

Why is Indoor Air Quality Important?

Indoor air quality can impact significantly on the health, comfort and productivity of occupants of office environments. It is, therefore a major concern to employers, building managers, and employees.

Proper ventilation helps improve indoor air quality. Unlike outdoor air, indoor air is constantly being recycled. This causes the ventilation system to trap and build up pollutants. Common pollutants include dust, mould and spores, pollen, and smoke.

Natural and Mechanical Ventilation

Natural ventilation occurs when windows and other deliberate openings in the building allow indoor and outdoor air to be exchanged passively.

Mechanical ventilation involves the use of powered equipment, e.g. fans, to move air. Buildings with mechanical ventilation systems are sealed and a Heating, Ventilation and Air Conditioning (HVAC) system controls the air exchange and conditions the air that is delivered to the occupants.

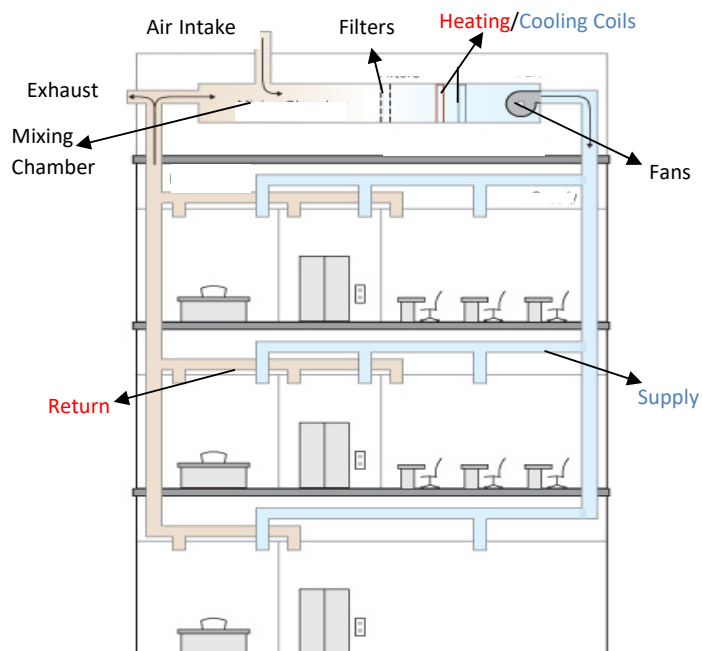
Heating, Ventilation and Air-Conditioning (HVAC) Systems

HVAC systems include all of the equipment used to ventilate, heat, and cool the building; to move the air around the building (ductwork); and to filter and clean the air. These systems can have a significant impact on how pollutants are distributed and removed. In Barbados, the heating component of this system is not utilised due to the annual temperatures which we experience.

How Do HVAC Systems Work?

(See Figure 1) Outside (supply) air is drawn into a building's HVAC system through the air intake by the air handling unit (AHU). The supply air is filtered to remove particulate matter, heated or cooled, and then circulated throughout the building by the fans via the air distribution system.

Figure 1: Basic HVAC System



Adapted from: University of Pittsburgh Medical Centre – Centre for Biosecurity

Conditioned (return) air travels to the AHU where it is mixed with fresh air, re-filtered, re-conditioned, and re-circulated throughout the building.

Effects of HVAC Systems on IAQ

Pollutants in the HVAC system (e.g. mould or bacteria in the duct lining or on filters) may be spread throughout the office from one portion of the building to another through the HVAC duct distribution system. Regular maintenance can help minimise these problems.

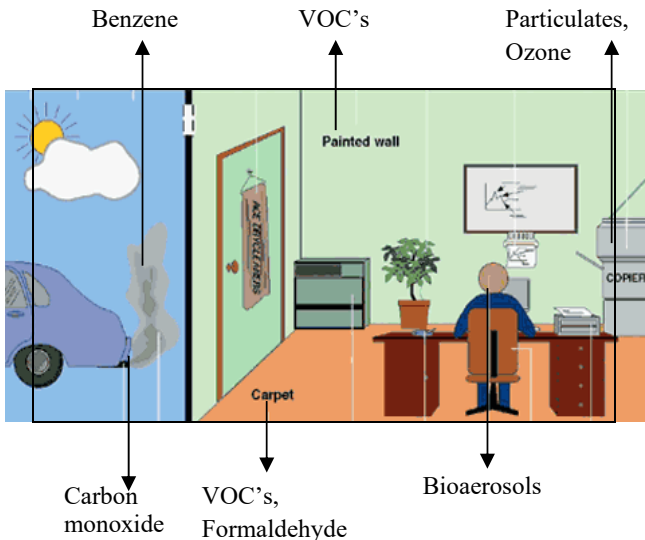
Sources of Indoor Air Pollutants

Biological contaminants: Condensation and inadequate maintenance, poor housekeeping and insufficient humidity control may result in increased concentrations of bacteria and fungi by creating conditions that support their growth. Mould is usually present in small amounts in indoor air but conditions should not promote its growth.

Chemical pollutants including Volatile Organic Compounds (VOC's): Sources of chemical pollutants include tobacco smoke and emissions from products used in the building, such as office equipment, and cleaning products, and human activities such as perfumes and air fresheners.

Particles: Particles of dust, dirt, or other substances may enter the building from the outside and may also be produced by activities within buildings such as smoking, printing, copying, and operating equipment. Other particulate sources include cleaning products, carpet, paper dust and human skin cell fragments.

Figure 2: Primary sources of indoor air pollutants



Adapted from the Australian Government, Department of the Environment, Water Heritage and the Arts

Sick Building Syndrome (SBS)

This condition is characterised by symptoms such as itchy or watery eyes, dizziness, headaches, nausea, sinus congestion, lethargy, and an inability to concentrate. Respiratory infections and aggravated symptoms associated with allergies and asthma may also result from SBS.

SBS evolved as a result of the increasing incidence of indoor air pollution, caused mainly by the move from natural to mechanical ventilation in offices. The introduction of mechanically ventilated systems in offices has resulted in the construction of more tightly sealed buildings and reductions in ventilation rates, to save energy. The use of synthetic building materials and furnishings and the use of chemically formulated cleaners have also served to increase our exposure to indoor air pollutants.

How to Improve the Indoor Air in Your Office:

- Do not block air vents or grilles.
- Avoid bringing products into the building that could release harmful or bothersome odors or contaminants.
- Comply with the office and building smoking policy.
- Dispose of garbage promptly and properly.
- Water and maintain office plants properly.
- Monitor any signs of mould.
- Outdoor air intakes should be located high above the ground and away from known pollution sources, like traffic routes, parking lots and garbage areas.
- Air filters must be changed according to the manufacturers' recommendations.
- Humidifiers add humidity to air that is too dry. These can be a contamination source if they are not cleaned properly or if they contain standing water that is not appropriately treated.

Sources of Information

1. <http://www.flex.net/~lonestar/indoor.htm> - ACU Air Heating and Air Conditioning
2. http://irc.nrc-cnrc.gc.ca/ie/cope/05-1-Vent_Principles_e.html - NRC-IRC Institute for Research in Construction
3. <http://www.epa.gov/iaq/pubs/occupgd.html#whyisin-doorairqualityimportant> – US Environmental Protection Agency – An Office Building Occupant's Guide to Indoor Air Quality

Compiled by
The Labour Department
Occupational Safety and Health Section

*Promoting the Attainment and Maintenance of
Desirable Standards of Occupational Safety and
Health Practice in Barbados*

Labour Department



OCCUPATIONAL SAFETY AND
HEALTH SECTION

Indoor Air Quality in Office
Environments and the Role of
Centrally Controlled Ventilation
Systems



2nd Floor East, Warrens Office Complex
Warrens, St. Michael
Barbados

Tel: (246) 535-1524

Fax: (246) 535-1571

Email: labour@labour.gov.bb