



**TEAMSTERS**

# **Safety & Health FACTS**

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## **INDUSTRIAL VENTILATION**

No matter where you work air contaminants can affect your life. Dusts, mists, vapors, fumes, and gases are air contaminants that can be found in almost every workplace. Ventilation systems and other control measures are used to combat these contaminants.

The Federal government has established standards for some of the contaminants to which people are exposed in industrial settings. These standards are devised by the Occupational Safety and Health Administration (OSHA) and are known as Permissible Exposure Limits (PEL's). PEL's are defined as the average concentration at which a normal worker can be exposed for eight hours without having any adverse health effects, either short term (rash, lung irritation, etc.) or long term (chronic bronchitis, cancer, etc.). The PEL's for substances regulated by OSHA can be found in the Code of Federal Regulations (29 CFR) Part 1910.1000. This standard is a very general standard, however, OSHA does have standards that address specific chemicals or substances, some of which are known carcinogenic (cancer-causing) substances.

### **Local Exhaust Ventilation:**

Local exhaust ventilation systems are most often used in industrial settings. The purpose of a local exhaust system is to remove the contaminants such as dusts, fumes, vapors or mists from the air *at the source* in order to maintain safe levels. There are various components of a local ventilation system that must work together. It is crucial that the entire system be properly balanced and running as designed.

Enclosures around equipment are intended to prevent the contaminants from escaping into the surrounding air. Very often there are air currents that can capture a contaminant and carry it away from the source. Enclosures help to prevent this distribution of contaminants. By localizing the contaminant, enclosures enable the system to capture and remove the pollutants more effectively. Some enclosures actually serve two purposes: increasing the

efficiency of the ventilation system and reducing noise from equipment, when lined with a sound-deadening material.

A crucial component of every local ventilation system is the hood. Hoods can be various shapes and sizes and are essentially the beginning of the ventilation system. They function as the suction end of the ventilation system, similar to the nozzle on the hose of a vacuum cleaner. The main purpose of the hood is to focus the suction power of the ventilation system and to increase efficiency of the system.

The velocity (speed) of the air is critical to the effectiveness of a ventilation system. The velocity needed to capture a contaminant is known as the "capture velocity" and the velocity of the air needed to keep the contaminant entrained in the air stream within the system is known as the "transport velocity". If the ventilation system does not have the correct velocities, contaminants will not be removed from the source and/or the contaminants might escape the system (fall out in the duct). For example, if the transport velocity is too low in a system intended to carry dust, dust can build-up inside the ducts and slip out of the joints of the ductwork. If this problem is left alone it will become worse - dust in the duct further reduces the efficiency of the system, which causes an increase in dust build up.

The contaminants that are captured by the ventilation system must be removed from the air before it is vented to the outside or recirculated throughout the facility. Air cleaning devices are responsible for removing contaminants from the air. There are various designs engineered to remove vapors, gases, dusts or fumes. Proper selection of the air cleaning device is essential if the air is to be recirculated. After the air is cleaned it is drawn through the fan, which provides the energy for the entire system, and expelled out an exhaust stack (unless it is recirculated).

Every ventilation system must be "balanced" properly: the volume of air removed from the building by the system must be replaced with an equal volume. The air, which replaces the removed air, is known as "make up air". If the system is not balanced, it can create negative pressure, which reduces the efficiency of the system allowing the contaminant levels in the facility to increase. A telltale sign of negative pressure is difficulty opening doors that then slam shut.

## **What To Do:**

If you have concerns about your ventilation system, there are some steps you can take:

- ♦ Examine the visible parts of the system: Look for leaks where it is obvious that contaminants are coming out of the system. Look at the system and observe how clean it looks since obvious signs of buildup are clear indicators of problems with maintenance.
- ♦ Determine if others are having the same problems: Do their symptoms go away when they leave work, and reappear when they return to work?

- ♦ Determine if the problem occurs only at certain times of day and in certain areas of the building. This will help determine if it is related to a particular job that is performed in the building or if it is a contaminant continuously released from its source, such as a biological contaminant.
- ♦ If you work in an industrial facility, observe the efficiency of the hoods since this is critical to the proper functioning of the system.
- ♦ Ask your employer to test the ventilation system to determine if it is running within design specifications. Your employer can also perform personal monitoring for particular contaminants to determine if any worker is being overexposed due to a faulty ventilation system.

### **Professionals:**

Following are a list of professionals who are trained to solve ventilation system problems.

- ♦ Industrial hygienists are employed in the IBT Safety and Health Department and are specially trained to anticipate, recognize, evaluate and control personal exposures to chemicals and harmful contaminants.
- ♦ System design engineers are professionals who design and modify ventilation systems for both industrial and office settings. It is important that the design engineer know what the system will be used for and how much of a demand will be placed on the system in order to design it properly.
- ♦ American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), a professional group, establishes recommended ventilation rates and other guidelines.
- ♦ The National Institute for Occupational Safety and Health (NIOSH) is a government agency that is responsible for performing research on occupational safety and health issues. NIOSH has published documents discussing indoor air quality issues and even performs evaluations of indoor air quality problems.

For more information on the indoor environment please refer to the IBT Safety and Health Department Fact Sheet entitled "Indoor Air Quality in Office Settings".