

Fact Sheets: MSDS: How To Read A Material Safety Data Sheet

CSEA members who work around chemicals frequently ask, "What is this stuff and what is it doing to me?" Most public employees are now covered by Right-to-Know laws which require employers to supply workers with information on the identity of the chemicals they are exposed to, their health effects and training on how to handle them safely. In addition, all containers of hazardous materials must carry a warning label.

The details of these laws may differ from state to state, but they all require employees to have access to a Material Safety Data Sheet (MSDS) which contains information on health hazards, chemical ingredients, physical characteristics, control measures, and special handling procedures for all hazardous substances in the work area. The laws say that MSDSs must be readily accessible to all employees. It is also illegal to have any blanks on the sheet. If no information exists, "no information" must be written in the space.

Because federal law requires all chemical manufactures and distributors to produce and distribute MSDSs, public employees who are not covered by a Right-to-Know law may still be able to obtain an MSDS from their employer or directly from the chemical manufacture or distributor.

The laws state that MSDSs must contain complete, accurate, and up-to-date information. Nevertheless, many MSDSs are inaccurate and incomplete. They may, however, still be very useful if you know how to read them and where to look for more information. Many states have agencies that will check the accuracy of MSDSs and the CSEA Safety Department can also assist.

MSDSs may differ slightly in organization, but they must all contain the same basic information on hazardous ingredients, health effects, legal and recommended exposure limits, physical properties, and control methods.

Section I -- Material Identification

The name of the product and name, address, and emergency telephone number of the manufacturer must be provided.

Section II -- Hazardous Ingredients/Identity Information

Which Chemicals are Covered?

State laws differ about which chemicals are required to be listed on an MSDS. Those states with laws similar to the Federal OSHA hazard communication standard require evaluation of all chemicals. All those found to be hazardous are covered by the law. Some states, however, require coverage of only the chemicals which have OSHA standards (about 500 chemicals). Other laws contain a list of thousands of chemicals that must be included, while a few require all ingredients to be listed, even those which are not hazardous. Assume that all of the chemicals that you work with should be included unless the manufacturer or employer can prove otherwise.

The percentage concentration of each substance in a mixture may also be listed, but this is not required by most state laws. This is unfortunate, because it is useful to know what the other, "non-toxic" chemicals in the mixture are.

What are the Names of the Chemicals?

Chemicals are often known by different names:

- A **trade name**, such as "Safety Clean", is the brand name the manufacturer gives the product. It does not tell you, however, what chemicals are in the product, or whether the product is a mixture of chemicals or a single chemical. The same chemical may be used in a variety of products with different trade names. The trade name usually appears on the label and in Section I of the MSDS.

- A **generic name** describes a family or group of chemicals. For example, there are several different "isocyanates", and thousands of different "chlorinated hydrocarbons". Sometimes an MSDS will try to get away with just listing the generic names. However, the law says that chemical names must also be listed.
- The **chemical or specific name** is the one that describes -the specific chemical. An example is methyl chloroform, one of the thousands of "chlorinated hydrocarbons", or toluene disocyanate, a member of the "isocyanate" family. The chemical name is the easiest name to use when doing research on the health effects of chemicals and how to protect yourself.
- The **CAS Number** is a number given by the Chemical Abstract Service to each chemical. While different chemicals may have the same name, they will all have their own CAS number which can be used to look up information. The Chemical Abstract Service publishes a book that contains a list of all CAS Numbers and the chemicals they represent.

The MSDS must list the chemical name of all hazardous ingredients which make up more than 1% of the mixture (or 0.1% for cancer-causing substances). Listing only the trade name, only the CAS number or only the generic name is not acceptable.

Trade Secrets

The manufacturer may be able to withhold ingredient information from the MSDS if any ingredients are trade secrets. Procedures for challenging a manufacturer's trade secret claim are determined by different state laws. Under most Right-to-Know laws, the manufacturer must provide the trade secret identities to health care professionals and/or workers if they have a need to know the information, or in a medical emergency. Consult your state law for more details. Remember that even if certain ingredients in the product are labeled as trade secrets, the MSDS must contain all of the other required information.

Exposure Limits

The MSDS must also list the OSHA Permissible Exposure Limit (PEL) for each hazardous ingredient. It must also list Threshold Limit Values (TLVS) recommended by the American Conference of Governmental Industrial Hygienists and may also list workplace exposure limits recommended by the National Institute for Occupational Safety and Health (NIOSH). These are important because ACGIH and NIOSH often recommend exposure limits that are more up-to-date and protective than OSHA's.

Section III -- Physical/Chemical Characteristics

Physical and chemical characteristics include the chemical's appearance and odor, along with physical properties that indicate how easily a chemical will evaporate and release potentially harmful vapors into the air.

- **Boiling point:** The boiling point of a substance is the temperature at which the liquid boils or becomes a gas. The lower the boiling point, the quicker it evaporates and the easier it is to inhale. Chemicals with boiling points below 100 C (or 212 F) require special caution.
- **Vapor pressure:** A high vapor pressure indicates that a liquid will evaporate easily. Chemicals which evaporate quickly are called volatile. This means that air concentrations can build up quickly, even though the substance is in liquid form. Liquids with high vapor pressures may be especially hazardous if you are working with them in a confined space or an enclosed area.
- **Vapor density:** If the vapor density is less than one, it will tend to rise in air. If the vapor density is greater than one, it will fall in air and concentrate in the bottom of tanks or confined spaces.
- **Appearance and odor:** This information may help identify a substance that spills or leaks in your work area. However, many chemicals are hazardous at levels lower than they can be smelled. Also, many chemicals, such as hydrogen sulfide and ammonia, cause "olfactory fatigue", which means that workers rapidly lose their ability to smell the substance.
- **Specific gravity:** If the specific gravity is greater than one, the substance will sink in water; if less than one, it will float on top of water.

- **Evaporation rate:** This is the rate at which a substance evaporates compared to either ether, which evaporates quickly, or butyl acetate, which evaporates slowly. If the substance has an evaporation rate greater than one, it evaporates faster than the comparison substance.

Section IV -- Fire and Explosion Hazard Data

This section should provide information on the fire hazards of a product and special precautions necessary to extinguish a fire.

- **Flash point:** This is the lowest temperature at which a liquid gives off enough vapor to form a mixture with air that can be ignited by a spark. Liquids with flash points below 100 F are considered flammable, and liquids with flash points between 100 and 200 F are considered to be combustible. Flammable and combustible liquids require special handling and storage precautions.
- **Extinguishing media:** This section should specify what kind of fire extinguisher to use. There are four classifications of fires: Class A for paper and wood, Class B for more flammable materials such as liquids or greases, Class C for electrical fires, and Class D for fires involving metals or metal alloys.
- **Special firefighting procedures and unusual fire and explosion hazards:** For example, some chemicals (such as corrosives) must not be extinguished with water in case of fire.

Section V -- Reactivity Data

When stored improperly, some chemicals can react with other chemicals and release dangerous materials. This describes the reaction of chemicals when they are mixed together with other chemicals, or when stored or handled improperly.

Section VI -- Health Hazard Data

This section describes the health effects of the product, including signs and symptoms of exposure and medical conditions made worse by exposure. Acute (short-term) and chronic (long-term) effects of exposure must always be included. MSDSs often leave out chronic health information, such as whether a chemical causes cancer or birth defects.

Routes of entry (inhalation, skin contact, swallowing) and emergency and first aid procedures must also be included. Unfortunately, a lot of MSDSs in circulation do not contain complete and accurate health hazard information.

This section must also contain information on target organs (liver, kidneys or central nervous system), signs or symptoms of exposure, medical conditions generally aggravated by exposure, and emergency First Aid procedures.

Section VII -- Precautions for Safe Handling and Use (Spill or Leak Procedures)

This section contains information on proper equipment to use and what precautions to follow if a spill or leak occurs. It should also describe safe waste disposal methods and precautions to be taken in handling and storing.

Section VIII -- Control Measures

The MSDS must list control measures that can reduce or eliminate the hazard, including ventilation and other engineering controls, safe work practices, and personal protective equipment.

For respirators, information on the type of respirator, degree of protection and the appropriate filter cartridge (such as acid gases, dust or organic vapors) must be included. In addition, all gloves do not protect against all chemicals. The correct type of glove should be specified on the MSDS.

CHECKING THE ACCURACY OF MSDSs

What can be done if you suspect that the MSDS that you received is not accurate or complete?

- **Ask your Employer:** If an MSDS is not accurate, your employer is responsible for obtaining an accurate, complete MSDS. Ask your employer to request a more accurate MSDS from the supplier or manufacturer.
- **Contact the Manufacturer:** The union can contact the manufacturer and ask for a more accurate MSDS.
- **Call OSHA:** Your state OSHA (if applicable) can check MSDSs and give you more accurate information. Federal OSHA can also require a manufacturer to redo an MSDS if the information is inaccurate or incomplete.
- **Call NIOSH:** The toll-free number for information about chemical identities, health effects or other information is (800) 356-4674.
- **Contact your CSEA Safety Representative:** Your CSEA safety representative may have information on the chemicals you use and also has access to the CSEA Occupational Safety & Health Department which can analyze MSDSs.