OIST Mandatory Training by Occupational Health and Safety Section

Fundamentals of Laboratory Safety

2024 v.1.0

2024/11/15

Please use the buttons below to navigate through this presentation.

no audio

quiz at end

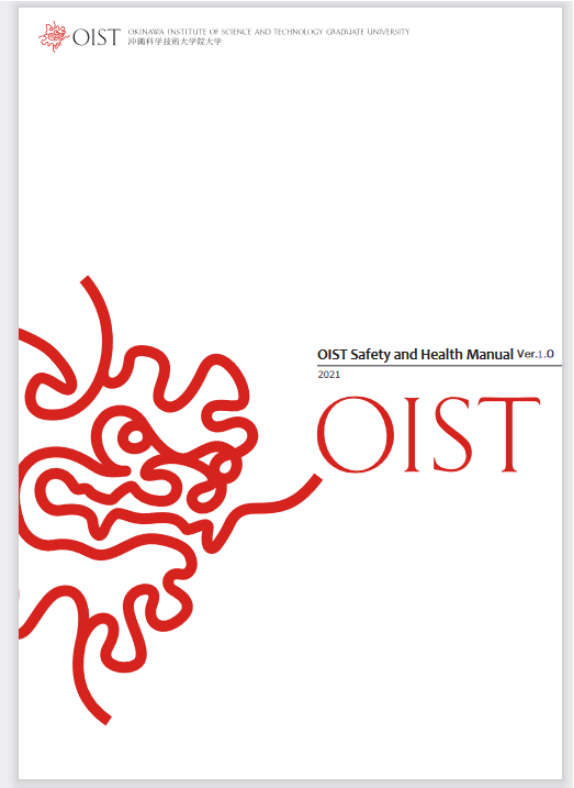
Introduction

Target : All personnel working/studying at OIST

Purpose:

- Reconfirm emergency response
- Reconfirm safety responsibilities
- Raise safety awareness

Everything described in this training is covered in detail in the OIST Safety and Health Manual. Be sure to read through the manual and make sure you understand it before you start working.



This training picks up only the basics and *does not include everything* that you need to know to conduct your work safely. It is set upon the premise where after completing, trainees will undertake necessary training courses as per their job requirements, and read the OIST Policy, Rules and Procedures, related OIST groups websites, rules, and related materials.

I hereby acknowledge that I have completely read and fully understand the above requirement.

Next

Message from General Safety and Health Manager

Dear OIST Community

It is the desire of everyone associated with OIST to ensure the safe implementation of our university's founding principle, "Promote internationally distinguished research and education in science and technology."

It is essential that the entire OIST community be proactive about safety and that each individual fulfill their responsibility for research safety through best practices and high safety standards.

Let us continue to work together to make safety a part of everything we do at OIST and to foster a culture of safety based on our values: excellence, responsibility, and transparency.

- **Excellence**
  Proactively introduce superior safety standards from outside OIST and meet or exceed all legal and regulatory requirements for health and safety.
- **Responsibility**
  Take responsibility for our own actions and the health and safety of ourselves and others. Ensure we protect ourselves and others from harm when research involves risky technologies, materials, or environments.
- **Transparency**
  Act with integrity, fairness, and appropriateness, and maintain standards in all safety discussions while respecting transparency and authenticity.

Emergency Response

Do you know how to respond to an emergency?

Who to contact during an emergency

Within the Campus

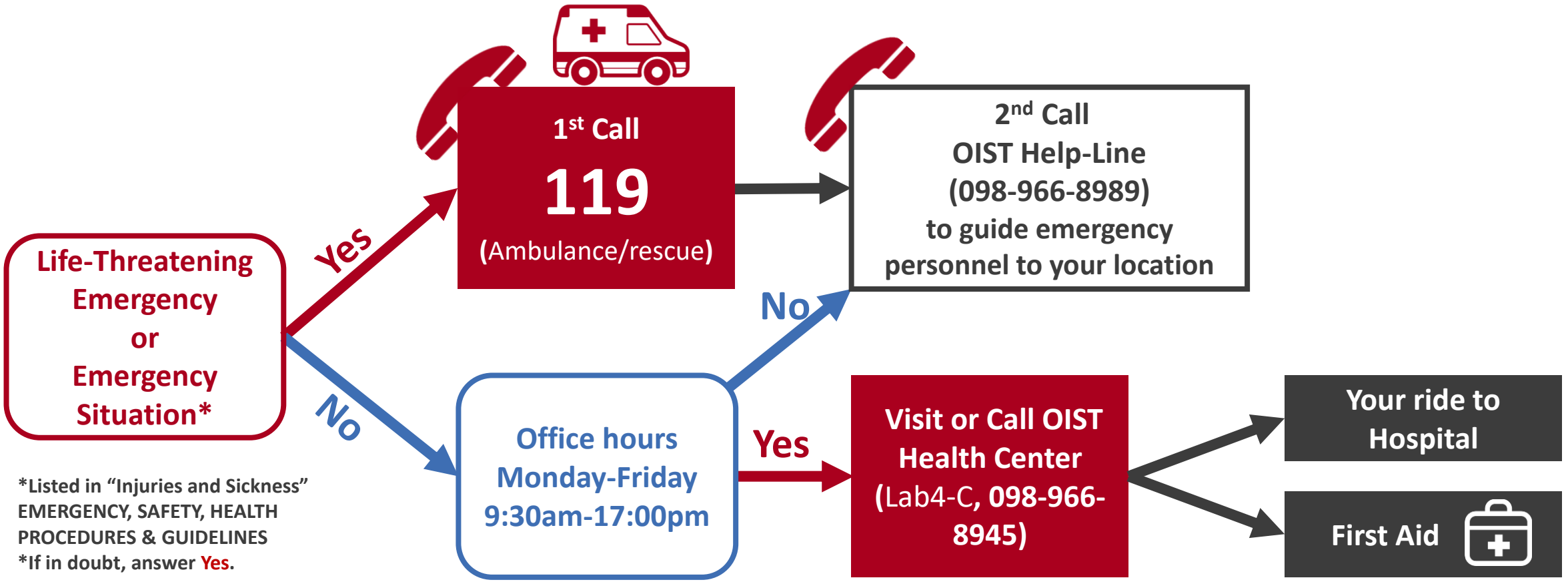
Call 119 Directly for Life-Threatening Emergency

Call "OIST Help-Line" at 098-966-8989 (24 hours, 365 days a year) for non-life-threatening emergencies

OR

- Be prepared for emergency by saving the phone number on your mobile phone
- How to use OIST Emergency Phone and Emergency Phone Locations

Emergency Workflow (Injuries/Sickness)



*Listed in "Injuries and Sickness" EMERGENCY, SAFETY, HEALTH PROCEDURES & GUIDELINES
*If in doubt, answer Yes.

TO DO

Contact "OIST Help-Line" 098-966-8989 immediately if there are safety hazards or concerns that may lead to secondary accidents (such as chemical spill, gas leakage, etc.).

Emergency Workflow (Fire)

IF you find fire,

Alert people around you in a loud voice "FIRE!".

Press the fire alarm switch to ring alarm bells.

Immediately call the fire department (119). Tell them the location of the fire.

*Make sure you are able to evacuate yourself. Please do so away from fire and smoke.

IF you attempt to extinguish the fire, ask yourself:

Have you been trained for initial firefighting?

Has the fire just started which is not so severe that can be put out with a fire extinguisher or indoor fire hydrant?

All Yes → **Extinguish the fire**

No → **Leave immediately**

Fire alarm switch

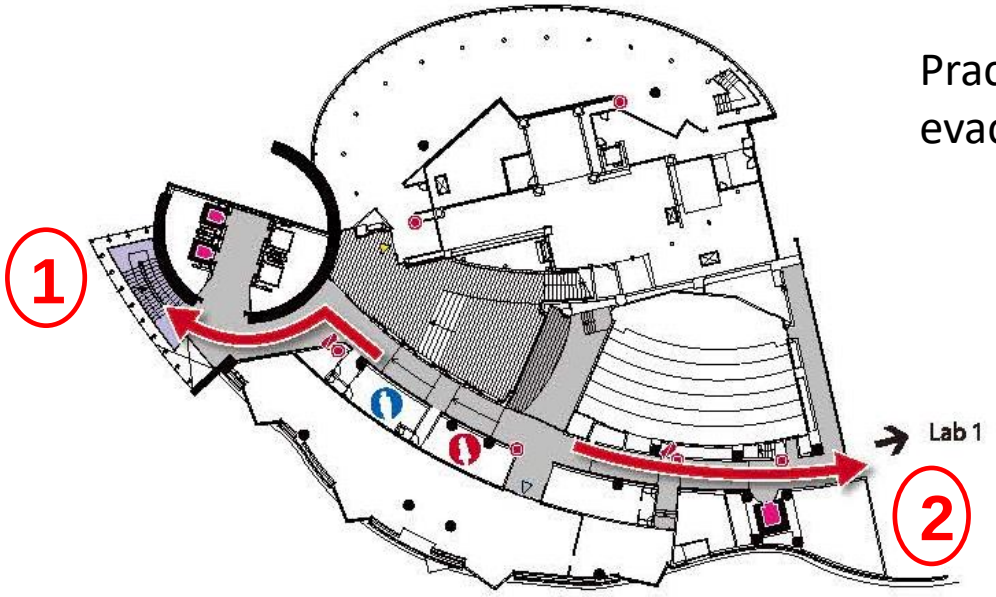
Indoor fire hydrant

Fire Extinguisher

Please also call the OIST Help-Line to ensure that firefighters can work smoothly.

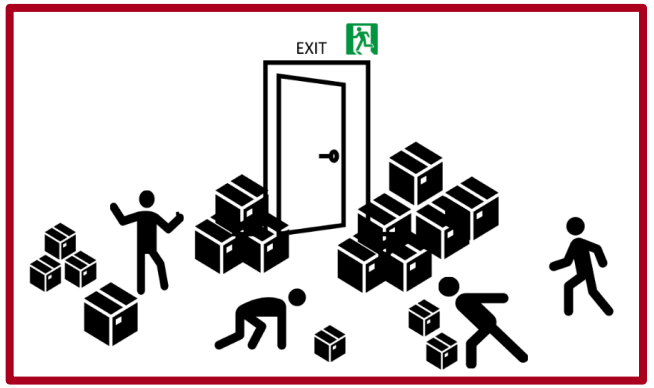
All fires, even extinguished fires within the facility must be reported to OIST Help-Line (098-966-8989).

Evacuation Route



Evacuation routes can be blocked by flame, smoke, etc. during fire or other emergency. Memorize at least two different evacuation routes from your workplace to outside of the building.

Practice evacuation by walking evacuation routes so you can evacuate even under low visibility conditions.



Never block emergency exits and corridors leading to the exit.

TO DO
- Check the Evacuation Route in advance.
- Do not store items in corridors that create obstacles while exiting the building during emergency.

Emergency Response (Initial Fire Fighting - Fire Extinguisher)

ABC Dry Powder Fire Extinguisher can extinguish fires from:

Combustibles

Flammable Liquids

Electrical fires

Don't use for metal fires

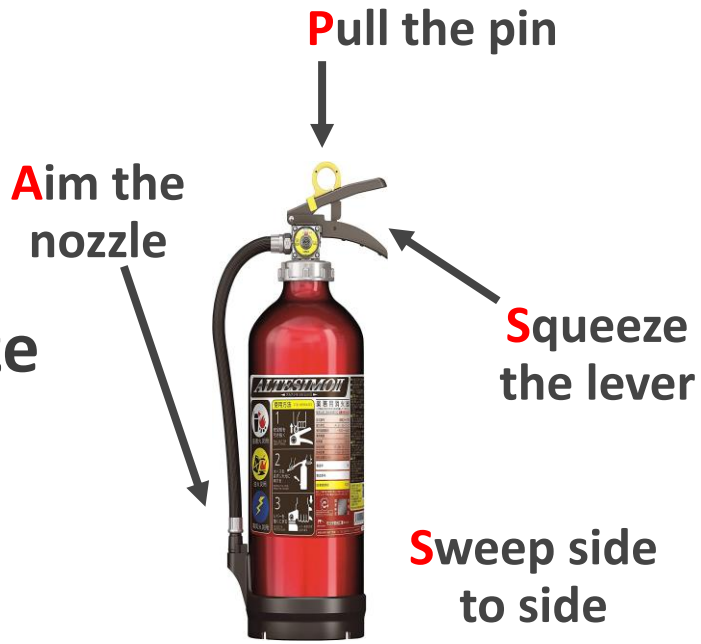
How to Use: Remember PASS

Pull

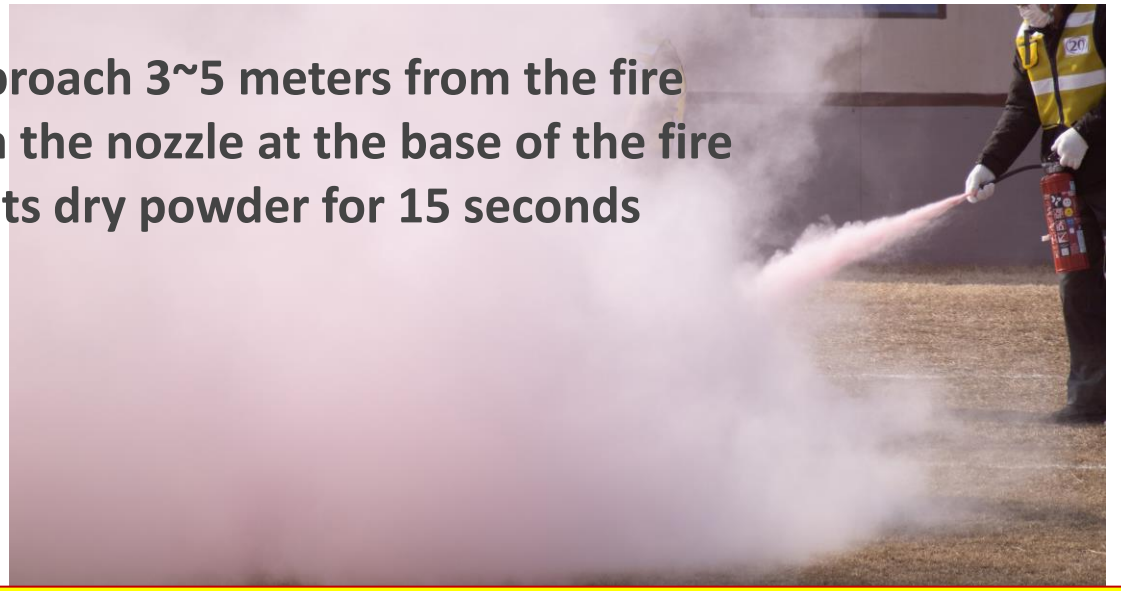
Aim

Squeeze

Sweep



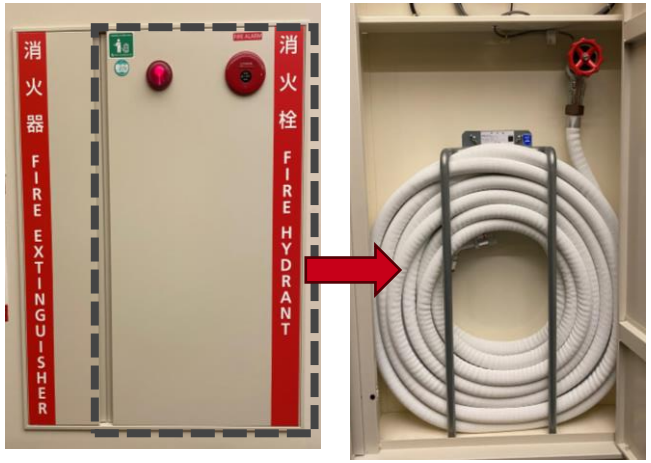
Approach 3~5 meters from the fire
Aim the nozzle at the base of the fire
Emits dry powder for 15 seconds



Stand with your back to an exit.
Make sure there is an evacuation route behind you.

Emergency Response (Initial Fire Fighting – Indoor Fire Hydrant)

Locate indoor fire hydrant and open cover



How to Use: Operates like a garden hose

Turn red valve

Pull out hose

Twist nozzle

Emergency Response (Lab/Experimental Area)

Emergency showers and eyewash are available near the laboratory.
When splashed with chemical, use the emergency shower or eyewash for at least 15 minutes.

What to do during an emergency

“Emergency, Safety, Health Procedures & Guidelines” are posted throughout the campus. They include contact information for emergency situations, and how to respond to incidents/accidents. Please look them thoroughly and often so everyone is prepared for an emergency.

PDF file can be downloaded from Occupational Health and Safety Section website

Occupational Health and Safety Section：
https://groups.oist.jp/rs

Incidents and Accidents Report

How to Report

1. (You) Report any work-related injury or sickness to your supervisor as soon as possible.
2. (You or your Supervisor) Submit initial incident report within 24 hours to OHS via Incident and Accident Report Form.
3. (You or your Supervisor) Submit full report within 2 weeks using designated form from OHS.

Why Report?

- Many of these incidents can occur to anyone. Incident Reports become “lessons learned” resources to avoid similar incidents in the future. Past incidents and accidents including near-misses, are available on the Lessons Learned Website

OIST defines an incident as “an event other than the accident that caused harm or might have caused harm, i.e., near miss”.
These reports are solely used to inform the OIST community as "Lessons Learned" to prevent recurrence or materials to raise safety awareness. The Reporter will not be sanctioned for submitting an incident report.

Hazards Around You

Slips, Trips, and Falls

Slips, trips, and falls are common cause of incidents/accidents in office areas.

- Wear shoes appropriate for the work and access areas.
- Parts of the campus can be slippery during and after rain.
- Watch out for uneven walk surfaces, steps, cords or objects in the walkways.
- Minimize or eliminate working at heights as much as possible. Use ladders or stepladders only when no other measures can be taken after due consideration and only when it is safe to do so.
- Never stand on a chair - using chairs is a common cause of falls in office areas.

Electrical Hazards (Office/ Lab)

In the use of electrical appliances at OIST are required to follow the Japanese Electrical Law.

Use electrical devices (including home electronic products) **with the PSE mark** in principle.

PSE mark: (Product Safety Electrical appliance & materials) is the mark assigned on an electrical product that has passed the inspection of Japanese Safety Law (excluding PC, printer, phone, FAX, and walkie-talkie).

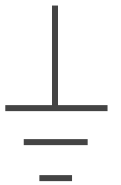
When using laboratory, machinery equipment (including experimental research and self-made products) that do not have the PSE mark, **check if it meets electrical installation in Japan** and **measure safety** such as the insulation resistance or set earth leakage circuit breaker prior to using the equipment.

For the installation of laboratory equipment or machinery equipment that require a dedicated power supply**, clarify the electrical specifications before installation**. Ask the electric vendor for electrical connection **and install a special electric board or isolation switch** for **proper ground connection**.

The installation of power supply and ground wires must **be conducted by an official Japanese electrical certification holder**. if an additional power installation requiring confirmation about the electrical system in the facility, please consult directly with the Facility Operation & Use Section or Facility Management Section.

Please contact us if you have any inquires or concerns about insulation resistance, electric leakage and ground connections.

For more details, refer to the eFront training course **Electrical Safety Guidelines**



Contact： Facility Operation & Use Section or Facility Management Section (https://services.oist.jp/bfm)

Electrical Hazards (Office/ Lab)

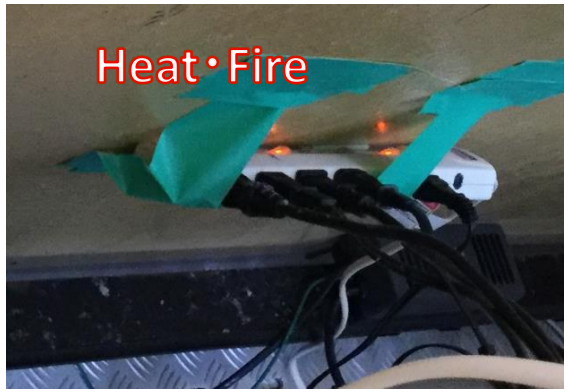
Using a Travel Adaptor called “World Wide Travel Adapter Plug” is very dangerous due to difficulty pulling out of the socket, which can cause electricity flows to the grounding.

When using an adapter, choose product
① with the **PSE mark**
② blade does not rotate.

※ Case: Wrongly connected causing electric leakage (Forcibly screwed blade into the outlet hole)

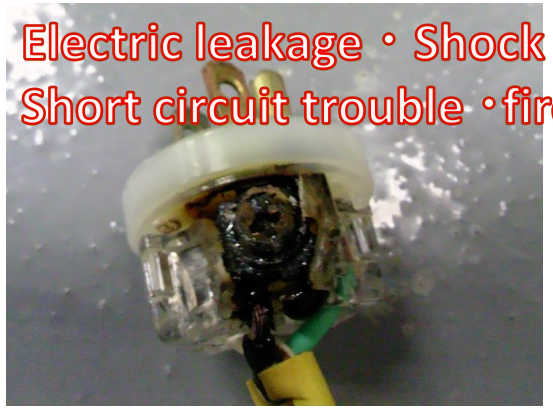
Unsafe practices (examples)

Overloaded power strip



Outlet taps submerged in water

Unqualified repair



Damaged wires

Contact： Facility Operation & Use Section or Facility Management Section (https://services.oist.jp/bfm)

Cryogen in Elevators

Elevators may be used to transport cryogens. When doing so, a sign (below) is placed in front of the cryogen container.

Cryogen are asphyxiation hazard.

Do not enter elevators when cryogen containers are inside.

Hazardous Materials (Lab/Experimental Area)

There are areas where research activities are conducted where different types of hazards are present. Take caution while entering experimental areas and common corridors. Every Unit/Section must affix the necessary safety signs to the entrances of rooms they manage.

How to find out what dangers are present

Safety signs are posted at entrances. Don't know what they mean? It's best not to enter those areas unless accompanied by someone who has a well understanding and who has responsibility (such as owner of the room, etc.).

These signs show what and where the potential hazard are located. You will find these signs at the entrance of each laboratory.

Examples

Chemical Safety

Chemical Safety Basics – Risk Management

The potential hazards of each experiment vary greatly. The most important thing is for each person conducting the experiment to understand the potential hazards in advance, and to take safety procedures and safety precautions.

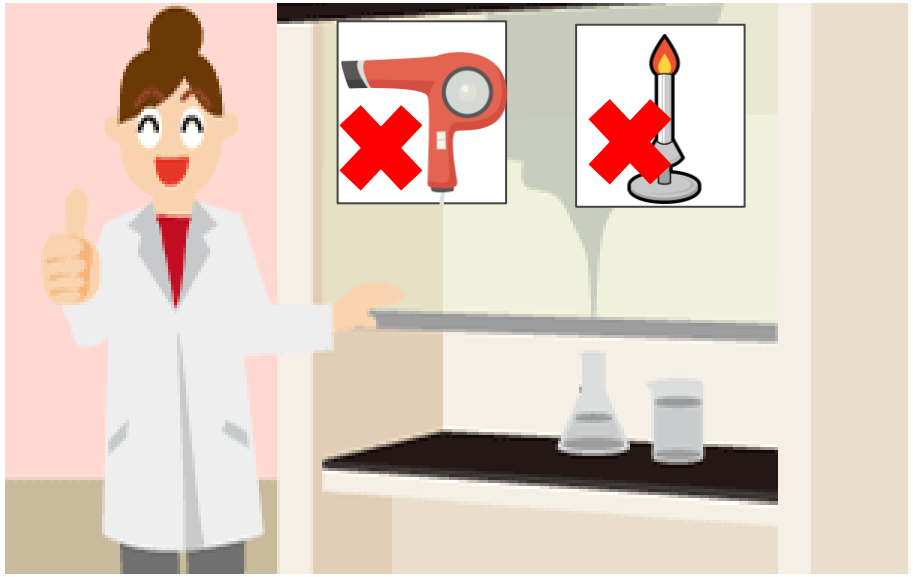
Identify potential hazards of chemicals used

↓

Plan safety measures
To prevent potential hazards from arising

↓

Conduct experiments with safety measures



Chemical Safety Basics – The Basics

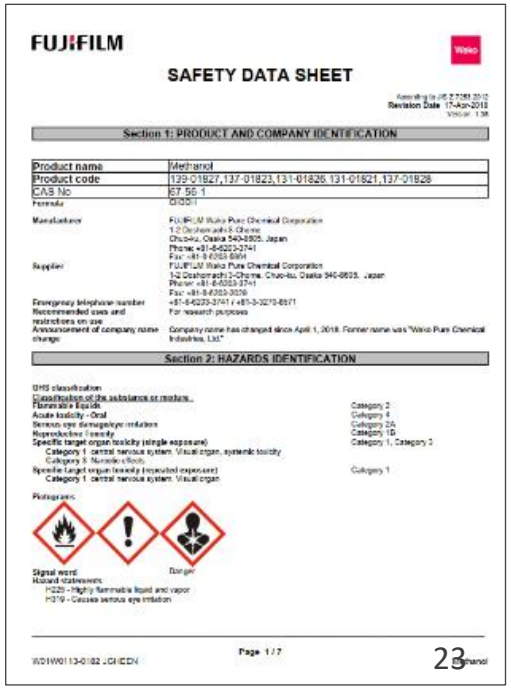
Basic for Handling Chemical Materials

- Do not smoke, eat, or drink in experimental areas where chemical materials are handled.
- Check the safety data sheet of the chemical materials to be handled before use to confirm the composition, properties, hazards and toxicity, exposure controls, stability and reaction, and applicable laws and regulations.
- When handling chemicals, wear personal protective equipment (PPE) such as safety glasses, lab coats, and gloves appropriate for the experiment.
- Purchase and store only the necessary quantities of chemicals. When no longer needed, dispose of them immediately.
- Store chemicals in an appropriate location within the experimental area.

Hazards and Toxicity of Chemicals

When handling a chemical substance, we need to know in advance about its toxicity, ignition and explosive properties, etc. Safety Data Sheets (SDS) provide this information.

- SDSs are available from chemical (reagent) manufacturers and distributors. (Some manufacturers provide this information on their websites.)
- The following sections (indicated in parenthesis) of the SDS are important. Be sure to read through them.
  - (1) Hazards
  - (4) First Aid Measures
  - (5) Fire Fighting Measures
  - (7) Precautions for handling and storage
  - (8) Exposure Prevention and Protection Measures -> Check for appropriate protective equipment
  - (9) Physical and Chemical Properties -> Check flash point and explosion range
  - (10) Stability and Reactivity -> Check for hazardous substances, etc.
  - (15) Applicable Laws and Regulations -> Check applicable laws and regulations


FUJIFILM

SAFETY DATA SHEET

Section 1: PRODUCT AND COMPANY IDENTIFICATION

Product name	Methanol
Product code	139-01827,137-01823,131-01826,131-01821,137-01828
CAS No	67-56-1

Section 2: HAZARDS IDENTIFICATION

Hazards and Toxicity of Chemicals – GHS Pictogram

The GHS (Globally Harmonized System of Classification and Labelling of Chemicals) pictogram is a pictorial representation of the type and degree of internationally standardized hazards. It provides information on hazards and safety and can be found on SDSs and containers.

Physicochemical Hazards

Health Hazards

Environmental Hazards

Physicochemical Hazards – Explosive and Flammable/Combustible

Some substances may ignite or explode when exposed to heat, flames, shocks, friction, or other stimuli.

Explosive

- Property to explode by causing a rapid pressure increase to the surroundings due to shock, high pressure or elevated temperature.
- Do not use metal spatula or glass stopper.
- Examples: Nitroglycerin, picric acid, etc.

Flammable/Combustible

- Can easily ignite with ignition sources.
- Keep away from ignition sources such as burners, irons, heat guns, etc.
- Example: Acetone, diethyl ether, ethanol, hexane, etc.

Physicochemical Hazards – Pyrophorics and Water-Reactive Substances

- Some chemical materials may ignite or generate heat when exposed to air or water.
- Pyrophorics and Water-reactive substances
  - Ignition and heat generation will occur when exposed to air and/or water.
  - Use under inert gas.
  - Inactivate when disposing of the product.

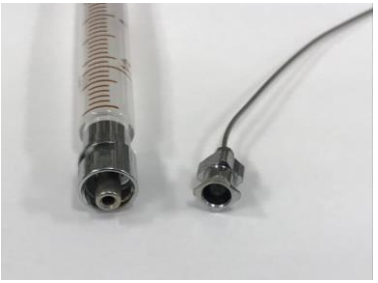
  Example: Yellow phosphorus, metallic sodium, organic lithium (butyl lithium), etc.

Physicochemical Hazards – Pyrophorics and Water-Reactive Substances

Commonly used pyrophorics and water-reactive substance examples and their and handling precautions

- **Sodium metal, Potassium metal**
  - Make sure there is no water around when using the product.
  - Inactivate residues slowly using alcohol inside the fume hood.
  - Be sure to confirm that inactivation is complete.
  - In case of fire, use fire sand or a fire extinguisher for metal fires.

- **Alkyl lithium (e.g., butyl lithium)**
  - When measuring the reagent solution with a syringe, use a Luer lock or other type of syringe with a fixed syringe needle and a piston that cannot be removed. Use a syringe of a sufficiently generous size.
  - In case of fire, use fire sand or a fire extinguisher for metal fires.

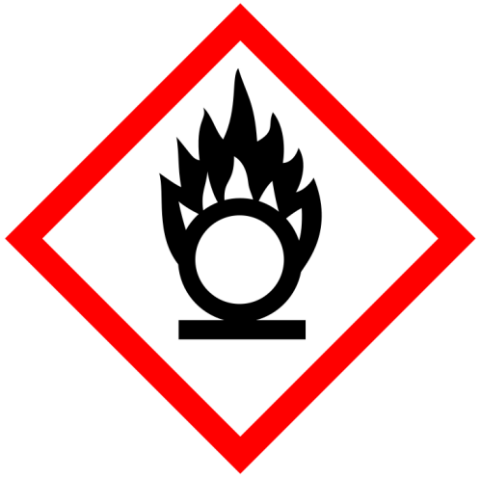


- **Lithium Aluminum Hydride (LAH), Sodium Hydride**
  - Since it reacts with water and moisture in the air, make sure there is no water in the vicinity.
  - Use a glass container to weigh the reagent (powder). Do not use chemical wrappers or wipe up debris with tissues, as they can ignite. Inactivate slowly in a fume hood and be sure to confirm that inactivation is complete.
  - In case of fire, use fire sand and a fire extinguisher for metal fires.

Physicochemical Hazards – Oxidizer

Oxidizer

- Property to promote combustion.
- Do not store with strong acids, flammables or reductants.
  If mixed, heat, shock or friction increases risks of ignition or explosion.
- Example: Hydrogen peroxide, concentrated nitric acid, etc.



Mixing Hazards

Mixing Hazards

Chemicals can create hazards when mixed. To avoid mixing during storage, separate storage areas or use leak-proof trays. There are multiple mixing hazards, but some common examples include:

- Oxidizing Substances × Flammable Substances
  - Nitric acid and sulfuric acid × Flammable organic solvents (alcohol, acetone, etc.)
  - Potassium permanganate × Flammable organic solvents (alcohol, glycerin, etc.)
- Strong acids × Oxidizing salts
  - Nitric acid and sulfuric acid × Potassium permanganate, etc.
- Other combinations that produce explosive substances
  - Sodium azide × Metals (zinc, lead, copper, silver, etc.)

Examples of oxidizing substances

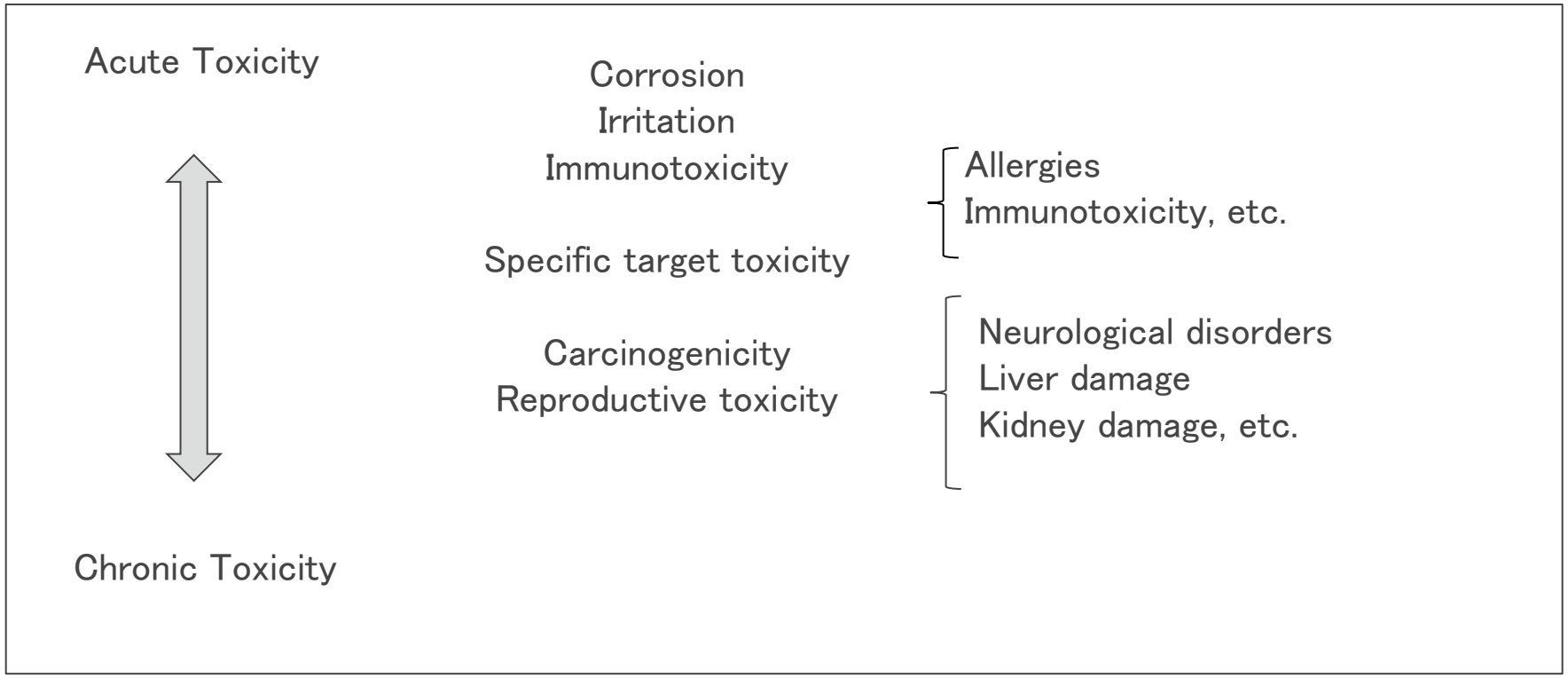
Nitric acid, concentrated sulfuric acid, hydrogen peroxide, sodium chlorite, sodium hypochlorite, sodium chlorate, potassium permanganate, potassium dichromate, halogens (iodine, bromine, chlorine, fluorine), etc.

Health Hazards

Health Hazards

Some chemicals have adverse effects on human health. Their toxicity ranges from immediate health hazards (acute toxicity) to those that appear over a long period of time (chronic toxicity).

Categorization of Health Hazards



Wearing Personal Protective Equipment (PPE)

- Wear Personal Protective Equipment (PPE) appropriate for your experiment.
  See PPE Guidelines for more details.
  - PPE includes lab coats, safety glasses, masks, gloves, face shields.
    Check resistance to the chemical materials you use, on the manufacturer's website, etc., in advance.
    - Example 1: Latex gloves have much lower oil resistance than nitrile gloves.
    - Example 2: Polyester lab coats have lower fire resistance than cotton lab coats.
  - Choose safety glasses which can cover around your eyes even on top of your prescription glasses.
  - Wear closed shoes, not bare feet or flip-flops/slippers etc.

PPE Standards: Examples for Particular Hazards

Research, risk or work field	Examples of possible PPE
All laboratories	■ Long pants or equivalent ■ Closed-toed/heel shoes ■ Long hair tied back
Chemical hazards	■ Lab coat ■ Safety glasses ■ Chemical-resistant gloves Options ♦ Flame-resistant lab coat ♦ Chemical-resistant apron ♦ Flame-resistant gloves ♦ Face shield (for high risk activities) ♦ Shoe covers
Physical hazards	■ Lab coat ■ Safety glasses ■ Work suit Options ♦ Face shield ♦ Cryogenic protective gloves ♦ Thermal protective gloves ♦ Heavy rubber gloves ♦ Earplugs/ear muffs ♦ Cut resistant gloves

Research, risk or work field	Examples of possible PPE
Biological hazards	■ Lab coat ■ Safety glasses ■ Surgical mask Options ♦ Disposable lab coat ♦ DS2(N95) mask ♦ (double layer) Disposable gloves ♦ Shoe covers ♦ Dedicated shoes
Radiological hazards	■ Dedicated lab coat ■ Safety glasses ■ Impermeable gloves
Laser hazards	■ Appropriate protective eyewear, wavelength and optical density based on individual beam parameters ■ Appropriate skin protection Options ♦ Flame-resistant lab coat

Precautions for Handling – Labeling

Clearly label the contents of chemical materials and their owner.

- Label all equipment and containers with chemical materials,
  such as the chemical name, concentration, solvent in use, name of the owner, date, etc.
- To avoid making mistakes in operation, take measures to clarify the chemical material in use during an experiment, such as labelling the chemical name on the tube, attaching stickers corresponding to the types of chemical materials, etc.

Precautions for Handling – Local Exhaust Ventilation

The following chemicals may cause health hazards and should always be used with a local exhaust ventilation system, such as a fume hood. The same should be done for substances with strong odors, such as thiols. Refer to Chapter 5, 4. Chemical Safety in the Safety and Health Manual for instructions.

- Specified Chemical Substances Class 1 and Class 2

  Examples: **Acrylamide**, **Acrylonitrile**, **Ethylbenzene**, Ethylene oxide, o-Toluidine, **Cadmium**, **Cadmium compounds**, **Chromate**, **Chloroform**, Vanadium pentoxide, Cobalt, Cobalt compounds, **Propylene oxide**, Potassium cyanide, Hydrogen cyanide, Sodium cyanide, **Carbon tetrachloride**, **1,4-Dioxane**, **1,2-dichloroethane**, **Dichloromethane**, 1,1-Dimethylhydrazine, Methyl bromide, **Mercury**, **Mercury compounds**, **Dichromic acid**, **Dichromate**, Styrene, 1,1,2,2-Tetrachloroethane, Tetrachloroethylene, Trichloroethylene, Naphthalene, **Nickel**, **Nickel compounds**, Arsenic, Arsenic compounds, β-Propiolactone, **Formaldehyde**, **Manganese**, **Manganese compounds**, Methyl iodide, Hydrogen sulfide, Dimethyl sulfate, etc.

- Organic Solvents Class 1 and Class 2

  Examples: 1,2-Dichloroethylene, **Carbon disulfide**, **Acetone**, Isobutyl alcohol, **Isopropyl alcohol**, Isopentyl alcohol, **Ethyl ether**, **Xylene**, Cresol, Chlorobenzene, Ethyl acetate, n-butyl acetate, Methyl acetate, **Hexane**, **N,N-dimethylformamide**, **Tetrahydrofuran**, 1,1,1-Trichloroethane, **Toluene**, Butanol, **Methanol**, etc.

Requirement by Individual Law – Poisonous and Deleterious Substances

Poisonous and deleterious substances must be stored as required by law.

- Store in a secure, locked storage cabinet. Lock when unsupervised.
- Storage cabinets must indicate “ 医薬用外毒物 ” (poisonous substance not intended for medical use) or “ 医薬用外劇物 ” (deleterious substance not intended for medical use).
- Poisonous and deleterious substances must be stored in a dedicated locked cabinet separate from other chemicals.

Summary

- It is important that the experimenter himself/herself foresee potential hazards, understand precautions in advance, and take safe experimental procedures and safety measures.
- Carefully read the “Rules for the Management of Chemical Materials" and “Rules for Poisonous and Deleterious Substances Management" established by OIST, and also refer to the Chemical Materials Handling Manual.
- Confirm the hazards and health hazards of the chemical materials to be handled, precautions for handling and storage, and applicable laws and regulations in advance using SDS, etc.
- When handling, observe basic rules such as wearing personal protective equipment, transportation, labeling of containers, and use of local exhaust equipment.
- Handle the chemical materials appropriately in compliance with the individual laws apply.
- Use tools to properly manage chemical substances, such as chemical management systems (CMS).
- Take emergency measures in accordance with applicable guidelines.

Laboratory Waste

Principles of Laboratory Waste Disposal

Dispose of all Laboratory Wastes (LW) according to the laws and OIST Rules for Waste Management.

Principles of LW Disposal:

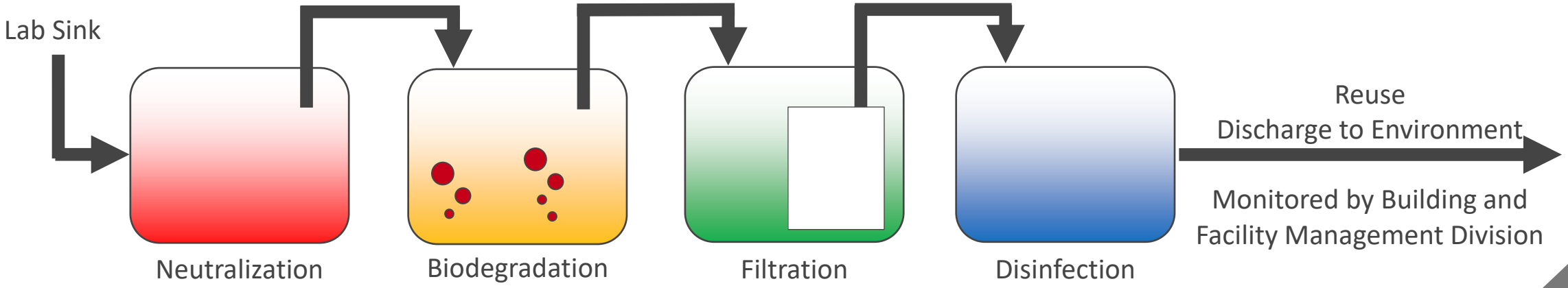
1. Complete all necessary trainings prior to conducting experiments and disposing of LW.
2. Select and wear appropriate Personal Protective Equipment (PPE) when handling and disposing of LW.
3. Dispose of LW to prevent injuries, accidents, and environmental pollution.
4. Separate and sort LW into appropriate categories.
5. Follow specific disposal instructions in accordance with its category.
6. Manage and handle LW inside the laboratory until safe to be placed inside the LW Disposal Cabinet.
7. Waste containers must be kept closed except when adding waste.
8. Pack LW appropriately for safe handling and transport.
9. Dispose of LW in designated LW Disposal Cabinets.
10. Label LW appropriately and complete forms accurately.
11. Do not leave waste unattended in a common space. If it is absolutely necessary to do so, appropriately manage the waste by clearly identifying the names of the Unit, the person who disposed of the waste, and the substances inside the waste container.

NOTE

- Dispose of pyrophoric and water-reactive substances after confirming that they are **inactivated**.
- Contact OHS section (research_safety@oist.jp) prior to disposing of LW that requires special attention, such as explosives or extremely harmful waste.

OIST Wastewater Treatment Facility

- OIST's wastewater treatment facility uses a combination of biodegradation and filtration methods. Some of the treated water is used to cool air conditioners and for gardens and is ultimately discharged to the environment.
- Since the system does not have the ability to remove chemical substances, wastewater containing chemical substances that affect human health and the environment cannot be discharged into the sink. Also, do not discharge highly acidic or alkaline wastewater or large amounts of disinfectants, as they will have a negative impact on the biodegradation in the wastewater treatment system.
- If heavy metals, etc. are discharged into the sink, wastewater treatment system will shutdown to stop the discharge into the environment, and toilets, etc. will no longer be usable.



Disposal Method based on LW Category

Lab Waste

Check FIRST

- Contaminated with Specified Hazardous Substances
- Reagents in original containers
- Animal carcasses (without ACUC protocol number)
- Mercury-containing products/equipment parts
- Rechargeable batteries
- Large laboratory equipment

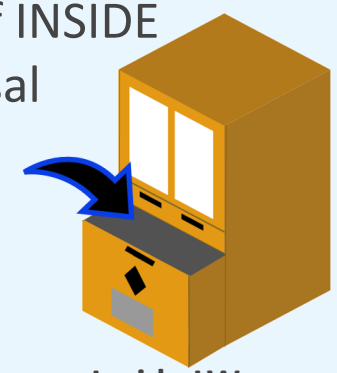
Special handling required with specific disposal instruction. Submit WEBFORM

WEBFORM required

Check SECOND

- Liquid
  - Infectious
  - Non-infectious
- Solid
  - Sharps
  - Infectious
  - Powders, Particles, and Sludges
  - Plastics, Wipes, and other Combustibles
  - Glasses
  - Metals

Pack appropriately and dispose of INSIDE LW Disposal Cabinet



Inside LW Disposal Cabinet

Contaminated with Specified Hazardous Substances

WEBFORM required

Japanese government regulates certain chemicals as specified hazardous substances (list in the next slide). LW contaminated with these substances continue to be regulated as Specified Hazardous Industrial Waste and requires to be transferred to licensed waste treatment facility.

Request for pickup by submitting waste information via WEBFORM.

- Pickup will be arranged after the details of the waste is checked. Please allow 3 business days for response.
- Visit Laboratory Waste Disposal Manual for the WEBFORM and details on labeling, etc. **(https://groups.oist.jp/rs/waste)**

NOTE when submitting WEBFORM:

- Solid LW – **photo of solid waste required** (take photo before closing the LW container lid).
- Liquid/Sludge and Solid LW with mercury and mercury compounds – **concentration (ppm) of Mercury required**.
- Silica gels (used in column chromatography, etc.) are considered sludge. Select “Liquid/Sludge” on the WEBFORM when entering information about silica gel waste contaminated with specified hazardous substances.

Contaminated with Specified Hazardous Substances

Below is a list of regulated Specified Hazardous Substances.
Visit Laboratory Waste Disposal Manual for thresholds and other details
(https://groups.oist.jp/rs/specified-hazardous-substances)

RED substances have been disposed of from OIST labs

Alkyl mercury and its compounds	1,1-dichloroethylene
Mercury and its compounds	Cis-1,2-dichloroethylene
Cadmium and its compounds	1,1,1-trichloroethane
Lead and its compounds	1,1,2-trichloroethane
Organic phosphorus compounds	1,3-dichloropropene
Hexavalent Chromium compounds	Tetramethylthiuram disulfide (Thiuram)
Arsenic and its compounds	2-Chloro-4,6-bis(ethylamino)-S-triazine (Simazine)
Cyanide compounds (inorganic)	S-(4-Chlorobenzyl) N,N-diethylthiocarbamate (Thiobencarb)
Poly Chlorinated Biphenyls (PCBs)	Benzene
Trichloroethylene	Selenium and its compounds
Tetrachloroethylene	1,4-Dioxane
Dichloromethane	Dioxins
Carbon tetrachloride	Hydrogen fluoride
1,2-dichloroethane	Osmium and its compounds

Check points: Disposing LW inside LW Disposal Cabinet

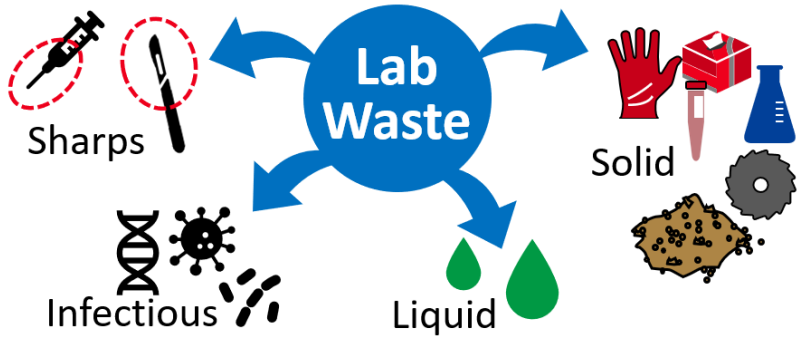
- Identify and separate based on material of the waste as much as possible
- Rinse and handle its rinsates as LW
- Inactivate LW
- Pack LW properly and safely using the provided waste containers/bags
- Attach ONE category sticker to each waste container/bag
- Some categories require to attach LW Content Details form
- LW Disposal Cabinet and Labeling Supplies

Identifying and Separating LW

When disposing of LW inside the LW Disposal Cabinet….

Identify and separate based on material of the waste as much as possible

- To manage the waste properly.
- To separate liquids from solids, infectious from non-infectious, etc.
- To process and treat the waste tailored to its category at the Waste Treatment Facility.



- Different categories of LW cannot be placed inside the same container/bag.
- Liquids and Solids Wastes cannot be disposed of in the same waste container.

Rinse and handle its rinsates as LW

- To separate/remove chemical and harmful substance residues from labwares, etc.
- To prevent harmful substances entering the drain.
- To properly dispose of the residues as LW.

- The first two "rinses" used to separate/remove residues from labware (beakers, tubes, used reagent bottles, etc.) during cleaning are considered LW.
- Use appropriate solvent to rinse the labwares and continue to rinse until residues are removed before washing labwares in the sink.
- Use funnel to minimize spills when disposing of rinsates as LW.

Inactivating LW

When disposing of LW inside the LW Disposal Cabinet….

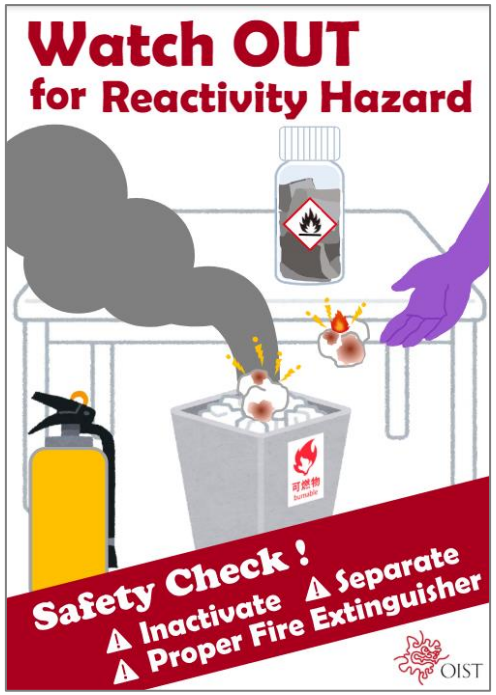
Inactivate LW

- To process at the point of origin.
- To handle and transport the waste safely.
- To reduce environmental burden.

Biosafety

Inactivate infectious wastes, recombinant DNA (required) and its contaminants (required), and other biological materials.

Refer to Biosafety Manual, Biosafety Core Training, etc.



Chemical

Inactivate pyrophoric, water-reactive substances, and other spontaneously combustible substances (Fire Service Act, Category III) inside the fume hood before disposing.

Keep *inactivated* spontaneously combustible and water-reactive substance wastes separate from combustible wastes.

Refer to Safety and Health Manual – Chemical Safety.

Packing LW for Safe Handling

When disposing of LW inside the LW Disposal Cabinet….

Pack LW properly and safely using the provided waste containers/bags

- To prevent injuries while handling (outer surface must be clean).
- To prevent leaks, odors, scattering, protrusion, etc., such as during waste pick up and transport.

LW should be packed to be safe to handle (hold, carry, etc.) and contained to prevent wastes from scattering, spilling, leaking, etc.

- Do not overfill or overpack waste containers/bags.
- Limit the amount of Liquid LW to 80% of the container.
- Outer surface of the waste container/bag must be clean, free from leaks, spills, protrusion, etc.
- Select the appropriate waste container based on the waste.
- Close the lid/bag, except when adding waste into the waste container.
- Seal the waste containers/bags (tie plastic bags, twist lids securely, etc.).
- Wastes with strong odors should be double bagged, sealed shut, etc., and kept in the refrigerator/freezer, etc., until just before disposal.

Packing LW - LW Containers and Bags

Available waste containers and bags to pack LW

Screw-cap Lid Containers

Press-on Permanent Lid Containers

Red Sharps Bins

Plastic Bags

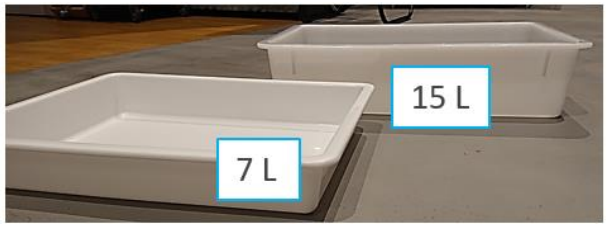
These waste containers and bags are located at the reserve stations in the experimental areas.
Locate your closest container reserve (map).

Main reserve station: Lab1-B Loading Dock

The following are also available at the main container reserve station:

Secondary Trays

(to temporarily store waste to prevent spills, etc.)



Autoclave Bags

Attaching to LW Containers/Bags

When disposing of LW inside the LW Disposal Cabinet….

Attach ONE category sticker to each waste container/bag

- To indicate that it is a LW and its category.
- To inform the cleaning staffs on the proper handling of the waste.
- To keep record of and report how much and types of LW are disposed of from OIST.

attach

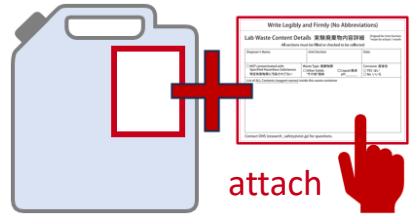
Some categories require to attach LW Content Details form

- To inform safety hazards and details of the waste (i.e., what is inside the waste).
- To further categorize the LW.
- To store and manage the waste based on its details and hazards.

Three-sheet carbon copy form (with adhesive backing) to write down the contents of the waste.

The following LW categories require this form in addition to its LW category sticker:

- Infectious Liquid
- Non-infectious Liquid
- Powders, Particles, and Sludges



LW Content Details Form

(previously known as Request Form)

3-sheet carbon copy form to indicate contents of the waste

Write Legibly and Firmly (No Abbreviations)

Lab Waste Content Details 実験廃棄物内容詳細

Original for Unit/Section
*retain for at least 1 month

All sections must be filled or checked to be collected

Disposer's Name | Unit/Section | Date

Disposer's (Waste Generator's) Information

☐ NOT contaminated with Specified Hazardous Substances 特定有害物質に汚染されてない 1

Waste Type 廃棄物類 2
☐ Other Solids "その他"個体 ☐ Liquid 廃液 pH

Corrosive 腐食性 3
☐ YES はい
☐ No いいえ

List of ALL Contents (reagent names) inside this waste container

List of all contents inside waste container

Contact OHS (research_safety@oist.jp) for questions.

Top layer: Original for Unit/Section
Middle: Copy for OHS
Bottom: Copy for Waste Treatment Facility

- Write legibly and firmly so that the written items are clearly copied to the third (bottom) sheet.
- Indicate disposer's information.
- Place ✓ checks to appropriate boxes
  Total of three ✓ checks must be placed based on the waste (one ✓ check in each of the 1 2 3 boxes)
  Details in next slide.
- Indicate all contents (reagent names) in full names
  - Do not write contents with abbreviations, chemical formulas, or brand/kit names

When ready to dispose of waste inside the LW Disposal Cabinet:

- Remove the top layer and retain for at least one month.
- Remove the blue adhesive backing from the back of the form.
- Attach it (middle and bottom layers) to the outermost container.

LW Content Details Form

One ✓ check in each of the 1 2 3 boxes (total of three ✓ checks) required to be picked up from the LW Disposal Cabinet

Place ✓ check after confirming that the waste is **not contaminated** with Specified Hazardous Substances.

Look through the list of Specified Hazardous Substances to confirm that the LW is NOT contaminated with such substances.

Place ✓ check next to either **Other Solids** OR **Liquid**. Indicate **pH** if Liquid.

For liquid LW, measure the **pH** using the pH strip found inside the drawers/cupboards of the LW Disposal Cabinets.
*pH exempt for liquid wastes containing only organic solvents

Check if the waste is corrosive. Place ✓ check next to either **YES** OR **No**.

Select **YES*** if the waste includes skin, eye, or respiratory irritating hazardous substances (GHS Category 1) or skin-absorbable hazardous substances.
Visit here for the list of the substances
*Substances known to cause skin disorders, etc., and/or cause health problems by being absorbed through or penetrating the skin that must be handled with impermeable protective equipment.
Ref: Safety and Health Manual

LW Disposal Cabinet and Labeling Supplies

The design of the LW Disposal Cabinet differs by location.
Check the location of your nearest LW Disposal Cabinet (map).

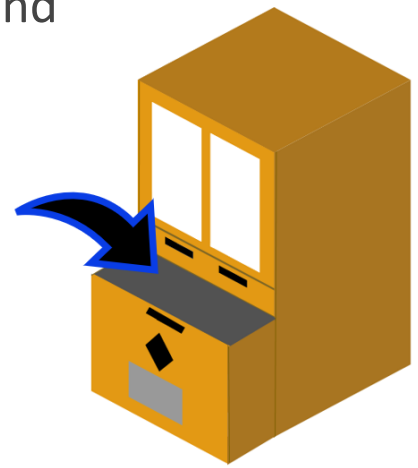
Drawers and cupboards of the LW Disposal Cabinet includes the following:

- LW Category Sticker
- LW Content Details form
- pH strip

LW to place INSIDE LW Disposal Cabinet

Following LW categories are to be packed appropriately and disposed of by placing INSIDE the LW Disposal Cabinet.

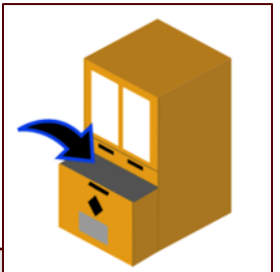
- Liquid
  - Infectious
  - Non-infectious
- Solid
  - Sharps
  - Infectious
  - Plastics, Wipes, and other Combustibles
  - Powders, Particles, and Sludges
  - Glasses
  - Metals



Inside LW Disposal Cabinet

Examples, packing methods, attachments, and cautionary points for each category will be described in the following slides.

Infectious Liquid



Examples

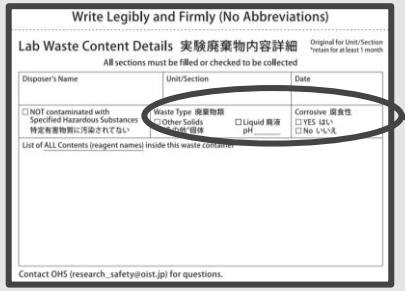
- Infectious liquids that are <u>not sterilized/inactivated</u>.
- Solutions containing blood, serum, plasma, and other bodily fluids that are <u>not sterilized/inactivated</u>.

Not applicable:

Liquids sterilized with autoclave, bleach, or other sterilization/inactivation methods.

Attach to each waste container

1. Biohazard (black) LW category sticker
2. LW Content Details form


Write Legibly and Firmly (No Abbreviations)

Lab Waste Content Details 実験廃棄物内容詳細

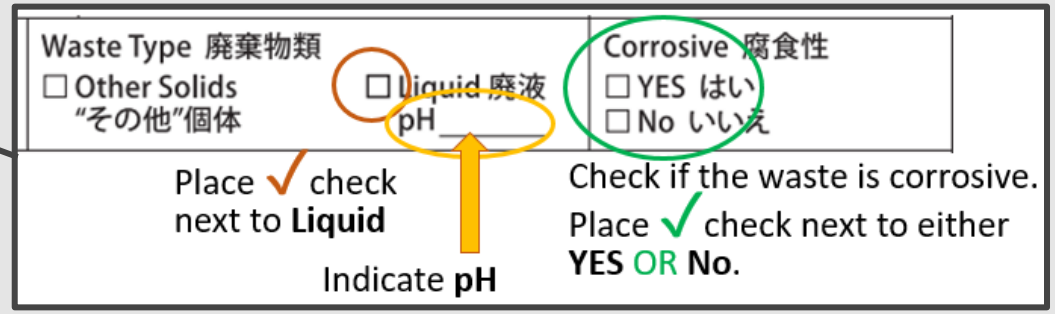
All sections must be filled or checked to be collected

Disposer's Name | Unit/Section | Date

☐ NOT contaminated with Specified Hazardous Substances 特定有害物質に汚染されてない | Waste Type 廃棄物類 ☐ Other Solids "その他"個体 ☐ Liquid 廃液 pH ____ | Corrosive 腐食性 ☐ YES はい ☐ No いいえ

List of ALL Contents (reagent names) inside this waste container

Contact OHS (research_safety@oist.jp) for questions.



Packing Method

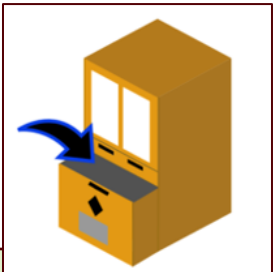
- Use screw-cap lid containers (1L, 5L, 10L, or 20L)
- Limit the amount of waste to **80%** of the container
- **Tightly** twist the lid shut

CAUTION

- Use funnel to transfer liquid wastes. Wipe spills from container surface and surrounding area immediately and inactivate.
- Close the lid tightly, except when adding wastes into the waste container to prevent spills and evaporation
- Keep LW inside secondary tray until ready to be placed inside LW Disposal Cabinet.

Crystalized solids on the outer surface of Infectious LW

Non-Infectious Liquid



Examples

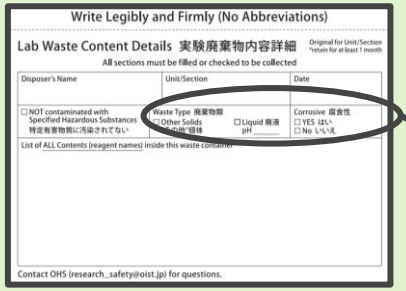
- Biological liquids sterilized with autoclave, bleach, or other sterilization/ inactivation methods.
- Inactivated liquids from rDNA experiments.
- Chemicals, liquid samples, rinsettes and washes, etc.

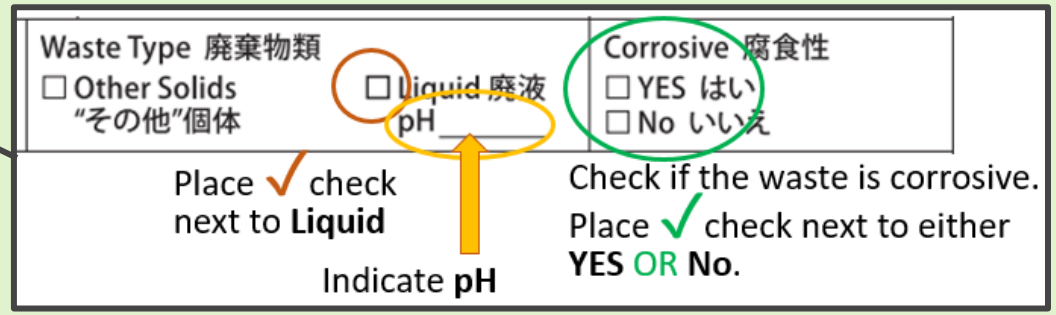
Separate into the following categories:

a. Halogenated organic solvents
b. Non-halogenated organic solvents
c. Strongly acidic (pH ≤ 2)
d. Strongly alkali (pH ≥ 12.5)
e. Other aqueous

Attach to each waste container

1. Liquid (green) LW category sticker
2. LW Content Details form





Packing Method

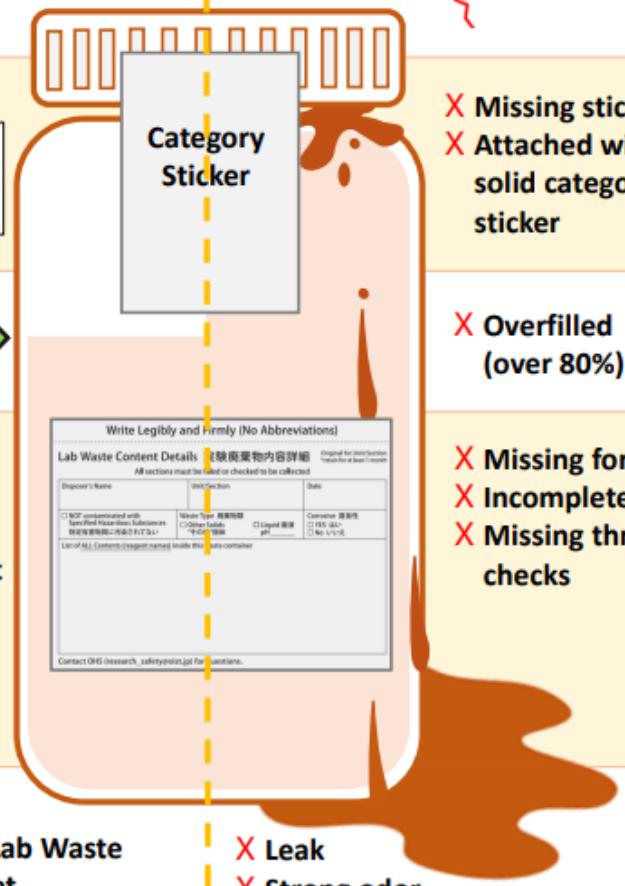
- Use screw-cap lid containers (1L, 5L, 10L, or 20L)
- Limit the amount of waste to **80%** of the container
- **Tightly** twist the lid shut

CAUTION

- First two "rinses" are considered Liquid LW.
- Check safety before mixing Liquid LW. Mixing incompatible wastes can lead to explosion, heat generation, toxic gas emission, etc.
- Use funnel to transfer liquid wastes. Wipe spills from container surface and surrounding area immediately.
- Close the lid tightly, except when adding wastes into the waste container to prevent spills and evaporation.
- Keep LW inside secondary tray until ready to be placed inside LW Disposal Cabinet.

Check your Liquid Lab Waste

	Packed well	Won't get picked up...
Lid	Tightly twisted Completely sealed	X Loose lid X Missing lid (inner or outer lid)
Category Sticker	Attached 感染性 biohazard OR 廃液 liquid	X Missing sticker X Attached with solid category sticker
Volume	No more than 80%	X Overfilled (over 80%)
Lab Waste Content Details Form	All contents of the liquid lab waste legibly written without using abbreviations and have three (3) ✓ checks	X Missing form X Incomplete X Missing three checks
Other	Placed INSIDE Lab Waste Disposal Cabinet	X Leak X Strong odor X Spilled to surrounding area X Mixed with solids X Placed somewhere other than Lab Waste Disposal Cabinet



Sharps

Examples

Used, clean, or new of the following:

- Needles
  Includes needles used to transfer chemicals, etc.
- Scalpels, razor blades, and other medical tools that are designed to cut human or animal skin
- Broken glass with blood (from injury, etc.)

Packing Method

Use red sharps bins (1L, 1.4L, or 3L)

Each red sharps bin has a “Fill Line” or “Do not fill above this line” mark.

*Mark varies by container. Check each container for details.

Attach to each red sharps bin

Biohazard (black)
LW category sticker

感染性
biohazard

CAUTION

- Never re-cap needles.
- Forcing or overfilling sharps into red sharps bin may cause serious injury.
- Close the lid completely when placing inside the LW Disposal Cabinet.

Infectious Solids

Examples

- Non-sterilized solids of the following:
  - Pathological waste generated during dissection (e.g., removed or excised organs, tissues, skin, etc.)
  - Items used in experiments involving pathogenic microorganisms
- Those which Specially Controlled Industrial Waste Manager has determined that they need to be handled in the same manner as Biohazard Waste

Not applicable:

Biomaterials and its contaminants that were sterilized using autoclave, ozone, or other inactivation/sterilization method

Packing Method

Use screw-cap lid containers (1L or 5L), press-on permanent lid containers,
or 45L plastic bag

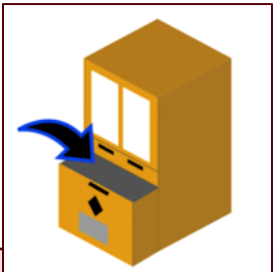
Attach to each waste

Biohazard (black)
LW category sticker

CAUTION

- Pack properly to prevent spills and scatter.
- Double-bag if necessary or use more robust container.
- Outer surface of the waste container must be clean and safe to handle.

Plastics, Wipes, and other Solid Combustibles



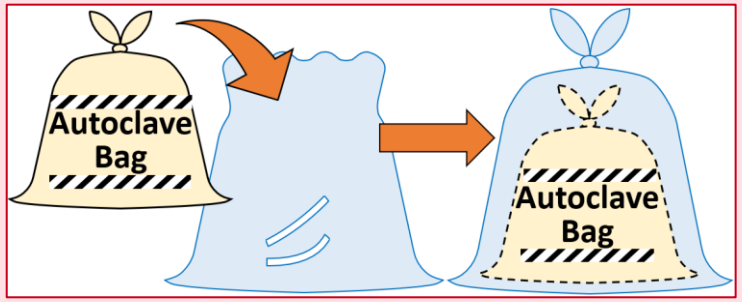
Examples

- Gloves (including clean gloves)
- Wipes (kimwipes, paper towels, etc.)
- Plastic conical tubes, plastic racks and trays, plastic pipette tips, etc.
- Autoclaved combustibles used in rDNA experiment or other biological experiments

Packing Method

- Use screw-cap lid containers (1L or 5L), press-on permanent lid containers, or 45L plastic bag

- Double-bag autoclaved bag and other wastes that may potentially leak or have strong odor.



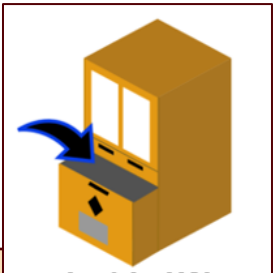
Attach to each waste

Burnable (red)
LW category sticker

CAUTION

- Do not dispose of objects adhered with items that can generate heat or ignite together with combustible materials.
- Use waste containers/bags that can fit inside the LW Disposal Cabinet.
- Do not overfill plastic bags.
- Pointed objects, such as plastic serological pipettes, box/tray corners, etc., can rip through plastic bags (especially when overfilled or overly packed).

Powders, Particles, and Sludges



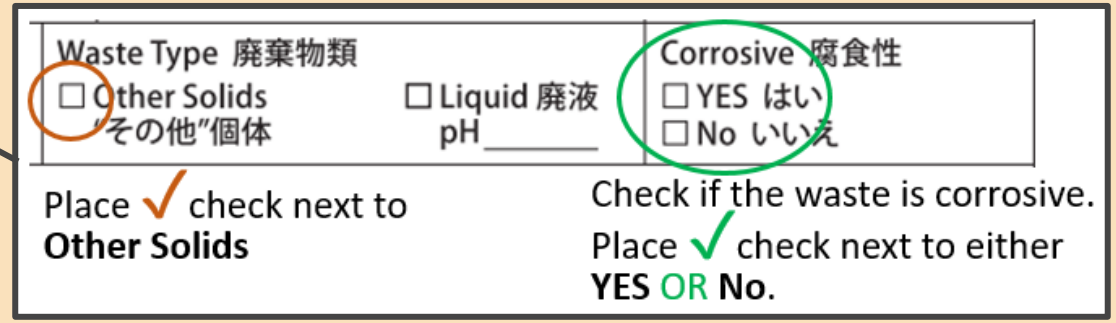
Examples

- Column chromatography packing materials (e.g., silica gel)*
  *indicate eluents in the LW Content Details form
- Silica desiccants
- Charcoal powder canister
- Spilled chemical powders/pellets (Sodium hydroxide pellets, etc.)

Attach to each waste container

1. Other Solids (brown) LW category sticker
2. LW Content Details form


Write Legibly and Firmly (No Abbreviations)
Lab Waste Content Details 実験廃棄物内容詳細
All sections must be filled or checked to be collected
Disposer's Name
Unit/Section
Date
☐ NOT contaminated with Specified Hazardous Substances 特定有害物質に汚染されていない
Waste Type 廃棄物類
☐ Other Solids "その他"個体
☐ Liquid 廃液 pH_____
Corrosive 腐食性
☐ YES はい
☐ No いいえ
List of ALL Contents (reagent names) inside this waste container
Contact OHS (research_safety@oist.jp) for questions.



Packing Method

Use screw-cap lid containers (1L or 5L)

CAUTION

- Silica powder spills on the waste container can make the container surfaces very slippery, making it difficult to hold/carry and attach LW category sticker and content details form.
- Wipe the outer surface of the container.
- *If eluents include Specified Hazardous Substances, refer to the disposal instructions under the Contaminated with Specified Hazardous Substances category.
- Do not use plastic bags.

Glass

Examples

- Ceramic crucibles
- Glass test tubes, glass Pasteur pipette, glass ampoule, glass vials, etc.
- **Empty and clean** glass reagent bottles
- Broken glass

Packing Method

- Use screw-cap lid containers (1L or 5L) or press-on permanent lid containers

Note:

- Fragile or broken glass must be disposed of in hard-case container.
- Place small glass bottles, etc., inside screw-cap lid or press-on permanent containers.
- 1L or larger glass reagent bottles that are **rigid** can be disposed of as is without additional packing.

Attach to each waste

Glass (blue)
LW category sticker

CAUTION

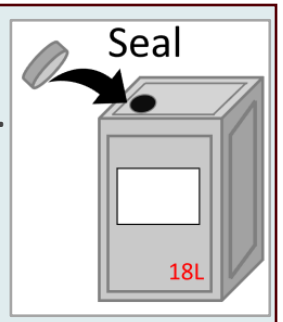
- Do not dispose of broken glass without packing in durable hard-case container.
- Do not place fragile glass inside the LW Disposal Cabinet without properly packing. Heavier wastes placed above the fragile glass can shatter, leading to broken glass cleanup and possible injuries.

Metals

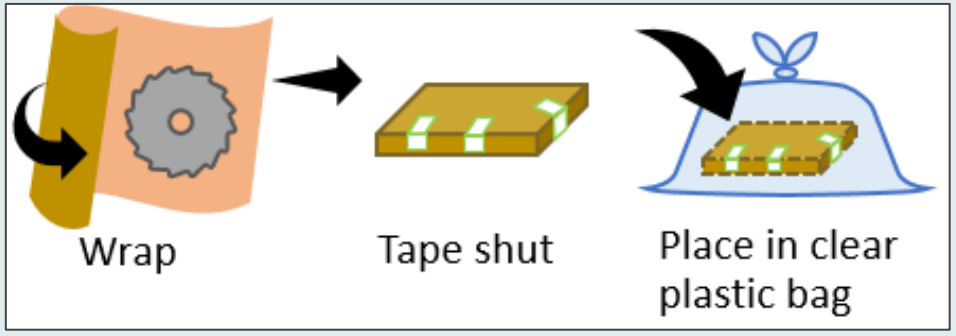
Examples

- 18L reagent canister
- Metal boxes and trays
- Electrical cords from lab equipment
- Aluminum foil
- Metal tweezer, spatula, etc.
- Metal knives, power tool blades, etc. (from machine shop, field work, etc.)

Packing Method



- 18L reagent canister - seal the opening, such as with its metal lid.
- Electrical cords from lab equipment, etc., can be bundled inside 45L plastic bag.
- Use screw-cap lid containers (1L or 5L) for sharp-edged metals.
- Wrap large blades in cardboard. Tape shut to prevent the blade from slipping out or protrude. Place it inside clear plastic 45L bag and seal.
  Do not place any other LW inside the bag.



Attach to each waste

Metal (gray)
LW category sticker

CAUTION

- Seal reagent canister to prevent evaporation of remaining solvents, odors and exposure during transport.
- Thin metals, such as box-cutter blades, can slip through thin openings. Use a more durable container to prevent protrusion and injury.

Inappropriate Disposals

- Inappropriately packed LW can lead to spills and injuries.
- Cleaning staffs are trained to NOT pick up inappropriately packed and/or labeled (i.e., lack of label) LW.
- Do not place LW in the corridors or at the General Waste Collection Areas.
- Inappropriately disposed of LW identified by cleaning staffs will have a “notice” attached to the LW.
  Such laboratory wastes will not be picked up until the issue is resolved and placed inside the LW disposal cabinet.

Summary

- Separate LW as much as possible based on its material and contaminants.
- Do not pour harmful materials down the drain.
- Certain LW require special handling and specific disposal instructions, requiring WEBFORM submission.
- Pack the LW using appropriate waste containers and/or methods and securely seal lids/openings.
- Limit the amount of Liquid LW to 80% of the container.
- Do not place liquids and solids in the same waste container.
- Waste containers must be kept closed except when adding waste.
- Prevent leaks by double-bagging or disposing of in a more durable container.
- Autoclaved bags must be double-bagged or placed in a durable container to prevent leaks.
- Wastes with strong odors should be double bagged and kept in the refrigerator/freezer, etc., until just before disposal.
- In the lab, keep LW inside secondary trays and clean up spills immediately.
- Keep the outer surface of the LW container clean and safe to handle.
- Manage and handle LW inside the lab until ready for disposal.
- Attach appropriate LW category sticker to each waste container/bag (and LW content details form for required LW) before placing the LW inside the LW disposal cabinet.
- Legibly fill-in the LW Content Detail form.
- Do not dispose of non-LW (food packaging, etc.) as LW.
- Dispose of pyrophoric and water-reactive substances after confirming that they are inactivated.
- Do not leave waste unattended in a common space.
  If it is absolutely necessary to do so, appropriately manage the waste by clearly identifying the names of the Unit, the person who disposed of the waste, and the substances inside the waste container.