Healthy Indoors Partnership

BUYER'S GUIDE

Balanced guidance developed by a multi-stakeholder expert panel

products and services with low-chemical emissions

If you're like most Canadians, you spend more than 90 percent of your time indoors. And whether you are spending that time in an urban or a rural setting, you are exposed to a variety of air pollutants indoors, including dust mites, moulds, fine particles, radiation and chemicals. This guide focuses on chemical pollutants and how to reduce your exposure to them.

what are indoor chemical emissions?

Indoor chemical emissions are air pollutants that are released with the use of a wide range of products. These emissions may come from products you bring into your home yourself, for example, cleaning products, personal care products, furnishings, hobby materials and electronic equipment. Others may be released by products used by service providers during pest control, cleaning and maintenance. Chemical emissions may also be released from building materials and finishes used in construction or renovation. These chemical emissions can remain in the air for long periods of time after a product is used, and are typically found at higher concentrations indoors than outdoors.

This guide focuses specifically on **volatile organic compounds** (**VOC**s). They are called volatile because they off-gas or vapourize at room temperature, and organic because they are carbon-based. VOCs are present in all buildings. They become part of the indoor air, and circulate freely throughout your home.

VOC emissions in typical homes can be classified into two **exposure categories**:

a) *high-concentration, short-term emissions* (from a recently painted wall, for example)

b) *low-concentration, long-term emissions* (such as those that are released from most composite wood products and carpets).

In practical terms, these two categories overlap.

VOC emissions can also be classified by **how they originate**:

Primary emissions are released directly from new products, for example, from a cleaning product.

Secondary emissions are released when the chemicals in one product mix with other indoor chemicals, to create new chemicals. For example, when ozone reacts with the latex backing of carpets or terpenes in air fresheners, various aldehydes, including formaldehyde, may be released.

health effects

Some VOCs have no known health effects. However, many are known to cause cancer in animals. Some are known or suspected to cause cancer or to have toxic effects in humans. Immediate symptoms from exposure to some VOCs may include breathing problems, fatigue, headaches, dizziness, nausea, blurred vision, and skin or eye irritation. The long-term effects of chronic exposure to VOCs at the levels found indoors are not well understood yet. In general, however, the higher the level of exposure to a potentially toxic chemical, or the more prolonged that exposure is, the greater the risk that adverse health effects may occur.

While we are all susceptible to the effects of exposure to harmful VOCs, certain groups of people are particularly vulnerable to harmful chemical exposures, including pregnant women and their unborn babies, young children, the elderly and people with allergies or asthma. Furthermore, individual reactions to chemical exposures vary widely. Some people react immediately and severely to small amounts of VOCs which others may not even notice. People of any age or health status can develop such chemical sensitivities.

should I be concerned?

It is important to realize that emissions from chemicals can be harmful to our health, and that we should all be concerned with reducing our indoor exposure to harmful chemicals. Sometimes there are clues that an indoor air problem exists. If you observe that someone develops headaches, runny nose, confusion or other symptoms within a few moments or hours after entering your home or a room in your home, but feels better after leaving, it may indicate that something in that environment is triggering health problems.

In addition, there are particularly opportune times for reducing your risk of exposures to indoor chemical emissions. When you buy new furnishings, personal care products, cleaning and maintenance products or a new home, or are planning to renovate, you can ask for and select products that have low chemical emissions.

Pay particular attention to the materials and products that you use in bedrooms — more than one-third of every day will be spent there!

what to look for and do

The main sources of indoor chemical emissions include:

- cigarette smoke
- unvented or poorly vented stoves
- building materials and furnishings (including curtains and wall coverings)
- cleaning products (including laundry products)
- personal care products
- pest control products
- electronic equipment (such as televisions, computers, printers and photocopiers)

The most effective way to reduce chemical emissions is to choose products and services that have the lowest emissions. You can find information on how to locate low emission products in the section of this guide called "Labeling systems and other on-line resources for selecting products and services." Whenever possible, obtain information on the ingredients in the products and their possible health risks.

The presence of a chemical odour is an indicator that one or more chemicals are being released into the air. However, don't rely on odour as a measure of the strength or danger of a chemical. For example, carbon monoxide is odorless, and can be deadly.

It may also be helpful to contain emissions so they don't spread throughout your house, for example by closing the door to a room that has been freshly painted. Another way to decrease your exposure to potentially harmful chemical exposures is to exhaust the emissions from your home as quickly as possible, for example by opening the windows and running exhaust fans.

building materials and furnishings

By obtaining information on the emissions of potential new products you plan to use or install in your home, you can select lower emitting products when available. Be sure that the information you gather is for the specific products you plan to use. Do not rely on generic information on 'similar' products. If the information you need is not readily available, contact the manufacturer, ask about the

emission levels of the product in question, and request a *Material Safety Data Sheet (MSDS)*.

Consider all of the materials required for use in a project, not just the major ones. For example, grouts, adhesives, sealants and sealant primers as well as other products, all need to be evaluated. In general, it is prudent to choose water-based paints, sealants and finishes for indoor use — they tend to emit lower levels of VOCs than oil-based products. Be mindful, though, that water-based products may also contain solvents.

Solid wood tends to release lower emissions than composite wood products. The glues in composite wood products such as particleboard, fiberboard, chipboard and plywood often contain high levels of VOCs including formaldehyde. When selecting solid woods, it is helpful to know that pine and cedar contain higher levels of natural VOCs called terpenes that are released into the air.

It's worth paying attention to little things — they add up. For example, you can reduce emissions by choosing solid wood trim, rather than trim made from plastic or manufactured wood (such as medium density fiberboard, known as MDF) or by selecting low VOC caulking.

In addition to selecting low-emission materials, you can reduce emissions by airing out products in a well-ventilated space prior to installation, for example by unrolling flooring materials or opening cupboard doors. This can reduce the initial surge of off-gassing from the surface of the materials, although it will not eliminate ongoing, longer-term emissions.

Renovation and painting activities are best conducted when your home is least occupied and can be opened up for ventilation. Whenever new products with the potential for off-gassing are installed, allow extra time for ventilation before you reoccupy the area.

cleaning and laundry products

Common cleaning and laundry products can be a significant source of indoor pollutants. These include ammonia, chlorine bleach, floor sweeping products, air fresheners and deodorizers, scented detergents, fabric softeners, mothballs, and many others.

There are many low-emission, unscented alternatives available (see the *Guide to Less Toxic Products*, listed in the table on page five). For example, baking soda and unscented detergents are less toxic alternatives to bleach and ammonia-based cleaners. Using microfibre cleaning cloths can reduce the need for harsh, chemical-based cleaners. If you choose to use bleach, buy products that contain no more than 0.02 % (200 ppm) sodium hypochlorite.

Air fresheners and deodorizers don't remove the cause of unpleasant odors. They mask them and at the same time add hazardous chemicals to your indoor air. Basic cleaning with soap and water, vacuuming, and daily removal of kitchen garbage and compost can address the cause of many unpleasant odors and help maintain a healthy environment. If there is a musty smell, you may have a mould and moisture problem that needs to be fixed.

Did you know that dry-cleaned clothing can release toxic chemicals after you bring them home? Look for a cleaner who offers a solvent-free "wet cleaning" option. If you can't locate one, at least air out your dry cleaned clothes before bringing them inside.

You can eliminate the need for fabric softeners in a number of ways, while saving energy at the same time. To eliminate static, hang your laundry outside on a line if outdoor conditions permit. Or take your clothes out of the dryer and hang them up before they are bone dry, which also reduces the need for ironing. In addition, there are products you can put in your dryer that replace fabric softeners and do not release toxic chemicals (see the *Guide to Less Toxic Products*, listed in the table on page five).

Fungicides or biocides are another significant source of pollutants They are sometimes used, among other applications, for duct cleaning. Do not allow the use of chemical sprays in your ducts.

personal care products

Consider using unscented soaps, shampoos, deodorants, lotions, cosmetics and hair care products (see the *Guide to Less Toxic Products*, in the table on page five), and avoid aerosol sprays.

pest control

Use non-chemical methods of pest control whenever possible. These include making pest nesting places less attractive, using baits and traps, and mechanically removing the pests themselves. Controlling moisture and sealing likely entry points can prevent some pests from entering your building. Many internet sites provide information on chemical free methods of pest control.

If you must bring in professional pest control services, take time to request information from a number of services. Inquire about options that are least toxic to humans, and then select the service that employs the least toxic materials and methods (for example, the use of baits and traps rather than chemicals). Ensure that the pest control service identifies the source of the problem, so it can be corrected.

products of combustion

Cigarettes, wood-burning stoves and fireplaces, candles and incense produce emissions that consist of a mixture of gases (including sulphur oxides, nitrogen oxides and carbon monoxide) and fine particles, which contribute to poor air quality. Gas stoves and space heaters may also release harmful pollutants.

To reduce your exposure to combustion-related contaminants, use low-emission, wood-burning appliances and burn only clean, dry wood. Limit the use of candles, especially scented candles, and incense. Ensure that no one smokes in your home, and do not use kerosene space heaters or fondue heaters indoors. In general, ensure that all combustion equipment is properly maintained and vented to the outside. To further reduce combustion pollutants, consider using electric appliances rather than wood-or gas-burning ones.

when to get professional help

If you are designing a new home or renovating extensively, it may be helpful to engage the assistance of a professional such as an architect, builder, registered industrial hygienist or interior designer, who has a special interest in indoor air quality and experience in selecting low-emission products.

If you are looking for someone trained in handling home indoor air quality problems, contact *Canada Mortgage and Housing Corporation (CMHC)* at *1-800-668-2642*. Ask for the names of professionals in your region who have completed CMHC's Residential IAQ Investigator Training Program. Alternatively, look for an environmental consultant, architect or other professional in your community who specializes in handling home indoor air quality problems.

testing

A wide range of tests are available for chemical emissions — from very simple, do-it-yourself ones to very complex, costly laboratory testing, which is seldom necessary for homeowners.

One simple do-it-yourself test is the "jar test", used to compare products (carpet samples, or brands of water-based paints, for example) to determine the most tolerable product for use in your particular application. This test may help you to identify some problematic chemicals, though it may not reveal the presence of all potentially toxic VOCs. (The jar test is described by CMHC in its on-line brochure, "How to Reduce Chemical Contaminants in Your Home" — see the *Additional Guides and References* section on page six.)

Even before you attempt a jar test, however, — to minimize the risk of exposing yourself to a particularly noxious substance — it is prudent to first educate yourself about what a particular product is made of and the toxins it emits. A good place to start this type of research is to consult the National Institutes of Health's on-line "Household Products Database" (listed in the *Additional Guides and References* section on page six). It can be informative as well to review a product's *Material Safety Data Sheet (MSDS)*, which is generally available from the product manufacturer.

where to purchase

An increasing number of low-emission products are available from hardware and building supply stores, pharmacies, chain stores and the internet — all the usual places you would go to purchase products. Some products may be available only from retailers who sell environmentally friendly goods. Certain cleaning supplies, cosmetics and personal care products, for example, may be available only in health/natural foods shops, or in the natural foods section of grocery stores.

You can use the following table to learn more about the low-emissions criteria that products meet, and to find out where the products are sold. Please note that this table represents only a sampling of products. Note, too, that a product's inclusion in any of these resources does not necessarily mean that it is safe and harmless for everyone.

labeling systems and on-line resources for selecting products and services

The following table includes a range of labeling systems and websites which can help you locate products that have fewer chemical emissions. Please note that a number of these systems cover a range of environmental criteria. Not all give occupant health a high priority; in some cases, occupant health may be just one of many criteria considered. Those systems that focus exclusively on indoor air quality are typically the most stringent and reliable in terms of emissions and occupant health.
It is advisable to carefully review product claims, and look for products that specify third-party testing or endorsement.

System/Resource	Scope	Criteria and URL
Clean Air Technologies	Adhesives, sealants and sealant primers; cleaning products; paints and other coatings	*Third-party rating system and on-line list specifically focused on air quality, including indoor air. Managed by California's South Coast Air Quality Management District.* **http://www.aqmd.gov/tao** Click on "Technology" at the top of the page.
Envirodesic	Insulation, cleaners	*Third-party verified labeling system and on-line list focused specifically on indoor air quality. Managed by Small and Rubin Ltd., an independent Canadian business.* **www.envirodesic.com**
EcoLogo	Adhesives, caulkings, composite wood products, insulation, cleaning products, flooring products, personal care products, paints and finishing	*Third-party verified labeling system and on-line list, administered by TerraChoice for the Government of Canada. The only eco-labeling program in North America to be accredited by the Global Eco-Labeling Network. Air quality is one of many environmental factors considered. Certifies both consumer and industrial products that meet specific limits for chemicals of concern.* **www.ecologo.org**
Green Label	Carpets and carpet cushions	*Industry developed and administered labeling system focused specifically on off-gassing from carpets and carpet cushions. Products undergo third-party testing. Those that meet the U.S. Carpet and Rug Institute (CRI) emission test criteria bear a green and white CRI Indoor Air Quality Carpet Test Program logo. This program is supported in Canada by the Canadian Carpet Institute.* **www.carpet-rug.org/** **www.canadiancarpet.org**
Greenguard	Building materials, interior furnishings, furniture, cleaning and maintenance products, electronic equipment, and personal care products	*Third-party verified labeling system and on-line list. Managed by the Greenguard Environmental Institute (GEI), an industry-independent, non-profit organization that focuses specifically on indoor air quality, and is authorized to develop standards by the American National Standards Institute (ANSI). Greenguard standards are incorporated into the Canada Green Building Council's LEED Program for new commecial interiors. More than 20,000 different products certified.* **www.greenguard.org**
GreenSeal	Aerosol adhesives, cleaners, paints, floor care products	*Third-party verified labeling system and on-line list. Managed by GreenSeal, an independent, science-based, non-profit organization. Air quality is one of many environmental factors considered.* **www.greenseal.org**
Guide to Less Toxic Products	Personal care, baby care, household cleaning and pest control	*A free on-line resource on potential health risks of commonly used consumer products, with recommendations for less toxic alternatives. Published by the Environmental Health Association of Nova Scotia, a Canadian non-profit organization.* **www.lesstoxicguide.ca**
Household Products Database	Arts and crafts, automotive, home cleaning, home maintenance, home office, landscaping, personal care, pet care, pesticides	*Another free on-line resource about the potential health risks of commonly used consumer products, including ingredient lists and MSDS sheets from manufacturers. Published by the U.S. National Institutes of Health, National Library of Medicine.* **http://householdproducts.nlm.nih.gov/**
Low-Emitting Materials	Building insulation, adhesives, sealants, concrete sealers, gypsum board, acoustical ceilings, wall panels, wood flooring, composite wood boards, resilient flooring (includes rubber), carpet, wall coverings, paint	*Third-party rating system and on-line list of low-emission products that meet California requirements for use in school construction projects. Published by California's Collaborative for High Performance Schools.* **www.chps.net/manual/lem_overvw.htm**

additional guides and references

- Built Green Society of Canada, "Checklist" (for new homes in Alberta and British Columbia) **www.builtgreencanada.ca/**
- Canada Green Building Council, "LEED® Canada for Commercial Interiors Green Building Rating System" **www.cagbc.org/**
- Canadians for a Safe Learning Environment (CASLE) **www.casle.ca**
- CMHC, "CMHC Residential Indoor Air Quality Investigator Program" **www.iaq-qai.com**
- CMHC, "Dealing with Pests" **www.cmhc-schl.gc.ca/en/co/reho/reho_008.cfm**
- CMHC, "Farewell to Cockroaches – Controlling Cockroaches the Least Toxic Way" **www.cmhc-schl.gc.ca/en/co/maho/gemare/faco/index.cfm**
- CMHC, "How to Reduce Chemical Contaminants in Your Home" **www.schl.ca/en/co/maho/yohoyohe/inaiqu/inaiqu_006.cfm**
- CMHC, "Painting: Walls, Ceilings and Floors" **www.schl.ca/en/co/maho/gemare/gemare_005.cfm**
- EHANS, Lice Do's and Don'ts, **http://www.environmentalhealth.ca/licedosdonts.htm**
- Environment Canada, "Residential Wood Heating" **www.ec.gc.ca/cleanair-airpur/default.asp?lang=En&n=50E7D551-1**
- Environment Canada, "Wood Heating" **www.ec.gc.ca/cleanair-airpur/Wood_Heating-WSC1A217A6-1_En.htm**
- Environmental Health Association of Nova Scotia, **www.environmentalhealth.ca**
- Fragranced Products Information Network, "Web Site on the Health, Environmental, and Regulatory Aspects Related to Fragrance" **www.fpinva.org/**
- Health Canada, "Exposure Guidelines for Residential Indoor Air Quality" **www.hc-sc.gc.ca/ewh-semt/pubs/air/exposure-exposition/index-eng.php**
- Health Canada, "Indoor Air Quality in Office Buildings: A Technical Guide" **www.hc-sc.gc.ca/ewh-semt/pubs/air/office_building-immeubles_bureaux/index-eng.php**
- Health Canada (2003) "Indoor Air Quality – Tools for Schools Action Kit for Canadian Schools" **www.hc-sc.gc.ca/ewh-semt/pubs/air/tools_school-outils_ecoles/index-eng.php**
- National Institutes of Health, National Library of Medicine (USA), "Household Products Database" **http://householdproducts.nlm.nih.gov**
- Natural Resources Canada, "R-2000 Indoor Air Quality 'Pick List'" **www.oee.nrcan.gc.ca/residential/personal/new-homes/r-2000/standard/indoor-air-quality.cfm?attr=4**

expert panel

Experts from the following organizations joined together to develop and review this Buyer's Guide, to provide balanced guidance in purchasing products and services with low chemical emissions. While this guide represents their assessment of the current state of knowledge on low-emission products and services, it does not necessarily reflect the view of any particular participating organization.

Association of Registered Interior Designers of Ontario
Beau Biology Institute of Canada
Canadians for a Safe Learning Environment
Ecomaterials.ca
EcoSpex Canada
Environmental Health Association of Nova Scotia
Environmental Health Clinic, Women's College Hospital, Toronto
Government of Canada
- Canada Mortgage and Housing Corporation
- Health Canada
- Natural Resources Canada
- Public Works and Government Services Canada

Healthy Indoors Partnership
La Maison du 21e siècle magazine
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Ontario Public Health Association
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