ENVIRONMENTAL SAFETY CENTER

GUIDE

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Environmental Safety Center Guide

2021 ▸ 2022

Foreword

The Environmental Safety Center was established in December 1979 as part of Waseda's commitment to environmental conservation activities. The Center takes responsibility for managing laboratory waste and chemical substances as well as for conducting analyses related to environmental management and consultation. Our goals are to prevent and reduce the impact of environmental pollution through education and research activities, and to secure the living environments of faculty members, stuffs, students, and local residents. We have been especially proactive in efforts to improve the quality of managing chemical substances and workplace health and safety with respect to chemical substance-related risks at Waseda University. These efforts include introducing the Chemical Registration Information System (CRIS) at all the campuses, creating and operating an e-learning program for undergraduate and graduate students who plan to do research for graduation and master's theses, respectively, and measuring the conditions of laboratory working environments in accordance with provisions of the Industrial Safety and Health Act. Another role of the Center is research support activities at the university. This involves providing access to our equipment, draft chambers, and other facilities used in environmental conservation activities to the extent that doing so does not affect wastewater analysis operations. As concerns experimental equipment, the Center offers comprehensive research support that includes safety guidance by staff members. It also provides research infrastructure under the Advanced Research Infrastructure Sharing Promotion Project (Core Facility Construction Support Program), adopted by the Ministry of Education, Culture, Sports, Science in fiscal 2020.

This Environmental Safety Center Guide has been compiled to help this Center carry out the tasks involved smoothly. It consists of the following sections: Overview of the Environmental Safety Center; Rules on Use of Chemical Substances; Research Support; and Laws Related to the Environment. Faculty members, stuffs and students using chemical substances in their research activities can secure their personal safety and avoid impact on the environment by storing, using, and disposing of all chemical substances properly according to the rules. This guide summarizes the significance of rules in actual research activities and indexes the rules governing the purchase, storage, use, and disposal of chemical substances for students to use as a guide to their safe handling. We hope all concerned will use this guide in education and research activities at Waseda University, and thus ensure that research is conducted safely without burdening the environment.

Yoshiyuki Sugahara
Director of the Environmental Safety Center
Professor, Faculty of Science and Engineering

Why do we need to follow the rules?

We must follow the rules because we live on Earth and are members of an organization—Waseda University. Various laws, regulations, ordinances, and in-house rules govern the research activities that you are about to begin. Failing to comply with the rules may result in accidents and environmental pollution that could adversely affect you and the people and organisms around you.

Why should we follow the rules?

What kinds of rules are there?

What happens if we fail to follow the rules?

You must understand the answers to these questions before starting research and follow the laws and regulations below related to your research works.

Why must chemical substances be registered?

◆Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof (PRTR) → p. 14

◆Tokyo Metropolitan Ordinance on Environmental Preservation to Secure the Health and Safety of Citizens of the Tokyo Metropolitan Area → p. 15

◆Poisonous and Deleterious Substances Control Act → p. 18

◆Fire Service Act → p. 18

- If you want to purchase chemical substances → p. 12
- If you want to know about SDSs → p. 8
- What is the Chemical Registration Information System (CRIS)? → p. 10
- If you want to purchase dry ice/liquid nitrogen → p. 19

Purchasing a chemical substance

Using and storing chemical substances

Why can't we put chemicals wherever we like?

◆Poisonous and Deleterious Substances Control Act → p. 18

◆Fire Service Act → p. 18

◆Fire Prevention Ordinance

- If you want to store chemical substances → p. 15
- If you want to store hazardous substances → p. 15, 16
- If you want to store poisonous substances → p. 15, 16
- If you want to store deleterious substances → p. 15, 16

Everyone should handle chemical substances responsibly.

During the period from initial purchase to final disposal of chemical substances by students and faculty members, the university must submit many notifications and reports to the relevant authorities. For the university to fulfill this responsibility, each student and faculty member who handles chemicals must follow the rules.

Being aware that you are a member of Waseda

This awareness helps prevent chemical accidents.

Why can't we pour chemicals down the drain of the sink?

◆Water Pollution Control Act → p. 23

◆Sewerage Act → p. 23

◆Tokyo Metropolitan Sewerage Ordinance → p. 23

How should we wash lab instruments after use with chemicals? → p. 24

Why must we record wastes to indicate the content? Why must waste be sorted prior to collection?

◆Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof (PRTR) → p. 14

◆Tokyo Metropolitan Ordinance on Environmental Preservation to Secure the Health and Safety of Citizens of the Tokyo Metropolitan Area → p. 15

◆Waste Management and Public Cleansing Act → p. 26

If you want to know about the waste disposal system process → p. 25

If you want a container for collection → p. 27

If you want to know about the waste sorting collection system → p. 31

If you want to dispose of chemicals that will not be used anymore → p. 40

What you should do when the collection container becomes full → p. 28

If you do not know how to fill in a Disposal Request → p. 29

If you want to know what happens to waste after disposal → p. 26

Chemical disposal

CONTENTS

I Overview of the Environmental Safety Center

1. Management of Chemical Substances

Recently, laws and regulations related to chemical substances have become increasingly strict, and we are now required not only to manage chemical substances according to conventional laws and regulations but also to manage them autonomously. Waseda University and the Environmental Safety Center (ESC) are working together for compliance with the Fire Service Act, the PRTR system, the Industrial Safety and Health Act, the Tokyo Metropolitan Ordinance on Environmental Preservation and other laws and regulations related to chemical substances, and promotion for autonomous risk assessments of chemical substances in laboratories and encouragement of students to voluntarily manage chemical substances they use.

Our Center opened the Chemical Shop in 1985 and started selling chemicals in small portions. We also developed a chemical management system, which was rare for a university at that time, on its own and started managing chemicals kept in stock in the schools of science and engineering. More than 30 years after that, our Center now manages chemicals as well as high-pressure gases under a university-wide Chemical Registration Information System (CRIS) and uses this system not only to manage chemicals and high-pressure gases kept in stock and ensure compliance with relevant laws and regulations but also to respond urgently to fires, to inspect the items for public funds and to manage chemical substances in many other ways.

2. Environmental Management

Those who engage in education and research activities at universities must observe various laws and regulations, including the Water Pollution Control Act, Sewerage Act, and Industrial Safety and Health Act. To ensure compliance with these laws and regulations, on a monthly basis (except February and August), the Environmental Safety Center analyzes wastewater discharged from laboratories that use specific chemical substances and measures the conditions of the working environments in areas where such chemical substances are handled.

If a measured value exceeds the legal limit, we conduct an investigation of the causes and take appropriate measures to prevent recurrence, working together with administrative offices to ensure the safety and health of students and faculty members as well as proper management of the water environment on campus and in the surrounding areas.

3. Management of Laboratory Waste

Waste materials generated from laboratories as a result of education and research activities at universities fall under the category of industrial waste as defined in the “Waste Management and Public Cleansing Act.” Waste materials that contain toxic substances as defined under the law at levels exceeding the prescribed limits must be handled as specially controlled industrial waste. Standards have been defined for the storage, transport, and disposal of laboratory waste materials. People involved in the emission of such waste are responsible for carrying out proper handling until final waste disposal in accordance with the law.

Waseda University manages laboratory waste materials generated on campus in accordance with its defined Laboratory Waste-Disposal Procedure. Laboratory waste generated through education and research activities is sorted and collected under the responsibility of those involved in the emission of such waste. The waste (except some waste materials) is transported to the Environmental Safety Center, where information about the collected waste and potential safety factors are examined before industrial waste disposal contractors are requested to dispose of such waste. Typically, waste is processed properly

based on its type as follows: inorganic waste liquids are processed by neutralization/detoxification or by collecting the metals contained therein, while organic waste liquids, infectious waste, and solid waste are processed by combustion or another method.
When making a request to an industrial waste disposal contractor for disposal of laboratory waste materials, a manifest (control manifest for industrial waste) is issued to confirm whether the contracted disposal has been properly carried out. Contractors are selected only after examining their intermediate and final treatment facilities.
Waseda University classify and compile data on the amounts of laboratory waste generated as well as the amounts disposed of by contractors, which are based on the types of industrial waste and specially controlled industrial waste, and then report each year said data to the Tokyo Metropolitan Government and other administrative authorities. A significant portion of laboratory waste contains specific chemical substances that are controlled under the “Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof (PRTR)” and the “Tokyo Metropolitan Ordinance on Environmental Preservation to Secure the Health and Safety of Citizens of the Tokyo Metropolitan Area.” Therefore, the amounts of these substances are compiled using data entered into “Laboratory Waste Disposal Request/Chemical Management Form,” and the results are reported to the authorities as the amounts of chemical substances emitted (or contained in waste materials and transported) from the campus into the environment.

4. Support for Education and Research Activities

We offer analytical instruments and facilities in the Center to students and faculty members to support education and research activities on campus. Specifically, we offer instruments that are widely used in various research areas, such as ICP emission spectrometer and gas chromatography systems. For students who do not have experimental equipment in their own laboratories, we also offer basic equipment, such as fume hoods, electrical furnaces, and water purifying systems for generating ultra-pure water.
As necessary, we offer workshops on how analytical instruments work and how to operate them for students who are not familiar with handling chemicals or performing instrumental analysis. We also provide consultations on qualitative/quantitative analyses as well as analysis services on a fee basis. The Environmental Safety Center is registered with the Tokyo Metropolitan Government as a Certified Business for the Measurement of Water or Soil Substance Concentration, and we perform environmental measurement work at the request of parties outside the university.
In addition, as we are the organization that takes full responsibility for receiving and making inventories of chemical substances, managing the handling of chemical substances in classrooms and laboratories, managing laboratory waste, and performing other on-campus management related to chemical substances, at the beginning of the academic year, we host workshops on the “environment and safety when handling chemical substances” for undergraduate and graduate students who plan to write graduation or master’s theses. We also provide the safety e-learning program, for which we make full use of our accumulated experience and knowledge of safety issues. Our aim is to ensure the safety of education and research environments in laboratories safe and to prevent accidents by having students participate in workshops and programs.

Ⅱ Rules on Use of Chemical Substances

STEP 1 Purchase and Storage of Chemical Substances

1. Planning for Experiments

Experiments consist of repeating the processes of planning, preparation, experimentation, and analysis of results. The best way to obtain good results is to invest much time in planning and preparation before conducting an experiment.
In the planning stage, the kinds and quantities of chemical substances to use must be carefully examined. When using hazardous chemical substances that have adverse effects on human health or the environment, you should first search to check whether any alternative chemical substances can be used. Also, chemical substances should not be purchased in larger quantities than necessary. It is important to plan experiments by visualizing how much and what kinds of waste will actually be generated as a result of research activities.
The environment in which to conduct the experiment must also be prepared for use of chemical substances. Some chemical substances require use of protective gear and/or a fume hood (draft chamber) to ensure safety. Before making purchases, be sure to check the relevant Safety Data Sheet (SDS) for each chemical to learn about the properties of the chemical substances that will be used.

Upon using a chemical substance for the first time, be sure to check the SDS.

2. Obtaining and Using an SDS

(1) What is an SDS?

An SDS is a document prepared by the manufacturer of a chemical substance or chemical product to provide the buyer with information about said substance or product upon shipment. The Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof (PRTR) (p. 14) requires that manufacturers and suppliers of legally stipulated Class 1 Designated Chemical Substances, Class 2 Designated Chemical Substances, and products containing such chemical substances provide an SDS for each such substance or product.

(2) How to obtain an SDS

You can obtain an SDS using either of the following methods:

(1) From the supplier(s) of the chemical

In order to facilitate users' proper management of chemicals, suppliers that offer products that contain regulated chemical substances must provide an SDS (under the SDS system) for such products. You can obtain an SDS from a supplier if you ask for the SDS to be included upon delivery of the chemical.

(2) By using MyWaseda

You can search the manufacturer's website for the SDS.

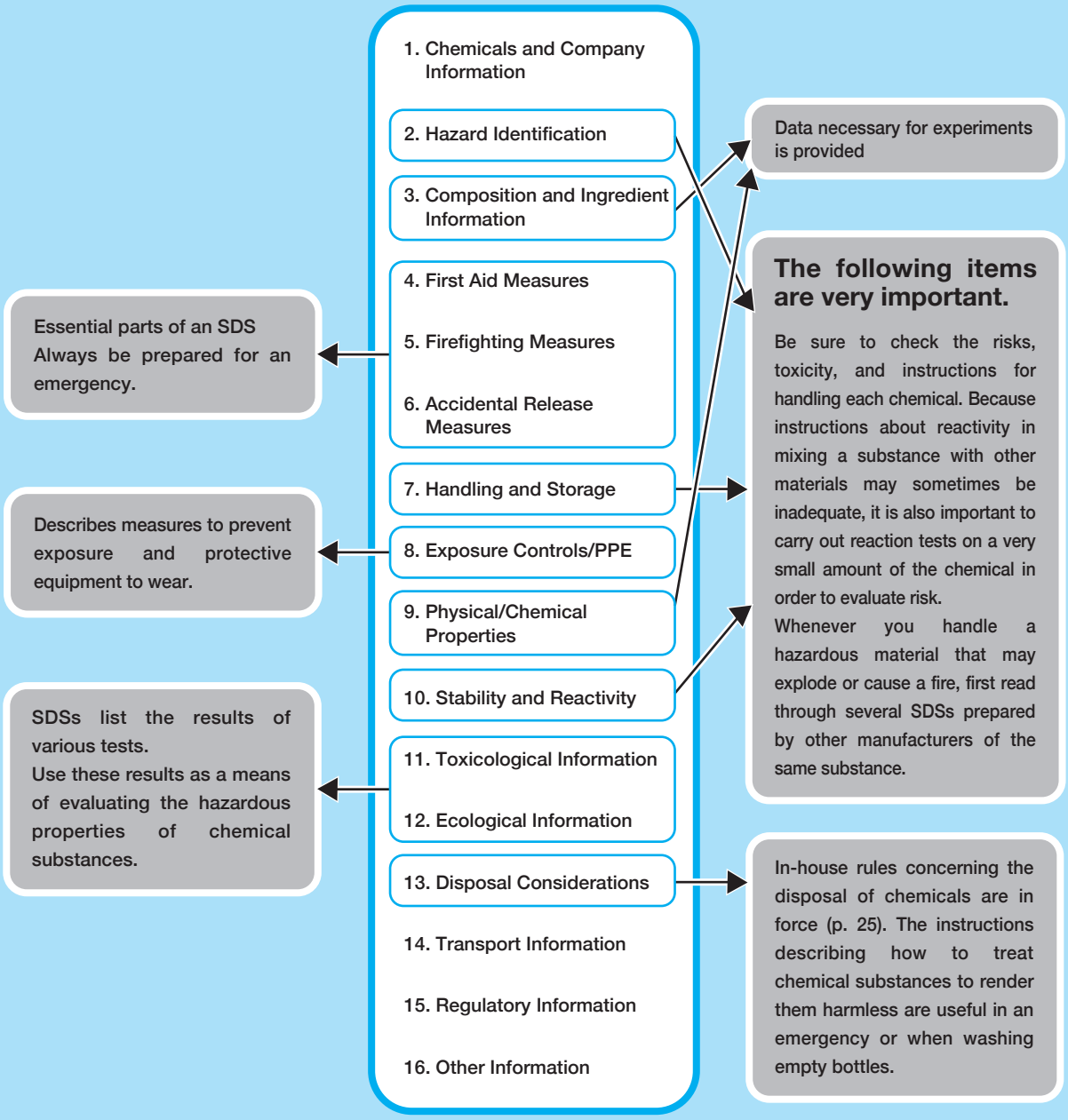
You can search for reagents from different manufacturers. Students and faculty members can access the list of reagents by selecting "Chemical Management → SDS" from the "Research" category in MyWaseda, and administrative staff members can access the list by selecting "Chemical Management → SDS" from the "Work" category. If the desired reagent is not in the list, use a search engine to search for it.

Important Notes on SDSs (Safety Data Sheet)

Be sure to look through all 16 items shown on an SDS because each provides important information. Keep in mind that SDSs are not perfect. SDSs are prepared for regular users and thus do not necessarily contain information about how you should handle a given chemical substance under specific conditions.

Based on the information in the SDS, you must make additions or modifications to the content in a manner that suits the way you will handle a chemical substance.

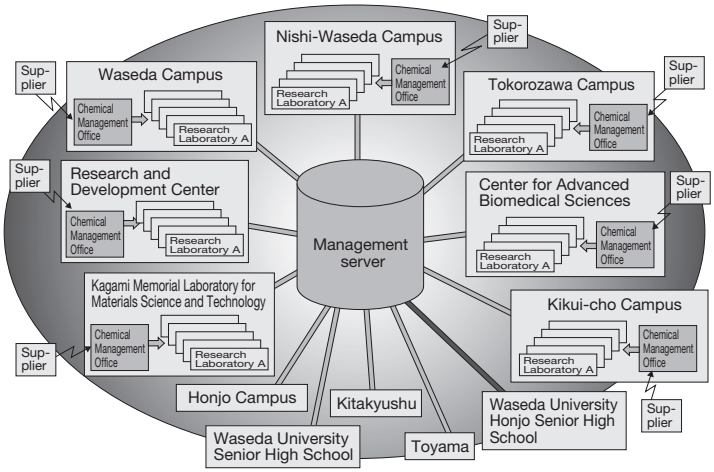
Essential parts of an SDS



3. Chemical Registration Information System (CRIS)

(1) At Waseda university, chemical substances used in education and research are managed under the Chemical Registration Information System (CRIS). The CRIS, which is controlled through the management server, allows you to know the status of chemical substances stored at the university. It is also used to conduct daily inventory management as well as to aggregate and report data under laws and regulations. In emergency situations such as fires, this system also serves to report the inventory of chemical substances and high-pressure gases in that location to the fire department and other relevant authorities.

The CRIS cannot operate without the cooperation of students, faculty members, and chemical suppliers. Information on the storage of chemical substances and high-pressure gases registered in the CRIS must always be consistent with chemical substances and high-pressure gases that actually exist. To ensure this, daily management of chemical substances and high-pressure gases is important; particularly, users must promptly affix a barcode label to each chemical substance upon delivery as well as promptly return the labels after disposing of chemical substances (For high-pressure gases, slips are issued instead of barcode labels). If a product is delivered without a barcode label or slip, ask the Chemical Management Office at your campus (refer to page 49) to issue a barcode label or slip. Determine whether to register chemical substances or high-pressure gases in the CRIS according to the flowchart on substances to be registered in the CRIS (in page 11).



CRIS—an institution-wide, Web-based system

(2) How to use the CRIS

(1) An ID and password

An ID and password are required to use the CRIS. An ID is issued to each individual. If you have not obtained an ID, please refer to the CRIS manual on how to apply for one. You can download the CRIS manual from the Environmental Safety Center's website. To maintain ID security, please do not share your ID with anyone else.

(2) Logging in the CRIS

Students and faculty members can log in the CRIS by selecting "Chemical Management" -> "Chemical Management (from within the university only)" from the "Research" category in MyWaseda. Administrative staff can log in from the "Work category." For security, the CRIS can only be used in the on-campus network of Waseda.

(3) Examples of using the CRIS

You can use the CRIS to search information or calculate the quantities of chemical substances in stock. Please use it in education or research.

(1) Search for chemicals or high-pressure gases kept in stock

e.g.: You can search for chemicals or high-pressure gases kept in stock in Room △△ of Building No. ○○.

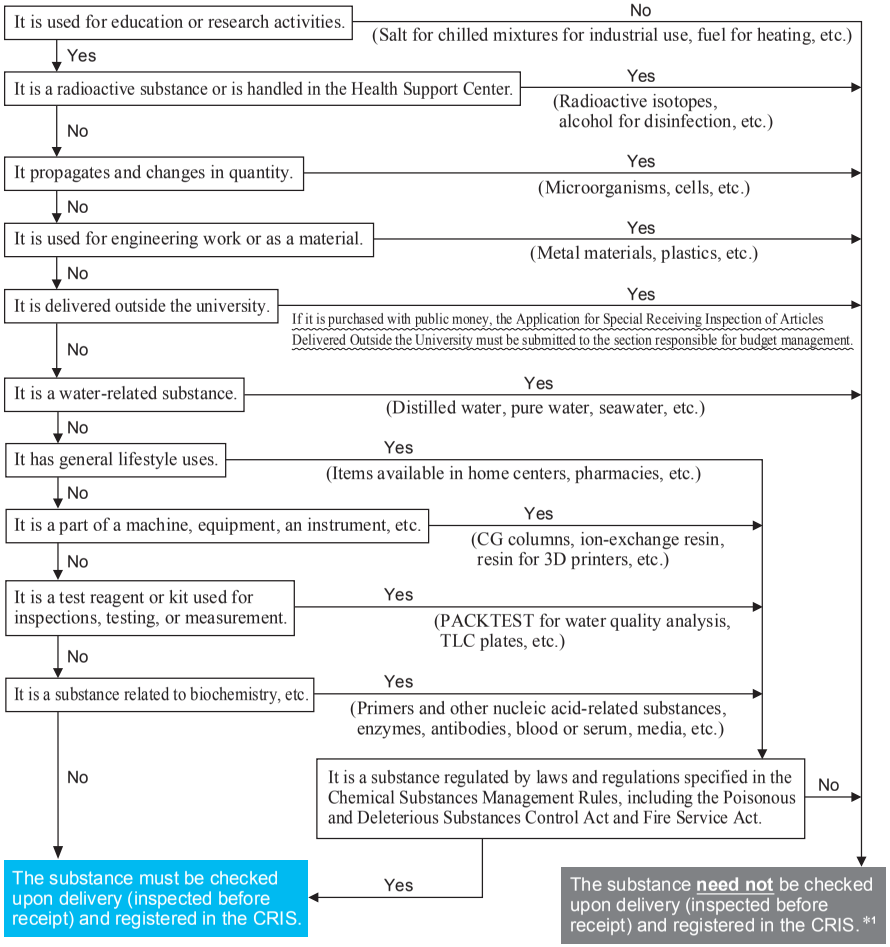
(2) Calculate the stored quantities of hazardous substances designated by the Fire Service Act

e.g.: You can look up the factors of hazardous substances in Room △△ of Building No. ○○

Revised on April 1, 2019

Flowchart on substances to be registered in the CRIS

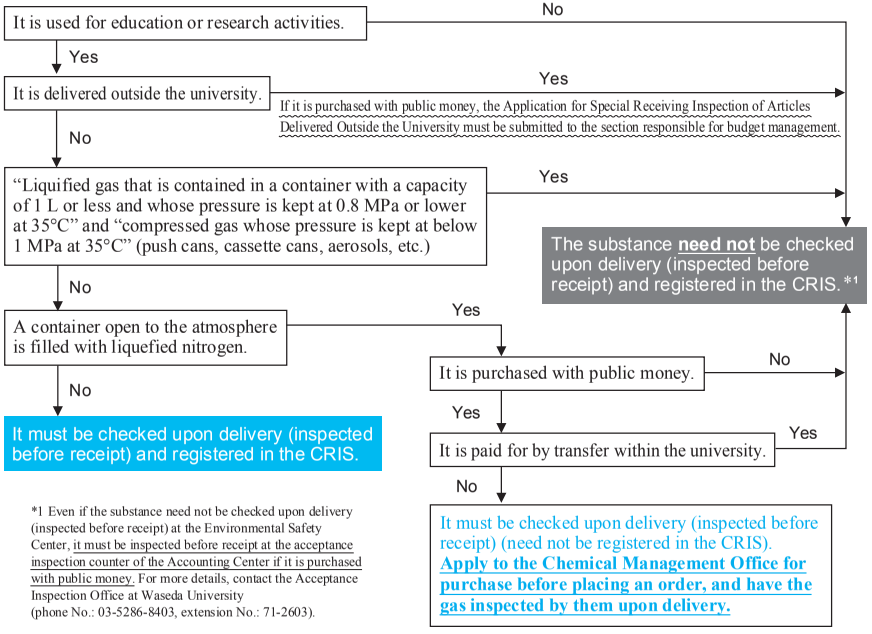
● Chemicals



*1 Even if the substance need not be checked upon delivery (inspected before receipt) at the Environmental Safety Center, it must be inspected before receipt at the acceptance inspection counter of the Accounting Center if it is purchased with public money. For more details, contact the Acceptance Inspection Office at Waseda University (phone No.: 03-5286-8403, extension No.: 71-2603).

*2 Select Yes for all substances labeled "poisonous substance not for medical use" or "deleterious substance not for medical use." Select No if the substance does not carry such a label and does not have the risk of injuring users during normal use (such as resin for 3D printers, primers, silica gel for drying purposes, and membrane filters). If you are unsure which to select, contact the Environmental Safety Center (phone No.: 03-5286-3089, extension No.: 73-6202).

● Compressed gas or liquefied gas



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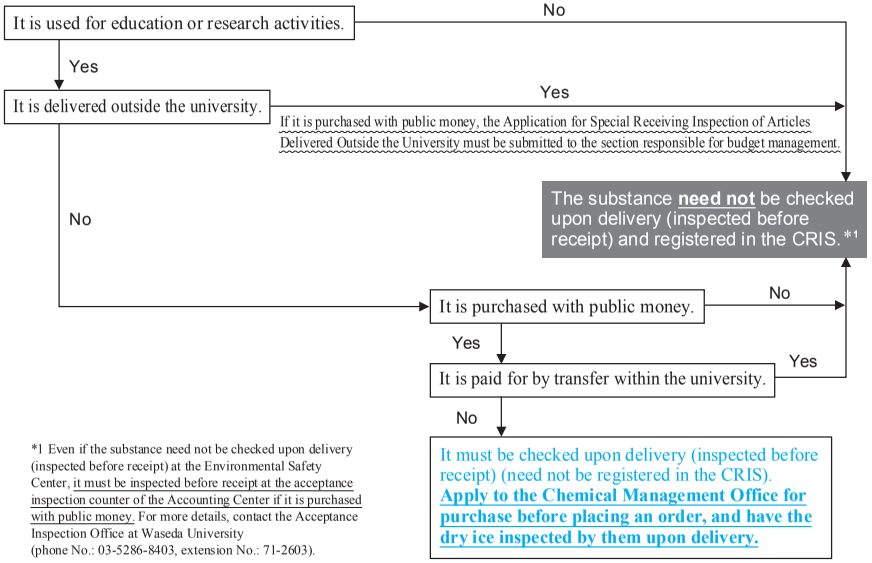
● Dry ice



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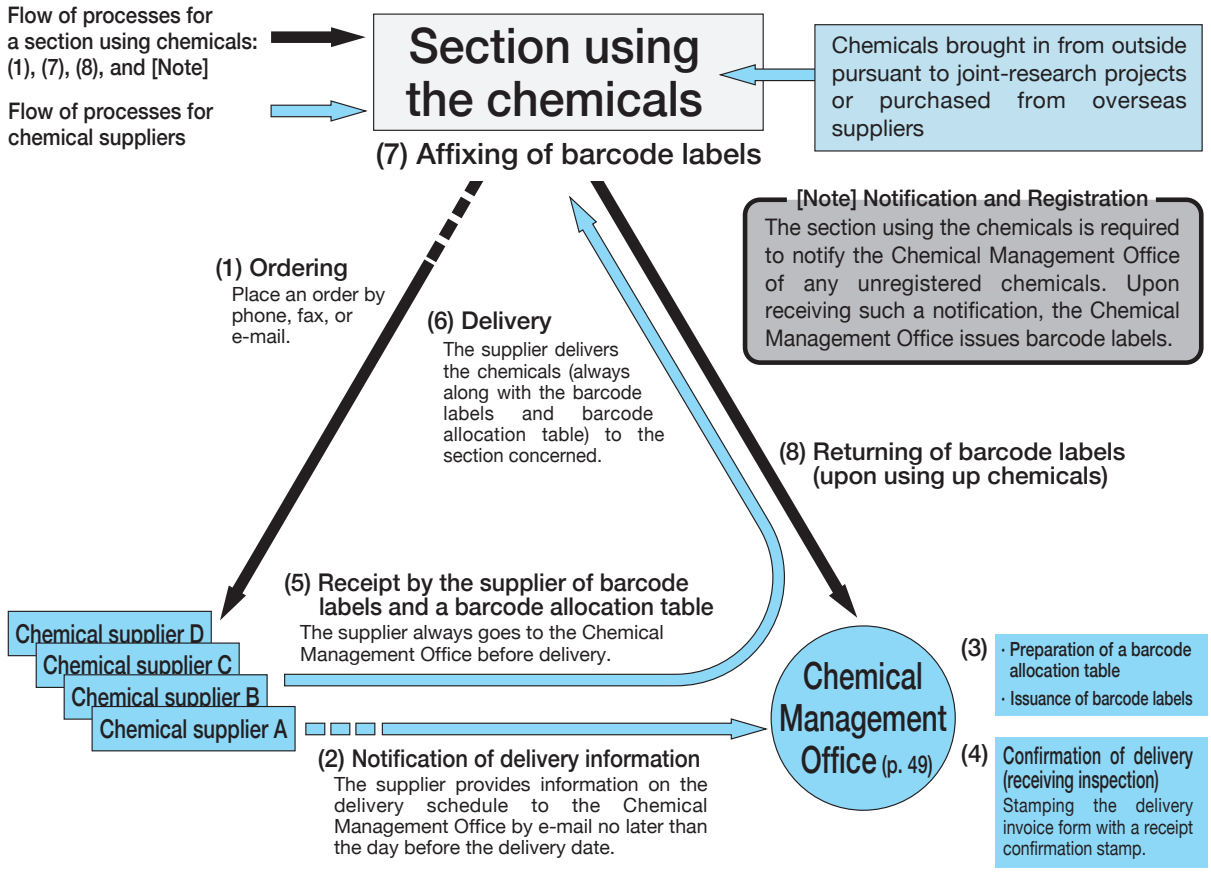
4. Purchasing Chemical Substances

The following describes the flow of processes from ordering a chemical substance through to delivery and final disposal.

<Flow of Processes from Ordering through to Disposal>

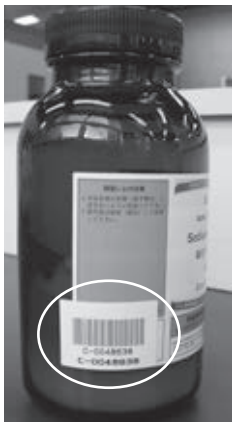
Task	Instructions
(1) Ordering	Place a purchase order directly with a supplier by phone, fax, or e-mail.
(2) Notification of delivery information	Prior to delivery, the supplier notifies the Chemical Management Office about the delivery via e-mail.
(3) Preparation of barcode labels and a barcode allocation table	Chemical Management Office personnel enter the delivery information into CRIS, and then issue barcode labels to be affixed to each container, as well as a barcode allocation table.
(4) Confirmation of delivery	The supplier stops by the Chemical Management Office before delivering the chemicals to the section where the chemicals are to be used. Chemical Management Office personnel confirm receipt of the delivery with an invoice and stamp the delivery invoice form.
(5) Receipt by the supplier of barcode labels and a barcode allocation table	The supplier receives barcode labels and a barcode allocation table.
(6) Delivery	The supplier delivers the chemicals to the appropriate section along with the barcode labels and barcode allocation table.
(7) Affixing of barcode labels	User(s) affix the barcode labels to the chemicals according to the allocation table.
(8) Returning of barcode labels (p. 13) (upon using up chemicals)	User(s) affix the barcode labels onto a barcode label collection sheet and promptly return said sheet to the Chemical Management Office.

* Use of narcotics, psychotropics, stimulants, raw materials of stimulants, or specified poisonous substances requires notification to public authorities and other procedures. Before using any of these substances for the first time, contact and consult the management office at your campus (refer to page 49) (At the Nishi-Waseda Campus, contact and consult the Technology Planning Section).
* For high-pressure gases, slips are issued instead of barcode labels.
* For billing, please attach the delivery invoice form stamped with a receipt confirmation stamp to the bill.



Note on (7) Affixing of barcode labels:

Obtain barcode labels and a barcode allocation table from the supplier, and then affix the labels onto the reagent containers as shown in the photograph. Be sure to check applicable laws and regulations and other details (for poisonous, deleterious, or dangerous substances) in SDSs and chemical labels.



Barcode label

Barcode allocation table（バーコード割当票）

Slip No.: 0001

Barcode (バーコード)	Chemical name (化学物質製品名)	Grade (グレード)	Volume (容量)	Poisonous and Deleterious Substances Control Act (毒物劇物取締法)
C-0000001	メタノール	一級	3L	劇物
C-0000002	アセトン	一級	3L	
C-0000003	硫酸	JIS 特級	500mL	劇物
C-0000004	酢酸	JIS 特級	500mL	
C-0000005	硝酸 1.38	特級		劇物

Note on (8) Returning of barcode labels (upon using up chemicals):

Once you have used up all content of a chemical reagent container, remove the barcode label affixed to the container, affix the label to the appropriate box on the collection sheet, and then promptly return the sheet to the Chemical Management Office. (Refer to page 49.)

If you affix the barcode label of an unnecessary chemical to the List of Unnecessary Chemicals (不要薬品リスト) to apply for disposal and submit the list, the inventory data will be deleted based on the list. In this case, you do not need to remove the barcode label and then affix it to the collection sheet.

Barcode label collection sheet (yellow)

You are not permitted to use chemical substances that have not been registered in CRIS (i.e., chemical substances that do not have barcode labels or slips attached).

<Chemical Management Offices>

The Chemical Management Offices at each campus and other locations are listed in page 49.

<Procedures for changing information registered in the CRIS>

If you encounter any of the following events, you need to carry out the respective procedures described below:

(1) When there is a chemical that is not registered in the CRIS
(1) When there is a chemical that is not registered in the CRIS
The chemical needs to be registered in the CRIS. Download the Request Form for Chemical Registration（薬品登録依頼書）from the Environmental Safety Center's website, fill in the form, and contact the office specified in the form.
(2) If the chemical had been registered before but has been deleted from the inventory, and you want to re-register it
We will check whether data on the chemical remains in the system. Let the Environmental Safety Center (WCRIS@list.waseda.jp) know the ID written on the chemical's barcode label. If the data on the chemical had been deleted from the inventory before FY2019, the data will no longer be on the system. In this case, you need to submit the Request Form for Chemical Registration（薬品登録依頼書）to re-register it.
(2) When a chemical registered in the CRIS does not exist
(1) If you have an empty container and barcode label for the chemical at hand
The chemical needs to be deleted from the inventory. Remove the barcode label, affix it to the barcode label collection sheet, and then submit the sheet to the appropriate Chemical Management Office.
(2) If the chemical is registered in the CRIS but is not in stock
The chemical needs to be deleted from the inventory. Download the Request Form for Change of Information Registered in the CRIS（CRIS登録情報変更依頼書）from the Environmental Safety Center's website, fill in the form, and contact the office specified in the form (If it is a poisonous substance, you also need to submit the Report of Exhaustion of Poisonous Substances（毒物使用済み報告書）to confirm that it has not been lost or stolen).
(3) When a chemical is stored in a place different to the storage place registered in the CRIS
The storage place needs to be changed. Fill in and submit the Request Form for Change of Information Registered in the CRIS（CRIS登録情報変更依頼書）. Alternatively, the storage place can be changed at your location (You can change the storage place by selecting [Online Query] and then [ISearch chemical stock], selecting the appropriate chemical, and then selecting the actual storage place from [Stock Revise], where the storage places registered for your location are listed).

TOPIC

The Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof (Enacted on July 13, 1999)

The Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof is built upon two pillars, namely the PRTR (Pollutant Release and Transfer Register) system and the SDS system.

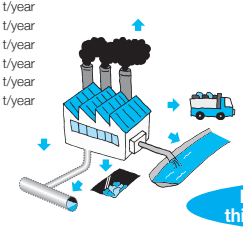
The PRTR system gathers data on what types of toxic chemical substances have been released into the environment from which sources, or how much of such substances have been emitted or transferred outside business establishments in waste form. Such data can thus be monitored, summarized, and made public.

Businesses subject to the PRTR system (including colleges and universities) must keep track of the quantity of substances they release into the environment and the quantity transferred outside their business establishments as waste or sewage, and report the results to an administrative authority once a year. The administrative authority then summarizes this data, and, in parallel, estimates the quantity of specified chemical substances released into the environment from households, farms, automobiles, and other sources, after which it simultaneously publishes both types of data.

The PRTR system enables us to learn what kinds and quantities of chemical substances have been released from which sources on an annual basis. (PRTR Information Plaza: http://www.env.go.jp/chemi/prtr/risk0.html)

Into the soil

(1) Boron compounds	2,495 t/year
(2) Hydrogen fluoride and its water-soluble salts	1,983 t/year
(3) Zinc compounds (water-soluble)	641 t/year
(4) Manganese and its compounds	608 t/year
(5) Thiourea	192 t/year
(6) Water-soluble copper salts (except complex salts)	119 t/year
(7) Poly (oxyethylene) alkyl ether	110 t/year



To the atmosphere

(1) Toluene	49,754 t/year
(2) Xylene	25,455 t/year
(3) Ethylbenzene	14,827 t/year
(4) n-Hexane	10,510 t/year
(5) Dichloromethane	9,748 t/year
(6) Carbon disulfide	4,274 t/year
(7) 1,2,4-Trimethylbenzene	2,883 t/year

Transfer to outside the business establishment

(1) Manganese and its compounds	59,746 t/year
(2) Toluene	38,119 t/year
(3) Chromium and chromium (III) compounds	22,863 t/year
(4) Hydrogen fluoride and its water-soluble salts	12,711 t/year
(5) Xylene	7,757 t/year
(6) Ferric chloride	7,275 t/year
(7) N,N-Dimethylformamide	7,125 t/year

Transfer to sewers

(1) Formaldehyde	107 t/year
(2) Poly (oxyethylene) alkyl ether	103 t/year
(3) Triethylamine	54 t/year
(4) Boron compounds	44 t/year
(5) Hydrogen fluoride and its water-soluble salts	42 t/year
(6) 1,2-Epoxypropane (also known as propylene oxide)	38 t/year
(7) N,N-Dimethylformamide	37 t/year

Disposal by landfill from this business establishment

(1) Lead compounds	3,885 t/year
(2) Arsenic and its inorganic compounds	1,031 t/year
(3) Manganese and its compounds	925 t/year
(4) Antimony and its compounds	344 t/year
(5) Chromium and chromium (III) compound	120 t/year
(6) Nickel compounds	68 t/year
(7) Cadmium and its compounds	45 t/year

Public waters

(1) Boron compounds	2,495 t/year
(2) Hydrogen fluoride and its water-soluble salts	1,983 t/year
(3) Zinc compounds (water-soluble)	641 t/year
(4) Manganese and its compounds	608 t/year
(5) Thiourea	192 t/year
(6) Water-soluble copper salts (except complex salts)	119 t/year
(7) Poly (oxyethylene) alkyl ether	110 t/year

Made public through the PRTR system in 2020
(Report for FY2018 by business establishment)

TOPIC

The Tokyo Metropolitan Ordinance on Environmental Preservation to Secure the Health and Safety of Citizens of the Tokyo Metropolitan Area (Tokyo Metropolitan Ordinance on Environmental Preservation) (Enacted on December 22, 2000)

The Tokyo Metropolitan Ordinance on Environmental Preservation was enacted in connection with the complete revision of the Tokyo Metropolitan Pollution Control Ordinance.

With the primary objective of protecting the health of Tokyo metropolitan citizens, the ordinance prohibits operation of diesel vehicles that do not meet Tokyo's own emission standards, and provides for a global-warming control measure plan that calls for reductions in greenhouse gas emissions in order to hand down the environment in good condition to future generations. The ordinance also provides for appropriate management of hazardous chemical substances and imposes the obligation of dealing with soil pollution to ensure a safe living environment.

The Tokyo Metropolitan Government's Chemical Substance Control Measures

Appropriate management of chemical substances (reporting data on usage, etc.)	In order to control emissions of hazardous chemical substances, encourage voluntary control, and switch over to safer alternative substances, business establishments that handle more than 100 kg of any of the 59 chemical substances designated for appropriate management per year shall submit data on usage, emissions, and other related items to the Metropolitan Government each fiscal year.
Appropriate management of chemical substances (preparation of chemical substance management procedures)	In order to effectively prevent inadvertent release of hazardous chemical substances during handling as well as to ensure safety during accidents, business establishments that have at least 21 employees and that handle more than 100 kg of any of the 59 chemical substances designated for appropriate management per year shall prepare chemical substance management procedures that set forth the manufacturing processes of each chemical substance and handling methods befitting of the properties of each such substance, and then submit said procedures to the governor of Tokyo.

5. How to Use and Store Chemical Substances

Be sure to store chemical substances in appropriate chemical safes specialized for each substance to prevent such safes from toppling. Take earthquake-resistance measures to prevent safes from toppling.

Store hazardous materials and poisonous/deleterious chemical substances in accordance with the following standards.

(1) General notes on use and storage of chemical substances

(1) Be sure to wear a white lab coat or workwear and protective eyeglasses. Wear protective gloves and use a fume hood as necessary.

(2) Check the information on risks and hazards in the SDSs of the substances to be used.

(3) Store reagents in dedicated chemical safes and install equipment to prevent them from toppling. Also, install equipment inside the safes, such as dividers, to prevent reagents from tipping over during an earthquake.

Dividers for reagents

(2) Storage of hazardous substances

(1) Some combinations of hazardous materials may cause a fire if the materials become mixed or make contact with each other. For this reason, check the hazardous material categories specified on the labels attached to reagent containers, and then store the hazardous substances so as to prevent dangerous combinations. For a list of dangerous combinations of hazardous materials, see "Table of Combinations of Hazardous Substances in Mixed Storage (Rules for Mixed Storage Control; Attached Table 4)" below, and "Table of Dangerous Material Categories Stipulated by the Fire Service Act" (p. 17).

Example of a hazardous storage chemical combination when becoming mixed or making contact: acetic acid (Category 4) and perchloric acid (Category 6)

Table of Combinations of Hazardous Substances in Mixed Storage

(×: combinations that must not be stored together;
○: combinations that may be stored together)

	Category 1	Category 2	Category 3	Category 4	Category 5	Category 6
Category 1		×	×	×	×	○
Category 2	×		×	○	○	×
Category 3	×	×		○	×	×
Category 4	×	○	○		○	×
Category 5	×	○	×	○		×
Category 6	○	×	×	×	×	

(2) The permissible quantity of hazardous materials that can be stored in each fire-prevention compartment is stipulated in the Fire Service Act (p. 18) and the fire prevention ordinances of local governments. Do not store hazardous materials in quantities that exceed the permissible limits. Since the CRIS system can calculate the quantity stored, be sure to check the quantity of each hazardous material stored in each room on a regular basis.

(3) Storage of poisonous and deleterious substances

(1) Store poisonous and deleterious substances separately from general reagents in a solid safe that can be locked with a key in order to prevent substances from being stolen or lost. Use a safe that does not allow the content to be seen (safes with glass windows are inappropriate). Display a notice stating “Non-medicinal Poison (医薬用外毒物)” in white letters on a red background or “Non-medicinal Deleterious Substances (医薬用外劇物)” in red letters on a white background at the storage site.

Markings for poisonous and deleterious substances

医薬用外毒物
（赤地に白文字）

医薬用外劇物
（白地に赤文字）

(2) Store poisonous and deleterious substances together in one location in a room so as to manage the substances collectively.
(3) Treat hazardous materials that are poisonous or deleterious as such, and manage these substances together with other poisonous/deleterious substances. Certain combinations of hazardous materials may cause a fire. When storing substances, refer to Section (2) above with regard to hazardous materials.
(4) To prevent substances from leaking or being lost, do not carry poisonous or deleterious substances off campus. Do not transfer poisonous or deleterious substances from one campus to another.
(5) If a poisonous or deleterious substance is spilled, stolen, or lost, the incident must be reported immediately to a health center, police station, or fire station according to Article 16-2 of the Poisonous and Deleterious Substances Control Act. If such an incident occurs in a laboratory or other places, immediately notify the Environmental Safety Center (ex. 73-6202).
(6) After a poisonous substance is used, register the amount used in the CRIS without fail. Note that a poisonous substance cannot be deleted from the inventory until the remaining amount reaches 0 based on the amount of use registered. Keep records of the amounts used for deleterious substances, too (In FY2021, it will become possible to register amounts of deleterious substances used in the CRIS).
(7) At locations where poisonous substances are stored, persons in charge, such as academic instructors, must submit a written consent on the management of poisonous substances every year. Before using poisonous substances, be sure to thoroughly check the Rules on the Management of Poisonous Substances at Waseda University delivered together with the substances.

Table of Dangerous Material Categories Stipulated by the Fire Service Act

Category	Type	Characteristics	Substance names	Classification and examples	Specified quantity
Category 1	Oxidizing solids	Solids that react with flammable materials by releasing oxygen and may cause explosions	1. Chlorates 2. Perchlorates 3. Inorganic peroxides 4. Chlorites 5. Bromates 6. Nitrates 7. Iodates 8. Permanganates 9. Dichromates 10. Other substances specified by ordinances 11. Materials that contain one or more of the above	Class 1 oxidizing solids · Sodium chlorate · Sodium chlorite · Sodium bromate · Potassium permanganate	50 kg
				Class 2 oxidizing solids · Ammonium nitrite (granular form) · Bleaching powder (calcium hypochlorite)	300 kg
				Class 3 oxidizing solids · Potassium ammonium nitrate phosphate (fertilizer product) · Potassium dichromate · Sodium nitrate	1,000 kg
Category 2	Combustible solids	Solids that easily combust or ignite at low temperatures	1. Phosphorus sulfide 2. Red phosphorus 3. Sulfur	· Phosphorus sulfide · Red phosphorus · Sulfur	100 kg
			4. Iron powder	· Iron powder	500 kg
			5. Metal powder 6. Magnesium 7. Other substances specified by ordinances 8. Materials that contain one or more of the above	Class 1 combustible solids · Aluminum (200 mesh or finer) · Zinc (200 mesh or finer) · Magnesium (80 to 120 mesh)	100 kg
				Class 2 combustible solids	500 kg
			9. Flammable solids	· Solid alcohol	1,000 kg
Category 3	Spontaneously combustible substances and water-reactive substances	Substances that ignite upon contact with air or water	1. Potassium 2. Sodium 3. Alkylaluminum 4. Alkyllithium		10 kg
			5. Yellow phosphorus		20 kg
			6. Alkali metals (excluding K and Na), and alkali earth metals 7. Organometallic compounds (excluding alkylaluminum and alkyllithium) 8. Metal hydride 9. Metal phosphide 10. Calcium carbide or aluminum carbide 11. Other substances specified by ordinances 12. Materials that contain one or more of the above	Class 1 spontaneously combustible substances and water-reactive substances · Lithium (powder)	10 kg
				Class 2 spontaneously combustible substances and water-reactive substances · Lithium hydride · Sodium hydride	50 kg
				Class 3 spontaneously combustible substances and water-reactive substances · Sodium borohydride	300 kg
Category 4	Inflammable liquids	Liquids that ignite easily	Special inflammable substances	· Diethyl ether	50L
			Class 4 petroleum No. 1	Water-insoluble liquids · Gasoline · Toluene · Ethyl acetate	200L
				Water-soluble liquids · Acetone	400L
			Alcohols	· Ethanol	400L
			Class 4 petroleum No. 2	Water-insoluble liquids · Xylene · Kerosene · Diesel oil	1,000L
				Water-soluble liquids · Acetic acid	2,000L
			Class 4 petroleum No. 3	Water-insoluble liquids · Aniline · Heavy oil	2,000L
				Water-soluble liquids · Ethylene glycol	4,000L
			Class 4 petroleum No. 4	· Gear oil	6,000L
			Animal and plant oils	· Olive oil	10,000L
Category 5	Self-reactive substances	Substances that may ignite, combust, or explode upon exposure to heat or shock	1. Organic peroxides 2. Nitric acid esters 3. Nitro compounds 4. Nitroso compounds 5. Azo compounds 6. Diazo compounds 7. Hydrazine derivatives 8. Hydroxylamine 9. Hydroxylamine salts 10. Other substances specified by ordinances 11. Materials that contain one or more of the above	Class 1 self-reactive substances · Picric acid · Nitroglycerine · Trinitrotoluene	10 kg
				Class 2 self-reactive substances · Hydroxylamine sulfate · 2,4-Dinitrophenol	100 kg
Category 6	Oxidizing liquids	Liquids that react with flammable materials and may facilitate combustion	1. Perchloric acid 2. Hydrogen peroxide 3. Nitric acid 4. Other substances specified by ordinances 5. Materials that contain one or more of the above	· Perchloric acid (60%) · Hydrogen peroxide (60%) · Nitric acid	300 kg

TOPIC

Poisonous and Deleterious Substances Control Act **(Enacted on December 28, 1950)**

This law was enacted in order to exercise necessary control over poisonous and deleterious substances for the purposes of health and hygiene. Specifically, the law pertains to registration and qualifications related to the manufacture, marketing, and handling of poisonous and deleterious substances; requirements on their labeling and disposal; and technical standards concerning the transport, storage, and handling of such substances.

Poisonous and deleterious substances are very useful in industry, research, and daily life. However, a mistake in using such substances may result in a disastrous accident or event. In the past, there have been many crimes using poisonous and deleterious substances, such as arsenous acid and sodium azide.If you possess or use a poisonous or deleterious substance, you must strictly manage it under your responsibility and work to prevent it from being stolen or lost.

Do not put poisonous or deleterious substances in food or drink containers.

(Article 11, Paragraph 4 of the Poisonous and Deleterious Substances Control Act)

For research purposes, we often transfer compounds and byproducts from dedicated containers to other vessels for storage. However, never use food or drink containers to store chemicals. Putting a poisonous or deleterious substance in a food container or drink bottle is prohibited by law. Exercise due care to avoid unintentionally causing an accident.

TOPIC

Fire Service Act **(Enacted on July 24, 1948)**

This law was enacted in order to prevent and control fires; to protect people's lives, bodies, and property from fires; and to alleviate damage from fires, earthquakes, and other natural disasters.

The law regulates the handling of hazardous materials as well as provides procedures and standards on the installation of hazardous material manufacturing plants, storehouses, and handling sites. This law applies to facilities and equipment used for storing or handling regulated hazardous materials in quantities exceeding their respective specified limits. Facilities and equipment for storing or handling regulated hazardous materials in quantities less than the specified maximum quantities are regulated by local government fire prevention ordinances.

What do "Specified quantity" and "Factor" mean?

"Specified quantity" refers to the allowable quantities of each hazardous material established by law, with due consideration given to the degree of hazard; the upper limit on storage of a hazardous material in a laboratory is indicated in terms of a "factor." Factors of less than 0.2 can be applied per fire-prevention compartment in a room of standard construction, and less than 1.0 for a room that has been approved as a location that is suitable for storing and handling small amounts of hazardous materials. The factor value is calculated as follows:

- If storing or handling multiple quantities of the same chemical substance in the same location, a factor of 1 or more indicates that the place is considered to be a storage facility for hazardous materials, and permission is required.

$$\frac{\text{Quantity of hazardous materials stored or handled}}{\text{Specified quantity}} = \text{Factor value}$$

- If storing or handling multiple quantities of different chemical substances in the same location, a factor of 1 or more indicates that hazardous materials are being stored at the location in quantities exceeding what has been specified.

$$\frac{\text{Quantity of hazardous material A stored}}{\text{Specified quantity of hazardous material A}} + \frac{\text{Quantity of hazardous material B stored}}{\text{Specified quantity of hazardous material B}} + \frac{\text{Quantity of hazardous material C stored}}{\text{Specified quantity of hazardous material C}} = \text{Factor value}$$

6. Purchasing Dry Ice and Liquid Nitrogen (at the Nishi-Waseda Campus)

(1) Chemical Shop location and operating hours

(a) Location: Room 15 (first floor) of Building No. 60
(b) Operating hours: Monday–Friday, 9:30–17:00
(c) Contact info: Extension No.: 73–6214

(2) Purchasing dry ice

You can purchase dry ice at the Chemical Shop (Room 15 on the 1st floor of Building No. 60) counter in 500-gram increments, but you cannot pay for dry ice in cash. If you want to purchase dry ice, place an order with the Chemical Shop (during acceptance hours from 9:00 to 15:30) by the day before the day you need it.
On Saturdays, only self service is available. If you want to purchase dry ice on a Saturday, you need to place an order by 15:30 on the Thursday of that week. Please contact the Chemical Shop for more information.

(3) Supply of liquid nitrogen

(1) **Location:** Liquid nitrogen supply facility on the north side of Building No. 56
(2) **Supply hours:** Monday–Saturday, 9:00–10:10, 10:40–11:50, and 14:40–16:00
(3) **Supply-operations training course:** Only students and faculty members who have attended a liquid nitrogen supply-operations training course given by the Center and are registered as "liquid nitrogen supply workers" may obtain their own supplies of liquid nitrogen. Apply for the supply-operations training course at the Chemical Shop (Room 15 on the 1st floor of Building No. 60).

No.

液体窒素供給受領書［ｹﾐｶﾙｼｮｯﾌﾟ控え］

寿産業 株式会社
電話 03（5735）4311（代）

日付：　年　月　日　時　分

学部・機関	学　科	研究室・実験室	電　話

供給担当者	液面計値	圧力計値	供給量（Kg）

＊配管冷却分として、供給一回につき一律１リットル加算して請求致します

Receipt of Liquid Nitrogen
Fill out a Receipt of Liquid Nitrogen every time you receive a supply of liquid nitrogen, and place the form in the postbox.
This form comes in duplicate; the second copy is a delivery slip that should be retained at the laboratory.

Note: Neither liquid nitrogen nor dry ice can be used on Saturdays during the summer and winter vacation periods.

(4) Billing and payment

Bills for monthly charges are prepared at the end of each month and sent to the relevant laboratories and offices at the start of the following month.

Important Notes on the Characteristics of Liquid Nitrogen

Liquid nitrogen is dangerous and hazardous because it is a simple asphyxiant and an extremely cold substance. This substance functions as asphyxiant when it is in a gaseous state, while it is extremely cold when it is in a liquid state; however, liquid nitrogen that has just been evaporated is also extremely cold, so caution must be exercised. Read the following instructions on the handling process from filling through to use, and attend a liquid nitrogen supply-operations training course.

Filling a Dewar flask with liquid nitrogen

*When using a liquid gas container (LGC), follow the instructions in the manufacturer's manual.

- Do not allow low-temperature liquid nitrogen to make contact with your skin. Wear safety goggles, dry extreme-cold-temperature-proof gloves, and protective clothing.
- When filling a normal temperature Dewar flask with liquid nitrogen, fill it slowly to avoid splashing and prevent thermal shock. To prevent frostbite, remove any articles of clothing when liquid nitrogen has splashed.
- Open the Dewar flask to the air to prevent released nitrogen gas from settling at the flask.
- Handle new glass Dewar flasks carefully because they are fragile.
  (As a container for liquid nitrogen, use a stable Dewar flask as shown below. Do not directly fill small glass Dewar flasks or other vessels with liquid nitrogen from a storage tank.)

Transfer, use, and storage

Temperature of liquid nitrogen: –196°C

- Do not allow low-temperature liquid nitrogen to make contact with your skin. Wear safety goggles, dry extreme-cold-temperature-proof gloves, and protective clothing. If liquid nitrogen does make contact with the skin, warm the skin gradually using cold water. If the skin blisters or liquid nitrogen gets in the eyes, seek immediate medical attention.
- Check Dewar flasks periodically to determine whether the opening parts have been clogged due to water in the air becoming frozen.
- Exercise great caution in handling liquid nitrogen because the volume of evaporated liquid nitrogen increases to about 700 times the original volume. When using liquid nitrogen with your own instrument setup, ensure the setup has a structure that will not be destroyed by the pressure generated by the gasified nitrogen.
- When using an elevator to transport liquid nitrogen, do not ride in the elevator with other people.
- Do not confine liquid nitrogen in an airtight or poorly ventilated place, because when liquid nitrogen evaporates, the concentration of oxygen in the air decreases. Measure the oxygen concentration to manage it so that the oxygen concentration does not drop below 18 v/v%.
- Materials that may appropriately come into direct contact with liquid nitrogen include austenite stainless steel, 9% nickel steel, copper, copper-silicon alloy, aluminum, monel, and some types of brass. Be careful; note that some materials, such as carbon steel, decrease in toughness, deteriorate, or may become brittle at a temperature as low as that of liquid nitrogen.

Dewar flask

Supplying liquid nitrogen at a training course

STEP 2 Use of Chemical Substances

1. Working Environment Measurement

At Waseda University, through the Safety and Health Committee at each campus, we conduct ongoing measurements of working environments to check for organic solvents specified in the Industrial Safety and Health Act, specified chemical substances, and metals in order to ascertain the indoor environment conditions in laboratories that use toxic substances.

(1) What is working environment measurement?

"Working environment measurement" refers to measurement of air quality and so on performed in order to identify the levels of toxic substances present in laboratories. The purpose of working environment measurement is to ensure that laboratory technicians handling chemical substances are able to conduct experiments without any health risks.
"Working environment measurement" is defined by Japan's Industrial Safety and Health Act. Article 2 states that "'Working environment measurement' shall be defined as measurement design, sampling and analysis (including analytical research) carried out on the atmospheric environment and other working environments in order to grasp the actual conditions of the working environment." In addition, Article 65 states that "The employer shall, as provided for by the Ordinance of the Ministry of Health, Labour and Welfare, conduct necessary working environment measurement in respect to the indoor and other workplaces prescribed by Cabinet Order as harmful work operations are performed, and keep the record of the results."
Waseda University has established Safety and Health Provisions based on the content of the Industrial Safety and Health Act. One objective of these provisions is to "promote the creation of safe educational and research environments for students." Waseda University policy prioritizes the safety of students and faculty members.

(2) What are organic solvents and specified chemical substances?

There are laws and ordinances that determine what is covered by working environment measurement. Currently, our working environment measurement covers the organic solvents (Classes 1 and 2), specified chemical substances, and metals listed on the next page.

(3) Specific measurement methods

About 230 rooms have been registered in Waseda University's Chemical Registration Information System (CRIS) as storage places for organic solvents and specified chemical substances. We subject some of the rooms where organic solvents, specified chemical substances, or metals are handled in excess of certain levels to working environment measurement. (Rooms used only for storage are not subjected to this measurement).

The following two measurement methods are available:

- A sampling (used at sampling points ① to ⑥ on the figure on the right)
  Divide the laboratory into equal-sized squares on a grid so that each side is no more than 6 meters. Take measurements at five or more locations for at least 10 minutes at each location. (In this way, representative conditions can be measured.)
- B sampling (used at sampling point Ⓑ on the figure on the right)
  Take measurements for 10 minutes at the location where the concentration levels in the environmental atmosphere are considered to be at the maximum level. (This is to supplement Method of A sampling.)

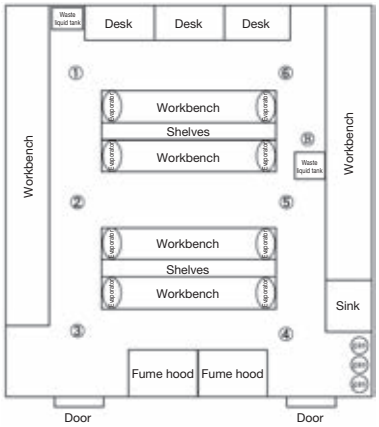


Figure 1. Example of setting sampling points for working environment measurement

Figure 2. Working environment measurement (1)

Figure 3. Working environment measurement (2)

The results of the aforementioned measurements are categorized into the following control classes:
Control Class 1: The management of the working environment is proper.
Control Class 2: The management of the working environment has room for improvement.
Control Class 3: The management of the working environment is improper.

If a result falls under Control Class 3, more thorough measures are necessary to reduce the concentration levels in the atmosphere. Such measures may include (1) carrying out column processes and synthesis reactions in a fume hood or (2) closing the lid of the waste liquid tank when it is not in use. In particular, chloroform, formaldehyde, and other substances for which lower administrative levels have been set may reach their respective administrative levels even if they are present in small amounts, and thus require more caution than acetone or ether to avoid release or dispersion into the atmosphere.

Today, an increasing number of both private and public universities in Japan have started to conduct working environment measurement (with some outsourcing it to contractors and others having organizations within the university carry it out). At Waseda University, the Environmental Safety Center is responsible for working environment measurement. We will visit your

List of Organic Solvents and Specified Chemical Substances

As of December 2018

Organic Solvents		
Class	Substance name	Administrative level
Class 1 organic solvents	1,2-Dichloroethylene (acetylene dichloride)	150 ppm
	Carbon disulfide	1 ppm
Class 2 organic solvents	Acetone	500 ppm
	Isobutyl alcohol	50 ppm
	Isopropyl alcohol	200 ppm
	Isopentyl alcohol (isoamyl alcohol)	100 ppm
	Ethyl ether	400 ppm
	Ethylene glycol monoethyl ether (cellosolve)	5 ppm
	Ethylene glycol monoethyl ether acetate (cellosolve acetate)	5 ppm
	Ethylene glycol mono-n-butyl ether (butyl cellosolve)	25 ppm
	Ethylene glycol monomethyl ether (methyl cellosolve)	0.1 ppm
	o-Dichlorobenzene	25 ppm
	Xylene	50 ppm
	Cresol	5 ppm
	Chlorobenzene	10 ppm
	Isobutyl acetate	150 ppm
	Isopropyl acetate	100 ppm
	Isopentyl acetate (Isoamyl acetate)	50 ppm
	Ethyl acetate	200 ppm
	n-Butyl acetate	150 ppm
	n-Propyl acetate	200 ppm
	n-Pentyl acetate (n-amyl acetate)	50 ppm
	Methyl acetate	200 ppm
	Cyclohexanol	25 ppm
	Cyclohexanone	20 ppm
	N,N-Dimethylformamide	10 ppm
	Tetrahydrofuran	50 ppm
	1,1,1-Trichloroethane	200 ppm
	Toluene	20 ppm
	Normal hexane	40 ppm
	1-Butanol	25 ppm
	2-Butanol	100 ppm
	Methanol	200 ppm
	Methyl ethyl ketone	200 ppm
	Methylcyclohexanol	50 ppm
	Methylcyclohexanone	50 ppm
	Methyl-n-butyl ketone	5 ppm

Specified Chemical Substances		
Class	Substance name	Administrative level
Class 1 substances	Dichlorobenzidine and its salts	—
	a-Naphthylamine and its salts	—
	Polychlorinated biphenyl (PCB)	0.01 mg/m³
	o-Tolidine and its salts	—
	Dianisidine and its salts	—
	Beryllium and its compounds	0.001 mg/m³ (as Be)
	Benzotrichloride	0.05 ppm
Class 2 substances	Alkyl mercury compounds (limited to compounds with a methyl group or ethyl group)	0.01 mg/m³ (as Hg)
	Indium compounds	—
	o-Phthalodinitrile	0.01 mg/m³
	Cadmium and its compounds	0.05 mg/m³ (as Cd)
	Chromic acid and its salts	0.05 mg/m³ (as Cr)
	Vanadium pentoxide	0.03 mg/m³ (as V)
	Cobalt and its inorganic compounds	0.02 mg/m³

Specified Chemical Substances		
Class	Substance name	Administrative level
Class 2 substances	Coal tar	0.2 mg/m³ (as benzene-soluble fraction)
	Diantimony trioxide	0.1 mg/m³ (as antimony)
	Potassium cyanide	3 mg/m³ (as cyanide)
	Sodium cyanide	3 mg/m³ (as cyanide)
	Dichromic acid and its salts	0.05 mg/m³ (as Cr)
	Mercury and its inorganic compounds (excluding HgS)	0.025 mg/m³ (as Hg)
	Nickel compounds (limited to compounds in powder form except for nickel carbonyl)	0.1 mg/m³ (as Ni)
	Nitroglycol	0.05 ppm
	Arsenic and its compounds (excluding arsine and gallium arsenide)	0.003 mg/m³ (as As)
	Pentachlorophenol (PCP) and its sodium salts	0.5 mg/m³ (as PCP)
	Manganese and its compounds (excluding MnO and Mn_2O_3)	0.2 mg/m³ (as Mn)
	Refractory ceramic fiber	0.3 × 5 μm or larger fibers/m³
	Auramine	—
	Magenta	—
Class 2 specified chemical substances	Acrylamide	0.1 mg/m³
	Acrylonitrile	2 ppm
	Ethyleneimine	0.05 ppm
	Ethylene oxide	1 ppm
	Vinyl chloride	2 ppm
	Chlorine	0.5 ppm
	Chloromethyl methyl ether	—
	Propylene oxide	2 ppm
	Hydrogen cyanide	3 ppm
	3,3'-dichloro-4,4'-diaminodiphenylmethane	0.005 mg/m³
	Dimethyl 2,2-dichlorovinyl phosphate (DDVP)	0.1 mg/m³
	1,1-Dimethylhydrazine	0.01 ppm
	Methyl bromide	1 ppm
	Tolylene diisocyanate	0.005 ppm
	Naphthalene	10 ppm
	Nickel carbonyl	0.001 ppm
	p-Dimethylaminoazobenzene	—
	p-Nitrochlorobenzene	0.6 mg/m³
	Hydrogen fluoride (hydrofluoric acid)	0.5 ppm
	beta-Propiolactone	0.5 ppm
	Benzene	1 ppm
	Formaldehyde	0.1 ppm
	Methyl iodide	2 ppm
	Hydrogen sulfide	1 ppm
	Dimethyl sulfate	0.1 ppm
★Special organic solvents	Ethylbenzene	20 ppm
	Chloroform	3 ppm
	Carbon tetrachloride	5 ppm
	1,4-Dioxane	10 ppm
	1,2-Dichloroethane (ethylene dichloride)	10 ppm
	1,2-Dichloropropane	1 ppm
	Dichloromethane (methylene dichloride)	50 ppm
	Styrene	20 ppm
	1,1,2,2-Tetrachloroethane (acetylene tetrachloride)	1 ppm
	Tetrachloroethylene (perchloroethylene)	50 ppm
	Trichloroethylene	10 ppm
	Methyl isobutyl ketone	20 ppm

Note: Administrative levels are used as indices to evaluate the results of working environment measurement; they are prescribed in the "Working Environment Evaluation Standards." More caution should be given to substances with lower administrative levels in order to prevent them from being released into the atmosphere and dispersing.

★ In particular, potentially carcinogenic substances are categorized as special organic solvents. In workplaces where these substances are handled, it is necessary to keep work records of those who work there on a regular basis, maintain records of their health checkup results for 30 years, and post a notice indicating the hazards and other information on those substances (Article 38-4 of the Ordinance on Prevention of Hazards Due to Specified Chemical Substances).

2. Sinks (Washing Facilities)

Sinks used to wash laboratory instruments differ from residential sinks and general sinks used to wash tableware at universities and elsewhere; laboratory sinks fall under the category of **specified facilities** regulated by the Water Pollution Control Act and the Sewerage Act. (Fume hoods with scrubber equipment are also in this category.)
Everyone who uses chemical substances and conducts educational research activities must observe the water quality standards (p. 47) in the Water Pollution Control Act and Sewerage Act (and the Tokyo Metropolitan Sewerage Ordinance) and work to prevent hazardous substances from being discharged into the sewage system and public waters.

Discharge of wastewater that does not meet the water quality standards will not only destroy drainage pipes by corrosion, degrade neutralization and other decontamination facilities, and produce offensive odors, but may also generate toxic gas.
If an on-site inspection by a regulatory agency or local government official finds that wastewater you have discharged does not meet the standards, **you will be ordered to temporarily stop discharging wastewater or may even be subject to penalties.**

For these reasons, we request that you wash laboratory instruments, bottles, and other items used in laboratories and experimentation facilities in accordance with the washing rules (p. 24) in order to preserve the quality of water and maintain facilities so as to ensure that the quality of wastewater discharged from sinks and other locations is maintained at the proper level.

TOPIC

Specified facilities:
Specified facilities are facilities specifically designated as requiring water quality control under the Water Pollution Control Act. At universities and affiliated research laboratories, such facilities include washing and quenching facilities. If you want to install a specified facility, you must notify the prefectural governor in advance of the type and structure of facility, the volume and quality of wastewater, and the method of treating wastewater.

Water Pollution Control Act:
This law defines emission controls for wastewater discharged mainly from factory and business establishments into public waters (controlled by the Ministry of the Environment). The law requires business operators to report any installation of or alteration to specified facilities, comply with the standards on the quality of effluent (effluent standards), measure the quality of wastewater being discharged, and inspect facilities to ensure effective prevention of ground water contamination.

Sewerage Act:
The primary purpose of this law is to promote construction of sewage systems for preserving the water quality of public waters. It provides for control of sewage from factories and business establishments equipped with specified facilities (controlled by Ministry of Land, Infrastructure, Transport and Tourism). The law requires business operators to report any installation of or alteration to specified facilities, comply with the standards on the quality of sewage, measure the contamination of effluent being discharged, and accept on-site inspections.

Tokyo Metropolitan Sewerage Ordinance (for the 23 special wards):
This ordinance provides regulations on the management and use of public sewage systems installed in the 23 special wards of Tokyo; it applies more stringent emission standards in addition to the concentrations prescribed by the Sewerage Act. The ordinance also defines rules on selection of water quality management supervisors and on guidelines for pretreatment facility installations.

3. Rules for Washing Laboratory Instruments after the Use of Chemical Substances

Chemical substances left after the experiments must be disposed of in prescribed containers according to the rules for the sorted collection of laboratory wastes (p. 25). Washing an instrument tainted by even tiny amounts of chemicals in a sink runs the risk of draining wastewater from the sink that excessing the water-quality standards as mentioned on page 23.(1) What is working environment measurement?

Do not wash instruments directly in the sink (washing facility) like this!

Wash instruments and chemical bottles with tap water or an appropriate organic solution (e.g., alcohol and acetone in a washing bottle), and put the liquid in a waste liquid container before washing in a sink or washing machine.

(1) As a general rule, laboratory instruments tainted by substances which has a water quality standard under laws and regulations must be rinsed **at least three times**, and such liquid (together with the washing liquid) must be poured into a waste liquid container before washing the instruments in a sink. Any liquid used for rinsing must also be poured into a wastewater container.

(2) Laboratory instruments tainted by other chemical substances must be rinsed **at least twice**, and such liquid (together with the washing liquid) must be poured into a waste liquid container before washing the instruments in a sink.

The quantity of water or solution used per rinsing should be roughly 1/50 of the instrument's capacity.
However, you may determine the quantity of rinsing water/solution and number of times to rinse at your own discretion based on the degree of staining.

Place a washing bottle in your laboratory. Most substances can be washed by following four ingredients: water, ethanol, acetone, and hexane.

The Environmental Safety Center analyzes the quality of sewage every month except for February and August.

STEP 3 Handling of Laboratory Waste

1. Laboratory Waste Disposal Procedure

Experiment and research activities using chemical substances not only produce desired data and products, but also generate waste liquid and solid waste. These waste liquids and other waste often contain hazardous substances, and therefore must be properly treated in accordance with the law. At Waseda University, waste liquids and other waste are sorted by category before being collected and managed as laboratory waste. Waseda outsources the disposal of laboratory waste that has been sorted and collected to external waste management service, with due consideration given to such waste's properties. Everyone who produce laboratory waste must treat the waste properly based on an understanding of the processes from generation of waste through to final disposal.
In conducting research and experiments, each experimenter who handles chemical substances must be well aware of his or her duties and responsibilities in order to properly treat waste.

We request that experimenters take particular note of the following two points to collect laboratory waste:

- Sort and collect waste in accordance with the University's rules.
- Record the quantities of chemical substances in the waste.

Details of the collection procedure are provided on page 27 and thereafter. You must first understand the laboratory waste disposal procedure:

- Waste that falls under a collection category
  (Waste collection in dedicated containers lent out by the Center)

(1) Request containers.
↓
(2) Receive a set of containers and disposal request/chemical management forms.
↓
(3) Sort and collect waste into containers, and prepare disposal request/chemical management forms.
↓
(4) Carry the waste containers to the Center and submit thedisposal request/chemical management form.
↓
Waste disposal is outsourced to external waste management services.

- Waste that does not fall under a collection category
  (e.g., unnecessary chemicals, manometers)

(1) Prepare a disposal request.
↓
(2) Prepare various lists.
↓
(3) Carry the waste to the Center and submit the disposal request. (If the quantity of waste is large, give the Center advance notice.)
↓
Waste disposal is outsourced to external waste management services.



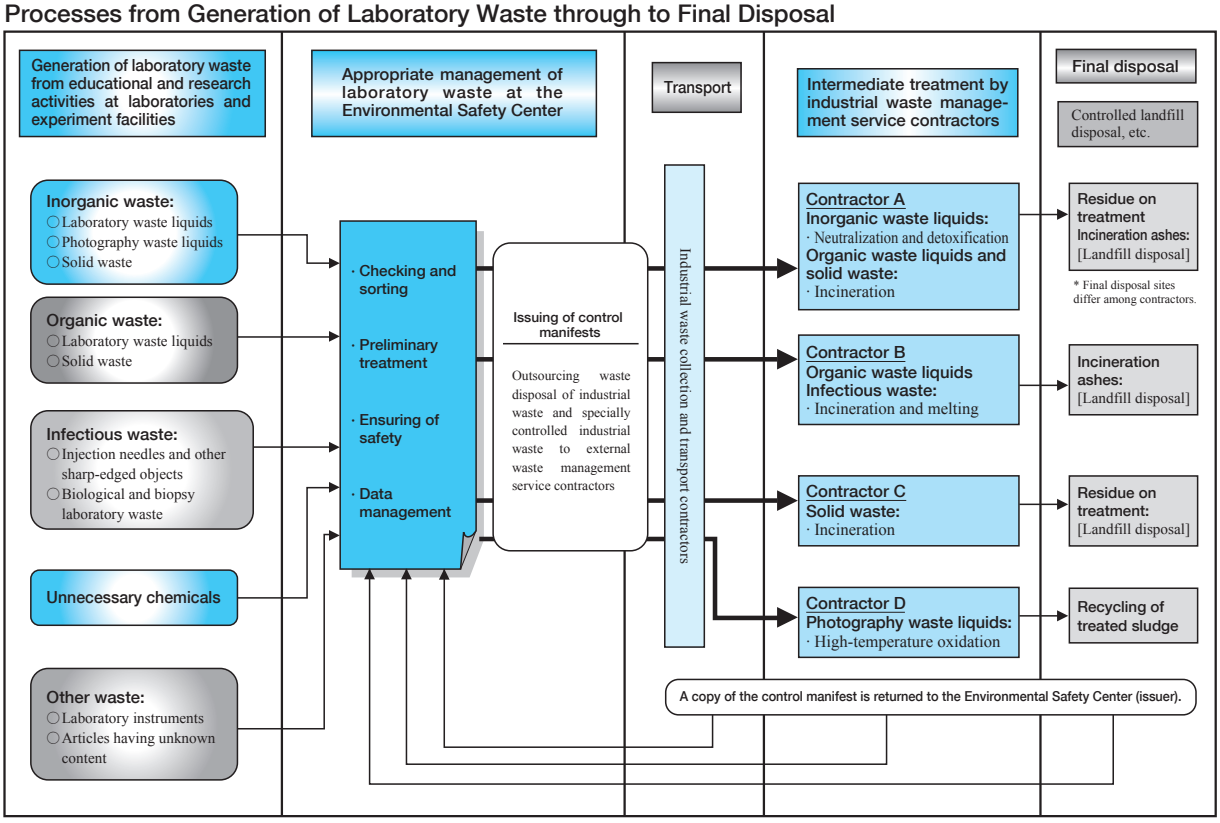
TOPIC

Waste Management and Public Cleansing Act **(Enacted on December 25, 1970)**

Education, research, and experimentation activities that use chemical substances (chemicals) generate various kinds of waste. Such waste includes explosive and toxic substances; thus, it should be handled with extreme care as a matter of course. The Waste Management and Public Cleansing Act classifies most laboratory waste as specially controlled industrial waste and requires that producers of such waste dispose of it in a manner that prevents damage to human health and living environments, or to outsource proper disposal of it to contractors authorized to perform industrial waste management services.

At Waseda University, we have been outsourcing disposal of such waste to external waste management service since 2001 (and since 1989 for organic laboratory waste). The law requires us to issue a control manifest for industrial waste in order to track the disposal process and ensure that waste is transported, intermediately treated, and finally disposed of exactly as agreed upon under an outsourcing agreement. Most waste generated at Waseda is brought into the Environmental Safety Center, where we examine its properties according to the information on the relevant Laboratory Waste Disposal Request/Chemical Management Form (実験系廃棄物処理依頼伝票 兼 化学物質管理票), issue a control manifest, and then outsource disposal of the waste to a waste management service. Therefore, failure to fill in detailed descriptions of the chemical substances contained in waste will delay processing of said waste. In recent years, accidents have occurred due to failures to provide sufficient information to waste management service. You are therefore strongly urged to fulfill your responsibility to provide adequate information on waste.

Processes from Generation of Laboratory Waste through to Final Disposal



Why should waste be sorted before collection?

University laboratories conduct diverse types of research, and even a single laboratory may handle completely different types of chemical substances. In theory, we should provide different collection containers for each type of chemical substance used for each research theme. However, this is difficult in practice due to the limited space available in the laboratories. For the sake of convenience, we therefore direct laboratory personnel to perform sorted collection of waste. We sort all waste into a total of 28 categories, including 11 categories of inorganic waste liquids, 8 categories of organic waste liquids, and other categories such as solid waste. We do this to prevent undesired side reactions after waste has been put into collection containers as well as to ensure safety in the laboratories. These rules are also intended to make it easier to render waste harmless. Experimenters must take responsibility for and be aware of how to properly sort waste before collection.

2. Procedure for Collecting Laboratory Waste and Requesting Disposal Thereof

The procedure for requesting disposal of laboratory waste at the Nishi-Waseda Campus is described below. Regarding the procedures for receiving collection containers and bringing in waste at other campuses, follow the instructions given by one of the appropriate offices listed on page 49. The rules on sorted collection waste categories and documents to be submitted are the same across the university.

[Acceptance Hours]

Monday to Friday (based on the university calendar)
[Mornings] 9:00 to 12:30* [Afternoons] 13:30 to 17:00*

Note: If you bring laboratory waste directly to the Center, visit the Center at least 30 minutes before the end of the acceptance period because it must be checked before submitting.

(1) Requesting and receiving laboratory waste collection containers

Laboratory waste collection containers may be lent out. Anyone who wishes to borrow such a container should submit a request in accordance with the following procedure.

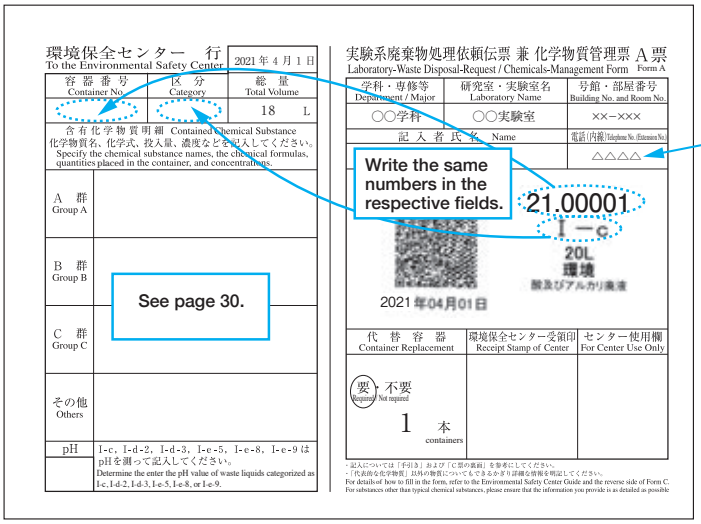
Depending on the type of container and/or quantity of waste, sufficient collection containers may not be available. Therefore, be sure to request containers in advance.

1) When you first request a certain type of container:

File a request with the Center after determining the container category and number of containers needed (make a request for containers at the Center office or by phone).

2) If you repeatedly request the same type of container:

If you need the same type of container on an ongoing basis, circle “Required (要)” in the Container Replacement (代替容器) column of the Laboratory Waste Disposal Request/Chemical Management Form (実験系廃棄物処理依頼伝票兼 化学物質管理票) and state the number of containers needed.

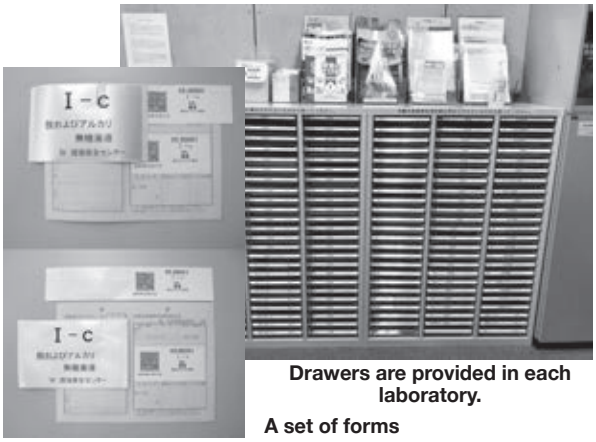


- See pages 29 and 30 for details about how to fill out the form.
- The container number and category should match those shown on the attached barcode label.
- At the Nishi-Waseda Campus, circle “Required (要)” or “Not required (不要)” in the Container Replacement (代替容器) column.

3) Receiving collection containers and affixing barcode labels

Receive a set of forms* from the drawers at the Center’s reception counter. Take the appropriate collection container from among the containers in the corridor in front of the Center and affix a category seal and barcode label to each container.

* This set of forms consists of a Laboratory Waste Disposal Request/Chemical Management Form, a category seal, and a barcode label.



Drawers are provided in each laboratory.

A set of forms

Affix a category seal and barcode label to each container promptly after receiving it. (Do not lose category seals and barcode labels.)

(2) Sorted collection of waste liquids and other waste

Collect waste liquids and other waste in the designated collection containers in accordance with the classification tables and sorted collection flowchart. The permitted quantity of waste liquids to be put into a single container must not exceed 80 percent of the container's capacity. In addition, be sure that the amount of solid waste in a single collection container does not weigh more than 15 kg. Be careful not to stain the barcode label on the collection container with waste liquid. For details, see "Section 3. Sorted Waste Collection Procedure."

Because the PRTR system and the Tokyo Metropolitan Ordinance on Environmental Preservation (pages 14 and 15) require us to determine the quantity of chemical substances contained in waste, be sure to state the name and quantity of all chemical substances placed in containers on a Laboratory Waste Disposal Request/Chemical Management Form (see the examples given on pages 30).

(3) Bringing waste to the Center

With some exceptions, when you bring a waste liquid or other waste to the Center, you must submit a Laboratory Waste Disposal Request/Chemical Management Form (実験系廃棄物処理依頼伝票 兼 化学物質管理票) or a Disposal Request (処理依頼書). If you will bring a large quantity of waste to the Center, check with us in advance.

1) Preparing a Laboratory Waste Disposal Request

Fill out a Laboratory Waste Disposal Request/Chemical Management Form and, in the Chemical Substances Contained column, state the names, concentrations, and quantities of chemical substances entered by the experimenter.

2) Bringing waste to the Center

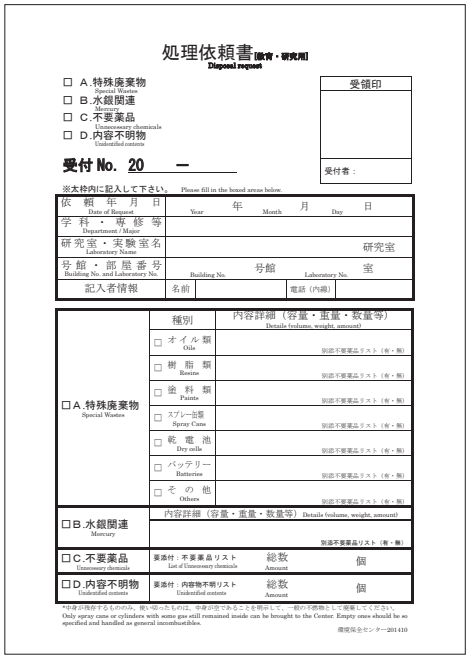
In order to avoid storing waste for a long period of time, bring it to the Center together with a Laboratory Waste Disposal Request/Chemical Management Form within roughly 6 months since generation. In order to prevent accidents, if brining multiple containers, we request that you have several people carry each container. **If the container of waste is dirty, wipe the dirt off it before bringing it to the Center.**

For the sake of safety during transport, the staff collect waste container at some laboratories and experimentation facilities specially designated by the Center. In such a case, you should put the completed Laboratory Waste Disposal Request/Chemical Management Form and the collection container(s) in front of each room. Be sure to fill in the Laboratory Waste Disposal Request/Chemical Management Form completely and correctly. Errors or omissions in the form may prevent waste from being collected. Please be advised that, depending on the timing of collection, delays may occur in obtaining container replacements.

After the Center accepts waste you have brought in, Form B will be returned to your laboratory. Store this form at your laboratory for 5 years.

3) Waste that does not fall into a sorted collection waste category

Bring directly to the Center any waste that does not fall into any sorted collection waste category, together with a completed Disposal Request (処理依頼書). For details, see "Section 4. Procedure for Requesting Disposal of Unnecessary Chemicals" and "Section 5. Handling of Laboratory Waste Not in a Sorted Collection Category" on page 40 and thereafter. For more information, contact the Center.



処理依頼書[教育・研究用]
Disposal request

□ A.特殊廃棄物 Special Wastes
□ B.水銀関連 Mercury
□ C.不要薬品 Unnecessary chemicals
□ D.内容不明物 Unidentified contents

受領印

受付 No. 20 —

受付者：

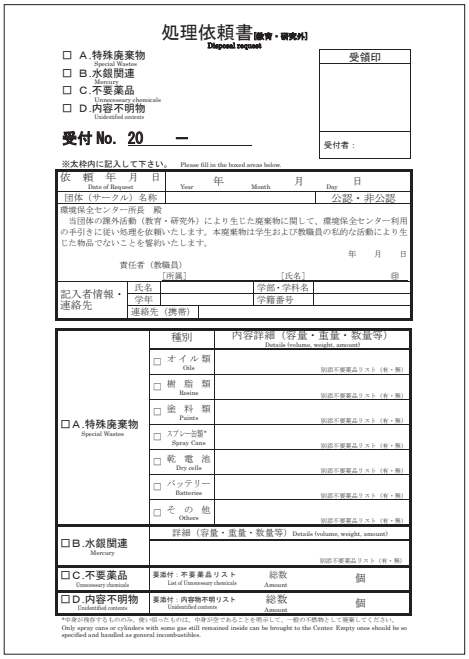
※太枠内に記入して下さい。 Please fill in the boxed areas below.

依頼年月日 Date of Request	年 Year 月 Month 日 Day
学科・専修等 Department / Major	
研究室・実験室名 Laboratory Name	研究室
号館・部屋番号 Building No. and Laboratory No.	号館 Building No. 室 Laboratory No.
記入者情報	名前 電話（内線）

	種別	内容詳細（容量・重量・数量等） Details (volume, weight, amount)
□A.特殊廃棄物 Special Wastes	□ オイル類 Oils	別添不要薬品リスト（有・無）
	□ 樹脂類 Resins	別添不要薬品リスト（有・無）
	□ 塗料類 Paints	別添不要薬品リスト（有・無）
	□ スプレー缶等 Spray Cans	別添不要薬品リスト（有・無）
	□ 乾電池 Dry cells	別添不要薬品リスト（有・無）
	□ バッテリー Batteries	別添不要薬品リスト（有・無）
	□ その他 Others	別添不要薬品リスト（有・無）
□B.水銀関連 Mercury	内容詳細（容量・重量・数量等） Details (volume, weight, amount)	別添不要薬品リスト（有・無）
□C.不要薬品 Unnecessary chemicals	薬品付：不要薬品リスト List of Unnecessary chemicals	総数 Amount 個
□D.内容不明物 Unidentified contents	要添付：内容物不明リスト Unidentified contents	総数 Amount 個

*中身が残存するもののみ、使い切ったものは、中身が空であることを明示して、一般の不燃物として廃棄してください。
Only spray cans or cylinders with some gas still remained inside can be brought to the Center. Empty ones should be so specified and handled as general incombustibles.

環境保全センター201410



処理依頼書[教育・研究外]
Disposal request

□ A.特殊廃棄物 Special Wastes
□ B.水銀関連 Mercury
□ C.不要薬品 Unnecessary chemicals
□ D.内容不明物 Unidentified contents

受領印

受付者：

受付 No. 20 —

※太枠内に記入して下さい。 Please fill in the boxed areas below.

依頼年月日 Date of Request	年 Year 月 Month 日 Day
団体（サークル）名称	公認・非公認

環境保全センター所長 殿
当団体の課外活動（教育・研究外）により生じた廃棄物に関して、環境保全センター利用の手引きに従い処理を依頼いたします。本廃棄物は学生および教職員の私的な活動により生じた物品でないことを誓約いたします。

年 月 日

責任者（教職員） [所属] [氏名] 印

記入者情報・連絡先	氏名	学部・学科名	
	学年	学籍番号	
	連絡先（携帯）		

	種別	内容詳細（容量・重量・数量等） Details (volume, weight, amount)
□A.特殊廃棄物 Special Wastes	□ オイル類 Oils	別添不要薬品リスト（有・無）
	□ 樹脂類 Resins	別添不要薬品リスト（有・無）
	□ 塗料類 Paints	別添不要薬品リスト（有・無）
	□ スプレー缶等* Spray Cans	別添不要薬品リスト（有・無）
	□ 乾電池 Dry cells	別添不要薬品リスト（有・無）
	□ バッテリー Batteries	別添不要薬品リスト（有・無）
	□ その他 Others	別添不要薬品リスト（有・無）
□B.水銀関連 Mercury	詳細（容量・重量・数量等） Details (volume, weight, amount)	別添不要薬品リスト（有・無）
□C.不要薬品 Unnecessary chemicals	要添付：不要薬品リスト List of Unnecessary chemicals	総数 Amount 個
□D.内容不明物 Unidentified contents	要添付：内容物不明リスト Unidentified contents	総数 Amount 個

*中身が残存するもののみ、使い切ったものは、中身が空であることを明示して、一般の不燃物として廃棄してください。
Only spray cans or cylinders with some gas still remained inside can be brought to the Center. Empty ones should be so specified and handled as general incombustibles.

Download the List of Unnecessary chemicals (不要薬品リスト) or the List of Unidentified content (内容不明物リスト) as well if needed to bring waste to the Center.

(4) How to report chemical substances in a Laboratory Waste Disposal Request

In April 2001, the Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof (the PRTR system) (p. 15) and the Tokyo Metropolitan Ordinance on Environmental Preservation to Secure the Health and Safety of Citizens of the Tokyo Metropolitan Area (Tokyo Metropolitan Ordinance on Environmental Preservation) (p. 15) went into effect, requiring that users of designated specific chemical substances properly manage those substances and determine both the quantities being released into the environment and the quantities of waste being disposed of. The PRTR system designates 462 substances as Class 1 Designated Chemical Substances, while the Tokyo Metropolitan Ordinance on Environmental Preservation designates 59 substances as chemical substances to be managed properly. In order to properly manage chemical substances, it is necessary to determine the quantity of such chemical substances contained in waste, manage said substances appropriately, and provide proper information to the waste management service that will receive the waste.
When filling out a Laboratory Waste Disposal Request/Chemical Management Form, note the following points and provide as much information as possible. The Chemical Substance Contained (含有化学物質明細) column is divided into the following four parts: Group A (organic solvents), Group B (heavy metals and inorganic salts), Group C (inorganic acids and alkalis), and Others.

Group A **Organic solvents: Specify the name or chemical formula of the organic solvents, along with the quantity put into the container or its concentration if in a waste liquid**

<Typical Chemical Substances>

- Acetone
- Hexane
- Toluene
- Xylene
- Benzene
- Chloroform
- Carbon tetrachloride
- Methanol
- Ethyl acetate
- Pyridine
- Dichloromethane
- Trichloroethylene
- Isopropyl alcohol
- Formaldehyde
- 1,2-Dichloroethane

Example 1. <Organic Waste Liquid>

Specify the name/chemical formula of the chemical substance, the abbreviated form of the name, and the quantity placed into the container. If water is mixed in, specify the quantity of water in the “Others” column.

Group B **Heavy metals and inorganic salts: Specify the name or chemical formula of the heavy metals and inorganic salts, along with the quantity put into the container or its concentration if in a waste liquid.**

<Typical Chemical Substances>

- Chromium and its compounds
- Mercury compounds
- Zinc and its compounds
- Nickel and its compounds
- Boron and its compounds
- Cadmium and its compounds
- Selenium and its compounds
- Copper and its compounds
- Iodine and its compounds
- Inorganic fluorine compounds (Hydrogen fluoride is categorized into Group C.)
- Lead and its compounds
- Arsenic and its compounds
- Manganese and its compounds
- Inorganic cyanide
- Ammonium compounds (Ammonia water is categorized into Group C.)

Example 2. <Inorganic Waste Liquid>

Specify the weight or molar quantity of the compound placed into the container. For solutions, state the concentration and quantity of solution put into the container.

Group C **Inorganic acids and alkalis: Specify the concentration of the inorganic acids and alkalis put into the waste liquid container, along with the quantity put into the container or its concentration if in a waste liquid.**

<Typical Chemical Substances>

- Hydrochloric acid
- Hydrogen fluoride (hydrofluoric acid)
- Nitric acid
- Ammonia water
- Sulfuric acid
- Hydrogen peroxide

Examples 3

Be sure to specify the concentration and quantity of acid or alkali put into the container. Specify the concentration in detail as shown in Example 3 (e.g., concentrated, conc., 10 mol/L, 30%). Specify the pH value in the pH field in the lower left.

◆Filling Out a Laboratory Waste Disposal Request/Chemical Management Form (実験系廃棄物処理依頼伝票 兼 化学物質管理票): Examples

	Concentration (mol/L, M, %, ppm, etc.)	Quantity in container (L, g, etc.)
Group A substances (Organic Waste Liquids)	—	○
Group B substances (Inorganic Waste Liquids)	○	○
Group C substances (Acid and Alkaline Waste Liquids)	○	○

○: To be specified.

記入例 1 <Organic Waste Liquids>

環境保全センター 行 To the Environmental Safety Center — 2021年 4 月 1 日

容器番号 Container No.	区分 Category	総量 Total Volume
21．20001	Ⅱ−i	18 L

含有化学物質明細 Chemical Substance Contained
化学物質名、化学式、投入量、濃度などを記入してください。
Specify the chemical substance names, the chemical formulas, quantities put in the container, and concentrations.

Specify the total quantity placed in the container.

A 群 Group A	アセトン6L、 EtOAc3L ヘキサン6L、 CH_2Cl_2 1.5L
B 群 Group B	
C 群 Group C	
その他 Others	水 1.5L
pH	I-c，I-d-2，I-d-3，I-e-5，I-e-8，I-e-9 は pH（水素イオン濃度）を測って記入してください。 Determine the pH value of a waste liquid under category I-c, I-d-2, I-d-3, I-e-5, I-e-8, or I-e-9, and indicate that value on the form.

Be sure to specify the quantities of water and other solvents.

記入例 2 <Inorganic Waste Liquids>

環境保全センター 行 To the Environmental Safety Center — 2021年 4 月 1 日

容器番号 Container No.	区分 Category	総量 Total Volume
21．20002	I−d−2	18 L

含有化学物質明細 Chemical Substance Contained
化学物質名、化学式、投入量、濃度などを記入してください。
Specify the chemical substance names, the chemical formulas, quantities put in the container, and concentrations.

Specify the total quantity placed in the container.

A 群 Group A	
B 群 Group B	硝酸クロム 100g Cd 10ppm $CuSO_4$ 5mol
C 群 Group C	
その他 Others	水 18L
pH	I-c，I-d-2，I-d-3，I-e-5，I-e-8，I-e-9 は pH（水素イオン濃度）を測って記入してください。 Determine the pH value of a waste liquid under category I-c, I-d-2, I-d-3, I-e-5, I-e-8, or I-e-9, and indicate that value on the form.
2	

(Inorganic waste liquid) Specify the pH value.

記入例 3 <Acid and Alkaline Waste Liquids>

環境保全センター 行 To the Environmental Safety Center — 2021年 4 月 1 日

容器番号 Container No.	区分 Category	総量 Total Volume
21．20003	I−c	18 L

含有化学物質明細 Chemical Substance Contained
化学物質名、化学式、投入量、濃度などを記入してください。
Specify the chemical substance names, the chemical formulas, quantities put in the container, and concentrations.

Specify the total quantity placed in the container.

A 群 Group A	
B 群 Group B	
C 群 Group C	濃塩酸1L、30%H_2O_2 0.5L conc.硫酸1L、10mol/ℓ HNO_3 3.5L
その他 Others	水 2L
pH	I-c，I-d-2，I-d-3，I-e-5，I-e-8，I-e-9 は pH（水素イオン濃度）を測って記入してください。 Determine the pH value of a waste liquid under category I-c, I-d-2, I-d-3, I-e-5, I-e-8, or I-e-9, and indicate that value on the form.
1	

Specify the concentrations and quantities.

Specify the pH value.

記入例 4 <Solid Waste>

環境保全センター 行 To the Environmental Safety Center — 2021年 4 月 1 日

容器番号 Container No.	区分 Category	総量 Total Volume
21．20004	P	30 L

含有化学物質明細 Chemical Substance Contained
化学物質名、化学式、投入量、濃度などを記入してください。
Specify the chemical substance names, the chemical formulas, quantities put in the container, and concentrations.

Specify the total quantity placed in the container.

A 群 Group A	
B 群 Group B	
C 群 Group C	
その他 Others	薬品の付着した手袋、キムワイプ、プラスチック容器 Gloves, Kimwipes, and plastic containers tainted with chemicals
pH	I-c，I-d-2，I-d-3，I-e-5，I-e-8，I-e-9 は pH（水素イオン濃度）を測って記入してください。 Determine the pH value of a waste liquid under category I-c, I-d-2, I-d-3, I-e-5, I-e-8, or I-e-9, and indicate that value on the form.

3. Waste Sorted Collection Procedure

Properly sort and safely collect laboratory waste according to the flowchart for sorted collection of laboratory waste in Figure 1 and the waste categories and collection container types in Tables 1 to 3. You must be very careful because even if two or more waste liquids are in the same category, mixing those liquids may generate heat, give off smoke, or even start a fire. If you are unsure of how to safely put waste into containers, contact the Center for assistance. After putting waste in a container, make it a rule to keep it covered. Degas waste that may produce a gas under a draft chamber or another appropriate environment when appropriate. Avoid storing a container with waste in it for a long period of time, and be sure to bring it to the Center each time – even if it is not full. To bring in a small amount of laboratory waste (less than 1 L), ask the management office for a special container.
Be sure to keep a record of the content of collection containers in order to prevent accidents as well as to manage chemical substances **In particular, if you mistakenly put waste into an unauthorized container (one not designed for the relevant waste category), clearly describe the content in a blank space on the form.**

(1) Inorganic waste

1) Instructions on collection

(1) Whenever possible, avoid mixing organic substances with inorganic waste. If organic substances have been mixed with inorganic waste in an experiment, treat such mixed waste as organic waste.
(2) Put solid matter in an inorganic solid waste collection container. Ensure the solid matter in such containers does not weigh more than 15 kg.
(3) Liquid used for rinsing lab equipment used to handle inorganic chemicals should be poured into a collection container along with the chemical solution itself. (Rinsing is required twice or more.)
(4) If a waste liquid contains any harmful substance (e.g., cadmium, cyanide, lead, hexavalent chromium, arsenic, or selenium; see page 48) which has legal standards (e.g., the Water Pollution Control Act or the Sewerage Act), rinsing is required three times, and any liquid used to rinse the container of the relevant chemical should also be poured into a collection container.
(5) Always put mercury compounds in an I-d-1 container. If mercury compounds have been placed into another type of container by mistake, do not add any more waste to such containers, notify the Center of such fact, and then bring the relevant containers to the Center.
(6) Put waste liquid that contains cyanide compounds or hydrogen fluoride into an alkaline state and be careful to avoid generation of toxic gas (Be careful not to mix a strong acid with such waste).
(7) Inorganic waste that contains poisonous substances should be handled separately from other waste in the same category.

(2) Organic waste

1) Instructions on collection

(1) Be careful not to mix organic waste with inorganic waste because mixing organic and inorganic substances may generate heat, give off smoke, or even start a fire.
(2) Liquid used for rinsing lab equipment used to handle organic chemicals should be poured into a collection container along with the chemical solution itself. Also, use an appropriate solvent for rinsing. (Rinsing is required twice or more.)
(3) If a waste liquid contains any harmful substance (e.g., dichloromethane, carbon tetrachloride, benzene, trichloroethylene; see page 48) which has legal standards (e.g., the Water Pollution Control Act, the Sewerage Act), rinsing is required three times, and any liquid used to rinse the container of the relevant chemical should also be poured into a collection container.
(4) Substances that are considered highly acidic or explosive must be handled separately from other substances and never mixed with other substances. If you intend to dispose of such substances, contact the Center regarding the details of disposal.
(5) Use extreme care when handling mixtures of organic and inorganic substances because such mixtures may generate toxic gases (e.g., cyanide, hydrogen sulfide, halogenated hydrogen).
(6) Put solid matter in an organic solid waste collection container. Ensure the solid matter in such containers does not weigh more than 15 kg.
(7) Store collection containers in a place that is not affected by changes in temperature in order to prevent ignition and inadvertent combustion.
(8) Handle toxic substances very carefully, record the details of toxic substances even if in small quantities, and handle such substances separately from other substances. For further details, contact the Center.

(3) Infectious waste (including solid waste generated from biological experiments)

At Waseda University, the following are collected as infectious waste: injection needles, Pasteur tubes, and other sharp-edged objects; blood, serums, blood plasma, and body fluids used in experiments; and injection tubes, laboratory dishes (plastic and glass dishes), vinyl tubes, and gloves stained by these fluids.
Waste produced in genetic modification experiments should be treated in accordance with the Act on the Conservation and Sustainable Use of Biological Diversity through Regulations on the Use of Living Modified Organisms before disposal in order to ensure safety. Perform sorted collection of such waste as infectious waste.

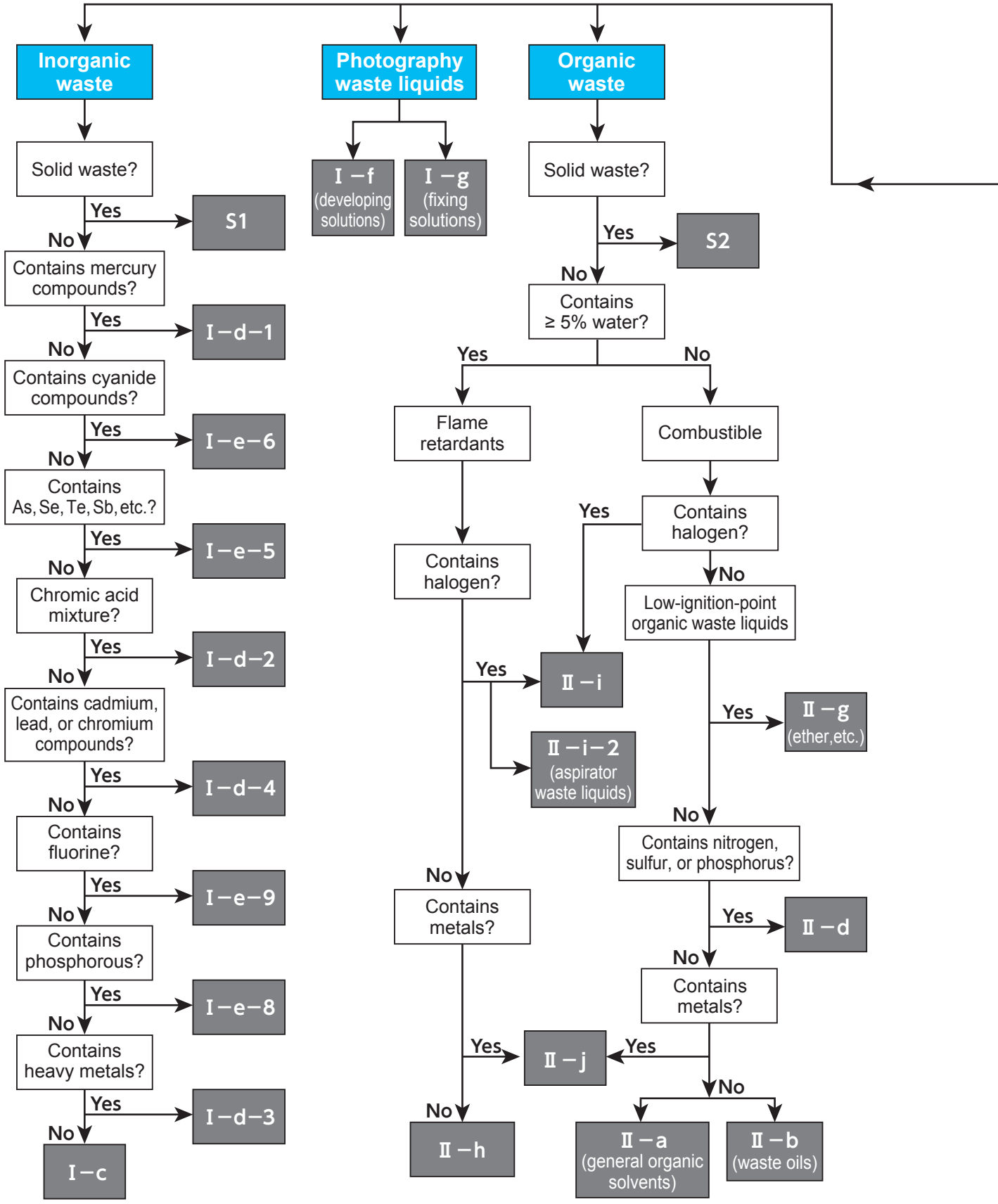
(4) Waste laboratory instruments

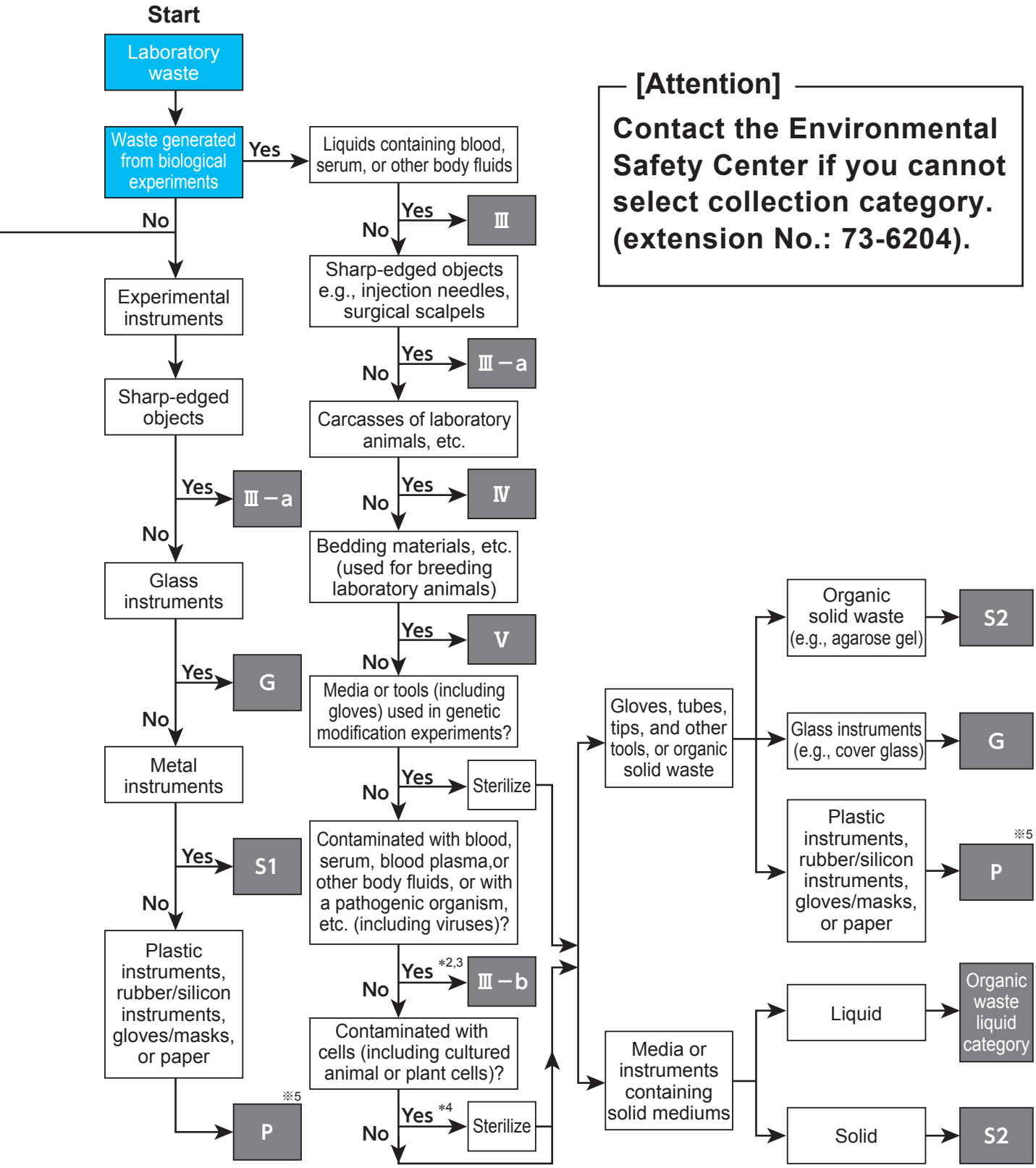
Used laboratory instruments tainted by chemicals are collected on a sorted-collection basis (see Table 3 on page 36 and Figure 2 on page 37).

(5) Handling of drug vials and bottles

Sort drug vials and bottles according to the flowchart for sorted collection of drug vials and bottles in Figure 2 (p. 39).

Figure 1. Flowchart for Sorted Collection of Laboratory Waste (Based on Classification by the University)*1





[Attention]

Contact the Environmental Safety Center if you cannot select collection category. (extension No.: 73-6204).

*1 For details about disposal of waste that does not fall into any waste category, see “Section 5. Handling of Laboratory Waste Not in a Sorted Collection Category” on page 41.
*2 Please sterilize waste that has been heavily contaminated with blood, pathogenic organisms, etc. and is considered likely to cause an infection.
*3 Dispose of waste in liquid form as II-h, II-i, or other appropriate organic waste liquid category after sterilizing it.
*4 Dispose of waste that cannot be sterilized as III-b.
*5 If the waste smells bad, put it in the S1 or S2.

◆Table 1. Classification of Inorganic Waste Liquids and Collection Container Types

Order of precedence (rough standard) for waste liquid mixtures

* Waste liquids of which 5% or more consists of organic substances are treated as organic waste.

I - d - 1 > I - e - 6 > I - e - 5 > I - d - 2 > I - d - 4 > I - e - 9 > I - e - 8 > I - d - 3 > I - c

	Waste classification	Container type color/capacity	Category	Handling instructions
Inorganic waste liquids	I - c		Acid and alkaline waste liquids	1. Dilute strong acid or alkaline liquids, or add several liters of water, before putting them in containers. 2. Indicate the pH.
	I - d - 1		Waste liquids containing mercury compounds	Specify the mercury concentration.
	I - d - 2		Waste liquids containing cadmium, lead, or chromium (or its compounds)	1. Use care in handling because these waste liquids contain hazardous substances. 2. If waste liquids contain large amounts of ammonium ions and chelate compounds, be sure to specify the details of these substances on a form. 3. Indicate the pH.
	I - d - 3		General heavy metal waste liquids, excluding I - d - 1, I - d - 2, I - d - 4, and I - e - 5	
	I - d - 4		Chromic acid-mixture solution (chromium-sulfuric acid) waste liquids	1. Use extreme care in handling because these waste liquids are highly acidic and hazardous. 2. Do not mix organic substances with these waste liquids.

* Consult with the Center if you intend to use any undesignated containers or capacities.

	Waste classification	Container type color/capacity	Category	Handling instructions
Inorganic waste liquids	I - e - 5		Waste liquids containing arsenic, selenium, antimony, tellurium, or their compounds) (Beryllium, osmium, and thallium are excluded.)	1. Take great care in handling these waste liquids because they contain hazardous substances. **2. Avoid mixing these liquids with other ingredients whenever possible.** 3. Indicate the pH. 4. There is no technology established to treat Be, Os, and Tl. Therefore, avoid mixing these substances with other components and collect them as single components.
	I - e - 6		Waste liquids containing cyanide compounds	1. Waste liquids containing free cyanide **2. Do not mix strong acids with these waste liquids** (to avoid generating hydrogen cyanide gas). **3. Keep these waste liquids in an alkaline state.** 4. Waste liquids containing cyanide complexes, such as ferricyanide and ferrocyanide compounds, should be collected under the II - j category.
	I - e - 8		Waste liquids containing phosphorous compounds	1. Organic phosphorous should be collected under the II - d category. 2. Indicate the pH.
	I - e - 9		Waste liquids containing hydrofluoric acid or fluorine compounds	1. Do not put undiluted hydrofluoric acid in collection containers. **2. Do not mix strong acids with these waste liquids** (to avoid generating hydrogen fluoride gas). 3. Keep these waste liquids in an alkaline state as much as possible. 4. Indicate the pH.
	I - f		Photography developing solution waste	Declare whether any fixing solution is mixed with these waste liquids.
	I - g		Photography fixing-solution waste	Declare whether any developing solution is mixed with these waste liquids.

* Consult with the Center if you intend to use any undesignated containers or capacities.

◆Table 2. Classification of Organic Waste Liquids/Solid Waste and Collection Container Types

Order of precedence (rough standard) for waste liquid mixtures

* Waste liquids of which 5% or more consists of water are treated as flame-resistant waste liquids.

Combustible waste liquids: Ⅱ - i (including halogen) > Ⅱ - g > Ⅱ - d > Ⅱ - j > Ⅱ - a > Ⅱ - b

Flame-resistant waste liquids: Ⅱ - i > Ⅱ - i - 2 > Ⅱ - j > Ⅱ - h

	Waste classification	Container type color/capacity	Category	Handling instructions
Combustible waste liquids	Ⅱ - a		Combustible general organic solvents (e.g., acetone, hexane, benzene, alcohol)	1. Water content ≤ 5% **2. Do not mix this type of solvent with a peroxide, concentrated nitric acid, or concentrated sulfuric acid. Doing so is strictly prohibited.**
	Ⅱ - b		Waste oils (e.g., heavy oil, machine oil, animal and plant oils, silicon oil)	1. Dilute viscous oils with an appropriate solvent prior to collection. 2. PCBs and oils containing PCBs are excluded.
	Ⅱ - d		Organic compound waste liquids containing nitrogen, sulfur, and phosphorous (e.g., aniline, pyridine, dimethylsulfoxide, phosphoric ester)	**1. Explosive substances such as nitrate ester, nitromethane, and diazo compounds are excluded. (Refer to 5. (4) on page 42.)** 2. Collect organic phosphorous pesticides separately. (Refer to 5. (2) on page 41.) 3. Collect and handle malodorous substances separately.
	Ⅱ - g		Low-ignition-point organic waste liquids (those that consist mainly of gasoline, diethyl ether, pentane, carbon disulfide, etc.)	1. De-gas containers periodically. 2. Avoid mixing these waste liquids with other substances as much as possible. 3. Do not store large amounts of these waste liquids; instead, frequently bring small amounts to the Center. 4. These waste liquids fall under the Fire Service Act's category of special inflammables. 5. Do not put acids or alkalis in this container.

	Waste classification	Container type color/capacity	Category	Handling instructions
Flame-resistant waste liquids	Ⅱ - h		Organic waste liquids containing ≥ 5% water (excluding II - i and II - j)	1. Water solutions containing water-soluble organic compounds such as alcohol and organic acid 2. Emulsive waste liquids
	Ⅱ - i		Organic waste liquids containing halogen (e.g., dichloromethane, chloroform, carbon tetrachloride)	1. PCBs and waste liquids containing PCBs are excluded. 2. Under this category, classify solutions used to rinse instruments that have been used with organic chlorine solvents. 3. If the waste liquid contains components categorized as II-g, use a 10-L container and avoid storing it for a long period of time.
	Ⅱ - i - 2		Circulating aspirator wastewater	Wastewater used in circulating aspirators that contains solvents such as dichloromethane, benzene, chloroform, carbon tetrachloride, or acetone
	Ⅱ - j		Waste liquids containing ferrocyanide or ferricyanide compounds and metals	Collect organic mercury compounds under the I - d - 1 category.

* You do not need to indicate the pH of organic waste liquids.

Solid waste	S1		Inorganic solid waste (e.g., silica gel, alumina, inorganic salts, metal oxides, waste metals) * Before you dispose of waste soil, contact the Center.	1. Contents must not weigh more than 15 kg. 2. Completely dehydrate the sediment. 3. Collect metal mercury, broken mercury thermometers, and manometers as unclassified waste. **4. Before transporting, put on the lid and push it down firmly onto the pail on four sides, and lock it so that it will not open accidentally.**
	S2		Organic solid reagents (e.g., high polymer compounds, resins)	1. Content must not weigh more than 15 kg 2. .Completely remove any liquids. **3. Before transporting, put on the lid and push it down firmly onto the pail on four sides, and lock it so that it will not open accidentally .**

* Consult with the Center if you intend to use any undesignated containers or capacities.

Table 3. Classification of Infectious Waste/Laboratory Waste Instruments and Collection Container Types

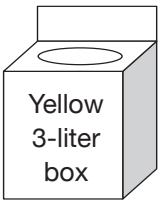
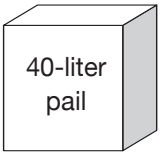
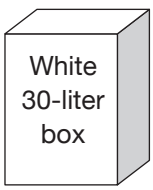
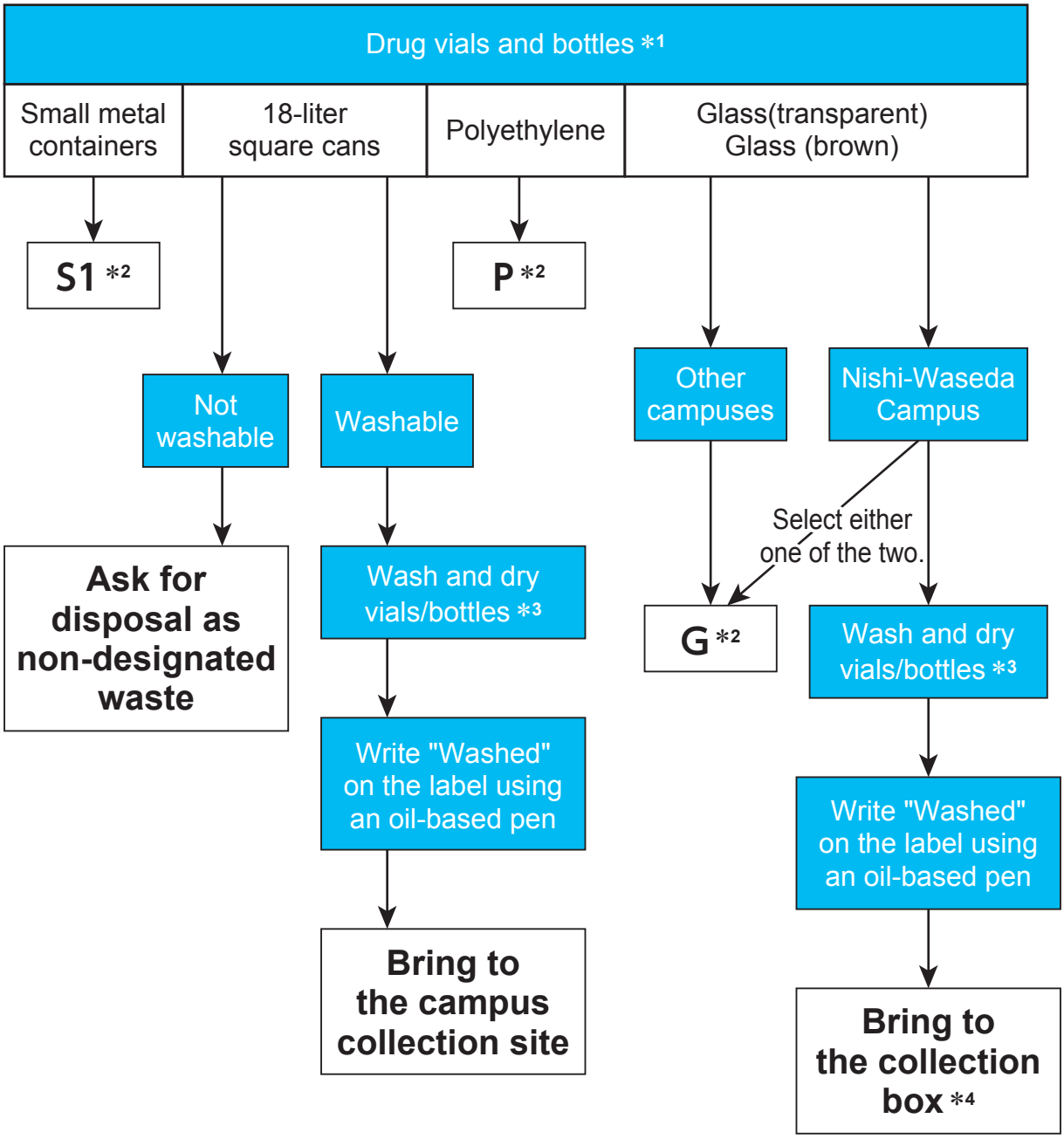
	Waste classification	Container type color/capacity	Category	Handling instructions
Infectious waste	Ⅲ		Blood and other waste liquids (blood, serums, plasma, body fluids, and waste liquids in which these fluids are mixed)	1. Put the inner lid on this container. 2. When putting these waste liquids into containers, do not fill the container to more than 80 percent capacity, firmly cap the container, and then bring it to the Center. 3. Add formalin to these waste liquids to prevent decay, and store them in a cool, dark place. 4. When transporting this container, be careful not to let it topple it over sideways.
	Ⅲ - a		Injection needles and other sharp-edged objects (e.g., injection needles, capillaries, Pasteur tubes, surgical scalpels)	1. Take great care not to prick your finger with a needle or any other object, and collect this waste in dedicated containers. **2. Set the lid of the box properly before use. Before transporting, be sure to close up the box by bending the lug on the lid and inserting it into the hole.** 3. For waste that gives off a smell, put the box in a special plastic bag and seal it up before transporting. 4. Check how to use the box.
	Ⅲ - b		Blood and other deposits (e.g., plastics, glass, paper, cloths)	1. Keep containers covered and avoid storing them for a long period of time. 2. Do not put waste in liquid form in these containers (sterilize liquid waste and dispose of it as II-h or other appropriate organic waste liquid category). **3. Before transporting, put on the lid and push it down firmly onto the pail on four sides, and lock it so that it will not open accidentally .**
	Ⅳ	Inquire at the Center because containers differ among campuses.	Carcasses of laboratory animals (including internal organs)	Check the weight and number of animal carcasses, put them in bags, and then freeze and store them in a dedicated cold storage vault.
	Ⅴ	Inquire at the Center because containers differ among campuses.	Bedding materials and other matter (articles used for breeding laboratory animals)	Put small articles in plastic bags, and put the bags in a dedicated container.
Laboratory instruments	G		Glass instrument waste (glass instruments tainted by chemicals)	1. Content must not weigh more than 15 kg. 2. Glass instruments used in experiments that have been tainted by small amounts of chemicals or contain chemical residue **3. Before transporting, put on the lid and push it down firmly onto the pail on four sides, and lock it so that it will not open accidentally.**
	P		Plastic instruments and other similar waste (plastic instruments tainted by chemicals, rubber and silicon instruments, gloves, masks, paper articles)	1. Laboratory instruments used in experiments described in the adjacent left column that have been tainted by small amounts of chemicals or contain chemical residue. 2. Dehydrate waste for collection as much as possible in a manner that prevents leakage. **3. Before transporting, tie the plastic bag that comes with the box.**

Figure 2. Flowchart for Sorted Collection of Drug Vials and Bottles



*1 Affix barcode labels (chemical management labels) to the collection form
*2 For vials or bottles that are too large to put in a container for their category, ask for disposal as non-designated waste.
*3 Wash vials and bottles of an inorganic substance in water, and those of an organic substance in acetone, ethanol, or another appropriate solvent (Dry vials and bottles washed in an organic solvent under local ventilation).
*4 Before putting drug vials and bottles in the collection box, remove the cap (put in only the vials and bottles).

4. Procedure for Requesting Disposal of Unnecessary Chemicals

Unnecessary chemicals that have been **found to be safe if they make contact or become mixed with other substances** should be put into collection containers for disposal according to the flowchart for sorted collection.
Other unnecessary chemicals should be brought to the Center in their original containers. When performing disposal, fill out an unnecessary chemicals form (which can be downloaded from the Environmental Safety Center's website) and submit the form along with a completed Disposal Request (処理依頼書) (p. 28) to the Center.
Put organic and inorganic chemicals in separate chemical containers when bringing them to the Center. Put identification numbers on these containers and prepare a list of the containers. List the containers so that the identification numbers correspond to the numbers in the list's No. column. Please note that the Center does not accept for disposal any chemicals in beakers or sample vials, or those that are considered to be reagents prepared and synthesized in a laboratory. Before bringing unnecessary chemicals to the Center, you need to make a reservation by phone. Check vacancies and then contact the office at extension No. 73-6204. You can see the vacancies for reservations on the Environmental Safety Center's website.

(1) Filling out the "List of Unnecessary Chemicals" (不要薬品リスト)

Starting in the 2005 academic year, all chemical substances stored in laboratories have been managed with barcode labels affixed to their containers or packages. If any chemicals are no longer necessary, fill out a copy of the form below, remove the barcode label from the chemical's container or package, paste the barcode label onto the List of Unnecessary Chemicals (不要薬品リスト), and then submit the list and the chemical to the Center. For unnecessary chemicals purchased before the 2004 academic year that have no barcode on the container or package, or those whose barcode label has been defaced or is illegible, write the chemical's name.

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不要薬品リスト

学部・研究室/実験室名		号館・部屋番号		内線番号		記入者氏名		作成日	
								年　月　日	

No.	バーコードラベルを添付（バーコードラベルが無い場合は、薬品名を記入）	使用状況	初期容量	残容量	No.	バーコードラベルを添付（バーコードラベルが無い場合は、薬品名を記入）	使用状況	初期容量	残容量
1		開封 未開封			11		開封 未開封		
2		開封 未開封			12		開封 未開封		
3		開封 未開封			13		開封 未開封		
4		開封 未開封			14		開封 未開封		
5		開封 未開封			15		開封 未開封		
6		開封 未開封			16		開封 未開封		
7		開封 未開封			17		開封 未開封		
8		開封 未開封			18		開封 未開封		
9		開封 未開封			19		開封 未開封		
10		開封 未開封			20		開封 未開封		

↑記入欄が不足する場合は別の紙に記入して下さい。

＜記入にあたっての注意事項＞
・学部・研究室名・実験室名、号館・部屋番号、内線番号等連絡先、記入者氏名、作成日を記入して下さい。
・薬品ビンに通し番号をつけ、その番号とNo欄が対応するよう1本ずつ記入して下さい。
・バーコードを添付した場合、薬品名の記入は不要です。

ご不明な点は環境保全センターへお問い合わせ下さい。
(内線番号:73-6204　直通:03-3232-8695)

環境保全センター201410

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記入例　**不要薬品リスト**

学部・研究室/実験室名	号館・部屋番号	内線番号	記入者氏名	作成日
応用化学科・早稲田研究室	77号館777室	73-1234	早稲田　太郎	2014年10月10日

No.	バーコードラベルを添付（バーコードラベルが無い場合は、薬品名を記入）	使用状況	初期容量	残容量	No.	バーコードラベルを添付（バーコードラベルが無い場合は、薬品名を記入）	使用状況	初期容量	残容量
1	アセトン	(開封) 未開封	500mL	100mL	11		開封 未開封		
2	C-0000001	(開封) 未開封	100g	50g	12		開封 未開封		
3	ヘキサン	開封 (未開封)	3L	3L	13		開封 未開封		
4		開封 未開封			14		開封 未開封		
5		開封 未開封			15		開封 未開封		
6		開封 未開封			16		開封 未開封		
7		開封 未開封			17		開封 未開封		
8		開封 未開封			18		開封 未開封		
9		開封 未開封			19		開封 未開封		
10		開封 未開封			20		開封 未開封		

↑記入欄が不足する場合は別の紙に記入して下さい。

＜記入にあたっての注意事項＞
・学部・研究室名・実験室名、号館・部屋番号、内線番号等連絡先、記入者氏名、作成日を記入して下さい。
・薬品ビンに通し番号をつけ、その番号とNo欄が対応するよう1本ずつ記入して下さい。
・バーコードを添付した場合、薬品名の記入は不要です。

ご不明な点は環境保全センターへお問い合わせ下さい。
(内線番号:73-6204　直通:03-3232-8695)

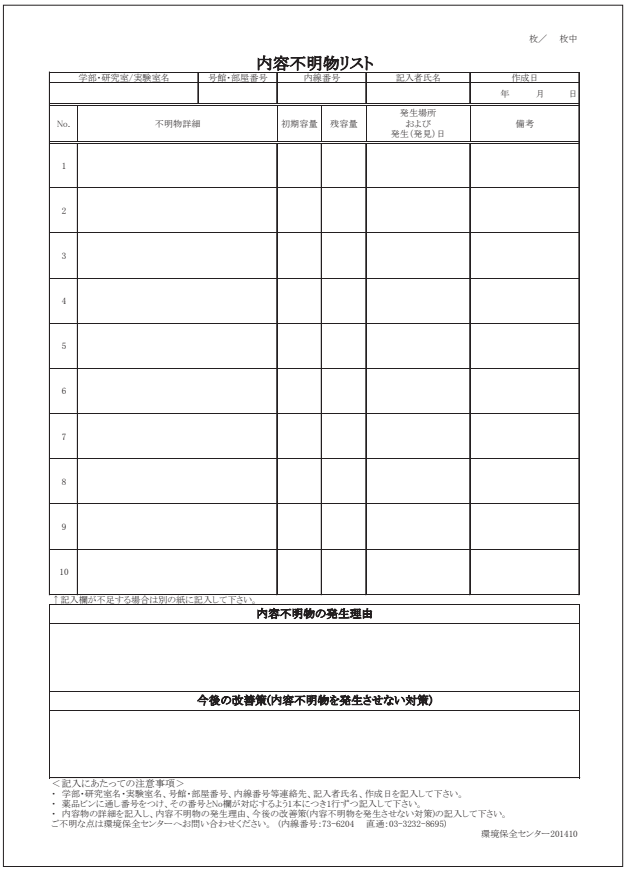
環境保全センター201410

<Sorting of unnecessary chemicals>
Put identification numbers on all unnecessary chemicals.

<Barcode label>

(2) Unnecessary chemicals with illegible labels or unidentified content

Use a form for waste of unidentified content if you have an unnecessary chemical whose content is unknown because the label on its container or package has been discolored, stained, or defaced, thus rendering it illegible. Such chemicals are not only difficult to dispose of properly but also undesirable from the perspective of laboratory safety. We request that users properly manage chemical labels by, for example, using seals to repair any labels that may be peeling off.



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内容不明物リスト

学部・研究室/実験室名	号館・部屋番号	内線番号	記入者氏名	作成日
				年　月　日

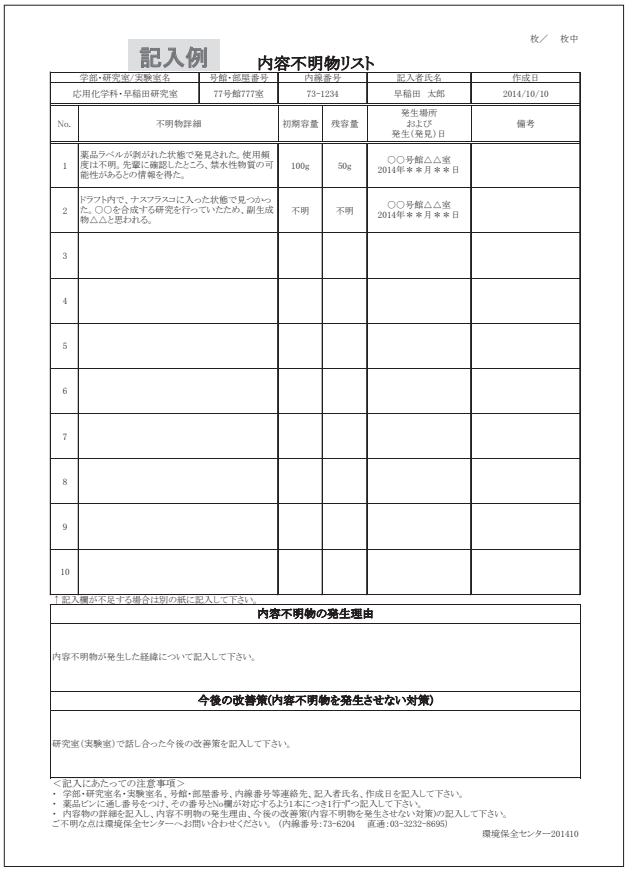
No.	不明物詳細	初期容量	残容量	発生場所および発生(発見)日	備考
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

↑記入欄が不足する場合は別の紙に記入して下さい。

内容不明物の発生理由
今後の改善策(内容不明物を発生させない対策)

＜記入にあたっての注意事項＞
・学部・研究室名・実験室名、号館・部屋番号、内線番号等連絡先、記入者氏名、作成日を記入して下さい。
・薬品ビンに通し番号をつけ、その番号とNo.欄が対応するよう1本につき1行ずつ記入して下さい。
・内容物の詳細を記入し、内容不明物の発生理由、今後の改善策(内容不明物を発生させない対策)の記入して下さい。
ご不明な点は環境保全センターへお問い合わせください。（内線番号:73-6204　直通:03-3232-8695）

環境保全センター201410



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記入例

内容不明物リスト

学部・研究室/実験室名	号館・部屋番号	内線番号	記入者氏名	作成日
応用化学科・早稲田研究室	77号館777室	73-1234	早稲田　太郎	2014/10/10

No.	不明物詳細	初期容量	残容量	発生場所および発生(発見)日	備考
1	薬品ラベルが剥がれた状態で発見された。使用頻度は不明。先輩に確認したところ、禁水性物質の可能性があるとの情報を得た。	100g	50g	○○号館△△室 2014年＊＊月＊＊日	
2	ドラフト内で、ナスフラスコに入った状態で見つかった。○○を合成する研究を行っていたため、副生成物△△と思われる。	不明	不明	○○号館△△室 2014年＊＊月＊＊日	
3					
4					
5					
6					
7					
8					
9					
10					

↑記入欄が不足する場合は別の紙に記入して下さい。

内容不明物の発生理由
内容不明物が発生した経緯について記入して下さい。
今後の改善策(内容不明物を発生させない対策)
研究室(実験室)で話し合った今後の改善策を記入して下さい。

＜記入にあたっての注意事項＞
・学部・研究室名・実験室名、号館・部屋番号、内線番号等連絡先、記入者氏名、作成日を記入して下さい。
・薬品ビンに通し番号をつけ、その番号とNo.欄が対応するよう1本につき1行ずつ記入して下さい。
・内容物の詳細を記入し、内容不明物の発生理由、今後の改善策(内容不明物を発生させない対策)の記入して下さい。
ご不明な点は環境保全センターへお問い合わせください。（内線番号:73-6204　直通:03-3232-8695）

環境保全センター201410

5. Handling of Laboratory Waste Not in a Sorted Collection

Before bringing waste to the Environmental Safety Center that does not fall into any sorted collection waste category, you need to make a reservation by phone (extension No. 73-6204). You can see the vacancies for reservations on the Environmental Safety Center's website.

(1) Disposal of instruments containing mercury, and treating of unnecessary mercury

To dispose of damaged mercury thermometers, manometers, or tools used to collect mercury (mercury-contaminated materials), take measures to prevent the mercury from scattering, bring them to the Center, and submit them together with a Disposal Request. Handle not only simple mercury but also compounds containing mercury, materials contaminated with them, unneeded metal mercury and mercury amalgams in the same manner.

(2) Handling experimental instruments or other waste used with hazardous substances other than mercury

To dispose of experimental instruments contaminated with a hazardous substance, contact the Center and dispose of them properly according to given instructions.

(3) Handling of waste soil

Before you dispose of waste soil, contact the Center. Bring it to the Center according to given instructions and submit it together with a Disposal Request.

(4) Handling of waste not suitable for collection containers

Some types of liquid and other waste may catch fire if they make contact with water or air (oxygen), or may ignite when dry. Such waste is not suitable for collection containers. Therefore, collect such waste separately in a safe manner, bring it to the Center, and declare the type and degree of hazard on a Disposal Request.

(5) Handling of waste having unidentified content

As a general rule, the Center could not accept materials of unknown content.

Because it costs a great deal to dispose of such waste, we request that you strictly manage chemicals and waste daily to avoid producing waste having unidentified content. If unavoidable circumstances result in such materials requiring disposal, read any relevant research papers and management records, and then obtain information about the properties of the waste— whether it is liquid or solid, inorganic or organic, its combustibility, flame-resistance property, toxicity, and harmfulness— and present this information on a Disposal Request. Submit the Disposal Request to the Center and bring the waste there.

(6) Handling of carcasses and internal organs of laboratory animals

To dispose of and store the carcasses or internal organs of animals used in animal experiments, contact the person in charge at the Nishi-Waseda Campus (Environmental Safety Center), the Tokorozawa Campus (Technical Management Office), or the Center for Advanced Biomedical Sciences (Administrative Office of the Center for Advanced Biomedical Sciences) and follow the person's instructions. At other campuses, contact the Center and ask how to dispose of this kind of waste.

(7) Handling of waste containing PCBs, such as insulation oils from capacitors and transformers

Some old capacitor and transformer insulation oils contain PCBs. Such waste oils must be examined to determine whether they contain PCBs. If insulation oils or devices containing PCBs are in use or there are insulation oils or devices that have not been examined, immediately discontinue use, contact the Environmental Safety Center, and then dispose of them properly according to law at the expense of the laboratory or office. Check the procedures to follow on the Environmental Safety Center's website.

The law requires that waste containing PCBs is disposed of properly by given deadlines* because of the hazards they present. Waseda University surveyed the total number of PCB-containing devices held by the university, worked to dispose of all the devices containing PCBs, and completed acceptance of these devices at the end of May 2020. We would like to thank all the laboratories and offices for their cooperation with our survey on and disposal of these devices.

*By the end of March 2022 for transformers and capacitors containing a high concentration of PCB, by the end of March 2023 for stabilizers containing a high concentration of PCB and materials contaminated with a high concentration of PCB, and by the end of March 2027 for devices containing a low concentration of PCB.

(8) Handling of unneeded oils, resins, paints, metallic waste, magnetic waste, spray cans, and small fuel gas cylinders

Unnecessary oils, resins, and paints (mainly those in cans) should be brought to the Center as they are, together with a completed Disposal Request.

Spray cans (containing paints, adhesives, or combustible gas) and small fuel-gas cylinders should be brought to the Center without making holes in them, together with a completed Disposal Request.

(9) Laboratory waste containing asbestos

Some mantle heaters and electrical furnaces contain asbestos. To dispose of such waste, check with the manufacturer or store where it was purchased as to whether it contains asbestos. If a laboratory instrument or device to be disposed of is found to contain asbestos, contact the Center and follow its instructions. Laboratory instruments and devices that have been confirmed to be free of asbestos should be properly disposed of in accordance with the rules in force at the relevant campus.

(10) Handling of used dry cell and electrical batteries

Sort used dry cell and electrical batteries into detailed categories and bring them directly to the Center. At campuses other than the Nishi-Waseda Campus, bring such waste to the designated place. For recyclable, peculiar, or large used dry cell or electrical batteries, ask the store they were purchased from to perform disposal. If the store does not accept them, contact the Center.

- Alkaline cells and manganese cells (Both types of dry cell batteries can be mixed together.)
- Primary lithium batteries (CR) To prevent a short circuit, discharge and insulate such batteries before bringing them to the Center or designated location.
- Button-type batteries: alkaline (LR), silver oxide (SR), air-zinc (PR), lithium (CR), etc.

(Insulate button-type batteries by putting adhesive tape on both surfaces to prevent a short circuit. When you store these batteries in a small bag for disposal, insulate them by putting adhesive tape or a similar material on them.)

• Small secondary batteries: Ni-Cd, Ni-MH, Li-ion, Pb, etc. (used in digital cameras, cell phones, and tools)
(Most of these batteries have a “Recyclable” mark on them and should be returned to the store where they were purchased.)
• Batteries (Ask the supplier or the store where the batteries were purchased to dispose of them.)

(11) Handling of laboratory equipment containing CFCs (other than that for household use)

Some old laboratory equipment uses CFCs. Ask the store where it was purchased for CFC collection. If the store does not accept it, contact the Center.

(12) Waste not accepted by the Center

The Center does not accept the following types of laboratory waste. Ask the section concerned for disposal instructions, and then dispose of such waste accordingly.

1) Printer toner
Request an applicable equipment distributor or supplier to dispose of developing solutions.

2) High-pressure gases (Some high-pressure gases such as spray cans and small fuel-gas cylinders are accepted.)
Return high-pressure gases to the manufacturer from which they were purchased or ask them to perform disposal.

3) Laboratory waste that contains radioisotopes, nuclear fuel materials, or nuclear source materials
The Center does not accept such waste for disposal. Contact the Radiation Safety Management Office (extension 73-8024).

* Contact the Environmental Safety Center for details about any waste that you are unsure about how to handle, collect, or transfer.

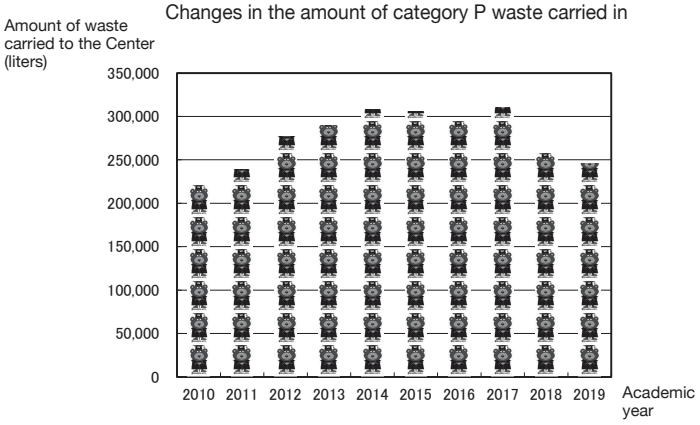
TOPIC

Category P waste

At Waseda University, since 2001 we have collected plastic instruments, rubber and silicon instruments, gloves, masks, and paper tainted by small amounts of chemicals as category P waste. This new category was established to cover disposable pipettes, laboratory dishes, Kimwipes, and other materials previously disposed of as general incombustible or combustible waste after use in laboratories and experiment facilities.
When category P was established, the annual amount of waste we collected in this category was around 450 boxes (13,500 liters). However, reflecting increased research activities and increased awareness of sorted collection by experimenters, the annual amount of waste collected in this category peaked in the period from 2014 to 2017, and has nearly doubled at present. The containers for waste of this category should be used to collect instruments or materials used in experiments, but general waste such as magazines and paper, plastic noodle cups, and plastic bottles may be found among these experimental instruments or materials. Category P waste—a category for waste exposed to chemicals—is incinerated at a special waste treatment plant, and then has a higher unit treatment cost than general waste. Do not use the containers for waste of this category in laboratories as regular dustbins.
Category P covers various kinds of waste. Be careful not to put any materials contaminated with a chemical that may generate heat, give off smoke, or start a fire (such as Kimwipes used to wipe off concentrated sulfuric acid or a material with highly active metal power attached to it) into containers for this category of waste.

* Before disposal, Kimwipes used to wipe off concentrated sulfuric acid or other similar materials should be washed with running water and thoroughly wrung out to prevent water from escaping. Handling of highly active substances depends on their types. If you have any questions, please contact the Center.

Changes in the amount of category P waste carried in



Do not place plastic cup noodle cups, plastic bottles, magazines, and so on in category P.

Ⅲ Research Support

1. Research Support Services

To support research activities at Waseda, we provide the following services:

(1) Opening up the Analysis Laboratory to students

We open up our facilities and analytical equipment (for a fee) to the extent that our essential work is not affected.

(2) Holding workshops on analysis

We offer workshops, such as on how to operate equipment and pre-treatment methods, when necessary for students and staff members.

(3) Providing technical support for analysis

We provide instructions and advice on pretreatment of samples, equipment operations, handling of values, and analysis methods.

(4) Providing information on analysis

We search for analysis-related information and provide the results upon request.



2. Use of the ESC Analysis Laboratory

(1) Timing of availability of equipment and facilities

For details about the timing of availability of equipment and facilities, refer to Table 4 on page 45. Note that equipment and facilities are unavailable during periodic wastewater analysis or our other essential works.

(2) Application for use

(1) Please send an e-mail to the address below to consult about using the equipment or facilities.
(2) You can make a reservation with the Center office on or after the first day of the month preceding the month you want to use the laboratory.
(3) To cancel a reservation, please contact the ESC by e-mail or other means as soon as possible.

(3) Usage precautions

(1) Be on time for your reservation. If you are late and do not give advance notice, you may be unable to use the reserved equipment or facilities.
(2) As a rule, up to two students (including an assistant) may enter the laboratory at a time.
(3) You must wear a lab coat or work clothing and safety glasses.
(4) You must pay for all chemicals or instruments used in the laboratory.
(5) ESC keeps a record of when you enter and leave the laboratory, and will lend you a laboratory key at the ESC Office.
(6) If you need a time extension, consult with the person in charge.
(7) The fee for using the ESC laboratory will be charged to your laboratory on a monthly basis.

Contact info for inquiries: analytical-chemists@list.waseda.jp

◆Table 4 List of Analytical Equipment and Facilities

Equipment/facilities	Model	Fee	Available time
Fume hood (inorganic/organic)	–	10 yen/10 minutes	Monday to Friday 9:00–16:00
Pure water (production equipment)	ELGA Chorus2	100 yen/L	
Ultrapure water (production equipment)	ELGA Analytical Research	200 yen/L	
pH meter	HORIBA F-54		
Electrical furnace (muffle furnace)	Yamato Scientific FP32		
Constant temperature water tank	Yamato Scientific BK300		
Autoclave	Yamato Scientific SP200	10 yen/10 minutes	
Shaker	Yamato Scientific SA-31		
Centrifugal separator	KOKUSAN H-103N		
Hot plate	ADVANTEC HTP352AA, etc.	30 yen/10 minutes	
ICP emission spectrometers	Agilent Technologies 5100	250 yen/10 minutes	
ICP mass spectrometer	Agilent Technologies 7700X	400 yen/10 minutes	
Spectrophotometer	Shimazu UV-1800	15 yen/10 minutes	
Mercury analyzers	Nippon Instruments RA-3, MA-1	60 yen/10 minutes	
Ion chromatographs	Thermo Fisher Scientific ICS-90 (Dionex)	60 yen/10 minutes	
	Thermo Fisher Scientific ICS-2100 (Dionex)	80 yen/10 minutes	
Gas chromatographs	Shimazu GC2010 (Flame ionization detector with a thermal desorption system)	40 yen/10 minutes + 30 yen/10 minutes when using the thermal desorption system	
	Agilent Technologies 6890 (Electron capture detector)	30 yen/10 minutes	
	GL Sciences GC323 (Thermal conductivity detector)		
Gas chromatography mass spectrometers	Agilent Technologies 7890B-5977B	100 yen/10 minu	
	Shimazu GCMS-QP2010		
Ultra-high-performance liquid chromatograph QTof mass spectrometer	Waters G2-XS QTof	150 yen/10 minutes	
High-performance liquid chromatograph	Agilent Technologies Infinity II 1260	150 yen/10 minutes	
Total organic carbon meter	Shimazu TOC-VCSH	100 yen/10 minutes	

Note: You will be charged additional fees for using standard samples or consumables.

IV Laws Related to the Environment

1. List of Laws Related to the Environment

Laws related to preservation of the environment	Enactment date
(1) Basic Environment Act	November 19, 1993
(2) Air Pollution Control Act	June 10, 1968
(3) Water Pollution Control Act	December 25, 1970
(4) Soil Contamination Countermeasures Act	May 29, 2002
(5) Sewerage Act	April 24, 1958
(6) Noise Regulation Act	June 10, 1968
(7) Offensive Odor Control Act	June 1, 1971
(8) Vibration Regulation Act	June 10, 1976
(9) Industrial Water Act	June 11, 1956
(10) Act on the Regulation of Pumping-up of Groundwater for Use in Buildings (Building Water Act)	May 1, 1962
(11) Act on Conservation of Endangered Species of Wild Fauna and Flora (Endangered Species Conservation Act)	June 5, 1992
(12) Environmental Impact Assessment Act (Environmental Assessment Act)	June 13, 1997
(13) Act on Promotion of Global Warming Countermeasures	October 9, 1998
(14) Act on the Promotion of Business Activities with Environmental Consideration by Specified Corporations, etc., by Facilitating Access to Environmental Information, and Other Measures (Environmental Consideration Act)	June 2, 2004
(15) Act on the Promotion of Environmental Conservation Activities through Environmental Education (Environmental Education Promotion Act)	July 25, 2003
(16) Basic Act on Biodiversity	June 6, 2008
(17) Act on Preventing Environmental Pollution of Mercury (Mercury Pollution Prevention Act)	June 19, 2015
Laws related to resources and waste	
(18) Waste Management and Public Cleansing Act	December 25, 1970
(19) Act on the Rational Use, etc. of Energy (Energy Saving Act)	June 22, 1979
(20) Act on Control of Export, Import and Others of Specified Hazardous Wastes and Other Wastes (Basel Act)	December 16, 1992
(21) Basic Act on Establishing a Sound Material-Cycle Society	June 2, 2000
(22) Act on the Promotion of Effective Utilization of Resources (Effective Resource Use Promotion Act)	April 26, 1991
(23) Act on the Promotion of Sorted Collection and Recycling of Containers and Packaging (Container and Packaging Recycling Act)	June 16, 1995
(24) Act on Recycling of Specified Kinds of Home Appliances (Home Appliance Recycling Act)	June 5, 1998
(25) Act on Promotion of Procurement of Eco-Friendly Goods and Services by the State and Other Entities (Green Purchasing Act)	May 31, 2000
(26) Act Concerning Recycling of Materials from Construction Work (Construction Material Recycling Act)	May 31, 2000
(27) Act on Promotion of Recycling and Related Activities for Treatment of Cyclical Food Resources (Food Recycling Act)	June 7, 2000
(28) Act on Special Measures concerning Promotion of Proper Treatment of PCB Wastes (PCB Special Measures Act)	June 22, 2001
(29) Act on Recycling, etc. of End-of-Life Vehicles (Automobile Recycling Act)	July 12, 2002
(30) Basic Act on the Water Cycle	April 2, 2014
Laws related to chemical substances, etc.	
(31) Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof (PRTR Act)	July 13, 1999
(32) Fire Service Act	July 24, 1948
(33) High Pressure Gas Safety Act	June 7, 1951
(34) Agricultural Chemicals Control Act	July 1, 1948
(35) Poisonous and Deleterious Substances Control Act	December 28, 1950
(36) Stimulants Control Act	June 30, 1951
(37) Narcotics and Psychotropics Control Act	March 17, 1953
(38) Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. (Chemical Substances Examination and Regulation Act)	October 16, 1973
(39) Act on Special Measures against Dioxins	July 16, 1999
(40) Act on the Protection of the Ozone Layer Through the Control of Specified Substances and Other Measures (Ozone Layer Protection Act)	May 20, 1988
(41) Act for Rationalized Use and Proper Management of Fluorocarbons (Fluorocarbon Emission Control Act)	December 10, 2014
Laws related to health and safety	
(42) Industrial Safety and Health Act	June 8, 1972
(43) Working Environment Measurement Act	May 1, 1975
(44) Act on Prevention of Radiation Disease Due to Radioisotopes, etc. (Radiation Hazards Control Act)	June 10, 1957

2. Quality Standards for Water Pollution

◆Basic Environment Act

Environmental quality standards for water pollution

	Water quality item	Standard values
Environmental quality standards for human health	Cadmium	0.003 mg/L or less
	Total cyanide	Undetectable
	Lead	0.01 mg/L or less
	Hexavalent chromium	0.05 mg/L or less
	Arsenic	0.01 mg/L or less
	Total mercury	0.0005 mg/L or less
	Alkyl mercury	Undetectable
	PCBs	Undetectable
	Dichloromethane	0.02 mg/L or less
	Carbon tetrachloride	0.002 mg/L or less
	1,2-Dichloroethane	0.004 mg/L or less
	1,1-Dichloroethylene	0.1 mg/L or less
	Cis-1,2-Dichloroethylene	0.04 mg/L or less
	1,1,1-Trichloroethane	1 mg/L or less
	1,1,2-Trichloroethane	0.006 mg/L or less
	Trichloroethylene	0.01 mg/L or less
	Tetrachloroethylene	0.01 mg/L or less
	1,3-Dichloropropene	0.002 mg/L or less
	1,4-Dioxane	0.05 mg/L or less
	Thiuram	0.006 mg/L or less
	Simazine	0.003 mg/L or less
	Thiobencarb	0.02 mg/L or less
	Benzene	0.01 mg/L or less
	Selenium	0.01 mg/L or less
	Nitrate-nitrogen and nitrite-nitrogen	10 mg/L or less
	* Fluorine	0.8 mg/L or less
	* Boron	1 mg/L or less
	(*The standard values for fluorine and boron do not apply to sea areas.)	

	Water quality item
Environmental quality standards for conservation of living environments	Hydrogen ion activity (pH)
	Biochemical oxygen demand (BOD)
	Suspended solids (SS)
	Dissolved oxygen (DO)
	Total coliform
	Total zinc
	Chemical oxygen demand (COD)
	Total nitrogen
	Total phosphorus
	Nonylphenol
	Linear alkylbenzene sulfonate and its salts
	n-Hexane extracts
	Amount of bottom dissolved oxygen
	Water quality items for standards related to conservation of living environments are set for each of rivers, lakes, and sea areas, and standard values for each category in these items are set for each type of waters.

◆Monitored substances and guideline values (items to be monitored to protect human health)

Item to be monitored	Guideline value	Item to be monitored	Guideline value
Chloroform	0.06 mg/L or less	Fenobucarb	0.03 mg/L or less
Trans-1,2-dichloroethylene	0.04 mg/L or less	Iprobenfos	0.008 mg/L or less
1,2-Dichloropropane	0.06 mg/L or less	Chlornitrofen	—
p-Dichlorobenzene	0.2 mg/L or less	Toluene	0.6 mg/L or less
Isoxathion	0.008 mg/L or less	Xylene	0.4 mg/L or less
Diazinon	0.005 mg/L or less	Diethylhexyl phthalate	0.06 mg/L or less
Fenitrothion	0.003 mg/L or less	Nickel	—
Isoprothiolane	0.04 mg/L or less	Molybdenum	0.07 mg/L or less
Oxinecopper	0.04 mg/L or less	Antimony	0.02 mg/L or less
Chlorothalonil	0.05 mg/L or less	Vinyl chloride monomer	0.002 mg/L or less
Propyzamide	0.008 mg/L or less	Epichlorohydrin	0.0004 mg/L or less
EPN	0.006 mg/L or less	Total manganese	0.2 mg/L or less
Dichlorvos	0.008 mg/L or less	Uranium	0.002 mg/L or less

◆Water Pollution Control Act

Quality standards for water discharged from specified facilities into public waters

	Type and item of hazardous substance	Permissible limit
Hazardous substance	Cadmium and its compounds	Cd 0.03 mg/L
	Cyanide compounds	CN 1 mg/L
	Organic phosphorous compounds	1 mg/L
	Lead and its compounds	Pb 0.1 mg/L
	Hexavalent chrome compounds	Cr^{6+} 0.5 mg/L
	Arsenic and its compounds	As 0.1 mg/L
	Mercury and alkyl mercury Other mercury compounds	Hg 0.005 mg/L
	Alkyl mercury compounds	Undetectable
	PCBs	0.003 mg/L
	Trichloroethylene	0.1 mg/L
	Tetrachloroethylene	0.1 mg/L
	Dichloromethane	0.2 mg/L
	Carbon tetrachloride	0.02 mg/L
	1,2-Dichloroethane	0.04 mg/L
	1,1-Dichloroethylene	1 mg/L
	Cis-1,2-Dichloroethylene	0.4 mg/L
	1,1,1-Trichloroethane	3 mg/L
	1,1,2-Trichloroethane	0.06 mg/L
	1,3-Dichloropropene	0.02 mg/L
	Thiuram	0.06 mg/L
	Simazine	0.03 mg/L
	Thiobencarb	0.2 mg/L
	Benzene	0.1 mg/L
	Selenium and its compounds	Se 0.1 mg/L
	*1 Boron and its compounds	B 10 mg/L
		B 230 mg/L
	*1 Fluoride and its compounds	F 8 mg/L
		F 15 mg/L
	Ammonia and ammonium compounds Nitrate and nitrite compounds	100 mg/L
	1,4-Dioxane	0.5 mg/L
Other items	Hydrogen ion activity	5.8 ≤ pH ≤ 8.6
	Biochemical oxygen demand	160 mg/L (Daily average: 120)
	Chemical oxygen demand	160 mg/L (Daily average: 120)
	Suspended solids	200 mg/L (Daily average: 150)
	Mineral oil	5 mg/L
	Animal and vegetable fats	30 mg/L
	Phenols	5 mg/L
	Copper	Cu 3 mg/L
	Zinc	Zn 2 mg/L
	Dissolved iron	Fe 10 mg/L
	Dissolved manganese	Mn 10 mg/L
	Chromium	Cr 2 mg/L
	No. of coliform groups	Daily average: 3,000/cm^3
	Nitrogen	120 mg/L (Daily average: 60)
	Phosphorus	16 mg/L (Daily average: 8)

◆Sewerage Act

Quality standards for water discharged from specified facilities into public sewers

Water quality item		Standard
Cadmium and its compounds		Cd 0.03 mg/L or less
Cyanide compounds		CN 1 mg/L or less
Organic phosphorous compounds		1 mg/L or less
Lead and its compounds		Pb 0.1 mg/L or less
Hexavalent chrome compounds		Cr^{6+} 0.5 mg/L or less
Arsenic and its compounds		As 0.1 mg/L or less
Mercury and alkyl mercury Other mercury compounds		Hg 0.005 mg/L or less
Alkyl mercury compounds		Undetectable
PCBs		0.003 mg/L or less
Trichloroethylene		0.1 mg/L or less
Tetrachloroethylene		0.1 mg/L or less
Dichloromethane		0.2 mg/L or less
Carbon tetrachloride		0.02 mg/L or less
1,2-Dichloroethane		0.04 mg/L or less
1,1-Dichloroethylene		1 mg/L or less
Cis-1,2-Dichloroethylene		0.4 mg/L or less
1,1,1-Trichloroethane		3 mg/L or less
1,1,2-Trichloroethane		0.06 mg/L or less
1,3-Dichloropropene		0.02 mg/L or less
Thiuram		0.06 mg/L or less
Simazine		0.03 mg/L or less
Thiobencarb		0.2 mg/L or less
Benzene		0.1 mg/L or less
Selenium and its compounds		Se 0.1 mg/L or less
*2 Boron and its compounds		B 10 mg/L or less
		B 230 mg/L or less
*2 Fluoride and its compounds		F 8 mg/L or less
		F 15 mg/L or less
1,4-Dioxane		0.5 mg/L or less
Phenols		5 mg/L or less
Copper and its compounds		Cu 3 mg/L or less
Zinc and its compounds		Zn 2 mg/L or less
Iron and its compounds (soluble)		Fe 10 mg/L or less
Manganese and its compounds (soluble)		Mn 10 mg/L or less
Chromium and its compounds		Cr 2 mg/L or less
Hydrogen ion activity		5 < pH < 9
Biochemical oxygen demand		Less than 600 mg/L (5 days)
Suspended solids		Less than 600 mg/L
n-hexane extracts	Mineral oils	5 mg/L or less
	Animal and plant oils	30 mg/L or less
*3 Nitrogen		Less than 240 mg/L
*3 3Phosphorus		Less than 32 mg/L
Iodine consumption		Less than 220 mg/L
Dioxins		10 pg–TEQ/L or less

*1 The upper values are the maximum permissible limits for discharge into public waters other than sea areas; the lower values are those for discharge into sea areas.

*2 The upper values are the standards for release into public sewers leading to rivers or other public waters; the lower values are for release into public sewers leading to sea areas.

*3 The Tokyo Metropolitan Sewerage Ordinance sets the following standards:
Nitrogen: Less than 120 mg per liter
Phosphorus: Less than 16 mg per liter

V Key Contacts at Each Campus

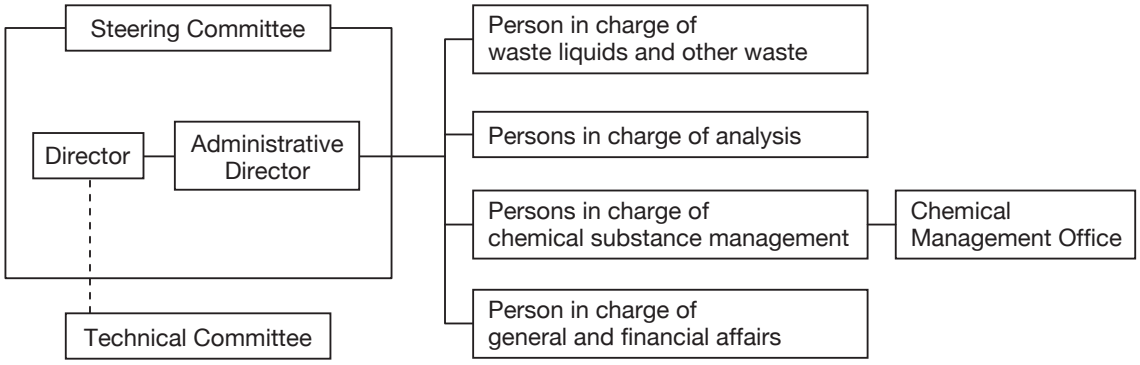
	Chemical Management Offices	Laboratory Waste Management Offices
Waseda Campus (School of Education)	Natural Sciences Office (Building No. 6, Room 307)	
Nishi-Waseda Campus	Chemical Shop (Building No. 60, Room 115)	Environmental Safety Center (1st basementof Building No. 55N)
Kikui-cho Campus	Chemical Shop (Building No. 60, Room 115)	※
Research and Development Center	Administrative Office of Research and Development Center (Building No. 121, Room 101)	
Toyama Campus	Chemical Shop (Building No. 60, Room 115)	※
Tokorozawa Campus	Technical Management Office (Building No. 100, Room A208)	
Kagami Memorial Laboratory for Materials Science and Technology	Analytical Instrument Management Office (Building No. 42-1, Room 304)	Administration Office (Building No. 42-1, Room 106)
Kitakyushu Campus	Administrative Office of IPS (Building No. 201-46, N Building, Room 157)	Management Office of IPSRC (1st floor of Building No. 201-36)
Waseda University Senior High School	Chemistry Laboratory (Building No. 74-10, Room 303)	
Waseda University Honjo Senior High School	Chemistry Laboratory (Building No. 95, N Building, Room 318)	
Center for Advanced Biomedical Sciences	Office of Center for Advanced Biomedical Sciences (Building No. 50, Room 03C101)	

※ : If new laboratory waste is generated, please contact the Environmental Safety Center.

VI Organization of the Environmental Safety Center

(As of December 1, 2020)

Important matters related to the operations of the Environmental Safety Center are considered and decided by the Steering Committee. The Center has a Technical Committee that serves as an advisory panel to the director, and committee members harness their respective fields of expertise to provide appropriate advice on various matters.



Steering Committee

Senior Executive Director … 1

Director, Waseda Research Institute for Science and Engineering

Director, Research Institute for Materials Science and Technology

Director, Environmental Research Institute

Professors, Faculty of Science and Engineering … 3

Professor, Faculty of Education and Integrated Arts and Sciences … 1

Professor, Faculty of Human Sciences … 1

Teacher, Waseda University Senior High School … 1

Teacher, Waseda University Honjo Senior High School … 1

Academic Affairs Manager

Director, Research Promotion Division

General Affairs Manager

Director, Administration and Technology Management Center for Science and Engineering

Technical Manager, Administration and Technology Management Center for Science and Engineering

Manager, Planning and Construction Section, Campus Planning Division Director, Environmental Safety Center

Administrative Director, Environmental Safety Center

Technical Committee

Professors, Faculty of Science and Engineering … 8

Professor, Faculty of Education and Integrated Arts and Sciences … 1

Administrative Director, Environmental Safety Center

Staff Members

Director: Yoshiyuki Sugahara

Administrative Director: Takasumi Hattori

Full-time staff: 4

Full-time contract staff: 4

Temporary employee: 1

Hachio Co., Ltd. (outsourcing)

Fujifilm Wako Pure Chemical Corporation (outsourcing)

Kotobuki Corporation (outsourcing)

Certificates and licenses held by Environmental Safety Center staff members

- ☐ Pollution control manager (National, air quality, Class 1)
- ☐ Certified measurer (concentration measurement)
- ☐ Dangerous object handler (Class A, Class B (type 4))
- ☐ Hazardous materials security superintendent
- ☐ Working environment measurement expert (Class 1-1, -3, -4, and -5)
- ☐ Class 1 health supervisor
- ☐ Organic solvent chief engineer
- ☐ Operations chief of specified chemical substances and tetraalkyl lead courses
- ☐ High-pressure gas production safety manager
- ☐ Qualified energy manager
- ☐ Person handling poisonous substances and deleterious substances
- ☐ Authorized chief X-ray inspection engineer
- ☐ Sanitary engineering sanitation supervisor
- ☐ Specially controlled industrial waste control manager
- ☐ Operations chief for work handling ordinary Class-1 pressure vessels
- ☐ LC/MS analyzer (second-level)

Environmental Safety Center (ESC)

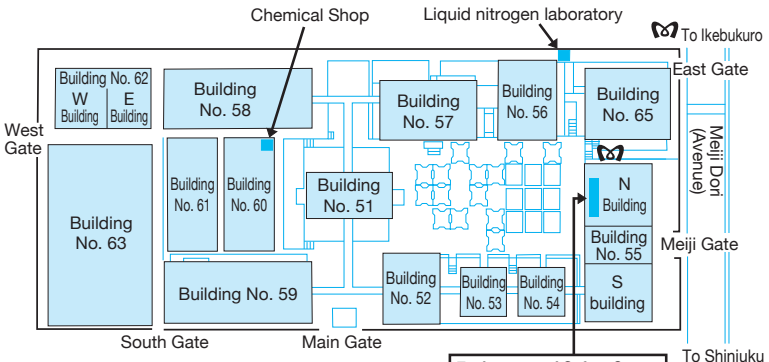
This Center was established in 1979 in an effort to preserve the environment at Waseda University. Since its foundation, the Center has engaged in various activities with the aims of preventing environmental pollution due to educational and research activities, reducing environmental burdens caused by such activities, and preserving the living environments of faculty members, students, and residents in the vicinity of Waseda.

<Contact numbers (extensions)>

Waste management:	73-6204
Chemical management:	73-6203
Chemical Shop:	73-6214
Analysis:	73-6205

◆Guide Map

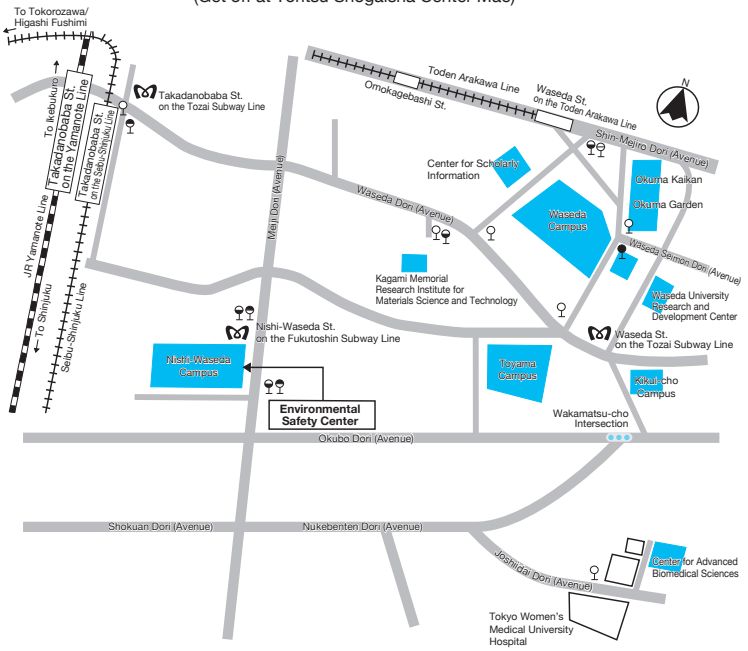
Nishi-Waseda Campus



JR Yamanote Line
Seibu-Shinjuku Line
Tozai Subway Line — Takadanobaba Station (approx. 15-min. walk)

Fukutoshin Subway Line — Nishi-Waseda Station (directly connected)

Bus
- West Exit of Shinjuku Station to Waseda
- Takadanobaba Station to Kudanshita (Get off at Toritsu Shogaisha Center Mae)



◆Summary History

Year	Month	Event
1979	12	· The Environmental Safety Center was established. (Building No. 60) · Professor Hirotomo Murakami was inaugurated as the first director.
1980	4	· The first meeting on management and handling of laboratory waste was held. · A guidebook on safe disposal of laboratory waste entitled “実験廃棄物を安全に処理するための手引書” was published.
	5	· The opening ceremony of the Center was held.
	9	· Professor Chuzo Kato was inaugurated as the second director.
1981	4	· Incineration of organic laboratory waste liquids at the University was started.
1983	3	· The first Workshop on Chemical Analysis (the predecessor to the present Workshop on Analysis) was held.
	5	· The Center was registered as a measurement certification business office.
	7	· The first issue of a report entitled “環境” was published.
1984	11	· Environmental measurement was performed at the Tokorozawa Campus.
1985	3	· The Environmental Measures Association of Private Universities (the predecessor to the present Environmental Protection Association of Private Universities) was established. Since establishment, Waseda University has served as the head office.
	4	· The Chemical Shop system was launched. (Building No. 65)
1986	12	· Professor Hajime Hasegawa was inaugurated as the third director.
1989	8	· Processing of organic waste liquids at the University was discontinued.
	12	· 10th anniversary of the Center’s establishment
1990	6	· Professor Akira Hirata was inaugurated as the fourth director.
1993	3	· The Center was relocated to the first basement of Building No. 55.
1995	6	· The Center participated as part of the investigation team on universities stricken by the Great Kobe Earthquake.
	9	· The first English brochure for the Center was issued.
	12	· Professor Hidehiro Sakurai was inaugurated as the fifth director.
1996	4	· A video on environmental education was created.
	7	· An annual report entitled “環境” was launched.
1997	4	· The first meeting of the Symposium on Global Environmental Problems was held.
1999	12	· Professor Toshio Nagoya was inaugurated as the sixth director. · 20th anniversary of the Center’s establishment
2000	4	· A new chemical management system was introduced.
2001	7	· Waste liquid processing equipment was removed.
2002	6	· According to the PRTR Act and the Tokyo Metropolitan Ordinance on Environmental Preservation, the Center started to report the amounts of chemical substances handled.
2003	7	· As a measure for sick buildings and school buildings, the Center started to analyze the amounts of chemical substances in indoor air.
2004	3	· The ceremony for the 20th anniversary of the establishment of the Environmental Protection Association of Private Universities was held.
	12	· 25th anniversary of the Center’s establishment
2005	4	· A new University-wide Chemical Registration Information System (CRIS) was introduced.
	12	· Professor Kazuyuki Kuroda was inaugurated as the seventh director.
2007	12	· The website was upgraded.
2008	4	· A safety e-learning program was introduced to ensure that experiments are conducted safely (Course N@vi).
	9	· The Chemical Shop was relocated (to Building No. 60).
	10	· The information display for Center operations was installed.
2009	4	· A chemical delivery confirmation system was introduced.
	12	· 30th anniversary of the Center’s establishment
2010	7	· Working environment measurement was started.
2012	9	· Professor Satoshi Tsuneda was inaugurated as the eighth director.
2014	9	· Professor Izumi Hirasawa was inaugurated as the ninth director.
2016	5	· Chemical substance risk assessment began.
2018	10	· A university-wide survey on devices containing PCBs was conducted.
2020	4	· The Chemical Registration Information System (CRIS) was upgraded. · University-wide rules on the management of poisonous substances were developed and put into operation.
	9	· Professor Yoshiyuki Sugahara was inaugurated as the tenth director.

Environmental Safety Center Guide
2021-2022

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