

# Improve the Indoor Air Quality in Your Home

香港特別行政區政府  
環境保護署

Indoor Air Quality  
Information Centre  
室內空氣質素資訊中心

## Improve the Indoor Air Quality in Your Home

We spend a large part of our lives at home. We would all like the air we breathe at home to be fresh and healthy. Good air quality is important for everyone, but it is especially important for certain vulnerable members of the household, including babies, children, pregnant women and their unborn babies, the elderly and those suffering from respiratory or allergic disease, such as asthma.

## How do air pollutants enter a home?

There are many possible sources of air pollutants in homes. Air pollution may increase considerably during renovation work. Another important cause of poor air quality in homes can be the burning of fuels in gas stoves and ovens. Other pollutants found in homes originate from building materials. Smoking, of course, is a major cause of air pollution. The occupants themselves can increase levels of water vapour, carbon dioxide and body odour in indoor air. Homes which are poorly ventilated can have high levels of biological contaminants arising from mould growth on damp surfaces. This poor air quality adds to the general discomfort of living in such housing conditions, particularly for those with allergic conditions. This booklet tells you what you can do if your home is in this state.

## Improve the Indoor Air Quality in Your Home

### What are the common indoor air pollutants in Hong Kong?

Our indoor environment may contain a lot of air pollutants. Carbon dioxide level is a key indicator for indoor air pollutions. Living things breathe out carbon dioxide. A high level of carbon dioxide in the indoor means there is an inadequate supply of fresh air. It will make you feel sleepy, and provide a warning for possible build-up of other indoor air pollutants, which include:

- environmental tobacco smoke from smoking;
- volatile organic compounds from consumer products such as cosmetics, pesticide, cleaning agent, etc.;
- formaldehyde from pressed wood products such as furniture;
- biological contaminants from people, pets and plants; and
- radon from building materials.

### How do you know if you have a potential indoor air quality problem?

You would have a potential indoor air quality problem if:

- your friends or members of your family smoke in your areas of activity or worse still, in your presence;
- you could smell mouldy and damp odour, and observe visible mould growth;
- you have recently carried out renovation, laid a new carpet, or bought a new set of pressed-wood furniture;
- you use consumer products with high content of volatile organic compounds;
- the fresh air intake of your in-use air-conditioner is closed all the time or the filter of the air-conditioner is dirty.

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### ENVIRONMENTAL TOBACCO SMOKE

Environmental tobacco smoke (ETS) is a mixture of the smoke given off by the burning end of a cigarette, pipe, or cigar, and the smoke exhaled by the smoker. It is a complex pollutant to which people are frequently exposed indoors where smoking occurs. More than 4,000 gaseous and particulate substances are emitted in the ETS during a puff of the tobacco products. Many of these substances are strong irritants and at least 40 are known to cause cancer in humans or animals. The particulates in ETS are also hazardous because they are inhalable and can remain airborne for hours after smoking stops. They might attract radon decay products thus presenting an even greater health risk.

### What are the health effects?

While smoking is hazardous to the health of smokers, ETS also affects non-smokers. Other than causing eye, nose and throat irritation, it would:

- significantly increase the risk of lung cancer and heart disease in non-smokers.
- substantially increase respiratory illness in children. Children who live in households where there are smokers are more likely to have respiratory infections. Additional effects include increases in coughing, wheezing, sputum production, impaired lung function and slower lung growth.

Local studies also found that children living in a home with one or more smoking family members have a higher risk of respiratory problems, and that non-smoking women have increased risk of lung cancer if their husbands smoke.

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### What can you do to avoid the effects of ETS for yourself and others?

- quit smoking for your own health and your family;
- if you choose to smoke, please do not smoke at home;
- encourage your family, friends, and visitors not to smoke in your home;
- if you are a smoker yourself, ensure that you do not smoke in the presence of others, particularly children; and
- if you choose to smoke at home, increase the ventilation by opening the door or windows. However, ventilation alone does not adequately safeguard against exposure to environmental tobacco smoke.

### VOLATILE ORGANIC COMPOUNDS

Volatile organic compounds (VOCs) are a diverse group of organic compounds that evaporate at room temperature. In a typical indoor environment, there are more than 100 compounds, including formaldehyde, that can be classified as VOCs emitting from many sources such as construction materials, furnishings, cosmetics cleaning agents, pesticides, and tobacco smoke. Clothes which have been dry-cleaned may contain residual solvents.

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### What are the health effects?

Exposure to VOCs may result in both acute and chronic health effects. Many of the VOCs are strongly addictive and can result in the depression of the central nervous system. In sufficient quantities, VOCs can cause eye, nose and throat irritations, headaches, dizziness, visual disorder, and many impairments. Many of the VOCs which have been measured indoors are known human or animal carcinogens. As existing knowledge of toxicological effects of VOCs and their mixtures is still incomplete, it is always prudent to minimise exposure to them.

### What can you do to avoid effects of VOC?

- select low VOC products as far as possible. When handling VOC containing products like paints, adhesives, cleaning agents; always read and follow closely the instruction for the manufacturers. Note any warnings on the label;
- avoid using paints, glues, paint-stripper and varnishes in confined spaces. Make sure there is adequate ventilation and if possible take the work outside;
- only buy as much as you need at the time. Store any unused products in a ventilated cupboard;
- schedule redecoration work, pest control activity, etc. for unoccupied times. Flush the affected area with fresh air to dilute emission upon completion of work;
- dispose of surplus products safely; and
- if you have clothes or bedding dry-cleaned, make sure they are returned to you properly dried and air them thoroughly before use.

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### FORMALDEHYDE

Formaldehyde is a colourless gas with a pungent odour. The predominant emission source of formaldehyde is pressed-wood products made with urea-formaldehyde resins. These resins are used as adhesives in materials such as particle board, medium-density fibreboard, plywood and other pressed-wood products. Emissions of formaldehyde are highest in the first few months when products are new. Later, formaldehyde is released more slowly, but the release continues for a long period of time, often over a number of years. Formaldehyde is also emitted from cigarette smoking and combustion sources such as gas appliances, and kerosene heaters. Formaldehyde may also be found in other interior decorative items such as foam insulation, adhesives, fabrics, carpets and floor coverings, and in paper products and cosmetics.

### What are the health effects?

Low concentrations in the air may irritate the eyes, nose and throat, possibly causing watery eyes, sneezing and coughing. At higher concentrations, it can induce a feeling of nausea and shortness of breath.

The International Agency for Research of Cancer (IARC) classifies formaldehyde as a human cancer causing substance.

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### What can you do to avoid the effects of formaldehyde?

- the most effective approach is to keep major sources of formaldehyde out of your premises by avoiding building materials, furnishings, or other products that emit formaldehyde, particularly pressed-wood products made with urea-formaldehyde resins;
- generally speaking, furniture that consists mostly of bare pressed-wood products will emit more formaldehyde than those constructed of pressed-wood products that are covered fully by laminate or a water-repellent liquid finish. A rule of thumb is that if the finish can keep water away from the pressed-wood material, it can also reduce the escape of formaldehyde from the material;
- old furniture and furnishings, especially those constructed of solid wood, usually emit relatively little formaldehyde. You may consider not to replace them by new ones unless absolutely necessary;
- pay attention to the formaldehyde content of wooden panels of new furniture. Formaldehyde emission problems can be greatly reduced if the furniture is made from wooden panels with formaldehyde content meeting the European E1 standard or in compliance with the China GB18580-2001, GB18584-2001 or similar standards;
- new furniture should preferably be aired out for at least several days or weeks before they are admitted indoors. You may consider asking your furniture supplier to have them aired prior to delivery to your premises;
- you should ensure your home is adequately ventilated. Open the windows or the fresh air intake of your air conditioner; and
- emissions of formaldehyde increase as humidity and temperature increase. Reducing humidity and temperature on hot and humid days will help reduce formaldehyde levels.



## Improve the Indoor Air Quality in Your Home

### BIOLOGICAL CONTAMINANTS

Biological contaminants include bacteria, fungi, viruses and dust mites. There are many kinds and sources of these contaminants. Bacteria are carried by people, animals, and soil and plant debris. Dust mites are microscopic insects which flourish in damp and warm environments such as mattresses, bedclothes and heavily used upholstered furniture. Poorly maintained ventilation systems can be the breeding grounds for fungi and other biological contaminants. The following conditions will provide a favourable environment for biological contaminants to flourish:

- your homes are dusty, poorly ventilated or damp;
- air conditions are not regularly maintained or cleaned;
- there are mouldy, damp odours with evidence of previous flood or water leakage;
- ceiling tiles, carpet or building materials are mouldy, dirty or wet.

### What are the health effects?

Some biological contaminants trigger allergic reactions, including hypersensitivity pneumonitis, allergic rhinitis, and some types of asthma. Some fungi may also release disease-causing toxins. Symptoms of health problems caused by biological contaminants include sneezing, watery eyes, coughing, shortness of breath, dizziness, lethargy, fever, and digestive problems. Children, aged people, and those already with breathing problems, allergies, and lung disease are particularly vulnerable.

## Improve the Indoor Air Quality in Your Home

### What can you do to avoid the effects of biological contaminants?

- keep your home clean. Dust mites and other allergy-causing agents can often be reduced through regular cleaning;
- maintain good ventilation and keep indoor air clean and dry. Remove sources of water or moisture that encourage fungal growth and repair all external and internal leaks promptly;
- install and use in kitchens and bathrooms the exhaust fans that are vented to the outdoors;
- remove and discard contaminated materials such as mouldy ceiling tiles and carpets as soon as possible. If possible, wash all surfaces that have been contaminated by fungi with dilute bleach;
- clean the filters of air conditioners at regular intervals; and
- if your home is damp because of structural reasons, repair the defect.

## Improve the Indoor Air Quality in Your Home

### RADON

Radon is a radioactive gas which occurs naturally in rocks and soils. Natural radon emitted from soil, rock or from building materials such as concrete made with granite may enter the basement, ground or upper floors of buildings from the walls and floors, or through cracks or openings in the ground. If a building is not well ventilated, radon gas will become trapped and accumulate.

Granite is very widely used in concrete for building construction in Hong Kong. High radon concentrations may be found on any floor of any building. You should check the following to see if you have a potential radon problem:-

- whether you keep the windows of your accommodation shut most of the time, or if you close the fresh air intake of the air conditioning or ventilation systems;
- whether your accommodation is in the basement or on the ground floor; or
- whether the building is extensively constructed from granite, such as a stone house.

## Improve the Indoor Air Quality in Your Home

### What are the health effects?

Long term exposure to radon may increase the risk of lung cancer. Exposure to a combination of tobacco smoke and high radon levels poses an even higher risk. A cigarette smoker runs three times more risk of getting lung cancer than non-smokers exposed to high radon levels.

### What can you do to avoid the effects of radon?

Here are a few simple ways to reduce the radon risk associated with your home:-

- open your windows more often;
- set the fresh air intake and exhaust correctly if you have air conditioners or ventilation systems;
- seal any crack on the ground or walls if your home is in a basement or on the ground floor;
- apply less permeable wall covering such as wall paper;
- quit smoking immediately if you are a smoker; and
- spend more of your leisure time outdoors in areas with good air quality, such as country parks.

Improve the Indoor Air Quality in Your Home

For more information, please contact :

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改善家居的室內空氣質素

如想得到更多資料，請聯絡：

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## 改善家居的室內空氣質素

### 氡氣對健康有何影響？

長期接觸氡氣可增加患肺癌的機會。吸入二手煙和高濃度氡氣的混合物，更會大大提高患肺癌的機會。而吸入同樣高濃度的氡氣，吸煙人士較非吸煙人士患肺癌的機會高出三倍。

### 如何避免受到氡氣的影響？

下列一些間單的措施，有助減低家居的氡氣：

- 時常打開窗戶；
- 如使用冷氣機或通風系統時，適當地調較鮮風入口；
- 位於地庫或地面層的家居，應修補地面或牆壁上的任何縫隙；
- 牆壁應鋪上不易滲透的物料如牆紙；
- 如有吸煙的習性，應立即戒除；及
- 空閒時間多到郊野公園等空氣質素良好的戶外地方。

## 改善家居的室內空氣質素

### 氡氣

氡氣是一種放射性氣體，存在於石頭和泥土之中。天然的氡氣由泥土、石頭或建造物料（例如由花崗岩製成的混凝土）釋出，可經由牆壁和地板，或經由地面的裂縫或空隙，進入樓宇的地庫、地面層或高層單位。如樓宇內空氣流通欠佳，氡氣便會滯留及積聚。

本港建造業使用的混凝土，多含花崗岩。不論樓宇種類、層數高低，均可能存有高濃度的氡氣，應檢查下列情況，看看自己是否有可能受到氡氣的潛在影響：

- 住所的窗戶、空調或機械通風系統的新鮮空氣入口，是否大部份時間都關閉；
- 住所是否位於地庫或地面層；或
- 樓宇是否大多以花崗岩作為建造物料，例如石屋。



## 改善家居的室內空氣質素

### 如何避免受到生物污染物的影響？

- 保持家居室內環境清潔。定期把地方清洗有助消滅塵蟎及其他過敏原；
- 保持空氣流通及室內空氣清潔清爽，清除能引致真菌滋生的水源或潮濕源頭，盡快維修屋內外有滲漏現象的地方；
- 在廚房和浴室安裝及使用抽氣扇，將廢氣抽出室外排放；
- 盡快拆除及棄掉已受污染的物料，如發霉的天花瓦片和地氈。如有可能，使用稀釋漂白劑清洗曾受真菌污染的表面；
- 定期清洗冷氣機的隔塵網；
- 如家居因為結構問題而潮濕，應維修破損的地方。

## 改善家居的室內空氣質素

### 生物污染物

生物污染物包括細菌、真菌、過濾性病毒和塵蟎。這類污染物種類繁多，且來自多種污染源頭。細菌可經由人類、動物、泥土和植物的殘餘物傳播。塵蟎則是一種極細小的昆蟲，通常生長在潮濕溫暖的環境中，例如床褥、床單枕套及經常使用裝有墊套的傢具。欠缺妥善維修的通風系統，也是真菌和其他生物污染物滋長的溫床。

下列情況會成為生物污染物滋生的溫床：

- 住所積有塵埃，空氣不流通或潮濕；
- 冷氣機沒有定期維修或清洗；
- 以前曾發生水浸或漏水，留下發霉、潮濕的氣味；
- 天花瓦片、地氈或建築造物料發霉、骯髒或潮濕。

### 生物污染物對健康有何影響？

有些生物污染物能引致過敏反應，包括過敏性肺炎、變應性鼻炎及氣喘；有些真菌甚至可能釋放出一些致病的毒素。由生物污染物所引起的病徵包括打噴嚏、流眼水、咳嗽、呼吸急促、暈眩、精神不振、發熱和消化困難。兒童、老人及患有呼吸系統毛病、過敏性和肺病的人士尤其容易受到影響。

## 改善家居的室內空氣質素

### 如何避免受到甲醛的影響？

- 最有效的方法是避免你的居所存有甲醛的主要源頭，如建築物料、傢俬和室內陳設或其他釋出甲醛的產品，特別是用脲甲醛樹脂製成的木壓製品；
- 一般而言，主要以壓板製成的傢俬，較以疊層或塗上防水罩面漆的壓板傢俬，放出更多甲醛。原因是防水罩面漆能防止水份從壓製木料流失，也可減少甲醛自物料中釋出的機會；
- 舊傢俬和室內陳設，特別是用實木製成的物品，通常釋出較少量甲醛，如無必要，不應更換；
- 購買或訂造新木製傢俬時要留意板材的甲醛含量，使用低甲醛(如符合歐洲 E1、中國GB18580-2001，GB18584-2001或其他對等標準)的板材可大大減少日後從木製傢俬釋出甲醛的問題。
- 新傢俬應放在室外至少數天或數星期，讓風吹至沒有異味才放進室內；亦可考慮要求傢俬供應商讓傢俬放在室外風乾後才送往你的處所；
- 應確保自己的家居有足夠新鮮空氣流通；應該常打開窗戶或開啟冷氣機的鮮風入口；  
及
- 由於濕度和溫度上升會增加甲醛的排放量；在炎熱潮濕的日子降低濕度和溫度，有助降低甲醛的水平。

## 改善家居的室內空氣質素

### 甲醛

甲醛是一種無色而刺鼻的氣體，主要的排放源頭是一些用脲甲醛樹脂製成的木壓製產品。這些樹脂是用作物料中的黏合劑，例如粒子板、中密度纖維板、膠合板及其他木壓製產品。新製產品在最初幾個月內所排放的甲醛量最高；之後，甲醛釋出的速度會逐漸減慢，但仍會持續一段長時間，通常達至數年以上。甲醛也會從吸煙及燃燒裝置，如氣體裝置及火水暖爐排出。另外，甲醛也可在發泡膠隔熱層、黏合劑、織物、地氈、地板、以及紙製品和化妝品中找到。

### 甲醛對健康有何影響？

空氣中存有低濃度的甲醛，可令眼睛、鼻子和喉部不適，更可能導致流眼水、打噴嚏和咳嗽。而高濃度的甲醛更可使人作嘔及呼吸急促。國際研究癌病組織（IARC）已將甲醛分類為對人類致癌的物質。

## 改善家居的室內空氣質素

### 揮發性有機化合物對健康有何影響？

與 VOCs 接觸，可能會對健康構成短期性及長期性的不良影響。很多種類的 VOCs 會容易使人上癮，亦會抑制中樞神經系統。高濃度的 VOCs 可引致眼睛、鼻子和喉嚨不適，甚至頭痛、暈眩、視力失常及其他多種傷害。有多種可於室內測量到的 VOCs 及其混合物的毒理學認識還未足夠，最審慎的做法便是盡量減少與其接觸。

### 如何避免受到揮發性有機化合物的影響？

- 應盡量選購低 VOCs 含量的產品，在處理含 VOCs 產品如油漆、黏合劑、清潔劑時，應仔細閱讀各小心依照說明書的指示；留意標籤上的任何警告字句；
- 避免在密封的空間內使用油漆、膠水、脫漆劑及清漆；確保有足夠通風，並盡可能在室外進行這類工作；
- 只購買適量的含 VOCs 產品；並將任何未用的產品存放在通風的櫃內；
- 裝修工程和防蟲等工作應該安排在樓宇沒有人使用的時段內進行。工程完成後，讓鮮風吹透曾經進行工程的地方，以減低 VOCs 積存在單位內；
- 妥善地棄置剩餘含 VOCs 的用品；及
- 如果你有衣服或床上用品剛完成乾洗，在使用前應確保已經完全晾曬乾透。

## 改善家居的室內空氣質素

### 如何可使自己及其他人避免受到二手煙的影響？

- 為了自己及家人的健康，戒除吸煙的習慣；
- 若然要吸煙的話，不要在家中吸煙；
- 請你的家人、朋友和客人不要在你家中吸煙；
- 如你本身是吸煙人士，確保不在其他人特別是兒童面前吸煙；及
- 如你選擇在家中吸煙，應打開門窗使空氣更流通；然而，單憑空氣流通也不足以淡化二手煙對人體的影響。

### 揮發性有機化合物

揮發性有機化合物（或間稱VOCs）包含各種可於室溫下揮發的有機化合物。在一般的室內環境中，有著100種以上的VOCs，其中包括甲醛。這些VOCs可由多種不同源頭釋放出來，如建造物料、傢俬、化妝品、清潔劑、殺蟲劑及二手煙等。乾洗後的衣服亦可能殘存VOCs。

## 改善家居的室內空氣質素

### 二手煙

二手煙是由香煙、煙斗或雪茄燃燒時飄散出來或吸煙人士抽煙時呼出的一種混合煙霧。在許多吸煙的場所中二手煙是最常接觸到的污染物。抽煙時噴出的煙霧可散發超過4,000種氣體和微粒，部分這些物質都是很強烈的刺激物，其中至少有40種在人類或動物身上可引致癌病。二手煙中所含的微粒是尤其危險的，因為在停止吸煙後，這些微粒仍能停留在空氣中數小時，可被人吸入體內，亦可能和氮氣的衰變產物混合一起，吸入後對人體健康造成更大的的傷害。

### 二手煙對健康有何影響？

吸煙危害吸煙人士本身健康的同時，二手煙也影響非吸煙人士。除了刺激眼、鼻和咽喉外，它也會：

- 明顯地增加非吸煙人士患上肺癌和心臟病的機會。
- 大大增加兒童患呼吸系統疾病的機會。如果兒童與一些吸煙人士同住的話，他們的呼吸系統會較易受到感染。其他影響包括增加咳嗽、氣喘、痰多、損壞肺部功能和減緩肺部發育等。

根據本地研究發現，如果在一個家庭中，有一個或以上的家庭成員吸煙，兒童會有較大機會患上呼吸系統疾病。如果丈夫有吸煙的習慣，妻子即使本身不吸煙也會較容易患上肺癌。

## 改善家居的室內空氣質素

### 甚麼是香港普遍的室內空氣污染物？

我們的室內環境含有許多空氣污染物。二氧化碳的水平是室內空氣污染的重要指標。生物呼出二氧化碳，當室內存有高水平的二氧化碳時，即表示沒有足夠的新鮮空氣；這樣會使人瞌睡，亦可反映室內可能積聚了其他的空氣污染物，包括：

- 吸煙所造成的二手煙；
- 消費品如化粧品、殺蟲劑、清潔劑等所釋出的揮發性有機化合物；
- 木壓製產品如傢俬所釋出的甲醛；
- 來自人類、寵物和植物的生物污染物；及
- 建造物料所釋放出的氬氣。

### 你如何知道受到室內空氣質素問題的潛在影響？

如有下列情況出現，你很可能已經受到室內空氣質素問題的潛在影響；

- 你的朋友或家人在你的活動範圍內吸煙，或更甚者在你的面前吸煙；
- 你嗅到發霉、潮濕的氣味，並察覺有霉菌滋生跡象；
- 家中剛完成裝修工程，鋪設新地氈，或購買了一套新的木壓製傢俬；
- 你使用高含量揮發性有機化合物的日用品；
- 冷氣機使用的時候其鮮風入口經常關閉或使用不潔的隔塵網。



## 改善家居的室內空氣質素

我們大部分時間在家中渡過，自然希望在家中可呼吸到清新和健康的空氣。優質空氣，對每一個人都很重要，尤其是家中一些易受影響的成員，包括嬰兒、小孩、孕婦、老人、和有呼吸系統毛病或患過敏症者，如哮喘人士。

## 空氣污染物如何進入家中？

家居中的空氣污染物來自多種源頭。當進行裝修翻新工程時，空氣污染的程度可大幅增加。導致家居中空氣質素欠佳的另一個重要成因，是來自使用氣體煮食爐和焗爐時所產生的燃燒物料。其他在家中找到的污染物則來自建造物料，當然吸煙也是導致空氣污染的主因。而居住者本身也可以令室內空氣中的水蒸氣、二氧化碳和人體氣味的水平提高。空氣流通欠佳的家居，因潮濕的表面助長黴菌生長，可存偏高的生物污染水平。惡劣的空氣質素，使生活在上述居住環境的人更感不適，尤其患有過敏症的人。本小冊子教你如何改善上述情況。

改善家居的  
室內空氣質素

香港特別行政區政府  
環境保護署

Indoor Air Quality  
Information Centre  
室內空氣質素資訊中心