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Material safety data sheets - what to look for, how to understand them

Scope

There are numerous chemicals and chemical compounds used in manufacturing and industrial processes. Some of these chemicals and compounds can be hazardous. For the sake of everyone's health and safety, workers must be informed about the substances used in the work area and must know how to handle them safely.

Safety precautions

None required when reading Material Safety Data Sheets.

Background

The Federal Occupational and Health Administration (OSHA) has implemented the Hazard Communication Standard (HCS) to provide safe and appropriate methods of working with the hazardous substances in the workplace. The HCS has five requirements, and every hazardous or potentially hazardous substance found in the work area is subject to all five. They are hazard evaluations, warning labels, material safety data sheets (MSDS), work area specific training, and a written hazard communication program.

The material safety data sheet (MSDS) must be supplied by the manufacturer or importer for each hazardous substance. Many manufacturers also supply MSDSs for non-hazardous products as well. The MSDSs must be kept available in the area where the substance is used. Because MSDSs are prepared by various companies they may be called by various names, may be in different formats, and some may contain more information than others. However, the MSDSs typically contain the information listed in the following sections.

Chemical product and company identification

This section names the material and links the MSDS to the label, internal lists of hazardous materials and shipping documents. It also lists the manufacturer or the company who developed the MSDS and provides a mailing address and phone number for contacting the manufacturer.

Typical chemical and physical properties

This may contain such things as boiling and melting points, vapor density and pressure, relative density, solubility in water, appearance, and odor. The purpose is to provide data for health and safety assessments, not product performance evaluations. Some key properties are:

pH - a measure of relative acidity or alkalinity, on a scale of 0 to 14, with 7 considered neutral.

Viscosity - a measure of a fluid's resistance to flow

Flash point - under specific conditions, the temperature at which a material will generate enough flammable

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vapors to ignite in the presence of an ignition source.

Relative density (or specific gravity) - the density of a material compared with water; shows whether the material floats (RD less than 1) or sinks (RD above 1) in water.

Vapor pressure - a measure of volatility. The higher the VP, the greater the potential for vapor inhalation, and for flammable or combustible materials, greater the potential for fire hazard.

Ingredients

This section contains information on the composition of the product.

Hazardous ingredients - suppliers will identify as hazardous any material that meets the definition of "hazardous chemical" by the OSHA HCS or contains any ingredient in sufficient concentration to pose a potential health and/or safety hazard if handled improperly. The source of the hazardous identification is also listed with the chemical name and the Chemical Abstracts Service (CAS) Registry number if one has been assigned. If no hazardous ingredients are present, the term NONE will be shown.

Wt Pct (Approx.) - Approximate weight percentages of ingredients.

Exposure limits, Mg/m³ - Milligrams (mg) of a particulate per cubic meter (m³) of air. Common unit of measure for exposure limit for dusts or mists.

ppm - Parts per million. Parts of gas or vapor per million parts of air by volume. Common unit of measure for exposure limits for gases or vapors.

Sources - Sources identify the agency or group recommending the exposure limit, if applicable.

ACGIH-TLV - Identifies the exposure limit established by the American Conference of Governmental Hygienists (ACGIH) in the latest edition of the Threshold Limit Values (TLV).

TLV - Threshold Limit Values. The recommended airborne concentration of a chemical to which nearly all workers may be exposed without adverse health effects. A TLV is considered a good practice guideline, but does not represent a regulatory exposure limit.

TWA - Time Weighted Average. The TWA concentration of a chemical for a normal eight-hour work day.

PEL - Permissible Exposure Limit. The airborne concentration of a chemical established as an exposure limit by OSHA.

Emergency and first aid procedures for primary routes of entry

This section contains recommended first aid procedures, depending on the type of exposure, for example, ingestion, inhalation, skin or eye contact. The information is for emergency situations only. If discomfort persists, obtain medical assistance.

Fire and explosion hazard data

This section describes the fire and explosive properties of the material, appropriate extinguishing media, and basic fire fighting guidance. It also may include:

NFPA hazard id - The coding system developed by the National Fire Protection Assoc. Codes of 0 through 4 are assigned to the categories of Health, Flammability, and Reactivity. The lowest level of hazard is 0, while 4 is the highest.

Reactivity data

Stability and conditions to avoid - Identifies special physical situations to avoid, for example, extreme heat, light, etc.

Incompatibility - Special chemical combinations to avoid because of the potential for an explosion or toxic reaction.

Hazardous decomposition products - Hazardous materials that may be produced in significant amounts as a result of burning, oxidation or heat from fire, welding, heating, etc. One common concern is the generation of carbon monoxide from combustion.

Hazardous polymerization - A particular chemical reaction that a material may undergo that could produce large amounts of heat.