

# Volatile Organic Compounds

Volatile organic compounds (VOCs) are emitted as gases from certain solids or liquids. This is a very broad set of chemicals. VOCs include a variety of chemicals, some of which may have short and long-term adverse health effects. Concentrations of many VOCs are consistently higher indoors (up to ten times higher) than outdoors. VOCs are emitted by a wide array of products numbering in the thousands.

## **Where do Volatile Organic Compounds come from?**

Volatile Organic Compounds (VOCs) come from paints and lacquers, paint strippers, cleaning supplies, pesticides, building materials and furnishings, office equipment such as copiers and printers, correction fluids and carbonless copy paper, graphics and craft materials including glues and adhesives, permanent markers, and photographic solutions. Organic chemicals are widely used as ingredients in household products. Paints, varnishes, and wax all contain organic solvents, as do many cleaning, disinfecting, cosmetic, degreasing, and hobby products. Fuels are made up of organic chemicals. All of these products can release organic compounds while you are using them or when they are stored.

## **Why measure Volatile Organic Compounds?**

Volatile Organic Compounds (VOCs) are a health hazard resulting in eye, nose, and throat irritation, headaches, loss of coordination, nausea, damage to liver, kidney, and central nervous system. Some organics can cause cancer in animals; some are suspected or known to cause cancer in humans. Key signs or symptoms associated with exposure to VOCs include conjunctival irritation, nose and throat discomfort, headache, allergic skin reaction, dyspnea, declines in serum cholinesterase levels, nausea, emesis, epistaxis, fatigue, and dizziness.

The ability of organic chemicals to cause health effects varies greatly from those that are highly toxic, to those with no known health effect. As with other pollutants, the extent and nature of the health effect will depend on many factors including level of exposure and length of time exposed. Eye and respiratory tract irritation, headaches, dizziness, visual disorders, and memory impairment are among the immediate symptoms that some people have experienced soon after exposure to some organics. At present, not much is known about what health effects occur from the levels of organics usually found in homes. Many organic compounds are known to cause cancer in animals; some are suspected of causing, or are known to cause, cancer in humans.

## **How do I measure Volatile Organic Compounds (VOCs)?**

There are a variety of VOC meters or gas detector tubes available for making measurements. You should select a measurement device based on your purpose for measuring. You can Google "VOC meters" for a selection of meters. For a less expensive VOC measurement, you can Google "VOC gas detector tubes". The meter provides a continuous reading, while the tubes will provide a snapshot.

### **What are normal levels of Volatile Organic Compounds (VOCs) that I might find?**

Studies have found that levels of several organics average 2 to 5 times higher indoors than outdoors. During and for several hours immediately after certain activities, such as paint stripping, levels may be 1,000 times background outdoor levels.

### **What standards or guidelines are there for Volatile Organic Compounds (VOCs)?**

No standards have been set for VOCs in non industrial settings. There are thousands of VOC compounds. Some of the compounds have been recognized as a specific health risk and have specific guidelines.

When the USEPA built their own building, they used a Maximum Allowable Air Concentration Standard of <0.20 mg/m<sup>3</sup> Total Volatile Organic Compounds (TVOCs).

Occupational Safety and Health Administration (OSHA) regulates formaldehyde, a specific VOC, as a carcinogen. OSHA has adopted a Permissible Exposure Level (PEL) of .75 ppm, and an action level of 0.5 ppm. US Department of Housing and Urban Development (HUD) has established a level of 0.4 ppm for mobile homes. Based upon current information, it is advisable to mitigate formaldehyde that is present at levels higher than 0.1 ppm.