Laboratory Safety Training

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Laboratory Safety Training Overview

- Material Safety Data Sheets
- Chemical Labeling
- Lab Safety Practices
- Chemical Storage
- Personal Protective Equipment
- Emergency Equipment
- Hazardous Waste

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Principle OSHA Regulations Affecting Lab Safety

- Occupational Exposures to Hazardous Chemicals in Laboratories (29 CFR 1910.1450)
- Personal Protective Equipment (29 CFR, 1910, Subpart I)
- Airborne Contaminants (29 CFR 1910.1000)
- Emergency Response (29 CFR 1910.120)

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Material Safety Data Sheets (MSDS)

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Material Safety Data Sheets (MSDS)

When provided by the supplier, employees and those working with the chemical must be given access to the MSDS.

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Material Safety Data Sheets

- Chemical product and company identification;
- Composition and information on ingredients;
- Hazard identification;
- First aid measures;
- Fire and explosion data;
- Accidental release measures;
- Handling and storage;
- Exposure controls/PPE;
- Physical and chemical properties;
- Stability and reactivity data;
- Toxicological information;
- Ecological information;
- Disposal considerations;
- Transport information; and
- Other regulatory information.

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Hazard Communication – Labels

- Every container in the lab *should* be labeled

- All hazardous substances ***must*** be labeled
  - Identity of the substance
  - Hazard Warnings

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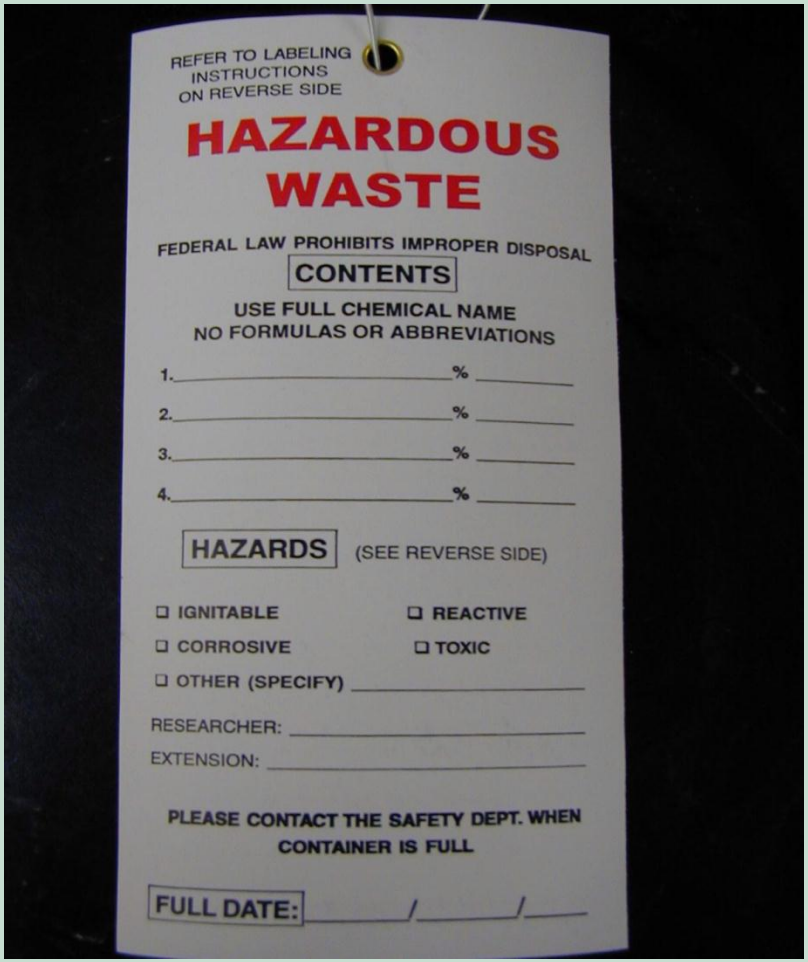
Other Container Labels

- Hazardous Waste



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Food in the Laboratory

- Food and drinks are not allowed in the lab.
- Food and drinks should be kept within a break room or within office areas.

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Refrigerators

- Refrigerators should bear signs indicating "no food" and/or "do not store flammable or explosive material inside," as appropriate (i.e., unless it's a food-only and/or an explosion-proof refrigerator).

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Flammable Materials Storage

- Flammable liquid should be stored in a flammables storage cabinet.

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Chemical Storage

- Acids are incompatible with bases, flammable solvents, oxidizers - glacial acetic acid.
- Cyanides should stored separately from acids.
- Water reactive materials should be stored separately .
- Flammable materials with very low flashpoints and boiling points (Class IA) should be stored in an explosion proof refrigerator.
- Peroxide forming chemicals must be dated when opened, disposed of when required.

*Keep on hand only those chemicals that you have room to store properly.

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Chemical Storage

- Chemicals not in immediate use should be kept in a designated storage area.
- Dry chemicals may be stored alphabetically or in any convenient manner.

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Chemical Storage

- Liquid chemicals should be stored by class. Examples of such groupings include flammables, organic acids, mineral acids, bases, oxidizers and carcinogens.
- Where storage space is limited, separation using plastic tubs.
- Peroxide formers must be marked with date of receipt and date of opening.

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Personal Protective Equipment (PPE) and Engineering Controls

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Personal Protective Equipment (PPE)

- Gloves – nitrile, butyl, PVC, neoprene, PVA
- Eye Protection - glasses, goggles, face shields
- Lab coats, aprons, scrubs
- Safety shoes – closed toe shoes
- Respirators

PPE requirements vary according to the lab type and work performed

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Gloves

- select gloves appropriate for the task
- check gloves for leaks
- double glove if necessary
- be alert to unusual sensations in your hands
- do not touch your face, telephone, etc with contaminated gloves
- use clean hand / dirty hand technique

Eye Protection

"Eye protection must be worn in any area where there is the potential for eye injury"

- All eye protection used is ANSI approved ("Z87" is stamped on the sidebar of ANSI approved eyewear)

- If your prescription glasses are not ANSI approved, you must wear safety glasses, safety goggles or a full face shield over them

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Fume Hoods

The most vital piece of equipment in your lab!

Use Properly:

- keep sashes down (as low as practical)
- don't store flammable liquids, equipment in hood
- limit traffic behind you

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Chemical Fume Hoods

- Do not use fume hoods as storage cabinets.
- Increased storage within a fume hood can alter the air flow within.
- When large equipment is placed in a fume hood, place it on blocks or racking to allow air flow under the equipment.

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Chemical Fume Hoods

- Fume hoods may have air flow alarms
- Visual flow indicator
- Annual flow test.
  - Completed by third party contractor.

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Emergency Equipment

- Access to emergency equipment is essential.
- Check to ensure that equipment is not blocked.

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Spill Kits

- Each lab should have a first aid kit and spill control kit.
- Know the location of each kit and understand how to use it in an emergency.
- If you remove anything from the kit, notify supervisor so that kit may be restocked.

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Fire Extinguishers

- Located in each lab
- For insipient stage fires only
- Inspected Monthly
- Annual training (if employees are authorized or expected to use)

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Gas Cylinders

- Cylinders not in use must be secured with a cylinder cap. All cylinders must be secured with a strap to a wall, lab bench or suitable equipment.
- Regulators must be removed and caps used when moving cylinders.
- Cylinders should not be stored in egress paths.

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Emergency Response

- Refer to facility emergency procedures.
- Notify professor, teacher or teachers assistant in the event of an emergency.
- Notification should be made to Campus Police of incident.
- Follow University specific procedures for clean-up of spills.

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RCRA- Hazardous Waste Management

Program for Connecticut Generators

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RCRA

The Resource Conservation and Recovery Act of 1976

Originally conceived as a law addressing municipal trash disposal, Subtitle C of RCRA was included to give the U.S. Environmental Protection Agency (EPA) the authority to regulate hazardous waste.

This includes the generation, transportation, treatment, storage, and disposal of hazardous waste.

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Violations

Failure to Comply with RCRA Regulations

Compliance Orders –

The regional EPA Administrator has the authority to issue a "compliance order" whenever he determines there has been, or is in existence, a violation of any requirement of RCRA. The order can require compliance immediately or within a specified time period, or both.

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Violations

(cont'd)

Civil Penalties-

The Administrator is also authorized to issue penalties up to ***$37,500*** *for each day of noncompliance for each violation of a RCRA requirement.*

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Major Compliance Issues

- hazardous waste identification and profiling;
- manifesting;
- land disposal restriction notification (federal rule);
- short term storage and satellite accumulation;
- inventory and inspection;
- reporting;
- preparedness and prevention;
- contingency planning;
- training;
- recordkeeping
- use & management of containers;
- marking and labeling; and
- shipping.

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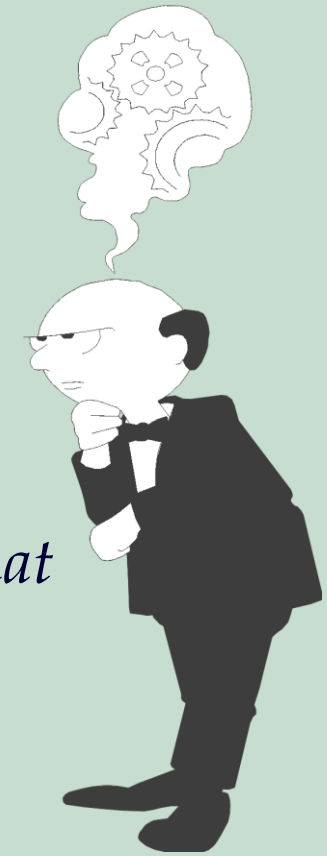
Hazardous Waste Identification & Profiling

It is the responsibility of the generator to determine if a material is considered hazardous waste.



To do it properly, the generator must have detailed information about the constituents and properties of the waste, as well as information about the process that generated the waste.

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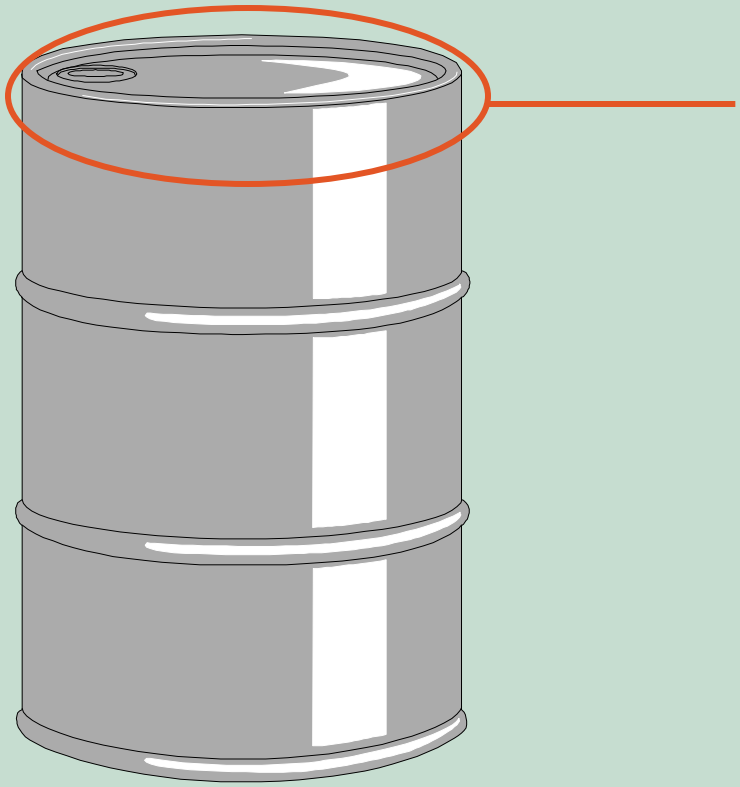
Container Standards



Closed and sealed at all times-

(Bung and vent caps screwed in, covers squarely on top and snapped shut /ring tightened)

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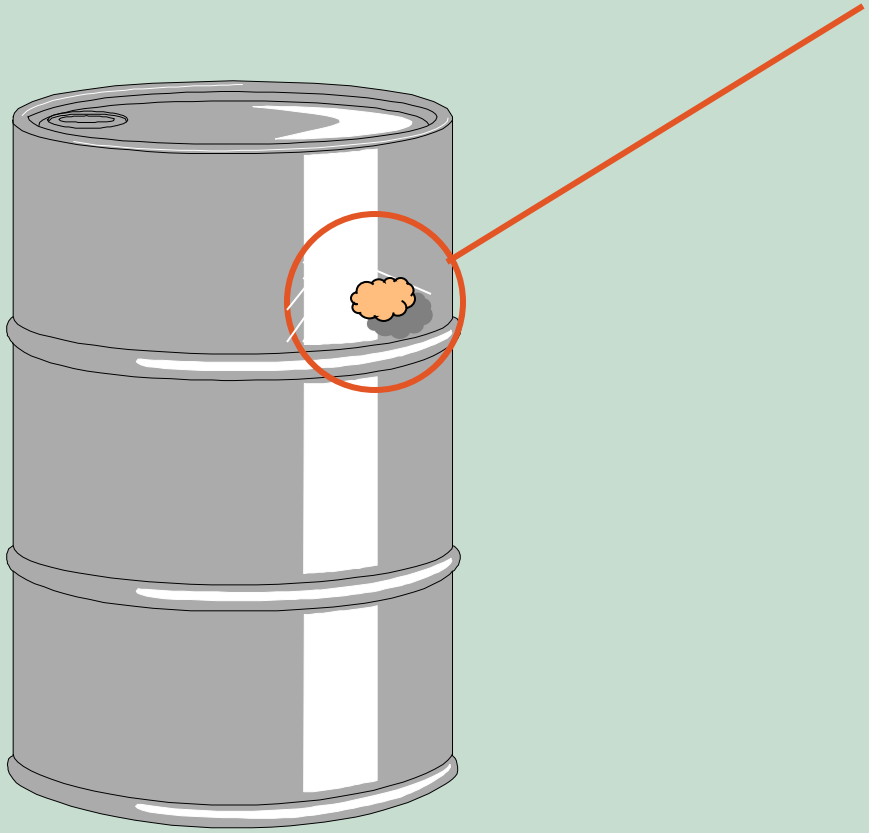
Container Standards



Good Condition

(No leaking, dents, pitting, rusting, or damaged closures or seams)

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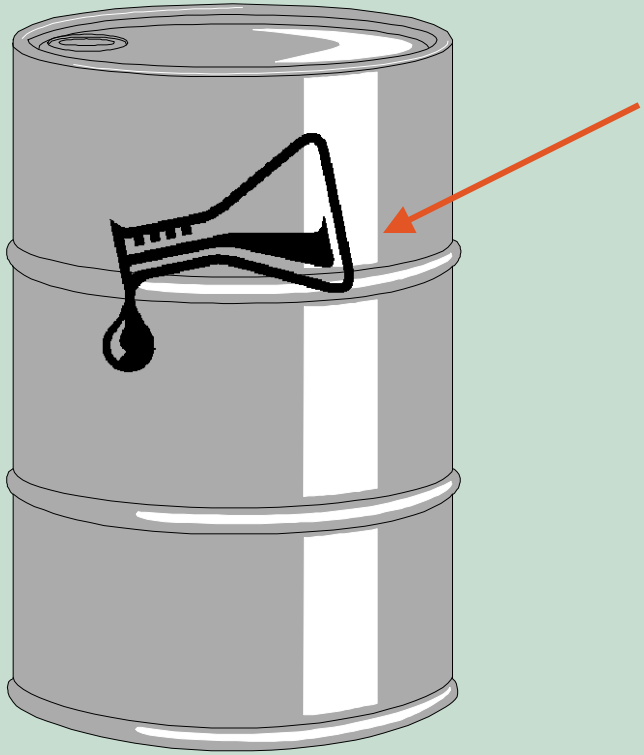
Container Standards



Chemically- Compatible

(Contents will not corrode, embrittle, prematurely age, or otherwise compromise the packaging)

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Emergency Contacts and Equipment

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Emergency Contact List

All size generators are required to post an emergency contact list next to the telephone

It is recommended that this list be posted at the telephone nearest the hazardous waste storage area and any other telephones designated for emergency use.
The list is required, at a minimum, to include:

1. The name and telephone numbers of the emergency coordinators;
2. Evacuation routes and the location of fire extinguishers, spill control materials, and fire alarms (if present); and
3. the telephone number of the fire department; and
4. the telephone numbers of the police department, hospital, and state and local emergency response teams that may be called upon to provide emergency services.

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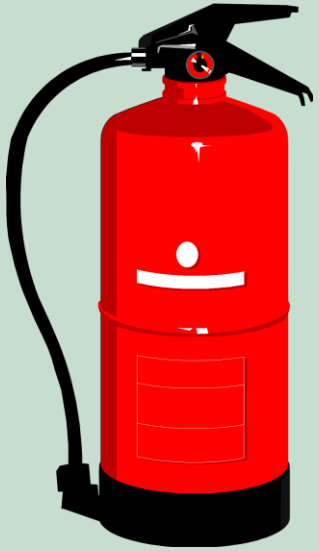
Emergency Equipment



The generator is required to maintain various emergency response equipment at their facility in order to protect human health and the environment from the hazards posed by the waste stored at the facility.

1. An internal communications device or alarm to summon assistance from facility personnel;
2. A device to summon assistance from local police, fire departments, or state or local emergency response teams.
3. Portable fire extinguishers, fire control equipment, spill control equipment, and decontamination equipment;
4. An adequate water supply system for hoses, sprinkler systems or other waste-based fire control systems.

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Alarms & Communication

All size generators must provide immediate access to an internal alarm and/or communications device to employees whenever hazardous waste is being poured, mixed, spread or otherwise handled. Communications may be direct or through visual or voice contact with another employee.

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Satellite Accumulation Area Regulations

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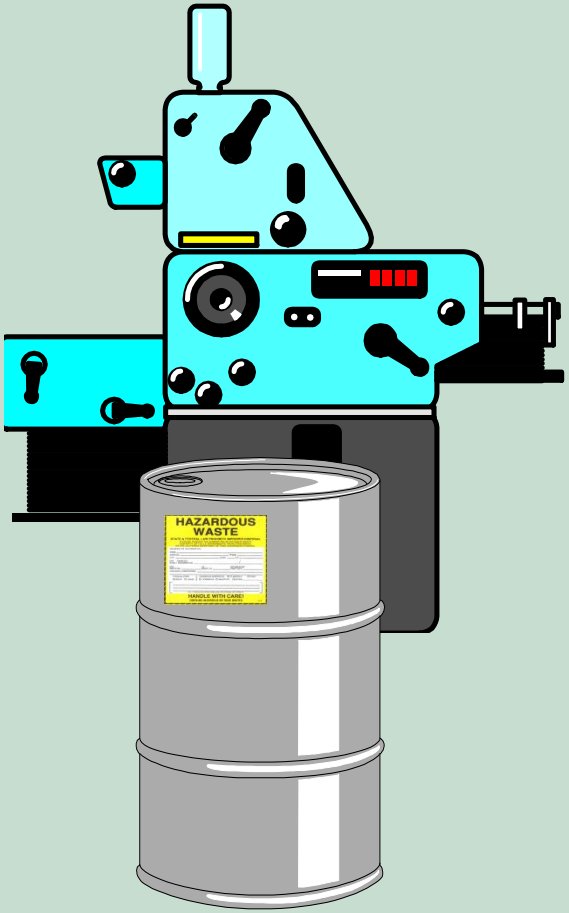
Satellite Storage



The purpose of the satellite storage provision is to provide a means by which generators may accumulate hazardous waste in containers without an accumulation time limit while those containers are being slowly filled.

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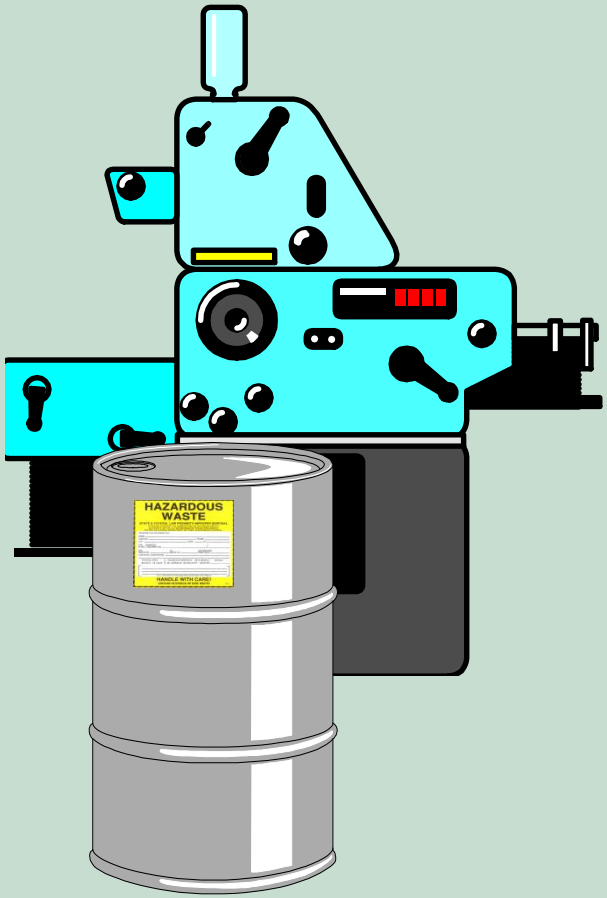
Satellite Storage



The provision allows hazardous waste to accumulate while being filled at or near the point of generation without an accumulation time limit. One container per waste stream, not to exceed 55-gallon capacity.

Once filled however, the container must be moved to the storage area within 72 hours and be shipped off-site within the storage time limit (90 or 180 days depending on the generator's status)

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Satellite Storage Provision

The satellite container must be under the control of a trained key staff individual who is directly responsible for the process that is generating the waste.

Like containers accumulating in the Main Storage Area, satellite containers must meet the same container standards, including using good condition, chemically-compatible containers that remain closed at all times.

The containers must be on an impermeable surface (often secondary containment tubs, skids, etc.), the labels are clearly visible, and there must be adequate clearance on the labeled side.

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Satellite Storage

Labeling

1. The Words, “HAZARDOUS WASTE”; and
2. A description of the waste

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Bloodborne Pathogens

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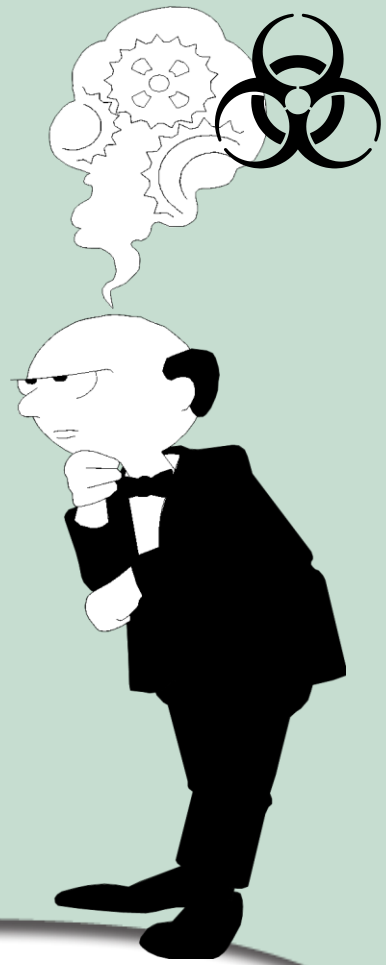
Universal Precautions

(the “Better Safe than Sorry” approach)
It is often not possible or practical to determine if blood or body fluids are infectious prior to contact (which could include first aid, clean-up, decontamination, etc.). For this reason, it will always be assumed that blood and other body fluids contain pathogens capable of harming employees upon unprotected contact.



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Engineering & Work Practice Controls

Employees must wash their hands immediately or as soon as feasible after removal of gloves or other personal protective equipment.

Employees must wash their hands and any other body areas with soap and water (or waterless anti-bacterial/antiseptic wash), and flush mucous membranes with water immediately following contact with blood or other potentially infectious materials.

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Engineering & Work Practice Controls

Sharps Handling

If contaminated sharps are discovered or generated by an accident (such as broken glass), they must not be handled directly with the hands, but rather with mechanical means (dustpan and brush, tongs, forceps, etc.) and placed into a proper sharps container.

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Engineering & Work Practice Controls

Contaminated Sharps - Discarding and Containment

Contaminated sharps must be discarded immediately in containers that are:

Closable;

Puncture-resistant;

Leakproof on sides and bottom; and

Labeled or color-coded as a biohazard

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Engineering & Work Practice Controls

Contaminated Sharps- Discarding and Containment

<u>During use, containers must be</u>:

Easily accessible

Maintained upright throughout use

Replaced routinely and not be allowed to overfill.

Closed immediately prior to removal or replacement to prevent spillage or protrusion of contents during handling, storage, transport, or shipping; and

If leakage is possible, placed in a secondary container.

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Engineering & Work Practice Controls

Packaging & Containment of Waste

Regulated waste must be placed in containers which are:

- Closable;
- Constructed to contain all contents and prevent leakage;
- Labeled or color-coded as a biohazard
- Closed prior to removal; and
- Disposal of all regulated waste shall be in accordance with all applicable local, state and federal regulations.

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Engineering & Work Practice Controls

Decontamination

Surfaces, equipment, machinery, or objects which may become contaminated with blood or other potentially infectious materials will be decontaminated with a suitable disinfecting solution.

Note: If decontamination is not performed immediately, the contaminated surfaces should be signed or labeled as a biohazard to warn all employees as to it's potentially-infectious condition. Once decontaminated, the warnings may be removed.

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Engineering & Work Practice Controls

Contaminated Laundry

Should be:

- Handled as little as possible
- Bagged at the location where it was used.
- Placed in bags or containers labeled as a bio-hazard.
- Placed in bags or containers which prevent soak- through and/or leakage when soakthrough could be expected.

Employees should wear protective gloves and other appropriate personal protective equipment.

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Communication of Hazard

Communication of Hazard

Warning Labels - Legend

Warning labels must be affixed to containers of regulated waste, refrigerators and freezers containing blood or other potentially infectious material; and other containers used to store, transport or ship blood or other potentially infectious materials.

Labels must include the following legend:

BIOHAZARD

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Communication of Hazard

Warning Labels- Color

These labels must be fluorescent orange or orange-red or predominantly so, with lettering and symbols in a contrasting color.

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Questions?

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