

# **Chemical Waste Guide**

## **For Facilities Services**

September 2009

# Chemical Waste Guide

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# Chemical Waste Guide

For Facilities Services

## Introduction

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### Purpose

This guide contains instructions for a list of specific shop-related wastes as well as general guidance for spills and disposal. This guide was written for UW Facilities Services shops. Other groups on campus, such as laboratories, that produce the chemical wastes discussed in this guide are welcome to also use it as a reference and training tool.

The last page of this guide is a training worksheet that should be filled out and kept in the personnel file of all employees who handle Hazardous Waste. Documented hazardous waste training is required under state and federal law, and state inspectors may ask to see it during an audit. Audits occur every two to four years.

For chemical wastes commonly related to maintenance and construction projects, such as asbestos, lead-containing debris, wash water, PCB-containing oil, mercury in p-traps, contaminated soils and more, please refer to the EH&S Design Guides at <http://www.ehs.washington.edu/fsodesignrev/index.shtm>. These guides were originally created for the UW Capital Projects Office but were revised in 2008 to include Facilities Services, since all types and sizes of projects share similar waste disposal issues.

Laboratory staff should also refer to the UW Laboratory Safety Manual, Section 3 for instructions specific to laboratory waste.

This guide applies to all UW campuses and other UW-owned sites.

### Regulatory Requirements

The University must comply with federal, state, and local hazardous waste regulations. The Washington State Department of Ecology (Ecology) governs chemical waste management. Local city and county governments regulate discharges to the sanitary sewer systems and solid waste landfills. Disposal of hazardous waste in drains, trash cans or by evaporation is a serious violation punishable by fines or imprisonment.

### EH&S Responsibilities

EH&S designates, collects, transports and arranges for the disposal or recycling of hazardous wastes. EH&S also provides departments with information and training about waste accumulation and minimization.

### Waste Generator Responsibilities

The waste generator is responsible for identifying which wastes are hazardous waste and managing them according to the rules outlined in this guide.

### Waste Minimization

Avoid the use of hazardous chemicals when possible to minimize hazardous waste and exposure. Substitute less hazardous chemicals or use less of the chemical.

A chemical waste is hazardous if it has at least one of the following characteristics:

**Flammable/Ignitable**

Materials with flashpoints below 140°F. These chemicals are volatile and flammable, and their vapors can catch on fire when exposed to spark or flame. Examples are acetone, propane, acetylene, oil-based paints, many solvents.

**Corrosive**

Wastes with a pH less than 5.5 or greater than 12. Examples are muriatic acid and corrosive cleaning solutions that contain sodium hydroxide.

**Toxic**

Toxic waste has an LD50 less than 5 mg/kg as stated on the product MSDS. If the chemical is diluted, fill out the Waste Evaluation Request (on the EH&S website) to ask EH&S to determine whether or not the mixture is hazardous waste. Examples include Citra Safe with d-Limonene, mineral oil and much more.

**Persistent**

Chemicals in this category are often harmful to human health and the environment. Examples include older pesticides, Saf-sol, Zep, Bug Off, refrigerants and PCB oil.

**Reactive**

Reactive wastes can become unstable or react violently with water to evolve flammable or toxic gases. They are generally only used in laboratories.

**Local Sewer Discharge Limits**

In addition, wastewater is regulated by King County to protect pipes, biosolids from the wastewater treatment plant, and water quality. Sewer Discharge Local discharge limits exist for flammable alcohols and other types of waste, such as fats/oils/grease, pH, settleable solids and heavy metals. These limits are on our website at <http://www.ehs.washington.edu/epowaste/sink.shtm>. However, most cleaning products are okay for discharge to sewer when used as intended.

Sewer discharge limits are much stricter in the City of Tacoma. As in King County, cleaning products are okay to pour down the drain when used as intended. But, contact EH&S if you have any questions about disposal of other materials.

If you discharge to septic, as in Pack Forest, pour only septic-safe chemicals down the drain.

### **Waste accumulation**

Hazardous waste is usually accumulated in shops prior to collection by EH&S. Up to fifty-five gallons per waste stream can be accumulated at or near the point of generation. This means that if you will soon fill a 55-gallon drum with waste, contact EH&S for pickup. Also, flammable wastes cannot exceed the storage limit specified by the local fire department. Call the EH&S Facilities Safety Office at 206.543.0465 for storage limits in your area if you accumulate large amounts of flammable waste.

Hazardous waste must also be

- under the control of the individual generating the waste, or the area must be kept locked and secured. The generator must be able to prevent improper waste from being added to the container.
- in compatible containers with no signs of deterioration or leaking.
- labeled with the completed UW Hazardous Waste label.
- in closed containers except when waste is being added.
- stored away from floor drains, storm drains and sinks and/or in secondary containment.

### **Waste collection and disposal**

Routinely generated hazardous waste should be assigned a "routine number" by EH&S. Submit a Setup Routine Chemical Collection Request to obtain a waste routine number. After you receive your routine number you only need submit the online Routine Chemical Collection Request to request waste pickup. Forms and details are at <http://www.ehs.washington.edu/epowaste/chemwaste.shtm>.

Request one-time pickup of your hazardous waste by submitting a Chemical Collection Request for non-routine wastes. The form is available at <http://www.ehs.washington.edu/forms/epo/1470.pdf>.

Do not drop off hazardous waste at EH&S unless instructed by EH&S to do so.

### **Waste removal by independent contractors**

Service agreements which involve Hazardous Waste removal, transport, treatment or disposal by other vendors must be approved by EH&S first. Do not make arrangements with outside vendors for collecting Hazardous Waste without first contacting EH&S. For example, EH&S must approve vendors that manage spent solvent from parts washers.

### Reuse

Consider reusing the empty container for hazardous waste disposal of that same chemical or other compatible chemicals. If you do this, completely deface or remove the label on the container and then fill out and affix a hazardous waste label to the container. Defacing and labeling are required by law and also help others know that the container contains hazardous waste, not the original chemical.

### Recycling

Containers for non-toxic chemicals can be recycled if they are emptied and dried completely and their labels are defaced. Do not put these containers in public area bins; instead, take them to the nearest bottles and cans container outside the building. Custodial Services will not recycle them for you. All metal containers are recyclable but only certain shapes of plastic containers (bottles with neck and shoulders and tubs) are recyclable. Contact EHS at 206.616.5835 for more information.

### Disposal

To dispose of the empty container, follow these directions:

- Dry the container in a well-ventilated area.
- With a pen, cross out or black out the labels on the container.
- Leave the container uncapped. Throw the cap away separately.
- Place the container in or next to the trash.

Do not leave empty containers in hallways or on loading docks unless you have arranged for pickup.

### Pesticide containers

By law, empty pesticide containers must be triple rinsed and the rinseate be disposed of as hazardous waste. Also, poke a hole in the container or otherwise make it so that the container cannot be used again. Then follow the directions above for disposal.

### What is "empty"?

It can be difficult to remove all the contents from a container. A container is legally "empty" if:

- you have used "normal, no-nonsense means, such as inverting and draining, shaking, scraping, or scooping" to empty the container, and
- no more than 3% of the contents remain.

Do not leave containers open to evaporate the contents.

### **Spill preparedness**

All shops and departments must have spill kits appropriate to the types of chemicals that they stock. Include gloves, goggles and anything else needed to clean up spills safely.

Respirators may be necessary for cleanup of spills of volatile, toxic chemicals. However, the use of a respirator requires prior medical evaluation, training and fit testing. In many cases, outside contractors are used to clean up these types of spills. Call the EH&S Occupational Health & Safety Office at 206.543.7388 for more information.

### **Emergencies**

Consult with your supervisor or manager on your specific emergency procedures. In general, if necessary evacuate all affected areas by pulling the fire alarm and/or yelling. Then call 911 for help. The UW or local police will notify the local fire department, who will respond, stabilize and contain the chemical spill and help injured or exposed personnel. EH&S suggests that paper copies of MSDSs be available for medical emergencies.

### **Exposures**

In the event of a chemical exposure, use a safety shower or eye wash, if available, to rinse the chemical off. Call 911. If you are not sure

### **Spill cleanup**

Hazardous material spills that do not endanger anyone may be cleaned up by employees who are properly equipped and trained to do so.

Hazardous material spills that cannot be safely cleaned by staff must be cleaned up by a contractor. Call the EH&S Spill Line at 206.543.0467 during business hours with any questions about cleaning up spills. Call EH&S at 206.543.0467 to arrange for a cleanup contractor during business hours. If you need assistance from the spill contractor after hours or weekends, contact the UW Police at 206.685.UWPD and ask the dispatcher to contact the EH&S Staff on-call. When in doubt about whether you need help, contact your supervisor or call the EH&S number above during business hours.

### **Spill to storm drain or sanitary sewer**

Stop the spill if possible. Call 206.543.0467 for spill assistance and for state required spill reporting during business hours. After hours or weekends, contact the UW Police at 206.685.UWPD and ask the dispatcher to contact the EH&S Staff-On-Call.

**Information and forms**

More information about the hazardous waste collection process, and all the forms you need, are available on the EH&S website at <http://www.ehs.washington.edu/epowaste/chemwaste.shtm>.

**Specific waste questions**

[chmwaste@u.washington.edu](mailto:chmwaste@u.washington.edu) or 206.616.5835

**Waste pickup questions by waste collection zone**

Zone 0	UW Bothell, UW Tacoma, offsites	206.685.2849
Zone 1	Upper campus (Seattle)	206.616.0587
Zone 2	UW Medical Center	206.616.0586
Zone 3	Health Sciences Building/south campus (Seattle)	206.685.3200
Zone 4	Harborview Medical Center	206.543.2931

**Local waste pickup questions**

UW Bothell	Building & Grounds Supervisor, 425.352.3361
UW Tacoma	Facilities Manager, 253.692.5707
Friday Harbor	Supervisor of Marine Operations, 206.616.0703
Pack Forest	Building & Grounds Supervisor, 206.685.4485
ONRC, Forks	Maintenance Mechanic II, 206.685.9477

Many products come in aerosol spray cans, including cleaners, lubricants, coolants, paints and starting fluids. Aerosol containers often contain hazardous materials that are flammable or toxic and require management and disposal as Hazardous Waste.

Avoid purchasing aerosol containers when possible. Consider using refillable pump aerosol containers. Also purchase aerosol products that use nitrogen or air as the propellant instead of propane, butane or CFCs.

### **Empty containers**

Whenever possible, use aerosols for their intended purpose until empty. When aerosol cans are empty (no pressure and devoid of container contents) they may be disposed as a solid waste into the municipal trash.

### **Accumulation**

If an aerosol container is no longer needed or cannot be used for its intended purpose, but is not empty, it is Hazardous Waste. It must be placed in an accumulation container that is lined with a heavy duty inner plastic bag and have a tight fitting lid. The aerosol cans should be placed in the waste accumulation container in such a way as to prevent any release of remaining contents.

The accumulation container must be labeled with a UW Hazardous Waste Label that reads "HAZARDOUS WASTE AEROSOL SPRAY CANS". Check the appropriate hazards(s), such as flammable and/or toxic.



Batteries contain hazardous materials and must not be disposed of in the regular trash. This is true even for alkaline batteries.

To avoid arcing, the terminals on lead acid and lithium batteries must be taped or the batteries must be in separate plastic bags. Keep batteries away from flammable chemicals.

Larger batteries should be repacked in the heavy cardboard boxes they are purchased in. By law, used batteries cannot be kept on site for longer than one year.

### **Battery routines**

Many sites generate used batteries on a frequent basis. These sites, called routine battery sites, have either a scheduled regular pickup date or an "on call" pickup arrangement. For more information see

<http://www.ehs.washington.edu/eporecycle/batteries.shtm>.

### **Battery one-time collections**

EH&S will collect oversized, heavy or large volumes (greater than five pounds) of batteries. To request collection, submit the online form at

<http://www.ehs.washington.edu/forms/epo/1943.pdf>.

### **E.media program**

Place small amounts (less than five pounds) of household-type batteries in E.media bins (available on the Seattle, Tacoma and Bothell campuses.) The E.media bins are also used for cell phones (except for UW property), inkjet cartridges and electronic media such as CDs and tapes. For more information, see

<http://www.ehs.washington.edu/eporecycle/batteries.shtm>.

### **Leaking batteries**

Batteries rarely leak, but if you find a leaking battery, put it in a plastic bag or container. Wear gloves and wash your hands after handling. Fill out and send to EH&S a [Chemical Collection Request](#) (PDF) and EH&S will pick it up as hazardous waste. For a leaking lead acid battery (in UPS units and similar), we advise that you neutralize the leaking acid with baking soda (sodium bicarbonate.) Wear gloves and wash your hands afterwards, and be careful with your clothing and shoes. Put the battery and spill debris (paper towels, gloves) in a container and fill out the request as above for battery and debris. If you have any questions, call the EH&S Spills Advice Line at 206.543.0467 during business hours.



Used fluorescent lamps and high intensity discharge (HID) lamps are hazardous because the tubes contain a small amount of mercury vapor. Intact bulbs are recycled under special rules (called Universal Waste Rules).

### **Lamp packaging**

Pack used lamps in boxes or cardboard drums. Pack carefully to prevent breakage. Big Beef Creek, Friday Harbor Laboratories, and other locations use kits provided by the current recycling vendor.

If the lamps are being placed in a labeled shipping container within the same working shift that they are removed, the boxes or drums do not need to be labeled. Otherwise, boxes or drums must be labeled with a completed used lamp label as soon as the first lamp goes in them. For labels call 206.616.0595 or email [chmwaste@u.washington.edu](mailto:chmwaste@u.washington.edu) with your box number and EH&S will mail them to you.

EH&S will contact most locations each year to make sure that used lamps are not kept on site for longer than one year, a requirement of the Universal Waste Rules.

### **Lamp recycling**

Recycling protocols differ for each campus. Contacts for each location are below:

- |                         |  |
|-------------------------|--|
| <b>Seattle:</b>         | Contact the Electrical Shops for lamp replacement and handling of used lamps. Bulbs should be boxed and placed in the shipping container located in Corporation Yard 3. The container is picked up by a recycling vendor. Property & Transport Services manages the contract for lamp recycling. |
| <b>Harborview:</b>      | Lighting Maintenance Technician (HMC Maintenance 8EC04, 206.744.3042)  |
| <b>Tacoma:</b>          | Project Contractor Coordinator (253.692.5707)  |
| <b>Bothell:</b>         | Building & Grounds Supervisor (425.352.3361)   |
| <b>Other locations:</b> | Call EH&S at 206.685.2849 for information.   |

### **Broken bulbs**

Avoid any dust created by broken lamps. Clean up the broken lamp, carefully, wetting the dust first if practicable, and place all of the material in a sturdy container with a secure screw top lid or a double plastic bag in a cardboard box. Make sure that your container keeps the mercury-containing dust in and is not able to be punctured by the broken glass. Manage the broken bulb as hazardous waste. Label the box with a UW Hazardous Waste label and notify EH&S for a waste pick-up.



### **Procurement**

When purchasing your gas cylinder from a vendor, make sure that the manufacturer will take back any unused portion of gas to avoid having to dispose of the cylinder as hazardous waste, which is very expensive. Retain all return instructions, including the return agreement.

### **Storage**

Compressed gas cylinders should be stored in an organized, ventilated, well-lit place away from combustible materials. Gas types should be separated from incompatibles and the areas marked. No manufacturer applied labels, decals, or cylinder content information should be damaged or removed from the cylinder. Any storage area must be protected from excessive heat, open flame, or ignition sources. Storage outside should be above grade, dry, and protected from weather conditions. Store cylinders so oldest products get used first.

For more tips on gas cylinder management, including transport and use, see <http://www.ehs.washington.edu/fsohazmat/gascylinders.shtm>. EH&S also offers gas cylinder safety training.

### **Disposal**

Normally cylinders are owned by a vendor and are returned to them, full or empty. Cylinders of toxic or flammable gas that are not empty and cannot be returned to a vendor must be disposed of as hazardous waste at the cost of your department. Cylinders of oxygen, nitrogen or other normal constituents of air may be vented. Empty cylinders should be devalved and disposed of as scrap metal or returned to the supplier.



Since 1989 the University of Washington has had a voluntary PCB ballast removal program. Ballasts manufactured prior to 1978 commonly contain polychlorinated biphenyls (PCBs). PCBs are in the capacitor oil and in the tar-like "potting compound" that surrounds the capacitor. These older ballasts are being replaced by energy efficient, non-PCB electronic ballasts.

**PCB-containing ballasts**

PCB-containing ballasts should be managed as hazardous waste. Submit a Chemical Collection Request or contact the Environmental Programs Office for dropoff.

**Older unlabeled ballasts**

Assume that ballasts which contain no statement regarding PCB content contain PCBs. Some unlabelled ballasts manufactured after 1978 contain a PCB replacement called DEHP. DEHP is a probable human carcinogen. Therefore, manage these unlabeled ballasts as hazardous waste similar to PCB-containing ballasts.

**Electronic ballasts**

Electronic ballasts with plastic covers can go into the regular trash. Electronic ballasts with metal covers should go in the scrap metal dumpster.

**Leaking ballasts**

If the ballast contains PCBs, they are inside the capacitor. If the capacitor breaks open due to ballast failure, the PCBs will contaminate the surrounding material and leak out of the fixture. The capacitor does not always leak when the ballast fails, but when it does, measures should be taken to limit or avoid personal exposure. If you discover a leaking ballast, please call the PCB Program Coordinator at 616-5837. Facility Services personnel can manage the removal of a leaking ballast and perform a small cleanup. However, be sure to talk with a supervisor and the PCB Program Coordinator first. These recommendations are also true for ballasts suspected to contain DEHP.

*Clockwise from upper left: PCB ballast, electronic ballast with metal cover, electronic ballast with plastic cover, older unlabeled ballast.*



Oil includes any petroleum-based or synthetic oil. Oils used as lubricants, hydraulic fluids, cutting fluid and heat transfer fluids are also considered used oil.

Oil does not include products used as solvents or degreasers, antifreeze and kerosene. These materials, along with oil contaminated with PCBs and oil which has high levels of halogens, must be managed as hazardous waste.

### **Accumulation**

Store used oil in a sturdy, leak-proof, closed container labeled "Used Oil". Keep containers on covered impermeable surfaces away from drains, preferably indoors. Use secondary containment.

Have spill cleanup supplies readily available. Spill pads and diatomaceous earth work well.

Avoid contamination of the used oil with other chemicals.

### **Recycling used oil**

Recycle the oil via EH&S using the Chemical Collection Request. The one exception to this policy is UW Fleet Services, who recycles oil directly with a vendor.

### **Contaminated oil**

Manage oil contaminated with metals, PCBs or other chemicals as hazardous waste. See <http://www.ehs.washington.edu/epopcb/index.shtm> for more information about the PCB management program.



Paint shops regularly generate wastes that are flammable and toxic, including leftover paint, waste ink, cleanup sludges and unused solvent.

### **Latex paint**

Avoid “leftover” paint. Buy only what you will use. Find new uses for paint that wasn’t used for its original purpose.

Full or partially full cans or pails of unwanted latex paint are recycled through EH&S. Keep paint in its original container and seal lid tightly. The paint recycling company will only accept paint in its original manufacturer container.

To dispose of small amounts of latex paint (less than ¼ of one gallon of paint), use kitty litter or vermiculite to absorb paint. Then place the open container in the dumpster.

An “empty” paint can has less than ½ inch of paint in it. Allow the paint to dry a few days before you place empty paint cans in the dumpster.

Minimize latex paint wash water. Use or remove and save as much latex paint as possible before washing equipment.

### **Oil-based paint**

Avoid the use of oil-based paint. It requires the use of hazardous solvents and is not recyclable.

Any leftover oil-based paint must be disposed of as hazardous waste.

### **Solvents**

Prevent evaporation; keep solvents tightly closed.

Dispose of solvent as hazardous waste when it loses its cleaning effectiveness, not just because it looks dirty.



One of the primary purposes of the University's Integrated Pest Management Program is the wise use of pesticides. You must also ensure that pesticides and fertilizer products, rinseate and wash waters are prevented from being spilled or otherwise released into the environment in an uncontrolled manner.

**Waste minimization**

Eliminate or reduce the generation of contaminated water. Any contaminated water should be prevented from moving off site to minimize the amount of environmental impact.

Mix only enough for immediate use to avoid leftover material.

Mix and use the chemical products as directed by the container labeling.

Return unused agricultural chemicals to the distributor or manufacturer for disposal. Most companies will accept them. EH&S is available to assist with return shipments.

**Storage**

Store pesticides in a locked area, preferably indoors. Use secondary containment for leaks and spills.

**Empty containers**

To dispose of empty containers, triple rinse the container, collect the rinseate as hazardous chemical waste, remove labels and render the container unusable. Then dispose of in the regular trash.



Most refrigerants are potent greenhouse gasses. Some refrigerants also contain chemicals that destroy the earth's protective ozone layer. Therefore, regulations have been developed governing the maintenance and disposal of refrigerant-containing appliances.

### **Maintenance**

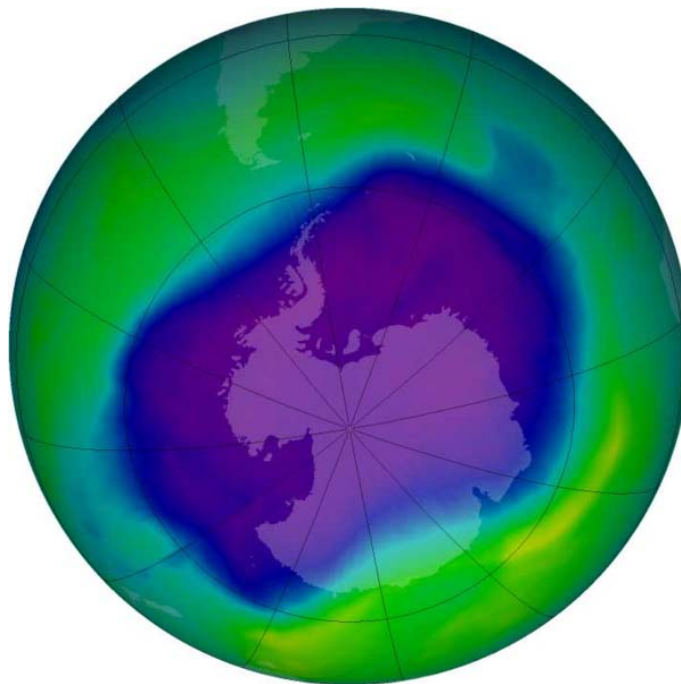
It is unlawful to vent any refrigerant to the air. Federal and state rules require that persons working on refrigeration equipment, including automotive air conditioning systems, obtain training and pass a certification exam. Large refrigeration appliances that contain more than 50 pounds of refrigerants are subject to special rules. For a list of requirements applicable to large appliances, please see the compliance checklist online at: <http://www.ehs.washington.edu/epoairqual/reefer.shtm>.

### **Disposal**

If you have an appliance that you no longer need, dispose of it through UW Surplus Property. They will make sure the unit is offered for sale if it is still working or sent out for proper disposal. Do not put refrigerant-containing appliances or bottles of refrigerant in the trash.

Refrigerant disposal is governed by the Department of Ecology's Dangerous Waste Regulations. Special procedures have been developed for disposal of refrigerants on the UW campus. For spent refrigerants sent for reclaim or recycle, see specific records listed in WAC 173-303-506(b)(2). Records must be kept for a period of five years. Spent refrigerants that cannot be reclaimed or recycled are subject to all the applicable requirements of hazardous waste and must be managed as hazardous waste. The EH&S Environmental Programs Office manages disposal of hazardous waste.

Ozone hole over Antarctica, September 2006. Credit: NASA



## **USED SHOP TOWELS**

Shop towels are commonly used with cleaners or solvents to remove oil, dirt and grease. Many cleaners and solvents are ignitable and/or toxic. Also, the oils and metals that are being cleaned up can be ignitable and/or toxic. Therefore, shop rags must be managed according to hazardous waste rules.

### **Cloth versus paper shop towels**

Using cloth shop towels is strongly preferred over disposable paper towels. Cloth towels should be laundered. Use only those laundry services approved by EH&S (see the EH&S Design Guides for the list of approved laundry services.)

### **Collecting used shop towels**

Make sure that used shop towels contaminated with hazardous chemicals are collected in closed containers. The containers must be in good condition and labeled with the words "contaminated shop towels" or "used shop towels".

Often shop towels are collected in cans near each work station. This is okay; however, all of these cans must be emptied into the main shop towel accumulation area by the end of each day.

Containers holding used shop towels must be sufficiently separated from all sources of ignition. "No Smoking" signs must be posted at all accumulation areas.

Remove free liquids from the towels before tossing soiled shop towels in containers. Free liquids should be reused or disposed of as hazardous waste. Do not pour used solvents into the shop towel containers.

Keep towels with incompatible wastes separate (e.g. solvents and acids).

### **Waste minimization**

As always, minimize the amount of ignitable and toxic chemicals you use with shop towels by using only the amount that gets the job done. Avoid chlorinated solvents. Whenever possible, use the least hazardous solvent.



**Employee name:**

**Signature:**

**Supervisor name:**

**Signature:**

**Date(s) of training:**

**Topics covered:**

**General Information for all employees**

- Introduction
- Chemical Hazards
- Waste Accumulation
- Empty Containers
- Chemical Spills
- Resources

**Specific information according to waste(s) generated by employee:**

- Aerosol Cans
- Batteries
- Gas Cylinders
- Fluorescent Lamps
- Lamp Ballasts
- Oil
- Paint
- Pesticides
- Refrigerants
- Used shop towels

**Any additional topics:**