexene**

Area air samples for 4-phenylcyclohexene were collected on solid sorbent Carbo Trap 300 tubes equipped with Sagelock fittings and each sample was analyzed by gas chromatography with mass spectrometry detection (GC-MS) in accordance with U.S. EPA Method TO17. These data are presented in parts per billion volume (ppbv) and appear in Table 21009001-5.

#### **3.6 Airborne Volatile Organic Compounds**

Direct-reading air measurements for VOCs were also recorded at various locations on the 20<sup>th</sup> Floor using a RAE Systems, Inc. Mini-RAE 2000 photoionization detector, which is capable of detecting a wide variety of unsaturated hydrocarbons at airborne concentrations ranging from 0.1 to 10,000 parts per million (ppm). Prior to the survey, this instrument was calibrated using a 100-ppm isobutylene gas standard. These data are presented in ppm.



### 3.0 SAMPLING AND ANALYSIS (CONTINUED)

#### 3.7 Airborne Carbon Dioxide

Direct-reading air measurements for airborne CO<sub>2</sub> concentration were recorded at stationary locations using a Telaire® 7001 Carbon Dioxide and Temperature Monitor. The data are presented in ppm.

#### 3.8 Air Temperature and Relative Humidity

Air temperature and relative humidity data were recorded at stationary locations using an Extech Instrument hygro-thermometer.

### 4.0 DISCUSSION

#### 4.1 Airborne Total Fungi

The airborne total fungi data showed mostly common spore types outdoors such as *Alternaria*, ascospores, basidiospores, *Botrytis*, *Chaetomium*, *Cladosporium*, colorless spores typical of *Penicillium* and *Aspergillus* species, *Curvularia*, *Epicoccum*, *Nigrospora*, *Pithomyces*, rusts, smuts, *Stemphylium*, *Torula*, and/or *Ulocladium*, with *Cladosporium* and colorless spores typical of *Penicillium* and *Aspergillus* species predominating. Indoors, the ambient data showed that airborne fungal spores were either not detected at or above the laboratory analytical detection limit or were detected at low airborne concentrations. The common fungal spore types found indoors included basidiospores, *Cladosporium*, and/or colorless spores typical of *Penicillium* and *Aspergillus* species. Indoors, the distribution of fungal spore types detected in the surveyed areas was consistent with those found outdoors, and the overall data within the tested areas were well below the overall data recorded outdoors. These data are not believed to pose a health risk beyond that posed by the outdoor environment where exposures to airborne fungi are expected.

#### 4.2 Airborne Fibrous Dust

The data recorded in the surveyed areas indicated that airborne fibrous dusts were not detected at or above the respective laboratory analytical detection limit of 0.003 f/cc. Because the samples were collected at stationary locations at approximate breathing zone height, the resultant data are expected to represent building occupant *exposure potentials* for those persons working in or passing through the areas monitored. These data, which are expected to represent employee *exposure potentials* to fibers of various types, including man-made and natural mineral fibers, cellulose (paper or wood composition), gypsum, and other fibrous dusts common in the environment, are well below the current Cal-OSHA 8-hour TWA PEL for asbestos fibers of 0.1 f/cc, the most restrictive exposure limit for fibrous dusts.

#### 4.3 Airborne Total Dust

Common dust that is typically identified in buildings usually contains a wide variety of materials including, but not limited to, gypsum crystals, cellulosic particles, fiberglass fragments, mineral grains from soil, fungi spores, fine glass fibers, textile and wood fibers, iron or steel fragments, dead skin cells, insect parts, animal dander, and pollens. Generally, exposure to low levels of such materials



## 4.0 DISCUSSION (CONTINUED)

### 4.3 Airborne Total Dust (Continued)

does not produce ill effects in most persons. In fact, these so-called *nuisance dusts* have a long history of little adverse effect to the lungs and are not known to produce significant diseases or toxic effects, such as collagen (scar tissue) formation, when exposure are kept under reasonable control.

The data recorded in the surveyed areas showed that airborne total dust was not detected at or above the laboratory analytical detection limits of 0.21 mg/M<sup>3</sup>. Because the samples were collected at stationary locations at approximate breathing zone height, the resultant data are expected to represent building occupant *exposure potentials* for those persons working in or passing through the areas monitored. These data are well below the State of California, Department of Industrial Relations, Division of Occupational Safety and Health (Cal-OSHA) 8-hour time-weighted average (TWA) permissible exposure limit (PEL) for total dust of 10 mg/M<sup>3</sup>, as defined in Title 8 of the California Code of Regulations, Section 5155 (T8, CCR § 5155). Note that these data are also well below the American Conference of Governmental Industrial Hygienists 8-hour TWA threshold limit value (TLV-TWA) for particulate (not otherwise classified) of 10 mg/M<sup>3</sup>; the U.S. Environmental Protection Agency (EPA) National Ambient Air Quality Primary Standard of 0.26 mg/M<sup>3</sup> (24-hour standard); and the American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc. (ASHRAE) theoretical value for non-occupational environments of 1/10 of the TLV.

### 4.4 Formaldehyde

The data recorded in the surveyed areas indicated that airborne formaldehyde was detected at 0.01 ppm. Because these samples were collected at stationary locations at approximate breathing zone height, the resultant data are expected to represent building occupant *exposure potentials* for those persons working in or passing through the areas monitored. These data are well below the State of California, Department of Industrial Relations, Division of Occupational Safety and Health (Cal-OSHA) 8-hour time-weighted average (TWA) permissible exposure limit (PEL) for Formaldehyde of 0.75 ppm, as defined in Title 8 of the California Code of Regulations, Section 5155 (T8, CCR § 5155).

### 4.5 Airborne 4-Phenylcyclohexene

The airborne data indicated that 4-phenylcyclohexene was not detected at or above the laboratory analytical detection limits of 0.089 ppbv. Although current standards or guidelines have not been established for 4-phenylcyclohexene at the time of this report, all such data are considered unremarkable.

### 4.6 Airborne Volatile Organic Compounds

With the use of a direct-reading photoionization detector, VOCs were detected at peak levels ranging from 0.1 to 0.7 ppm, with average levels that did not exceed the analytical detection limit of 0.1 ppm. Because these data were recorded at various locations at approximate breathing zone height, the results are expected to represent building occupant *exposure potentials* for those persons occupying or passing through the areas monitored. These data were well below the surrogate Cal-OSHA PELs that are often used for comparative purposes regarding VOC exposures, such as those for gasoline, hexane, and varnish makers and painters (VM&P) naphtha.



## 4.0 DISCUSSION (CONTINUED)

### 4.7 Airborne Carbon Dioxide

The direct-reading results indicated that CO<sub>2</sub> was detected at levels ranging from 507 to 638 ppm on the 20<sup>th</sup> Floor. While these data were somewhat higher than the expected outdoor CO<sub>2</sub> levels, which generally range between 320 and 350 ppm, they are considered normal for indoor environments and they are all well below the Cal-OSHA 8-hour TWA PEL for CO<sub>2</sub> of 5000 ppm (T8, CCR, § 5155). They are also below the level of 1000 ppm, which is essentially equivalent to the recommended upper limit for building occupant comfort and odor control established by ASHRAE (not greater than 700 ppm above the outdoor CO<sub>2</sub> value) as stated in ASHRAE 62-2001.

Based on historic studies performed by HygieneTech, building occupant complaints of "stuffy" air often begin when CO<sub>2</sub> levels exceed 800 ppm. HygieneTech has also found that some sensitive persons may experience discomfort, including eye irritation and headache, when CO<sub>2</sub> levels reach 1,000 ppm. Such symptoms are not believed to be the result of an unhealthy exposure to CO<sub>2</sub>; rather, they are thought to be the result of exposure to other common indoor air pollutants which, if not exhausted and/or diluted, can accumulate over time.

### 4.8 Air Temperature and Relative Humidity

The recorded air temperatures ranged between 74.9 and 76.8 degrees Fahrenheit (°F). Based on the experience of HygieneTech, the air temperatures perceived as comfortable by most persons in office environments, and recommended by ASHRAE for occupant comfort, range between 68.0 and 74.5°F (winter) and 73.0 and 79.0°F (summer).

Relative humidity data were recorded indoors at levels ranging from 31.1 to 37 percent. Such levels were well within the 20 to 60 percent relative humidity level range recommended by ASHRAE for occupant comfort. Note that HygieneTech recommends that the relative humidity in buildings not exceed 50 percent in order to limit the potential for fungal growth.

## 5.0 CONCLUSIONS

- 5.1 The airborne total fungi data recorded in the surveyed areas showed airborne fungi levels that were below those recorded outdoors and therefore considered unremarkable. These data are not believed to pose a health risk beyond that posed by the outdoor environment where exposures to airborne fungi are expected.
- 5.2 The airborne total and fibrous dust, 4-phenylcyclohexene, formaldehyde, VOC, and CO<sub>2</sub> levels recorded during the survey were unremarkable. Collectively, the data were well below applicable Cal-OSHA 8-hour TWA PELs and/or other occupational, non-occupational, ASHRAE, or foreign guidelines. The data are not expected to represent conditions that pose a measurable health risk to the building occupants.



## 5.0 CONCLUSIONS (CONTINUED)

- 5.3 The air temperatures ranged between 74.9 and 76.8 degrees Fahrenheit (°F). Based on the experience of HygieneTech, the air temperatures perceived as comfortable by most persons in office environments, and recommended by ASHRAE for occupant comfort, range between 68.0 and 74.5°F (winter) and 73.0 and 79.0°F (summer). Relative humidity data were recorded indoors at levels ranging from 31.1 to 37 percent. Such levels were well within the 20 to 60 percent relative humidity level range recommended by ASHRAE for occupant comfort. Note that HygieneTech recommends that the relative humidity in buildings not exceed 50 percent in order to limit the potential for fungal growth.
- 5.4 Be advised that the data provided in this report only represent fungal growth exposure potentials that existed at the time the survey was performed and at the precise sample locations only, the latter of which were selected based on the available background information provided. Note that fungal growth and exposure potentials may change due to changes in environmental conditions (such as those caused by water intrusion), use of mechanical systems, or other factors. Also be advised that additional fungal growth may exist at one or more locations in the structure that were not specifically assessed during the survey.

## 6.0 RECOMMENDATIONS

All such recommendations are based strictly on the assessment information and analytical data that were available to HygieneTech at the time this report was prepared. Be advised that, in order to establish data that accurately reflects all the fungal growth sites on the 20<sup>th</sup> Floor, additional assessment evaluations may be required as more information is known regarding the history of water intrusion episodes in discrete building areas.

- 6.1 Additional fungal growth remediation is potentially required within the core of the 20<sup>th</sup> Floor due to known fungal growth reservoirs confirmed in similar areas on other floors during destructive testing, as stated by LaCroix Davis, LLC in their *California State Board of Equalization Building Assessment – Final Report* dated February 29, 2009. The purpose of this assessment was to allow the BOE to safely reoccupy the 20<sup>th</sup> Floor. Until such time that these confirmed fungal growth and perhaps other unknown reservoirs are remediated within the structure, it is highly likely that complaints related to fungal growth-like odors, which has been a common concern on several floor, will continue to be an issue. The HygieneTech investigation into the odor complaints, conclusions, and recommendations can be found in HygieneTech Document No. 20903001.1 dated May 4, 2009.
- 6.2 If not yet established, an accurate record of all air monitoring results should be maintained in accordance with Cal-OSHA regulation found in T8, CCR § 3204. All affected employees should be informed that the *exposure potential* data in this report exist and that those persons, or their representatives, have a right to access relevant exposure data and medical records.



## 6.0 RECOMMENDATIONS (CONTINUED)

- 6.3 Also be advised that the exposure data recorded during the survey may not be sufficiently broad to adequately assess the suitability of the indoor air quality for all individuals, particularly those who are extremely sensitive to certain chemical and/or biological substances or for those individuals with immune system deficiencies. Although not expected, if persons occupying or passing through the 20<sup>th</sup> Floor do experience non-specific ill effects of unknown etiology, then those affected should be referred to a medical professional in order to determine or specify the possible cause(s) of such reactions. If more information becomes available, further investigation and air monitoring may be warranted.

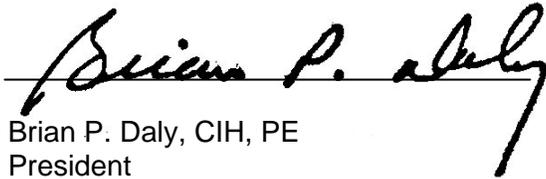
### HYGIENE TECHNOLOGIES INTERNATIONAL, INC.



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Kenny K. Hsi, CIH  
Technical Director

Date: October 14, 2010



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Brian P. Daly, CIH, PE  
President

Date: October 14, 2010

# HYGIENE TECHNOLOGIES INTERNATIONAL, INC.

# APPENDIX A



CLIENT: State of California  
Board of Equalization  
450 N Street  
Sacramento, California 94279

**TABLE 21009001-1  
AIRBORNE TOTAL FUNGI RESULTS  
20<sup>TH</sup> FLOOR  
SACRAMENTO, CALIFORNIA  
SEPTEMBER 28, 2010**

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**Results reported in spores per cubic meter of air (spores/M<sup>3</sup>)**

SAMPLE NUMBER	21009001-1 TM01OUT	21009001-1 TM02	21009001-1 TM03	21009001-1 TM04
<b>SAMPLING LOCATION/ACTIVITIES</b>	Outdoors; about 20 feet east of building; approximately five feet above ground/Normal outdoor activities	Column M22 area; Break Room 2014 entry way area; approximately five feet above floor/Sampling activities only	Southern hallway about five feet south of Elevator Lobby; approximately five feet above floor/Sampling activities only	Column L23 area; Cubicle 71; about center; approximately five feet above floor/Sampling activities only
<b>START/STOP</b>	10:10:00/10:15:00	10:41:00/10:46:00	10:49:00/10:54:00	10:57:00/11:02:00
<b>SAMPLE TIME</b>	5 minutes	5 minutes	5 minutes	5 minutes
Alternaria	110			
Arthrinium				
Ascospores	320			
Aureobasidium				
Basidiospores	2,200		53	
Bipolaris/Drechslera group				
Botrytis				
Chaetomium	27			
Cladosporium	17,000	53		
Curvularia	53			
Epicoccum	40			
Fusarium				
Myrothecium				
Nigrospora	53			
Other brown				
Penicillium/Aspergillus types	6,800			
Pithomyces				
Rusts	370			
Smuts, Periconia, Myxomycetes	850			
Stachybotrys				
Stemphylium	13			
Torula	67			
Trichocladium				
Ulocladium	13			
Hyphal fragments	390	<13	<13	<13
Background debris*	4+	1+	1+	1+
<b>TOTAL **</b>	28,000	53	53	<13

\*Background debris is an indication of the amount of non-biological particulate matter present on the slide and is graded (from least to greatest) as 1+ to 4+.

\*\*Note that all reported counts have been rounded to no more than two significant figures based on the sampling and analytical methods used, and therefore the total count may not equal the sum of the individual counts in a column.

# HYGIENE TECHNOLOGIES INTERNATIONAL, INC.

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450 N Street  
Sacramento, California 94279

**TABLE 21009001-1  
AIRBORNE TOTAL FUNGI RESULTS  
20<sup>TH</sup> FLOOR  
SACRAMENTO, CALIFORNIA  
SEPTEMBER 28, 2010**

Page 2

**Results reported in spores per cubic meter of air (spores/M<sup>3</sup>)**

	21009001-1 TM05	21009001-1 TM06	21009001-1 TM07	21009001-1 TM08
<b>SAMPLING LOCATION/ACTIVITIES</b>	Room 2017; about center; approximately five feet above floor/Sampling activities only	Column K19 area; Cubicle 46; about center; approximately five feet above floor/Sampling activities only	Reference Library Room 2004; entry way; approximately five feet above floor/Sampling activities only	Column N18 area; Cubicle 115; about center; approximately five feet above floor/Sampling activities only
<b>START/STOP</b>	11:04:00/11:09:00	11:12:00/11:17:00	11:18:00/11:23:00	11:24:00/11:29:00
<b>SAMPLE TIME</b>	5 minutes	5 minutes	5 minutes	5 minutes
Alternaria				
Arthrinium				
Ascospores				
Aureobasidium				
Basidiospores	110			
Bipolaris/Drechslera group				
Botrytis				
Chaetomium				
Cladosporium	53	110	53	
Curvularia				
Epicoccum				
Fusarium				
Myrothecium				
Nigrospora				
Oidium				
Other brown				
Penicillium/Aspergillus types	53		53	
Pithomyces				
Rusts				
Smuts, Periconia, Myxomycetes				
Stachybotrys				
Stemphylium				
Torula				
Trichocladium				
Ulocladium				
Hyphal fragments	<13	<13	<13	<13
Background debris*	1+	1+	1+	1+
<b>TOTAL **</b>	210	110	110	<13

\*Background debris is an indication of the amount of non-biological particulate matter present on the slide and is graded (from least to greatest) as 1+ to 4+.

\*\*Note that all reported counts have been rounded to no more than two significant figures based on the sampling and analytical methods used, and therefore the total count may not equal the sum of the individual counts in a column.

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# APPENDIX A



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Board of Equalization  
450 N Street  
Sacramento, California 94279

TABLE 21009001-1  
AIRBORNE TOTAL FUNGI RESULTS  
20<sup>TH</sup> FLOOR  
SACRAMENTO, CALIFORNIA  
SEPTEMBER 28, 2010

Page 3

## Results reported in spores per cubic meter of air (spores/M<sup>3</sup>)

SAMPLE NUMBER	21009001-1 TM09	21009001-1 TM10OUT		
<b>SAMPLING LOCATION/ACTIVITIES</b>	Area between Column N20 and N21; Cubicle 106; entry way; approximately five feet above floor/Sampling activities only	Outdoors; southwestern corner of building; approximately five feet above ground/Normal outdoor activities	This column intentionally left blank	This column intentionally left blank
<b>START/STOP</b>	11:31:00/11:36:00	12:05:00/12:10:00		
<b>SAMPLE TIME</b>	5 minutes	5 minutes		
Alternaria		150		
Arthrinium				
Ascospores		210		
Aureobasidium				
Basidiospores		1,900		
Bipolaris/Drechslera group				
Botrytis		13		
Chaetomium		80		
Cladosporium		18,000		
Curvularia				
Epicoccum		13		
Fusarium				
Myrothecium				
Nigrospora		640		
Oidium				
Other brown				
Penicillium/Aspergillus types		2,500		
Pithomyces		13		
Rusts				
Smuts, Periconia, Myxomycetes		190		
Stachybotrys				
Stemphylium		40		
Torula		67		
Trichocladium				
Ulocladium				
Hyphal fragments	<13	110		
Background debris*	1+	4+		
<b>TOTAL **</b>	<13	24,000		

\*Background debris is an indication of the amount of non-biological particulate matter present on the slide and is graded (from least to greatest) as 1+ to 4+.

\*\*Note that all reported counts have been rounded to no more than two significant figures based on the sampling and analytical methods used, and therefore the total count may not equal the sum of the individual counts in a column.

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# APPENDIX A



CLIENT: State of California  
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Sacramento, California 94279

TABLE 21009001-2  
20<sup>TH</sup> FLOOR  
AIRBORNE FIBERS RESULTS  
SACRAMENTO, CALIFORNIA  
SEPTEMBER 28, 2010

NAME/ REFERENCE	LOCATION/ ACTIVITIES	PPE USED	SAMPLE NUMBER	START/ STOP	SAMPLE TIME	CONTAMINANT	RESULTS (f/cc)	PEL (f/cc)
Area Sample	Column J20 area; Cubicle 34; southern cubicle partition; approximately five feet above floor/Sampling activities only	N/A	21009001-2 F01	07:56/ 11:56	240 minutes	Fibers	<0.003	0.1
Area Sample	Column L23 area; Cubicle 72; eastern cubicle partition; approximately five feet above floor/Sampling activities only	N/A	21009001-2 F02	07:59/ 11:59	240 minutes	Fibers	<0.003	0.1
Area Sample	Column N18 area; Cubicle 118; western cubicle partition; approximately five feet above floor/Sampling activities only	N/A	21009001-2 F03	12:11/ 16:12	241 minutes	Fibers	<0.003	0.1
Area Sample	Column K17 area; Cubicle 9; western cubicle partition; approximately five feet above floor/Sampling activities only	N/A	21009001-2 F04	12:13/ 16:13	240 minutes	Fibers	<0.003	0.1
Blank	N/A	N/A	21009001-2 F05BLANK	N/A	N/A	Fibers	All data blank corrected	N/A

## LEGEND

PPE: Personal protective equipment  
N/A: Not applicable  
PEL: Cal-OSHA 8-hour time-weighted average permissible exposure limit

<: Less than  
f/cc: Fibers per cubic centimeter of air

# HYGIENE TECHNOLOGIES INTERNATIONAL, INC.

# APPENDIX A



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Board of Equalization  
450 N Street  
Sacramento, California 94279

TABLE 21009001-3  
20<sup>TH</sup> FLOOR  
AIRBORNE TOTAL DUST RESULTS  
SACRAMENTO, CALIFORNIA  
SEPTEMBER 28, 2010

NAME/ REFERENCE	LOCATION/ ACTIVITIES	PPE USED	SAMPLE NUMBER	START/ STOP	SAMPLE TIME	CONTAMINANT	RESULTS (mg/M <sup>3</sup> )	PEL (mg/M <sup>3</sup> )
Area Sample	Room 2016; about center; approximately four feet above floor/Sampling activities only	N/A	21009001-3 TD01	07:53/ 11:53	240 minutes	Total Dust	<0.21	10
Area Sample	Column K18 area; Cubicle 44 entrance; approximately five feet above floor/Sampling activities only	N/A	21009001-3 TD02	07:59/ 11:59	240 minutes	Total Dust	<0.21	10
Area Sample	Elevator Lobby; northeastern portion; above defibrillator box; approximately five feet above floor/Sampling activities only	N/A	21009001-3 TD03	12:03/ 16:04	241 minutes	Total Dust	<0.21	10
Area Sample	File Room 2010; northwestern corner; approximately four feet above floor/Sampling activities only	N/A	21009001-3 TD04	12:05/ 16:07	242 minutes	Total Dust	<0.21	10
Blank	N/A	N/A	21009001-3 TD05BLANK	N/A	N/A	Total Dust	All data blank corrected	N/A

## LEGEND

PPE: Personal protective equipment  
N/A: Not applicable  
mg/M<sup>3</sup>: Milligrams per cubic meter

<: Less than  
PEL: Cal-OSHA 8-hour time-weighted average permissible exposure limit

# HYGIENE TECHNOLOGIES INTERNATIONAL, INC.

# APPENDIX A



CLIENT: State of California  
Board of Equalization  
450 N Street  
Sacramento, California 94279

TABLE 21009001-4  
20<sup>TH</sup> FLOOR  
AIRBORNE FORMALDEHYDE RESULTS  
SACRAMENTO, CALIFORNIA  
SEPTEMBER 28, 2010

NAME/ REFERENCE	LOCATION/ ACTIVITIES	PPE USED	SAMPLE NUMBER	START/ STOP	SAMPLE TIME	CONTAMINANT	RESULTS (ppm)	PEL (ppm)
Area Sample	Column K21 area; Cubicle 54; northern cubicle partition; approximately five feet above floor/Sampling activities only	N/A	21009001-4 FO01	14:31/ 15:46	75 minutes	Formaldehyde	0.01	0.75
Area Sample	Column M23 area; Cubicle 73; eastern cubicle partition; approximately five feet above floor/Sampling activities only	N/A	21009001-4 FO02	14:34/ 15:49	75 minutes	Formaldehyde	0.01	0.75
Area Sample	Column L17 area; Cubicle 7; western cubicle partition; approximately five feet above floor/Sampling activities only	N/A	21009001-4 FO03	15:48/ 17:03	75 minutes	Formaldehyde	0.01	0.75
Area Sample	Column N19 area; Cubicle 113; southern cubicle partition; approximately five feet above floor/Sampling activities only	N/A	21009001-4 FO04	15:53/ 17:08	75 minutes	Formaldehyde	0.01	0.75
Blank	N/A	N/A	21009001-4 FO05BLANK	N/A	N/A	Formaldehyde	All data blank corrected	N/A

## LEGEND

PPE: Personal protective equipment  
N/A: Not applicable  
ppm: Parts per million

<: Less than  
PEL: Cal-OSHA 8-hour time-weighted average permissible exposure limit

# HYGIENE TECHNOLOGIES INTERNATIONAL, INC.

# APPENDIX A



CLIENT: State of California  
Board of Equalization  
450 N Street  
Sacramento, California 94279

TABLE 21009001-5  
20<sup>TH</sup> FLOOR  
AIRBORNE 4-PHENYLCYCLOHEXENE RESULTS  
SACRAMENTO, CALIFORNIA  
SEPTEMBER 28, 2010

NAME/ REFERENCE	LOCATION/ ACTIVITIES	PPE USED	SAMPLE NUMBER	START/ STOP	SAMPLE TIME	CONTAMINANT	RESULTS (ppbv)	PEL (ppbv)
Area Sample	Column K19 area; Cubicle 48; western cubicle partition; about center; approximately four feet above floor/Sampling activities only	N/A	21009001-5 PCH01	08:21/ 14:21	360 minutes	4-Phenylcyclohexene	<0.089	N/A
Area Sample	Quiet Room 2007; southwestern corner; approximately four feet above floor/Sampling activities only	N/A	21009001-5 PCH02	08:24/ 14:24	360 minutes	4-Phenylcyclohexene	<0.089	N/A

## LEGEND

PPE: Personal protective equipment  
N/A: Not applicable  
PPBV: Parts per billion volume

<: Less than  
PEL: Cal-OSHA 8-hour time-weighted average permissible exposure limit

# HYGIENE TECHNOLOGIES INTERNATIONAL, INC.

# APPENDIX A



CLIENT: California State  
Board of Equalization  
450 N Street  
Sacramento, California 94279

TABLE 21009001-6  
DIRECT-READING RESULTS  
20<sup>TH</sup> FLOOR  
SACRAMENTO, CALIFORNIA  
SEPTEMBER 28, 2010

LOCATION/SITE ACTIVITIES	SAMPLE TIME	CONTAMINANT	RESULTS (ppm)	COMMENTS
Southern quadrant; approximately five feet above floor/Sampling activities only	15:03/15:13	Volatile Organic Compounds	Average: <0.1 Peak: 0.7	N/A
Eastern quadrant; approximately five feet above floor/Sampling activities only	15:15/15:25	Volatile Organic Compounds	Average: <0.1 Peak: 0.5	N/A
Western quadrant; approximately five feet above floor/Sampling activities only	15:29/15:39	Volatile Organic Compounds	Average: <0.1 Peak: <0.1	N/A
Northern quadrant; approximately five feet above floor/Sampling activities only	15:40/15:50	Volatile Organic Compounds	Average: <0.1 Peak: 0.1	N/A

## LEGEND

ND: Not detected  
<: Less than

N/A: Not applicable  
ppm: Parts per million



Report for:

**Mr. Wesley Frey, Mr. Larry Sandhu**  
**Hygiene Technologies International, Inc.: Northern California**  
3625 Del Amo Boulevard, Suite 180  
Torrance, CA 90503-8370

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Regarding: Project: 21009001-1  
EML ID: 708434

Approved by:

Lab Manager  
Malcolm Moody

Dates of Analysis:

Spore trap analysis: 09-29-2010 and 09-29-2010

Service SOPs: Spore trap analysis (1038)

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For clarity, we report the number of significant digits as calculated; but, due to the nature of this type of biological data, the number of significant digits that is used for interpretation should generally be one or two. 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 corrections of results is not a standard practice. The results relate only to the items tested.

EMLab P&K ("the Company") shall have no liability to the client or the client's customer with respect to decisions or recommendations made, actions taken or courses of conduct implemented by either the client or the client's customer as a result of or based upon the Test Results. In no event shall the Company be liable to the client with respect to the Test Results except for the Company's own willful misconduct or gross negligence nor shall the Company be liable for incidental or consequential damages or lost profits or revenues to the fullest extent such liability may be disclaimed by law, even if the Company has been advised of the possibility of such damages, lost profits or lost revenues. In no event shall the Company's liability with respect to the Test Results exceed the amount paid to the Company by the client therefor.

Document Number: 200091 - Revision Number: 5

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Client: Hygiene Technologies International, Inc.:  
Northern California  
C/O: Mr. Wesley Frey, Mr. Larry Sandhu  
Re: 21009001-1

Date of Sampling: 09-28-2010  
Date of Receipt: 09-28-2010  
Date of Report: 09-29-2010

**SPORE TRAP REPORT: NON-VIABLE METHODOLOGY**

Location:	21009001-1 TM01OUT		21009001-1 TM02		21009001-1 TM03		21009001-1 TM04	
Comments (see below)	A		None		None		B	
Lab ID-Version‡:	3139753-1		3139754-1		3139755-1		3139756-1	
	raw ct.	spores/m3	raw ct.	spores/m3	raw ct.	spores/m3	raw ct.	spores/m3
Alternaria	8	110						
Arthrinium								
Ascospores*	6	320						
Basidiospores*	41	2,200			1	53		
Bipolaris/Drechslera group								
Botrytis								
Chaetomium	2	27						
Cladosporium	327	17,000	1	53				
Curvularia	4	53						
Epicoccum	3	40						
Myrothecium								
Nigrospora	4	53						
Penicillium/Aspergillus types†	168	6,800						
Pithomyces								
Rusts*	28	370						
Smuts*, Periconia, Myxomycetes*	64	850						
Stachybotrys								
Stemphylium	1	13						
Torula	5	67						
Ulocladium	1	13						
Zygomycetes								
Background debris (1-4+)††	4+		1+		1+		1+	
Hyphal fragments/m3	390		< 13		< 13		< 13	
Pollen/m3	53		< 13		13		< 13	
Skin cells (1-4+)	< 1+		1+		1+		1+	
Sample volume (liters)	75		75		75		75	
<b>§ TOTAL SPORES/m3</b>		<b>28,000</b>		<b>53</b>		<b>53</b>		<b>&lt; 13</b>

Comments: A) 54 of the raw count *Penicillium/Aspergillus* type spores were present as a single clump. B) No spores detected.

Spore types listed without a count or data entry were not detected during the course of the analysis for the respective sample.  
 \* Most of these spore types are not seen with culturable methods (Andersen sampling), although some may appear as non-sporulating fungi. Most of the basidiospores are "mushroom" spores while the rusts and smuts are plant pathogens.  
 † 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 Limit of Detection is the product of a raw count of 1 and 100 divided by the percent read. The analytical sensitivity (counts/m3) is the product of the Limit of Detection and 1000 divided by the sample volume.  
 ‡ 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.

Client: Hygiene Technologies International, Inc.:  
Northern California  
C/O: Mr. Wesley Frey, Mr. Larry Sandhu  
Re: 21009001-1

Date of Sampling: 09-28-2010  
Date of Receipt: 09-28-2010  
Date of Report: 09-29-2010

**SPORE TRAP REPORT: NON-VIABLE METHODOLOGY**

Location:	21009001-1 TM05		21009001-1 TM06		21009001-1 TM07		21009001-1 TM08	
Comments (see below)	None		None		None		B	
Lab ID-Version‡:	3139757-1		3139758-1		3139759-1		3139760-1	
	raw ct.	spores/m3						
Alternaria								
Arthrinium								
Ascospores*								
Aureobasidium								
Basidiospores*	2	110						
Bipolaris/Drechslera group								
Botrytis								
Chaetomium								
Cladosporium	1	53	2	110	1	53		
Curvularia								
Epicoccum								
Fusarium								
Myrothecium								
Nigrospora								
Other colorless								
Penicillium/Aspergillus types†	1	53			1	53		
Pithomyces								
Rusts*								
Smuts*, Periconia, Myxomycetes*								
Stachybotrys								
Stemphylium								
Torula								
Ulocladium								
Zygomycetes								
Background debris (1-4+)††	1+		1+		1+		1+	
Hyphal fragments/m3	< 13		< 13		< 13		< 13	
Pollen/m3	< 13		< 13		< 13		13	
Skin cells (1-4+)	1+		1+		1+		1+	
Sample volume (liters)	75		75		75		75	
<b>§ TOTAL SPORES/m3</b>		<b>210</b>		<b>110</b>		<b>110</b>		<b>&lt; 13</b>

Comments: B) No spores detected.

Spore types listed without a count or data entry were not detected during the course of the analysis for the respective sample.

\* Most of these spore types are not seen with culturable methods (Andersen sampling), although some may appear as non-sporulating fungi.

Most of the basidiospores are "mushroom" spores while the rusts and smuts are plant pathogens.

† 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 Limit of Detection is the product of a raw count of 1 and 100 divided by the percent read. The analytical sensitivity (counts/m3) is the product of the Limit of Detection and 1000 divided by the sample volume.

‡ 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.

Client: Hygiene Technologies International, Inc.:  
Northern California  
C/O: Mr. Wesley Frey, Mr. Larry Sandhu  
Re: 21009001-1

Date of Sampling: 09-28-2010  
Date of Receipt: 09-28-2010  
Date of Report: 09-29-2010

**SPORE TRAP REPORT: NON-VIABLE METHODOLOGY**

Location:	21009001-1 TM09		21009001-1 TM10	
Comments (see below)	B		None	
Lab ID-Version‡:	3139761-1		3139762-1	
	raw ct.	spores/m3	raw ct.	spores/m3
Alternaria			11	150
Arthrinium				
Ascospores*			4	210
Aureobasidium				
Basidiospores*			36	1,900
Bipolaris/Drechslera group				
Botrytis			1	13
Chaetomium			6	80
Cladosporium			340	18,000
Curvularia				
Epicoccum			1	13
Fusarium				
Myrothecium				
Nigrospora			48	640
Other colorless				
Penicillium/Aspergillus types†			46	2,500
Pithomyces			1	13
Rusts*				
Smuts*, Periconia, Myxomycetes*			14	190
Stachybotrys				
Stemphylium			3	40
Torula			5	67
Ulocladium				
Zygomycetes				
Background debris (1-4+)††	1+		4+	
Hyphal fragments/m3	< 13		110	
Pollen/m3	< 13		470	
Skin cells (1-4+)	1+		< 1+	
Sample volume (liters)	75		75	
<b>§ TOTAL SPORES/m3</b>		<b>&lt; 13</b>		<b>24,000</b>

**Comments:**B) No spores detected.

Spore types listed without a count or data entry were not detected during the course of the analysis for the respective sample.

\* Most of these spore types are not seen with culturable methods (Andersen sampling), although some may appear as non-sporulating fungi.

Most of the basidiospores are "mushroom" spores while the rusts and smuts are plant pathogens.

† 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 Limit of Detection is the product of a raw count of 1 and 100 divided by the percent read. The analytical sensitivity (counts/m3) is the product of the Limit of Detection and 1000 divided by the sample volume.

‡ 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.

Client: Hygiene Technologies International, Inc.:  
Northern California  
C/O: Mr. Wesley Frey, Mr. Larry Sandhu  
Re: 21009001-1

Date of Sampling: 09-28-2010  
Date of Receipt: 09-28-2010  
Date of Report: 09-29-2010

**MoldRANGE™: Extended Outdoor Comparison**

**Outdoor Location: 21009001-1 TM01OUT**

Fungi Identified	Outdoor data	Typical Outdoor Data by Date†				Typical Outdoor Data by Location‡			
		Month: September				State: CA			
	spores/m3	low	med	high	freq %	low	med	high	freq %
<b>Generally able to grow indoors*</b>									
Alternaria	110	7	40	590	63	7	27	220	54
Bipolaris/Drechslera group	-	7	13	230	26	7	13	130	12
Chaetomium	27	7	13	120	13	7	13	120	19
Cladosporium	17,000	50	850	14,000	97	53	590	7,200	97
Curvularia	53	7	27	720	34	7	13	230	7
Epicoccum	40	7	27	440	33	7	13	160	19
Nigrospora	53	7	20	260	29	7	13	180	8
Penicillium/Aspergillus types	6,800	27	270	3,400	81	33	210	2,400	84
Stachybotrys	-	7	13	340	3	7	13	230	4
Stemphylium	13	7	13	53	5	7	13	67	8
Torula	67	7	13	150	15	7	13	160	11
Ulocladium	13	7	13	120	7	7	13	93	10
<b>Seldom found growing indoors**</b>									
Ascospores	320	13	240	5,800	84	13	110	2,100	69
Basidiospores	2,200	27	650	27,000	96	13	210	8,600	92
Rusts	370	7	27	470	33	7	13	250	25
Smuts, Periconia, Myxomycetes	850	7	53	870	79	8	40	530	67
<b>§ TOTAL SPORES/m3</b>	<b>28,000</b>								

† The Typical Outdoor Data by Date represents the typical outdoor spore levels across North America for the month indicated. The last column represents the frequency of occurrence. The low, medium, and high values represent the 2.5, 50, and 97.5 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, 2.5% of the time it is present in levels above the detection limit and below 53 spores/m3. These values are updated periodically, and if enough data is not available to make a statistically meaningful assessment, it is indicated with a dash.

‡ The Typical Outdoor Data by Location represents the typical outdoor spore levels for the region indicated for the entire year. As with the Typical Outdoor Data by Date, the four columns represent the frequency of occurrence and the typical low, medium, and high concentration values for the spore type indicated. These values are updated periodically, and if enough data is not available to make a statistically meaningful assessment, it is indicated with a dash.

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

\*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.

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 data" are based on the results of the analysis of samples delivered to and analyzed by EMLab P&K 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. In addition, EMLab P&K may not have received and tested a representative number of samples for every region or time period. EMLab P&K hereby disclaims any liability for any and all direct, indirect, punitive, incidental, special or consequential damages arising out of the use or interpretation of the data contained in, or any actions taken or omitted in reliance upon, this report.

Client: Hygiene Technologies International, Inc.:  
 Northern California  
 C/O: Mr. Wesley Frey, Mr. Larry Sandhu  
 Re: 21009001-1

Date of Sampling: 09-28-2010  
 Date of Receipt: 09-28-2010  
 Date of Report: 09-29-2010

**MoldSTAT™: Supplementary Statistical Spore Trap Report**

**Outdoor Summary:** 21009001-1 TM01OUT:

Species detected	Outdoor sample spores/m3				Typical outdoor ranges (North America)	Freq. %
	<100	1K	10K	>100K		
Alternaria				110	7 - 27 - 430	50
Ascospores				320	13 - 160 - 5,200	76
Basidiospores				2,200	13 - 360 - 18,000	91
Chaetomium				27	7 - 13 - 150	11
Cladosporium				17,000	27 - 480 - 9,300	92
Curvularia				53	7 - 27 - 640	18
Epicoccum				40	7 - 20 - 340	26
Nigrospora				53	7 - 13 - 210	16
Penicillium/Aspergillus types				6,800	20 - 190 - 2,500	76
Rusts				370	7 - 17 - 320	21
Smuts, Periconia, Myxomycetes				850	7 - 40 - 840	67
Stemphylium				13	7 - 13 - 67	4
Torula				67	7 - 13 - 170	11
Ulocladium				13	7 - 13 - 93	5
<b>Total</b>				28,347		

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 occurrence 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:** 21009001-1 TM02

% of outdoor total spores/m3	Friedman chi-square* (indoor variation)	Agreement ratio** (indoor/outdoor)	Spearman rank correlation*** (indoor/outdoor)	MoldSCORE**** (indoor/outdoor)	
Result: < 1%	dF: 8 Result: 32.5026 Critical value: 15.5073 Inside Similar: No	Result: 0.1333	dF: 14 Result: 0.6022 Critical value: 0.4593 Outside Similar: Yes	Score: 101 Result: Low	
Species Detected		Spores/m3			
		<100	1K	10K	>100K
	Cladosporium				53
	<b>Total</b>				53

Client: Hygiene Technologies International, Inc.:  
 Northern California  
 C/O: Mr. Wesley Frey, Mr. Larry Sandhu  
 Re: 21009001-1

Date of Sampling: 09-28-2010  
 Date of Receipt: 09-28-2010  
 Date of Report: 09-29-2010

**MoldSTAT™: Supplementary Statistical Spore Trap Report**

**Location:** 21009001-1 TM03

% of outdoor total spores/m3	Friedman chi-square* (indoor variation)	Agreement ratio** (indoor/outdoor)	Spearman rank correlation*** (indoor/outdoor)	MoldSCORE**** (indoor/outdoor)	
Result: < 1%	dF: 8 Result: 32.5026 Critical value: 15.5073 Inside Similar: No	Result: 0.1333	dF: 14 Result: 0.5407 Critical value: 0.4593 Outside Similar: Yes	Score: 105 Result: Low	
Species Detected		Spores/m3			
		<100	1K	10K	>100K
Basidiospores					53
<b>Total</b>					53

**Location:** 21009001-1 TM04

% of outdoor total spores/m3	Friedman chi-square* (indoor variation)	Agreement ratio** (indoor/outdoor)	Spearman rank correlation*** (indoor/outdoor)	MoldSCORE**** (indoor/outdoor)	
Result: < 1%	dF: 8 Result: 32.5026 Critical value: 15.5073 Inside Similar: No	Result: 0.0000	dF: N/A Result: N/A Critical value: N/A Outside Similar: N/A	Score: 100 Result: Low	
Species Detected		Spores/m3			
		<100	1K	10K	>100K
None Detected					N/A

**Location:** 21009001-1 TM05

% of outdoor total spores/m3	Friedman chi-square* (indoor variation)	Agreement ratio** (indoor/outdoor)	Spearman rank correlation*** (indoor/outdoor)	MoldSCORE**** (indoor/outdoor)	
Result: < 1%	dF: 8 Result: 32.5026 Critical value: 15.5073 Inside Similar: No	Result: 0.3529	dF: 14 Result: 0.7462 Critical value: 0.4593 Outside Similar: Yes	Score: 110 Result: Low	
Species Detected		Spores/m3			
		<100	1K	10K	>100K
Basidiospores					110
Cladosporium					53
Penicillium/Aspergillus types					53
<b>Total</b>					213

Client: Hygiene Technologies International, Inc.:  
 Northern California  
 C/O: Mr. Wesley Frey, Mr. Larry Sandhu  
 Re: 21009001-1

Date of Sampling: 09-28-2010  
 Date of Receipt: 09-28-2010  
 Date of Report: 09-29-2010

**MoldSTAT™: Supplementary Statistical Spore Trap Report**

**Location:** 21009001-1 TM06

% of outdoor total spores/m3	Friedman chi-square* (indoor variation)	Agreement ratio** (indoor/outdoor)	Spearman rank correlation*** (indoor/outdoor)	MoldSCORE**** (indoor/outdoor)	
Result: < 1%	dF: 8 Result: 32.5026 Critical value: 15.5073 Inside Similar: No	Result: 0.1333	dF: 14 Result: 0.6022 Critical value: 0.4593 Outside Similar: Yes	Score: 103 Result: Low	
Species Detected		Spores/m3			
		<100	1K	10K	>100K
Cladosporium					110
<b>Total</b>					107

**Location:** 21009001-1 TM07

% of outdoor total spores/m3	Friedman chi-square* (indoor variation)	Agreement ratio** (indoor/outdoor)	Spearman rank correlation*** (indoor/outdoor)	MoldSCORE**** (indoor/outdoor)	
Result: < 1%	dF: 8 Result: 32.5026 Critical value: 15.5073 Inside Similar: No	Result: 0.2500	dF: 14 Result: 0.6868 Critical value: 0.4593 Outside Similar: Yes	Score: 104 Result: Low	
Species Detected		Spores/m3			
		<100	1K	10K	>100K
Cladosporium					53
Penicillium/Aspergillus types					53
<b>Total</b>					107

**Location:** 21009001-1 TM08

% of outdoor total spores/m3	Friedman chi-square* (indoor variation)	Agreement ratio** (indoor/outdoor)	Spearman rank correlation*** (indoor/outdoor)	MoldSCORE**** (indoor/outdoor)	
Result: < 1%	dF: 8 Result: 32.5026 Critical value: 15.5073 Inside Similar: No	Result: 0.0000	dF: N/A Result: N/A Critical value: N/A Outside Similar: N/A	Score: 100 Result: Low	
Species Detected		Spores/m3			
		<100	1K	10K	>100K
<b>None Detected</b>					N/A

Client: Hygiene Technologies International, Inc.:  
 Northern California  
 C/O: Mr. Wesley Frey, Mr. Larry Sandhu  
 Re: 21009001-1

Date of Sampling: 09-28-2010  
 Date of Receipt: 09-28-2010  
 Date of Report: 09-29-2010

**MoldSTAT™: Supplementary Statistical Spore Trap Report**

**Location: 21009001-1 TM09**

% of outdoor total spores/m3	Friedman chi-square* (indoor variation)	Agreement ratio** (indoor/outdoor)	Spearman rank correlation*** (indoor/outdoor)	MoldSCORE**** (indoor/outdoor)	
Result: < 1%	dF: 8 Result: 32.5026 Critical value: 15.5073 Inside Similar: No	Result: 0.0000	dF: N/A Result: N/A Critical value: N/A Outside Similar: N/A	Score: 100 Result: Low	
Species Detected		Spores/m3			
None Detected		<100	1K	10K	>100K
		N/A			

**Location: 21009001-1 TM10**

% of outdoor total spores/m3	Friedman chi-square* (indoor variation)	Agreement ratio** (indoor/outdoor)	Spearman rank correlation*** (indoor/outdoor)	MoldSCORE**** (indoor/outdoor)	
Result: 85%	dF: 8 Result: 32.5026 Critical value: 15.5073 Inside Similar: No	Result: 0.8148	dF: 16 Result: 0.6728 Critical value: 0.4265 Outside Similar: Yes	Score: 278 Result: High	
Species Detected		Spores/m3			
		<100	1K	10K	>100K
Alternaria					150
Ascospores					210
Basidiospores					1,900
Botrytis					13
Chaetomium					80
Cladosporium					18,000
Epicoccum					13
Nigrospora					640
Penicillium/Aspergillus types					2,500
Pithomyces					13
Smuts, Periconia, Myxomycetes					190
Stemphylium					40
Torula					67
<b>Total</b>					23,920

\* 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.

Client: Hygiene Technologies International, Inc.:  
Northern California  
C/O: Mr. Wesley Frey, Mr. Larry Sandhu  
Re: 21009001-1

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### **MoldSTAT™: Supplementary Statistical Spore Trap Report**

\*\*\* 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.

\*\*\*\* 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. EMLab P&K reserves 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 EMLab P&K 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. EMLab P&K 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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**MoldSCORE™: Spore Trap Report**

**Location:** 21009001-1 TM03

Fungi Identified	Indoor sample spores/m3				Raw count	Spores/m3	MoldSCORE‡			
	<100	1K	10K	>100K			100	200	300	Score
<b>Generally able to grow indoors*</b>										
Alternaria					ND	< 13				100
Bipolaris/Drechslera group					ND	< 13				100
Chaetomium					ND	< 13				100
Cladosporium					ND	< 13				100
Curvularia					ND	< 13				100
Nigrospora					ND	< 13				100
Penicillium/Aspergillus types†					ND	< 13				100
Stachybotrys					ND	< 13				100
Torula					ND	< 13				100
<b>Seldom found growing indoors**</b>										
Ascospores††					ND	< 13				100
Basidiospores††					1	53				105
Rusts					ND	< 13				100
Smuts, Periconia, Myxomycetes††					ND	< 13				100
<b>Total</b>						<b>53</b>				
							<b>Final MoldSCORE</b>	<b>105</b>		

**Location:** 21009001-1 TM04

Fungi Identified	Indoor sample spores/m3				Raw count	Spores/m3	MoldSCORE‡			
	<100	1K	10K	>100K			100	200	300	Score
<b>Generally able to grow indoors*</b>										
Alternaria					ND	< 13				100
Bipolaris/Drechslera group					ND	< 13				100
Chaetomium					ND	< 13				100
Cladosporium					ND	< 13				100
Curvularia					ND	< 13				100
Nigrospora					ND	< 13				100
Penicillium/Aspergillus types†					ND	< 13				100
Stachybotrys					ND	< 13				100
Torula					ND	< 13				100
<b>Seldom found growing indoors**</b>										
Ascospores††					ND	< 13				100
Basidiospores††					ND	< 13				100
Rusts					ND	< 13				100
Smuts, Periconia, Myxomycetes††					ND	< 13				100
<b>Total</b>						<b>N/A</b>				
							<b>Final MoldSCORE</b>	<b>100</b>		

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**MoldSCORE™: Spore Trap Report**

**Location:** 21009001-1 TM05

Fungi Identified	Indoor sample spores/m3				Raw count	Spores/m3	MoldSCORE‡			
	<100	1K	10K	>100K			100	200	300	Score
<b>Generally able to grow indoors*</b>										
Alternaria					ND	< 13	█			100
Bipolaris/Drechslera group					ND	< 13	█			100
Chaetomium					ND	< 13	█			100
Cladosporium	█				1	53	█			100
Curvularia					ND	< 13	█			100
Nigrospora					ND	< 13	█			100
Penicillium/Aspergillus types†	█				1	53	█			100
Stachybotrys					ND	< 13	█			100
Torula					ND	< 13	█			100
<b>Seldom found growing indoors**</b>										
Ascospores††					ND	< 13	█			100
Basidiospores††	█				2	110	█			110
Rusts					ND	< 13	█			100
Smuts, Periconia, Myxomycetes††					ND	< 13	█			100
<b>Total</b>						<b>213</b>	<b>Final MoldSCORE 110</b>			

**Location:** 21009001-1 TM06

Fungi Identified	Indoor sample spores/m3				Raw count	Spores/m3	MoldSCORE‡			
	<100	1K	10K	>100K			100	200	300	Score
<b>Generally able to grow indoors*</b>										
Alternaria					ND	< 13	█			100
Bipolaris/Drechslera group					ND	< 13	█			100
Chaetomium					ND	< 13	█			100
Cladosporium	█				2	110	█			103
Curvularia					ND	< 13	█			100
Nigrospora					ND	< 13	█			100
Penicillium/Aspergillus types†					ND	< 13	█			100
Stachybotrys					ND	< 13	█			100
Torula					ND	< 13	█			100
<b>Seldom found growing indoors**</b>										
Ascospores††					ND	< 13	█			100
Basidiospores††					ND	< 13	█			100
Rusts					ND	< 13	█			100
Smuts, Periconia, Myxomycetes††					ND	< 13	█			100
<b>Total</b>						<b>107</b>	<b>Final MoldSCORE 103</b>			

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**MoldSCORE™: Spore Trap Report**

**Location:** 21009001-1 TM07

Fungi Identified	Indoor sample spores/m3				Raw count	Spores/m3	MoldSCORE‡			
	<100	1K	10K	>100K			100	200	300	Score
<b>Generally able to grow indoors*</b>										
Alternaria					ND	< 13	█			100
Bipolaris/Drechslera group					ND	< 13	█			100
Chaetomium					ND	< 13	█			100
Cladosporium	█				1	53	█			100
Curvularia					ND	< 13	█			100
Nigrospora					ND	< 13	█			100
Penicillium/Aspergillus types†	█				1	53	█			104
Stachybotrys					ND	< 13	█			100
Torula					ND	< 13	█			100
<b>Seldom found growing indoors**</b>										
Ascospores††					ND	< 13	█			100
Basidiospores††					ND	< 13	█			100
Rusts					ND	< 13	█			100
Smuts, Periconia, Myxomycetes††					ND	< 13	█			100
<b>Total</b>						<b>107</b>	<b>Final MoldSCORE 104</b>			

**Location:** 21009001-1 TM08

Fungi Identified	Indoor sample spores/m3				Raw count	Spores/m3	MoldSCORE‡			
	<100	1K	10K	>100K			100	200	300	Score
<b>Generally able to grow indoors*</b>										
Alternaria					ND	< 13	█			100
Bipolaris/Drechslera group					ND	< 13	█			100
Chaetomium					ND	< 13	█			100
Cladosporium					ND	< 13	█			100
Curvularia					ND	< 13	█			100
Nigrospora					ND	< 13	█			100
Penicillium/Aspergillus types†					ND	< 13	█			100
Stachybotrys					ND	< 13	█			100
Torula					ND	< 13	█			100
<b>Seldom found growing indoors**</b>										
Ascospores††					ND	< 13	█			100
Basidiospores††					ND	< 13	█			100
Rusts					ND	< 13	█			100
Smuts, Periconia, Myxomycetes††					ND	< 13	█			100
<b>Total</b>						<b>N/A</b>	<b>Final MoldSCORE 100</b>			

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**MoldSCORE™: Spore Trap Report**

**Location:** 21009001-1 TM09

Fungi Identified	Indoor sample spores/m3				Raw count	Spores/m3	MoldSCORE‡			
	<100	1K	10K	>100K			100	200	300	Score
<b>Generally able to grow indoors*</b>										
Alternaria					ND	< 13	100			
Bipolaris/Drechslera group					ND	< 13	100			
Chaetomium					ND	< 13	100			
Cladosporium					ND	< 13	100			
Curvularia					ND	< 13	100			
Nigrospora					ND	< 13	100			
Penicillium/Aspergillus types†					ND	< 13	100			
Stachybotrys					ND	< 13	100			
Torula					ND	< 13	100			
<b>Seldom found growing indoors**</b>										
Ascospores††					ND	< 13	100			
Basidiospores††					ND	< 13	100			
Rusts					ND	< 13	100			
Smuts, Periconia, Myxomycetes††					ND	< 13	100			
<b>Total</b>						<b>N/A</b>	<b>Final MoldSCORE 100</b>			

**Location:** 21009001-1 TM10

Fungi Identified	Indoor sample spores/m3				Raw count	Spores/m3	MoldSCORE‡			
	<100	1K	10K	>100K			100	200	300	Score
<b>Generally able to grow indoors*</b>										
Alternaria	█				11	150	123			
Bipolaris/Drechslera group					ND	< 13	100			
Chaetomium	█				6	80	186			
Cladosporium	█	█	█	█	340	18,000	271			
Curvularia					ND	< 13	100			
Epicoccum	█				1	13	100			
Nigrospora	█	█	█		48	640	273			
Penicillium/Aspergillus types†	█	█	█		46	2,500	100			
Pithomyces	█				1	13	105			
Stachybotrys					ND	< 13	100			
Stemphylium	█				3	40	112			
Torula	█				5	67	104			
<b>Seldom found growing indoors**</b>										
Ascospores††	█				4	210	100			
Basidiospores††	█	█	█		36	1,900	105			
Botrytis	█				1	13	105			
Rusts					ND	< 13	100			
Smuts, Periconia, Myxomycetes††	█				14	190	100			
<b>Total</b>						<b>23,920</b>	<b>Final MoldSCORE 278</b>			

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### **MoldSCORE™: Spore Trap Report**

\*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.

†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.

††Most of these spore types are not seen with culturable methods (Anderson sampling), although some may appear as non-sporulating fungi. Most of the basidiospores are "mushroom" spores.

‡Rated on a scale from 100 to 300. A rating less than 150 is low and indicates a low probability of spores originating inside. A rating greater than 250 is high and indicates a high probability that the spores originated from inside, presumably from indoor mold growth. A rating between 150 and 250 indicates a moderate likelihood of indoor fungal growth. MoldSCORE is NOT intended for wall cavity samples. It is intended for ambient air samples in residences. Using the analysis on other samples (like wall cavity samples) will lead to misleading results.



## Request For Analysis

Project Number/Purchase Order: 21009001-1 Date Submitted: 9/28/10Project Contact: L. Sandler / W. Fry Turnaround Required: NormalLab Destination: EMLAB Lab Contact: Sample Receiving

SAMPLE ID	VOLUME	MEDIA	ANALYSIS REQUESTED
21009001-1 TM01	75L	ART-O-CELL	SPROT 102P
21009001-1 TM02	↓	↓	↓
21009001-1 TM03			
21009001-1 TM04			
21009001-1 TM05			
21009001-1 TM06			
21009001-1 TM07			
21009001-1 TM08			
21009001-1 TM09			
21009001-1 TM10			

*Internal Notes*  
Special Instructions: 20th Flr pre-occupancy IAB

1. Sampled by: #Sandler on 9/28/10 @ 10:10 Received by: C. Schatz 1:20pm  
 2. Relinquished by: #Sandler on 9/28/10 @ 11:20 Received by: \_\_\_\_\_  
 3. Relinquished by: \_\_\_\_\_ Received by: \_\_\_\_\_  
 Please include signature, date, and time

Lab Use Only: