



**Indoor Air Quality  
Inspection & Testing Services**

**(SES Project # 17-04034)**

**Prepared For:**

Mr. Gordon Murray  
Director of Buildings and Grounds  
RSU-2  
7 Reed Street  
Hallowell, Maine 04347

**Project Location:**

*Hall-Dale Middle School*  
111 Maple St  
Farmington, Maine 04344

**From**

Bruce M. Hackett, Sr.  
Industrial Hygienist  
Safe Environmental Solutions  
62 Darling Ave.  
South Portland, Maine 04106

June 6, 2017

June 6, 2017

Mr. Gordon Murray  
Director of Buildings and Grounds  
RSU-2  
7 Reed Street  
Hallowell, Maine 04347

Dear Mr. Murray,

Safe Environmental Solutions, Inc. (SES) is a leader in the Indoor Air Quality (IAQ), asbestos, lead, testing and abatement services. Our management team has over 40 years of combined experience in providing cost effective solutions for environmental issues.

The cornerstone of our company's philosophy is the concept that an informed consumer is an important partner in the successful management of any environmental remediation project.

Our fully insured professional staff at Safe Environmental Solutions are committed to providing safe creative engineering, design, and cost effective solutions that work to meet our individual client's needs.

The enclosed information has been assembled so that you can have a better understanding of the industry. We encourage you to ask us questions and to contact any of our clients regarding our professionalism, price and overall response.

Our commitment is to a safe and healthy environment, satisfied customers, quality service, and of course very competitive pricing.

Sincerely,

*Bruce M. Hackett, Sr.*  
Bruce M. Hackett, Sr,  
President

## Executive Summary:

Safe Environmental Solutions, Inc. conducted an indoor air quality (IAQ) assessment at the Hale-Dale Middle School Facility on May 22, 2017. The purpose of this assessment was to identify any potential IAQ items that may be having a negative effect on the facility's Indoor Air Quality. Based on my knowledge of this facility and from my initial facility walk thru and information during conversations with facility the Facility Director and custodian personal, and conferring with my laboratory representative, screening was conducted for Airborne Mold Spores, Carbon Monoxide, Carbon Dioxide, Temperature, Relative Humidity, and USEPA T.O. 15 Volatile Organic Compounds (VOC's) samples. Samples were analyzed by the following laboratories:

Mold analysis was conducted by Northeast Laboratories, located in Winslow, Maine and the TO 15 VOCs were analyzed by EMSL Analytical in Cinnaminson, New Jersey.

In addition, we conducted a visual evaluation of the rooms and conducted visual inspections within the wall cavities in rooms 208 & 210 utilizing a borescope.

## Results:

**Table 1.1 Non-viable Mold Spore**

Sample Location	Ct./m <sup>3</sup>	Predominant Genus
Outdoor Control	18,000	Ascospores
Room 219	110	Basidiospores
Room 210	1200	Ascospores
Room 208	480	Ascospores

**Table 1.2 Surface Tape lift Sample**

Sample Location	Growth (1-5)	Predominant Genus
Room 210 Window Wall sheetrock	5 - Heavy Growth	<b>Stachybotrys-sp</b>

## Carbon Monoxide, Carbon Dioxide, Temperature, Relative Humidity

Data logging results **did not** identify any high levels of carbon monoxide. Levels of carbon dioxide, temperature, and relative were identified at levels considered "typical" for this time of year with seasonal influences. One must also keep in mind that the testing was done without the typical occupant levels, the identified levels are expected to be higher with typical student occupant load.

## CARBON MONOXIDE

Carbon monoxide (CO) sources are usually traced to the ingress of the vehicle exhaust fumes or fumes leaking from poorly ventilated combustion sources, furnaces, and boilers. Carbon monoxide is a colorless, odorless gas, and because contamination from CO gas is insidious, preventative measures should be taken to ensure that there is no ingress of CO gas into the indoor environment.

Indoor air quality criteria recommend that carbon monoxide levels remain *below* 9.0 parts per million (ppm) throughout the work day. Occupational Safety and Health Administration has established an upper acceptable limit of 35 ppm. Outdoor level was found at .5 ppm upon arrival, indoor levels were all found at 0.0 ppm.

## CARBON DIOXIDE

When CO<sub>2</sub> levels increase indoors, many people may experience discomfort, headaches, tiredness, and general lethargy. It is generally accepted that it is not a lack of oxygen, nor even the build-up of CO<sub>2</sub> itself causing the problem, but the sum of all indoor air contaminants that are trapped in the indoor environment at the same time due to lack of proper ventilation. Thus the value of CO<sub>2</sub> is used as a surrogate indicator of the effectiveness of overall ventilation is recognized.

The ANSI/ASHRAE Standard 62.1-2010 does not set an upper limit for Carbon Dioxide (CO<sub>2</sub>) but recommends that levels be maintained at no more than 700 ppm above outdoor levels.

Typically, outdoor ambient air concentrations of CO<sub>2</sub> can range from 350 ppm to 450 ppm depending on such variables as temperature inversions, vehicle traffic, or other combustion sources. Outdoor sample level was found at 510 ppm upon arrival and the inside levels ranged from 646 (Room 210), 708 ppm (Room 208) and 845 ppm (Room 219) all well within recommendations.

## TEMPERATURE & RELATIVE HUMIDITY

ANSI/ASHRAE Standard 55-2010, Thermal Environmental Conditions for Human Occupancy, recommends that temperatures during the winter months be maintained between 68°F - 75°F and during the summer months between 73°F - 79°F and recommends that Relative Humidity range between 30% - 40% in winter months and 40% - 50 % in summer months. On average, humidity levels of 30% - 60% are generally acceptable for all seasons, dependent on the actual interior temperature and type of clothing worn by occupants.

Temperature was within limits during the monitoring ranging from 72.4 °F – 74.1 °F in interior locations. Relative Humidity levels were within recommended and typical in our state during this time of year interior levels ranging from 36.8% – 41%

## Results Interpretation

**Phase I** – *Temperature* was found within the expected range for this type of setting during the present season. *Relative Humidity* was found “typical” levels during this time of year with seasonal influences. *Carbon Dioxide* was found within expected levels based on time of year, *Carbon monoxide* was found within current industry recommendations. **No “Red flags” were raised with this testing.**

## **Non-viable Mold Spore and Particulate**

Sample results **did not** identify any **elevation/amplifications** in areas sampled. Levels were considered “Typical” indoor air levels during this time of year. Room 210 was found higher than the other interior sample but still less than the outdoors with the same types of mold identified. No problematic, pathogenic, and/or toxigenic types of mold were identified in the interior air.

The tape sample collected from the wall cavity in Room 210 did identify a Zero Tolerant mold type “Stachybotrys sp.”. Our borescope visual did confirm that it appears to be scattered within the wall cavity under the window. This specie requires a prolong moisture source to flourish it typically takes up to 14 days to grow which may indicate a reoccurring

The wall cavity in Room 208 was built differently and had a poly vapor barrier system installed and no evidence of water and/or mold was seen.

**Volatile organic compounds** (*Specific individual results are in the ANALYTICAL DATA section in this report*)

Levels and compounds (VOC's) identified are not alarming most compounds were found in the outdoor air. Currently, there is no enforceable levels for VOC's however, there are many organizations that have recommendations based on "typical" indoor levels for homes and schools. Most enforceable levels are based on OSHA which is typically over an 8-hr. works day, in a industrial setting. These samples were collected over a 24-hr. period.

For the most part the levels found in the interior samples were very comparable between rooms screened. It must be noted that in the "complaint" rooms one (1) VOC identified in Room 210 and two (2) two VOC's were identified in Room 208 that were slightly higher than the "typical" Residential recommendations. Levels in the "non-complaint" comparison Room 219 had the greatest Total VOC (TVOC) level and the majority of VOC's were higher in that room than the complaint areas. All VOC's identified were also identified in the outdoor air as well.

Looking at the provided potential sources of VOC'S, a lot of the identified compounds can be, not only sources from the facility, but can also be from items brought from home.

The IAQ-index, The GREEN standard for Healthier Environments, recommends and categorizes the following levels, research suggests these recommended levels are low. You will find these recommendations within this report.

**Recommendations**

Based on the Air sampling conducted we make the following specific recommendations.

1. Conduct mold remediation of the wall below the window using environmental controls in a negative pressure enclosure by appropriate trained individuals.
2. Conduct post remediation sampling to assist in demonstrating the no-cross contamination had occurred.

I have provided some information on potential sources of compounds identified during this assessment. As well as a comparison chart of compounds and levels identified. Please keep in mind that this testing is a "snap-shot" in time levels and compounds are expected to change with outside influences.

Continue with you "Proactive" Indoor Air Quality Program. Please share this report, in it's entirety to any treating physician for their professional input. Levels and compounds identified should not effect the "normal" non-sensitized population. Immunocompromised individuals may be more sensitive to levels.

As always, we appreciate the opportunity to assist you and your school with your indoor air quality needs. Should you have any questions and/or concerns feel free to contact me at 207.245.3232 or my cell at 207.615.3694.

Sincerely,

*Bruce M. Hackett, Sr.*

Bruce M. Hackett, Sr.  
President  
Industrial Hygienist



**ANALYTICAL DATA**  
**Mold Spore Laboratory Sheets**



Client: Safe Environmental Solutions  
 Address: 62 Darling Ave  
 So Portland, ME 04106

Date Sampled: 5/22/2017  
 Date Received: 5/23/2017  
 Date Reported: 5/23/2017  
 Project Name: RSU 2  
 Project Number: 05034

1-800-244-8378 Phone  
 1-207-873-7022 FAX  
 227 China Rd., Winslow,  
 Maine 04901  
 www.NeLabServices.com

S.O.P 4.3.24

Sample Type: SPORE TRAP

Analysis Report - Spore Trap Direct Exam

Sample Description	OD -1 Outdoor		S-1 219		S-2 210		S-3 208	
Sample Number	101703564		101703565		101703566		101703567	
Volume Sampled	75		75		75		75	
Background Debris	1		3		1		2	
	Raw Ct.	Ct./m3	Raw Ct.	Ct./m3	Raw Ct.	Ct./m3	Raw Ct.	Ct./m3
<b>Total Mold Spores &amp; Fragments</b>	<b>341</b>	<b>18,000</b>	<b>2</b>	<b>110</b>	<b>22</b>	<b>1,200</b>	<b>9</b>	<b>480</b>
Ascospores	175	9,300			14	750	5	270
Basidiospores	150	8,000	2	110	8	430	4	210
Cladosporium	16	850						
<b>Particulates</b>	Raw Ct.	Ct./m3	Raw Ct.	Ct./m3	Raw Ct.	Ct./m3	Raw Ct.	Ct./m3
Black Opaque Particles	6	320	18	960	5	270	8	430
Fiberglass Fibers	-	-	-	-	-	-	-	-
Insect Parts	-	-	-	-	-	-	-	-
Misc. Fibers	-	-	7	370	8	430	3	160
Pollen	-	-	-	-	-	-	-	-
Skin Cell Fragments	-	-	200	11,000	85	4,500	26	1,400
Comments								

(1) Debris Rating Scale: 0 = No trace visible; 5 = Contiguous debris. Background debris levels greater than 3 indicate poor visibility for the analyst reading the slide, which can result in under-counting of small spores such as those from members of the Aspergillus/Penicillium-like group.

Note: Values may not appear to be additive due to rounding of numbers. 100% of Sample Trace examined for anomalies, spore clusters and Stachybotrys / Memnionella spores.

Reporting limits vary depending on amount of air sampled. 30L - 133 counts/m<sup>3</sup>, 75L - 53 counts/m<sup>3</sup>, 150L - 27 counts/m<sup>3</sup>.

No discernable field blank was submitted with these samples.

Report Reviewed By:

*Brett Goodrich*

Brett Goodrich, Manager, Environmental Microbiology Dept.

Analytical results and reports are generated by NEL at the request of and for the exclusive use of the person or entity (client) named on this report. Results, reports or copies of same will not be released by NEL to any third party without the prior express written consent from the client named in this report. This report applies only to those samples taken at the time, place and location referenced by the client. This report makes no express or implied warranty or guarantee as to the sample methodology used by the individual performing the sampling unless sampling was performed by NEL. The client is solely responsible for the use and interpretation of these results and NEL makes no express or implied warranties as to such use or interpretation. NEL is not able to make and does not make a determination as to the soundness or safety of a product, environment or property from only the samples sent to their laboratory for analysis. Unless otherwise specified by the Client, NEL reserves the right to dispose of all samples after the testing of such samples is sufficiently completed or after a thirty-day period, whichever period is greater. Samples for Microbiology that degrade rapidly or pass their hold times will be retained for shorter periods or not at all. NEL liability extends only to the cost of the testing.

**Analysis Report  
Direct Microscopic Exam**

**Client:** Safe Environmental Solutions  
**Address:** 62 Darling Ave  
So Portland, ME 04106

**Date Sampled:** 5/22/2017  
**Date Received:** 5/23/2017  
**Date Reported:** 5/23/2017  
**Project Number:** 05034  
**Project:** RSU 2

SOP: Tape 4.3.25 Swab 4.3.26 Bulk 4.3.27

Lab Number	Sample Type	Description	Background Debris (1)	Mold Growth (2)	Comments
101703568	TAPE LIFT	T-1 Wall SR	2	5 Stachybotrys	

Qualitative Scale: N.D. = Not Detected; 1 = Lowest (Trace); 5 = Highest (Heavy or Highly Abundant Presence)  
\* = Spores only, no growth structures present.

(1) Background particles include organic and inorganic debris from a variety of sources, and generally occur as a result of settling from an airborne state.

(2) Mold observed with associated vegetative structures (unless otherwise indicated). In addition to a relative numerical abundance rating, molds present are identified to the highest level possible. Mold growing at level 4 or above could obscure the visibility of other, smaller mold growing under and/or within the heavily growing mold.

Report Reviewed By:



Brett Goodrich, Manager, Environmental Microbiology Dept.


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Ship samples to: Phone: 1(800) 244-8378  
227 China Road Email: info@nelabservices.com  
Winslow, Maine 04901 Website: www.nelabservices.com

## Chain of Custody Record Environmental Microbiology Analysis

Client: <u>Safe Environmental Solutions</u>				Lab Use Only		
Address: <u>62 Darling Ave</u>						
City, State, Zip: <u>South Portland ME 04106</u>						
Contact: <u>B Hackett</u>						
Phone: <u>2453232</u> Fax: <u>2453230</u>						
Email: <u>bruce@sesafe.com</u>				Project #: <u>05034</u>		Project Name: <u>RSU-2</u>
Sampled by: <u>Bruce Hackett SR</u>				Report by: Fax <input type="checkbox"/> Email <input checked="" type="checkbox"/> Regular Mail only <input type="checkbox"/>		
Turnaround*: <input checked="" type="checkbox"/> Standard (2-Day)				Next Day (as available)		RUSH - Same Day ( surcharge applies)
<b>Sample Type Codes</b>						
AC = Air Culture Plate		BS = Bulk Solid		RCS = RCS Air Strip	ST = Spore Trap	WC = Wall Cavity (air)
AND = Anderson Plate		BURK = Burkard/Allergenco Slide		SAS = SAS Plate	T = Tape Lift	WP = Wipe
AOC = Air-O-Cell Cassette		D = Dust		S = Surface Swab	W = Water	O = Other (describe)
<b>Sample Information</b>						
Lab No.	Sample Identification		Type	Date/Time	Volume/Area	Analysis Requested**
*10763564	00-1 outdoor		BURK	5/22/17	75L	Fungi + Particulate
*565	S-1 219		↓	↓	↓	↓
566	S-2 210		↓	↓	↓	↓
567	S-3 208		↓	↓	↓	↓
568	<del>T-1 Wall SR</del>		<del>T</del>	<del>↓</del>	<del>—</del>	<del>Mold</del>
Spore Traps – Brand & Type (e.g. Cyclex slide, AirO-Cell Cassette, Laro-100, etc.):						
Air Culture Plates – Sampler & Type (e.g. Anderson N6, SAS-100, etc.):						
Special sample information, testing or reporting instructions:						
* Pre-calibrated Pump @ 15 Lpm *				+ Control		

Custody Record			
Date	Time	Samples relinquished by:	Samples received by:
5/22/17	1201		mm 5/22/17
			5/23/17 0800 EWL
			Comments: 12102

\*Turnaround times are for Direct-Exam analysis only and are contingent on daily workload; culture sample turnaround contact NEL prior to submitting samples for same-day turnaround.  
\*\*Analysis Requested. Please describe or use NEL Analysis Code.

WB1700884

**NORTHEAST LABORATORY SERVICES  
SAMPLE RECEIPT CONDITION REPORT**

Client: Safe Env. Solutions

NEL Sample Number/Range: 101703564-68

Project: RSU-2

Tracking Number: Client

Date/Time Received: 5/23/17 0800 Initials: EWL

Rush? Yes  No  TAT

INDOOR AIR QUALITY

	Yes	No
1. Is the COC properly filled out?	<u>✓</u>	<u>   </u>
2. Do sample labels match the COC?	<u>✓</u>	<u>   </u>
3. Are samples in good condition?	<u>✓</u>	<u>   </u>

Comments: \_\_\_\_\_

\_\_\_\_\_

**CONTROLLED**



**ANALYTICAL DATA**  
**Volatile Organic Compounds (VOC's)**

Client: **RSU-2** Facility: **Hallowell Middle School** Test Date: **05/22/17**

Collected by: **Bruce M. Hackett, Sr.** References: **USEPA, NIOSH, OSHA**

VOC Identified	Location Outdoor	Location Room 210	Location Room 208	Location Room 219	Residential Recommendations
Chloroethene	1.1 ug/m3	1.4 ug/m3	1.2 ug/m3	1.7 ug/m3	94 ug/m3
Ethanol	2.1 ug/m3	32 ug/m3	18 ug/m3	54 ug/m3	N.E. (1900000 ug/m3)
Ethyl Acetate	3.6 ug/m3	8.6 ug/m3	6.3 ug/m3	10 ug/m3	73 ug/m3
Freon 1,1		7.0 ug/m3	15 ug/m3	10 ug/m3	7.0 ug/m3
Freon 12					
Isopropyl alcohol	3.8 ug/m3	11 ug/m3	13 ug/m3	8.4 ug/m3	13 ug/m3
Acetone	4.2 ug/m3	9.3 ug/m3	8.4 ug/m3	12 ug/m3	8.4 ug/m3
2-Butanone (MEK)	3.5 ug/m3				5200 ug/m3
Total VOC's (TVOC)	18 ug/m3	79 ug/m3	62 ug/m2	130 ug/m3	**

ug/m3 = Micro gram per cubic meter of air. mg/m3=Milligram per cubic meter of air

1.0 mg/m3 = 1000 ug/m3 (i.e. 130 ug/m3 = 0.13 mg/m3)

1.0 mg/m3 = 0.001 ppm

Residential Recommendations are referenced because they are the lowest published levels, OSHA levels are established for the Industry and are not applicable for this type of setting.

N.E. = None Established, but we listed the NIOSH published Level which is lower than the OSHA Published level

NIOSH = National Institute of Occupations Health

OSHA= Occupational Safety and Health Administration

\*\* Most reported TVOC-concentrations in non-industrial environments are below 1 mg/m3 and few exceed 25 mg/m3. At these concentration levels only sensory effects are likely to occur, but other health effects can not be excluded after long term exposure. The sensory effects include sensory irritation, dryness, weak inflammatory irritation in eyes, nose, air ways and skin. At TVOC concentrations above 25 mg/m3, the likelihood of other types of health effects becomes of greater concern

**EMSL Analytical**

200 Route 130 North, Cinnaminson, NJ 08077  
 Phone/Fax: (856)858-4800 / (856)858-4571  
<http://www.EMSL.com> [to15lab@EMSL.com](mailto:to15lab@EMSL.com)

EMSL Order #: 491700563

Customer ID: SFES42

Customer PO: 17-03034

Attn: **Bruce Hackett**  
**Safe Environmental Solutions**  
**62 Darling Ave**  
**South Portland, ME 04106**

Phone: 207-615-3694

Fax: Not Available

Project: Hall - Dale Middle

Date Collected: 5/22/2017

Date Received: 5/24/2017

**Laboratory Report- Sample Summary**

EMSL Sample ID.	Client Sample ID.	Start Sampling Date	Start Sampling Time
491700563-0001	Rm 210	5/22/2017	10:45 AM
491700563-0002	Rm 208	5/22/2017	10:38 AM
491700563-0003	Rm 219	5/22/2017	10:03 AM
491700563-0004	Outdoor	5/22/2017	10:17 AM

If "Preliminary Report" is displayed in the signature box; this indicates that there are samples that have not yet been analyzed, that are in a preliminary state, or that analysis is in progress but not completed at the time of report issue.

Report Date:  
5/31/2017

Report Revision  
R0

Revision Comments  
Initial Report

**Marjorie Howley, Laboratory Manager**  
 or other approved signatory

Test results meet all NELAP requirements unless otherwise specified.

**EMSL Analytical**

200 Route 130 North, Cinnaminson, NJ 08077  
 Phone/Fax: (856)858-4800 / (856)858-4571  
<http://www.EMSL.com> [to15lab@EMSL.com](mailto:to15lab@EMSL.com)

EMSL Order #: 491700563  
 EMSL Sample #: 491700563-1  
 Customer ID: SFES42  
 Customer PO: 17-03034

Attn: **Bruce Hackett**  
**Safe Environmental Solutions**  
**62 Darling Ave**  
**South Portland, ME 04106**

Phone: 207-615-3694  
 Fax: Not Available  
 Date Collected: 5/22/2017  
 Date Received: 5/24/2017

Project: Hall - Dale Middle

Sample ID: Rm 210

Analysis Initial	Analysis Date	Analyst Init.	Lab File ID	Canister ID	Sample Vol.	Dil. Factor
	05/30/2017	KW	K12680.D	E0370	250 cc	1

**Target Compound Results Summary**

Target Compounds	CAS#	MW	Result ppbv	RL ppbv	Q	Result ug/m3	RL ug/m3	Comments
Propylene	115-07-1	42.08	ND	1.0		ND	1.7	
Freon 12(Dichlorodifluoromethane)	75-71-8	120.9	ND	0.50		ND	2.5	
Freon 114(1,2-Dichlorotetrafluoroethan	76-14-2	170.9	ND	0.50		ND	3.5	
Chloromethane	74-87-3	50.49	0.70	0.50		1.4	1.0	
n-Butane	106-97-8	58.12	ND	0.50		ND	1.2	
Vinyl chloride	75-01-4	62.50	ND	0.50		ND	1.3	
1,3-Butadiene	106-99-0	54.09	ND	0.50		ND	1.1	
Bromomethane	74-83-9	94.94	ND	0.50		ND	1.9	
Chloroethane	75-00-3	64.52	ND	0.50		ND	1.3	
Ethanol	64-17-5	46.07	17	0.50		32	0.94	
Bromoethene(Vinyl bromide)	593-60-2	106.9	ND	0.50		ND	2.2	
Freon 11(Trichlorofluoromethane)	75-69-4	137.4	1.2	0.50		7.0	2.8	
Isopropyl alcohol(2-Propanol)	67-63-0	60.10	4.3	0.50		11	1.2	
Freon 113(1,1,2-Trichlorotrifluoroethan	76-13-1	187.4	ND	0.50		ND	3.8	
Acetone	67-64-1	58.08	3.9	0.50		9.3	1.2	
1,1-Dichloroethene	75-35-4	96.94	ND	0.50		ND	2.0	
Acetonitrile	75-05-8	41.00	ND	0.50		ND	0.84	
Tertiary butyl alcohol(TBA)	75-65-0	74.12	ND	0.50		ND	1.5	
Bromoethane(Ethyl bromide)	74-96-4	108.0	ND	0.50		ND	2.2	
3-Chloropropene(Allyl chloride)	107-05-1	76.53	ND	0.50		ND	1.6	
Carbon disulfide	75-15-0	76.14	ND	0.50		ND	1.6	
Methylene chloride	75-09-2	84.94	ND	0.50		ND	1.7	
Acrylonitrile	107-13-1	53.00	ND	0.50		ND	1.1	
Methyl-tert-butyl ether(MTBE)	1634-04-4	88.15	ND	0.50		ND	1.8	
trans-1,2-Dichloroethene	156-60-5	96.94	ND	0.50		ND	2.0	
n-Hexane	110-54-3	86.17	ND	0.50		ND	1.8	
1,1-Dichloroethane	75-34-3	98.96	ND	0.50		ND	2.0	
Vinyl acetate	108-05-4	86.00	ND	0.50		ND	1.8	
2-Butanone(MEK)	78-93-3	72.10	ND	0.50		ND	1.5	
cis-1,2-Dichloroethene	156-59-2	96.94	ND	0.50		ND	2.0	
Ethyl acetate	141-78-6	88.10	2.4	0.50		8.6	1.8	
Chloroform	67-66-3	119.4	ND	0.50		ND	2.4	
Tetrahydrofuran	109-99-9	72.11	ND	0.50		ND	1.5	
1,1,1-Trichloroethane	71-55-6	133.4	ND	0.50		ND	2.7	
Cyclohexane	110-82-7	84.16	ND	0.50		ND	1.7	
2,2,4-Trimethylpentane(Isooctane)	540-84-1	114.2	ND	0.50		ND	2.3	
Carbon tetrachloride	56-23-5	153.8	ND	0.50		ND	3.1	
n-Heptane	142-82-5	100.2	ND	0.50		ND	2.0	
1,2-Dichloroethane	107-06-2	98.96	ND	0.50		ND	2.0	
Benzene	71-43-2	78.11	ND	0.50		ND	1.6	
Trichloroethene	79-01-6	131.4	ND	0.50		ND	2.7	
1,2-Dichloropropane	78-87-5	113.0	ND	0.50		ND	2.3	
Methyl Methacrylate	80-62-6	100.12	ND	0.50		ND	2.0	
Bromodichloromethane	75-27-4	163.8	ND	0.50		ND	3.3	
1,4-Dioxane	123-91-1	88.12	ND	0.50		ND	1.8	
4-Methyl-2-pentanone(MIBK)	108-10-1	100.2	ND	0.50		ND	2.0	

**EMSL Analytical**

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<http://www.EMSL.com> [to15lab@EMSL.com](mailto:to15lab@EMSL.com)

EMSL Order #: 491700563  
 EMSL Sample #: 491700563-1  
 Customer ID: SFES42  
 Customer PO: 17-03034

Attn: **Bruce Hackett**  
**Safe Environmental Solutions**  
**62 Darling Ave**  
**South Portland, ME 04106**

Phone: 207-615-3694  
 Fax: Not Available  
 Date Collected: 5/22/2017  
 Date Received: 5/24/2017

Project: Hall - Dale Middle

Sample ID: Rm 210

Analysis Initial	Analysis Date	Analyst Init.	Lab File ID	Canister ID	Sample Vol.	Dil. Factor
	05/30/2017	KW	K12680.D	E0370	250 cc	1

**Target Compound Results Summary**

Target Compounds	CAS#	MW	Result ppbv	RL ppbv	Q	Result ug/m3	RL ug/m3	Comments
cis-1,3-Dichloropropene	10061-01-5	111.0	ND	0.50		ND	2.3	
Toluene	108-88-3	92.14	ND	0.50		ND	1.9	
trans-1,3-Dichloropropene	10061-02-6	111.0	ND	0.50		ND	2.3	
1,1,2-Trichloroethane	79-00-5	133.4	ND	0.50		ND	2.7	
2-Hexanone(MBK)	591-78-6	100.1	ND	0.50		ND	2.0	
Tetrachloroethene	127-18-4	165.8	ND	0.50		ND	3.4	
Dibromochloromethane	124-48-1	208.3	ND	0.50		ND	4.3	
1,2-Dibromoethane	106-93-4	187.8	ND	0.50		ND	3.8	
Chlorobenzene	108-90-7	112.6	ND	0.50		ND	2.3	
Ethylbenzene	100-41-4	106.2	ND	0.50		ND	2.2	
Xylene (p,m)	1330-20-7	106.2	ND	1.0		ND	4.3	
Xylene (Ortho)	95-47-6	106.2	ND	0.50		ND	2.2	
Styrene	100-42-5	104.1	ND	0.50		ND	2.1	
Isopropylbenzene (cumene)	98-82-8	120.19	ND	0.50		ND	2.5	
Bromoform	75-25-2	252.8	ND	0.50		ND	5.2	
1,1,2,2-Tetrachloroethane	79-34-5	167.9	ND	0.50		ND	3.4	
4-Ethyltoluene	622-96-8	120.2	ND	0.50		ND	2.5	
1,3,5-Trimethylbenzene	108-67-8	120.2	ND	0.50		ND	2.5	
2-Chlorotoluene	95-49-8	126.6	ND	0.50		ND	2.6	
1,2,4-Trimethylbenzene	95-63-6	120.2	ND	0.50		ND	2.5	
1,3-Dichlorobenzene	541-73-1	147.0	ND	0.50		ND	3.0	
1,4-Dichlorobenzene	106-46-7	147.0	ND	0.50		ND	3.0	
Benzyl chloride	100-44-7	126.0	ND	0.50		ND	2.6	
1,2-Dichlorobenzene	95-50-1	147.0	ND	0.50		ND	3.0	
1,2,4-Trichlorobenzene	120-82-1	181.5	ND	0.50		ND	3.7	
Hexachloro-1,3-butadiene	87-68-3	260.8	ND	0.50		ND	5.3	
Naphthalene	91-20-3	128.17	ND	0.50		ND	2.6	
<b>Total Target Compound Concentrations:</b>			<b>30</b>	<b>ppbv</b>		<b>69</b>	<b>ug/m3</b>	

**Surrogate**

4-Bromofluorobenzene

**Result**

11

**Spike**

10

**Recovery**

110%

**Qualifier Definitions**

ND = Non Detect

B = Compound also found in method blank.

E = Estimated concentration exceeding upper calibration range.

D = Result reported from diluted analysis.

**Method Reference**

USEPA: Compendium Method TO-15, "Determination of Volatile Organic Compounds (VOCs) in Air..." Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS), January 1999, (EPA/625/R-96/010b).



NJDEP Certification #: 03036



**EMSL Analytical**

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 Phone/Fax: (856)858-4800 / (856)858-4571  
<http://www.EMSL.com> [to15lab@EMSL.com](mailto:to15lab@EMSL.com)

EMSL Order #: **491700563**  
 EMSL Sample #: **491700563-1**  
 Customer ID: **SFES42**  
 Customer PO: **17-03034**

Attn: **Bruce Hackett**  
**Safe Environmental Solutions**  
**62 Darling Ave**  
**South Portland, ME 04106**

Phone: **207-615-3694**  
 Fax: **Not Available**  
 Date Collected: **5/22/2017**  
 Date Received: **5/24/2017**

Project: **Hall - Dale Middle** Sample ID: **Rm 210**

<u>Analysis</u>	<u>Analysis Date</u>	<u>Analyst Init.</u>	<u>Lab File ID</u>	<u>Canister ID</u>	<u>Sample Vol.</u>	<u>Dil. Factor</u>
Initial	05/30/2017	KW	K12680.D	E0370	250 cc	1

**Tentatively Identified Compound Results Summary**

<u>Tentatively Identified Compounds</u>	<u>CAS#</u>	<u>MW(1)</u>	<u>Result ppbv</u>	<u>Q</u>	<u>Result ug/m3</u>	<u>Retention Time</u>	<u>Comments</u>
Difluorochloromethane	000075-45-6	86	2.8	JN	9.9	4.5	
<b>Total TIC Concentrations:</b>			<b>2.8</b>	<b>ppbv</b>	<b>10</b>	<b>ug/m3</b>	

**Qualifier Definitions**  
 (1) = If unknown, MW is assigned as equivalent Toluene (92) for ug/m3 conversion purposes.  
 B = Compound also found in method blank.  
 J= Estimated value based on a 1:1 response to internal standard.  
 N= Presumptive evidence of compound based on library match.

**Method Reference**  
 USEPA: Compendium Method TO-15, "Determination of Volatile Organic Compounds (VOCs) in Air..." Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS), January 1999, (EPA/625/R-96/010b).





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EMSL Order #: 491700563  
 EMSL Sample #: 491700563-1  
 Customer ID: SFES42  
 Customer PO: 17-03034

Attn: **Bruce Hackett**  
**Safe Environmental Solutions**  
**62 Darling Ave**  
**South Portland, ME 04106**

Phone: 207-615-3694  
 Fax: Not Available  
 Date Collected: 5/22/2017  
 Date Received: 5/24/2017

Project: **Hall - Dale Middle**

Sample ID: Rm 210

Analysis	Analysis Date	Analyst Init.	Lab File ID	Canister ID	Sample Vol.	Dil. Factor
Initial	05/30/2017	KW	K12680.D	E0370	250 cc	1

**Total Volatile Organic Compounds (TVOC) Summary**

Target Compounds	CAS#	MW	Result ppbv	RL ppbv	Q	Result ug/m3	RL ug/m3	Comments
Chloromethane	74-87-3	50.49	0.70	0.50		1.4	1.0	
Ethanol	64-17-5	46.07	17	0.50		32	0.94	
Freon 11 (Trichlorofluoromethane)	75-69-4	137.40	1.2	0.50		7.0	2.8	
Isopropyl alcohol (2-Propanol)	67-63-0	60.10	4.3	0.50		11	1.2	
Acetone	67-64-1	58.08	3.9	0.50		9.3	1.2	
Ethyl acetate	141-78-6	88.10	2.4	0.50		8.6	1.8	
<b>Total Target Compound Concentrations:</b>			<b>30</b>	<b>ppbv</b>		<b>69</b>	<b>ug/m3</b>	

**Qualifier Definitions**

B = Compound also found in method blank.  
 E = Estimated concentration exceeding upper calibration range.  
 D = Result reported from diluted analysis.

Tentatively Identified Compounds	CAS#	MW(1)	Result ppbv	Q	Result ug/m3	Retention Time	Comments
Difluorochloromethane	000075-45-6	86	2.8	JN	9.9	4.5	
<b>Total TIC Concentrations:</b>			<b>2.8</b>	<b>ppbv</b>	<b>10</b>	<b>ug/m3</b>	

**Qualifier Definitions**

(1) = If unknown, MW is assigned as equivalent Toluene (92) for ug/m3 conversion purposes.  
 B = Compound also found in method blank.  
 J = Estimated value based on a 1:1 response to internal standard.  
 N = Presumptive evidence of compound based on library match.

Total Volatile Organic Compounds (TVOCs): **33 ppbv**

**79 ug/m3**



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EMSL Order #: 491700563  
 EMSL Sample #: 491700563-2  
 Customer ID: SFES42  
 Customer PO: 17-03034

Attn: **Bruce Hackett**  
**Safe Environmental Solutions**  
**62 Darling Ave**  
**South Portland, ME 04106**

Phone: 207-615-3694  
 Fax: Not Available  
 Date Collected: 5/22/2017  
 Date Received: 5/24/2017

Project: Hall - Dale Middle

Sample ID: Rm 208

Analysis Initial	Analysis Date	Analyst Init.	Lab File ID	Canister ID	Sample Vol.	Dil. Factor
	05/30/2017	KW	K12681.D	E0385	250 cc	1

**Target Compound Results Summary**

Target Compounds	CAS#	MW	Result ppbv	RL ppbv	Q	Result ug/m3	RL ug/m3	Comments
Propylene	115-07-1	42.08	ND	1.0		ND	1.7	
Freon 12(Dichlorodifluoromethane)	75-71-8	120.9	ND	0.50		ND	2.5	
Freon 114(1,2-Dichlorotetrafluoroethan	76-14-2	170.9	ND	0.50		ND	3.5	
Chloromethane	74-87-3	50.49	0.60	0.50		1.2	1.0	
n-Butane	106-97-8	58.12	ND	0.50		ND	1.2	
Vinyl chloride	75-01-4	62.50	ND	0.50		ND	1.3	
1,3-Butadiene	106-99-0	54.09	ND	0.50		ND	1.1	
Bromomethane	74-83-9	94.94	ND	0.50		ND	1.9	
Chloroethane	75-00-3	64.52	ND	0.50		ND	1.3	
Ethanol	64-17-5	46.07	9.4	0.50		18	0.94	
Bromoethene(Vinyl bromide)	593-60-2	106.9	ND	0.50		ND	2.2	
Freon 11(Trichlorofluoromethane)	75-69-4	137.4	2.6	0.50		15	2.8	
Isopropyl alcohol(2-Propanol)	67-63-0	60.10	5.5	0.50		13	1.2	
Freon 113(1,1,2-Trichlorotrifluoroethan	76-13-1	187.4	ND	0.50		ND	3.8	
Acetone	67-64-1	58.08	3.5	0.50		8.4	1.2	
1,1-Dichloroethene	75-35-4	96.94	ND	0.50		ND	2.0	
Acetonitrile	75-05-8	41.00	ND	0.50		ND	0.84	
Tertiary butyl alcohol(TBA)	75-65-0	74.12	ND	0.50		ND	1.5	
Bromoethane(Ethyl bromide)	74-96-4	108.0	ND	0.50		ND	2.2	
3-Chloropropene(Allyl chloride)	107-05-1	76.53	ND	0.50		ND	1.6	
Carbon disulfide	75-15-0	76.14	ND	0.50		ND	1.6	
Methylene chloride	75-09-2	84.94	ND	0.50		ND	1.7	
Acrylonitrile	107-13-1	53.00	ND	0.50		ND	1.1	
Methyl-tert-butyl ether(MTBE)	1634-04-4	88.15	ND	0.50		ND	1.8	
trans-1,2-Dichloroethene	156-60-5	96.94	ND	0.50		ND	2.0	
n-Hexane	110-54-3	86.17	ND	0.50		ND	1.8	
1,1-Dichloroethane	75-34-3	98.96	ND	0.50		ND	2.0	
Vinyl acetate	108-05-4	86.00	ND	0.50		ND	1.8	
2-Butanone(MEK)	78-93-3	72.10	ND	0.50		ND	1.5	
cis-1,2-Dichloroethene	156-59-2	96.94	ND	0.50		ND	2.0	
Ethyl acetate	141-78-6	88.10	1.7	0.50		6.3	1.8	
Chloroform	67-66-3	119.4	ND	0.50		ND	2.4	
Tetrahydrofuran	109-99-9	72.11	ND	0.50		ND	1.5	
1,1,1-Trichloroethane	71-55-6	133.4	ND	0.50		ND	2.7	
Cyclohexane	110-82-7	84.16	ND	0.50		ND	1.7	
2,2,4-Trimethylpentane(Isooctane)	540-84-1	114.2	ND	0.50		ND	2.3	
Carbon tetrachloride	56-23-5	153.8	ND	0.50		ND	3.1	
n-Heptane	142-82-5	100.2	ND	0.50		ND	2.0	
1,2-Dichloroethane	107-06-2	98.96	ND	0.50		ND	2.0	
Benzene	71-43-2	78.11	ND	0.50		ND	1.6	
Trichloroethene	79-01-6	131.4	ND	0.50		ND	2.7	
1,2-Dichloropropane	78-87-5	113.0	ND	0.50		ND	2.3	
Methyl Methacrylate	80-62-6	100.12	ND	0.50		ND	2.0	
Bromodichloromethane	75-27-4	163.8	ND	0.50		ND	3.3	
1,4-Dioxane	123-91-1	88.12	ND	0.50		ND	1.8	
4-Methyl-2-pentanone(MIBK)	108-10-1	100.2	ND	0.50		ND	2.0	

**EMSL Analytical**

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<http://www.EMSL.com> [to15lab@EMSL.com](mailto:to15lab@EMSL.com)

EMSL Order #: 491700563  
 EMSL Sample #: 491700563-2  
 Customer ID: SFES42  
 Customer PO: 17-03034

Attn: **Bruce Hackett**  
**Safe Environmental Solutions**  
**62 Darling Ave**  
**South Portland, ME 04106**

Phone: 207-615-3694  
 Fax: Not Available  
 Date Collected: 5/22/2017  
 Date Received: 5/24/2017

Project: Hall - Dale Middle  
 Sample ID: Rm 208

Analysis Initial	Analysis Date	Analyst Init.	Lab File ID	Canister ID	Sample Vol.	Dil. Factor
	05/30/2017	KW	K12681.D	E0385	250 cc	1

**Target Compound Results Summary**

Target Compounds	CAS#	MW	Result ppbv	RL ppbv	Q	Result ug/m3	RL ug/m3	Comments
cis-1,3-Dichloropropene	10061-01-5	111.0	ND	0.50		ND	2.3	
Toluene	108-88-3	92.14	ND	0.50		ND	1.9	
trans-1,3-Dichloropropene	10061-02-6	111.0	ND	0.50		ND	2.3	
1,1,2-Trichloroethane	79-00-5	133.4	ND	0.50		ND	2.7	
2-Hexanone(MBK)	591-78-6	100.1	ND	0.50		ND	2.0	
Tetrachloroethene	127-18-4	165.8	ND	0.50		ND	3.4	
Dibromochloromethane	124-48-1	208.3	ND	0.50		ND	4.3	
1,2-Dibromoethane	106-93-4	187.8	ND	0.50		ND	3.8	
Chlorobenzene	108-90-7	112.6	ND	0.50		ND	2.3	
Ethylbenzene	100-41-4	106.2	ND	0.50		ND	2.2	
Xylene (p,m)	1330-20-7	106.2	ND	1.0		ND	4.3	
Xylene (Ortho)	95-47-6	106.2	ND	0.50		ND	2.2	
Styrene	100-42-5	104.1	ND	0.50		ND	2.1	
Isopropylbenzene (cumene)	98-82-8	120.19	ND	0.50		ND	2.5	
Bromoform	75-25-2	252.8	ND	0.50		ND	5.2	
1,1,2,2-Tetrachloroethane	79-34-5	167.9	ND	0.50		ND	3.4	
4-Ethyltoluene	622-96-8	120.2	ND	0.50		ND	2.5	
1,3,5-Trimethylbenzene	108-67-8	120.2	ND	0.50		ND	2.5	
2-Chlorotoluene	95-49-8	126.6	ND	0.50		ND	2.6	
1,2,4-Trimethylbenzene	95-63-6	120.2	ND	0.50		ND	2.5	
1,3-Dichlorobenzene	541-73-1	147.0	ND	0.50		ND	3.0	
1,4-Dichlorobenzene	106-46-7	147.0	ND	0.50		ND	3.0	
Benzyl chloride	100-44-7	126.0	ND	0.50		ND	2.6	
1,2-Dichlorobenzene	95-50-1	147.0	ND	0.50		ND	3.0	
1,2,4-Trichlorobenzene	120-82-1	181.5	ND	0.50		ND	3.7	
Hexachloro-1,3-butadiene	87-68-3	260.8	ND	0.50		ND	5.3	
Naphthalene	91-20-3	128.17	ND	0.50		ND	2.6	
<b>Total Target Compound Concentrations:</b>			<b>23</b>	<b>ppbv</b>		<b>62</b>	<b>ug/m3</b>	

**Surrogate**

4-Bromofluorobenzene

**Result**

10

**Spike**

10

**Recovery**

100%

**Qualifier Definitions**

ND = Non Detect

B = Compound also found in method blank.

E = Estimated concentration exceeding upper calibration range.

D = Result reported from diluted analysis.

**Method Reference**

EPA: Compendium Method TO-15, "Determination of Volatile Organic Compounds (VOCs) in Air..." Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS), January 1999, (EPA/625/R-96/010b).



NJDEP Certification #: 03036



**EMSL Analytical**

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<http://www.EMSL.com> [to15lab@EMSL.com](mailto:to15lab@EMSL.com)

EMSL Order #: 491700563  
 EMSL Sample #: 491700563-2  
 Customer ID: SFES42  
 Customer PO: 17-03034

Attn: **Bruce Hackett**  
**Safe Environmental Solutions**  
**62 Darling Ave**  
**South Portland, ME 04106**

Phone: 207-615-3694  
 Fax: Not Available  
 Date Collected: 5/22/2017  
 Date Received: 5/24/2017

Project: **Hall - Dale Middle**

Sample ID: **Rm 208**

<u>Analysis</u>	<u>Analysis Date</u>	<u>Analyst Init.</u>	<u>Lab File ID</u>	<u>Canister ID</u>	<u>Sample Vol.</u>	<u>Dil. Factor</u>
Initial	05/30/2017	KW	K12681.D	E0385	250 cc	1

### Total Volatile Organic Compounds (TVOC) Summary

Target Compounds	CAS#	MW	Result ppbv	RL ppbv	Q	Result ug/m3	RL ug/m3	Comments
Chloromethane	74-87-3	50.49	0.60	0.50		1.2	1.0	
Ethanol	64-17-5	46.07	9.4	0.50		18	0.94	
Freon 11(Trichlorofluoromethane)	75-69-4	137.40	2.6	0.50		15	2.8	
Isopropyl alcohol(2-Propanol)	67-63-0	60.10	5.5	0.50		13	1.2	
Acetone	67-64-1	58.08	3.5	0.50		8.4	1.2	
Ethyl acetate	141-78-6	88.10	1.7	0.50		6.3	1.8	
<b>Total Target Compound Concentrations:</b>			<b>23</b>	<b>ppbv</b>		<b>62</b>	<b>ug/m3</b>	

**Qualifier Definitions**

B = Compound also found in method blank.  
 E = Estimated concentration exceeding upper calibration range.  
 D = Result reported from diluted analysis.

Tentatively Identified Compounds	CAS#	MW(1)	Result ppbv	Q	Result ug/m3	Retention Time	Comments
<b>Total TIC Concentrations:</b>			<b>0.0</b>	<b>ppbv</b>	<b>0.0</b>	<b>ug/m3</b>	

**Qualifier Definitions**

(1) = If unknown, MW is assigned as equivalent Toluene (92) for ug/m3 conversion purposes.  
 B = Compound also found in method blank.  
 J = Estimated value based on a 1:1 response to internal standard.  
 N = Presumptive evidence of compound based on library match.

Total Volatile Organic Compounds (TVOCs): 23 ppbv      62 ug/m3



NJDEP Certification #: 03036

**EMSL Analytical**

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EMSL Order #: 491700563  
 EMSL Sample #: 491700563-3  
 Customer ID: SFES42  
 Customer PO: 17-03034

Attn: **Bruce Hackett**  
**Safe Environmental Solutions**  
**62 Darling Ave**  
**South Portland, ME 04106**

Phone: 207-615-3694  
 Fax: Not Available  
 Date Collected: 5/22/2017  
 Date Received: 5/24/2017

Project: Hall - Dale Middle

Sample ID: Rm 219

Analysis Initial	Analysis Date	Analyst Init.	Lab File ID	Canister ID	Sample Vol.	Dil. Factor
	05/30/2017	KW	K12682.D	E12322	250 cc	1

**Target Compound Results Summary**

Target Compounds	CAS#	MW	Result ppbv	RL ppbv	Q	Result ug/m3	RL ug/m3	Comments
Propylene	115-07-1	42.08	ND	1.0		ND	1.7	
Freon 12(Dichlorodifluoromethane)	75-71-8	120.9	0.70	0.50		3.5	2.5	
Freon 114(1,2-Dichlorotetrafluoroethan	76-14-2	170.9	ND	0.50		ND	3.5	
Chloromethane	74-87-3	50.49	0.80	0.50		1.7	1.0	
n-Butane	106-97-8	58.12	ND	0.50		ND	1.2	
Vinyl chloride	75-01-4	62.50	ND	0.50		ND	1.3	
1,3-Butadiene	106-99-0	54.09	ND	0.50		ND	1.1	
Bromomethane	74-83-9	94.94	ND	0.50		ND	1.9	
Chloroethane	75-00-3	64.52	ND	0.50		ND	1.3	
Ethanol	64-17-5	46.07	29	0.50		54	0.94	
Bromoethene(Vinyl bromide)	593-60-2	106.9	ND	0.50		ND	2.2	
Freon 11(Trichlorofluoromethane)	75-69-4	137.4	1.8	0.50		10	2.8	
Isopropyl alcohol(2-Propanol)	67-63-0	60.10	3.4	0.50		8.4	1.2	
Freon 113(1,1,2-Trichlorotrifluoroethan	76-13-1	187.4	ND	0.50		ND	3.8	
Acetone	67-64-1	58.08	5.2	0.50		12	1.2	
1,1-Dichloroethene	75-35-4	96.94	ND	0.50		ND	2.0	
Acetonitrile	75-05-8	41.00	ND	0.50		ND	0.84	
Tertiary butyl alcohol(TBA)	75-65-0	74.12	ND	0.50		ND	1.5	
Bromoethane(Ethyl bromide)	74-96-4	108.0	ND	0.50		ND	2.2	
3-Chloropropene(Allyl chloride)	107-05-1	76.53	ND	0.50		ND	1.6	
Carbon disulfide	75-15-0	76.14	ND	0.50		ND	1.6	
Methylene chloride	75-09-2	84.94	ND	0.50		ND	1.7	
Acrylonitrile	107-13-1	53.00	ND	0.50		ND	1.1	
Methyl-tert-butyl ether(MTBE)	1634-04-4	88.15	ND	0.50		ND	1.8	
trans-1,2-Dichloroethene	156-60-5	96.94	ND	0.50		ND	2.0	
n-Hexane	110-54-3	86.17	ND	0.50		ND	1.8	
1,1-Dichloroethane	75-34-3	98.96	ND	0.50		ND	2.0	
Vinyl acetate	108-05-4	86.00	ND	0.50		ND	1.8	
2-Butanone(MEK)	78-93-3	72.10	ND	0.50		ND	1.5	
cis-1,2-Dichloroethene	156-59-2	96.94	ND	0.50		ND	2.0	
Ethyl acetate	141-78-6	88.10	2.7	0.50		10	1.8	
Chloroform	67-66-3	119.4	ND	0.50		ND	2.4	
Tetrahydrofuran	109-99-9	72.11	ND	0.50		ND	1.5	
1,1,1-Trichloroethane	71-55-6	133.4	ND	0.50		ND	2.7	
Cyclohexane	110-82-7	84.16	ND	0.50		ND	1.7	
2,2,4-Trimethylpentane(Isooctane)	540-84-1	114.2	ND	0.50		ND	2.3	
Carbon tetrachloride	56-23-5	153.8	ND	0.50		ND	3.1	
n-Heptane	142-82-5	100.2	ND	0.50		ND	2.0	
1,2-Dichloroethane	107-06-2	98.96	ND	0.50		ND	2.0	
Benzene	71-43-2	78.11	ND	0.50		ND	1.6	
Trichloroethene	79-01-6	131.4	ND	0.50		ND	2.7	
1,2-Dichloropropane	78-87-5	113.0	ND	0.50		ND	2.3	
Methyl Methacrylate	80-62-6	100.12	ND	0.50		ND	2.0	
Bromodichloromethane	75-27-4	163.8	ND	0.50		ND	3.3	
1,4-Dioxane	123-91-1	88.12	ND	0.50		ND	1.8	
4-Methyl-2-pentanone(MIBK)	108-10-1	100.2	ND	0.50		ND	2.0	

**EMSL Analytical**

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 Phone/Fax: (856)858-4800 / (856)858-4571  
<http://www.EMSL.com> [to15lab@EMSL.com](mailto:to15lab@EMSL.com)

EMSL Order #: 491700563  
 EMSL Sample #: 491700563-3  
 Customer ID: SFES42  
 Customer PO: 17-03034

Attn: **Bruce Hackett**  
**Safe Environmental Solutions**  
**62 Darling Ave**  
**South Portland, ME 04106**

Phone: 207-615-3694  
 Fax: Not Available  
 Date Collected: 5/22/2017  
 Date Received: 5/24/2017

Project: Hall - Dale Middle

Sample ID: Rm 219

Analysis	Analysis Date	Analyst Init.	Lab File ID	Canister ID	Sample Vol.	Dil. Factor
Initial	05/30/2017	KW	K12682.D	E12322	250 cc	1

**Target Compound Results Summary**

Target Compounds	CAS#	MW	Result ppbv	RL ppbv	Q	Result ug/m3	RL ug/m3	Comments
cis-1,3-Dichloropropene	10061-01-5	111.0	ND	0.50		ND	2.3	
Toluene	108-88-3	92.14	ND	0.50		ND	1.9	
trans-1,3-Dichloropropene	10061-02-6	111.0	ND	0.50		ND	2.3	
1,1,2-Trichloroethane	79-00-5	133.4	ND	0.50		ND	2.7	
2-Hexanone(MBK)	591-78-6	100.1	ND	0.50		ND	2.0	
Tetrachloroethene	127-18-4	165.8	ND	0.50		ND	3.4	
Dibromochloromethane	124-48-1	208.3	ND	0.50		ND	4.3	
1,2-Dibromoethane	106-93-4	187.8	ND	0.50		ND	3.8	
Chlorobenzene	108-90-7	112.6	ND	0.50		ND	2.3	
Ethylbenzene	100-41-4	106.2	ND	0.50		ND	2.2	
Xylene (p,m)	1330-20-7	106.2	ND	1.0		ND	4.3	
Xylene (Ortho)	95-47-6	106.2	ND	0.50		ND	2.2	
Styrene	100-42-5	104.1	ND	0.50		ND	2.1	
Isopropylbenzene (cumene)	98-82-8	120.19	ND	0.50		ND	2.5	
Bromoform	75-25-2	252.8	ND	0.50		ND	5.2	
1,1,2,2-Tetrachloroethane	79-34-5	167.9	ND	0.50		ND	3.4	
4-Ethyltoluene	622-96-8	120.2	ND	0.50		ND	2.5	
1,3,5-Trimethylbenzene	108-67-8	120.2	ND	0.50		ND	2.5	
2-Chlorotoluene	95-49-8	126.6	ND	0.50		ND	2.6	
1,2,4-Trimethylbenzene	95-63-6	120.2	ND	0.50		ND	2.5	
1,3-Dichlorobenzene	541-73-1	147.0	ND	0.50		ND	3.0	
1,4-Dichlorobenzene	106-46-7	147.0	ND	0.50		ND	3.0	
Benzyl chloride	100-44-7	126.0	ND	0.50		ND	2.6	
1,2-Dichlorobenzene	95-50-1	147.0	ND	0.50		ND	3.0	
1,2,4-Trichlorobenzene	120-82-1	181.5	ND	0.50		ND	3.7	
Hexachloro-1,3-butadiene	87-68-3	260.8	ND	0.50		ND	5.3	
Naphthalene	91-20-3	128.17	ND	0.50		ND	2.6	
<b>Total Target Compound Concentrations:</b>			<b>44</b>	<b>ppbv</b>		<b>100</b>	<b>ug/m3</b>	

**Surrogate**

4-Bromofluorobenzene

**Result**

10

**Spike**

10

**Recovery**

100%

**Qualifier Definitions**

ND = Non Detect

B = Compound also found in method blank.

E = Estimated concentration exceeding upper calibration range.

D = Result reported from diluted analysis.

**Method Reference**

USEPA: Compendium Method TO-15, "Determination of Volatile Organic Compounds (VOCs) in Air..." Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS), January 1999, (EPA/625/R-96/010b).



NJDEP Certification #: 03036



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EMSL Order #: **491700563**  
EMSL Sample #: **491700563-3**  
Customer ID: **SFES42**  
Customer PO: **17-03034**

Attn: **Bruce Hackett**  
**Safe Environmental Solutions**  
**62 Darling Ave**  
**South Portland, ME 04106**

Phone: **207-615-3694**  
Fax: **Not Available**  
Date Collected: **5/22/2017**  
Date Received: **5/24/2017**

Project: **Hall - Dale Middle**

Sample ID: **Rm 219**

<u>Analysis</u>	<u>Analysis Date</u>	<u>Analyst Init.</u>	<u>Lab File ID</u>	<u>Canister ID</u>	<u>Sample Vol.</u>	<u>Dil. Factor</u>
<b>Initial</b>	<b>05/30/2017</b>	<b>KW</b>	<b>K12682.D</b>	<b>E12322</b>	<b>250 cc</b>	<b>1</b>

**Tentatively Identified Compound Results Summary**

<b>Tentatively Identified Compounds</b>	<b>CAS#</b>	<b>MW(1)</b>	<b>Result ppbv</b>	<b>Q</b>	<b>Result ug/m3</b>	<b>Retention Time</b>	<b>Comments</b>
Ethane, 1-chloro-1,1-difluoro-	000075-68-3	100	<b>6.3</b>	JN	<b>26</b>	4.89	
1-Butanol	000071-36-3	74	<b>2.7</b>	JN	<b>8.1</b>	17.70	
<b>Total TIC Concentrations:</b>			<b>9.0</b>	<b>ppbv</b>	<b>34</b>	<b>ug/m3</b>	

**Qualifier Definitions**

- (1) = If unknown, MW is assigned as equivalent Toluene (92) for ug/m3 conversion purposes.
- B = Compound also found in method blank.
- J = Estimated value based on a 1:1 response to internal standard.
- N = Presumptive evidence of compound based on library match.

**Method Reference**

USEPA: Compendium Method TO-15, "Determination of Volatile Organic Compounds (VOCs) in Air..." Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS), January 1999. (EPA/625/R-96/010b).



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Phone: 207-615-3694  
 Fax: Not Available  
 Date Collected: 5/22/2017  
 Date Received: 5/24/2017

Project: **Hall - Dale Middle**

Sample ID: Rm 219

Analysis Initial	Analysis Date	Analyst Init.	Lab File ID	Canister ID	Sample Vol.	Dil. Factor
	05/30/2017	KW	K12682.D	E12322	250 cc	1

**Total Volatile Organic Compounds (TVOC) Summary**

Target Compounds	CAS#	MW	Result ppbv	RL ppbv	Q	Result ug/m3	RL ug/m3	Comments
Freon 12(Dichlorodifluoromethane)	75-71-8	120.90	0.70	0.50		3.5	2.5	
Chloromethane	74-87-3	50.49	0.80	0.50		1.7	1.0	
Ethanol	64-17-5	46.07	29	0.50		54	0.94	
Freon 11(Trichlorofluoromethane)	75-69-4	137.40	1.8	0.50		10	2.8	
Isopropyl alcohol(2-Propanol)	67-63-0	60.10	3.4	0.50		8.4	1.2	
Acetone	67-64-1	58.08	5.2	0.50		12	1.2	
Ethyl acetate	141-78-6	88.10	2.7	0.50		10	1.8	
<b>Total Target Compound Concentrations:</b>			<b>44</b>	<b>ppbv</b>		<b>100</b>	<b>ug/m3</b>	

**Qualifier Definitions**

B = Compound also found in method blank.  
 E = Estimated concentration exceeding upper calibration range.  
 D = Result reported from diluted analysis.

Tentatively Identified Compounds	CAS#	MW(1)	Result ppbv	Q	Result ug/m3	Retention Time	Comments
Ethane, 1-chloro-1,1-difluoro-	000075-68-3	100	6.3	JN	26	4.89	
1-Butanol	000071-36-3	74	2.7	JN	8.1	17.7	
<b>Total TIC Concentrations:</b>			<b>9.0</b>	<b>ppbv</b>	<b>34</b>	<b>ug/m3</b>	

**Qualifier Definitions**

(1) = If unknown, MW is assigned as equivalent Toluene (92) for ug/m3 conversion purposes.  
 B = Compound also found in method blank.  
 J = Estimated value based on a 1:1 response to internal standard.  
 N = Presumptive evidence of compound based on library match.

Total Volatile Organic Compounds (TVOCs): **53 ppbv**

**130 ug/m3**



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 EMSL Sample #: 491700563-4  
 Customer ID: SFES42  
 Customer PO: 17-03034

Attn: **Bruce Hackett**  
**Safe Environmental Solutions**  
**62 Darling Ave**  
**South Portland, ME 04106**

Phone: 207-615-3694  
 Fax: Not Available  
 Date Collected: 5/22/2017  
 Date Received: 5/24/2017

Project: Hall - Dale Middle

Sample ID: Outdoor

Analysis Initial	Analysis Date	Analyst Init.	Lab File ID	Canister ID	Sample Vol.	Dil. Factor
	05/30/2017	KW	K12684.D	E15307	250 cc	1

**Target Compound Results Summary**

Target Compounds	CAS#	MW	Result ppbv	RL ppbv	Q	Result ug/m3	RL ug/m3	Comments
Propylene	115-07-1	42.08	ND	1.0		ND	1.7	
Freon 12(Dichlorodifluoromethane)	75-71-8	120.9	ND	0.50		ND	2.5	
Freon 114(1,2-Dichlorotetrafluoroethan	76-14-2	170.9	ND	0.50		ND	3.5	
Chloromethane	74-87-3	50.49	0.53	0.50		1.1	1.0	
n-Butane	106-97-8	58.12	ND	0.50		ND	1.2	
Vinyl chloride	75-01-4	62.50	ND	0.50		ND	1.3	
1,3-Butadiene	106-99-0	54.09	ND	0.50		ND	1.1	
Bromomethane	74-83-9	94.94	ND	0.50		ND	1.9	
Chloroethane	75-00-3	64.52	ND	0.50		ND	1.3	
Ethanol	64-17-5	46.07	1.1	0.50		2.1	0.94	
Bromoethene(Vinyl bromide)	593-60-2	106.9	ND	0.50		ND	2.2	
Freon 11(Trichlorofluoromethane)	75-69-4	137.4	ND	0.50		ND	2.8	
Isopropyl alcohol(2-Propanol)	67-63-0	60.10	1.4	0.50		3.6	1.2	
Freon 113(1,1,2-Trichlorotrifluoroethan	76-13-1	187.4	ND	0.50		ND	3.8	
Acetone	67-64-1	58.08	1.8	0.50		4.2	1.2	
1,1-Dichloroethene	75-35-4	96.94	ND	0.50		ND	2.0	
Acetonitrile	75-05-8	41.00	ND	0.50		ND	0.84	
Tertiary butyl alcohol(TBA)	75-65-0	74.12	ND	0.50		ND	1.5	
Bromoethane(Ethyl bromide)	74-96-4	108.0	ND	0.50		ND	2.2	
3-Chloropropene(Allyl chloride)	107-05-1	76.53	ND	0.50		ND	1.6	
Carbon disulfide	75-15-0	76.14	ND	0.50		ND	1.6	
Methylene chloride	75-09-2	84.94	ND	0.50		ND	1.7	
Acrylonitrile	107-13-1	53.00	ND	0.50		ND	1.1	
Methyl-tert-butyl ether(MTBE)	1634-04-4	88.15	ND	0.50		ND	1.8	
trans-1,2-Dichloroethene	156-60-5	96.94	ND	0.50		ND	2.0	
n-Hexane	110-54-3	86.17	ND	0.50		ND	1.8	
1,1-Dichloroethane	75-34-3	98.96	ND	0.50		ND	2.0	
Vinyl acetate	108-05-4	86.00	ND	0.50		ND	1.8	
2-Butanone(MEK)	78-93-3	72.10	1.2	0.50		3.5	1.5	
cis-1,2-Dichloroethene	156-59-2	96.94	ND	0.50		ND	2.0	
Ethyl acetate	141-78-6	88.10	1.0	0.50		3.6	1.8	
Chloroform	67-66-3	119.4	ND	0.50		ND	2.4	
Tetrahydrofuran	109-99-9	72.11	ND	0.50		ND	1.5	
1,1,1-Trichloroethane	71-55-6	133.4	ND	0.50		ND	2.7	
Cyclohexane	110-82-7	84.16	ND	0.50		ND	1.7	
2,2,4-Trimethylpentane(Isooctane)	540-84-1	114.2	ND	0.50		ND	2.3	
Carbon tetrachloride	56-23-5	153.8	ND	0.50		ND	3.1	
n-Heptane	142-82-5	100.2	ND	0.50		ND	2.0	
1,2-Dichloroethane	107-06-2	98.96	ND	0.50		ND	2.0	
Benzene	71-43-2	78.11	ND	0.50		ND	1.6	
Trichloroethene	79-01-6	131.4	ND	0.50		ND	2.7	
1,2-Dichloropropane	78-87-5	113.0	ND	0.50		ND	2.3	
Methyl Methacrylate	80-62-6	100.12	ND	0.50		ND	2.0	
Bromodichloromethane	75-27-4	163.8	ND	0.50		ND	3.3	
1,4-Dioxane	123-91-1	88.12	ND	0.50		ND	1.8	
4-Methyl-2-pentanone(MIBK)	108-10-1	100.2	ND	0.50		ND	2.0	

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EMSL Order #: 491700563  
 EMSL Sample #: 491700563-4  
 Customer ID: SFES42  
 Customer PO: 17-03034

Attn: **Bruce Hackett**  
**Safe Environmental Solutions**  
**62 Darling Ave**  
**South Portland, ME 04106**

Phone: 207-615-3694  
 Fax: Not Available  
 Date Collected: 5/22/2017  
 Date Received: 5/24/2017

Project: Hall - Dale Middle

Sample ID: Outdoor

Analysis	Analysis Date	Analyst Init.	Lab File ID	Canister ID	Sample Vol.	Dil. Factor
Initial	05/30/2017	KW	K12684.D	E15307	250 cc	1

**Target Compound Results Summary**

Target Compounds	CAS#	MW	Result ppbv	RL ppbv	Q	Result ug/m3	RL ug/m3	Comments
cis-1,3-Dichloropropene	10061-01-5	111.0	ND	0.50		ND	2.3	
Toluene	108-88-3	92.14	ND	0.50		ND	1.9	
trans-1,3-Dichloropropene	10061-02-6	111.0	ND	0.50		ND	2.3	
1,1,2-Trichloroethane	79-00-5	133.4	ND	0.50		ND	2.7	
2-Hexanone(MBK)	591-78-6	100.1	ND	0.50		ND	2.0	
Tetrachloroethene	127-18-4	165.8	ND	0.50		ND	3.4	
Dibromochloromethane	124-48-1	208.3	ND	0.50		ND	4.3	
1,2-Dibromoethane	106-93-4	187.8	ND	0.50		ND	3.8	
Chlorobenzene	108-90-7	112.6	ND	0.50		ND	2.3	
Ethylbenzene	100-41-4	106.2	ND	0.50		ND	2.2	
Xylene (p,m)	1330-20-7	106.2	ND	1.0		ND	4.3	
Xylene (Ortho)	95-47-6	106.2	ND	0.50		ND	2.2	
Styrene	100-42-5	104.1	ND	0.50		ND	2.1	
Isopropylbenzene (cumene)	98-82-8	120.19	ND	0.50		ND	2.5	
Bromoform	75-25-2	252.8	ND	0.50		ND	5.2	
1,1,2,2-Tetrachloroethane	79-34-5	167.9	ND	0.50		ND	3.4	
4-Ethyltoluene	622-96-8	120.2	ND	0.50		ND	2.5	
1,3,5-Trimethylbenzene	108-67-8	120.2	ND	0.50		ND	2.5	
2-Chlorotoluene	95-49-8	126.6	ND	0.50		ND	2.6	
1,2,4-Trimethylbenzene	95-63-6	120.2	ND	0.50		ND	2.5	
1,3-Dichlorobenzene	541-73-1	147.0	ND	0.50		ND	3.0	
1,4-Dichlorobenzene	106-46-7	147.0	ND	0.50		ND	3.0	
Benzyl chloride	100-44-7	126.0	ND	0.50		ND	2.6	
1,2-Dichlorobenzene	95-50-1	147.0	ND	0.50		ND	3.0	
1,2,4-Trichlorobenzene	120-82-1	181.5	ND	0.50		ND	3.7	
Hexachloro-1,3-butadiene	87-68-3	260.8	ND	0.50		ND	5.3	
Naphthalene	91-20-3	128.17	ND	0.50		ND	2.6	
<b>Total Target Compound Concentrations:</b>			<b>7.0</b>	<b>ppbv</b>		<b>18</b>	<b>ug/m3</b>	

**Surrogate**

4-Bromofluorobenzene

Result	Spike	Recovery
9.8	10	98%

**Qualifier Definitions**

ND = Non Detect

B = Compound also found in method blank.

E = Estimated concentration exceeding upper calibration range.

D = Result reported from diluted analysis.

**Method Reference**

USEPA: Compendium Method TO-15, "Determination of Volatile Organic Compounds (VOCs) in Air..." Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS), January 1999, (EPA/625/R-96/010b).



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 Phone: 207-615-3694  
 Fax: Not Available  
 Date Collected: 5/22/2017  
 Date Received: 5/24/2017  
 Project: Hall - Dale Middle  
 Sample ID: Outdoor

Analysis	Analysis Date	Analyst Init.	Lab File ID	Canister ID	Sample Vol.	Dil. Factor
Initial	05/30/2017	KW	K12684.D	E15307	250 cc	1

**Tentatively Identified Compound Results Summary**

Tentatively Identified Compounds	CAS#	MW(1)	Result ppbv	Q	Result ug/m3	Retention Time	Comments
No TICs to Report							
Total TIC Concentrations:			0.0	ppbv	0.0	ug/m3	

**Qualifier Definitions**

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- J= Estimated value based on a 1:1 response to internal standard.
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 Customer ID: SFES42  
 Customer PO: 17-03034

Attn: **Bruce Hackett**  
**Safe Environmental Solutions**  
**62 Darling Ave**  
**South Portland, ME 04106**

Phone: 207-615-3694  
 Fax: Not Available  
 Date Collected: 5/22/2017  
 Date Received: 5/24/2017

Project: **Hall - Dale Middle**

Sample ID: **Outdoor**

<u>Analysis</u>	<u>Analysis Date</u>	<u>Analyst Init.</u>	<u>Lab File ID</u>	<u>Canister ID</u>	<u>Sample Vol.</u>	<u>Dil. Factor</u>
Initial	05/30/2017	KW	K12684.D	E15307	250 cc	1

**Total Volatile Organic Compounds (TVOC) Summary**

Target Compounds	CAS#	MW	Result ppbv	RL ppbv	Q	Result ug/m3	RL ug/m3	Comments
Chloromethane	74-87-3	50.49	0.53	0.50		1.1	1.0	
Ethanol	64-17-5	46.07	1.1	0.50		2.1	0.94	
Isopropyl alcohol(2-Propanol)	67-63-0	60.10	1.4	0.50		3.6	1.2	
Acetone	67-64-1	58.08	1.8	0.50		4.2	1.2	
2-Butanone(MEK)	78-93-3	72.10	1.2	0.50		3.5	1.5	
Ethyl acetate	141-78-6	88.10	1.0	0.50		3.6	1.8	
<b>Total Target Compound Concentrations:</b>			<b>7.0</b>	<b>ppbv</b>		<b>18</b>	<b>ug/m3</b>	

**Qualifier Definitions**

B = Compound also found in method blank.  
 E = Estimated concentration exceeding upper calibration range.  
 D = Result reported from diluted analysis.

Tentatively Identified Compounds	CAS#	MW(1)	Result ppbv	Q	Result ug/m3	Retention Time	Comments
<b>Total TIC Concentrations:</b>			<b>0.0</b>	<b>ppbv</b>	<b>0.0</b>	<b>ug/m3</b>	

**Qualifier Definitions**

(1) = If unknown, MW is assigned as equivalent Toluene (92) for ug/m3 conversion purposes.  
 B = Compound also found in method blank.  
 J = Estimated value based on a 1:1 response to internal standard.  
 N = Presumptive evidence of compound based on library match.

**Total Volatile Organic Compounds (TVOCs):** **7.0 ppbv**      **18 ug/m3**



NJDEP Certification #: 03036



# USEPA TO-15

## External Chain of Custody/ Field Test Data Sheet

EMSL Analytical, Inc.  
200 Route 130 North  
Cinnaminson, NJ 08077  
Ph. (800) 220-3974  
Fax (856) 786-0327

EMSL Order Number (Lab Use Only): 491700563

Report To Contact Name: Bruce Heckert  
 Company Name: Safe Environmental Solutions  
 Address 1: 62 Deering Ave  
 Address 2: South Portland ME 04106  
 Phone No.: 207.615.3694 Fax: 207.245.2230  
 Email Results To: vlucic@sesolinc.com  
 Turnaround Time (in Business Days):  1 Day  2 Day  3 Day  4 Day  5 Day  
 Project Name: Hell Dale Wadded 1g  
 Reporting Format:  Results Only (Standard Lab Report)  Full Deliverables (Surcharge may apply)  Other

Bill To Company: SAFE  
 Attention To:  
 Address 1:  
 Address 2:  
 Phone No.:  
 Fax:  
 Sampled By (Sign): [Signature]  
 Sampled By (Name): B. Heckert  
 Total # of Samples: 4  
 Date Shipped:  
 Sample Collection Zip Code:  
 Purchase Order: 17-05034

Client Field Sample Identification	Field Use - All Information Required				Sampling Stop Information				Canister Information				Lab Use Only				Analysis	Matrix								
	Sampling Start Information		Barometric Pres. (Hg)		Time (24 hr clock)		Canister Pressure (Hg)		Interior Temp. (F)		Size (L)		Can Cert Batch ID		Outgoing Pressure (Hg)				Incoming Pressure (Hg)		Flow Controller		Other (Specify)	Indoor/ Ambient Air	Soil Gas	Landfill/ Vent
	Start Date	Time (24 hr clock)	Canister Pressure (Hg)	Interior Temp. (F)	Stop Date	Time (24 hr clock)	Canister Pressure (Hg)	Interior Temp. (F)	Canister ID	Size (L)	Can Cert Batch ID	Outgoing Pressure (Hg)	Incoming Pressure (Hg)	Reg. ID	Cal Flow (ml/min)	USEPA TO-15			NDEP LT0-15	LIBRARY SEARCH						
RA 210	5/23/17	1045	30	74.3	5/23/17	1130	5.5	77.9	E0370	6	6346	-29.6	-6.8	5961	3.5	✓	✓	✓								
RA 208	5/23/17	1038	30	72.3	5/23/17	1134	9	78.2	10395	1						✓	✓	✓								
RA 219	5/23/17	1003	30	73.2	5/23/17	1158	5.5	76.8	12322	1						✓	✓	✓								
OUTDOOR	5/23/17	1017	30	65.7	5/23/17	1132	3	80.6	15307	1						✓	✓	✓								

Comments: \* Control/non-complaint

Relinquished by:	Date/Time	Received by:	Date/Time	Affixed Seal #	Reason for Exchange (Circle appropriate)
<u>Carly Pato</u>	<u>5/19/17 1340</u>	<u>[Signature]</u>	<u>5/20/17 1330</u>	<u>353</u>	Shipping <input checked="" type="checkbox"/> Courier <input type="checkbox"/> Receiving <input type="checkbox"/> Sampling <input type="checkbox"/> Other: <input type="checkbox"/>
<u>[Signature]</u>	<u>5/23/17 1530</u>	<u>[Signature]</u>	<u>5/24/17 1110</u>		Shipping <input checked="" type="checkbox"/> Courier <input type="checkbox"/> Receiving <input type="checkbox"/> Sampling <input type="checkbox"/> Other: <input type="checkbox"/>
<u>[Signature]</u>	<u>5/24/17 1155</u>	<u>Carly Pato</u>	<u>5/24/17 1315</u>		Shipping <input type="checkbox"/> Courier <input type="checkbox"/> Receiving <input type="checkbox"/> Sampling <input type="checkbox"/> Other: <input checked="" type="checkbox"/> AN

Lab Canister Certification  
 Analyst Signature (TO-15):

491700563

### TO-15 Sample Information

Please fill out this worksheet in addition to the Chain of Custody form. This information helps us to best analyze your samples, achieve requested TAT and provide you with helpful interpretation information.

Company: SES

Contact Person:

Name: Bruce Hackett

E-mail: bruce@sesofae.com

Additional E-mails:

Telephone #: - 207 615 3694

Library Search requested:  YES  NO

A library search (aka Tentatively Identified Compounds) will identify up to 20 of the largest, non-target peaks that are not part of the standard TO-15 list of 74 compounds. If you are performing an Indoor Air Quality or odor investigation, the library search is recommended to provide you with all available information for your sample.

Sample Type:

- Indoor Air Quality (Home/Office)  Soil Gas/Sub Slab
- IAQ (Industrial)
- Other:

Sample Description: School GLASS ROOMS

PLEASE NOTE: The result forms that we provide will not indicate whether your results have exceeded any Exposure Limit criteria established by any regulatory agency. If you would like that information, please check off below which regulatory comparison forms you would like to receive.

- OSHA PELs/NIOSH RELS *combined form*  Potential Sources of Compounds found in your IAQ sample
- EPA RSLs - 5/2016 Blended for THQ=1.0 and THQ=0.1  TVOC (Library Search Required for this format)
- NJ DEP 1/2013 - Circle one: Indoor Air Soil Gas  Ohio 4/2013 - Circle one: Residential Commercial
- NC DENR 4/2014 - Circle one: Residential Non-residential  Indiana Dept Env Mgmt Screening Levels 3/2016
- PA DEP - 11/2016 Indoor Air  Vermont DEP IROCP 4/2012 (soil gas only)
- PA DEP - 11/2016: Sub Slab Soil Gas OR Near Source Soil Gas  California OEHHA 2/2012
- CA HHSL 11/2004 - Circle on Indoor Air Soil Gas  Other, These are the compounds I want reported:

Additional analyses that can be performed from your canister. Please note: there is an additional charge for any of the tests below.

- US EPA TO-3 via GC/FID (choose one below): ASTM-D5504 via GC/SCD (choose one below): \*
- C<sub>1</sub>-C<sub>6</sub> hydrocarbons  Sulfur Scan (H<sub>2</sub>S, COS, MeSH, EtSH, DMS)
- Methane only  H<sub>2</sub>S only

\*Note: Hold time for sulfur gases is 1 day from collection. Please schedule your sample collection so that samples are received in the lab prior to noon on Friday. Analysis performed out of hold time will have a notation in the report.

We can provide the following CMS tests from your canisters. Please note that these tests are to be used for IAQ/Screening purposes ONLY. EMSL recommends alternate field sampling techniques for these parameters (with the exception of water vapor); please contact your sales rep for the proper media. Please note: there is an additional charge for any of the tests

- Draeger CMS Analyzer:
- CO  CO<sub>2</sub>  NH<sub>3</sub>  O<sub>2</sub>  Water Vapor

Sample Retention Policy: All canisters are guaranteed to be retained for one day after results are reported. Please review your results promptly to ensure that your project scope is fully addressed. Cans may be retained for a longer period of time but arrangements to hold your cans must be made through your customer account representative quickly. Thank you.

RECEIVED  
CINNAMINSON, NJ  
2017 MAY 24 A 11:53

**EMSL Analytical**

200 Route 130 North, Cinnaminson, NJ 08077  
 Phone/Fax: (856)858-4800 / (856)858-4571  
<http://www.EMSL.com> [to15lab@EMSL.com](mailto:to15lab@EMSL.com)

EMSL Order #: 491700563  
 EMSL Sample #: 491700563-1  
 Customer ID: SFES42  
 Customer PO: 17-03034

Attn: **Bruce Hackett**  
**Safe Environmental Solutions**  
**62 Darling Ave**  
**South Portland, ME 04106**

Phone: 207-615-3694  
 Fax: Not Available  
 Date Collected: 5/22/2017  
 Date Received: 5/24/2017

Project: Hall - Dale Middle

Sample ID: Rm 210

Analysis Initial	Analysis Date	Analyst Init.	Lab File ID	Canister ID	Sample Vol.	Dil. Factor
	05/30/2017	KW	K12680.D	E0370	250 cc	1

**USEPA Generic Air Screening Level Summary Table**

Target Compounds	CAS#	MW	Result ppbv	Q	Result ug/m3	Residential ug/m3	>	Industrial ug/m3	>
Propylene	115-07-1	42.08	ND		ND	3100		13000	
Freon 12(Dichlorodifluoromethane)	75-71-8	120.90	ND		ND	100		440	
Freon 114(1,2-Dichlorotetrafluoroethan	76-14-2	170.90	ND		ND	N.E.		N.E.	
Chloromethane	74-87-3	50.49	0.70		1.4	94		390	
n-Butane	106-97-8	58.12	ND		ND	N.E.		N.E.	
Vinyl chloride	75-01-4	62.50	ND		ND	0.2		3	
1,3-Butadiene	106-99-0	54.09	ND		ND	0.1		0.4	
Bromomethane	74-83-9	94.94	ND		ND	5		22	
Chloroethane	75-00-3	64.52	ND		ND	10000		44000	
Ethanol	64-17-5	46.07	17		32	N.E.		N.E.	
Bromoethene(Vinyl bromide)	593-60-2	106.90	ND		ND	0.1		0.4	
Freon 11(Trichlorofluoromethane)	75-69-4	137.40	1.2		7.0	N.E.		N.E.	
Isopropyl alcohol(2-Propanol)	67-63-0	60.10	4.3		11	210		880	
Freon 113(1,1,2-Trichlorotrifluoroethan	76-13-1	187.40	ND		ND	31000		130000	
Acetone	67-64-1	58.08	3.9		9.3	32000		140000	
1,1-Dichloroethene	75-35-4	96.94	ND		ND	210		880	
Acetonitrile	75-05-8	41.00	ND		ND	63		260	
Tertiary butyl alcohol(TBA)	75-65-0	74.12	ND		ND	N.E.		N.E.	
Bromoethane(Ethyl bromide)	74-96-4	108.00	ND		ND	N.E.		N.E.	
3-Chloropropene(Allyl chloride)	107-05-1	76.53	ND		ND	0.5		2	
Carbon disulfide	75-15-0	76.14	ND		ND	730		3100	
Methylene chloride	75-09-2	84.94	ND		ND	100		1200	
Acrylonitrile	107-13-1	53.00	ND		ND	0		0	
Methyl-tert-butyl ether(MTBE)	1634-04-4	88.15	ND		ND	11		47	
trans-1,2-Dichloroethene	156-60-5	96.94	ND		ND	N.E.		N.E.	
n-Hexane	110-54-3	86.17	ND		ND	730		3100	
1,1-Dichloroethane	75-34-3	98.96	ND		ND	1.8		8	
Vinyl acetate	108-05-4	86.00	ND		ND	210		880	
2-Butanone(MEK)	78-93-3	72.10	ND		ND	5200		22000	
cis-1,2-Dichloroethene	156-59-2	96.94	ND		ND	N.E.		N.E.	
Ethyl acetate	141-78-6	88.10	2.4		8.6	73		310	
Chloroform	67-66-3	119.40	ND		ND	0.1		0.5	
Tetrahydrofuran	109-99-9	72.11	ND		ND	2100		8800	
1,1,1-Trichloroethane	71-55-6	133.40	ND		ND	5200		22000	
Cyclohexane	110-82-7	84.16	ND		ND	6300		26000	
2,2,4-Trimethylpentane(Isooctane)	540-84-1	114.20	ND		ND	N.E.		N.E.	
Carbon tetrachloride	56-23-5	153.80	ND		ND	0.5		2	
n-Heptane	142-82-5	100.20	ND		ND	N.E.		N.E.	
1,2-Dichloroethane	107-06-2	98.96	ND		ND	0.1		0.5	
Benzene	71-43-2	78.11	ND		ND	0.4		1.6	
Trichloroethene	79-01-6	131.40	ND		ND	0.5		3	
1,2-Dichloropropane	78-87-5	113.00	ND		ND	0.3		1.2	
Methyl Methacrylate	80-62-6	100.12	ND		ND	730		3100	
Bromodichloromethane	75-27-4	163.80	ND		ND	0.1		0.3	
1,4-Dioxane	123-91-1	88.12	ND		ND	1		3	
4-Methyl-2-pentanone(MIBK)	108-10-1	100.20	ND		ND	3100		13000	



**EMSL Analytical**

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Attn: **Bruce Hackett**  
**Safe Environmental Solutions**  
**62 Darling Ave**  
**South Portland, ME 04106**

Phone: 207-615-3694  
 Fax: Not Available  
 Date Collected: 5/22/2017  
 Date Received: 5/24/2017

Project: **Hall - Dale Middle**

Sample ID: **Rm 210**

<u>Analysis</u>	<u>Analysis Date</u>	<u>Analyst Init.</u>	<u>Lab File ID</u>	<u>Canister ID</u>	<u>Sample Vol.</u>	<u>Dil. Factor</u>
Initial	05/30/2017	KW	K12680.D	E0370	250 cc	1

**USEPA Generic Air Screening Level Summary Table**

Target Compounds	CAS#	MW	Result ppbv	Q	Result ug/m3	Residential ug/m3	>	Industrial ug/m3	>
cis-1,3-Dichloropropene**	10061-01-5	111.00	ND		ND	N.E.		N.E.	
Toluene	108-88-3	92.14	ND		ND	5200		22000	
trans-1,3-Dichloropropene**	10061-02-6	111.00	ND		ND	N.E.		N.E.	
1,1,2-Trichloroethane	79-00-5	133.40	ND		ND	0.2		0.8	
2-Hexanone(MBK)	591-78-6	100.10	ND		ND	31		130	
Tetrachloroethene	127-18-4	165.80	ND		ND	11		47	
Dibromochloromethane	124-48-1	208.30	ND		ND	N.E.		N.E.	
1,2-Dibromoethane	106-93-4	187.80	ND		ND	0.0		0.0	
Chlorobenzene	108-90-7	112.60	ND		ND	52		220	
Ethylbenzene	100-41-4	106.20	ND		ND	1.1		5	
Xylene (p,m)	1330-20-7	106.20	ND		ND	100		440	
Xylene (Ortho)	95-47-6	106.20	ND		ND	100		440	
Styrene	100-42-5	104.10	ND		ND	1000		4400	
Isopropylbenzene (cumene)	98-82-8	120.19	ND		ND	420		1800	
Bromoform	75-25-2	252.80	ND		ND	3		11	
1,1,2,2-Tetrachloroethane	79-34-5	167.90	ND		ND	0.0		0.2	
4-Ethyltoluene	622-96-8	120.20	ND		ND	N.E.		N.E.	
1,3,5-Trimethylbenzene	108-67-8	120.20	ND		ND	N.E.		N.E.	
2-Chlorotoluene	95-49-8	126.60	ND		ND	N.E.		N.E.	
1,2,4-Trimethylbenzene	95-63-6	120.20	ND		ND	7		31	
1,3-Dichlorobenzene	541-73-1	147.00	ND		ND	N.E.		N.E.	
1,4-Dichlorobenzene	106-46-7	147.00	ND		ND	0.3		1.1	
Benzyl chloride	100-44-7	126.00	ND		ND	0		0	
1,2-Dichlorobenzene	95-50-1	147.00	ND		ND	210		880	
1,2,4-Trichlorobenzene	120-82-1	181.50	ND		ND	2		9	
Hexachloro-1,3-butadiene	87-68-3	260.80	ND		ND	0.1		0.6	
Naphthalene	91-20-3	128.17	ND		ND	0.1		0.4	

\*\*The concentrations of each isomer should be added if multiple isomers are present and compared to the total screening level.

The > column is used to flag exceedences as marked

**Exposure Limit Definitions**

RSL= Regional Screening Level (Target Hazard Quotient (THQ) =0.1 if available, otherwise THQ = 1)

**Agency Definitions**

United States Environmental Protection Agency

**Reference**

EPA Regional Screening Levels (RSLs), May 2016

**Compound Exposure Definitions**

NE= No Limit Established  
 LFC= Lowest Feasible Concentration  
 NS= No Screening Value

**Regional Screening Level Definition**

Target Hazard Quotients (THQ)=0.1 is used for screening when multiple contaminants of concern are



NJDEP Certification #: 03036

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Project: **Hall - Dale Middle**

Sample ID: **Rm 210**

<u>Analysis</u>	<u>Analysis Date</u>	<u>Analyst Init.</u>	<u>Lab File ID</u>	<u>Canister ID</u>	<u>Sample Vol.</u>	<u>Dil. Factor</u>
Initial	05/30/2017	KW	K12680.D	E0370	250 cc	1

**NIOSH and OSHA Exposure Limit Comparisons**

Target Compounds	CAS#	MW	Result ppbv	Q	Result ug/m3	NIOSH REL ug/m3	>	OSHA PEL ug/m3	>
Propylene	115-07-1	42.08	ND		ND	N.E.		N.E.	
Freon 12(Dichlorodifluoromethane)	75-71-8	120.90	ND		ND	4900000		4900000	
Freon 114(1,2-Dichlorotetrafluoroethan	76-14-2	170.90	ND		ND	7000000		7000000	
Chloromethane	74-87-3	50.49	0.70		1.4	LFC		210000	
n-Butane	106-97-8	58.12	ND		ND	1900000		1900000	
Vinyl chloride	75-01-4	62.50	ND		ND	LFC		2600	
1,3-Butadiene	106-99-0	54.09	ND		ND	LFC		2200	
Bromomethane	74-83-9	94.94	ND		ND	LFC		78000	
Chloroethane	75-00-3	64.52	ND		ND	LFC		2600000	
Ethanol	64-17-5	46.07	17		32	1900000		1900000	
Bromoethene(Vinyl bromide)	593-60-2	106.90	ND		ND	LFC		N.E.	
Freon 11(Trichlorofluoromethane)	75-69-4	137.40	1.2		7.0	5600000		5600000	
Isopropyl alcohol(2-Propanol)	67-63-0	60.10	4.3		11	980000		980000	
Freon 113(1,1,2-Trichlorotrifluoroethan	76-13-1	187.40	ND		ND	7700000		7700000	
Acetone	67-64-1	58.08	3.9		9.3	590000		2400000	
1,1-Dichloroethene	75-35-4	96.94	ND		ND	790000		790000	
Acetonitrile	75-05-8	41.00	ND		ND	34000		67000	
Tertiary butyl alcohol(TBA)	75-65-0	74.12	ND		ND	300000		300000	
Bromoethane(Ethyl bromide)	74-96-4	108.00	ND		ND	880000		880000	
3-Chloropropene(Allyl chloride)	107-05-1	76.53	ND		ND	3100		3100	
Carbon disulfide	75-15-0	76.14	ND		ND	3100		62000	
Methylene chloride	75-09-2	84.94	ND		ND	LFC		87000	
Acrylonitrile	107-13-1	53.00	ND		ND	2200		4300	
Methyl-tert-butyl ether(MTBE)	1634-04-4	88.15	ND		ND	N.E.		N.E.	
trans-1,2-Dichloroethene	156-60-5	96.94	ND		ND	790000		790000	
n-Hexane	110-54-3	86.17	ND		ND	180000		1800000	
1,1-Dichloroethane	75-34-3	98.96	ND		ND	400000		400000	
Vinyl acetate	108-05-4	86.00	ND		ND	14000		N.E.	
2-Butanone(MEK)	78-93-3	72.10	ND		ND	590000		590000	
cis-1,2-Dichloroethene	156-59-2	96.94	ND		ND	790000		790000	
Ethyl acetate	141-78-6	88.10	2.4		8.6	1400000		1400000	
Chloroform	67-66-3	119.40	ND		ND	9800		240000	
Tetrahydrofuran	109-99-9	72.11	ND		ND	590000		590000	
1,1,1-Trichloroethane	71-55-6	133.40	ND		ND	1900000		1900000	
Cyclohexane	110-82-7	84.16	ND		ND	1000000		1000000	
2,2,4-Trimethylpentane(Isooctane)	540-84-1	114.20	ND		ND	N.E.		N.E.	
Carbon tetrachloride	56-23-5	153.80	ND		ND	13000		63000	
n-Heptane	142-82-5	100.20	ND		ND	350000		2000000	
1,2-Dichloroethane	107-06-2	98.96	ND		ND	4000		200000	
Benzene	71-43-2	78.11	ND		ND	320		3200	
Trichloroethene	79-01-6	131.40	ND		ND	130000		540000	
1,2-Dichloropropane	78-87-5	113.00	ND		ND	LFC		350000	
Methyl Methacrylate	80-62-6	100.12	ND		ND	410000		410000	
Bromodichloromethane	75-27-4	163.80	ND		ND	N.E.		N.E.	
1,4-Dioxane	123-91-1	88.12	ND		ND	3600		360000	
4-Methyl-2-pentanone(MIBK)	108-10-1	100.20	ND		ND	200000		410000	



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 Customer ID: SFES42  
 Customer PO: 17-03034

Attn: **Bruce Hackett**  
**Safe Environmental Solutions**  
**62 Darling Ave**  
**South Portland, ME 04106**

Phone: 207-615-3694  
 Fax: Not Available  
 Date Collected: 5/22/2017  
 Date Received: 5/24/2017

Project: Hall - Dale Middle

Sample ID: Rm 210

<u>Analysis</u>	<u>Analysis Date</u>	<u>Analyst Init.</u>	<u>Lab File ID</u>	<u>Canister ID</u>	<u>Sample Vol.</u>	<u>Dil. Factor</u>
Initial	05/30/2017	KW	K12680.D	E0370	250 cc	1

### NIOSH and OSHA Exposure Limit Comparisons

Target Compounds	CAS#	MW	Result ppbv	Q	Result ug/m3	NIOSH REL ug/m3	>	OSHA PEL ug/m3	>
cis-1,3-Dichloropropene**	10061-01-5	111.00	ND		ND	4500		N.E.	
Toluene	108-88-3	92.14	ND		ND	380000		750000	
trans-1,3-Dichloropropene**	10061-02-6	111.00	ND		ND	4500		N.E.	
1,1,2-Trichloroethane	79-00-5	133.40	ND		ND	55000		55000	
2-Hexanone(MBK)	591-78-6	100.10	ND		ND	4100		410000	
Tetrachloroethene	127-18-4	165.80	ND		ND	LFC		680000	
Dibromochloromethane	124-48-1	208.30	ND		ND	N.E.		N.E.	
1,2-Dibromoethane	106-93-4	187.80	ND		ND	350		150000	
Chlorobenzene	108-90-7	112.60	ND		ND	N.E.		350000	
Ethylbenzene	100-41-4	106.20	ND		ND	430000		430000	
Xylene (p.m)	1330-20-7	106.20	ND		ND	430000		430000	
Xylene (Ortho)	95-47-6	106.20	ND		ND	430000		430000	
Styrene	100-42-5	104.10	ND		ND	210000		430000	
Isopropylbenzene (cumene)	98-82-8	120.19	ND		ND	250000		250000	
Bromoform	75-25-2	252.80	ND		ND	5200		5200	
1,1,1,2-Tetrachloroethane	79-34-5	167.90	ND		ND	6900		34000	
4-Ethyltoluene	622-96-8	120.20	ND		ND	N.E.		N.E.	
1,3,5-Trimethylbenzene	108-67-8	120.20	ND		ND	120000		120000	
2-Chlorotoluene	95-49-8	126.60	ND		ND	260000		N.E.	
1,2,4-Trimethylbenzene	95-63-6	120.20	ND		ND	120000		120000	
1,3-Dichlorobenzene	541-73-1	147.00	ND		ND	N.E.		N.E.	
1,4-Dichlorobenzene	106-46-7	147.00	ND		ND	LFC		450000	
Benzyl chloride	100-44-7	126.00	ND		ND	5200		5200	
1,2-Dichlorobenzene	95-50-1	147.00	ND		ND	300000		300000	
1,2,4-Trichlorobenzene	120-82-1	181.50	ND		ND	37000		N.E.	
Hexachloro-1,3-butadiene	87-68-3	260.80	ND		ND	210		N.E.	
Naphthalene	91-20-3	128.17	ND		ND	52000		52000	

\*\*The concentrations of each isomer should be added if multiple isomers are present and compared to the total screening level.

The > column is used to flag exceedences as marked

#### Exposure Limit Definitions

REL= Recommended Exposure Limit, PEL= Permissible Exposure Limit

#### Agency Definitions

NIOSH= The National Institute for Occupational Safety and Health

#### Reference

Occupational Safety and Health Administration (OSHA) General Industry Air Contaminants Standard (29 CFR 1910.1000)

#### Compound Exposure Definitions

NE= No Limit Established  
 LFC= Lowest Feasible Concentration  
 NS= No Screening Value



NJDEP Certification #: 03036

**EMSL Analytical**

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<http://www.EMSL.com> to15lab@EMSL.com

EMSL Order #: 491700563  
 EMSL Sample #: 491700563-1  
 Customer ID: SFES42  
 Customer PO: 17-03034

Attn: **Bruce Hackett**  
**Safe Environmental Solutions**  
**62 Darling Ave**  
**South Portland, ME 04106**

Phone: 207-615-3694  
 Fax: Not Available  
 Date Collected: 5/22/2017  
 Date Received: 5/24/2017

Project: Hall - Dale Middle

Sample ID: Rm 210

<u>Analysis</u>	<u>Analysis Date</u>	<u>Analyst Init.</u>	<u>Lab File ID</u>	<u>Canister ID</u>	<u>Sample Vol.</u>	<u>Dil. Factor</u>
Initial	05/30/2017	KW	K12680.D	E0370	250 cc	1

**Possible Background Sources of Contaminants**

Target Compounds	CAS#	Result ppbv	Q	Result ug/m3	Use and Possible Sources
Chloromethane	74-87-3	0.70		1.4	Most (99%) of the chloromethane in the environment comes from natural sources. Because chloromethane is made in the oceans by natural processes, it is present in air all over the world. In most areas, the outside air contains less than 1 part of chloromethane in a billion parts of air (ppb). In cities, human activities, mostly combustion and manufacturing, add to the chloromethane in the air, resulting in somewhat higher levels, up to 1 ppb. Cigarette smoke, polystyrene insulation, and aerosol propellants; home burning of wood, coal, or certain plastics; and chlorinated swimming pools. <sup>4</sup>
Ethanol	64-17-5	17		32	Hand sanitizers, disinfecting wipes. Personal care products: nail polish, nail polish remover, colognes, perfumes, rubbing alcohol, hair spray. <sup>2</sup>
Freon 11 (Trichlorofluoromethane)	75-69-4	1.2		7.0	Refrigerant from air conditioners, freezers, refrigerators, dehumidifiers. <sup>2</sup>
Isopropyl alcohol (2-Propanol)	67-63-0	4.3		11	Eye Glass Cleaners. Disinfecting wipes. Personal care products: nail polish, nail polish remover, colognes, perfumes, rubbing alcohol, hair spray. <sup>2</sup>
Acetone	67-64-1	3.9		9.3	Rubber cement, cleaning fluids, scented candles and nail polish remover. <sup>1</sup>
Ethyl acetate	141-78-6	2.4		8.6	Personal care products: nail polish, nail polish remover, colognes, perfumes, rubbing alcohol, hair spray. <sup>2</sup>

**Qualifier Definitions**

ND = Non Detect

B = Compound also found in method blank.

E = Estimated concentration exceeding upper calibration range.

D = Result reported from diluted analysis.

**Sources References**

- (1) NJDEP "Common Household Sources of Background Indoor Air Contamination". June 26, 2012
- (2) NYSDOH "Volatile Organic Compounds (VOCs) in Commonly Used Products", 2007
- (3) EPA, Air & Radiation, TTN Web - Technology Transfer Network Air Toxics Web site, various years.
- (4) Agency for Toxic Substances and Disease Registry (ATSDR). U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. 1998.
- (5) OFFICE OF POLLUTION PREVENTION AND TOXICS, U.S. ENVIRONMENTAL PROTECTION AGENCY, August 1994, EPA 749-F-94-012a
- (6) U.S. Environmental Protection Agency, Office of Research and Development, Cincinnati, OH. 1985.
- (7) World Health Organization,
- (8) Product Safety Assessment, Revised: November 19, 2010 The Dow Chemical Company
- (9) California Office of Environmental Health Hazard Assessment, PROPOSED ACTION LEVEL FOR 2-CHLOROTOLUENE
- (10) Delaware Health and Social Services, Division of Public Health, Revised: 01/2010
- (11) USEPA, Envirofacts Master Chemical Integrator (EMCI), Scorecard, 4/10/2009



NJDEP Certification #: 03036

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EMSL Order #: 491700563  
 EMSL Sample #: 491700563-2  
 Customer ID: SFES42  
 Customer PO: 17-03034

Attn: **Bruce Hackett**  
**Safe Environmental Solutions**  
**62 Darling Ave**  
**South Portland, ME 04106**

Phone: 207-615-3694  
 Fax: Not Available  
 Date Collected: 5/22/2017  
 Date Received: 5/24/2017

Project: Hall - Dale Middle  
 Sample ID: Rm 208

**Analysis**      **Analysis Date**      **Analyst Init.**      **Lab File ID**      **Canister ID**      **Sample Vol.**      **Dil. Factor**  
 Initial      05/30/2017      KW      K12681.D      E0385      250 cc      1

**USEPA Generic Air Screening Level Summary Table**

Target Compounds	CAS#	MW	Result ppbv	Q	Result ug/m3	Residential ug/m3	>	Industrial ug/m3	>
Propylene	115-07-1	42.08	ND		ND	3100		13000	
Freon 12(Dichlorodifluoromethane)	75-71-8	120.90	ND		ND	100		440	
Freon 114(1,2-Dichlorotetrafluoroethan	76-14-2	170.90	ND		ND	N.E.		N.E.	
Chloromethane	74-87-3	50.49	0.60		1.2	94		390	
n-Butane	106-97-8	58.12	ND		ND	N.E.		N.E.	
Vinyl chloride	75-01-4	62.50	ND		ND	0.2		3	
1,3-Butadiene	106-99-0	54.09	ND		ND	0.1		0.4	
Bromomethane	74-83-9	94.94	ND		ND	5		22	
Chloroethane	75-00-3	64.52	ND		ND	10000		44000	
Ethanol	64-17-5	46.07	9.4		18	N.E.		N.E.	
Bromoethene(Vinyl bromide)	593-60-2	106.90	ND		ND	0.1		0.4	
Freon 11(Trichlorofluoromethane)	75-69-4	137.40	2.6		15	N.E.		N.E.	
Isopropyl alcohol(2-Propanol)	67-63-0	60.10	5.5		13	210		880	
Freon 113(1,1,2-Trichlorotrifluoroethan	76-13-1	187.40	ND		ND	31000		130000	
Acetone	67-64-1	58.08	3.5		8.4	32000		140000	
1,1-Dichloroethene	75-35-4	96.94	ND		ND	210		880	
Acetonitrile	75-05-8	41.00	ND		ND	63		260	
Tertiary butyl alcohol(TBA)	75-65-0	74.12	ND		ND	N.E.		N.E.	
Bromoethane(Ethyl bromide)	74-96-4	108.00	ND		ND	N.E.		N.E.	
3-Chloropropene(Allyl chloride)	107-05-1	76.53	ND		ND	0.5		2	
Carbon disulfide	75-15-0	76.14	ND		ND	730		3100	
Methylene chloride	75-09-2	84.94	ND		ND	100		1200	
Acrylonitrile	107-13-1	53.00	ND		ND	0		0	
Methyl-tert-butyl ether(MTBE)	1634-04-4	88.15	ND		ND	11		47	
trans-1,2-Dichloroethene	156-60-5	96.94	ND		ND	N.E.		N.E.	
n-Hexane	110-54-3	86.17	ND		ND	730		3100	
1,1-Dichloroethane	75-34-3	98.96	ND		ND	1.8		8	
Vinyl acetate	108-05-4	86.00	ND		ND	210		880	
2-Butanone(MEK)	78-93-3	72.10	ND		ND	5200		22000	
cis-1,2-Dichloroethene	156-59-2	96.94	ND		ND	N.E.		N.E.	
Ethyl acetate	141-78-6	88.10	1.7		6.3	73		310	
Chloroform	67-66-3	119.40	ND		ND	0.1		0.5	
Tetrahydrofuran	109-99-9	72.11	ND		ND	2100		8800	
1,1,1-Trichloroethane	71-55-6	133.40	ND		ND	5200		22000	
Cyclohexane	110-82-7	84.16	ND		ND	6300		26000	
2,2,4-Trimethylpentane(Isooctane)	540-84-1	114.20	ND		ND	N.E.		N.E.	
Carbon tetrachloride	56-23-5	153.80	ND		ND	0.5		2	
n-Heptane	142-82-5	100.20	ND		ND	N.E.		N.E.	
1,2-Dichloroethane	107-06-2	98.96	ND		ND	0.1		0.5	
Benzene	71-43-2	78.11	ND		ND	0.4		1.6	
Trichloroethene	79-01-6	131.40	ND		ND	0.5		3	
1,2-Dichloropropane	78-87-5	113.00	ND		ND	0.3		1.2	
Methyl Methacrylate	80-62-6	100.12	ND		ND	730		3100	
Bromodichloromethane	75-27-4	163.80	ND		ND	0.1		0.3	
1,4-Dioxane	123-91-1	88.12	ND		ND	1		3	
4-Methyl-2-pentanone(MIBK)	108-10-1	100.20	ND		ND	3100		13000	

**EMSL Analytical**

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EMSL Order #: 491700563  
 EMSL Sample #: 491700563-2  
 Customer ID: SFES42  
 Customer PO: 17-03034

Attn: **Bruce Hackett**  
**Safe Environmental Solutions**  
**62 Darling Ave**  
**South Portland, ME 04106**

Phone: 207-615-3694  
 Fax: Not Available  
 Date Collected: 5/22/2017  
 Date Received: 5/24/2017

Project: Hall - Dale Middle

Sample ID: Rm 208

Analysis Initial	Analysis Date	Analyst Init.	Lab File ID	Canister ID	Sample Vol.	Dil. Factor
	05/30/2017	KW	K12681.D	E0385	250 cc	1

**USEPA Generic Air Screening Level Summary Table**

Target Compounds	CAS#	MW	Result ppbv	Q	Result ug/m3	Residential ug/m3	>	Industrial ug/m3	>
cis-1,3-Dichloropropene**	10061-01-5	111.00	ND		ND	N.E.		N.E.	
Toluene	108-88-3	92.14	ND		ND	5200		22000	
trans-1,3-Dichloropropene**	10061-02-6	111.00	ND		ND	N.E.		N.E.	
1,1,2-Trichloroethane	79-00-5	133.40	ND		ND	0.2		0.8	
2-Hexanone(MBK)	591-78-6	100.10	ND		ND	31		130	
Tetrachloroethene	127-18-4	165.80	ND		ND	11		47	
Dibromochloromethane	124-48-1	208.30	ND		ND	N.E.		N.E.	
1,2-Dibromoethane	106-93-4	187.80	ND		ND	0.0		0.0	
Chlorobenzene	108-90-7	112.60	ND		ND	52		220	
Ethylbenzene	100-41-4	106.20	ND		ND	1.1		5	
Xylene (p,m)	1330-20-7	106.20	ND		ND	100		440	
Xylene (Ortho)	95-47-6	106.20	ND		ND	100		440	
Styrene	100-42-5	104.10	ND		ND	1000		4400	
Isopropylbenzene (cumene)	98-82-8	120.19	ND		ND	420		1800	
Bromoform	75-25-2	252.80	ND		ND	3		11	
1,1,2,2-Tetrachloroethane	79-34-5	167.90	ND		ND	0.0		0.2	
4-Ethyltoluene	622-96-8	120.20	ND		ND	N.E.		N.E.	
1,3,5-Trimethylbenzene	108-67-8	120.20	ND		ND	N.E.		N.E.	
2-Chlorotoluene	95-49-8	126.60	ND		ND	N.E.		N.E.	
1,2,4-Trimethylbenzene	95-63-6	120.20	ND		ND	7		31	
1,3-Dichlorobenzene	541-73-1	147.00	ND		ND	N.E.		N.E.	
1,4-Dichlorobenzene	106-46-7	147.00	ND		ND	0.3		1.1	
Benzyl chloride	100-44-7	126.00	ND		ND	0		0	
1,2-Dichlorobenzene	95-50-1	147.00	ND		ND	210		880	
1,2,4-Trichlorobenzene	120-82-1	181.50	ND		ND	2		9	
Hexachloro-1,3-butadiene	87-68-3	260.80	ND		ND	0.1		0.6	
Naphthalene	91-20-3	128.17	ND		ND	0.1		0.4	

\*\*The concentrations of each isomer should be added if multiple isomers are present and compared to the total screening level.

The > column is used to flag exceedences as marked

**Exposure Limit Definitions**

RSL= Regional Screening Level (Target Hazard Quotient (THQ) =0.1 if available, otherwise THQ = 1)

**Agency Definitions**

United States Environmental Protection Agency

**Reference**

EPA Regional Screening Levels (RSLs), May 2016

**Compound Exposure Definitions**

NE= No Limit Established  
 LFC= Lowest Feasible Concentration  
 NS= No Screening Value

**Regional Screening Level Definition**

Target Hazard Quotients (THQ)=0.1 is used for screening when multiple contaminants of concern are



NJDEP Certification #: 03036

**EMSL Analytical**

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EMSL Order #: 491700563  
 EMSL Sample #: 491700563-2  
 Customer ID: SFES42  
 Customer PO: 17-03034

Attn: **Bruce Hackett**  
**Safe Environmental Solutions**  
**62 Darling Ave**  
**South Portland, ME 04106**

Phone: 207-615-3694  
 Fax: Not Available  
 Date Collected: 5/22/2017  
 Date Received: 5/24/2017

Project: **Hall - Dale Middle**

Sample ID: **Rm 208**

<u>Analysis</u>	<u>Analysis Date</u>	<u>Analyst Init.</u>	<u>Lab File ID</u>	<u>Canister ID</u>	<u>Sample Vol.</u>	<u>Dil. Factor</u>
Initial	05/30/2017	KW	K12681.D	E0385	250 cc	1

**NIOSH and OSHA Exposure Limit Comparisons**

Target Compounds	CAS#	MW	Result ppbv	Q	Result ug/m3	NIOSH REL ug/m3	>	OSHA PEL ug/m3	>
Propylene	115-07-1	42.08	ND		ND	N.E.		N.E.	
Freon 12(Dichlorodifluoromethane)	75-71-8	120.90	ND		ND	4900000		4900000	
Freon 114(1,2-Dichlorotetrafluoroethan	76-14-2	170.90	ND		ND	7000000		7000000	
Chloromethane	74-87-3	50.49	0.60		1.2	LFC		210000	
n-Butane	106-97-8	58.12	ND		ND	1900000		1900000	
Vinyl chloride	75-01-4	62.50	ND		ND	LFC		2600	
1,3-Butadiene	106-99-0	54.09	ND		ND	LFC		2200	
Bromomethane	74-83-9	94.94	ND		ND	LFC		78000	
Chloroethane	75-00-3	64.52	ND		ND	LFC		2600000	
Ethanol	64-17-5	46.07	9.4		18	1900000		1900000	
Bromoethene(Vinyl bromide)	593-60-2	106.90	ND		ND	LFC		N.E.	
Freon 11(Trichlorofluoromethane)	75-69-4	137.40	2.6		15	5600000		5600000	
Isopropyl alcohol(2-Propanol)	67-63-0	60.10	5.5		13	980000		980000	
Freon 113(1,1,2-Trichlorotrifluoroethan	76-13-1	187.40	ND		ND	7700000		7700000	
Acetone	67-64-1	58.08	3.5		8.4	590000		2400000	
1,1-Dichloroethene	75-35-4	96.94	ND		ND	790000		790000	
Acetonitrile	75-05-8	41.00	ND		ND	34000		67000	
Tertiary butyl alcohol(TBA)	75-65-0	74.12	ND		ND	300000		300000	
Bromoethane(Ethyl bromide)	74-96-4	108.00	ND		ND	880000		880000	
3-Chloropropene(Allyl chloride)	107-05-1	76.53	ND		ND	3100		3100	
Carbon disulfide	75-15-0	76.14	ND		ND	3100		62000	
Methylene chloride	75-09-2	84.94	ND		ND	LFC		87000	
Acrylonitrile	107-13-1	53.00	ND		ND	2200		4300	
Methyl-tert-butyl ether(MTBE)	1634-04-4	88.15	ND		ND	N.E.		N.E.	
trans-1,2-Dichloroethene	156-60-5	96.94	ND		ND	790000		790000	
n-Hexane	110-54-3	86.17	ND		ND	180000		1800000	
1,1-Dichloroethane	75-34-3	98.96	ND		ND	400000		400000	
Vinyl acetate	108-05-4	86.00	ND		ND	14000		N.E.	
2-Butanone(MEK)	78-93-3	72.10	ND		ND	590000		590000	
cis-1,2-Dichloroethene	156-59-2	96.94	ND		ND	790000		790000	
Ethyl acetate	141-78-6	88.10	1.7		6.3	1400000		1400000	
Chloroform	67-66-3	119.40	ND		ND	9800		240000	
Tetrahydrofuran	109-99-9	72.11	ND		ND	590000		590000	
1,1,1-Trichloroethane	71-55-6	133.40	ND		ND	1900000		1900000	
Cyclohexane	110-82-7	84.16	ND		ND	1000000		1000000	
2,2,4-Trimethylpentane(Isooctane)	540-84-1	114.20	ND		ND	N.E.		N.E.	
Carbon tetrachloride	56-23-5	153.80	ND		ND	13000		63000	
n-Heptane	142-82-5	100.20	ND		ND	350000		2000000	
1,2-Dichloroethane	107-06-2	98.96	ND		ND	4000		200000	
Benzene	71-43-2	78.11	ND		ND	320		3200	
Trichloroethene	79-01-6	131.40	ND		ND	130000		540000	
1,2-Dichloropropane	78-87-5	113.00	ND		ND	LFC		350000	
Methyl Methacrylate	80-62-6	100.12	ND		ND	410000		410000	
Bromodichloromethane	75-27-4	163.80	ND		ND	N.E.		N.E.	
1,4-Dioxane	123-91-1	88.12	ND		ND	3600		360000	
4-Methyl-2-pentanone(MIBK)	108-10-1	100.20	ND		ND	200000		410000	

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Phone: 207-615-3694  
 Fax: Not Available  
 Date Collected: 5/22/2017  
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Project: Hall - Dale Middle

Sample ID: Rm 208

Analysis Initial	Analysis Date	Analyst Init.	Lab File ID	Canister ID	Sample Vol.	Dil. Factor
	05/30/2017	KW	K12681.D	E0385	250 cc	1

**NIOSH and OSHA Exposure Limit Comparisons**

Target Compounds	CAS#	MW	Result ppbv	Q	Result ug/m3	NIOSH REL ug/m3	>	OSHA PEL ug/m3	>
cis-1,3-Dichloropropene**	10061-01-5	111.00	ND		ND	4500		N.E.	
Toluene	108-88-3	92.14	ND		ND	380000		750000	
trans-1,3-Dichloropropene**	10061-02-6	111.00	ND		ND	4500		N.E.	
1,1,2-Trichloroethane	79-00-5	133.40	ND		ND	55000		55000	
2-Hexanone(MBK)	591-78-6	100.10	ND		ND	4100		410000	
Tetrachloroethene	127-18-4	165.80	ND		ND	LFC		680000	
Dibromochloromethane	124-48-1	208.30	ND		ND	N.E.		N.E.	
1,2-Dibromoethane	106-93-4	187.80	ND		ND	350		150000	
Chlorobenzene	108-90-7	112.60	ND		ND	N.E.		350000	
Ethylbenzene	100-41-4	106.20	ND		ND	430000		430000	
Xylene (p,m)	1330-20-7	106.20	ND		ND	430000		430000	
Xylene (Ortho)	95-47-6	106.20	ND		ND	430000		430000	
Styrene	100-42-5	104.10	ND		ND	210000		430000	
Isopropylbenzene (cumene)	98-82-8	120.19	ND		ND	250000		250000	
Bromoform	75-25-2	252.80	ND		ND	5200		5200	
1,1,2,2-Tetrachloroethane	79-34-5	167.90	ND		ND	6900		34000	
4-Ethyltoluene	622-96-8	120.20	ND		ND	N.E.		N.E.	
1,3,5-Trimethylbenzene	108-67-8	120.20	ND		ND	120000		120000	
2-Chlorotoluene	95-49-8	126.60	ND		ND	260000		N.E.	
1,2,4-Trimethylbenzene	95-63-6	120.20	ND		ND	120000		120000	
1,3-Dichlorobenzene	541-73-1	147.00	ND		ND	N.E.		N.E.	
1,4-Dichlorobenzene	106-46-7	147.00	ND		ND	LFC		450000	
Benzyl chloride	100-44-7	126.00	ND		ND	5200		5200	
1,2-Dichlorobenzene	95-50-1	147.00	ND		ND	300000		300000	
1,2,4-Trichlorobenzene	120-82-1	181.50	ND		ND	37000		N.E.	
Hexachloro-1,3-butadiene	87-68-3	260.80	ND		ND	210		N.E.	
Naphthalene	91-20-3	128.17	ND		ND	52000		52000	

\*\*The concentrations of each isomer should be added if multiple isomers are present and compared to the total screening level.

The > column is used to flag exceedences as marked

**Exposure Limit Definitions**

REL= Recommended Exposure Limit, PEL= Permissible Exposure Limit

**Agency Definitions**

NIOSH= The National Institute for Occupational Safety and Health

**Reference**

Occupational Safety and Health Administration (OSHA) General Industry Air Contaminants Standard (29 CFR 1910.1000)

**Compound Exposure Definitions**

NE= No Limit Established  
 LFC= Lowest Feasible Concentration  
 NS= No Screening Value



NJDEP Certification #: 03036



**EMSL Analytical**

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<http://www.EMSL.com> [to15lab@EMSL.com](mailto:to15lab@EMSL.com)

EMSL Order #: 491700563  
 EMSL Sample #: 491700563-2  
 Customer ID: SFES42  
 Customer PO: 17-03034

Attn: **Bruce Hackett**  
**Safe Environmental Solutions**  
**62 Darling Ave**  
**South Portland, ME 04106**

Phone: 207-615-3694  
 Fax: Not Available  
 Date Collected: 5/22/2017  
 Date Received: 5/24/2017

Project: **Hall - Dale Middle** Sample ID: **Rm 208**

<u>Analysis</u>	<u>Analysis Date</u>	<u>Analyst Init.</u>	<u>Lab File ID</u>	<u>Canister ID</u>	<u>Sample Vol.</u>	<u>Dil. Factor</u>
Initial	05/30/2017	KW	K12681.D	E0385	250 cc	1

**Possible Background Sources of Contaminants**

Target Compounds	CAS#	Result ppbv	Q	Result ug/m3	Use and Possible Sources
Chloromethane	74-87-3	0.60		1.2	Most (99%) of the chloromethane in the environment comes from natural sources. Because chloromethane is made in the oceans by natural processes, it is present in air all over the world. In most areas, the outside air contains less than 1 part of chloromethane in a billion parts of air (ppb). In cities, human activities, mostly combustion and manufacturing, add to the chloromethane in the air, resulting in somewhat higher levels, up to 1 ppb. Cigarette smoke, polystyrene insulation, and aerosol propellants; home burning of wood, coal, or certain plastics; and chlorinated swimming pools. <sup>4</sup>
Ethanol	64-17-5	9.4		18	Hand sanitizers, disinfecting wipes. Personal care products: nail polish, nail polish remover, colognes, perfumes, rubbing alcohol, hair spray. <sup>2</sup>
Freon 11(Trichlorofluoromethane)	75-69-4	2.6		15	Refrigerant from air conditioners, freezers, refrigerators, dehumidifiers. <sup>2</sup>
Isopropyl alcohol(2-Propanol)	67-63-0	5.5		13	Eye Glass Cleaners. Disinfecting wipes. Personal care products: nail polish, nail polish remover, colognes, perfumes, rubbing alcohol, hair spray. <sup>2</sup>
Acetone	67-64-1	3.5		8.4	Rubber cement, cleaning fluids, scented candles and nail polish remover. <sup>1</sup>
Ethyl acetate	141-78-6	1.7		6.3	Personal care products: nail polish, nail polish remover, colognes, perfumes, rubbing alcohol, hair spray. <sup>2</sup>

**Qualifier Definitions**

- ND = Non Detect
- B = Compound also found in method blank.
- E= Estimated concentration exceeding upper calibration range.
- D= Result reported from diluted analysis.

**Sources References**

- (1) NJDEP "Common Household Sources of Background Indoor Air Contamination". June 26, 2012
- (2) NYSDOH "Volatile Organic Compounds (VOCs) in Commonly Used Products", 2007
- (3) EPA, Air & Radiation, TTN Web - Technology Transfer Network Air Toxics Web site, various years.
- (4) Agency for Toxic Substances and Disease Registry (ATSDR). U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. 1998.
- (5) OFFICE OF POLLUTION PREVENTION AND TOXICS, U.S. ENVIRONMENTAL PROTECTION AGENCY, August 1994, EPA 749-F-94-012a
- (6) U.S. Environmental Protection Agency, Office of Research and Development, Cincinnati, OH. 1985.
- (7) World Health Organization,
- (8) Product Safety Assessment, Revised: November 19, 2010 The Dow Chemical Company
- (9) California Office of Environmental Health Hazard Assessment, PROPOSED ACTION LEVEL FOR 2-CHLOROTOLUENE
- (10) Delaware Health and Social Services, Division of Public Health, Revised: 01/2010
- (11) USEPA, Envirofacts Master Chemical Integrator (EMCI), Scorecard, 4/10/2009



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EMSL Order #: 491700563  
 EMSL Sample #: 491700563-3  
 Customer ID: SFES42  
 Customer PO: 17-03034

Attn: **Bruce Hackett**  
**Safe Environmental Solutions**  
**62 Darling Ave**  
**South Portland, ME 04106**

Phone: 207-615-3694  
 Fax: Not Available  
 Date Collected: 5/22/2017  
 Date Received: 5/24/2017

Project: Hall - Dale Middle

Sample ID: Rm 219

Analysis Initial	Analysis Date	Analyst Init.	Lab File ID	Canister ID	Sample Vol.	Dil. Factor
	05/30/2017	KW	K12682.D	E12322	250 cc	1

**USEPA Generic Air Screening Level Summary Table**

Target Compounds	CAS#	MW	Result ppbv	Q	Result ug/m3	Residential ug/m3	Industrial ug/m3
Propylene	115-07-1	42.08	ND		ND	3100	13000
Freon 12(Dichlorodifluoromethane)	75-71-8	120.90	0.70		3.5	100	440
Freon 114(1,2-Dichlorotetrafluoroethan	76-14-2	170.90	ND		ND	N.E.	N.E.
Chloromethane	74-87-3	50.49	0.80		1.7	94	390
n-Butane	106-97-8	58.12	ND		ND	N.E.	N.E.
Vinyl chloride	75-01-4	62.50	ND		ND	0.2	3
1,3-Butadiene	106-99-0	54.09	ND		ND	0.1	0.4
Bromomethane	74-83-9	94.94	ND		ND	5	22
Chloroethane	75-00-3	64.52	ND		ND	10000	44000
Ethanol	64-17-5	46.07	29		54	N.E.	N.E.
Bromoethene(Vinyl bromide)	593-60-2	106.90	ND		ND	0.1	0.4
Freon 11(Trichlorofluoromethane)	75-69-4	137.40	1.8		10	N.E.	N.E.
Isopropyl alcohol(2-Propanol)	67-63-0	60.10	3.4		8.4	210	880
Freon 113(1,1,2-Trichlorotrifluoroethan	76-13-1	187.40	ND		ND	31000	130000
Acetone	67-64-1	58.08	5.2		12	32000	140000
1,1-Dichloroethene	75-35-4	96.94	ND		ND	210	880
Acetonitrile	75-05-8	41.00	ND		ND	63	260
Tertiary butyl alcohol(TBA)	75-65-0	74.12	ND		ND	N.E.	N.E.
Bromoethane(Ethyl bromide)	74-96-4	108.00	ND		ND	N.E.	N.E.
3-Chloropropene(Allyl chloride)	107-05-1	76.53	ND		ND	0.5	2
Carbon disulfide	75-15-0	76.14	ND		ND	730	3100
Methylene chloride	75-09-2	84.94	ND		ND	100	1200
Acrylonitrile	107-13-1	53.00	ND		ND	0	0
Methyl-tert-butyl ether(MTBE)	1634-04-4	88.15	ND		ND	11	47
trans-1,2-Dichloroethene	156-60-5	96.94	ND		ND	N.E.	N.E.
n-Hexane	110-54-3	86.17	ND		ND	730	3100
1,1-Dichloroethane	75-34-3	98.96	ND		ND	1.8	8
Vinyl acetate	108-05-4	86.00	ND		ND	210	880
2-Butanone(MEK)	78-93-3	72.10	ND		ND	5200	22000
cis-1,2-Dichloroethene	156-59-2	96.94	ND		ND	N.E.	N.E.
Ethyl acetate	141-78-6	88.10	2.7		10	73	310
Chloroform	67-66-3	119.40	ND		ND	0.1	0.5
Tetrahydrofuran	109-99-9	72.11	ND		ND	2100	8800
1,1,1-Trichloroethane	71-55-6	133.40	ND		ND	5200	22000
Cyclohexane	110-82-7	84.16	ND		ND	6300	26000
2,2,4-Trimethylpentane(Isooctane)	540-84-1	114.20	ND		ND	N.E.	N.E.
Carbon tetrachloride	56-23-5	153.80	ND		ND	0.5	2
n-Heptane	142-82-5	100.20	ND		ND	N.E.	N.E.
1,2-Dichloroethane	107-06-2	98.96	ND		ND	0.1	0.5
Benzene	71-43-2	78.11	ND		ND	0.4	1.6
Trichloroethene	79-01-6	131.40	ND		ND	0.5	3
1,2-Dichloropropane	78-87-5	113.00	ND		ND	0.3	1.2
Methyl Methacrylate	80-62-6	100.12	ND		ND	730	3100
Bromodichloromethane	75-27-4	163.80	ND		ND	0.1	0.3
1,4-Dioxane	123-91-1	88.12	ND		ND	1	3
4-Methyl-2-pentanone(MIBK)	108-10-1	100.20	ND		ND	3100	13000

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EMSL Order #: 491700563  
 EMSL Sample #: 491700563-3  
 Customer ID: SFES42  
 Customer PO: 17-03034

Attn: **Bruce Hackett**  
**Safe Environmental Solutions**  
**62 Darling Ave**  
**South Portland, ME 04106**

Phone: 207-615-3694  
 Fax: Not Available  
 Date Collected: 5/22/2017  
 Date Received: 5/24/2017

Project: Hall - Dale Middle

Sample ID: Rm 219

Analysis	Analysis Date	Analyst Init.	Lab File ID	Canister ID	Sample Vol.	Dil. Factor
Initial	05/30/2017	KW	K12682.D	E12322	250 cc	1

**USEPA Generic Air Screening Level Summary Table**

Target Compounds	CAS#	MW	Result ppbv	Q	Result ug/m3	Residential ug/m3	>	Industrial ug/m3	>
cis-1,3-Dichloropropene**	10061-01-5	111.00	ND		ND	N.E.		N.E.	
Toluene	108-88-3	92.14	ND		ND	5200		22000	
trans-1,3-Dichloropropene**	10061-02-6	111.00	ND		ND	N.E.		N.E.	
1,1,2-Trichloroethane	79-00-5	133.40	ND		ND	0.2		0.8	
2-Hexanone(MBK)	591-78-6	100.10	ND		ND	31		130	
Tetrachloroethene	127-18-4	165.80	ND		ND	11		47	
Dibromochloromethane	124-48-1	208.30	ND		ND	N.E.		N.E.	
1,2-Dibromoethane	106-93-4	187.80	ND		ND	0.0		0.0	
Chlorobenzene	108-90-7	112.60	ND		ND	52		220	
Ethylbenzene	100-41-4	106.20	ND		ND	1.1		5	
Xylene (p,m)	1330-20-7	106.20	ND		ND	100		440	
Xylene (Ortho)	95-47-6	106.20	ND		ND	100		440	
Styrene	100-42-5	104.10	ND		ND	1000		4400	
Isopropylbenzene (cumene)	98-82-8	120.19	ND		ND	420		1800	
Bromoform	75-25-2	252.80	ND		ND	3		11	
1,1,2,2-Tetrachloroethane	79-34-5	167.90	ND		ND	0.0		0.2	
4-Ethyltoluene	622-96-8	120.20	ND		ND	N.E.		N.E.	
1,3,5-Trimethylbenzene	108-67-8	120.20	ND		ND	N.E.		N.E.	
2-Chlorotoluene	95-49-8	126.60	ND		ND	N.E.		N.E.	
1,2,4-Trimethylbenzene	95-63-6	120.20	ND		ND	7		31	
1,3-Dichlorobenzene	541-73-1	147.00	ND		ND	N.E.		N.E.	
1,4-Dichlorobenzene	106-46-7	147.00	ND		ND	0.3		1.1	
Benzyl chloride	100-44-7	126.00	ND		ND	0		0	
1,2-Dichlorobenzene	95-50-1	147.00	ND		ND	210		880	
1,2,4-Trichlorobenzene	120-82-1	181.50	ND		ND	2		9	
Hexachloro-1,3-butadiene	87-68-3	260.80	ND		ND	0.1		0.6	
Naphthalene	91-20-3	128.17	ND		ND	0.1		0.4	

\*\*The concentrations of each isomer should be added if multiple isomers are present and compared to the total screening level.

The > column is used to flag exceedences as marked

**Exposure Limit Definitions**

RSL= Regional Screening Level (Target Hazard Quotient (THQ) =0.1 if available, otherwise THQ = 1)

**Agency Definitions**

United States Environmental Protection Agency

**Reference**

EPA Regional Screening Levels (RSLs), May 2016

**Compound Exposure Definitions**

NE= No Limit Established

LFC= Lowest Feasible Concentration

NS= No Screening Value

**Regional Screening Level Definition**

Target Hazard Quotients (THQ)=0.1 is used for screening when multiple contaminants of concern are



NJDEP Certification #: 03036

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EMSL Order #: 491700563  
 EMSL Sample #: 491700563-3  
 Customer ID: SFES42  
 Customer PO: 17-03034

Attn: **Bruce Hackett**  
**Safe Environmental Solutions**  
**62 Darling Ave**  
**South Portland, ME 04106**

Phone: 207-615-3694  
 Fax: Not Available  
 Date Collected: 5/22/2017  
 Date Received: 5/24/2017

Project: Hall - Dale Middle

Sample ID: Rm 219

Analysis	Analysis Date	Analyst Init.	Lab File ID	Canister ID	Sample Vol.	Dil. Factor
Initial	05/30/2017	KW	K12682.D	E12322	250 cc	1

**NIOSH and OSHA Exposure Limit Comparisons**

Target Compounds	CAS#	MW	Result ppbv	Q	Result ug/m3	NIOSH REL ug/m3	>	OSHA PEL ug/m3	>
Propylene	115-07-1	42.08	ND		ND	N.E.		N.E.	
Freon 12(Dichlorodifluoromethane)	75-71-8	120.90	0.70		3.5	4900000		4900000	
Freon 114(1,2-Dichlorotetrafluoroethan	76-14-2	170.90	ND		ND	7000000		7000000	
Chloromethane	74-87-3	50.49	0.80		1.7	LFC		210000	
n-Butane	106-97-8	58.12	ND		ND	1900000		1900000	
Vinyl chloride	75-01-4	62.50	ND		ND	LFC		2600	
1,3-Butadiene	106-99-0	54.09	ND		ND	LFC		2200	
Bromomethane	74-83-9	94.94	ND		ND	LFC		78000	
Chloroethane	75-00-3	64.52	ND		ND	LFC		2600000	
Ethanol	64-17-5	46.07	29		54	1900000		1900000	
Bromoethene(Vinyl bromide)	593-60-2	106.90	ND		ND	LFC		N.E.	
Freon 11(Trichlorofluoromethane)	75-69-4	137.40	1.8		10	5600000		5600000	
Isopropyl alcohol(2-Propanol)	67-63-0	60.10	3.4		8.4	980000		980000	
Freon 113(1,1,2-Trichlorotrifluoroethan	76-13-1	187.40	ND		ND	7700000		7700000	
Acetone	67-64-1	58.08	5.2		12	590000		2400000	
1,1-Dichloroethene	75-35-4	96.94	ND		ND	790000		790000	
Acetonitrile	75-05-8	41.00	ND		ND	34000		67000	
Tertiary butyl alcohol(TBA)	75-65-0	74.12	ND		ND	300000		300000	
Bromoethane(Ethyl bromide)	74-96-4	108.00	ND		ND	880000		880000	
3-Chloropropene(Allyl chloride)	107-05-1	76.53	ND		ND	3100		3100	
Carbon disulfide	75-15-0	76.14	ND		ND	3100		62000	
Methylene chloride	75-09-2	84.94	ND		ND	LFC		87000	
Acrylonitrile	107-13-1	53.00	ND		ND	2200		4300	
Methyl-tert-butyl ether(MTBE)	1634-04-4	88.15	ND		ND	N.E.		N.E.	
trans-1,2-Dichloroethene	156-60-5	96.94	ND		ND	790000		790000	
n-Hexane	110-54-3	86.17	ND		ND	180000		1800000	
1,1-Dichloroethane	75-34-3	98.96	ND		ND	400000		400000	
Vinyl acetate	108-05-4	86.00	ND		ND	14000		N.E.	
2-Butanone(MEK)	78-93-3	72.10	ND		ND	590000		590000	
cis-1,2-Dichloroethene	156-59-2	96.94	ND		ND	790000		790000	
Ethyl acetate	141-78-6	88.10	2.7		10	1400000		1400000	
Chloroform	67-66-3	119.40	ND		ND	9800		240000	
Tetrahydrofuran	109-99-9	72.11	ND		ND	590000		590000	
1,1,1-Trichloroethane	71-55-6	133.40	ND		ND	1900000		1900000	
Cyclohexane	110-82-7	84.16	ND		ND	1000000		1000000	
2,2,4-Trimethylpentane(Isooctane)	540-84-1	114.20	ND		ND	N.E.		N.E.	
Carbon tetrachloride	56-23-5	153.80	ND		ND	13000		63000	
n-Heptane	142-82-5	100.20	ND		ND	350000		2000000	
1,2-Dichloroethane	107-06-2	98.96	ND		ND	4000		200000	
Benzene	71-43-2	78.11	ND		ND	320		3200	
Trichloroethene	79-01-6	131.40	ND		ND	130000		540000	
1,2-Dichloropropane	78-87-5	113.00	ND		ND	LFC		350000	
Methyl Methacrylate	80-62-6	100.12	ND		ND	410000		410000	
Bromodichloromethane	75-27-4	163.80	ND		ND	N.E.		N.E.	
1,4-Dioxane	123-91-1	88.12	ND		ND	3600		360000	
4-Methyl-2-pentanone(MIBK)	108-10-1	100.20	ND		ND	200000		410000	

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**South Portland, ME 04106**

Phone: 207-615-3694  
 Fax: Not Available  
 Date Collected: 5/22/2017  
 Date Received: 5/24/2017

Project: **Hall - Dale Middle**

Sample ID: Rm 219

Analysis	Analysis Date	Analyst Init.	Lab File ID	Canister ID	Sample Vol.	Dil. Factor
Initial	05/30/2017	KW	K12682.D	E12322	250 cc	1

**NIOSH and OSHA Exposure Limit Comparisons**

Target Compounds	CAS#	MW	Result ppbv	Q	Result ug/m3	NIOSH REL ug/m3	>	OSHA PEL ug/m3	>
cis-1,3-Dichloropropene**	10061-01-5	111.00	ND		ND	4500		N.E.	
Toluene	108-88-3	92.14	ND		ND	380000		750000	
trans-1,3-Dichloropropene**	10061-02-6	111.00	ND		ND	4500		N.E.	
1,1,2-Trichloroethane	79-00-5	133.40	ND		ND	55000		55000	
2-Hexanone(MBK)	591-78-6	100.10	ND		ND	4100		410000	
Tetrachloroethene	127-18-4	165.80	ND		ND	LFC		680000	
Dibromochloromethane	124-48-1	208.30	ND		ND	N.E.		N.E.	
1,2-Dibromoethane	106-93-4	187.80	ND		ND	350		150000	
Chlorobenzene	108-90-7	112.60	ND		ND	N.E.		350000	
Ethylbenzene	100-41-4	106.20	ND		ND	430000		430000	
Xylene (p,m)	1330-20-7	106.20	ND		ND	430000		430000	
Xylene (Ortho)	95-47-6	106.20	ND		ND	430000		430000	
Styrene	100-42-5	104.10	ND		ND	210000		430000	
Isopropylbenzene (cumene)	98-82-8	120.19	ND		ND	250000		250000	
Bromoform	75-25-2	252.80	ND		ND	5200		5200	
1,1,2,2-Tetrachloroethane	79-34-5	167.90	ND		ND	6900		34000	
4-Ethyltoluene	622-96-8	120.20	ND		ND	N.E.		N.E.	
1,3,5-Trimethylbenzene	108-67-8	120.20	ND		ND	120000		120000	
2-Chlorotoluene	95-49-8	126.60	ND		ND	260000		N.E.	
1,2,4-Trimethylbenzene	95-63-6	120.20	ND		ND	120000		120000	
1,3-Dichlorobenzene	541-73-1	147.00	ND		ND	N.E.		N.E.	
1,4-Dichlorobenzene	106-46-7	147.00	ND		ND	LFC		450000	
Benzyl chloride	100-44-7	126.00	ND		ND	5200		5200	
1,2-Dichlorobenzene	95-50-1	147.00	ND		ND	300000		300000	
1,2,4-Trichlorobenzene	120-82-1	181.50	ND		ND	37000		N.E.	
Hexachloro-1,3-butadiene	87-68-3	260.80	ND		ND	210		N.E.	
Naphthalene	91-20-3	128.17	ND		ND	52000		52000	

\*\*The concentrations of each isomer should be added if multiple isomers are present and compared to the total screening level.

The > column is used to flag exceedences as marked

**Exposure Limit Definitions**

REL= Recommended Exposure Limit, PEL= Permissible Exposure Limit

**Agency Definitions**

NIOSH= The National Institute for Occupational Safety and Health

**Reference**

Occupational Safety and Health Administration (OSHA) General Industry Air Contaminants Standard (29 CFR 1910.1000)

**Compound Exposure Definitions**

NE= No Limit Established  
 LFC= Lowest Feasible Concentration  
 NS= No Screening Value



NJDEP Certification #: 03036

**EMSL Analytical**

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EMSL Order #: 491700563  
 EMSL Sample #: 491700563-3  
 Customer ID: SFES42  
 Customer PO: 17-03034

Attn: **Bruce Hackett**  
**Safe Environmental Solutions**  
**62 Darling Ave**  
**South Portland, ME 04106**

Phone: 207-615-3694  
 Fax: Not Available  
 Date Collected: 5/22/2017  
 Date Received: 5/24/2017

Project: Hall - Dale Middle

Sample ID: Rm 219

<u>Analysis</u>	<u>Analysis Date</u>	<u>Analyst Init.</u>	<u>Lab File ID</u>	<u>Canister ID</u>	<u>Sample Vol.</u>	<u>Dil. Factor</u>
Initial	05/30/2017	KW	K12682.D	E12322	250 cc	1

**Possible Background Sources of Contaminants**

Target Compounds	CAS#	Result ppbv	Q	Result ug/m3	Use and Possible Sources
Freon 12(Dichlorodifluoromethane)	75-71-8	0.70		3.5	Refrigerant (CFCs) and cleaning solvent. Was phased out as a refrigerant in 1996. <sup>1</sup>
Chloromethane	74-87-3	0.80		1.7	Most (99%) of the chloromethane in the environment comes from natural sources. Because chloromethane is made in the oceans by natural processes, it is present in air all over the world. In most areas, the outside air contains less than 1 part of chloromethane in a billion parts of air (ppb). In cities, human activities, mostly combustion and manufacturing, add to the chloromethane in the air, resulting in somewhat higher levels, up to 1 ppb. Cigarette smoke, polystyrene insulation, and aerosol propellants; home burning of wood, coal, or certain plastics; and chlorinated swimming pools. <sup>4</sup>
Ethanol	64-17-5	29		54	Hand sanitizers, disinfecting wipes. Personal care products: nail polish, nail polish remover, colognes, perfumes, rubbing alcohol, hair spray. <sup>2</sup>
Freon 11(Trichlorofluoromethane)	75-69-4	1.8		10	Refrigerant from air conditioners, freezers, refrigerators, dehumidifiers. <sup>2</sup>
Isopropyl alcohol(2-Propanol)	67-63-0	3.4		8.4	Eye Glass Cleaners. Disinfecting wipes. Personal care products: nail polish, nail polish remover, colognes, perfumes, rubbing alcohol, hair spray. <sup>2</sup>
Acetone	67-64-1	5.2		12	Rubber cement, cleaning fluids, scented candles and nail polish remover. <sup>1</sup>
Ethyl acetate	141-78-6	2.7		10	Personal care products: nail polish, nail polish remover, colognes, perfumes, rubbing alcohol, hair spray. <sup>2</sup>

**Qualifier Definitions**

ND = Non Detect

B = Compound also found in method blank.

E= Estimated concentration exceeding upper calibration range.

D= Result reported from diluted analysis.

**Sources References**

- (1) NJDEP "Common Household Sources of Background Indoor Air Contamination". June 26, 2012
- (2) NYSDOH "Volatile Organic Compounds (VOCs) in Commonly Used Products", 2007
- (3) EPA, Air & Radiation, TTN Web - Technology Transfer Network Air Toxics Web site, various years.
- (4) Agency for Toxic Substances and Disease Registry (ATSDR). U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. 1998.
- (5) OFFICE OF POLLUTION PREVENTION AND TOXICS, U.S. ENVIRONMENTAL PROTECTION AGENCY, August 1994, EPA 749-F-94-012a
- (6) U.S. Environmental Protection Agency, Office of Research and Development, Cincinnati, OH. 1985.
- (7) World Health Organization,
- (8) Product Safety Assessment, Revised: November 19, 2010 The Dow Chemical Company
- (9) California Office of Environmental Health Hazard Assessment, PROPOSED ACTION LEVEL FOR 2-CHLOROTOLUENE
- (10) Delaware Health and Social Services, Division of Public Health, Revised: 01/2010
- (11) USEPA, Envirofacts Master Chemical Integrator (EMCI), Scorecard, 4/10/2009



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EMSL Order #: 491700563  
 EMSL Sample #: 491700563-4  
 Customer ID: SFES42  
 Customer PO: 17-03034

Attn: **Bruce Hackett**  
**Safe Environmental Solutions**  
**62 Darling Ave**  
**South Portland, ME 04106**

Phone: 207-615-3694  
 Fax: Not Available  
 Date Collected: 5/22/2017  
 Date Received: 5/24/2017

Project: Hall - Dale Middle

Sample ID: Outdoor

Analysis	Analysis Date	Analyst Init.	Lab File ID	Canister ID	Sample Vol.	Dil. Factor
Initial	05/30/2017	KW	K12684.D	E15307	250 cc	1

**USEPA Generic Air Screening Level Summary Table**

Target Compounds	CAS#	MW	Result ppbv	Q	Result ug/m3	Residential ug/m3	>	Industrial ug/m3	>
Propylene	115-07-1	42.08	ND		ND	3100		13000	
Freon 12(Dichlorodifluoromethane)	75-71-8	120.90	ND		ND	100		440	
Freon 114(1,2-Dichlorotetrafluoroethan	76-14-2	170.90	ND		ND	N.E.		N.E.	
Chloromethane	74-87-3	50.49	0.53		1.1	94		390	
n-Butane	106-97-8	58.12	ND		ND	N.E.		N.E.	
Vinyl chloride	75-01-4	62.50	ND		ND	0.2		3	
1,3-Butadiene	106-99-0	54.09	ND		ND	0.1		0.4	
Bromomethane	74-83-9	94.94	ND		ND	5		22	
Chloroethane	75-00-3	64.52	ND		ND	10000		44000	
Ethanol	64-17-5	46.07	1.1		2.1	N.E.		N.E.	
Bromoethene(Vinyl bromide)	593-60-2	106.90	ND		ND	0.1		0.4	
Freon 11(Trichlorofluoromethane)	75-69-4	137.40	ND		ND	N.E.		N.E.	
Isopropyl alcohol(2-Propanol)	67-63-0	60.10	1.4		3.6	210		880	
Freon 113(1,1,2-Trichlorotrifluoroethan	76-13-1	187.40	ND		ND	31000		130000	
Acetone	67-64-1	58.08	1.8		4.2	32000		140000	
1,1-Dichloroethene	75-35-4	96.94	ND		ND	210		880	
Acetonitrile	75-05-8	41.00	ND		ND	63		260	
Tertiary butyl alcohol(TBA)	75-65-0	74.12	ND		ND	N.E.		N.E.	
Bromoethane(Ethyl bromide)	74-96-4	108.00	ND		ND	N.E.		N.E.	
3-Chloropropene(Allyl chloride)	107-05-1	76.53	ND		ND	0.5		2	
Carbon disulfide	75-15-0	76.14	ND		ND	730		3100	
Methylene chloride	75-09-2	84.94	ND		ND	100		1200	
Acrylonitrile	107-13-1	53.00	ND		ND	0		0	
Methyl-tert-butyl ether(MTBE)	1634-04-4	88.15	ND		ND	11		47	
trans-1,2-Dichloroethene	156-60-5	96.94	ND		ND	N.E.		N.E.	
n-Hexane	110-54-3	86.17	ND		ND	730		3100	
1,1-Dichloroethane	75-34-3	98.96	ND		ND	1.8		8	
Vinyl acetate	108-05-4	86.00	ND		ND	210		880	
2-Butanone(MEK)	78-93-3	72.10	1.2		3.5	5200		22000	
cis-1,2-Dichloroethene	156-59-2	96.94	ND		ND	N.E.		N.E.	
Ethyl acetate	141-78-6	88.10	1.0		3.6	73		310	
Chloroform	67-66-3	119.40	ND		ND	0.1		0.5	
Tetrahydrofuran	109-99-9	72.11	ND		ND	2100		8800	
1,1,1-Trichloroethane	71-55-6	133.40	ND		ND	5200		22000	
Cyclohexane	110-82-7	84.16	ND		ND	6300		26000	
2,2,4-Trimethylpentane(Isooctane)	540-84-1	114.20	ND		ND	N.E.		N.E.	
Carbon tetrachloride	56-23-5	153.80	ND		ND	0.5		2	
n-Heptane	142-82-5	100.20	ND		ND	N.E.		N.E.	
1,2-Dichloroethane	107-06-2	98.96	ND		ND	0.1		0.5	
Benzene	71-43-2	78.11	ND		ND	0.4		1.6	
Trichloroethene	79-01-6	131.40	ND		ND	0.5		3	
1,2-Dichloropropane	78-87-5	113.00	ND		ND	0.3		1.2	
Methyl Methacrylate	80-62-6	100.12	ND		ND	730		3100	
Bromodichloromethane	75-27-4	163.80	ND		ND	0.1		0.3	
1,4-Dioxane	123-91-1	88.12	ND		ND	1		3	
4-Methyl-2-pentanone(MIBK)	108-10-1	100.20	ND		ND	3100		13000	

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EMSL Order #: 491700563  
 EMSL Sample #: 491700563-4  
 Customer ID: SFES42  
 Customer PO: 17-03034

Attn: **Bruce Hackett**  
**Safe Environmental Solutions**  
**62 Darling Ave**  
**South Portland, ME 04106**

Phone: 207-615-3694  
 Fax: Not Available  
 Date Collected: 5/22/2017  
 Date Received: 5/24/2017

Project: **Hall - Dale Middle** Sample ID: **Outdoor**

Analysis Initial	Analysis Date	Analyst Init.	Lab File ID	Canister ID	Sample Vol.	Dil. Factor
	05/30/2017	KW	K12684.D	E15307	250 cc	1

**USEPA Generic Air Screening Level Summary Table**

Target Compounds	CAS#	MW	Result ppbv	Q	Result ug/m3	Residential ug/m3	>	Industrial ug/m3	>
cis-1,3-Dichloropropene**	10061-01-5	111.00	ND		ND	N.E.		N.E.	
Toluene	108-88-3	92.14	ND		ND	5200		22000	
trans-1,3-Dichloropropene**	10061-02-6	111.00	ND		ND	N.E.		N.E.	
1,1,2-Trichloroethane	79-00-5	133.40	ND		ND	0.2		0.8	
2-Hexanone(MBK)	591-78-6	100.10	ND		ND	31		130	
Tetrachloroethene	127-18-4	165.80	ND		ND	11		47	
Dibromochloromethane	124-48-1	208.30	ND		ND	N.E.		N.E.	
1,2-Dibromoethane	106-93-4	187.80	ND		ND	0.0		0.0	
Chlorobenzene	108-90-7	112.60	ND		ND	52		220	
Ethylbenzene	100-41-4	106.20	ND		ND	1.1		5	
Xylene (p,m)	1330-20-7	106.20	ND		ND	100		440	
Xylene (Ortho)	95-47-6	106.20	ND		ND	100		440	
Styrene	100-42-5	104.10	ND		ND	1000		4400	
Isopropylbenzene (cumene)	98-82-8	120.19	ND		ND	420		1800	
Bromoform	75-25-2	252.80	ND		ND	3		11	
1,1,2,2-Tetrachloroethane	79-34-5	167.90	ND		ND	0.0		0.2	
4-Ethyltoluene	622-96-8	120.20	ND		ND	N.E.		N.E.	
1,3,5-Trimethylbenzene	108-67-8	120.20	ND		ND	N.E.		N.E.	
2-Chlorotoluene	95-49-8	126.60	ND		ND	N.E.		N.E.	
1,2,4-Trimethylbenzene	95-63-6	120.20	ND		ND	7		31	
1,3-Dichlorobenzene	541-73-1	147.00	ND		ND	N.E.		N.E.	
1,4-Dichlorobenzene	106-46-7	147.00	ND		ND	0.3		1.1	
Benzyl chloride	100-44-7	126.00	ND		ND	0		0	
1,2-Dichlorobenzene	95-50-1	147.00	ND		ND	210		880	
1,2,4-Trichlorobenzene	120-82-1	181.50	ND		ND	2		9	
Hexachloro-1,3-butadiene	87-68-3	260.80	ND		ND	0.1		0.6	
Naphthalene	91-20-3	128.17	ND		ND	0.1		0.4	

\*\*The concentrations of each isomer should be added if multiple isomers are present and compared to the total screening level.

The > column is used to flag exceedences as marked

**Exposure Limit Definitions**

RSL= Regional Screening Level (Target Hazard Quotient (THQ)=0.1 if available, otherwise THQ = 1)

**Agency Definitions**

United States Environmental Protection Agency

**Reference**

EPA Regional Screening Levels (RSLs), May 2016

**Compound Exposure Definitions**

NE= No Limit Established  
 LFC= Lowest Feasible Concentration  
 NS= No Screening Value

**Regional Screening Level Definition**

Target Hazard Quotients (THQ)=0.1 is used for screening when multiple contaminants of concern are



NJDEP Certification #: 03036



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EMSL Order #: 491700563  
 EMSL Sample #: 491700563-4  
 Customer ID: SFES42  
 Customer PO: 17-03034

Attn: **Bruce Hackett**  
**Safe Environmental Solutions**  
**62 Darling Ave**  
**South Portland, ME 04106**

Phone: 207-615-3694  
 Fax: Not Available  
 Date Collected: 5/22/2017  
 Date Received: 5/24/2017

Project: Hall - Dale Middle

Sample ID: Outdoor

Analysis	Analysis Date	Analyst Init.	Lab File ID	Canister ID	Sample Vol.	Dil. Factor
Initial	05/30/2017	KW	K12684.D	E15307	250 cc	1

**NIOSH and OSHA Exposure Limit Comparisons**

Target Compounds	CAS#	MW	Result ppbv	Q	Result ug/m3	NIOSH REL ug/m3	>	OSHA PEL ug/m3	>
Propylene	115-07-1	42.08	ND		ND	N.E.		N.E.	
Freon 12(Dichlorodifluoromethane)	75-71-8	120.90	ND		ND	4900000		4900000	
Freon 114(1,2-Dichlorotetrafluoroethan	76-14-2	170.90	ND		ND	7000000		7000000	
Chloromethane	74-87-3	50.49	0.53		1.1	LFC		210000	
n-Butane	106-97-8	58.12	ND		ND	1900000		1900000	
Vinyl chloride	75-01-4	62.50	ND		ND	LFC		2600	
1,3-Butadiene	106-99-0	54.09	ND		ND	LFC		2200	
Bromomethane	74-83-9	94.94	ND		ND	LFC		78000	
Chloroethane	75-00-3	64.52	ND		ND	LFC		2600000	
Ethanol	64-17-5	46.07	1.1		2.1	1900000		1900000	
Bromoethene(Vinyl bromide)	593-60-2	106.90	ND		ND	LFC		N.E.	
Freon 11(Trichlorofluoromethane)	75-69-4	137.40	ND		ND	5600000		5600000	
Isopropyl alcohol(2-Propanol)	67-63-0	60.10	1.4		3.6	980000		980000	
Freon 113(1,1,2-Trichlorotrifluoroethan	76-13-1	187.40	ND		ND	7700000		7700000	
Acetone	67-64-1	58.08	1.8		4.2	590000		2400000	
1,1-Dichloroethene	75-35-4	96.94	ND		ND	790000		790000	
Acetonitrile	75-05-8	41.00	ND		ND	34000		67000	
Tertiary butyl alcohol(TBA)	75-65-0	74.12	ND		ND	300000		300000	
Bromoethane(Ethyl bromide)	74-96-4	108.00	ND		ND	880000		880000	
3-Chloropropene(Allyl chloride)	107-05-1	76.53	ND		ND	3100		3100	
Carbon disulfide	75-15-0	76.14	ND		ND	3100		62000	
Methylene chloride	75-09-2	84.94	ND		ND	LFC		87000	
Acrylonitrile	107-13-1	53.00	ND		ND	2200		4300	
Methyl-tert-butyl ether(MTBE)	1634-04-4	88.15	ND		ND	N.E.		N.E.	
trans-1,2-Dichloroethene	156-60-5	96.94	ND		ND	790000		790000	
n-Hexane	110-54-3	86.17	ND		ND	180000		1800000	
1,1-Dichloroethane	75-34-3	98.96	ND		ND	400000		400000	
Vinyl acetate	108-05-4	86.00	ND		ND	14000		N.E.	
2-Butanone(MEK)	78-93-3	72.10	1.2		3.5	590000		590000	
cis-1,2-Dichloroethene	156-59-2	96.94	ND		ND	790000		790000	
Ethyl acetate	141-78-6	88.10	1.0		3.6	1400000		1400000	
Chloroform	67-66-3	119.40	ND		ND	9800		240000	
Tetrahydrofuran	109-99-9	72.11	ND		ND	590000		590000	
1,1,1-Trichloroethane	71-55-6	133.40	ND		ND	1900000		1900000	
Cyclohexane	110-82-7	84.16	ND		ND	1000000		1000000	
2,2,4-Trimethylpentane(Isooctane)	540-84-1	114.20	ND		ND	N.E.		N.E.	
Carbon tetrachloride	56-23-5	153.80	ND		ND	13000		63000	
n-Heptane	142-82-5	100.20	ND		ND	350000		2000000	
1,2-Dichloroethane	107-06-2	98.96	ND		ND	4000		200000	
Benzene	71-43-2	78.11	ND		ND	320		3200	
Trichloroethene	79-01-6	131.40	ND		ND	130000		540000	
1,2-Dichloropropane	78-87-5	113.00	ND		ND	LFC		350000	
Methyl Methacrylate	80-62-6	100.12	ND		ND	410000		410000	
Bromodichloromethane	75-27-4	163.80	ND		ND	N.E.		N.E.	
1,4-Dioxane	123-91-1	88.12	ND		ND	3600		360000	
4-Methyl-2-pentanone(MIBK)	108-10-1	100.20	ND		ND	200000		410000	

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Attn: **Bruce Hackett**  
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**62 Darling Ave**  
**South Portland, ME 04106**

Phone: 207-615-3694  
 Fax: Not Available  
 Date Collected: 5/22/2017  
 Date Received: 5/24/2017

Project: **Hall - Dale Middle**

Sample ID: **Outdoor**

<u>Analysis</u>	<u>Analysis Date</u>	<u>Analyst Init.</u>	<u>Lab File ID</u>	<u>Canister ID</u>	<u>Sample Vol.</u>	<u>Dil. Factor</u>
Initial	05/30/2017	KW	K12684.D	E15307	250 cc	1

**NIOSH and OSHA Exposure Limit Comparisons**

Target Compounds	CAS#	MW	Result ppbv	Q	Result ug/m3	NIOSH REL ug/m3	>	OSHA PEL ug/m3	>
cis-1,3-Dichloropropene**	10061-01-5	111.00	ND		ND	4500		N.E.	
Toluene	108-88-3	92.14	ND		ND	380000		750000	
trans-1,3-Dichloropropene**	10061-02-6	111.00	ND		ND	4500		N.E.	
1,1,2-Trichloroethane	79-00-5	133.40	ND		ND	55000		55000	
2-Hexanone(MBK)	591-78-6	100.10	ND		ND	4100		410000	
Tetrachloroethene	127-18-4	165.80	ND		ND	LFC		680000	
Dibromochloromethane	124-48-1	208.30	ND		ND	N.E.		N.E.	
1,2-Dibromoethane	106-93-4	187.80	ND		ND	350		150000	
Chlorobenzene	108-90-7	112.60	ND		ND	N.E.		350000	
Ethylbenzene	100-41-4	106.20	ND		ND	430000		430000	
Xylene (p,m)	1330-20-7	106.20	ND		ND	430000		430000	
Xylene (Ortho)	95-47-6	106.20	ND		ND	430000		430000	
Styrene	100-42-5	104.10	ND		ND	210000		430000	
Isopropylbenzene (cumene)	98-82-8	120.19	ND		ND	250000		250000	
Bromoform	75-25-2	252.80	ND		ND	5200		5200	
1,1,2,2-Tetrachloroethane	79-34-5	167.90	ND		ND	6900		34000	
4-Ethyltoluene	622-96-8	120.20	ND		ND	N.E.		N.E.	
1,3,5-Trimethylbenzene	108-67-8	120.20	ND		ND	120000		120000	
2-Chlorotoluene	95-49-8	126.60	ND		ND	260000		N.E.	
1,2,4-Trimethylbenzene	95-63-6	120.20	ND		ND	120000		120000	
1,3-Dichlorobenzene	541-73-1	147.00	ND		ND	N.E.		N.E.	
1,4-Dichlorobenzene	106-46-7	147.00	ND		ND	LFC		450000	
Benzyl chloride	100-44-7	126.00	ND		ND	5200		5200	
1,2-Dichlorobenzene	95-50-1	147.00	ND		ND	300000		300000	
1,2,4-Trichlorobenzene	120-82-1	181.50	ND		ND	37000		N.E.	
Hexachloro-1,3-butadiene	87-68-3	260.80	ND		ND	210		N.E.	
Naphthalene	91-20-3	128.17	ND		ND	52000		52000	

\*\*The concentrations of each isomer should be added if multiple isomers are present and compared to the total screening level.

The > column is used to flag exceedences as marked

**Exposure Limit Definitions**

REL= Recommended Exposure Limit, PEL= Permissible Exposure Limit

**Agency Definitions**

NIOSH= The National Institute for Occupational Safety and Health

**Reference**

Occupational Safety and Health Administration (OSHA) General Industry Air Contaminants Standard (29 CFR 1910.1000)

**Compound Exposure Definitions**

NE= No Limit Established  
 LFC= Lowest Feasible Concentration  
 NS= No Screening Value



NJDEP Certification #: 03036

**EMSL Analytical**

200 Route 130 North, Cinnaminson, NJ 08077  
 Phone/Fax: (856)858-4800 / (856)858-4571  
<http://www.EMSL.com> [to15lab@EMSL.com](mailto:to15lab@EMSL.com)

EMSL Order #: 491700563  
 EMSL Sample #: 491700563-4  
 Customer ID: SFES42  
 Customer PO: 17-03034

Attn: **Bruce Hackett**  
**Safe Environmental Solutions**  
**62 Darling Ave**  
**South Portland, ME 04106**

Phone: 207-615-3694  
 Fax: Not Available  
 Date Collected: 5/22/2017  
 Date Received: 5/24/2017

Project: **Hall - Dale Middle** Sample ID: **Outdoor**

Analysis	Analysis Date	Analyst Init.	Lab File ID	Canister ID	Sample Vol.	Dil. Factor
Initial	05/30/2017	KW	K12684.D	E15307	250 cc	1

**Possible Background Sources of Contaminants**

Target Compounds	CAS#	Result ppbv	Q	Result ug/m3	Use and Possible Sources
Chloromethane	74-87-3	0.53		1.1	Most (99%) of the chloromethane in the environment comes from natural sources. Because chloromethane is made in the oceans by natural processes, it is present in air all over the world. In most areas, the outside air contains less than 1 part of chloromethane in a billion parts of air (ppb). In cities, human activities, mostly combustion and manufacturing, add to the chloromethane in the air, resulting in somewhat higher levels, up to 1 ppb. Cigarette smoke, polystyrene insulation, and aerosol propellants; home burning of wood, coal, or certain plastics; and chlorinated swimming pools. <sup>4</sup>
Ethanol	64-17-5	1.1		2.1	Hand sanitizers, disinfecting wipes. Personal care products: nail polish, nail polish remover, colognes, perfumes, rubbing alcohol, hair spray. <sup>2</sup>
Isopropyl alcohol(2-Propanol)	67-63-0	1.4		3.6	Eye Glass Cleaners. Disinfecting wipes. Personal care products: nail polish, nail polish remover, colognes, perfumes, rubbing alcohol, hair spray. <sup>2</sup>
Acetone	67-64-1	1.8		4.2	Rubber cement, cleaning fluids, scented candles and nail polish remover. <sup>1</sup>
2-Butanone(MEK)	78-93-3	1.2		3.5	2-Butanone is produced in large quantities. Nearly half of its use is in paints and other coatings because it will quickly evaporate into the air and it dissolves many substances. <sup>4</sup> Can occur from automobile exhaust, printing inks, fragrance/flavoring agent in candy and perfume, paint, glue, cleaning agents and cigarette smoke. <sup>1</sup>
Ethyl acetate	141-78-6	1.0		3.6	Personal care products: nail polish, nail polish remover, colognes, perfumes, rubbing alcohol, hair spray. <sup>2</sup>

**Qualifier Definitions**

ND = Non Detect

B = Compound also found in method blank.

E = Estimated concentration exceeding upper calibration range.

D = Result reported from diluted analysis.

**Sources References**

- (1) NJDEP "Common Household Sources of Background Indoor Air Contamination". June 26, 2012
- (2) NYSDOH "Volatile Organic Compounds (VOCs) in Commonly Used Products", 2007
- (3) EPA, Air & Radiation, TTN Web - Technology Transfer Network/Air Toxics Web site, various years.
- (4) Agency for Toxic Substances and Disease Registry (ATSDR). U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. 1998.
- (5) OFFICE OF POLLUTION PREVENTION AND TOXICS, U.S. ENVIRONMENTAL PROTECTION AGENCY, August 1994, EPA 749-F-94-012a
- (6) U.S. Environmental Protection Agency, Office of Research and Development, Cincinnati, OH. 1985.
- (7) World Health Organization,
- (8) Product Safety Assessment, Revised: November 19, 2010 The Dow Chemical Company
- (9) California Office of Environmental Health Hazard Assessment, PROPOSED ACTION LEVEL FOR 2-CHLOROTOLUENE
- (10) Delaware Health and Social Services, Division of Public Health, Revised: 01/2010
- (11) USEPA, Envirofacts Master Chemical Integrator (EMCI), Scorecard, 4/10/2009



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## Summary of Published Mold/Bacteria Guidelines

Currently there are no enforceable regulatory standards suggesting maximum concentrations of bacteria or fungi in occupied buildings. This is largely due to the fact that there is an extremely wide range of individual human sensitivity to these agents.

Bacteria/Fungi are found in all environments, however, the levels and varieties in indoor environments play a critical role in IAQ. In general, the population found indoors should be quantitatively lower, although similar to outdoor levels.

Porous building materials are environments which are conducive to microbial growth, especially when not properly maintained. Bacteria/Fungi require moisture and a nutrient source in order to flourish in an indoor environment.

These "Amplification" sites are commonly found in water-damaged materials or in areas susceptible to water or moisture infiltration. Aggressive maintenance practices and routine cleaning will aid in the reduction of nutrient sources for microorganisms and contribute significantly to preserving and maintaining good indoor air quality.

Exposure to elevated levels of bacteria and fungi in indoor air can be problematic to building occupants. Symptoms such as upper respiratory distress, fatigue, general malaise, irritated eyes, nose, and throat are typical complaints.

When determining the health risks associated with bioaerosols, it is important to keep in mind that the colony count alone is not the only determining factor. The species of organism(s) identified is sometimes more important than the colony count (number of organisms).

Additionally, extreme high levels of fungi and/or bacteria may effect the accuracy of enumeration and identification due to over-growth on sampling media.

Pathogenic and/or toxic organisms can produce health concerns even when identified in small quantities, where ill-health symptoms have been reported, or where immuno-compromised individuals may be susceptible. Pathogenic and/or toxic organisms should be maintained at the lowest feasible levels.

*The elevated presence of certain fungal pathogens (e.g. Aspergillus sp.) or certain toxic fungi (e.g. Stachybotrys chartarum) is considered to be unacceptable.* The presence of certain pathogenic bacteria (e.g. Pseudomonas aeruginosa and Staphylococcus aureus) should be evaluated carefully as well.

*Chaetomium, Fusarium, Mammoniella, Stachybotrys, or Trichoderma mold species are **zero tolerance organisms** for the indoor environment as they have the capability to produce mycotoxins and microbial volatile organic compounds (mvoc's) and can seriously compromise a building and/or the health of occupants. These effects for human health can be worse for immune compromised persons (such as those with HIV, the elderly, terminally or seriously ill patients (cancer patients), persons with pre-existing conditions or asthma, and the very young).*

The analytical data is reviewed to identify specific bacteria or fungi, which may be pathogenic. This evaluation is as important as determining the number of colonies on the media. The colonies developed are not necessarily the most prevalent species, and the results reflect only those microbes for which the media and incubation conditions are most suitable. Levels of airborne microbes in a conducive environment can fluctuate greatly, even over short periods of time.

Allergic responses can be experienced by susceptible individuals exposed to organisms (common, nonpathogenic and/or toxic molds/bacteria) in elevated levels.

*The dominance of a single species may indicate indoor growth, whereas the presence of mixed bacterial species may reflect intrusion of outdoor air or shedding from building occupants. Actinomycetes (especially thermophilic ones) are rare in buildings and outdoors. Therefore, the presence of actinomycetes indoors may be considered an indication of an indoor source.*

Although there are no regulatory, enforceable levels of mold and/or bacteria there are numerous guidance documents suggesting what may be considered "normal" levels in a facility without active mold growth.

Although there are no regulatory, enforceable levels of mold and/or bacteria there are numerous guidance documents suggesting what may be considered "normal" levels in a facility without active mold growth.

**Three (3) separate guidelines utilized in the industry for conducting post remediation verification, once mold removal has been completed (clearance sampling). These levels are:**

*No greater than 500 ct./m<sup>3</sup> once Basidiospores, Ascospores, rusts, smuts, Myxomycetes, Periconia and Hyphal fragments are removed from the total. (Aerobiological Solutions, Arlington VA),*

*Total spore counts of 3000 ct./m<sup>3</sup>, no more than one genera or grouping may exceed 75% of the total count (U.S. Micro-solutions, Greensburg, PA),*

*not to exceed 2000 ct/m<sup>3</sup>, with approximately 1/3 cladsporium, 1/3 aspergillus/Penicillium-like, and 1/3 other spore types. (Texas Dept. of Public Health)*

#### References:

- D.M. Baxter, 1998, ETA Standard Operating Procedure: Sampling and Analysis of Particulate Bioaerosols for Indoor Air Quality Evaluations Using Light Microscopy
- E. Grant Smith, 1990, Sampling and Identifying Allergenic Pollens and Molds. Blewstone Press, San Antonio Texas
- IICRC S520, 2003, Standard and Reference Guide for Professional Mold Remediation  
New York City – Guidelines on Assessment and Remediation of Fubngi in the indoor Environments  
Post-remediatoin Verification and Clearance Testing for Mold and Bacteria, Rick-based Levels of Cleanliness, Robert C. Brandys, Gail M. Bradys
- ACGIH, 1999, Bioaerosols Assessment and Control
- OSHA SHIB 03-10-10, A brief Guide to Mold in the Workplace
- USEPA 402-K-01-001, 2002, Mold Remediation in Schools and Commercial Buildings
- ASHRAE, 62.2, Ventilation for Acceptable Indoor Air Quality

## Volatile Organic Compounds Guidance

### IAQ Index: FAQ: Volatile Organic Compounds (VOCs) Fact Sheet



Volatile organic compounds (VOCs) include a very wide range of organic compounds that can be emitted from building materials and products. It is estimated that 50 to 300 different VOCs may be detected in the air of homes, schools, offices, and commercial buildings at any given time. In addition, the Environmental Protection Agency (EPA) has determined that concentrations of VOCs are much higher indoors compared to outdoors (up to 10 times higher). VOCs are emitted from thousands of products such as building maintenance and cleaning products, cosmetics, paints, adhesives, sealants, caulks, carpets, furniture, panels, vinyl floor and wall coverings, composite wood products, drywall and drywall products, concrete deck leveling compounds, furniture finishing products, and insulation materials. Other sources include office equipment such as copiers and printers, correction fluid, carbonless paper, permanent markers, photographic solutions, and graphics and craft materials such as glues and adhesives.

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- [Carbon Monoxide \(CO\)](#)
- [Formaldehyde Fact Sheet](#)
- [Mold Fact Sheet](#)
- [Radon Fact Sheet](#)
- [Volatile Organic Compounds \(VOC\)](#)

Historically, most of our understanding of the health effects associated with VOCs comes from the study of individual VOC exposures at relatively high concentrations. For example, most of the standards established by the Occupational Safety and Health Administration (OSHA) are in the range of 100 to 1,000 parts per million (ppm) for individual VOCs (with some in the 1 to 10 ppm range), while most non-industrial (home, school, office, etc.) VOC levels are measured in the parts per billion (ppb) range (up to 1,000 times lower). However, the best information available today suggests that low-level VOC exposures can result in adverse health effects such as irritation or inflammation of exposed skin, eyes, and mucous membranes; throat irritation; tearing of the eyes; runny nose; stinging, itching, or tingling feelings in exposed tissues; headache; drowsiness; and various other stress reactions to the exposures.

Although much research needs to be performed to establish acceptable exposure levels to mixtures of VOCs that may be present in homes, schools, offices, and commercial buildings; recent European research has provided a good starting point, and provides a basis for the IAQ Index.

In general, the research has found that exposures to typical mixtures of VOCs below 1.0 ppm (1,000 ppb) should not result in health effects or significant occupant complaints, exposures in the range of 1 to 10 ppm should be expected to produce some health effects and complaints, and exposures above 10 ppm may produce more serious health effects.

**Therefore, the IAQ Index provides the following ratings to VOC levels:**

- <1.0 ppm = Good, or "Green"
- 1.0 to <10 ppm = Marginal, or "Yellow"
- 10 ppm and higher = Poor, or "Red"

IAQ Index

626 Arcola Court, The Villages, FL 32162

## Sampling Methods



**Non-viable Mold Spore Sampling** was collected to identify any airborne biological and/or particulate contaminant parameters. These samples are used to identify molds, pollens, insects, inorganic dust, skin fragments, fibers, fiberglass, and other type of particulates. Samples were collected over a 5 minute period at the average calibration of 15 liter per minute utilizing a 37 mm, Patented Laminar flow Venturi Allergenco-D collection filter and a high-volume sampling pump.

## SUMMA CANISTER SAMPLING MAY YIELD SUPERIOR RESULTS FOR YOU

### Why use a sampling canister?

If you're using charcoal tubes, passive monitors, or other traditional equipment to sample air for volatile organic compounds (VOCs), consider the advantages that canister sampling offers. They:

- ensure more reliable data.
- let you monitor more compounds.
- make it easier to collect and analyze air samples.



(If you're already using air sampling canisters but haven't yet discovered the benefits of our MiniCan, be sure to read about the types of canisters available, toward the end of this bulletin.)

### What applications can an air-sampling canister be used for?

Canisters are well-suited for many types of sampling, including, but certainly not limited to, indoor air quality (IAQ), landfill/soil gas, stack gas, product off-gassing, product quality testing, product liability testing, and emergency response. Canister sampling can collect multiple compounds for both ppb and ppm analysis.

### How does canister sampling produce such reliable data?

To prevent VOCs from sticking to the surface, thus enhancing the stability of the TO-15 compounds at subatmospheric pressures, air sampling canisters are acid-washed and electropolished, then treated with a fused silica deposition during manufacturing. Then, each time canisters are used, the lab decontaminate them, test them for cleanliness, and assign them independent batch numbers.

## Description of Mold/Fungi

### 1. A General Note on Fungi in Indoor Environments:

The information contained in this document is a compilation of information available from various texts, compendia and research literature. The availability of information is often dependent on the types and amount of work that has been done with any particular fungus, and as such there may be substantial gaps in the information on many fungi. The fact that toxins have not been found in a particular fungus does not necessarily mean that toxins are not produced. Also, toxigenic fungi such as *Stachybotrys* will not always produce toxin since the types and amounts of substances produced generally depend on the environmental conditions present and particularly on the growth substrate. In general, investigators should always consider that fungi growing indoors will be potentially allergenic and to some extent toxigenic. Growth indoors is never a normal or desirable circumstance, and should always be remediated as soon as possible. Precautions taken concerning exposure and remediation should not be based solely on the types of fungi present, but should be based on an overall consideration of the types of fungi present, the extent of contamination and the potential for occupant exposure.

Moreover, this guide is not meant to be all-inclusive, and many other types of fungi may be encountered in aerosol and bulk samples. Please feel free to call the laboratory if you should have any questions on these or any other fungi.

### 2. Fungi Commonly Observed in IAQ Investigations

**Absidia sp.** - A Zygomycete fungus. This fungus has a worldwide distribution and is principally found in soil and decaying vegetation. Reported to be allergenic. *Absidia corymbifera* is recognized as an opportunistic pathogen, causing zygomycosis involving the lungs, skin, meninges, and kidneys.

**Acremonium sp.** (*Cephalosporium sp.*) - A common and widespread soil fungus. Generally requires very wet conditions for growth. Reported to be allergenic as well as a cause of hypersensitivity pneumonitis. It can produce a trichothecene toxin which is toxic if ingested. It also produces cephalosporins. It was the primary fungus identified in at least two houses where the occupant complaints were nausea, vomiting and diarrhea. In an immunocompromised individual it can cause onychomycosis and more rarely keratitis, endophthalmitis, endocarditis, and meningitis.

**Alternaria sp.** - Outdoors it may be isolated from samples of soil, seeds and plants, where it is very common. It is often found in carpets, textiles, and on horizontal surfaces in building interiors. Often found on window frames. A very common allergen, it has also been associated with hypersensitivity pneumonitis. Its large spore size, 20 - 200 microns in length and 7 - 18 microns in width, suggests that the spores from this fungus will be deposited in the nose, mouth and upper respiratory tract. *Alternaria alternata* is capable of producing tenuazonic acid, alternariol, altertoxin and other toxic metabolites which may be associated with disease in humans or animals. Occasionally an agent of onychomycosis, ulcerated cutaneous infection and chronic sinusitis, principally in the immunocompromised patient.

**Ascomycetes** - This is a large group of fungi with more than 3,000 genera and species. Very widespread and common, they are principally saprophytes and plant pathogens. While some grow and sporulate in culture (e.g. *Chaetomium*), spores are often very slow to develop and some strict plant pathogens are only able to grow in their host plants. In terms of indoor air quality this group is very poorly studied. Their spores are likely to be allergenic and with such a vast number of genera and species, metabolites are likely produced that are toxic to some extent. This group also includes the sexual forms of many fungi that are known more commonly by their asexual forms, such as *Penicillium* and *Aspergillus*. The most common sexual forms of *Penicillium* are *Talaromyces* and *Eupenicillium*, while the most common sexual forms of *Aspergillus* are *Eurotium* and *Emericella*.

**Aspergillus sp.** - Widespread and commonly encountered, they are found principally in soil and decomposing plant material. They are able to grow well indoors on a wide range of substrates. Water requirements vary with species, but some Xerophilic species require relatively drier conditions. Known to be allergenic. Many species produce mycotoxins which may be associated with disease in humans and other animals. Toxin production is dependent on the species or a strain within a species and on the food source for the fungus. Some of these toxins have been found to be carcinogenic in animal species. Several toxins are considered potential human carcinogens. Common cause of extrinsic asthma (immediate-type hypersensitivity: type I). Also capable of causing Type III hypersensitivity pneumonitis. Approximately 20 species are currently recognized as opportunistic pathogens, causing nasal sinus lesions, respiratory and ear infections as well as invasive, systemic infections. *Aspergillus fumigatus* is the most commonly implicated species, followed by *A. flavus* and *A. niger*.



**Aureobasidium sp.** – a yeast-like mold that is common, particularly in temperate zones. It is found in water, soils and associated with wood and plant materials, including the aerial portions of plants. Indoors, it grows well wherever water accumulates, such as bathrooms and kitchens, on shower curtains, tile grout, window sills and other areas with high water activity. It is a common allergen and is also associated with hypersensitivity pneumonitis. No toxins have been discovered to date. It is rarely involved in keratitis and cutaneous infections, and there have been a few cases of deep infections in immunocompromised patients.

**Basidiomycetes** - Widespread and common group of Fungi that includes the mushrooms, puffballs, shelf fungi and many other fungi. Containing over 1,200 genera, they exist as saprophytes and plant pathogens. Although they are less commonly found growing indoors, when present they are usually associated with wood, which they degrade and potentially destroy the structural integrity of the building. They grow very slowly, and are therefore usually found in areas which have remained consistently wet over long periods of time. Their growth in laboratory culture is also very slow, and they often fail to produce fruiting bodies. As a result, they are often reported as sterile mycelia. Basidiomycetes are common allergens and are also associated with hypersensitivity pneumonitis. Many mushrooms are toxic when ingested, but little is known about toxicity via the inhalation route. In rare instances, the asexual forms of basidiomycetes may cause infections in the immunocompromised patient.

**Beauveria sp.** - cosmopolitan, it is isolated from soil, plant debris, dung and parasitized insects. It is not commonly found growing indoors. It is reported to be allergenic. In rare instances it has been involved in keratitis and pneumonia in immunocompromised patients.

**Bipolaris sp. (Bipolaris/Drechslera/Exserohilum Group)** - Cosmopolitan fungus, although some species are found mainly in tropical and subtropical regions. They exist in soil and as pathogens of plants. They grow indoors on a variety of substrates. They are allergenic and are very commonly involved in allergic fungal sinusitis. They are opportunistic pathogens but occasionally infect healthy individuals, causing keratitis, sinusitis and osteomyelitis,

**Botrytis sp.** - Widespread, principally in humid environments of temperate and subtropical regions. This fungus is generally found in saprophytic and parasitic relationships with plants, and can sometimes be found indoors in association with plants. It can also be found on stored fruits and vegetables. Reported to be allergenic and a cause of hypersensitivity pneumonitis. It is a very rare cause of keratitis.

**Chaetomium sp.** - Cosmopolitan Ascomycete fungus, commonly isolated from soil and from decomposing plant materials, especially woody or straw-like materials. It is cellulolytic and grows well indoors, particularly on damp sheetrock and other paper substrates. It is often found growing with *Stachybotrys*. It is reported to be allergenic. A few species produce toxins as well as secondary metabolites that are not toxins in the true sense but have toxic effects nonetheless. A variety of mutagens are also produced.

**Chrysosporium sp.** - cosmopolitan and common saprophytic soil fungus. This genera is a heterogeneous assemblage of over 10 species, some of which are strongly cellulolytic. It is more commonly found in temperate regions, although a few species occur in tropical and subtropical regions. It can be found in a variety of soils, plant litter, activated sludge, compost, wood and preservative-treated wood. Indoors it may be expected to be found on a wide variety of substrates, particularly those with a high cellulose content. There are reports of questionable reliability concerning its involvement in skin and nail infections, although one species has been substantiated, on rare occasion, as an agent of onychomycosis.

**Cladosporium sp.** - One of the most common genera worldwide and perhaps the most commonly encountered fungus both indoors and out. It is found in soil of many different types, plant debris and on the leaf surfaces of living plants. The outdoor numbers are reduced in the winter and often relatively high in the summer, especially when humidity is high. Often found indoors in numbers less than outdoor numbers. Indoors, it can be found growing on many substrates, including textiles, wood, moist window sills and on the surface of fiberglass duct liner in the interior of supply ducts. Producing greater than 10 allergenic antigens, it is a common cause of allergy and may be associated with hypersensitivity pneumonitis. *Cladosporium carrionii*, although very rarely encountered, can cause mycosis. The toxic secondary metabolites cladosporin and emodin may be produced, although neither are highly toxic.

**Curvularia sp.** - More commonly found in tropical and subtropical regions, but a few species are commonly isolated in temperate agricultural areas. They exist in soil and plant debris, and are facultative pathogens of living plants. Reported to be allergenic as well as a relatively common cause of allergic fungal sinusitis. It is occasionally a cause of human infection, including keratitis, sinusitis, onychomycosis, mycetoma, pneumonitis, endocarditis and disseminated infection. These cases of infection have occurred principally in immunocompromised individuals.

**Drechslera sp.** - see under *Bipolaris sp.*

**Epicoccum sp.** - Cosmopolitan fungus found in soil, plant litter and as a secondary invader of living plant tissues. It can grow indoors on a variety of substrates, including paper and textiles. It is a common allergen and produces several antibiotics which may be potentially toxic via inhalation. No cases of infection have been reported in humans or animals.

**Exophiala sp.** - Cosmopolitan fungus, isolated from soil, decaying wood and surfaces in contact with water. This fungus is poorly studied in terms of indoor air quality, but is likely to produce allergy as well as other common phenomena, such as hypersensitivity pneumonitis. It is an occasional cause of mycetomas and other subcutaneous infections. *Exophiala werneckii* is the etiologic agent of a superficial infection known as tinea nigra.

**Fusarium sp.** - Cosmopolitan, frequently isolated from soil and plant debris. Some species are plant pathogens. It is occasionally found indoors on a variety of substrates and in humidifiers, and requires very moist conditions. It is reported to be allergenic. Several species in this genus can produce potent toxins, including trichothecenes, T-2 toxin, fumonisin, vomatoxin and others. It has a lengthy history of severe toxicoses, particularly in terms of agriculture and the ingestion of contaminated grains. It is occasionally a cause of keratitis, endophthalmitis and mycetoma. It has also been involved in disseminated infection in the immunocompromised patient.

**Geotrichum sp.** - Cosmopolitan saprophytes, isolated from soil and plants and frequently from grains, fruits, dairy products, paper, textiles and water. *Geotrichum candidum* is considered part of the normal human flora. It may grow indoors on a wide range of substrates, generally where high moisture is present. Allergic reactions have been reported. Information on its pathogenicity has suffered from unreliable identifications, but it is believed to be involved in infections of oral, bronchial and bronchopulmonary epithelia as well as skin.

**Gliocladium sp.** - This fungus is not commonly encountered although it has a worldwide distribution. It can be found in soil of many types and in water, plants and plant debris and sewage. It has been reported growing on construction boards and plywood. It is structurally very similar to *Penicillium* and is reported to be allergenic. No cases of infection have been seen in humans or animals.

**Helminthosporium sp.** - See under *Bipolaris* sp.

**Histoplasma sp.** - A fungus which has filamentous growth at 25 degrees C and yeast-like growth at 37 degrees C. It is mostly isolated from nitrogen-rich soils such as those contaminated with the excrement from birds or bats. It has a worldwide distribution but is more commonly encountered in tropical and sub-tropical regions, as well as in several large river basins in temperate regions. *Histoplasma capsulatum* is the etiologic agent of histoplasmosis, which usually manifests itself as a relatively benign pulmonary infection but can occasionally progress to a life-threatening, disseminated form.

**Humicola sp.** - Worldwide distribution and found in a wide variety of soils and on decaying and living plants. It has also been reported on wood, fresh and salt water and sediments, sewage, compost and air. It is highly cellulolytic and may be found on any substrate with a high cellulose content. It is poorly studied in terms of allergenicity, but has been shown to produce at least one antibiotic and extracts of its mycelia have been shown to be toxic in laboratory experiments.

**Memnoniella sp.** - Cosmopolitan and often found growing with *Stachybotrys* sp. It is structurally and physiologically very similar to *Stachybotrys* and may be found in essentially the same indoor and outdoor habitats. It is poorly studied in terms of its allergenicity, but has been shown to produce many of the same toxins as *Stachybotrys*, including the trichothecenes.

**Mucor sp.** - A cosmopolitan Zygomycete fungus isolated from soil, decaying organic matter and dung. Indoors it is found on a variety of substrates, including foods. It is also found in leather, animal hair and jute. This organism and other Zygomycetes will grow rapidly on most fungal media, often obscuring other, slower-growing molds. It is allergenic and an agent of hypersensitivity pneumonitis. No toxins are known to date. It is uncommonly an agent of zygomycosis in the severely debilitated patient.

**Nigrospora sp.** - Widespread fungus particularly abundant in warm climates. It is a saprobe found in soil and on decaying plant material. It is rarely found growing indoors. It is reported to be allergenic. No toxins are known to date. No cases of infections have been recorded in humans or animals.

**Paecilomyces sp.** - Common and widespread fungus found in soil and dust, compost, decaying plant material and on legumes and other seeds. Some species are parasites of insects. Indoors it has been isolated from a variety of materials including paper, PVC and other plastics, leather, tobacco and some foods such as fruits and fruit juices. It may produce arsine gas if growing on an arsenic-containing substrate, such as wallpapers covered with paris green. It is allergenic and an agent of hypersensitivity pneumonitis. It produces several secondary metabolites which have been shown to be toxic to some extent. It is rarely pathogenic in humans and most cases involve nosocomial infections following surgery and other treatments such as dialysis. A few cases of cellulitis and pneumonia have been reported in immunocompromised individuals.

**Penicillium sp.** - Widespread and extremely common throughout the world, although they are predominant in temperate regions. With approximately 200 species known to date, they are often the most common types of fungi isolated from the environment. They are common indoors as well, and are found in house dust and on a wide variety of substrates, such as water-damaged papers, fabrics, behind or on paint, and in interior fiberglass duct insulation. They are also found in a variety of food products. It is a common allergen and an agent of hypersensitivity pneumonitis. Toxins are produced by various species, with over 20 toxins characterized to date. The production of volatile organic compounds has also been demonstrated. Most species are non-pathogenic, but *Penicillium marneffei* is a human pathogen of ever-increasing importance, particularly in the HIV-infected population.

**Phialophora sp.** - Cosmopolitan saprophytes commonly isolated from sub-aquatic debris in fresh water and from decomposing wood, on which they can cause a blue stain. They may become soil-borne secondarily. Some species are parasites of plants. They are occasionally found indoors, particularly on wood and wood products where it may greatly reduce structural integrity. *Phialophora verrucosa* is one of the agents of chromoblastomycoses. Several other species cause diverse types of phaeohyphomycosis, in the forms of mycotic arthritis, subcutaneous cysts, osteomyelitis, and cerebral or disseminated infection.

**Phoma sp.** - Cosmopolitan Ascomycete fungus frequently isolated from soil, plant materials and fruits. Indoors it is frequently found on walls, ceiling tiles and on the back-side of linoleum. It may also be found on cement, paint, rubber, paper, wood, natural fibers and some food products. It often produces pink and purple spots on painted walls. It is allergenic and an agent of hypersensitivity pneumonitis. Toxin production is not known to date. It is only very rarely involved in human infection, where it may cause keratitis, skin and subcutaneous infection.

**Pithomyces sp.** - Widespread and common fungus isolated from soil, decaying wood and plant litter. It is only rarely found indoors, where it can grow on several substrates including paper. Its allergenicity is very poorly characterized. It produces the toxin sporidesmin. No cases of infection have been reported in humans, but it can cause facial eczema in ruminants.

**Rhinocladiella sp.** - Cosmopolitan fungus found in soil, decaying wood and plant materials. It is occasionally found indoors on a variety of substrates, including cement and brickwork. Its allergenicity is very poorly characterized. Toxin production is not known to date. Only a few cases of subcutaneous infection from *Rhinocladiella aquaspersa* have been reported.

**Rhizomucor sp.** - Cosmopolitan, thermophilic fungus isolated from soil, decaying organic matter and compost. It occupies a biological niche similar to *Mucor sp.* and *Rhizopus sp.* This Zygomycete fungus is reported to be allergenic and is often linked to occupational allergy. *Rhizomucor pusillus* is occasionally an agent of pulmonary, facial, cerebral or disseminated zygomycosis, particularly in the debilitated, leukemic patient.

**Rhizopus sp.** - Widespread and common Zygomycete fungus that is found in soils, decaying plant material, dung, compost and various agricultural products such as vegetables and cereals. Indoors it may be found on a variety of substrates, although more often on food products than on environmental surfaces. It is allergenic and an agent of hypersensitivity pneumonitis, and is often linked to occupational allergy. Toxin production is not known to date. *Rhizopus* is the principal agent of zygomycosis. Individuals primarily affected are those suffering from diabetic ketoacidosis, malnutrition, severe burns or conditions that result in a compromised immune system.

**Scopulariopsis sp.** - Cosmopolitan fungus frequently isolated from soil. Some species are insect pathogens. It has been found growing on a wide variety of materials and has been present in house dust. It is associated with type III allergy. It may produce arsine gas if growing on an arsenic-containing substrate, such as on wallpapers covered with paris green. Occasionally causes subcutaneous and pulmonary infections in immunocompromised individuals.

**Sporobolomyces sp.** - Cosmopolitan fungus found on tree leaves, soil, plant litter and on plant lesions as a secondary invader. It is found indoors on a variety of substrates but requires very wet conditions for growth. It is reported to be allergenic. Toxin production is not known to date. It is implicated as a cause of dermatitis.

**Sporothrix sp.** – Rarely encountered fungus indoors, it is fairly widespread outdoors and is found in decaying wood, soil, vegetable debris, sphagnum moss, fertilizers and in association with bark beetles. It is found worldwide in both temperate and tropical zones, predominantly in Central & South America, Mexico, eastern Europe and the north-central United States. There are more than 24 species characterized to date, but some taxonomic confusion exists with members of the genus *Ophiostoma* and *Sporotrichum*. One species of *Sporothrix*, *S. schenckii*, can cause sporotrichosis, which is a chronic cutaneous and subcutaneous mycosis. The infection can be contracted by inhalation. Although healthy individuals can become infected, the type and severity of infection are dictated by the portal of entry of the fungus and by the immunocompetence of the host.

**Sporotrichum sp.** - Reported to be allergenic. See under *Sporothrix* sp. This fungus is a basidiomycete anamorph displaying characteristic clamp-connections on its hyphae, and is generally easily distinguished from *Sporothrix*. This genus does not cause sporotrichosis.

**Stachybotrys sp.** - Widespread and commonly found in soil and on decaying plant substrates. It is a very effective at decaying cellulose, and can be found indoors on wet materials containing cellulose, such as wallboard, ceiling tile, cardboard, and other paper-based materials. In laboratory culture, it is a relatively slow-growing fungus and does not compete well with other, faster-growing fungi. Due to the "sticky" nature of its spore arrangement, it does not become airborne easily. Irregardless of the type of medium employed, its spores have a relatively low percentage of viability in lab culture (especially once released into the air), and spore-trap samples are by-far the best for demonstrating the presence of this fungus in the air. Similarly, direct observation of bulk materials is often preferable over laboratory culture.

Allergens of *Stachybotrys* are poorly studied, but Type I allergies have been reported. No cases of infection have been reported in humans. Some species/strains of this fungus (*S. atra*, *S. chartarum* and *S. alternans* are synonymous) produce several macrocyclic trichothecene toxins which have been shown in laboratory studies to be very potent toxins. Most reports of toxicosis in humans are circumstantial, and much research is currently being carried out in this area. Individuals with chronic exposure to *Stachybotrys* spores have reported cold and flu symptoms, sore throats, cough, diarrhea, headache, fatigue, dermatitis, rhinitis, itching or burning sensation in mouth, throat, nasal passages and eyes, and generalized malaise. The toxins produced by this fungus can suppress the immune system affecting the lymphoid tissue and the bone marrow. Animals injected with the toxin from this fungus (in doses much higher than would be experienced via inhalation of spores) exhibited the following symptoms: necrosis and hemorrhage within the brain, thymus, spleen, intestine, lung, heart, lymph node, liver, and kidney. Reports of lung hemorrhage in humans exist, but are presently controversial and unsubstantiated. The mycotoxin is also reported to be a liver and kidney carcinogen. Per-cutaneous absorption has caused mild symptoms.

**Stemphylium sp.** - Common fungus found in soil and on wood and decaying vegetation. It grows on general laboratory media but often fails to sporulate. It is rarely found growing indoors. It is known to be allergenic and shares several allergens with *Alternaria*. It is not known to be toxigenic, and has only rarely been implicated as a cause of infection in humans (sinusitis).

**Sterile Mycelia** - Mycelia are the branching cellular filaments by which fungi grow. **Colorless sterile mycelia** are white or transparent mycelia in which no fruiting structures are produced (non-sporulating). **Dematiaceous sterile mycelia** are dark olive-green to dark brown-to-black mycelia in which no fruiting structures are produced (non-sporulating). Many fungi from the environment do not adjust well to growth on laboratory media, and therefore do not sporulate. Others, such as the Basidiomycetes and many of the Ascomycetes produce very specialized fruiting bodies that take a long time to form. They will therefore often be classified as non-sporulating due to the limited amount of incubation time employed for IAQ samples. Unless specific spores/fruiting bodies are formed, identification of these fungi is not possible. The allergenic and toxigenic potential of sterile mycelia is dependent on the actual type of fungi that is present. In general, toxins are likely to be low, since most fungal toxins are associated with spores. All should be considered to be allergenic to some extent, and toxigenic secondary metabolites may be produced and excreted by the hyphae.

**Torula sp.** - Widespread fungus found in soil and on wood, grasses and in the roots of several types of plants. It occurs more commonly in temperate regions. It grows well on laboratory media but usually does not sporulate. It can be found growing indoors, particularly on cellulose-containing materials. It is allergenic and has been reported to produce toxic substances in laboratory tests.

**Trichoderma sp.** - Widespread fungus found in soil and on decaying wood, fruits, vegetables, grains, paper and textiles. It grows extremely well on general laboratory media, often overtaking and obscuring other fungi. It is often found indoors growing on wood, paper products, tapestry, unglazed ceramics and a variety of other products. It is strongly cellulolytic. It is allergenic and an agent of hypersensitivity pneumonitis. It produces a wide variety of toxic substances, including some that are closely related to the trichothecene mycotoxins of *Stachybotrys*. It is commonly found in soil, dead trees, pine needles, paper, and unglazed ceramics, and readily degrades cellulose. It often will grow on other fungi. It produces antibiotics which are toxic to humans. It has been reported to be allergenic.

**Trichophyton sp.** - Found in soil and on the skin of warm-blooded animals. Can cause ring worm, athlete's foot, and infections of skin, nail, hair and scalp. Reported to be allergenic.

**Trichothecium sp.** - Found in decomposing vegetation, soil, corn seeds and in flour. The species *Trichothecium roseum* can produce a trichothecene toxin which may be associated with disease in humans and other animals. Reported to be allergenic.

**Unknown Colorless Spore** – Category used in spore-trap and direct microscopic analyses to describe all non-distinctive, unidentifiable colorless spores.

**Unknown Dematiaceous Spore** - Category used in spore-trap and direct microscopic analyses to describe all non-distinctive, unidentifiable spores that are dark olive-green to dark brown-to-black.

**Ulocladium sp.** - Widespread fungus found in soil and on decaying plant material, dung, grasses, wood, paper and textiles. Growth indoors is very common, where it grows in materials with a high water content, including wallboard, paint, textiles and paper-based materials. It is considered a major allergen and shares many antigens with *Alternaria*. It is not known to be toxigenic, and has only rarely been implicated as a cause of infection in humans (subcutaneous tissue infection).

**Verticillium sp.** – Commonly found in soil and on decaying vegetation. It is a major pathogen of plants as well as insects, but is not considered pathogenic to humans (although it may be a rare cause of corneal infections and keratitis). Very little is known about its allergenic and toxigenic potential via inhalation in humans.

**Wallemia sp.** - Widespread fungus found in soil, textiles, hay and in many food items with a low water-activity (for example, foods with a high sugar or salt content). It is known as xerophilic or osmophilic, indicating that it prefers relatively dry conditions. It grows poorly on general laboratory media, instead requiring specialized media with a lower water-activity such as DG-18 or MEA with high sucrose. It can be found indoors on wood and as a component of dust, often colonizing the relatively dry components of dust such as organic debris and dander (skin cells). It is known to be allergenic and produces several toxic metabolites. It has only rarely been implicated as a cause of infection in humans.

**Yeast** - Various types of yeast are commonly observed in air and bulk material samples. Yeast are typically found in moist environments such as wet carpeting, cooling coils, drain pans and humidifiers. Yeast, although a type of fungus, require high moisture conditions and unlike fungal spores, cannot survive extended dry conditions. They may also exist as commensals on the skin and oral cavity of building occupants, and may be shed into the air by normal activity. Some yeast are reported to be allergenic. Positive skin tests have been reported. Some types of yeast such as *Candida* sp. and *Geotrichum* sp. can cause serious infections in immuno-compromised individuals.

### Examples of Household Products

### Possible VOC Ingredients

Fuel containers or devices using gasoline, kerosene, fuel oil and products with petroleum distillates: paint thinner, oil-based stains and paint, aerosol or liquid insect pest products, mineral spirits, furniture polishes

BTEX (benzene, toluene, ethylbenzene, xylene), hexane, cyclohexane, 1,2,4-trimethylbenzene

Personal care products: nail polish, nail polish remover, colognes, perfumes, rubbing alcohol, hair spray

Acetone, ethyl alcohol, isopropyl alcohol, methacrylates (methyl or ethyl), ethyl acetate

Dry cleaned clothes, spot removers, fabric/ leather cleaners

Tetrachloroethene (perchloroethene (PERC), trichloroethene (TCE))

Citrus (orange) oil or pine oil cleaners, solvents and some odor masking products

d-limonene (citrus odor), a-pinene (pine odor), isoprene

PVC cement and primer, various adhesives, contact cement, model cement

Tetrahydrofuran, cyclohexane, methyl ethyl ketone (MEK), toluene, acetone, hexane, 1,1,1-trichloroethane, methyl-iso-butyl ketone (MIBK)

Paint stripper, adhesive (glue) removers

Methylene chloride, toluene, older products may contain carbon tetrachloride

Degreasers, aerosol penetrating oils, brake cleaner, carburetor cleaner, commercial solvents, electronics cleaners, spray lubricants

Methylene chloride, PERC, TCE, toluene, xylenes, methyl ethyl ketone, 1,1,1-trichloroethane

Moth balls, moth flakes, deodorizers, air fresheners

1,4-dichlorobenzene, naphthalene