

# IEQ NEWS



*We care about indoor air*

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Indoor Environmental Quality

Issue #6

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## What's New?

Green Seal Proposed Revised Environmental Standard for Industrial and Institutional Cleaners  
[http://www.greenseal.org/certification/gs37\\_iicleanersstandard\\_dev.cfm](http://www.greenseal.org/certification/gs37_iicleanersstandard_dev.cfm)

High Performance Green Building Act of 2007  
[http://www.healthyschools.org/documents/Senate\\_testimony.pdf](http://www.healthyschools.org/documents/Senate_testimony.pdf)



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## FOCUS: Volatile Organic Compounds

During the winter heating season, homes and buildings are closed up tightly. Indoor air quality can be impacted by lack of ventilation and products containing volatile organic compounds (VOCs) that may be used when building, renovating, cleaning or decorating.

### What are VOCs?

VOCs are chemicals containing carbon (organic) that are emitted as gases from certain solids or liquids. They may or may not be associated with an odor. Some may have short and long term adverse health effects. Levels of some VOCs may be 2-5 times higher indoors than outdoors.

### How Can You be Exposed ?

There are thousands of VOCs in products used in daily life. They are found in many industrial and consumer products ranging from vinyl floors to air fresheners to wood furniture (see box at right). Exposure occurs when these products are used and often persist in the air long after the activity is completed.

### How Can You Avoid Exposure to VOCs?

- Follow product label manufacturer directions carefully.
- Open doors and windows; use fans when using these products.
- Throw away used or little used containers; buy limited quantities.
- Eliminate products from the home that have high VOC levels; purchase Green Seal certified low VOC emitting products.

### Common Chemicals that are VOCs

- Formaldehyde
- Perchloroethylene (PERC)
- Trichloroethylene (TCE)
- Methylene Chloride
- Benzene

### Common Sources of VOCs

- Paints & paint strippers
- Cleaners/disinfectants
- Degreasers
- Upholstery fabrics
- Pressed wood furniture
- Glues & adhesives
- Carpets
- Sealants
- Varnishes & waxes
- Building materials
- Aerosol sprays
- Hobby supplies
- Dry cleaning
- Personal hygiene products
- Air fresheners

### Standards and Guidelines

There are no standards set for exposure to VOCs in non-industrial settings. There are only standards for workers. However, some states have set guidelines for exposure limits/target indoor air concentrations for some VOCs based on TVOC (concentration of all VOCs in a given sample). Washington state has set standards (500 micrograms/cubic meter) for new office buildings; California has guidelines for office building construction materials. <http://www.cal-iaq.org/VOC/VOCapp.pdf>.



# Technically Speaking: Building & Renovation



**Ventilation is Key.** It is very important to maintain good ventilation even in the winter, to prevent the indoor build-up of chemicals, especially during renovation projects. The American Society of Heating, Ventilation and Air-conditioning Engineers (ASHRAE) has established standards for ventilation for both residential (Standard 62.2-2007) and non-residential (Standard 62.1-2007) buildings. These standards take into account chemical, physical, biological contaminants that can affect air quality.

**Indoor Air Contaminants from Building and Renovation Materials.** Many composite wood materials such as plywood, particleboard, and OSB (oriented strand board), contain formaldehyde, which can off-gas. Finish materials such as carpets, upholstery fabric, and fabric wall coverings and window treatments may also contain formaldehyde.

Various types of glues are used in everything from carpet and wall covering adhesives to permanently connecting pvc pipes (plumbing). They contain VOCs including xylenes, acetone, pentane, cyclohexane, propane, dimethyl ether, and glycol ethers. 4-phenylcyclohexene (4-PC) is in the glue that holds carpet fibers together, and is associated with the typical "new carpet smell".

For paints and coatings, VOCs are expressed in terms of pounds per gallon (lbs./gal) or grams per liter (g/L). Interior paints should contain less than 50 g/L of VOCs for flat sheen, or less than 150 g/L for non-flat sheen paints in order to be labeled "Low VOC". Low VOC paints have been reformulated, usually with reduced amounts of volatile solvents, and can be either latex or oil based. Often times, soy and sunflower oil are added.

## VOC'S and Your Health

The ability of VOCs to cause health problems varies greatly. Some are highly toxic, while others have no known health effects.

The health effect expressed depends on the level of exposure, length of time exposed, rate at which the VOC off-gasses, and the volume of air in the room. People with respiratory problems such as asthma, young children, the elderly and those with chemical sensitivity may be more susceptible to illness from VOC exposure.

Signs & symptoms associated with immediate exposure include eye, nose & throat irritations, headaches, loss of concentration, nausea, and asthma exacerbation in acute exposures. These complaints are often associated with "sick building syndrome". Chronic exposure may be associated with cancer and liver, kidney and central nervous system damage.

Note: Most health studies have been done on single chemicals. Less is known about the health effects of combined chemical exposure.



## Tools for Schools

Winter is here, and it is time to keep energy costs down, but keep indoor air quality up. With rising fuel costs, building managers may be pressured to redirect scarce funds away from maintenance to cover fuel costs, and in some instances, cut back on needed fresh air. Maintaining good IAQ while saving energy costs is possible. Advances in technology allow increases in fresh air without substantially higher heating costs. To find out more about balancing IAQ needs and energy conservation, go to: [http://www.epa.gov/iaq/largebldgs/i-beam/text/energy\\_efficiency.html#E0.0](http://www.epa.gov/iaq/largebldgs/i-beam/text/energy_efficiency.html#E0.0)



## Literature Review

Total Exposure Assessment Methodology (TEAM) Study, 1987. Exposures to 20 VOC's were measured in 400 residents of NJ, NC, & ND. Personal exposures were consistently higher than outdoor concentrations for these chemicals and were sometimes 10 times the outdoor concentration. Indoor sources appeared to be responsible for much of the difference. <http://www.ncbi.nlm.nih.gov/pubmed/3608934>

## Helpful Web Links

<http://www.atsdr.cdc.gov/toxfaq.html>. Agency for Toxic Substances and Disease Registry. Clearly written Fact Sheets for numerous chemicals.

<http://www.EPA.gov/iaq/voc.html>. Environmental Protection Agency. Concise overview of volatile organic gases (VOCs).

<http://www.carpet-rug.org>. The Carpet & Rug Institute. Contains research about VOCs in carpets and rugs.

