

University of Tsukuba

Waste Management Guidelines



This pamphlet provides guidelines to faculty, staff and students on the appropriate collection, treatment and disposal of waste generated through their educational research, medical care, and administrative activities.

The Office of Occupational Health and Safety Management provides guidance and advice on, and also supervises, the handling of waste.

The pamphlet illustrates the following issues on the sorting and treatment of waste on campus:

- Categories of waste and wastewater
- Liquid laboratory waste and wastewater treatment facilities on the Tsukuba campus
- Flow chart for sorting laboratory waste
- Sorting laboratory waste for separate collection
- Application procedure for laboratory waste treatment
- Update of the Office of Occupational Health and Safety Management website
- Management of poisonous and deleterious substances
- PRTR Law and Ibaraki Prefectural Ordinance No. 9

Categories of waste and wastewater

Waste-collection boxes are set up on campus.

To be collected on predetermined days.

General waste	Burnable waste	Paper, fabric, wood, plastic, and rubber products, food waste, solidified cooking oil, etc.	Incineration
	Non-burnable waste	Glass, metal, and ceramic ware, complex products consisting of a combination of these materials, etc.	Landfill
	Empty cans	Empty food and drink cans. (Heavily soiled cans are handled as non-burnable waste.)	
	Empty bottles	Empty food and drink bottles. (Heavily soiled bottles are handled as non-burnable waste.)	Recycling
	PET bottles	PET bottles for drinks and others. (Heavily soiled bottles, as well as caps, are handled as burnable waste.)	
	Fluorescent lamps	Fluorescent lamps containing mercury. (Broken fluorescent lamps are handled as non-burnable waste.)	
	Dry batteries	Some dry batteries contain mercury.	

To be collected on days predetermined on a department-by-department basis.

Other waste	Bulky waste	Unnecessary equipment, furniture, electrical appliances (other than those below), bicycles, etc.
	Recyclable electrical appliances	Air conditioners, TV sets, refrigerators, washing machines (any such item belonging to an individual falls outside the scope of these guidelines)
	Specific waste	Department-specific waste

Application for collection must be made individually by the waste generator when collection is required.

Laboratory waste	Liquid laboratory waste, solid laboratory waste, animal laboratory waste, waste reagents
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Wastewater to be drained to day-to-day sinks

- Day-to-day sinks are provided in offices, hot-water service rooms, lavatories, and so on.
- Wastewater is discharged directly into the public sewage system.
- Day-to-day wastewater such as tea-making water, and non-toxic laboratory wastewater such as buffer solutions, must be drained to these sinks.
- Floc-like suspended organic substances, animal tissue and feces, sterilized growth media, and so on must be drained to a WC with a large waste pipe.

生活流し

生活系排水のみ

Daily-life waste

公共下水道へ直接排出されます
実験廃液はポリタンクへ



Wastewater to be drained to laboratory sinks

- Dilute laboratory wash wastewater (tertiary and subsequent wash water for laboratory instruments) must be drained to these sinks.
- Floc-like suspended organic substances, animal tissue and feces, growth media, and so on must not be drained to these sinks.
- Day-to-day wastewater such as tea-making water must not be drained to these sinks, either.



The carelessness of a single individual can instantly prevent us from meeting our targets.

■ Effluent standard for sewage system

Cyanide, organic phosphorus, alkyl mercury:	Must not be detected.
Total mercury:	No more than 0.0005 mg / ℓ
Cadmium:	No more than 0.001 mg / ℓ
Carbon tetrachloride:	No more than 0.002 mg / ℓ
Lead, Arsenic, benzene:	No more than 0.01 mg / ℓ
Dichloromethane:	No more than 0.02 mg / ℓ
Hexavalent chromium, 1, 4-dioxane:	No more than 0.05 mg / ℓ
Boron:	No more than 1mg / ℓ

About 250 kiloliters of general laboratory wastewater is discharged daily by the laboratories of the University. So, for example, if a mere 5 grams of dichloromethane were to be rinsed down a sink, our target criteria would be exceeded.

実験流し

3回目以降の洗浄水のみ

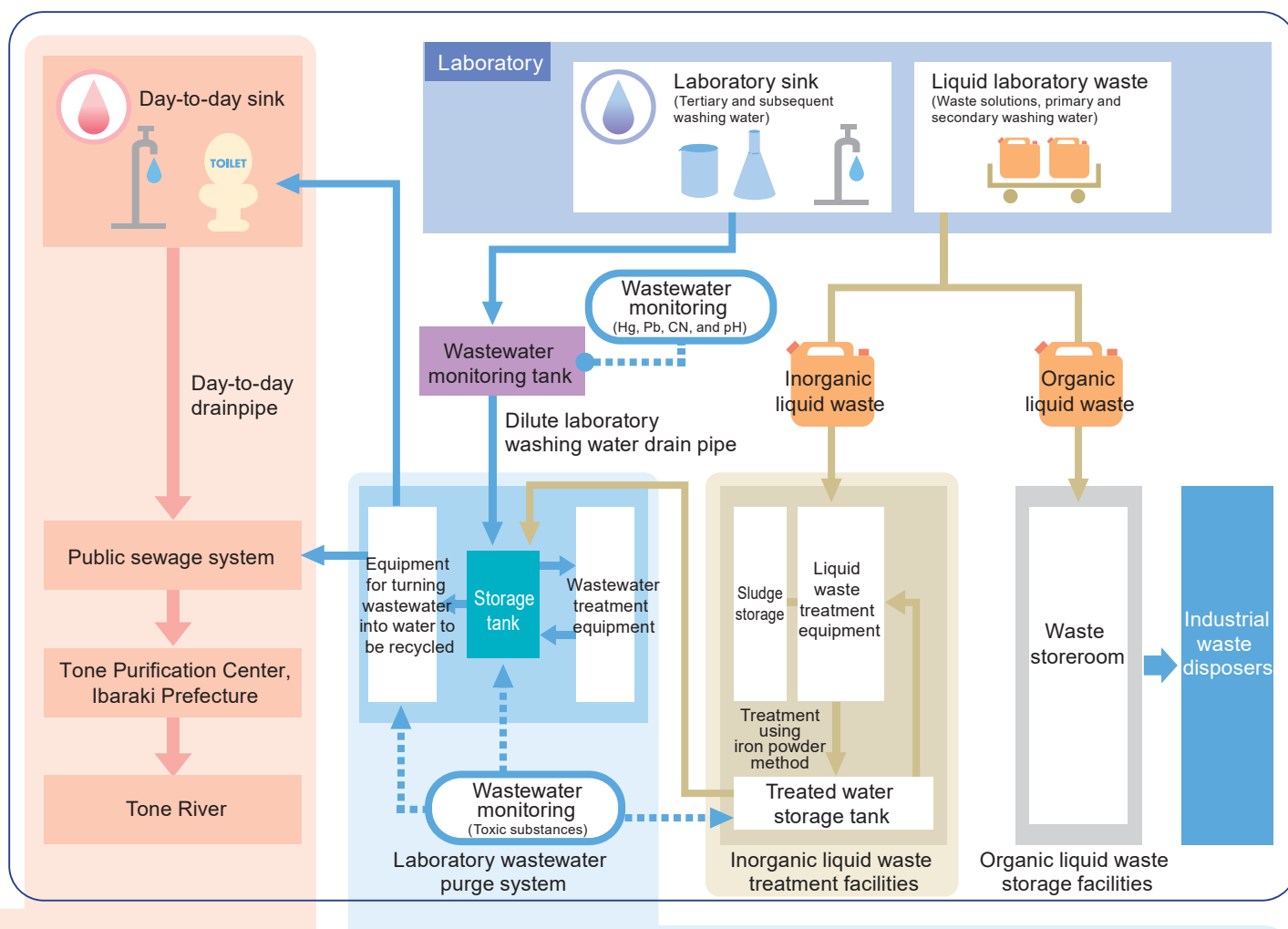
Only dilute washing water permitted

実験廃液はポリタンクへ

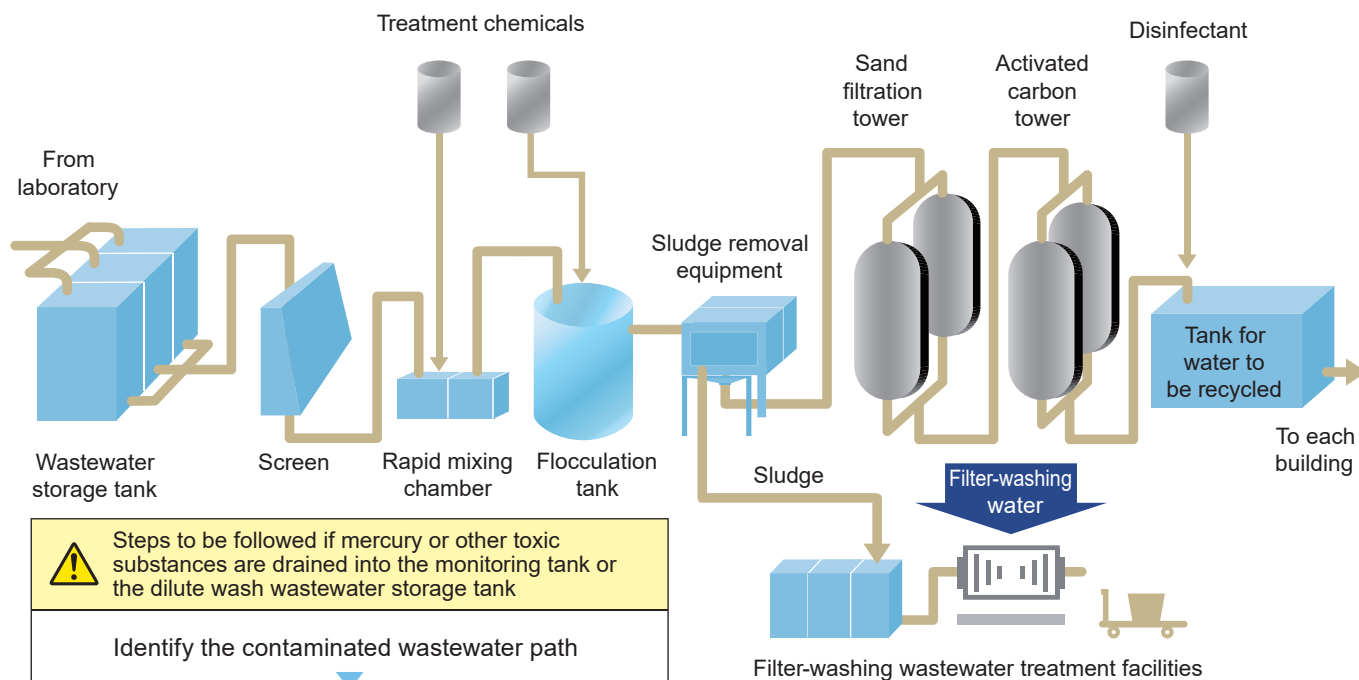
有害物質を流した時は水を止めて
実験環境管理室 (TEL 2891) へ連絡を!

If you accidentally pour mercury, cyanide compounds, or other toxic substances down a sink, turn off the water immediately and contact the Office of Occupational Health and Safety Management at 2891 or 2897.

Liquid laboratory waste and wastewater treatment facilities at Tsukuba Campus



■ Dilute laboratory wash wastewater treatment facilities (Central district)



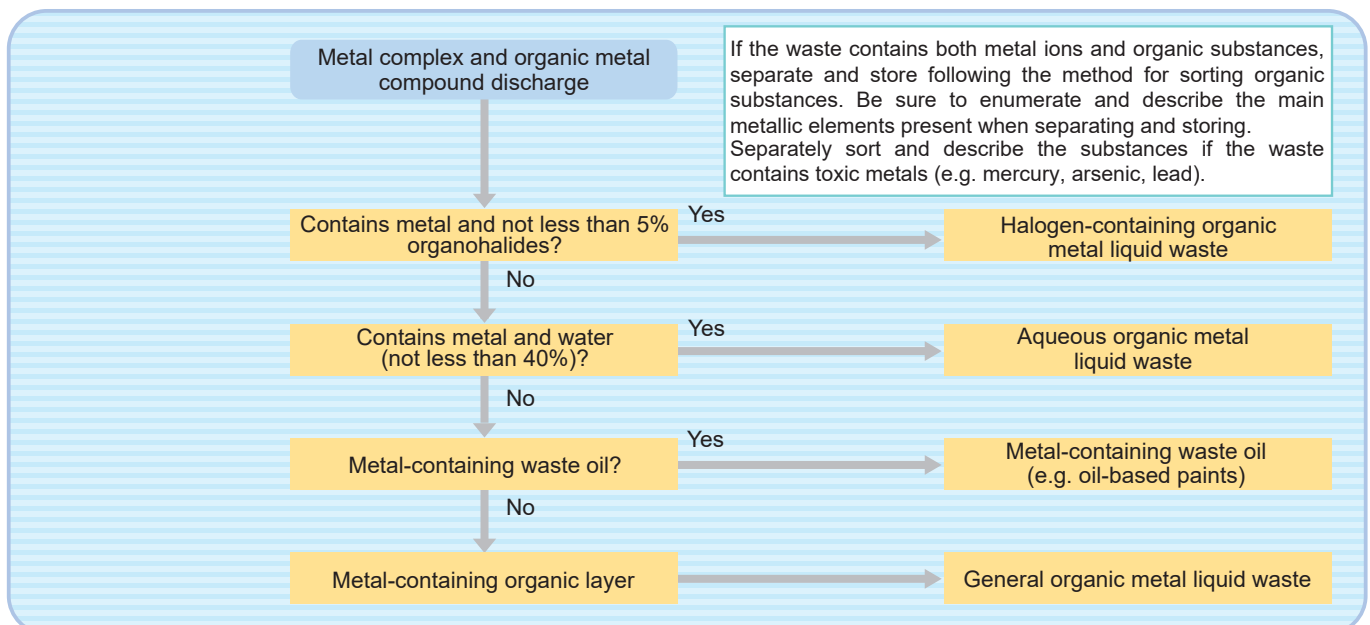
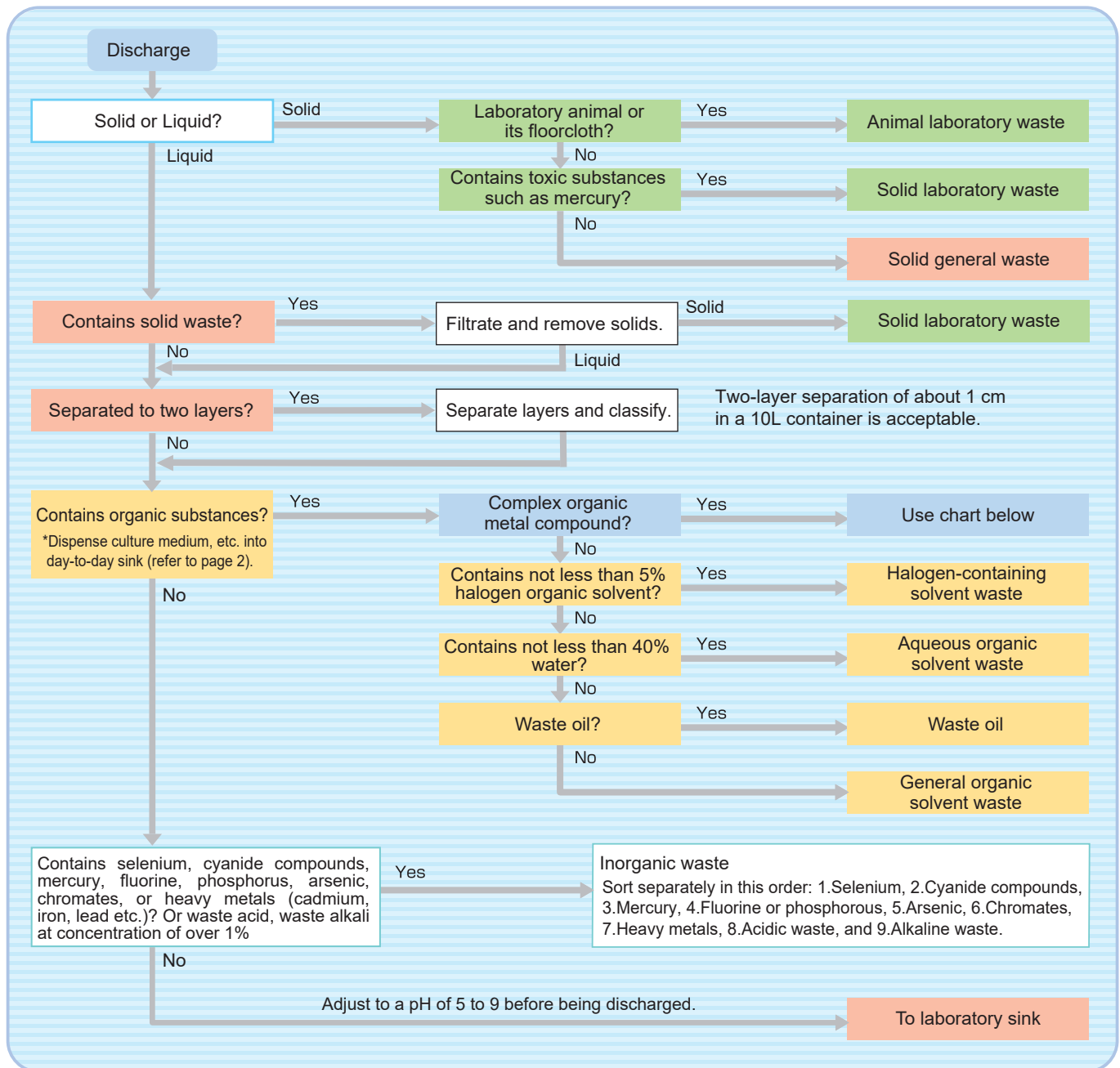
Steps to be followed if mercury or other toxic substances are drained into the monitoring tank or the dilute wash wastewater storage tank

Identify the contaminated wastewater path

Stop the use of the sink or stop the water supply

Clean or replace the sink and drainpipe

Flow chart for sorting laboratory waste



Sorting laboratory waste

Inorganic liquid waste

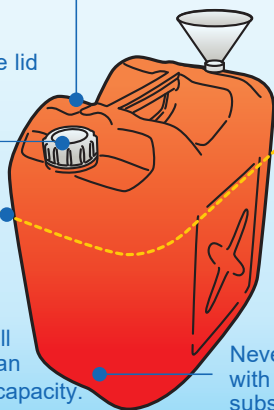
Store primary and secondary washing water in the container.

Leak-free polyethylene tank for transportation on campus.

Close the lid tightly.

Do not fill more than 80% of capacity.

Never mix with organic substances.



Record the contents

- Record the chemicals collected and their approximate concentrations. For PRTR class I designated substances and any substances specified in the Prefectural Regulations, in particular, record the amounts collected.

Sort priority for separate collection

- Sort out waste having the highest concentration of toxic components.
- For mixed waste, sort out the waste having the highest concentration of toxic components, according to the priority given below. (See also the chart on the previous page.)

1. Selenium wastewater
2. Cyanide wastewater
3. Mercury wastewater
4. Fluorine or phosphorous wastewater
5. Arsenic wastewater
6. Chromate wastewater
7. Common heavy metal wastewater
8. Acidic waste
9. Alkaline waste.

Liquid waste pH adjustment

- Only cyanide wastewater must be adjusted to a pH of 10 or greater.

Solids in liquid waste

- Deposits that are formed from liquid waste do not have to be removed, after storage in the tank.
- Remove pieces of glass and other debris.

Miscellaneous

- Metallic mercury is collected separately as a waste reagent.
- Refer to the quick reference sheet for separation and collection when separating and collecting complexes and organic metal compounds.
- Phosphoric acid and calcium hydroxide wastewater must be collected separately as fluorine wastewater.
- Magnesium waste must be collected separately as general heavy metal wastewater.
- Wastewater containing Be, Tl, and Os must be collected separately. For disposal, contact the Office of Occupational Health and Safety Management.

Organic liquid waste

If the container is used for a solvent subject to strict discharge regulations (such as benzene), wash it out at least twice, using ethanol or another appropriate substance.

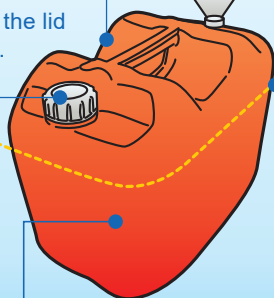
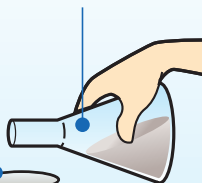
Record if mixing toxic metals including mercury and arsenic.

Leak-free polyethylene tank for transportation on campus.

Close the lid tightly.

Do not fill more than 80% of capacity.

Place general organic solvent waste in a 10-liter polyethylene tank.



Record the contents

- Record the names of the chemicals collected and their approximate concentrations. For PRTR class I designated substances and any substances specified in the Prefectural Regulations, in particular, record the amounts collected.

Sort priority for separate collection

- Sort out that waste with the highest concentration of toxic components.
- For mixed waste, sort out that waste having the highest concentration of toxic components, according to the priority given below. (See also the chart on the previous page.)

1. If there is not less than 5% organohalides solvent...Halogen-containing waste
2. Water soluble organic solvent waste with not less than 40% water...Aqueous organic solvent waste (non-combustible liquid waste)
3. Water soluble organic solvent with under 40% water or hydrophobic solvent waste... Waste oil, General organic solvent waste

Liquid waste pH adjustment

- pH adjustment is not necessary but measure the pH of the aqueous organic solvent waste and fill in the application form and tag.

Solids in liquid waste

- Deposits that are formed from liquid waste do not have to be removed, after storage in the tank.
- Remove pieces of glass and other debris.

Liquid waste separated into two layers

- Separate the liquids and handle the water layer as aqueous organic solvent waste.

Miscellaneous

- Refer to the quick reference sheet for separation and collection when separating and collecting complexes and organic metal compounds.
- The types of liquid waste listed below cannot be treated by outside contractors, and must be treated and detoxified at the source.

Explosive substances, reactive hazardous substances that may cause combustion, decomposition explosions, polymerization, etc., polychlorinated biphenyl, radioactive substances, internationally controlled materials, pathogens and highly toxic substances.

Photographic liquid waste

Photographic liquid waste classification had been discontinued on 2019/03.

Collect in a 10L polyethylene tank and apply as aqueous organic solvent waste.



Developer solution

Fixer solution

Stop solution

for separate collection

Solid laboratory waste

Inorganic sludge

Paper / Filter waste

Organic sludge

Waste plastic / rubber

Waste metal

Glass / Ceramic

Sharp objects and syringes including injection needles and razors

*Abide by rules if there are rules in each department

Mercury-using products (thermometer, lamp, etc.)

Waste polyethylene tank

*A broken tank is classified as "Waste plastic / rubber"

Classification and recording of contents

Record adhering toxic substances by classification

Place in plastic bag to prevent it from scattering or leaking with respect to each kind of waste. Close the opening tightly and pack in a cardboard box.*

Place sharp objects in a metal can, plastic bottle, etc. Place syringes in a plastic bag.

Simple packaging in buffer material, etc. for repackaging at the time of transportation

Mercury-using waste tank is classified as "Waste plastic / rubber". Containers with deposits at the bottom is classified as "Inorganic sludge" or "Organic sludge". List "Inorg" or "Org" directly on the waste polyethylene tank for other tanks.

* If case of waste polyethylene tank, packing is unnecessary unless broken

Prepare and stick a waste management label.

Any further packing is unnecessary

Transport with other wastes. No need to create waste management labels.

Animal laboratory waste

Animal carcasses, etc.

- Wrap it completely in newspaper, etc.
- Remove any noncombustible substances.
- If the waste presents a biohazard risk, sterilize it in an autoclave.

Place in a paper bag.

Miscellaneous

- Handle animal feces, floorcloths, remaining feed, etc. according to the rules governing animal carcasses.
- Waste that includes heavy metals or toxic substances: Contact the Office of Occupational Health and Safety Management.

Attach a label stating the name of the waste generator, the contents, the substances contained in the waste, the means of sterilization, and other necessary information.

Store the bag in a freezer before transportation.

For animal laboratory waste, fill in the copy slip. Request slips from the Office of Occupational Health and Safety Management.

Arts and crafts waste

- Pigment wastewater, dye wastewater, printing material treatment wastewater, pottery wastewater, solid waste, and others must be handled according to the rules governing liquid laboratory waste or the rules governing solid laboratory waste.
- Waste must be treated appropriately according to its properties. Some waste contains both heavy metals and organic substances. The website of the Office of Occupational Health and Safety Management provides information on the toxic-metal content and chemical composition of major pigments.

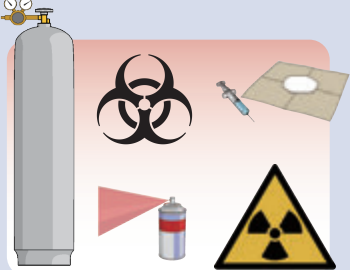
Waste reagents

- To dispose of reagents that are no longer necessary, an application must be filled with the Office of Occupational Health and Safety Management, using the "Waste reagent treatment application form".
- You can also apply using the "Waste reagent list" printed out from Tsukuba-CRIS. Refer to the Office of Occupational Health and Safety Management website for the output procedure of the waste reagent list.
- To dispose of reagents bottles, see below or contact the Office of Occupational Health and Safety Management.

Disposing of reagent bottles

- Clean and dry the inside of the reagent bottle. Place the water used for cleaning the bottles in a liquid waste container and apply for collection and treatment. Draining this water in a laboratory sink is strictly prohibited.
- When cleaning reagent bottles be sure to wear safety equipment such as protective goggles and gloves. Harmful reagents such as organic solvents, specified chemical substances, and poisonous or deleterious substances must be handled inside a fume hood.
- Once the reagent bottles are clean, remove the reagent label (or, if the label cannot be removed, write "Clean" on the label), sort into glass and burnable waste and place them at the waste collection station.
- Reagent bottles containing grease, etc. that is hard to clean and reagent bottles that contain highly toxic substances, reactive hazardous substances, or organic metallic compounds must not be cleaned and discarded. Make a request for their disposal after consultation with the Office of Occupational Health and Safety Management.

Waste not handled in the Office of Occupational Health and Safety Management



Biologically hazardous waste / infectious waste

- Drain the sterilized medium down the day-to-day sink. Do not drain it down the experimental sink.
- Once the containers, instruments, etc. are sterilized, cleaned, and dried, sort them, and place them at the waste collection station. Furthermore, in this case, bags with a biohazard mark will not be used or the mark will be deleted and clearly state that they have been sterilized.
- Dispose of sharp objects and syringes including injection needles and scalpels exposed to blood, bodily fluid, etc. according to department.
- For the disposal of growth media and solid waste that included or were exposed to heavy metals or toxic substances, contact the Office of Occupational Health and Safety Management.

High-pressure gas cylinders, sprays, radioactive waste, narcotics, stimulants

- These wastes cannot be collected and disposed by the Office of Occupational Health and Safety Management from a legal perspectives.
- For the return and disposal of High-pressure gas cylinders that is no longer required, directly ask the sales outlet. Oversized garbage, etc. is strictly prohibited.
- Spray reagents cannot be collected. After puncturing a hole to fully release the contents, place them at the waste collection station as general waste or after fully releasing the contents in similar way, make a request for their disposal as solid laboratory waste.
- Radioactive waste, narcotics, and stimulants should be properly disposed of by the discharging party in accordance with the applicable provision of laws, etc.

6

Application procedure for laboratory waste treatment

1

A person who discharge waste must download the application form for laboratory waste treatment from the Office of Occupational Health and Safety Management website, fill in the required items, and submit it as an e-mail attachment to the Office of Occupational Health and Safety Management

Application forms are classified according to the kind of waste. Prepare the application form by filling in the blanks.

- Inorganic solvent waste
- Organic solvent waste
- Metal complex and Organometal waste
- Waste reagent (managed by other than the Tsukuba-CRIS)

- Waste reagent (managed by Tsukuba-CRIS)
Register the waste from the dispatch registry on Tsukuba-CRIS and submit the output Excel file via email.

- Solid waste
Use the preparation tool for the Application for Solid Waste Disposal and prepare a list by kind and packing. Submit the prepared list via email.

Application form for liquid waste

Application form for waste reagent

Waste reagent list from Tsukuba-CRIS

Application tool for solid waste

2

The Office of Occupational Health and Safety Management will let discharging party know the time, date, and location of the collection and send the necessary documents after confirming the details.

- Liquid waste: The tag for the liquid waste tank will be sent by on-campus mail so fill in the blanks and tie it to the tank.
- Waste reagent: The number sticker will be sent by on-campus mail so affix it to each bottle.
- Solid waste: Print the solid waste management label from the tool and affix it to the waste.

Aqueous organic

Waste oil

Organohalogen containing

General organic

Inorganic waste

Waste reagent label

Solid waste manifest

3

The discharging party should transport the waste to the disposing facility in the prescribed style of packaging on the designated date and time.

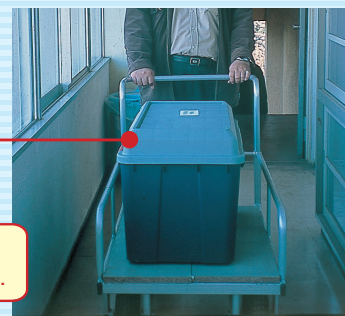
When carrying it, make sure that you are accompanied by the person responsible for the experiment (the waste generator), who is familiar with the contents.



Notes on Storing waste

Store waste in a location that is protected from sunlight and rain and which is not easily accessible to outsiders.
(Do not place the waste in the corridor.)
Be careful not to cause odor leaks or accidents.

When transporting waste, take special care so that no liquid or odor leaks occur.



4

The Office of Occupational Health and Safety Management will perform a verification of the waste and then receive it.

Update of the Office of Occupational Health and Safety Management website!

URL <http://anzenkanri.tsukuba.ac.jp>



Management of poisonous and deleterious substances

Storing poisonous and deleterious substances

- Store any such materials in a tip-resistant, metallic chemical cabinet, and lock the cabinet.
- Affix a sticker indicating the presence of non-medical poisonous and deleterious substances to the chemical cabinet.
- Do not store such materials on a laboratory table or in a glass chemical cabinet.

Using poisonous and deleterious substances

- For each reagent, record the name, the poisonous and deleterious substance classification, bottle style, date of purchase, amount purchased, date of use, usage, and any other necessary information.
- After use, immediately return it to the cabinet.
- Do not dispose of any poisonous and deleterious substances without careful consideration.



Chemical substances addressed by PRTR and by Ibaraki Prefectural Ordinance No.9

If more than a certain amount of any of the 462 class I designated chemical substances identified by the Law Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to Management Thereof (PRTR Law) is used in a year at the University, the University must report the amounts released and transferred to the government via the prefectural governor. The Office of Occupational Health and Safety Management surveys and totals the amount of the designated substances handled at the University.

As a result of a pilot survey, it is expected that the substances listed below will exceed the limits on amounts handled, above which reporting is required:

acetonitrile, xylene, chloroform, dichloromethane, n-hexane, N,N-dimethylformamide, toluene, phenol, benzene, formaldehyde

The following are designated chemical substances that are handled in large amounts every year:

acrylamide, aniline, ethylenediamine, ethylenediaminetetraacetic acid, carbon tetrachloride, 1,4-dioxane, trichloroethylene, pyridine

Of the 37 substances designated under Ibaraki Prefectural Ordinance No. 9 (regulation concerning the preservation of the living environment in Ibaraki Prefecture), the following are all handled in large amounts annually at the University:

acetone, ammonia, hydrogen chloride, ethyl acetate, n-butyl acetate, methanol, methylethylketone, sulfuric acid (including SO₃)

For the above designated substances, remember to record the amounts stocked, purchased, and discarded (in kg units).



筑波大学
University of Tsukuba

Office of Occupational Health and Safety Management

Phone: 029-853-2891, 2893 and 2897

(2891, 2893 and 2897 from an on-campus telephone)

E-mail address: jitukan@un.tsukuba.ac.jp

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