

Client Sample ID: Bedroom
Laboratory ID: 6010-1

Home Air Analysis For: Recent renovation
Home Tested: 123 W. Maple Ave.
Boston, MA 25478

Sampling Professional: Alex Carter
Air Quality Inspections
3212 NW 12th St.
Baltimore, MD 21224
U.S.A.

Client Sample ID: Bedroom
Sample Volume (L): 24.4
Date Sampled: 03/02/2017
Sample Type: TDT 150B
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: 03/07/2017
Approve Date: 03/07/2017
Scan Date: 03/08/2017
Report Date: 03/09/2017

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 1800 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 13 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 7, 8, and 9). These levels are estimates based on common home products and activities.

Building Related Sources

See page 7 for more detail.

M	Coatings (Paints, Varnishes, etc.)
H	PVC Cement
N	HFCs and CFCs (Freons™)

Mixed Building and Lifestyle Sources

See page 8 for more detail.

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

Lifestyle Related Sources

See page 9 for more detail.

N	Personal Care Products
E	Alcohol Products
M	Odorants and Fragrances
N	Dry Cleaning Solvents
N	Medicinals

Note: Severity levels 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.



Prism Analytical Technologies, Inc., the creator of IAQ Home Survey, has been performing air quality assessments to industry and environmental consultants since 1995. Prism Analytical Technologies, Inc. (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)

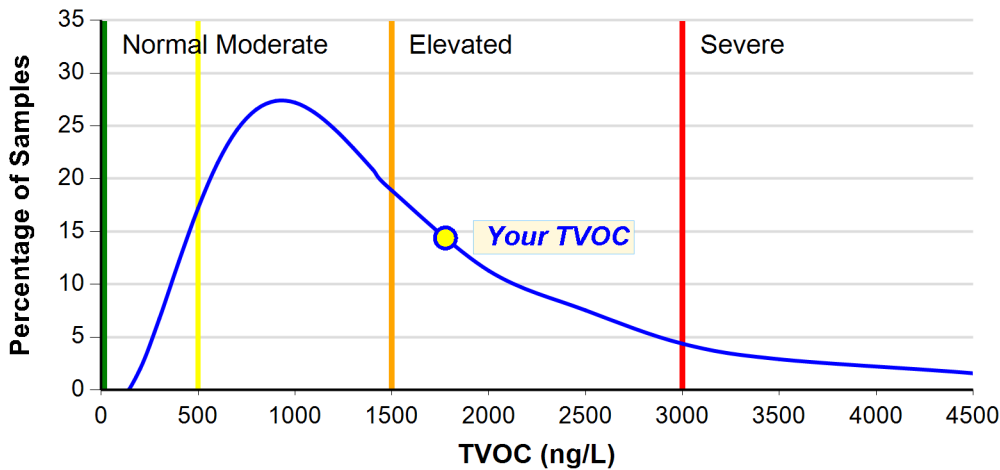
Your TVOC Level is: 1800 ng/L

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

Your Indoor Air Quality Level (Highlighted)

Normal	Moderate	Elevated	Severe
< 500 ng/L	500 - 1500 ng/L	1500 - 3000 ng/L	> 3000 ng/L

**All IAQ Survey TVOC
Air Quality Indicator**



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

This chart represents the TVOC distribution of over 8,000 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.

The U.S. federal government has not specified a TVOC limit for indoor air. However, the U.S. Green Building Council (USGBC) has recommended 500 ng/L as the upper TVOC limit. TVOC levels below 500 ng/L indicate that the IAQ is acceptable for most individuals; however, chemically sensitive persons may require lower levels. TVOC levels between 500 and 1,500 ng/L indicate that the air quality is marginal and some effect on the occupants is possible. Levels above 1,500 ng/L indicate that your IAQ should definitely be improved. These levels are based on observed health effects and have been determined from a combination of published journal articles (1, 2, 3) 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, ranging from an unpleasant odor to physical symptoms (burning and irritation in the eyes, nose, and throat; headaches; nausea; nervous system effects; severe illness; etc.). In some cases, these conditions may make the home unlivable. Anyone with respiratory issues like asthma and allergies, as well as children, the elderly, and pregnant women are more susceptible to poor indoor air quality than healthy individuals. However, at higher TVOC levels even healthy individuals are likely to experience ill effects. The following websites can offer more information:

- US EPA [Indoor Air Quality \(IAQ\)](#)
- American Lung Association [Healthy Air at Home](http://www.lung.org/healthy-air/home/)
- World Health Organization (WHO) [Guidelines for Indoor Air Quality](#)
- Lawrence Berkeley National Laboratory [Indoor Volatile Organic Compounds \(VOCs\) and Health](#)

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.

1 L. Molhave, Volatile Organic Compounds, Indoor Air Quality and Health, Vol. 5, International Indoor Air Quality Conference, Toronto, Canada, 1990, p. 22 ff.
2 European Collaborative Action: Indoor Air Quality and its Impact on Man (ECA-IAQ), Report No 19 Total Volatile Organic Compounds (TVOC) in Indoor Air Quality Investigations, 1997. (from L. Molhave et al., Total Volatile Organic Compound (TVOC) in Indoor Air Quality Investigation, Indoor Air 1997; 225-240.)
3 T. Salthammer, Critical evaluation of approaches in setting indoor air quality guidelines and reference values, Chemosphere 82, 2011, 1507-1517.

Total Mold Volatile Organic Compounds (TMVOC)

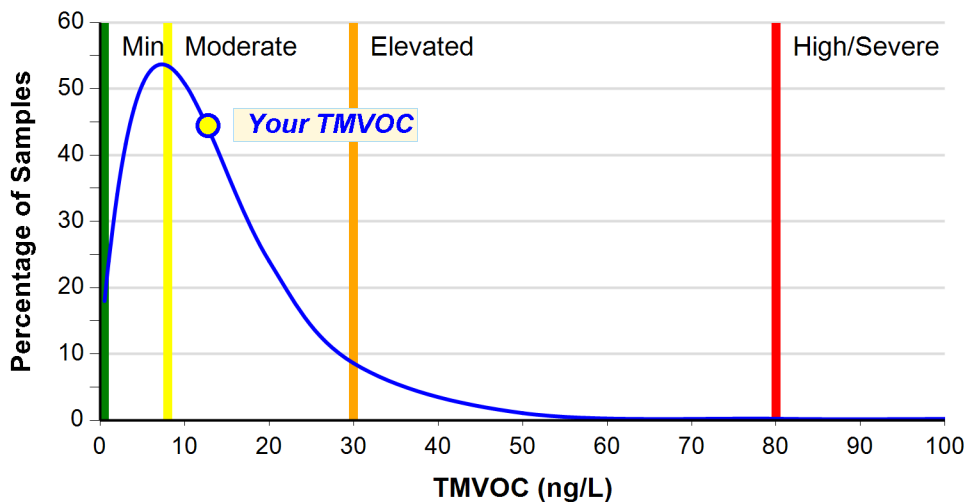
Your TMVOC Level is: 13 ng/L

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

Your Active Mold Level (Highlighted)

Minimal	Active-Moderate	Active-Elevated	Active-High	Active-Severe
< 8 ng/L	8 - 30 ng/L	30-80 ng/L	80 - 150 ng/L	150 + ng/L

All IAQ Survey TMVOC Active Mold Growth Indicator



The average TMVOC is 10 ng/L

This chart represents the TMVOC distribution of over 8,000 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 are fungi that grow in the form of multicellular filaments called hyphae that spread to form a network or colony called mycelium. There are thousands of known species of molds, although a much smaller number of mold species are commonly found in indoor environments.

Molds can affect humans and animals in their vicinity in several ways. The most commonly known aspect of molds is the spores they produce as their primary means of reproduction. Spores are released from the mature mold body and spread by air currents and on people, animals, or materials that travel from place to place. These spores can remain viable for a long time until they find a suitable environment and grow to form new colonies. In addition to spores, mycotoxins can also be released under certain situations. Mycotoxins are chemicals that are produced during certain parts of the mold life cycle and can evoke a toxic response (e.g., severe allergic reactions and respiratory irritation and exacerbation of asthma symptoms or other respiratory ailments) in humans and animals. Mycotoxins have low volatility, meaning they have relatively low concentrations in air, so contact or ingestion rather than inhalation is often the main route of exposure for these chemicals.

Finally, mold VOCs (MVOCs) are produced during the metabolic or digestive processes of molds and therefore can be used as an indicator of actively growing mold. When mold is in an inactive or dormant state it does not produce many MVOCs and so cannot be used as an indicator of inactive mold. There are a number of factors that can affect the production and movement of MVOCs, including but not limited to the genus/ species, ventilation rates, temperature, humidity, growth surfaces, and competition from other molds. These factors make determination of the genus/species of mold very difficult so the presence of MVOCs indicates active mold growth but not the genus/species of the mold.

Total Mold Volatile Organic Compounds (TMVOC)

Mold can grow anywhere that satisfies four primary conditions.

1. Presence of mold spores – spores are everywhere and it is very difficult if not impossible to remove them completely.
2. Appropriate growth surface or nutrient source – molds are adaptable and can grow on almost any surface; many molds especially like cellulose-based materials (e.g., wood, drywall, insulation, cardboard, paper, carpet, etc.).
3. Appropriate temperature – although many molds grow best in warmer temperatures, given enough time mold can grow at almost any temperature condition.
4. Water – this is the most significant and most important criteria since the other conditions are too commonly available to be controlled. The consensus of most organizations with a perspective on air quality (e.g., WHO, EPA, AIHA, ASHRAE, etc.)⁹ is that controlling moisture and dampness is the only way to consistently control or limit mold growth.

Mold Sources

Since there are so many possible locations that mold can grow, it can be difficult to locate without visual indicators. However, there are some potential locations where molds are often found, as listed here.

- Air conditioning units or drain lines
- Near plumbing leaks
- Near roof or wall leaks
- Basement water intrusion from surrounding soil
- Any consistently humid area
- Near condensation around windows or any other condensation locations like exterior walls (typically where there is a temperature gradient that allows water to condense)
- Freezer/refrigerator door seals, especially in summer
- Freezer/refrigerator drain line and drip pan (if present)
- Indoor plants
- Empty beverage containers and glasses, especially if left for trash or recycling without being rinsed out
- Wastebaskets and trash cans containing discarded food or wet items
- Sump pumps, especially when the pump does not cycle often
- Stand pipes and traps
- Books, magazines, and newspapers if they have gotten wet or sit for a long time
- Outside mold, especially if the air intake is near the ground and landscaping near the home uses wood chips or mulch

Typically, if there is no plumbing leak, condensation, or water intrusion into the home, there will not be a mold problem. If active mold growth is indicated, the first step in fixing the problem is to find and repair the water intrusion or moisture build up.

Some new or extensively renovated homes can have high MVOC results. Additional dampness is often introduced into a new home during the construction process (e.g., newly installed cement) and can lead to optimal mold growth conditions. Also, some building materials may have mold growth on them when they are installed due to exposure to water before installation. It is strongly recommended that new homes or those with extensive renovation undergo a drying process to eliminate or reduce the potential for mold growth.

Total Mold Volatile Organic Compounds (TMVOC)

MVOC Interpretation

As described above, the TMVOC value is an assessment of the quantity of actively growing mold in your home. Like TVOC, no government unit or organization has specified limits for TMVOC. The levels below describe the effects individuals exposed to these TMVOC values may experience. These levels are qualitative estimates of possible effects experienced by healthy individuals. Sensitive individuals or those with chronic or respiratory issues may experience effects at much lower levels. Mold may be visible on a surface but in an inactive state resulting in little or no production of MVOCs. Regardless of the TMVOC result if mold is visible it should be removed since molds may still produce spores or mycotoxins in an inactive state and new exposure to water or moisture can initiate new mold growth. Since MVOCs are VOCs, they can be affected by the same environmental conditions that affect other VOCs. Primarily lower temperature and higher air flow or ventilation will reduce MVOC concentrations. Any water or moisture issues should be addressed quickly to limit the potential for mold growth.

These levels were determined empirically through interaction with air quality professionals regarding the reported health effects experienced by individuals exposed to actively growing mold.

TMVOC (ng/L)	Level	Description
< 8	Minimal or Ambient	Actively growing molds may be present, but are at or below levels found in most homes (i.e., these levels could be considered ambient or background).
8 - 30	Active - Moderate	Actively growing molds are present, but are at levels which typically only affect people sensitive to molds. Investigate possible water or moisture sources. See Mold Sources
30 - 80	Active - Elevated	Significant levels of actively growing molds are present; reactions or symptoms are probable. See Mold Sources
80-150	Active - High	High levels of actively growing molds are present; high probability that all occupants will be affected; take immediate action to locate and remove mold. See Mold Sources
> 150	Active - Severe	Excessive levels of actively growing molds are present; all occupants will be affected; take immediate action to locate and remove mold. See Mold Sources

Additional Information about Mold

⁹⁸ World Health Organization (WHO):
[WHO Guidelines for Indoor Air Quality – Dampness and Mold](#)

US Environmental Protection Agency (EPA):
[Molds and Moisture](#)
[A Brief Guide to Mold, Moisture, and your Home](#)

American Industrial Hygiene Association (AIHA)
[Position Statement on Mold and Dampness](#)

American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE):
[Limiting Indoor Mold and Dampness in Buildings](#)
(Position Documents; click on Limiting Indoor Mold and Dampness in Buildings)

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.

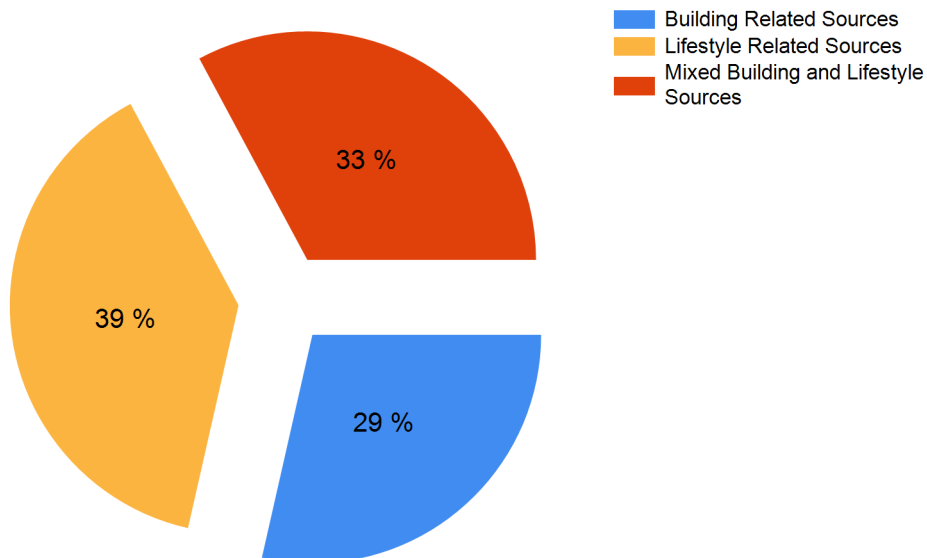
It is possible for a category listed in one source group to belong to another source group. For example, the 'Coatings' category is in the Building source group because the largest contribution is typically the paint on the walls, but cans of paint stored in a basement or garage could be considered part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



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
Building Related Sources	Coatings (Paints, Varnishes, etc.)	500	Moderate	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, sometimes longer. Ventilate as much as possible during and after application 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.'
	PVC Cement	50	High	PVC cement is used to join pieces of PVC pipe together, usually for plumbing. Chemical compounds in these products can cause respiratory irritation and headaches. Ventilate the area during and after use. If it has been more than 2 months since using this type of product, look for any issues with the application or leaky containers. Also have your HVAC system checked for appropriate make up air.
	HFCs and CFCs (Freons™)	4	Normal	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.

Contamination Index Category	Estimated	Severity	Description and Suggestions for VOC Reduction
	VOC Level (ng/L)		
Building Materials-Toluene Based	4	Normal	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.
Gasoline	120	Normal	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.
Fuel Oil, Diesel Fuel, Kerosene	0	Normal	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.).'
Moth Balls (Naphthalene Based)	0	Normal	Naphthalene based moth balls. May be present with p-Dichlorobenzene-based moth crystals.
Moth Crystals (p-Dichlorobenzene Based)	8	Moderate	p-Dichlorobenzene based moth crystals, attempt to locate these materials and remove them from the home. May be present with Naphthalene-based moth balls.
Light Hydrocarbons	160	Normal	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.
Light Solvents	340	Moderate	Stoddard solvent; mineral spirits; some coatings (paints, varnish, enamels); wax remover; adhesives; automotive products; light oils. Many of these are present in common household products; however, recent renovation or construction will increase these levels. Increase ventilation during and after use of these products. Typically, VOCs from these products are in the 6 to 9 carbon size range. Gasoline can contribute to the Light Solvents
Methylene Chloride	1	Normal	Automotive products; degreasing solvent; paint stripper; adhesive remover; aerosol propellant; insecticide.

Mixed Building and Lifestyle Sources

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
Lifestyle Related Sources	Personal Care Products	200	Normal	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.
	Alcohol Products	320	Elevated	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. Promptly rinse empty alcoholic beverage containers and place outside if possible. Consolidate cleaning products to the essentials. Consider switching to alternative methods of cleaning and sanitizing, e.g., baking soda, vinegar, borax, steam, etc., and ventilate the area during and after cleaning. Alcohol can also be found in some building materials, consider recent renovations/construction as a possible source.
	Odorants and Fragrances	230	Moderate	VOCs in this category can be found in scented candles, potpourri, air fresheners, scented cleaning products, and scented personal care products. Reduce use of scented products and store unused products in a tight fitting container.
	Dry Cleaning Solvents	5	Normal	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.
	Medicinals	1	Normal	Ointments and creams, topical first aid/pain relievers.

Significant VOCs

Based upon your specific home air analysis, the chemical compounds listed below are significant contributors to the TVOC level reported on page 2 of your IAQ Home Survey Report or are indicative of specific types of products or problems. Compounds from a variety of chemical classes are represented here, although only the most common or most notable are specifically listed. These chemical compounds may come from a variety of sources as shown in the Contamination Index section of this report. Many of these chemical compounds are commonly found in homes. However, locating and removing the source of the chemical compound is the most effective way to reduce the contribution of that chemical compound to the TVOC, which ultimately leads to improved IAQ. If removing the source is not possible, try to contain it in some way (e.g., placing the source in an air-tight container when not in use). In addition, most homes have inadequate ventilation so increasing the amount of outside air or filtering or purifying re-circulated inside air will almost always reduce the TVOC. However, since VOCs may continue to off-gas even when the sources are stored, ventilation and air-purification methods will need to be employed continuously in order to keep the VOC levels low. The Chemical Abstracts Service (CAS) registry number after the chemical compound name in the table below is a unique identifier for that chemical compound and is often the best means to search for additional information. The two VOC levels in the table below (ng/L and ppb) are different ways of describing the same concentration, in some cases exposure limits or other information may be described using one or both of these concentration units.

Compound	CAS	Estimated VOC Level (ng/L)	Estimated VOC Level (ppb)	Description
Ethanol	64-17-5	320	160	Cleaners, especially antiseptic wipes; personal care; consumable alcohol; some solvents; renewable gasoline component; pharmaceuticals
Isopropanol	67-63-0	240	95	Rubbing alcohol; cleaners, especially antiseptic wipes; personal care; solvents; food and beverages; microbial biocides or antimicrobial agents
Butane (C 4)	106-97-8	96	40	Aerosol propellant; cooking/camping/lighters fluids; liquefied petroleum gas (LPG); refrigerant; food additive
Pentane (C 5)	109-66-0	82	28	Aerosol propellant; blowing agent; gasoline fuel component
Acetone	67-64-1	67	28	Personal care, especially nail care; cleaners; paints and coatings; strippers and thinners; PVC cleaner; caulks and adhesives; wood filler; solvent
Isobutane	75-28-5	63	26	Gasoline and fuel additive; aerosol propellant; refrigerant; cooking/camping/lighter fluids
Cyclohexane	110-82-7	47	13	Solvent; glues and adhesives; some paints and coatings, petroleum fuel component
a-Pinene	80-56-8	47	8	Pine lumber; fragrances and essential oils; solvents; insecticides
Limonene	138-86-3 or 5989-27-5	38	7	Limonene (CAS 138-86-3) or d-Limonene (CAS 5989-27-5)Fragrances; paints and coatings; cleaners; solvent; preservative
Tetrahydrofuran	109-99-9	25	8	Solvent; PVC cement/cleaner, some adhesives

The notes below indicate any additional significant compounds present in this air sample or other noteworthy information.

C11-C13 Esters: typically a scent or flavor additive; solvents

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 are included 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
Carbonyl sulfide	463-58-1	< 1	< 0.4	None Listed	Fumigant; contaminated drywall; fuel combustion byproduct; some foods; naturally occurring at low levels
Carbon Disulfide	75-15-0	< 1	< 0.32	3,000 ng/L (1,000 ppb)	Solvent; fumigant; contaminated drywall; combustion byproduct
Methylene Chloride	75-09-2	< 1	< 0.28	Carcinogen	Automotive products; degreasing solvent; paint stripper; adhesive remover; aerosol propellant; insecticide
Hexane (C 6)	110-54-3	13	3	180,000 ng/L (50,000 ppb)	Solvent; adhesive; grease; lubricant; paints and coatings; petroleum fuel component
1,1,1-Trichloroethane	71-55-6	< 1	< 0.18	C; 1,900,000 ng/L (350,000 ppb)	Adhesives, lubricants, cleaners, solvents
Benzene	71-43-2	2	0.66	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	< 0.25	Carcinogen; 4,000 ng/L (1,000 ppb)	PVC production; solvent for rubber, insecticides, oils, waxes, gums, resins; rug and upholstery cleaners
Trichloroethene	79-01-6	< 1	< 0.18	Carcinogen	Dry cleaning; degreasers and cleaners for home/automotive; varnish removers; anesthetic
Methyl methacrylate	80-62-6	< 1	< 0.28	410,000 ng/L (100,000 ppb)	Acrylic Polymers for paints and coatings, adhesives, fillers; solvent; pharmaceuticals; personal care
Toluene	108-88-3	24	6	375,000 ng/L (100,000 ppb)	Gasoline; adhesives (building and arts/crafts); contact cement; solvent; heavy duty cleaner
Tetrachloroethene	127-18-4	5	0.72	Carcinogen	Dry cleaning; adhesives, automotive cleaners, polishes
Ethylbenzene	100-41-4	< 1	< 0.23	435,000 ng/L (100,000 ppb)	Gasoline; paints and coatings; solvent; pesticide
m,p-Xylene	108-38-3; 106-42-3	5	1	435,000 ng/L (100,000 ppb)	Gasoline; paints and coatings; adhesives and cements; solvent; print cartridges
o-Xylene	95-47-6	2	0.37	435,000 ng/L (100,000 ppb)	Gasoline; paints and coatings; adhesives and cements; solvent; print cartridges
Styrene	100-42-5	< 1	< 0.23	215,000 ng/L (50,000 ppb)	Polystyrene foam; synthetic rubber; flavoring agent
1,4-Dichlorobenzene	106-46-7	6	1	Carcinogen	Moth balls/crystals; room deodorant
Naphthalene	91-20-3	2	0.38	50,000 ng/L (10,000 ppb)	Gasoline; diesel; Moth balls/crystals; insecticide

These results are authorized by the Laboratory Director or approved representative.

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