

## About respiratory hazards

Respiratory hazards include harmful substances and below-normal concentrations of oxygen in the air we breathe. What makes a substance harmful depends on its toxicity, chemical state, physical form, concentration, and the period of time one is exposed. Examples include **particulates, gases and vapors,** and **biological organisms**. Harmful effects are wide ranging and may occur immediately or take years to develop.

When the oxygen concentration in normal breathing air drops below 19.5 percent by volume, the air becomes **oxygen deficient** — a significant concern for those who work in confined spaces. Harmful effects include impaired thinking and coordination, unconsciousness, and death.

### Protection from respiratory hazards

Protect yourself and your co-workers from respiratory hazards by doing the following:

- Identify the respiratory hazards in your workplace.
- Evaluate employees' exposures to each hazard.
- Use the evaluation information to eliminate the hazards or to lower employees' exposures to safe levels.

This three-step process, summarized below, is called a **hazard analysis** or **hazard evaluation**.

#### Identify the respiratory hazards in your workplace

- Consider the sources of respiratory hazards such as production processes, work tasks, raw materials, and end products. Each could expose employees to a respiratory hazard. What raw materials are used in a production process? What are the intermediate products and the byproducts of each process? Do employees use equipment or handle substances that could expose them to respiratory hazards?
- Review safety data sheets (SDS) and chemical inventories to identify chemicals that may expose employees to respiratory hazards.
- Talk to employees. Do they have safety or health concerns about certain products, materials, or machines? Have they reported signs or symptoms of respiratory conditions?

### Examples of respiratory hazards

**Particulates.** These are airborne particles such as dusts, fibers, fumes, mists, soot, and smoke. Some are so small they can only be seen with an electron microscope. The diameter of a particulate is usually measured in micrometers (one micrometer equals 1/1,000 millimeter or 1/25,400 inch). Particles with diameters under 10 micrometers are more likely to enter the respiratory system.

**Gas and vapors.** Gases can spread freely in the air. Vapors are the gaseous states of substances that are liquids or solids at room temperature. Gases and vapors are classified by their chemical forms.

**Biological organisms.** These include bacteria, viruses, fungi, and other living organisms that can cause respiratory infections.

**Oxygen-deficient atmosphere.** Normal air has an oxygen concentration of 20.8 percent by volume. When the concentration drops below 19.5 percent, the air is oxygen deficient and considered **immediately dangerous to life and health (IDLH)**.