

## Tight Building Syndrome

Tight Building, Sick Building, and Indoor Pollution are terms which have been coined to describe a relatively new occupational health and safety problem. Current “Energy Conservation” building designs, (windows that don’t open; doors and walls which prevent, decrease, or impede air exchanges; heavily-insulated buildings, etc.) do not allow for the dissipation or release of building contaminants such as carbon dioxide, tobacco smoke, and microbial contaminants. As a result, building occupants suffer from eye and throat irritation, headaches, fatigue, sinus congestion, and other ailments. These health complaints can be caused by a single contaminant, several contaminants, or microbial contamination.

Recent studies and evaluations completed by the National Institute for Occupational Safety and Health (NIOSH) have identified the following as causes of indoor pollution:

- Inadequate Ventilation—caused by lowering thermostats in winter, raising them in summer; eliminating humidification - dehumidification systems; late morning start-up and early afternoon shutdown of the ventilation system.
- Inside Contamination—significant inside contaminant sources include copy machines, pesticides, boiler additives, cleaning products, tobacco smoke. Outside Contamination—improperly-located exhaust and intake vents can cause motor vehicle exhaust, boiler gas and previously exhausted air to be captured by the fresh air source for the building, and circulated throughout the building.
- Microbial Contamination—microbial contaminants cause a wide variety of health problems, including pneumonitis, asthma, allergic rhinitis, infections, humidifier fever, conjunctivitis.
- Building Fabric Contamination—specific pollutants include formaldehyde, isocyanates, organic solvents. Suggested ways to eliminate/reduce/control indoor air pollution include the following: Ensure an adequate fresh outdoor air supply.
- Keep all outdoor air louvers open.
- Provide fresh outdoor air at a rate of 5 cubic feet per minute per person in nonsmoking areas and 20 cubic feet per minute per person in smoking areas.
- Keep fans in operation during the entire occupancy period.
- Keep air diffusers open and unobstructed.
- Make adjustments in ventilation system if office structure (walls, ceilings, etc.) have been altered.
- Prevent the building from having a negative pressure state due to insufficient quantities of makeup (fresh) air.
- Maintain a preventive maintenance program for the HVAC system. PM program should include regular changing of filters, cleaning and disinfecting of drop pans, checking of danger positions, belts, baffles, ductwork and system balance.
- Gauges should be made available to provide information on air volumes delivered, temperature, relative humidity, etc., and maintenance personnel

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should be trained to read them.

- Static pressure gauges should be used as an aid in determining when filters need to be changed.
- Maintain temperature between 73 to 79 degrees Fahrenheit.
- Maintain 20 - 60% relative humidity.
- Maintain carbon dioxide (co2) concentration below 1000 parts per million.

Eliminate or control all known and potential sources of chemical contaminants.

- Utilize local exhausts to capture chemical air contaminants at their source.
- Ventilate large source areas, such as a print shop where solvents are used, directly outdoors.
- Locate outside air intakes away from contamination sources.
- Isolate construction areas (painting, carpet laying, etc.) physically and, through the ventilation system, from the rest of the building.
- Apply pesticides only while the building is unoccupied.
- Restrict cigarette smoking to separately ventilated, designated areas.
- Isolate the office area from the parking garage.
- Utilize building fabrics, carpeting, furnishings that do not contain, or contain minimal amounts of formaldehyde, isocyanates, and organic solvents

Eliminate or control all known and potential sources of microbial contaminants.

- Identify and repair promptly all areas where water leaks or collects.
- Incline drain pans under cooling coils to prevent accumulation of stagnant water.
- Utilize steam as the only source for humidifiers in the system.
- Utilize additional filters downstream, should contamination occur.
- Construct air handlers so that there is direct and easy access for equipment maintenance.
- Discard water-damaged, porous furnishings rather than disinfect them.
- Clean up and disinfect promptly all water contaminated nonporous surfaces.

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