

Client Sample ID: Office  
Laboratory ID: 6010-1

**Home Air Analysis For:** J Cantrell 2258  
**Home Tested:** 485 W. Maple Ave.  
Boston, MA 25478

**Sampling Professional:** Alex Carter  
Prism Analytical Technologies  
2625 Denison Drive  
Mt. Pleasant, MI 48858

**Client Sample ID:** Office  
**Sample Volume (L):** 24.4  
**Date Sampled:** 10/19/2021  
**Sample Type:** TDT 154J  
**Sample Condition:** Acceptable

**Report Number:** 6010

**Thank you for using IAQ Home Survey!**  
If you have questions about your report,  
please contact your service provider who  
performed this test.

**Receive Date:** 10/21/2021  
**Approve Date:** 10/25/2021  
**Scan Date:** 10/26/2021  
**Report Date:** 11/02/2021

IAQ Home Survey™ is one of the most advanced, trusted air testing products on the market today for identifying chemical sources and active mold growth in a home. Many indoor air quality (IAQ) issues identified by IAQ Home Survey can be easily remediated or eliminated. This test is an invaluable tool for homebuyers, homeowners, and renters because it provides important information on potential contamination issues in the home that cannot be detected by a visual inspection alone. Acting upon the information in this report will enable you to dramatically improve the air quality in your home, creating a healthier environment for you and your family.

### Your Indoor Air Quality Report Summary

Your Indoor Air Quality Report has several sections describing different aspects of your home's air quality. A summary of this data is provided below, additional information and descriptions are included in the full report.

#### Total Volatile Organic Compounds (TVOC) Level

TVOC is a general indicator of the IAQ in your home (see page 2).

 **Total VOCs 2500 ng/L**

#### Total Mold Volatile Organic Compounds (TMVOC) Level

TMVOC is an assessment of the actively growing mold in your home (see page 3).

 **Total MVOCs 25 ng/L**

#### Contamination Index (CI) Level

The CI shows the types of air-contaminating products and materials that are present in your home (see pages 5, 6, and 7). These levels are estimates based on common home products and activities.

#### Building Related Sources

See page 5 for more detail.

<b>N</b>	Coatings (Paints, Varnishes, etc.)
<b>N</b>	PVC Cement
<b>N</b>	HFCs and CFCs (Freons™)

#### Mixed Building and Lifestyle Sources

See page 6 for more detail.

<b>N</b>	Building Materials-Toluene Based
<b>N</b>	Gasoline
<b>N</b>	Fuel Oil, Diesel Fuel, Kerosene
<b>N</b>	Moth Balls (Naphthalene Based)
<b>N</b>	Moth Crystals (p-Dichlorobenzene Based)
<b>N</b>	Light Hydrocarbons
<b>N</b>	Light Solvents
<b>N</b>	Methylene Chloride

#### Lifestyle Related Sources

See page 7 for more detail.

<b>N</b>	Personal Care Products
<b>N</b>	Alcohol Products
<b>N</b>	Odorants and Fragrances
<b>N</b>	Dry Cleaning Solvents
<b>N</b>	Medicinals

Note: Severity begin at Normal or Minimal and progress through Moderate, Elevated, High and/or Severe. The color progression from green to red indicates results that are increasingly atypical and suggest potentially higher risk.

All Severity classifications are based on empirical data and should not be taken as a pass/fail or conformance to a published specified limit.

**Normal** **Moderate** **Elevated** **High** **Severe**

Enthalpy Analytical, LLC (MTP), the creator of IAQ Home Survey, has been performing air quality assessments to industry and environmental consultants since 1995. Enthalpy Analytical, LLC (MTP) (ID 166272) is accredited by the AIHA Laboratory Accreditation Programs (AIHA-LAP), LLC in the Industrial Hygiene accreditation program for GC-MS Field of Testing as documented by the Scope of Accreditation [Certificate](#) and associated Scope. This analysis references methods EPA TO-17 and ISO 16000-6, which fall within the Scope of Accreditation.

## Total Volatile Organic Compounds (TVOC)

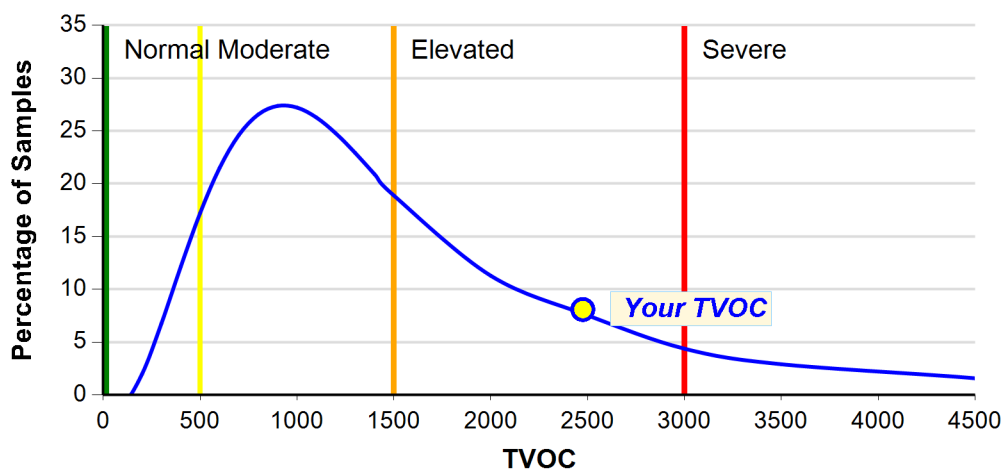
**Your TVOC Level is: 2500 ng/L**

IAQ needs improvement; effect on occupants is possible; reduce potential sources and increase ventilation.

### Your Indoor Air Quality Level (Highlighted)

Normal < 500 ng/L	Moderate 500 - 1500 ng/L	<b>Elevated 1500 - 3000 ng/L</b>	Severe > 3000 ng/L
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### All IAQ Survey TVOC Air Quality Indicator



**The average TVOC is  
1900 ng/L**

This chart represents the TVOC distribution of over 45,000 samples. Over 80% of these samples indicate improvements in IAQ are necessary to achieve the goal of TVOC less than 500 ng/L.

The chart above shows the TVOC levels for all homes tested using IAQ Home Survey. Results for this air sample are displayed on the chart as a yellow circle. The blue curved line represents the relationship between the percentage of homes (indicated on the vertical y-axis) and the TVOC level (indicated on the horizontal x-axis). The green, yellow, orange, and red vertical bars represent divisions between Normal, Moderate, Elevated, and Severe TVOC levels. As the TVOC value increases, individuals may experience aggravated health problems, and therefore, the need to address VOC issues becomes more critical. However, reductions in VOCs can be made at any level.

No government or organization has specified a TVOC limit for indoor air. However, the U.S. Green Building Council (USGBC) has set 500 ng/L as the recommended TVOC limit.

In general:

- < 500 ng/L IAQ is acceptable for most individuals; however, chemically sensitive persons may require lower levels.
- 500 - 1,500 ng/L some effects on the occupants is possible.
- > 1,500 ng/L IAQ should be improved.

Note: These levels are based on observed health effects and have been determined from a combination of published data and the statistical distribution of TVOC concentrations from the IAQ Home Survey methodology.

The presence of chemicals in your home can cause a wide range of problems, from an unpleasant odor to physical symptoms (burning and irritation in the eyes, nose, and throat; headaches; nausea; nervous system effects; severe illness; etc.). Anyone with respiratory issues like asthma or allergies, as well as children, the elderly, and pregnant women are more susceptible to poor indoor air quality than healthy individuals.

Click [here](#) for more information about VOCs.

The Contamination Index (CI) in the next pages of this report will help guide you through determining what types of products or materials in the home could be problematic for your IAQ, and will provide some recommendations to help reduce or eliminate them.

**Total Mold Volatile Organic Compounds (TMVOC)**

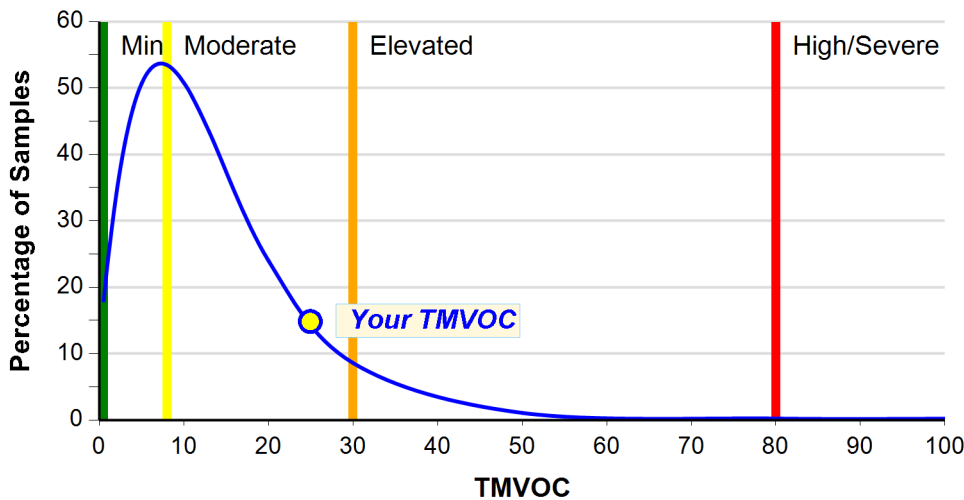
**Your TMVOC Level is: 25 ng/L**

Actively growing molds are present, individuals sensitive to molds will likely be affected.

**Your Active Mold Level (Highlighted)**

Minimal < 8 ng/L	Active-Moderate 8 - 30 ng/L	Active-Elevated 30-80 ng/L	Active-High 80 - 150 ng/L	Active-Severe > 150 ng/L
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**All IAQ Survey TMVOC  
Active Mold Growth Indicator**



**The average TMVOC is 10 ng/L**

This chart represents the TMVOC distribution of over 45,000 samples. Approximately half the samples indicate that some active mold growth is occurring at the time of sample collection.

The chart above shows the TMVOC level for all homes tested using IAQ Home Survey. Results for this air sample are displayed on the chart as a yellow circle. The blue curved line represents the relationship between the percentage of homes (indicated on the vertical y-axis) and the TMVOC level (indicated on the horizontal x-axis). For example, a TMVOC of 20 ng/L is reported in ~20% of the samples. The green, yellow, orange, and red vertical bars represent divisions between Minimal, Moderate, Elevated, and High/Severe TMVOC levels.

Molds can be found anywhere in the indoor environment as long as there is a source of water or moisture. Molds produce spores, VOCs (during the metabolic or digestive processes of mold), and mycotoxins (typically when the mold is threatened).

This test detects only the VOCs produced by actively growing molds and does not represent spores or mycotoxins. The TMVOC value is the sum of a select set of VOCs emitted by most molds while growing (when mold is in an inactive or dormant state it does not produce many MVOCs).

The presence of moisture is the primary factor in mold growth, controlling moisture and dampness is the only way to consistently control or limit mold growth.

Click [here](#) for more information about molds and mold VOCs.

## Contamination Index™

The Contamination Index™ (CI) shows the types of air-contaminating products and materials that are present in your home. Each CI category shows the approximate contribution of that category to the TVOC level, indicates how your home compares to thousands of other homes, and provides some suggestions for where these products and materials might be found. The CI is divided into three main source groups: Building-Related Sources, Mixed Building and Lifestyle Sources, and Lifestyle Sources.

1. Building-Related Sources are those that are typically part of the structure of the home and may be more difficult to reduce in the short term. Recent construction or renovation often increases the CI categories in this group to the Elevated, High, or Severe levels. VOCs from these activities often decrease substantially in the month following use/application of these products, especially if the area is flushed with air to dissipate the VOCs off gassed from the new products or materials.

2. Mixed Building and Lifestyle Sources are those that could belong to either category and investigation on your part may be necessary to determine which source is more likely. Recent construction or renovation can often contribute to other source categories in addition to Building-Related Sources.

3. Lifestyle Sources are those that the occupants of the home bring into the home and can usually be readily identified and remediated. Recent construction or renovation can often contribute to other source categories in addition to Building-Related Sources.

It is possible for a category listed in one source group to belong to another source group. For example, the 'Coatings' category is in the Building source group because the largest contribution is typically the paint on the walls, but cans of paint stored in a basement or garage could be considered part of the Lifestyle sources group. Always consider all possible sources for a particular CI category.

The CI classifications begin at Normal and progress through Moderate, Elevated, High and Severe. These severity classifications are determined using a combination of statistical data gathered from thousands of samples and health information specific to each CI category.

Since there are potentially many sources of VOCs, homes can often be re-contaminated even after sources have been removed because new products are constantly being brought into the home. Home occupants and homebuyers should take note of this fact, and view IAQ as a continuous improvement process.

The chart below depicts the distribution of the Contamination Index source groups. These source groups are estimates and may not indicate all of the VOCs in your air sample.

## Contamination Index Source Groups

- Building Related Sources
- Lifestyle Related Sources
- Mixed Building and Lifestyle Sources

**Contamination Index™ Building Sources**

Use the Contamination Index (CI) below to help you find products in your home that may be affecting your indoor air quality. Removing or reducing these products will improve your air quality. The concentrations reported here are approximate and may not add up to the TVOC value on page 2 of this report. These categories are typically part of the structure of the home and may be more difficult to reduce in the short term. Recent construction or renovation will often cause these categories to be elevated. The CI classifications begin at Normal and progress through Moderate, Elevated, High and Severe. These severity classifications are determined using a combination of statistical data gathered from thousands of samples and health information specific to each CI category. Levels indicated as Elevated, High, or Severe should be immediately addressed, and those listed as Moderate are areas that can be improved over time.

	Contamination Index Category	Estimated VOC Level (ng/L)	Severity	Description and Suggestions for VOC Reduction
<b>Building Related Sources</b>	<b>Coatings (Paints, Varnishes, etc.)</b>	0	<b>Normal</b>	Includes interior and exterior paints (including low- or no-VOC paints), varnishes, lacquers, some sealants, and other products that can be classified as a coating over a surface. Typically, VOCs from these products are in the 10 to 14 carbon size range and can linger for several months after application, sometimes longer. Ventilate as much as possible during and after application of any of these products and dispose of opened but unused products and related supplies if possible or store in areas that will minimize off gassing. There is some overlap between chemical compounds associated with 'Coatings (Paints, Varnishes, etc.)' and those found in 'Fuel Oil, Diesel Fuel, Kerosene.'
	<b>PVC Cement</b>	0	<b>Normal</b>	PVC cement is used to join pieces of PVC pipe together, usually for plumbing.
	<b>HFCs and CFCs (Freons™)</b>	0	<b>Normal</b>	Most often used as refrigerants for air conditioners and refrigerator/freezers and propellants for blown-in insulation, cushions, aerosol cans, etc. Many of these chemical compounds are being phased out because of the Montreal Protocol.

### Contamination Index™ Mixed Building and Lifestyle Sources

Use the Contamination Index (CI) below to help you find products in your home that may be affecting your indoor air quality. Removing or reducing these products will improve your air quality. The concentrations reported here are approximate and may not add up to the TVOC value on page 2 of this report. These categories could belong to either the Building or Lifestyle groups so additional investigation may be necessary to determine which source is more likely. The CI classifications begin at Normal and progress through Moderate, Elevated, High and Severe. These severity classifications are determined using a combination of statistical data gathered from thousands of samples and health information specific to each CI category. Levels indicated as Elevated, High, or Severe should be immediately addressed, and those listed as Moderate are areas that can be improved over time.

Mixed Building and Lifestyle Sources	Contamination Index Category	Estimated VOC Level (ng/L)	Severity	Description and Suggestions for VOC Reduction
	<b>Building Materials-Toluene Based</b>	0	<b>Normal</b>	Adhesives and glues used in construction and maintenance, arts and crafts; adhesive removers; contact cement; sealants; coatings (paint, polyurethane, lacquer, thinner); automotive products, including parts cleaners. Additional sources include gasoline and other fuels.
	<b>Gasoline</b>	0	<b>Normal</b>	VOCs from gasoline are typically a result of off-gassing from gas containers and gas-powered equipment such as lawnmowers, snow blowers, mini-bikes, etc. that are stored in attached garages or basements. Does not include exhaust emissions. These items should be stored externally to the home. Additionally, gasoline VOCs can linger on clothing after refueling an automobile at a gas station. Gasoline includes chemical compounds that are also included in the 'Light Solvents' category.
	<b>Fuel Oil, Diesel Fuel, Kerosene</b>	0	<b>Normal</b>	Often found in garages and basements. These fuels are not very volatile so will not readily get into the air, but they can linger for a long time and produce a strong, unpleasant odor. Does not include exhaust emissions. There is some overlap between chemical compounds associated with 'Fuel Oil, Diesel Fuel, Kerosene' and those found in 'Coatings (Paints, Varnishes, etc.)'.
	<b>Moth Balls (Naphthalene Based)</b>	0	<b>Normal</b>	Naphthalene based moth balls. May be present with p-Dichlorobenzene-based moth crystals.
	<b>Moth Crystals (p-Dichlorobenzene Based)</b>	0	<b>Normal</b>	p-Dichlorobenzene based moth crystals. May be present with Naphthalene-based moth balls.
	<b>Light Hydrocarbons</b>	0	<b>Normal</b>	Building materials; aerosol cans; fuel for cooking/camping/lighters; LPG; refrigerant; natural gas; propellant; blowing agent. Includes chemical compounds such as propane, butane, and isobutane.
	<b>Light Solvents</b>	0	<b>Normal</b>	Stoddard solvent; mineral spirits; some coatings (paints, varnish, enamels); wax remover; adhesives; automotive products; light oils. Typically, VOCs from these products are in the 6 to 9 carbon size range.
<b>Methylene Chloride</b>	0	<b>Normal</b>	Automotive products; degreasing solvent; paint stripper; adhesive remover; aerosol propellant; insecticide.	

### Contamination Index™ Lifestyle Sources

Use the Contamination Index (CI) below to help you find products in your home that may be affecting your indoor air quality. Removing or reducing these products will improve your air quality. The concentrations reported here are approximate and may not add up to the TVOC value on page 2 of this report. These categories are typically brought into the home by the occupants and can often be readily identified and removed or contained. The CI classifications begin at Normal and progress through Moderate, Elevated, High and Severe. These severity classifications are determined using a combination of statistical data gathered from thousands of samples and health information specific to each CI category. Levels indicated as Elevated, High, or Severe should be immediately addressed, and those listed as Moderate are areas that can be improved over time.

	Contamination Index Category	Estimated VOC Level (ng/L)	Severity	Description and Suggestions for VOC Reduction
<b>Lifestyle Related Sources</b>	<b>Personal Care Products</b>	0	<b>Normal</b>	Soap, deodorant, lotions, perfumes, hair coloring supplies, nail care supplies, oral hygiene products, etc. These products contain many VOCs that will dissipate if use is discontinued or reduced. Consider storing these products in a closed container when not in use, and dispose of unused products. Also, run an exhaust fan or open a window when using these products.
	<b>Alcohol Products</b>	0	<b>Normal</b>	Household cleaning products, antiseptic wipes, hand sanitizers, some solvents, reed diffusers, consumable alcohol, and some pharmaceuticals. These concentrations will be reduced by removing unnecessary products or proper storage of those materials in closed airtight containers.
	<b>Odorants and Fragrances</b>	0	<b>Normal</b>	VOCs in this category can be found in scented candles, potpourri, air fresheners, scented cleaning products, and scented personal care products. Consider reducing use of scented products and store unused products in a tight fitting container.
	<b>Dry Cleaning Solvents</b>	0	<b>Normal</b>	Typical dry-cleaning methods employ the use of carcinogenic chemicals. Dry-cleaning should be allowed to vent outside, without plastics bags, before being placed inside.
	<b>Medicinals</b>	0	<b>Normal</b>	Ointments and creams, topical first aid/pain relievers.

**TDT Air Scan®**

The TDT Air Scan analysis is a comprehensive listing of all compounds detected in the air sample above the listed reporting limit, including, but not limited to, those compounds contained in the Air Survey Analysis List (TB503 Quantitative and Semiquantitative List).

**Total VOCs**

Compound	Sample Concentration		Reporting Limit	Additional Information
	ng/L	ppb	ng/L	
Total VOCs as Isobutylene	< 8	< 4	8	Total volatile organic compounds calculated as isobutylene using internal standard ratio; does not include C1, C2, or methanol.

**Quantitative Results**

Compound	CAS	Sample Concentration		Reporting Limit	RI	Additional Information
		ng/L	ppb	ng/L		
Acetone	67-64-1	< 1	< 0.4	1.0	551	
Benzene	71-43-2	3.0	0.9	0.2	698	
Carbon Disulfide	75-15-0	< 0.5	< 0.2	0.5	598	
1,2-Dichloroethane	107-06-2	1.5	0.4	0.2	704	
Ethanol	64-17-5	< 2	< 1.1	2.0	525	
Ethylacetate	141-78-6	< 0.2	< 0.06	0.2	660	
Ethylbenzene	100-41-4	5.9	1.3	0.2	908	
Hexane (C 6)	110-54-3	< 0.2	< 0.06	0.2	608	
Isopropanol	67-63-0	< 1	< 0.4	1.0	562	
p-Isopropyltoluene	99-87-6	1.5	0.3	0.2	1077	
Methylene Chloride	75-09-2	1.3	0.4	0.2	630	
Naphthalene	91-20-3	0.7	0.1	0.4	1296	
n-Propylbenzene	103-65-1	1.1	0.2	0.2	1006	
Styrene	100-42-5	1.2	0.3	0.2	949	
Tetrachloroethene	127-18-4	0.9	0.1	0.2	842	
Toluene	108-88-3	110	29	0.2	808	J*
1,2,4-Trimethylbenzene	95-63-6	5.8	1.2	0.2	1052	
1,3,5-Trimethylbenzene	108-67-8	1.6	0.3	0.2	1021	
o-Xylene	95-47-6	6.9	1.6	0.2	948	
m,p-Xylene	108-38-3; 106-42-3	11	2.4	0.4	917	



**Semi-Quantitative Results**

Compound	CAS	Sample Concentration		Reporting Limit	RI	Additional Information
		ng/L	ppb	ng/L		
Acetaldehyde	75-07-0	15	8	4	363	
Acetic Acid	64-19-7	120	46	4	715	
Acetone	67-64-1	45	18	4	551	
Benzothiazole	95-16-9	14	3	4	1349	
1-Butoxy-2-propanol	5131-66-8	18	3	4	1002	
2-Butoxyethanol	111-76-2	29	6	4	977	
C10-C12 Hydrocarbon	N/A	15	N/A	4	1188	
C13-C15 Hydrocarbon	N/A	13	N/A	4	1412	
C4-C6 Hydrocarbon	N/A	9	N/A	4	518	At least one degree of unsaturation; possibly cyclic
C4-C6 Hydrocarbon	N/A	9	N/A	4	590	
C4-C6 Hydrocarbon	N/A	10	N/A	4	531	At least one degree of unsaturation; possibly cyclic
C6-C8 Hydrocarbon	N/A	32	N/A	4	860	Sum of at least two overlapping hydrocarbons; one is n-butylacetate (CAS 123-86-4)
C8-C10 Hydrocarbon	N/A	16	N/A	4	1176	Sum of two overlapping hydrocarbons; one is nonanal (CAS 124-19-6)
C8-C10 Hydrocarbon	N/A	21	N/A	4	1184	Contains oxygen; appears to be ethylene glycol monohexyl ether (CAS 112-25-4)
C8-C10 Hydrocarbon	N/A	15	N/A	4	1060	Sum of two overlapping hydrocarbons
Carbon Disulfide	75-15-0	0.8	0.3	0.5	598	
Dimethylhexane	N/A	21	4	4	765	Cannot determine isomer
2,4-Dimethylpentane	108-08-7	7	2	4	638	
2,3-Dimethylpentane	565-59-3	7	2	4	680	
Ethanol	64-17-5	720	380	4	525	
Ethylacetate	141-78-6	24	7	4	660	
m,p-Ethylmethylbenzene	622-96-8	20	4	4	1014	
Heptane (C 7)	142-82-5	11	3	4	709	
Hexadecane (C 16)	544-76-3	4	0.4	4		
Hexane (C 6)	110-54-3	15	4	4	608	

**Semi-Quantitative Results**

Compound	CAS	Sample Concentration		Reporting Limit	RI	Additional Information
		ng/L	ppb	ng/L		
Isopropanol	67-63-0	65	26	4	562	
Limonene	138-86-3 or 5989-27-5	20	4	4	1071	Limonene (CAS 138-86-3) or d-Limonene (CAS 5989-27-5)
2-Methylbutane	78-78-4	48	16	4	459	
3-Methylhexane	589-34-4	11	3	4	685	
2-Methylpentane	107-83-5	22	6	4	574	
Pentadecane (C 15)	629-62-9	14	2	4	1512	
Pentane (C 5)	109-66-0	20	7	4	508	
a-Pinene	80-56-8	55	10	4	970	
Texanol-A	74367-33-2	30	3	4	1474	
Texanol-B	74367-34-3	7	0.8	4	1487	
2,2,4-Trimethylpentane	540-84-1	46	10	4	697	

**Compound Notes**

J\* The accuracy of this determination may be degraded because the reported value exceeded the calibrated range by more than a factor of 10.

## Supplemental Information: Odorants

Many chemical compounds have odors associated with them, some pleasant and some unpleasant. These odors can combine to create different odors, making odor identification more difficult. The odor descriptions for the compounds reported in this air sample are listed below as well as some of the more common sources.

Compound	CAS	Conc. (ppb)	Odor Range (ppb)	Odor Description
Acetaldehyde	75-07-0	8	2 - 1,000,000	pungent, fruity, suffocating, fresh, green
Acetic Acid	64-19-7	46	0 - 204,000	pungent, vinegar,
Acetone	67-64-1	18	400 - 11,745,000	sweet, fruity, etherous
Benzene	71-43-2	0.9	470 - 313,000	aromatic, sweet, solvent, empyreumatic
2-Butoxyethanol	111-76-2	6	43 - 390	sweet, ester, musty
Carbon Disulfide	75-15-0	0.3	16 - 32,000	vegetable, sulfide, medicinal
1,2-Dichloroethane	107-06-2	0.4	4,300 - 988,000	sweet
Ethanol	64-17-5	380	90 - 40,334,000	vinous, alcohol
Ethylacetate	141-78-6	7	90 - 190,000	fruity, sweet, fingernail polish, etherous
Ethylbenzene	100-41-4	1.3	2 - 18,000	oily, solvent
Heptane (C 7)	142-82-5	3	410 - 732,000	gasoline
Hexane (C 6)	110-54-3	4	1,500 - 248,000	gasoline
Isopropanol	67-63-0	26	1,000 - 2,197,000	sharp, rubbing alcohol
Limonene	138-86-3 or 5989-27-5	4	2 - 310	lemon, plastic, citrus, rubber, terpeny
Methylene Chloride	75-09-2	0.4	1,200 - 440,000	sweet
Naphthalene	91-20-3	0.1	2 - 1,012	tar, creosote, mothballs, empyreumatic
Pentane (C 5)	109-66-0	7	1,290 - 1,147,000	sweet
Styrene	100-42-5	0.3	3 - 61,000	sharp, sweet
Tetrachloroethene	127-18-4	0.1	767 - 71,000	etherish
Toluene	108-88-3	29	21 - 157,000	sour, burnt
1,3,5-Trimethylbenzene	108-67-8	0.3	6 - 2,400	aromatic
1,2,4-Trimethylbenzene	95-63-6	1.2	6 - 2,400	aromatic
m,p-Xylene	108-38-3; 106-42-3	2.4	12 - 316,000	sweet, empyreumatic

Compound	CAS	Conc. (ppb)	Odor Range (ppb)	Odor Description
o-Xylene	95-47-6	1.6	12 - 316,000	sweet, empyreumatic

## Supplemental Information: EPA Hazardous Air Pollutants (HAPs)

Hazardous air pollutants, also known as toxic air pollutants or air toxics, are those pollutants that are known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental effects. Listed below are those HAPs that were detected with the IAQ Home Survey VOC test, this list does not include all HAPs. The '<' (less than) symbol in the 'Estimated VOC Level' columns indicates that compound is below the reporting limit for this air sample. For more information about HAPs visit the EPA [Air Toxics website](#). The exposure limits listed below can also be found in the [NIOSH Guide to Chemical Hazards](#). The HAPs in the table below may also be listed as Significant VOCs if the concentration of that chemical compound is greater than the threshold level for a Significant VOC.

Compound	CAS	Estimated VOC Level (ng/L)	Estimated VOC Level (ppb)	NIOSH Exposure Limit	Description
Carbon Disulfide	75-15-0	0.8	0.3	3,000 ng/L (1,000 ppb)	Solvent; fumigant; contaminated drywall; combustion byproduct
Methylene Chloride	75-09-2	1.3	0.4	Carcinogen	Automotive products; degreasing solvent; paint stripper; adhesive remover; aerosol propellant; insecticide
Hexane (C 6)	110-54-3	15	4	180,000 ng/L (50,000 ppb)	Solvent; adhesive; grease; lubricant; paints and coatings; petroleum fuel component
Benzene	71-43-2	3.0	0.9	320 ng/L (100 ppb)	Gasoline. Less common sources include some discontinued solvents; printing and lithography; paints and coatings; rubber; dry cleaning; adhesives; detergents
1,2-Dichloroethane	107-06-2	1.5	0.4	Carcinogen; 4,000 ng/L (1,000 ppb)	PVC production; solvent for rubber, insecticides, oils, waxes, gums, resins; rug and upholstery cleaners
Toluene	108-88-3	110	29	375,000 ng/L (100,000 ppb)	J*Gasoline; adhesives (building and arts/crafts); contact cement; solvent; heavy duty cleaner
Tetrachloroethene	127-18-4	0.9	0.1	Carcinogen	Dry cleaning; adhesives, automotive cleaners, polishes
Ethylbenzene	100-41-4	5.9	1.3	435,000 ng/L (100,000 ppb)	Gasoline; paints and coatings; solvent; pesticide
m,p-Xylene	108-38-3; 106-42-3	11	2.4	435,000 ng/L (100,000 ppb)	Gasoline; paints and coatings; adhesives and cements; solvent; print cartridges
o-Xylene	95-47-6	6.9	1.6	435,000 ng/L (100,000 ppb)	Gasoline; paints and coatings; adhesives and cements; solvent; print cartridges
Styrene	100-42-5	1.2	0.3	215,000 ng/L (50,000 ppb)	Polystyrene foam; synthetic rubber; flavoring agent
Naphthalene	91-20-3	0.7	0.1	50,000 ng/L (10,000 ppb)	Gasoline; diesel; Moth balls/crystals; insecticide

## Additional Information

### Glossary of Terms

**Total VOCs (TVOC):** TVOC is one of the most common general air quality indicators. It allows comparison of multiple samples with each other or with target levels.

The following formula depicts the calculation that determines TVOC. Typically, TVOC includes compounds that contain between 3 and 15 carbon atoms (along with the associated hydrogen, as well as oxygen, nitrogen, sulfur, silicon, etc.), although certain compounds outside this range of carbon atoms may be included depending on the type of compound.

Where:

As – C3-C15 TIC (Total Ion Chromatogram from GC-MS) area of the sample

Ab – C3-C15 TIC area of the media blank

Ws – Weight of the internal standard added in ng

Ai – average TIC area of the internal standard peak(s)

Ls – Volume of the sample in L

**CAS:** The Chemical Abstract Service (CAS) assigns a unique number to chemical compounds, commonly referred to as the CAS number. This number is usually the best way to search for additional information about the compound since some compounds may have many names but only one CAS number.

**Reporting Units - ng/L:** Most concentrations for air samples will be reported in units of ng/L, which translates to ng of that specific chemical compound present per liter of air sampled. Concentration in ng/L is equivalent to  $\mu\text{g}/\text{m}^3$ .

**Reporting Units - ppb:** Some sections of this will have a second column with compound concentrations displayed in units of ppb (parts per billion), which are also commonly used in exposure or reference limits. The concentration in ng/L (or  $\mu\text{g}/\text{m}^3$ ) can be converted easily to ppb using the following formula derived from the Ideal Gas Law.

Where:

$V_m$  = Molar Volume as 24.04 L/mol at 1 atm pressure and 20 °C (68 °F)

MW = Molecular Weight in g/mol

**Reporting Limit:** The Reporting Limit column displays the lowest possible concentration that could be reported for that compound for that sample and analysis. Typically the reporting limit is displayed in units of ng/L but other units may be used as appropriate.

**Retention Index (RI):** The retention index is a means of converting a compound GC-MS retention time, which is dependent on the type of system and specific operating parameters, into an independent and universal value based on the elution of the adjacent n-alkanes. Each n-alkane is assigned a retention index based on its carbon number, e.g., pentane (C5) has a retention index of 500 and hexane (C6) has a retention index of 600, etc. For example, a hydrocarbon with a retention index of 550 would be expected to elute at the midpoint between pentane and hexane. Using the elution of the n-alkanes as the reference point allows the resulting retention index of organic compounds to be applicable across almost any GC-MS system. The non-isothermal retention index, which is most applicable to the GC-MS instruments used by Prism, can be determined using the following formula derived from the Kovats isothermal retention index.

Where:

R<sub>Ix</sub> – retention index of target compound x

n – Carbon number of n-alkane eluting before the target compound x

RT<sub>x</sub> – retention time of target compound x

RT<sub>n</sub> – retention time of n-alkane eluting before target compound x

RT<sub>n+1</sub> – retention time of n-alkane eluting after target compound x

**Odor Description:** Description of the odor (e.g., fruity)

HAPs: Hazardous Air Pollutants

NIOSH: National Institute for Occupational Safety and Health

TWA: Time Weighted Average

REL: Recommended Exposure Limit

Ca: Potential carcinogen

Sources for Additional Compound Information:

The compound information displayed in this report (e.g., odor description, exposure limits, etc.) is gathered from a variety of sources, including but not limited to, the [NIST Chemistry Webbook](#), the [NIOSH Pocket Guide to Chemical Hazards](#), the [Household Products Database](#), the University of Akron [Chemical Database](#), the [WISER](#) (for Emergency Responders), [IRIS](#), [ToxNet](#), [ATSDR](#). Prism does not guarantee the accuracy of this information or endorse any of the views or opinions expressed.

*These results pertain only to this sample as it was collected and to the items reported.  
These results have been reviewed and approved by the Laboratory Director or approved representative.*

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This analysis was performed by Enthalpy Analytical, LLC (MTP). The results contained in this report are dependent upon a number of factors over which Enthalpy Analytical, LLC (MTP) has no control, which may include, but are not limited to, the sampling technique utilized, the size or source of sample, the ability of the sampler to collect a proper or suitable sample, the compounds which make up the TVOC, and/or the type of mold(s) present. Therefore, the opinions contained in this report may be invalid and cannot be considered or construed as definitive and neither Prism, nor its agents, officers, directors, employees, or successors shall be liable for any claims, actions, causes of action, costs, loss of service, medical or other expenses or any compensation whatsoever which may now or hereafter occur or accrue based upon the information or opinions contained herein.

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