

HOUSEHOLD HAZARDOUS WASTE GUIDE SHEET

-PUBLISHED BY
UNIVERSITY EXTENSION

Knowing a product's ingredients, as well as the potential hazards associated with those ingredients, is essential in planning adequate protection from the dangers of a hazardous product.

Yet not all products readily provide this basic information for consumers. If you decide to buy a product that does not give complete information about its hazardous ingredients, you may need to contact the manufacturer or distributor and request a copy of the Material Safety Data Sheet (MSDS) for that product. The company address should be on the product label.

For more information, contact:

HHWP
1031 Battlefield, Suite 214
Springfield, MO 65807
417/889-5000

Identifying product hazards — **Material Safety Data Sheets**

A Material Safety Data Sheet (MSDS) lists the ingredients in a hazardous product, the hazards to safety and health, and the precautions to follow when using the product. If the manufacturer claims its product is a trade secret, the ingredients will not be listed on the MSDS.

Under the Hazard Communication Standard written by the Occupational Safety and Health Administration (OSHA), employers who use, store, or manufacture hazardous materials are required to make Material Safety Data Sheets available to all employees who potentially could be exposed to the material. Although the MSDS is designed for industrial workers, it can provide valuable product information to all users of hazardous products.

In most cases, the product manufacturer prepares the MSDS. While manufacturers are required by law to provide accurate product information, the quality of this information may vary significantly depending upon the thoroughness of each manufacturer. You should

not consider an MSDS to be a complete source of information on a product, but rather an essential starting point in gathering important health and safety information. (If you need more information, contact one of the information sources listed at the end of this guide).

To receive an MSDS, write to the manufacturer or distributor of the product. While they are not required to provide consumers with a copy of an MSDS, responsible businesses should respond to your request. They may be slow to respond, so do not be surprised if it takes 4 to 6 weeks.

Keep copies of the letters you mail in order to keep track of the responses you receive. If the manufacturer does not respond after several requests, it should be possible to obtain a copy of the MSDS by contacting the Local Emergency Planning Committee (LEPC) where the manufacturer is located.

There are two important items to look for upon receiving an MSDS. First, check to see that the MSDS is written with your intended use of the

What Makes a Product Hazardous?

A product is considered hazardous if it has one or more of the following properties:

- ✓ **Flammable/combustible** — can easily be set on fire.
- ✓ **Explosive/reactive** — can detonate or explode through exposure to heat, sudden shock, pressure or incompatible substances.
- ✓ **Corrosive** — chemical action can burn and destroy living tissues or other materials when brought in contact.
- ✓ **Toxic** — capable of causing injury or death through ingestion, inhalation, or skin absorption.

Copyright © 1991 by the Environmental Improvement and Energy Resources Authority. The Household Hazardous Waste Project is a program of the University of Missouri Extension System, in cooperation with the EIERA.



General Rules for Identifying Product Hazards

- ✓ Buy products with informative labels.
- ✓ Do not entirely rely on the word “nontoxic” on a product’s label. A product that qualifies as nontoxic can still contain hazardous ingredients, but not in large enough amounts to cause an acute reaction. Chronic hazards often are not considered. Read the entire label for additional health warnings.
- ✓ If a product does not have sufficient information on the label, contact the manufacturer for an MSDS.
- ✓ Carefully read all sections of the MSDS prior to using the product and follow all precautionary advice.
- ✓ Do not consider an MSDS to be the complete source of hazardous information on a product.
- ✓ Do not assume that a section left blank signifies the lack of potential harm. If a product is not very hazardous, the sections should contain information showing that this is the case.

product in mind. For example, if a product is to be sprayed, but the MSDS only describes the characteristics of the product in powdered or in liquid form, request additional information.

Second, check the date of preparation of the MSDS. If it does not provide a preparation date or if the preparation date is several years old, request an updated copy.

Although there is no standard MSDS format, all Material Safety Data Sheets must contain the same basic information. This information typically is divided into eight major sections. (see Figure 1, page 5, for an example of an MSDS form.) In any of these sections, the letters “ND” signify “not determined” and the letters “NA” signify “not applicable.”

Material Manufacturer and Identification

This section identifies the product and gives the name, address, and emergency telephone number of its manufacturer. The product may be listed by its chemical name or trade name. For example, sodium hypochlorite is a chemical name and Brite Bleach® is its trade name. If the product is a mixture of several chemicals, only its trade name will be listed.

The product also may have a CAS (Chemical Abstract Service) number. CAS is an organization that indexes information about chemicals. Through the use of the CAS number, you can look up additional product information in a variety of sources, such as textbooks on toxicology, found at your local library. The date of preparation of the MSDS should also be provided in this section.

Hazardous Ingredients/ Identity Information

This section lists the product ingredients subject to regulations and standards, and lists the percentage of each ingredient by total weight. The product ingredients may be listed by chemical name(s) and by common name(s) (such as bleach). Information may also be provided on ingredient concentration levels that could produce a health hazard. This concentration may be stated in terms of PEL, LD₅₀, or TLV.

■ The *PEL (Permissible Exposure Limit)*, established by OSHA, is the amount of an airborne substance that most healthy adult workers can be exposed to at work without adverse effect. PELs are enforceable by law in the workplace.

■ The *LD₅₀* represents the lethal dose that will kill 50 percent of the test animals in laboratory experiments through either skin contact or ingestion. The laboratory results are used to estimate a substance’s toxicity to humans by adjusting the test results according to human body weight and characteristics. Because toxic substances have different effects on different species, researchers usually are conservative in their estimates of the effect a substance will have on humans.

Occasionally, an *LC₅₀* will be given. The *LC₅₀* is the lethal airborne concentration that will kill 50 percent of the test animals when administered in a single exposure in a specific time period, usually one to four hours.

■ The *TLV (Threshold Limit Value)*, established by the American Conference of Governmental Industrial Hygienists (ACGIH), is the recommended airborne concentration of a substance that nearly all workers can be exposed to without adverse effects. In general, the lower the TLV, the greater the potential for adverse health effects.

There are three types of TLVs

■ *TLV/TWA* — Time Weighted Average is the recommended exposure concentration for a normal 8-hour workday, 40-hour workweek. If an MSDS lists only “TLV,” it usually refers to this value.

■ *TLV/STEL* — Short Term Exposure Limit is the recommended exposure concentration above the TWA for a limited number of 15-minute exposure periods.

■ *TLV/C* — Ceiling Exposure Limit is the recommended exposure concentration that should not be exceeded at any time during the work period.

TLVs are not guarantees

There are several reasons why TLVs should not be considered absolute guarantees of protection. First, TLVs are not intended for, nor do they take into consideration exposure values for, children, pregnant women, hypersensitive individuals, or other high risk groups. Second, TLVs are intended for the 8-

hour workday/40-hour workweek, and do not apply to individuals who work longer shifts or to those who live and work in the same environment. Third, TLVs may be revised as new studies reveal hazards that were previously undetected. Finally, there are some substances known to be toxic that have no TLVs because of insufficient data to quantify the risk from exposure.

Notations often used with TLVs and PELs

■ *ppm* — parts per million measures the concentration of a gas or vapor in the air, or the concentration of a liquid or solid.

■ *mg/m³* — milligrams of chemical substance per cubic meter of air is used for concentrations of dusts, gases, or mists.

■ “*S*” or “*Skin*” — indicates that the substance may be absorbed through skin, mucous membranes and eyes.

■ *mg/kg* — milligrams per kilogram of body weight is the measure of solids or liquids usually given by ingestion or injection.

Physical/Chemical Characteristics

This section describes the physical characteristics of the product, such as whether it is liquid, solid, or gas at room temperature; how much vapor it forms; whether the vapor rises or settles; and whether the product dissolves in water.

The following provides definitions of commonly used physical data terms.

■ *Boiling point* is the temperature at which a liquid boils at sea level.

■ *Vapor pressure* indicates how easily a liquid will evaporate and is measured in millimeters of mercury (mm Hg). Liquids with higher vapor pressures require better ventilation. A liquid is considered volatile when its vapor pressure exceeds 5 or 6 mm Hg.

■ *Vapor density* is the weight of a vapor or gas compared to an equal volume of air. Air is rated as 1. Vapors heavier than air (toluene is 3.2) accumulate in low areas where they may pose health hazards to small children and pets, and may create fire hazards.

■ *Specific gravity* is the ratio of the weight of a product's known volume to the weight of an equal volume of water. A specific gravity of greater than 1 means the substance will sink in water; less than 1 means it will float on water. Most flammable liquids are lighter than water.

■ *Melting point* is the temperature above which a solid changes to a liquid.

■ *Evaporation rate* is the rate at which a product will change from a liquid to a gas when compared to the evaporation rate of a known material.

Normal butyl acetate (n-BuAc), which has an evaporation rate of 1.0, is commonly used for comparison. A slow evaporation rate is considered less than 0.8 (water is 0.3). A fast evaporation rate is considered greater than 3.0 (acetone is 5.6). Fast-evaporating solvents can release hazardous amounts of vapors into the air quickly and should only be used in well-ventilated areas and with appropriate safety equipment.

■ *Solubility in water* is the quantity of a product that will dissolve in water at room temperature. It is expressed either as a percentage or by one of the following terms:

- negligible = less than 0.1%
- slight = 0.1 to 1%
- moderate = 1 to 10%
- appreciable = more than 10%
- complete = 100%

This term has important health consequences. For example, gases with low water solubility are more likely to reach the deep tissues of the lungs; highly soluble gases are more likely to dissolve into the moist mucous membranes of the upper airways.

■ *Percent volatile* means the percentage of a liquid or solid that will evaporate at 70°F (unless another temperature is indicated). If the percent volatile exceeds 10 percent, be sure to use the product in a well-ventilated area.

■ *Appearance and odor* may help to identify the product and help to verify that you have the appropriate MSDS.

Fire and Explosion Hazard Data

This section describes the circumstances under which the product may ignite or explode and provides instructions on how to deal with these hazards. The following describes the terms used in this section.

■ *Flash point* is the lowest temperature at which sufficient vapors from a liquid are present that the air/vapor mixture will ignite when exposed to an ignition source.

A product with a flash point near or below 100°F is particularly dangerous because exposure to any ignition source, such as a spark from static electricity or a burning cigarette, may set off a fire or explosion. For example, extreme caution should be used when handling and storing gasoline because it has a flash point of -50°F

■ *Flammable limits* are the lowest and highest concentrations of vapor or gas in the air that will ignite when exposed to a spark or flame.

The Lower Flammable Limit is the LFL (or LEL) and the Upper Flammable Limit is the UFL (or UEL). Products with wide flammable limits (such as ethyl ether, 1.9-36) may ignite either near or far from an ignition source, while products with narrow flammable limits may ignite only near the ignition source. When considering the explosion hazards, the LFL is the most important. The lower the LFL, the less of a substance needed in the air before it can ignite.

■ *Extinguishing media* refers to materials that can extinguish a fire, such as foam, water, carbon dioxide, or dry chemical. The appropriate fire extinguisher depends upon the source of fire. For more information, refer to the publications "Selecting Household Safety Equipment" and "Selecting and Using a Fire Extinguisher" listed at the end of this guide.

■ *Special fire fighting procedures* may recommend special protective equipment to use or special fire fighting measures to follow.

■ *Unusual fire and explosion hazards* covers factors such as toxic or irritant gases that may be released in a fire.

Reactivity Data

This section tells how the product will react under particular environmental conditions. The following provides definitions of the terms used to describe reactivity.

■ *Stability* indicates whether the product will decompose over time and the environmental conditions, such as heat or direct sunlight, that may cause a dangerous reaction.

■ *Incompatibility* indicates which chemicals should not come in contact with the product. Store and use separately any materials that are identified as incompatible.

■ *Hazardous decomposition products* indicates which hazardous substances might be released during fires or from decomposition.

■ *Hazardous polymerization* is a process by which the molecules of a chemical can combine to form larger molecules (polymerize). If this chemical reaction happens too quickly, it may produce a great amount of heat (especially when large quantities of materials are involved), which may result in a fire or explosion.

This type of reaction, under controlled conditions, is commonly used to produce plastics and usually requires

heat or a catalyst. If a polymerization hazard exists, specific storage instructions and the shelf life of the chemical should be listed.

Health Hazard Data

This section provides a combined estimate of the total known hazard of the product. It describes routes of exposure and effects of acute and chronic exposure, including the signs, symptoms and diseases that may result from excessive exposure, any medical conditions that are generally recognized as being aggravated by exposure to the product, and emergency and first aid procedures to follow in case of overexposure.

It may also indicate whether the hazardous product is listed in the National Toxicology Program (NTP) Annual Report on Carcinogens or has been found to be a potential carcinogen in the International Agency for Research on Cancer (IARC) or by OSHA.

Hazardous substances may enter the body through one or more of these routes:

- ✓ Ingestion — eating or drinking hazardous substances or contaminated food and water.
- ✓ Inhalation — breathing in hazardous gases, vapors, dusts, and sprays.
- ✓ Skin contact/absorption — Hazardous products containing corrosives or irritants can injure the skin and may be slowly absorbed into the body tissues and bloodstream. Some hazardous substances (such as organic solvents) can be absorbed through skin contact without damaging the skin and without your being aware of it. Many hazardous products may cause eye damage if splashed into the eye. Eyes are particularly vulnerable to injury from hazardous substances.

■ *Acute health effects* are signs and symptoms that result from a single exposure, such as headaches, dizziness, skin or eye irritation, vomiting, coma, or death. Symptoms usually occur shortly after exposure and may range from minor to severe.

■ *Chronic health effects* are gradual and occur through repeated exposure over an extended period of time. Examples include cancer, liver or kidney damage, birth defects, or central nervous system damage.

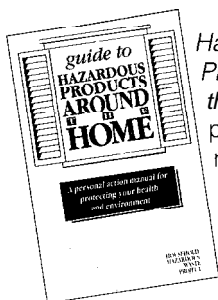
Acute effects usually are reported in more detail than chronic effects because more research has been conducted on acute effects. Isolating the long-term effects of a single chemical is difficult because individuals are exposed to toxic substances from a variety of sources, there may be a lapse in time between exposure and the development of symptoms, and symptoms may vary from one person to another.

Precautions for Safe Handling and Use

This section indicates procedures for cleaning up spills and leaks and disposing of the product. In general, information on disposal is not supplied in detail because local, state, and federal regulations vary. Check with your local waste officials for proper disposal procedures. This section also provides information that might not be listed elsewhere on the MSDS, such as handling and storage information, and cleaning or disposing of contaminated clothing.

Control Measures

This section describes personal protective equipment, work practices, and ventilation procedures to use when working with the product.



The *Guide to Hazardous Products Around the Home* is a personal action manual for protecting your health and the environment.

This comprehensive, 178-page handbook explains product ingredients, safety issues, disposal, recycling outlets, safer product alternatives, and more! Promoted by Greenpeace, the United Nations Environmental Programme, 50 *Simple Things You Can Do To Save the Earth and The Green Consumer*.

The *Guide* was written by the Household Hazardous Waste Project, winner of the 1991 President's Environment and Conservation Challenge Award.

To order, send \$9.95 (Missouri residents add \$0.64 sales tax) to: HHWP, 1031 E. Battlefield, Suite 214, Springfield, MO 65807

Related University Extension Publications:

Household Hazardous Waste Guide Sheets

- Safe Use, Storage and Disposal of Pesticides, WM6000 (\$0.25)
- Safe Use, Storage and Disposal of Paint, WM6001 (\$0.25)
- Selecting Household Safety Equipment, WM6002 (\$0.75)
- Household Hazardous Products: Consumer Information, WM6003 (\$0.25)

Household Hazardous Waste Educational Activities

- Stored Waste Abatement Program: SWAP Your Waste, WM5000 (\$0.75)
- What Your Home Haz: A Household Hazardous Waste Game, WM5001 (\$0.75)
- Home Hazardous Product Survey, WM5002 (\$0.75)
- Tools for the Environmental Teacher, WM5003 (\$2.00)

University Extension Guide Sheets

- Selecting and using a fire extinguisher, GO1906. (\$0.25)
- Homeowner chemical safety, GO1918. (\$0.50)

To order these publications, send the price of the publications plus \$1.00 for postage and handling to:

University of Missouri
Extension Publications
2800 Maguire
Columbia, MO 65211

Missouri residents add 6.475% sales tax. Please include the publication number and print your name and address clearly on your order.

Other sources of information:

- | *Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices*. American Conference of Governmental Industrial Hygienists, 6500 Glenway Ave., Bldg. D-7, Cincinnati, OH 45211-4438. (513) 66 1-788 1. Contact for current TLV booklet.
- | *The Artist's Complete Health and Safety Guide* by Monona Rossol, New York: Allworth Press, 1990.
- *Clinical Toxicology of Commercial Products*. 6th Edition by Robert E. Gosselin, et al., Baltimore: Williams and Wilkins, Co., 1987. Updated regularly.

- *Hazardous Substance Fact Sheets*, New Jersey Department of Health, CN 368, Trenton, NJ, 08625-0368. (609) 984-2202. These are fact sheets on a variety of individual chemicals.
- *The MSDS Pocket Dictionary*, J.O. Accrocco, ed., Genium Publishing Corporation, Rev., 1991. Contact Genium Publishing at 1145 Catalyn St., Schenectady, NY 12303-1836. (5 18) 377-8854.

| Regional Poison Control Centers can provide over-the-phone information on the potential health effects of product ingredients. In Missouri, call 1-800-366-8888. Identify your call as a non-emergency.

- RACHEL (Remote Access Chemical Hazard Electronic Library), Environmental Research Foundation, PO Box 73700, Washington, D.C. 20056-3700. (202) 328-1119. Computer database with chemical hazard profiles; offers an information packet to the public.

Though much effort has been made to ensure the accuracy of the information contained herein, the Household Hazardous Waste Project assumes no responsibility and disclaims any injury or damage resulting from the use or effect of any product or information specified in this publication.