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Selecting Household Safety Equipment

Marie Steinwachs
Office of Waste Management

Hazardous substances can enter your body in three ways: they can be ingested, inhaled or absorbed through the skin.

Common sense and a few pieces of safety equipment can protect you from exposure to hazardous substances.

Preventive measures and equipment you may need for protection from different household hazardous products are discussed in this guide.

Selecting household safety equipment

Before using household hazardous products, always consider how to reduce the risk of exposure. Limit exposure to hazardous chemicals by selecting less toxic products.

Wearing safety equipment should be your last option for protection since it does not protect people and pets who share your working environment.

Too many people risk unnecessary injury, poisoning, or even long-term health complications by using hazardous products without proper protection.

The comfort, money or time that is lost in using the correct protective equipment and procedures is of little consequence compared to the potential costs of poor health, time lost to illness and medical bills if safety is neglected.

General safety equipment guidelines

The type of safety equipment you may need depends upon the type of risk and ingredients to which you are exposed. Safety guidelines include:

- Read product labels to identify the exposure hazard, whether it is by inhalation, ingestion or skin contact and absorption.
- Do not trust your memory. Read the product's label with each use.
- Examine the product's label with each new purchase because manufacturers occasionally change the formulations of their products.
- Never smoke while using hazardous products. Small particles can be carried to your mouth or inhaled through the lit end of the cigarette. Cigarettes also have the potential to ignite any flammable substances you may be using.
- You can purchase equipment at safety equipment stores, hardware stores, automobile supply stores and farm equipment stores.

When purchasing safety equipment, tell the salesperson what products you will be using so that they can help you select the appropriate equipment. Use the tables in this publication as guidelines for the recommended type of safety equipment for specific household activities.

For further information on your safety equipment, contact the manufacturer's technical department. The phone number should be listed in the product's instructions.

Code words and phrases on labels that indicate potential risks from exposure

- **Keep away from children and pets**
indicates the product contains a hazardous ingredient.
- **May be harmful if swallowed**
indicates a risk of exposure through ingestion. Do not eat or drink while using this product and wash hands thoroughly when finished.
- **Use with adequate ventilation**
indicates a risk of exposure through inhalation. Work outdoors or increase the amount of airflow to the outdoors and wear an appropriate respirator.
- **Avoid skin contact**
indicates a risk of exposure through skin absorption or that the product could damage the skin. Wear appropriate gloves and protective clothing.
- **Keep away from eyes**
indicates a risk of eye damage. Wear chemical splash goggles.
- **Avoid if pregnant**
indicates the product could harm a developing fetus.

Ingestion prevention

Ingestion of most toxic materials can be avoided by not putting anything in your mouth while working with a hazardous product and by cleaning all contaminated surfaces.

- Always keep food, drinks, or anything else you may put in your mouth away from the work area to avoid contamination.
- When you are finished working, wash your hands (and other exposed body parts) and remove any contaminated clothing before putting anything into your mouth.
- Keep hazardous products in their original containers with the labels intact and isolated from stored food items. Never place hazardous products in food or beverage containers. Children often cannot (or do not) read labels, so keep these products out of their reach and in locked areas.
- Never work in the kitchen, dining area or any place where food is prepared, eaten or stored.

Inhalation prevention and respiratory protection

Many types of materials pose inhalation hazards. Each type varies in its degree of toxicity and physical hazard.

- **Dusts** are formed when solid materials are broken into small particles. Very small particles (respiratable dusts) are easier to inhale and can cause greater damage to the lungs than larger particles.
- **Gases** are substances that become airborne at room temperature. They may or may not mix with air.
- **Vapors** become airborne when liquids (and some solids) evaporate. Most liquids vaporize continually. The rate of evaporation increases as the temperature rises.
- **Mists** are tiny liquid droplets in the air. Any liquid, water, oil or solvent can be in a mist or aerosol form.
- **Fumes**, precisely defined, are small particles created in high heat operations such as welding or soldering. Fume particles are very small and tend to remain airborne for long periods of time. Metals, some organic chemicals, plastics and silica can produce fume particles.
- **Smoke** is formed from burning organic matter and contains a mixture of many gases, vapors and fumes.

Ventilation

Good ventilation is essential when using hazardous products.

- If possible, work outside.
- If you work inside, place an exhaust fan in a window near your work and draw the air away from the work area to the outdoors.
- Air conditioners do not provide sufficient ventilation because they recirculate air, even when set on "vent," and do not remove significant amounts of hazardous ingredients from the air.
- If you can smell a hazardous ingredient, your ventilation is not sufficient (although not all harmful ingredients have an odor) and you will need a respirator to protect yourself.

Individual respiratory protection

Different types of masks and respirators are available for protection from specific ingredients. This equipment protects only the wearer and leaves others in the area unprotected. In environments with limited oxygen, an oxygen-supplying respirator is necessary. Masks and respirators are not adequate protection in this type of environment.

The respirator or dust mask you choose should be approved by the National Institute for Occupational Safety and Health (NIOSH) for the particular ingredients you will be exposed to (Table 1). There are two kinds of dust masks: those with NIOSH approval and those without it. Look for product labels with the phrase "NIOSH approved" or for the NIOSH approval number that consists of the letters "TC" followed by two sets of three numbers (for example: TC-343-595).

- **Dust masks without NIOSH approval** are inexpensive and provide *minimal* protection from dusts. They should never be used with products that produce vapors, fumes or mists.
- **Dust masks with NIOSH approval** are *air-filtering* devices that contain fibers to trap particles, or absorbents that trap and hold mists. NIOSH-approved dust masks have two straps and a NIOSH approval number. When a dust mask becomes difficult to breathe through or the hazardous ingredient can be smelled, the mask should be replaced.
- **Respirators** are *air-purifying* devices. They are composed of several parts, including the face piece, cartridges and sometimes filters. Filters trap airborne particles in a fibrous material. Cartridges contain activated carbon or other substances that absorb, and in some cases react with, the chemicals in vapors, fumes or mists. The types of cartridges and filters you will need depend upon the hazardous product you are using (Table 1).

Respirators do not remove all the hazardous chemicals from the air you are breathing, but they do reduce the chemical's concentration to target levels set by NIOSH.

Some respirators are designed with the face piece, cartridges and filters in one unit. These disposable respirators are discarded when the cartridges or filters are spent or the mask is damaged. (See the "Safe Use and Care of Respirators" section for more information on the lifespan of cartridges and filters.) Disposable respirators may be more convenient when the project is a one-time, short-lived task.

Note

People with special medical conditions, especially heart or lung problems, may have their condition worsened by the additional stress of drawing air through a respirator. If you have either of these conditions, or if you are pregnant, please contact your physician before using a respirator or using a product that is an inhalation hazard.

Table 1

Respirators: types of cartridges and filters needed for specific tasks

	Product	Cartridge	Filter
Paints and solvents	Aerosol spray paints and varnishes	Organic vapor +	Paint spray
	Lacquer thinner	Organic vapor	
	Paint and varnish removers	Organic vapor	
	Turpentine	Organic vapor	
	Varnishes	Organic vapor	

Garden	Pesticides	Organic vapor +	Pesticide
Hobbies	Dusts from wood, stone, pigment, clay, fiber, shell and bone		Dust or dust and mist
	Photographic developing	Organic vapor/acid gas	
	Printmaking solvents	Organic vapor	
	Soldering		Dust, mist and fumes
Cleaners	Aluminum cleaner (with hydrofluoric acid)	Acid gas	
	Oven cleaner ¹	Organic vapor +	Dust and mist
	Septic tank cleaner	Organic vapor	

¹The product requires a respirator if it contains sodium or potassium hydroxide and is in an aerosol can.

Safe use and care of respirators

Correct fit

The respirator should be comfortable and have a correct fit so that it is leak-proof. Different people have different face sizes and shapes, so try on respirators until you find the right one. Respirators are built to either cover the nose and mouth (quarter-face respirator); the nose, mouth and chin (half-face respirator); or the nose, mouth, chin and eyes (full-face respirator).

Ask your safety equipment supplier to provide a proper fit test by a qualified tester. If this is not available, test the fit by covering the cartridge or filter inlets with the palms of your hands, inhale gently until the respirator collapses slightly, and hold your breath for 10 seconds. If the fit is not adequate, the respirator will resume its normal shape because of air leakage. Another test of the fit is to block the exhalation valve and gently breathe out. This should cause the mask to expand. If air leaks past the edge of the mask (particularly near the eyes), the mask will collapse to its normal shape. If your eyeglasses fog up while trying these tests with a half-face respirator, then it has a poor fit.

If the respirator fails any of these tests, try adjusting the straps and face piece. The salesperson can help you determine the correct fit. People with beards or small faces may not be adequately protected by a respirator because of poor fit.

Cleaning and storage

Remove the cartridges and filters. Wash the respirator according to the manufacturer's directions. While washing, inspect the respirator for wear, cracks and distortions. Damaged respirator parts should be replaced before wearing again. Rinse in clean water and air-dry. (Do not wash disposable respirators.) Store the respirator, cartridges and filters in an air-tight container (such as a resealable plastic bag) in a clean, cool, dry place.

Replacement

Filters and cartridges must be replaced regularly. When it is difficult to breathe through a respirator, the filter is probably clogged and needs to be replaced. Some general guidelines for cartridge replacement are after two weeks, after eight hours of cumulative use, or if you can smell the contaminant. If you can smell the hazardous ingredient through the respirator, the purifying chemicals are used up and the cartridge needs to be replaced. If you rely on the odor as a cue to replace the cartridge, be sure the material is odor-producing. Follow the directions given with each respirator.

Absorption prevention/eye and skin protection

Eye protection

Eyes are particularly vulnerable to injury from hazardous products (for example: oven cleaners, drain openers or paint thinners).

- **Do not** wear contact lenses (especially soft lenses) when working with hazardous products in a poorly ventilated area. The hazardous vapors or mists may be absorbed by the lenses, holding the irritant against your eye and increasing the potential for eye damage.
- Wear chemical splash goggles to protect eyes from chemical splashes, mists, vapors and particulates (Table 2). Standard eyeglasses **do not** provide adequate protection. Other goggles with side shields that are approved for impact can provide protection against scratches from particulates, such as when hand sanding.
- Use chemical splash goggles or impact goggles that meet the requirements of the American National Standards Institute (ANSI). If the eyewear meets these standards, the packaging will state ANSI approval and the eyewear will have the imprint "Z87." Read the product label to determine approved uses for the eyewear.

Table 2

Examples of products whose use required chemical splash goggles

Paints and solvents

- Caulking compounds
- Lacquer thinner
- Paint thinner
- Paint and varnish remover
- Turpentine

Garden

- Pesticides, including weed killers, bug sprays, etc.

Automotive

- Battery acid

Hobbies

- Photographic solutions
- Pool chemicals

Cleaners

- Ammonia and ammonia-based cleaners
- Aluminum cleaners
- Bleach
- Degreasing solutions
- Disinfectants
- Drain cleaner and openers
- Lye
- Oven cleaners
- Septic tank cleaners
- Tub and tile cleaners

Other

- Products in aerosol cans

Hand protection

Hands and fingers are the areas of the body most exposed to hazardous products.

- Wear the correct type of glove for the product you are using. Table 3 provides general recommendations. For specific information regarding the type of glove to wear for a given task, contact the technical department of the glove's manufacturer. The specific material the glove is made from will resist different types of ingredients. The appropriate glove prevents ingredients from being absorbed through your skin and entering into your bloodstream. When you wear an inappropriate glove for a task, some solvents may be absorbed through the gloves without apparent damage.
- **Nitrile gloves are effective protection against most household products, except for strong acids or bases. Use heavy rubber gloves for strong acids or bases**
 - Always wear **unlined** gloves when working with pesticides.
 - Gloves that fit properly will last longer and will help you handle the hazardous product better.
 - The life of your gloves can be extended by washing them with warm water and soap and allowing them to air-dry before using again.
 - The protective ability of gloves will deteriorate over time. Ask the salesperson or the manufacturer the duration of exposure recommended for your gloves and replace them on schedule.

Table 3

Types of gloves that provide protection while doing specific activities¹

Paints and solvents

- Lacquer thinner
Buna-N or NBR rubber gloves
- Paints (oil-based)
Latex/Neoprene or Nitrile gloves
- Paints (water-based) acrylics, latex, lucite
Natural rubber or latex, Neoprene rubber, Latex/Neoprene, Butyl rubber, Buna-N or NBR rubber, Nitrile, or Polyvinyl chloride gloves
- Paint thinner
Neoprene rubber, Latex/Neoprene, Buna-N or NBR rubber, or Nitrile gloves
- Paint and varnish removers
Nitrile gloves

Paints and solvents

- Tar (asphalt and roofing)
Neoprene rubber, Latex-Neoprene, Buna-N or NBR rubber, or Nitrile gloves
- Turpentine
Neoprene rubber, Latex-Neoprene, Buna-N or NBR rubber, or Nitrile gloves
- Wood filler and putty
Buna-N or NBR rubber or Nitrile gloves
- Wood stains and varnishes
Neoprene rubber, Latex-Neoprene, Buna-N or NBR rubber, or Nitrile gloves

Garden

- Fertilizer
Natural rubber or latex, Neoprene rubber, Latex/Neoprene, Butyl rubber, Buna-N or NBR rubber, Nitrile, or

- Polyvinyl chloride gloves
- Herbicides²
Natural rubber or Latex, Neoprene rubber, Nitrile, or Polyvinyl chloride gloves
- Pesticides²
Neoprene rubber or Nitrile gloves

Automotive

- Battery acid
Neoprene rubber, Latex/Neoprene or Butyl rubber gloves
- Car wax
Buna-N or NBR rubber or Nitrile gloves
- Gasoline, motor oil and transmission fluid
Buna-N or NBR rubber, Nitrile, or Polyvinyl chloride gloves
- Kerosene
Neoprene rubber, Latex/Neoprene, Nitrile, or Polyvinyl chloride gloves
- Windshield wiper fluid
Natural rubber or latex, Neoprene rubber, Latex/Neoprene, Butyl rubber, Buna-N or NBR rubber, Nitrile, or Polyvinyl chloride gloves

Hobbies

- Adhesives and cements
Buna-N or NBR rubber or Nitrile gloves
- Dyes, fiber reactive
Butyl rubber or Buna-N or NBR rubber gloves
- Photographic solutions (black-and-white developers, stop baths, and fix baths)
Natural rubber or Latex, Neoprene rubber, Nitrile, or Polyvinyl chloride gloves

Cleaners

- Acetone (Ketones)
Natural rubber or Latex, Neoprene rubber, Latex-Neoprene, or Butyl rubber gloves
- All-purpose and ammonia-based cleaners
Natural rubber or latex, Neoprene rubber, Latex/Neoprene, Butyl rubber, Buna-N or NBR rubber, Nitrile, or Polyvinyl chloride gloves
- Aluminum cleaner (with hydrofluoric acid)
Neoprene rubber, Latex/Neoprene, or Butyl rubber gloves
- Ammonia
Natural rubber or latex, Neoprene rubber, Latex/Neoprene, Butyl rubber, Buna-N or NBR rubber, Nitrile, or Polyvinyl chloride gloves
- Bleach
Neoprene rubber, Nitrile or Polyvinyl chloride gloves
- Degreasing solutions
Nitrile or Polyvinyl chloride gloves
- Disinfectants and deodorizers
Natural rubber or latex, Neoprene rubber, Latex/Neoprene, Butyl rubber, Buna-N or NBR rubber, Nitrile, or Polyvinyl chloride gloves
- Drain cleaners and openers
Neoprene rubber, Latex/Neoprene, Buna-N or NBR rubber, or Nitrile gloves
- Furniture polish
Neoprene rubber, Latex/Neoprene, Buna-N or NBR rubber, or Nitrile gloves
- Isopropyl alcohol

Natural rubber or latex, Neoprene rubber, Latex/Neoprene, Butyl rubber, Buna-N or NBR rubber, Nitrile, or Polyvinyl chloride gloves

- Lye
Neoprene rubber, Latex/Neoprene, Buna-N or NBR rubber, or Nitrile gloves
- Septic tank cleaners
Neoprene rubber, Latex/Neoprene, Buna-N or NBR rubber, or Nitrile gloves
- Spot removers
Nitrile gloves
- Toilet bowl cleaners
Natural rubber or Latex, Neoprene rubber, Nitrile or Polyvinyl chloride gloves
- Upholstery, rug and carpet cleaners
Neoprene rubber, Latex/Neoprene, Buna-N or NBR rubber, or Nitrile gloves

¹This list is not exhaustive. Other activities aside from those listed may require wearing gloves for protection.

²Wear only unlined gloves when working with these products.

Body protection

It is important to protect more than your hands and face when using some hazardous products (for example, spraying pesticides or applying solvents). Cover your arms, legs, head, feet and any exposed body part with protective clothing. The clothing will protect your body from contact with the product, preventing absorption through your skin.

- Wear clothing other than your everyday clothes when working with hazardous products. Inexpensive disposable suits can be purchased at hardware stores and safety equipment stores.
- Never expose leather to pesticides or products containing organic solvents. Leather, such as in shoes or gloves, will absorb these products and become impossible to clean thoroughly. The hazardous ingredient will then be in contact with your skin when the leather article is worn.
- Wash contaminated clothes separately from other clothing to keep the hazardous ingredient from spreading. Place the contaminated clothes in a washing machine with a full load setting of hot water and detergent. Rinse the washing machine thoroughly after laundering. Line-dry the clothes, because the high heat of a dryer can ignite any flammable vapors remaining in the clothing. See MU publication G1914, *Laundering Pesticide-Contaminated Clothing*, for additional information.

Fire prevention

- Always read and follow the directions on the product label.
- Do not mix products unless their instructions tell you to do so.
- Keep containers closed, even while working with the product.
- If the product is flammable or explosive, use and store it away from any sources of heat, flame, spark or ignition. For example, gas pilot lights, lit cigarettes, light switches, car engines and garage door openers can all be sources of sparks.
- Solvent-covered rags can spontaneously start on fire. Follow the directions on the product label regarding the disposal of solvent-covered rags. If there are no directions, place the rags in an airtight metal container. Store the container outside your house, away from other structures, until it can be picked up with the trash. Another option is to allow the solvent to volatilize by hanging the contaminated rags outside, away from your home and sources of sparks. For additional information and directions, contact your local fire marshal.
- Have two exits from the work area.
- Install smoke detectors in the house and in other areas where hazardous products are used. Check with your local fire department for the recommended locations to install smoke detectors. Refer to the end of this guide for additional information.

Post a list of emergency phone numbers (fire, medical assistance, regional poison center, etc.) by your phone and inform other home members about its location.

- Practice Exit Drills In The Home (also known as E.D.I.T.H.) with your family. Contact your fire department for more information on E.D.I.T.H.
- Keep a working and appropriate fire extinguisher readily available in your home and work space and know how to use it. Contact your fire department for instructions on how to use a fire extinguisher correctly.

In case of fire

Always follow these steps in case of an actual fire:

- Get everyone out of the building.
- Call the fire department or emergency number.
- Fight the fire with a fire extinguisher only if the fire is contained, you know how to use the extinguisher, and you have the correct extinguishing equipment.

Selecting a fire extinguisher

The appropriate fire extinguisher depends upon the type of fire. There are three different classes of fires, each requiring specific fire extinguishing chemicals.

Class A fires are fueled by ordinary combustibles such as paper, cloth, wood, rubber, plastics and upholstery.

Class B fires are fueled by flammable liquids, such as oil, gasoline, paint or grease.

Class C fires are ignited by malfunctions of electrical equipment, such as household appliances and televisions.

Using the wrong type of fire extinguisher can be dangerous since it may cause the fire to spread. Because most households contain combustibles, flammable liquids and electrical equipment, an ABC or Multi-purpose Dry Chemical fire extinguisher is recommended. Consult with a salesperson from a local safety equipment store, fire extinguisher store or hardware store to determine which extinguisher meets your needs.

Avoid purchasing fire extinguishers using a halon propellant (halon-1211). The release of halon contributes to ozone-layer depletion.

Maintenance of fire extinguishers

- Check the pressure gauge to determine if your fire extinguisher is properly charged at the intervals suggested by the manufacturer.
- Take your fire extinguisher to be serviced and refilled annually or, at a minimum, 6 years after purchase. Although the pressure gauge may read "full," the chemical extinguishing agent may deteriorate over time and become useless for putting out a fire.
- Take your fire extinguisher to be serviced and refilled each time it is discharged. A fire extinguisher that is empty or low on propellant will not protect you.

Resources

- *The Artist's Complete Health and Safety Guide*, (1990) Monona Rossol, Allworth Press, New York.
- *Artist Beware*, (1979) Michael McCann, Watson-Guptill Publications, New York.

For more information

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.

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Related MU Extension publications

- G1914, Laundering Pesticide-Contaminated Clothing
<http://extension.missouri.edu/p/G1914>
- WM6000, Safe Use, Storage and Disposal of Pesticides
<http://extension.missouri.edu/p/WM6000>
- WM6001, Safe Use, Storage and Disposal of Paint
<http://extension.missouri.edu/p/WM6001>
- WM6003, Household Hazardous Products
<http://extension.missouri.edu/p/WM6003>
- WM6004, Managing Household Hazardous Waste
<http://extension.missouri.edu/p/WM6004>
- WM6005, Store Hazardous Products Safely
<http://extension.missouri.edu/p/WM6005>
- WM6006, Identifying Product Hazards: Material Safety Data Sheets
<http://extension.missouri.edu/p/WM6006>
- WM6007, Setting Up a Used Antifreeze Collection Site
<http://extension.missouri.edu/p/WM6007>
- WM6009, Setting Up a Used Latex Paint Collection Site
<http://extension.missouri.edu/p/WM6009>
- WM6010, Setting Up a Used Oil Collection Site
<http://extension.missouri.edu/p/WM6010>
- WM6011, Storm Drains and Water Quality
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