

TECH BULLETIN - Industrial Hygiene

What is Industrial Hygiene?

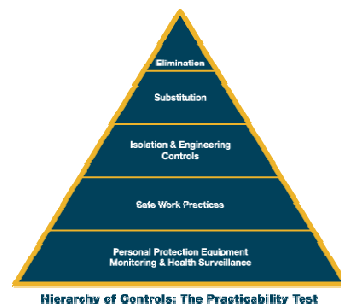
Industrial Hygiene is the science and art devoted to the recognition, evaluation, and control of those environmental factors or stresses, arising in or from the work place, which may cause sickness, impaired health and well-being, or significant discomfort and inefficiency among workers or among the citizens of the community.

Hierarchy of Controls

Controlling exposures to occupational hazards is the fundamental method of protecting workers. Traditionally, a hierarchy of controls has been used as a means of determining how to implement feasible and effective controls. One representation of this hierarchy can be summarized as follows:



- Elimination;
- Substitution;
- Engineering controls;
- Administrative controls; and
- Personal protective equipment.

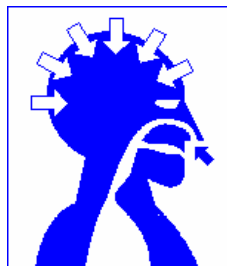


The idea behind this hierarchy is that the control methods at the top of the list are potentially more effective and protective than those at the bottom. Following the hierarchy normally leads to the implementation of inherently safer systems, ones where the risk of illness or injury has been substantially reduced.

Examples of On-The-Job Hazards

To be effective in recognizing and evaluating on-the-job hazards and recommending controls, industrial hygienists must be familiar with the hazards' characteristics. Potential hazards can include air contaminants, and chemical, biological and physical hazards.

Air Contaminants - commonly classified as either particulate or gas and vapor contaminants. (e.g. particulate contaminants include dusts, fumes, mists, aerosols, and fibers)



- **Dust** - Is a general name for very small solid particles.
- **Mist** - a liquid suspended in the atmosphere. (e.g. oil mists)
- **Aerosol** - a gaseous suspension of fine solid or liquid particles. (e.g. spray paints, spray lubricants)
- **Fiber** - a solid particle whose length is several times greater than their diameter. (e.g. asbestos)
- **Gas** - a state of matter distinguished from the solid and liquid states by relatively low density and viscosity, relatively great expansion and contraction with changes in pressure and temperature, the ability to diffuse readily, and the spontaneous tendency to become distributed uniformly throughout any container.
- **Fume** - formed when material from a volatilized *solid* condenses in cool air. (e.g. welding fumes)
- **Vapor** - the gaseous state of a substance that under ordinary conditions exists as a *liquid* or *solid*. (e.g. gas powered equipment exhaust)

Chemical Hazards

Harmful chemical compounds in the form of solids, liquids, gases, mists, dusts, fumes, and vapors exert toxic effects by inhalation (breathing), absorption (through direct contact with the skin), or ingestion (eating or drinking). Airborne chemical hazards exist as concentrations of mists, vapors, gases, fumes, or solids. Some are toxic through inhalation and some of them irritate the skin on contact; some can be toxic by absorption through the skin or through ingestion, and some are corrosive to living tissue.



The degree of worker risk from exposure to any given substance depends on the nature and potency of the toxic effects and the magnitude and duration of exposure. Information on the risk to workers from chemical hazards can be obtained from the Material Safety Data Sheet (MSDS).

Biological Hazards

Biological hazards include bacteria, viruses, fungi, and other living organisms that can cause acute and chronic infections by entering the body either directly or through breaks in the skin.



Physical Hazards

These include excessive levels of ionizing and non-ionizing electromagnetic radiation, noise, vibration, illumination, and temperature.



Noise, a significant physical hazard, can be controlled by various measures. One way to reduce noise exposure is by increasing the distance between the source and the receiver, by isolating workers in acoustical booths, limiting workers' exposure time to noise, and by providing hearing protection. The only treatment for hearing loss is prevention.

In sum, industrial hygiene encompasses a broad spectrum of the working environment. By recognizing and applying the principles of industrial hygiene, your facility will become healthier and safer place to work.