

## Green Cleaning for a Clean Bill of Health



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According to Health Canada, Canadians spend close to 90% of their time inside either at home, at work, or in recreational environments. Most people, however, are unaware of the effects that poor indoor air quality can have on their health. The air inside a building carries much higher concentrations of pollutants than the air outside and, also we are exposed to building pollutants for longer periods.

### **Indoor Air Quality: Every Breath You Take**

The term "indoor air" is usually applied to non-industrial indoor environments, such as office buildings, public buildings (schools, hospitals, theatres, restaurants, etc.) and private dwellings. Concentrations of contaminants in the indoor air of these structures are usually of the same order as those commonly found in outdoor air. Many building occupants experience the negative health effects caused by poor indoor air quality.

There is therefore a need to assess the quality of indoor air and to consider whether cleaning products and other chemicals being used regularly can be detrimental to health. Viable alternatives to traditional chemicals should also be carefully examined.

### **Health Problems Associated with Poor Indoor Air Quality**

The World Health Organization estimates that 1 out of every 3 worker may be toiling away in a workplace that is making them sick. In 20%-30% of the office population, health problems range from mild-headaches, nausea, dizziness, short-term memory loss, irritability, and itchy eyes or throats to possible damage to the nervous and respiratory systems.

Similarly, the Canadian Centre for Occupational Health and Safety notes that occupants of buildings with poor Indoor Air Quality (IAQ) report a wide range of health problems. These conditions are sometimes referred to as Sick Building Syndrome (SBS) or Tight Building Syndrome (TBS), Building-Related Illness (BRI) and Multiple Chemical Sensitivities (MCS). SBS describes cases in which building occupants experience adverse health effects that are apparently linked to the air or other conditions in a particular building but for which no cause, or specific illness, can be identified. BRI refers to less frequent, but often more serious, illness resulting from conditions in a specific building at a particular time. In these cases, a number of people usually experience a similar set of clinical symptoms and a clear cause can often be found. Legionnaires Disease is an example of BRI caused by bacteria which can contaminate a building's air conditioning system.

A certain percentage of workers may react to the combination of a number of chemicals in indoor air, each of which may occur at very low concentrations. Such reactions are known as MCS. Although some medical organizations have not yet recognized MCS as a disease, it is clear that further research into this condition is needed.

It is widely accepted that poor indoor air quality can be linked to various respiratory problems such as asthma, a chronic condition found in over half a million of Canadian children. It is also the leading cause of school absenteeism. Pollutants that can aggravate respiratory symptoms include biological pollutants (mould and house dust mites) and irritating



chemical pollutants (nitrogen dioxide, ozone and formaldehyde). Lung cancer and forms of lung disease have also been linked to VOC's (Volatile Organic Compounds) which release toxic emissions into the air.

These are just a handful of problems that are associated with chemicals found in indoor environments, many of which are caused by traditional cleaning products. These problems can impact janitorial staff, building occupants, and the environment.

*"...Consumer Product Safety Commission found that 150 chemicals commonly found in homes have been linked to allergies, birth defects, breast cancer, testicular cancer, prostate cancer, declining sperm counts and psychological abnormalities.*

According to the National Research Council, no toxic information is available for more than 80% of the chemicals in everyday-use products. Less than 20% have been tested for acute effects and less than 10% have been tested for chronic, reproductive or mutagenic effects. Most have not been tested for combined or accumulated effects, or for their effects on unborn children. A report by the Consumer Product Safety Commission found that 150 chemicals commonly found in homes have been linked to allergies, birth defects, breast cancer, testicular cancer, prostate cancer, declining sperm counts and psychological abnormalities.

Cleaning chemicals cause harm to the environment not only because of the toxins that are released into the air during their use. Their harmful effect on the environment can also be exacerbated when these chemicals are poured down drains, circulated through building ventilation systems, or disposed of outdoors. Also, certain products gradually emit toxins during storage. Improper dilution of cleaning products further adds to the problem of chemical residues - invisible solvent powder left behind on indoor surfaces that can be absorbed through the skin. These residues can cause irritations to the eyes and skin. Environmental damage can also occur during the development, manufacture, and transport of these products.

**A more complete list of chemicals often found in cleaning products and their effects on your health can be found in the attached Schedule.**

### Cleaning for Your Health

*"Healthy air also increases productivity: a small increase in each employees' output can represent big savings when an entire organization is impacted."*

A regular cleaning maintenance program is necessary to ensure high indoor air quality as it helps to remove contaminants from the building environment. In a business setting, cleaning not only gives your company a positive aesthetic, it is essential to ensure the optimal performance of your employees and thus have a significant effect on your bottom line. There is no doubt that a regular cleaning program reduces the bacteria, viruses and other causes of illness, and ultimately reduces absenteeism. Healthy air also increases productivity: a small increase in each employees' output can represent big savings when an entire organization is impacted.

To fully reap the rewards of a cleaning maintenance program, safer alternatives to traditional cleaning products should be used. In addition to benefits provided by traditional cleaning, green cleaning promotes health, safety and social consciousness. Defined as "cleaning to protect health without harming the environment," green cleaning programs employ processes aimed at improving indoor air quality, recycling, minimizing the use of raw materials and toxic products that require disposal, and include the use of environmentally friendly janitorial products and equipment. The president, CEO and founding chairman of the U.S. Green Building Council (USGBC), Rick Fedrizzi remarks: "Green



*buildings provide operational performance, environmental sensitivity and improved health for their occupants. It's a triple bottom line great companies can relate to."*

When choosing green cleaning products, it is important to be aware of the different options on the market, as well as the advantages and disadvantages of each method. Below is a quick review of biological and chemical green cleaning technologies.

**Biological Cleaning:** A biological cleaning solution uses biological decomposition to clean and deodorize. These solutions harness nature's own processes to recycle waste into simple and essential substances. They meet today's demands for cleaning, odour control, and waste elimination without the use of potentially harmful chemicals.

There are four main advantages to using biological cleaners and odour control products:

- ✓ They are better for the environment and safer for the users and occupants when compared to traditional products;
- ✓ They use highly specialized enzyme producing microbials to clean and control odours by eliminating the soils that traditional chemical products alone cannot treat;
- ✓ They provide residual cleaning up to 80 hours after application and therefore reduce overall labour costs by continuing to work long after application;
- ✓ They help to displace unknown, potentially disease causing bacteria with known, healthy microbials and in this way contribute to our better health.

**Chemical Cleaning:** Chemical based products can also offer an environmentally responsible method for effective cleaning. For example, hydrogen peroxide is particularly attractive because it can break up organic matter and then prevent grease from sticking onto the surface. Other benefits of Hydrogen peroxide are:

- ✓ Creates no toxic or hazardous byproducts – it breaks down into water and oxygen
- ✓ Is safe for hard surfaces and textile finishes
- ✓ Has excellent stain removal properties
- ✓ Eliminates odours
- ✓ Improves wastewater quality in sewer systems
- ✓ Helps reduce biochemical oxygen demand (BOD) and chemical oxygen demand (COD)
  - key parameters in measuring water quality
- ✓ Can detoxify cyanide, nitrogen compounds, chlorine, bisulfate, phenol and a host of other toxic based waste

Although biological and chemical technologies differ from one another, they can safely compliment each other. An ideal sustainable cleaning program will take advantage of the strengths of each technology in order to help obtain an effective and more complete clean.

Not all green cleaning products are created equal. Therefore, it is important to do the research in order to ensure that you have chosen the best products for your company or your household's needs. The products



you choose should meet the following criteria:

- ✓ **Performance** – Saves time while cleaning effectively and ensures the pristine appearance of your educational institution
- ✓ **People** – Safeguards the health and safety of students, teachers and staff
- ✓ **Planet** – Raw materials should be biodegradable and meet the highest environmental standards for safe storage, transportation and disposal. More specifically, materials used should be safe on our water systems and aquatic life.
- ✓ **Price** – Priced competitively when compared to conventional cleaning products in the same categories

In addition, look for products which provide dilution control. By providing accurate dilutions, the cleaning products will perform at their optimal level, thereby maximizing effectiveness, making cleaning easier and less dangerous for your employees, and preventing wastage and residues.

Good customer service, support, and training can be as important as the right cleaning solution. Look for a company who can offer added value and support in the form of hands-on training, sanitation programs, wall charts, proper labels and MSDS sheets. These tools are an integral part of the process of going green because it is crucial that the products you choose are being used properly for optimal performance.

### **Being Green**

In addition to choosing products which are non-toxic and not harmful to the environment, there are additional steps that you can take, both in your home and company, to protect your health and your surrounding environment for future generations. Being green also takes into consideration reductions in energy use, water use and waste disposal, in addition to improvements in indoor air quality.

Heating is responsible for nearly 35% of energy use in office buildings. Often there are simple ways to reduce energy consumption but they are overlooked because of inconvenience. For example, maintaining building temperatures no higher than 16°C when unoccupied and 22°C when occupied during the heating season and no lower than 30°C and 24°C during the cooling season can have a significant impact on overall energy consumption.

Reducing water use not only protects our water sources but delays the need to expand existing treatment plants and prolongs the life of systems. Here are a few steps that to reduce water consumption: regularly check that all valves are operating properly, inspect for and repair leaks on a monthly basis, do not run water longer than necessary.

The use of green cleaning products, coupled with other proactive measures to reduce energy and water use, will undoubtedly have a positive impact on your health, the health of those around you, as well as on the environment. When you think of all the time being spent indoors, and the effects on people and the planet, IAQ becomes a serious matter worth investigating. When each of us takes on the responsibility of switching to green cleaning and implementing other green building practices, we can make an enormous improvement to our surrounding environment.

Source: [http://www.hc-sc.gc.ca/ewh-semt/air/in/index\\_e.html](http://www.hc-sc.gc.ca/ewh-semt/air/in/index_e.html)  
<http://www.safety-council.org/info/OSH/airqual.htm>  
<http://www.asthma.ca/adults/lifestyle/indoor.php>



# Green Cleaning Factsheet

## Indoor Air Quality

- Construction of more tightly sealed structures, reduced air exchange rates in ventilation systems to save energy, use of synthetic building materials and furnishings and the use of chemically formulated household and commercial cleaners, personal care products and pesticides has dramatically increased exposure to indoor air pollutants.
- Studies show that indoor air quality is 2 to 5 times and occasionally 100 times higher than outdoor air.
- Indoor air pollution is among the top 5 environmental risks to public health.
- The 3 most important methods of improving indoor air quality are source removal, air cleaning, and increased ventilation.
- No one is safe from the risks presented by poor Indoor Air Quality.

## Green Cleaning in Education:

- School attendance increased from 89% to 93% after schools started a green cleaning program
- Math scores at basic or above increased from 51% to 76%
- Reading scores at basic or above increased from 59% to 75%

## Green Cleaning and the Environment:

- 5 billion pounds of chemicals are consumed in the U.S. each year to clean and maintain institutional and commercial buildings.
- Many cleaning chemicals actually increase in toxicity when combined with water
- 600,000,000 trees are cut down every year to make toilet paper, paper towels and tissues.

## Green Cleaning and Your Health:

- The air outside your building is often cleaner than the air in your workplace
- The deadliest area in your office is often the janitor's supply closet
- Cleaning chemicals are one of the cited causes of sick building syndrome\_

## Why Go Green?

- To improve Indoor Air Quality and to protect the health and safety of all those who visit and occupy your home or building.
- To help reduce health problems associated with allergens, chemical sensitivities and contaminants
- To increase worker satisfaction, improve morale, reduce absenteeism, and increase productivity, efficiency and retention.
- To save money and improve your bottom line by reducing operating, management, and disposal costs.
- To reduce the impact on our environment by helping to decrease air pollution, water pollution, ozone depletion and global climate change.
- To meet government initiatives to reduce greenhouse gases and other pollutants.
- To position your facility as a community leader in support of environmental initiatives.

Source: <http://www.puregreencleaners.com/facts-about-green-cleaning/>  
<http://www.indoorairqs.com/Facts.html>



## Schedule

### List of Common Harmful Chemicals, Ingredients and Products

**ACETONE** - A neurotoxin, acetone may cause liver and kidney damage, and damage to a developing fetus. It is a skin and eye irritant. Found in spot treatment cleaners, mark and scuff removers, and other products.

**AEROSOL PRODUCTS:** Aerosol propellants may contain propane, formaldehyde, a carcinogen, neurotoxin and central nervous system depressant, methylene chloride, a carcinogen, neurotoxin and reproductive toxin, and nitrous oxide. Products applied with aerosol sprays are broken into minute particles, which can be more deeply inhaled than larger particles, thereby increasing their toxic effect.

**AIR FRESHENERS:** Interfere with your ability to smell by releasing nerve-deadening agents or coating nasal passages with an oil film, usually methoxychlor, a pesticide that accumulates in fat cells. Known toxic chemicals found in an air freshener are formaldehyde, a highly toxic, known carcinogen, and phenol. When phenol touches your skin it can cause it to swell, burn, peel, and break out in hives.

**AMMONIA:** A very volatile chemical which is very damaging to your eyes, respiratory tract and skin. Ammonia irritates the respiratory system when inhaled, is poisonous when swallowed and can cause burns to the skin. Undiluted, ammonia is a severe eye and respiratory irritant that can cause severe burning pain, and corrosive damage including chemical burns, cataracts and corneal damage. It can also cause kidney and liver damage. Repeated or prolonged exposure to vapours can result in bronchitis and pneumonia. Found in a wide range of cleaning products. Ammonia will react with bleach to form poisonous chlorine gas that can cause burning and watering of eyes, as well as burning of the nose and mouth.

**ANTIBACTERIAL CLEANERS:** May contain triclosan, which is absorbed through the skin and can be tied to liver damage.

**BLEACH:** A strong corrosive. It will irritate or burn the skin, eyes and respiratory tract. It may cause pulmonary edema or vomiting and coma if ingested. Never mix bleach with acid toilet bowl cleaners or ammonia. These mixtures may produce fumes which can be deadly.

**CARPET AND UPHOLSTERY SHAMPOO:** Most formulas are designed to over power the stain itself; they accomplish the task but not without using highly toxic substances. Some include perchlorethylene, a known carcinogen that damages liver, kidney and nervous system damage; and ammonium hydroxide, a corrosive, extremely irritable to eyes, skin and respiratory passages.

**CHLORINE:** Chlorine is the number one cause of breast cancer and can be lethal. Scientists won't handle chlorine without protective gloves, facemasks, and ventilation, yet it is in most store-brand cleaners, including dishwasher detergents. The harmful effects are intensified when the fumes are heated, as in the shower. It is in our drinking water, swimming pools, Jacuzzis, and more.

**DIETHANOLAMINE (DEA):** A suspected carcinogen. This chemical is a skin and respiratory toxicant and a severe eye irritant. Used in a wide range of household cleaning products.

**D-LIMONENE:** This chemical is produced by cold-pressing orange peels. Used as a "natural" alternative because it's derived from oranges, d-limonene has been found to react with high levels of indoor ozone and create formaldehyde, as well as a variety of related chemicals that have been linked to respiratory conditions. On its own, it may be irritating to skin, eyes or airways and although not conclusively proven, some suspect it may cause cancer. There is some evidence of carcinogenicity. D-limonene is the active ingredient in some insecticides. It is used as a solvent in many all-purpose cleaning products, especially 'citrus' and 'orange' cleaners. Also listed on labels as citrus oil and orange oil.

**DISHWASHER DETERGENTS:** Most products contain chlorine in a dry form that is highly concentrated. The #1 cause of household poisoning is dish detergent. Dishwashing liquids are labelled "harmful if swallowed." However, each time you wash your dishes, some residue is left on them, which accumulates with each washing. Your food picks up part of the residue, especially if your meal is hot when you eat it.

**ETHOXYLATED NONYL PHENOL:** Nonyl phenols are hormone disruptors and some contain traces of ethylene oxide, a known human carcinogen. They are eye and skin irritants. Used in laundry detergents and other cleaning products.



**FORMALDEHYDE:** In lab tests, formaldehyde has caused cancer and damaged DNA. Formaldehyde is also a sensitizer, with the potential to cause asthma. Several laboratory studies have shown it to be a central nervous system depressant. Exposure to formaldehyde may cause joint pain, depression, headaches, chest pains, ear infections, chronic fatigue, dizziness and loss of sleep. While formaldehyde naturally occurs in the human body in minute amounts, it is estimated that 20% of people exposed to it will experience an allergic reaction. Used in a wide range of products, including some furniture polishes. Formaldehyde may be released by other chemicals, eg. quaternary 15.

**FRAGRANCE:** Fragrance on a label can indicate the presence of up to 4,000 separate ingredients, most of which are synthetic. Many compounds in fragrance are human toxins and suspected or proven carcinogens. The US National Institute of Occupational Safety and Health's evaluation of 2,983 fragrance chemicals for health effects identified 884 of them as toxic substances. Synthetic fragrances are known to trigger asthma attacks. The US Environmental Protection Agency found that 100% of perfumes contain toluene, which can cause liver, kidney and brain damage as well as damage to a developing fetus. Symptoms reported to the FDA from fragrance exposure have included headaches, dizziness, rashes, skin discoloration, violent coughing and vomiting, and allergic skin irritation. Clinical observations by medical doctors have shown that exposure to fragrances can affect the central nervous system, causing depression, hyperactivity, irritability, inability to cope, and other behavioural changes. Fragrance is a common skin irritant.

**FURNITURE POLISH:** Contains petroleum distillates, which are highly flammable and can cause skin and lung cancer. They contain nitrobenzene, which is easily absorbed through the skin and extremely toxic.

**LAUNDRY ROOM PRODUCTS:** Laundry detergents contain phosphorus, enzymes, ammonia, naphthalene, phenol, sodium nitrilotriacetate and countless other chemicals. These substances can cause rashes, itches, allergies, sinus problems and more. The residue left on your clothes, bed sheets, etc. is absorbed through your skin, as is everything else you touch.

**LYE:** (sodium hydroxide, caustic soda) is corrosive and causes burns on contact.

**METHYLENE CHLORIDE:** Methylene chloride is a carcinogen, a neurotoxin and a reproductive toxin. On inhalation, it can cause liver and brain damage, irregular heartbeat, and even heart attack. It is a severe skin and moderate eye irritant. Used in stain removers.

**MONOETHANOLAMINE:** This chemical may cause liver, kidney and reproductive damage, as well as depression of the central nervous system. Inhalation of high concentrations - when cleaning an oven for example - can cause dizziness or even coma. The chemical can also be absorbed through the skin. It is a moderate skin irritant, and a severe eye irritant. Found in many cleaning products, including oven cleaners, tub and tile cleaners, laundry pre-soaks, floor strippers and carpet cleaners.

**MORPHOLINE:** This corrosive ingredient can severely irritate and burn skin and eyes, and can even cause blindness if splashed in eyes. It can cause liver and kidney damage, and long-term exposure can result in bronchitis. It reacts with nitrites (added as a preservative in some products, or present as a contaminant) to form carcinogenic nitrosamines. Morpholine is a moderate to severe eye, skin and mucous membrane irritant. Used as a solvent in a number of cleaning products, including some furniture polishes and abrasive cleansers.

**NAPHTHALENE:** This registered pesticide is a suspected carcinogen and is most commonly found in mothballs, and some other pest repellents, as well as in deodorizers. As a reproductive toxin, it is transported across the placenta and can cause blood damage. It can cause liver and kidney damage, and corneal damage and cataracts. Skin exposure is especially dangerous to newborns.

**OVEN CLEANER:** One of the most toxic products people use. They contain lye and ammonia, which eat the skin, and the fumes linger and affect the respiratory system. Then there is the residue that is intensified the next time you turn your oven on. Use sea salt and baking soda instead.

**PARABENS:** Parabens are hormone disruptors. Widely used in cleaning products as preservatives, paraben is usually preceded by the prefixes methyl-, ethyl-, butyl-, or propyl. Parabens may cause contact dermatitis in some individuals.



**PARADICHLOROBENZENE:** This highly volatile registered pesticide is in the same chemical class as DDT. It is a suspected carcinogen, and may cause lung, liver and kidney damage. It is used in mothballs and some washroom deodorizers and urinal blocks.

**PBT:** Organic compounds that are resistant to environmental degradation through chemical, biological, and photolytic processes. Because of this, they have been observed to persist in the environment, to be capable of long-range transport, bioaccumulation in human and animal tissue, biomagnifies in food chains, and to have potential significant impacts on human health and the environment. Pollutants are chemicals that are toxic, persist in the environment bioaccumulation in food chains and, thus, pose risks to human health and ecosystems. The biggest concerns about PBTs are that they transfer rather easily among air, water, and land, and span boundaries of programs, geography, and generations.

**PETROLEUM DISTILLATES:** Health Hazards- Cardio-vascular, Neurotoxicant, Respiratory Toxicant.

**PHOSPHATES:** When excess plant nutrients, especially phosphorous, enter our rivers and lakes they increase the amount of nutrients available for plant growth; a process known as eutrophication. This causes excessive growth of plants such as algae, causing what is known as algal bloom and appearing to turn the lake green. This results in a very unhealthy lake incapable of supporting plant and animal life. The lake dies. In powders/liquids that utilise phosphates to carry out these functions, the phosphate content can be up to 25% of that detergent.

**PHOSPHORIC ACID:** Extremely corrosive, it can severely irritate and burn the skin and eyes. Breathing vapours can make the lungs ache, and it may be toxic to the central nervous system. Found in some liquid dishwasher detergents, metal polishes, some disinfectants, and bathroom cleaners, especially those that remove lime and mildew.

**SODIUM DICHLOROISOCYANURATE DIHYDRATE:** This corrosive chemical is a severe eye, skin and respiratory irritant. It may cause liver and gastrointestinal damage, and may be toxic to the central nervous system. It will react with bleach to form poisonous chlorine gas that can cause burning and watering of eyes, as well as burning of the nose and mouth. It is found in some toilet bowl cleaners and deodorizers, as well as industrial detergents and some institutional dishwashing detergents.

**SODIUM HYPOCHLORITE (BLEACH):** A corrosive chemical, sodium hypochlorite is an eye, skin and respiratory irritant, as well as a sensitizer. It is especially hazardous to people with heart conditions or asthma, and can be fatal if swallowed. It may be a neurotoxin and toxic to the liver. Found in a wide range of household cleaners.

**SODIUM LAURYL SULFATE:** Sodium lauryl sulfate (SLS) is used as a lathering agent. This chemical is a known skin irritant. It also enhances the allergic response to other toxins and allergens. The U.S. government has warned manufacturers of unacceptable levels of dioxin formation in some products containing this ingredient. SLS can react with other ingredients to form cancer-causing nitrosamines

**TOILET BOWL CLEANERS:** Usually contain hydrochloric acid, a highly corrosive irritant to both skin and eyes that damages kidneys and liver; and hypochlorite bleach, a corrosive irritant that can burn eyes, skin and respiratory tract. Toilet bowl cleaners also may cause pulmonary edema, vomiting or coma if ingested. Contact with other chemicals may cause chlorine fumes which may be fatal.

**TOLUENE:** Exposure to toluene may cause liver, kidney and brain damage. It is also a reproductive toxin which can damage a developing fetus.

**TURPENTINE:** This chemical can cause allergic sensitization, and kidney, bladder and central nervous system damage. It is an eye irritant. Found in specialty solvent cleaners, furniture polish and shoe products.

**XYLENE:** Xylene has significant neurotoxic effects, including loss of memory. High exposure can lead to loss of consciousness and even death. It may damage liver, kidneys and the developing fetus. It is a severe eye and moderate skin irritant. Used in some spot removers, floor polishes, ironing aids and other products.

