



Indoor Air Quality



How Serious Is Indoor Air Pollution?

Most people are aware that outdoor air pollution can damage their health, but may not know that indoor air pollution also can have significant harmful effects. U.S. Environmental Protection Agency (EPA) studies of human exposure to air pollutants indicate that indoor levels of many pollutants may be 2-5 times, and occasionally more than 100 times, higher than outdoor levels. Also, people spend more than 90% of their time indoors.

Tightly sealed buildings are an additional concern for the health of those who live and work in them. In 1988, the *Journal of the American Medical Association* reported that a population living in energy-efficient buildings contracted upper respiratory diseases at rates 46-50% higher than a comparable group living in older, more ventilated housing. The EPA and its Science Advisory Board rank indoor air pollution among the top five environmental risks to public health.

From Where Does It Come?

There are many potential sources of air pollution in houses and other buildings. Gases such as carbon monoxide, ozone, sulphur dioxide, nitrogen dioxide, lead and particulate matter (less than 10 microns in size) flow into buildings from the surrounding automotive and industrial culture. Radon gas seeps indoors from the soil and rock around the foundation, and hundreds of other chemicals, dust, fibers, molds, bacteria and metals are released into the indoor air primarily from carpeting, wood products made with synthetics and combustion sources. Some examples include formaldehyde, xylene, vinyl chloride, ethylbenzene, trichloroethylene, methacrylic acid, asbestos, textile dust and tobacco

smoke. Old synthetic carpeting, which becomes brittle with age, gives off synthetic house dust. Unhealthy in itself, dust is even more dangerous when burned by the furnace or kitchen stove because it may produce gases such as hydrogen cyanide and forgene. Common sources of indoor pollutants include household cleaners, textiles, automotive supplies, furnaces, gas cooking appliances, pesticides and paint.

What Are the Effects of These Pollutants?

Some common indoor air pollutants are known to cause cancer and are relatively well characterized. Examples are tobacco smoke, benzene, vinyl chloride, trichloroethylene and asbestos. Benzene is present in fossil fuel and is used as a solvent in the manufacturing of paints, plastics and pesticides. Vinyl chloride is used in plumbing and in manufacturing plastics. Trichloroethylene is used in dry cleaning and in the manufacturing of pesticides, paints, waxes and paint strippers. Many indoor air pollutants cause non-cancer health effects (such as neurological, reproductive / developmental, pulmonary, immune system) and generally are not understood as well as the cancer-causing ones. For example, the xylenes used as a paint and ink solvent and in some detergents are associated with liver, kidney and nervous system disorders. Plasticizers may cause chromosome damage. Dust mites and mold may cause allergic reactions. Further research on indoor air quality is needed to identify and characterize the health risks associated with exposures to indoor air pollutants, individually and in combination. Not all potential indoor air pollutants have been identified.

How Do We Detect Indoor Air Pollution?

With special equipment, a technician can test for airborne particulates, specific organic and inorganic gases, vapors and dust in indoor air. Detecting radon gas is easy and relatively inexpensive. Testing for carbon dioxide provides an index of the amount of outside air pollutants coming into a building.

How Do We Reduce the Hazards?

Several strategies may be used to improve indoor air quality. A combustion furnace, if

located indoors, should be efficient and atmospherically separated from the rest of the house. Solar heating and electric space heaters and kitchen ranges are better alternatives to kerosene and gas versions. Insulation of living spaces and metal conduits are recommended. Household cleaners, paints and other products in the house should be sealed and stored properly to avoid leaking into the living area of the house. A ventilation-controlled system can provide fresh air every day.

Source: Project A.I.R.E., U.S. Environmental Protection Agency,
<http://www.epa.gov/region01/students/teacher/airqual.html>