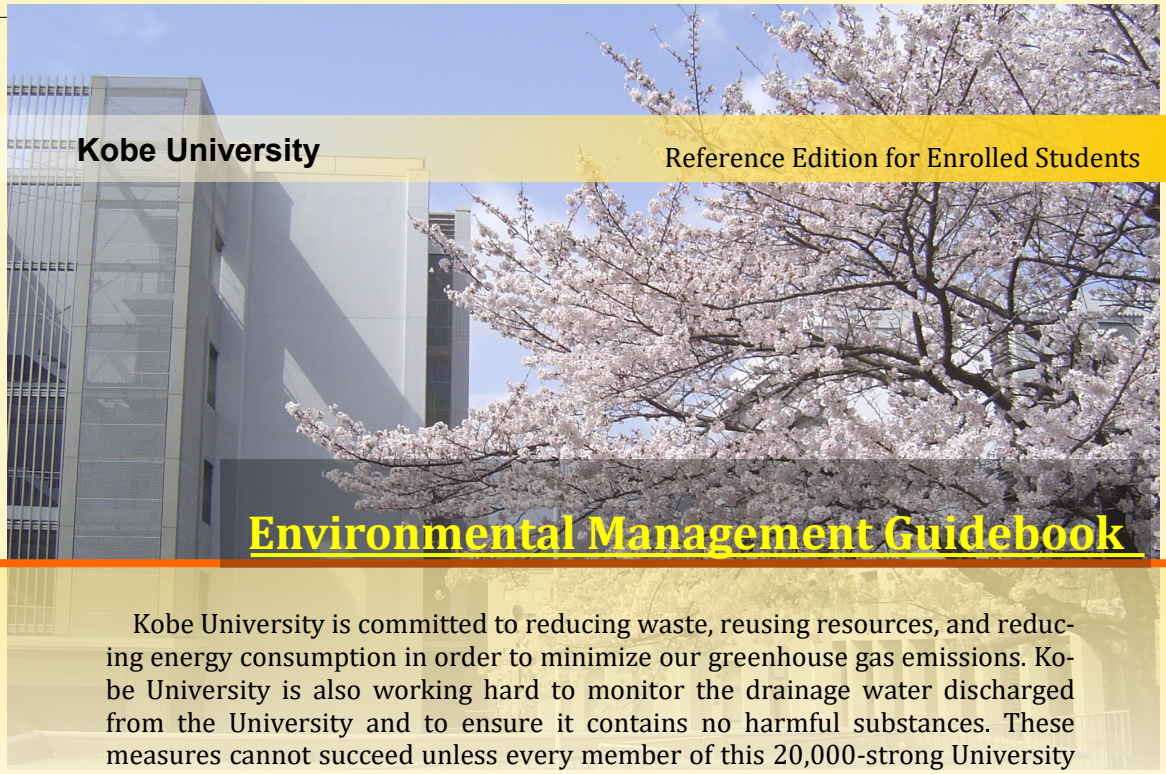


Kobe University

Reference Edition for Enrolled Students

Environmental Management Guidebook

Kobe University is committed to reducing waste, reusing resources, and reducing energy consumption in order to minimize our greenhouse gas emissions. Kobe University is also working hard to monitor the drainage water discharged from the University and to ensure it contains no harmful substances. These measures cannot succeed unless every member of this 20,000-strong University works on an individual basis to meet our environmental goals. A little care on a daily basis from each individual will add up to a great difference for the environment.

Kobe University Environmental Charter

(Established 29 September 2006)

(Basic Principles of the Charter)

As a world-leading center of research and education, Kobe University is fully committed to the conservation of the global environment and to the creation of a sustainable society, two extremely significant issues facing modern society today.

Kobe University pledges to: foster graduates with a strong awareness of the environment, as befitting of a university surrounded by the sea and the mountains; to promote the dissemination of academic information throughout the world from the heart of the international city of Kobe; and to take the initiative in environmental conservation. These measures are intended to allow Kobe University to help carve out a path toward the realization of one of humanity's common goals; the creation of an environmental sustainable society.

(Basic Policy)

1. To foster and support graduates with strong environmental awareness
2. To advance research focused on the conservation and creation of global environments
3. To promote innovation and initiative environmental conservation activities

Sorting & Collecting Garbage

Basic Vision

Kobe University has a number of campuses that are located within the boundaries of several local authorities, but most of the university lies within Kobe City. Kobe University is considered to be a place of business by these local authorities, rather than a general household, so the garbage that the university products is not collected by a local authority garbage truck. Collection and disposal of the garbage produced on campus is outsourced to a garbage disposal company. This means there are a number of differences in the way that garbage is treated and sorted in comparison to procedures for general households. The guidelines here give the commonly applicable points to garbage collection in all the campuses located in Kobe City. By following these rules, garbage is necessary to be correctly sorted and collected. These efforts help reduce the environmental burden as well as the cost of garbage treatment and disposal at Kobe University. For those campuses located outside of Kobe City, the garbage sorting and collection rules for the relevant local authority should be followed. The garbage sorting rules outlined here are the minimal rules that apply to all schools and graduate schools of the University. Additional rules may be in place in specific schools; where such rules are in place, these should also be followed.

The garbage collected by the garbage disposal company is taken to Kobe City garbage repositories and industrial waste treatment facilities used by the relevant garbage disposal companies. Most of the garbage will be taken to Kobe City repositories, so in principle the garbage sorting rules are identical to those for general household garbage.

Kobe City issues a guide to garbage disposal for general households (Rules for Sorting and Putting Out Garbage and Recyclables). On the other hand, Kobe University carries out to sort and collect garbage based on the rules for business; they are slightly different to those for general households, so please be aware of these differences.

Sorting Garbage: an Outline

In Kobe City, garbage is sorted into 6 categories (Burnable Garbage, Non-burnable Garbage, Gas-cartridges･Spray-cans, Cans･Bottles･PET-Bottles, Container Plastics and Trays, and Oversized Garbage) and put out to collection areas known as Clean Stations. There are two other categories which must not be put out to these Clean Stations, namely home appliances including personal computers, necessary to be recycled under “Home Appliance Recycling Law”, and Paper wastes, necessary to put out with local recyclables group’s collection. Thus, there are totally 8 categories. At Kobe University, some of these categories have been integrated, and a new category, laboratory waste, has been added. In total there are 7 categories: Burnable Garbage, Oversized (Non-burnable) Garbage, Recyclable (Cans･Bottles･PET-bottles), Recyclable (Paper Wastes), Large Garbage, Home Appliance Recyclables, Laboratory Wastes. Further details are provided on the following page.

☆ On Kobe University Campuses ☆

In the gangways and corridors of campuses located in Kobe City, you should find garbage containers marked variously: Burnables, Non-burnables, Cans, Bottles, PET Bottles, etc. Some schools and graduate schools have separate garbage containers for the PET bottle caps. Garbage should be sorted according to the classifications outlined on the following page. If you are unsure what to do with your rubbish, please ask the student office in the department.

Garbage Classification for Campuses located within Kobe City

Burnable Garbage

・Items should be burnable, less than 50 cm on any side.

(These should be placed in Burnable Garbage containers or in 'Burnable Garbage' bags designated for business by Kobe City and placed in the designated collection point.)

- Lunch box packaging, instant noodle cups
- Plastic products including stationary
- Small size and/or amount of polystyrene
- Kitchen waste
- Cloth, clothes
- Paper waste (dispose as Recyclable (Waste Paper) as far as possible)

Recyclable (Cans·Bottles·PET-bottles)

・Empty cans, bottles and PET-bottles used for drinks or foodstuffs.

(These should be sorted into the items shown below and placed in specified recycling containers.)

- Empty cans
- Empty bottles
- PET-bottles (Labels and caps should be placed in Burnable Garbage containers and the PET-bottle-cap collection containers, respectively.)

Recyclable (Paper Wastes)

・Corrugated cardboards, office papers, newspapers, magazines, other paper wastes.

(These should be sorted into the items shown below and placed in the designated collection point. Coated papers are disposed as Burnable Garbage.)

- Corrugated cardboards
- Office papers
- Newspapers (including newspaper inserts)
- Magazines
- Other paper wastes (wrapping papers, brochures, etc. Shredded paper is placed in plastic bags and put out .)

Home Appliance Recyclable

・Home appliance recyclables (as set out in Home Appliance Recycling Law.)

(These should be placed in the designated collection point after contacting student office in the relevant school or graduate school.)

- PCs, air conditioners, televisions, refrigerators, washing machines, etc.

Place in the designated bags for business, provided by Kobe City.

Do not place in the designated bags.

Oversized (Non-burnable) Garbage

・Non-burnable garbage small enough to fit in the designated bag for business.
・Items comprising a combination of Burnable and Non-burnable garbage.
・Burnable garbage with any one side greater than 50 cm in length and small enough to fit in the designated bag.

(These should be placed in Non-burnable Garbage containers or in 'Oversized (Non-burnable) Garbage' bags designed for business by Kobe City and placed in the designated collection point.)

- Ceramics, glass (sharps should be wrap in paper and attach a notice saying "DANGER".)
- Small pieces of metal, wire, wire mesh, chains (sharps should be wrap in paper and attach a notice saying "DANGER".)
- Gas cartridges, spray cans (empty the can and make a hole to remove all of the remaining gas.)
- Home electrical appliances (those items which Home Appliance Recycling Law does not apply to and fit in the designated bag.)

Large waste

・Burnable or Non-burnable garbage too large to fit in the designated bags.

(These should be placed in the designated collection point after contacting student office in the relevant school or graduate school.)

- Large furnitures (desks, chairs, bookshelves, etc.)
- Large plastic products (boxes, etc.)
- Large size and/or amount of polystyrene
- Home electrical appliances (those items which Home Appliance Recycling Law does not apply to and are too large to fit in the designated bag.)
- Experimental equipment (restricted to those which do not contain hazardous substances.)

Laboratory waste

・Wastes generated at laboratories.

(These should be sorted into the items shown below and placed in the designated collection point.)

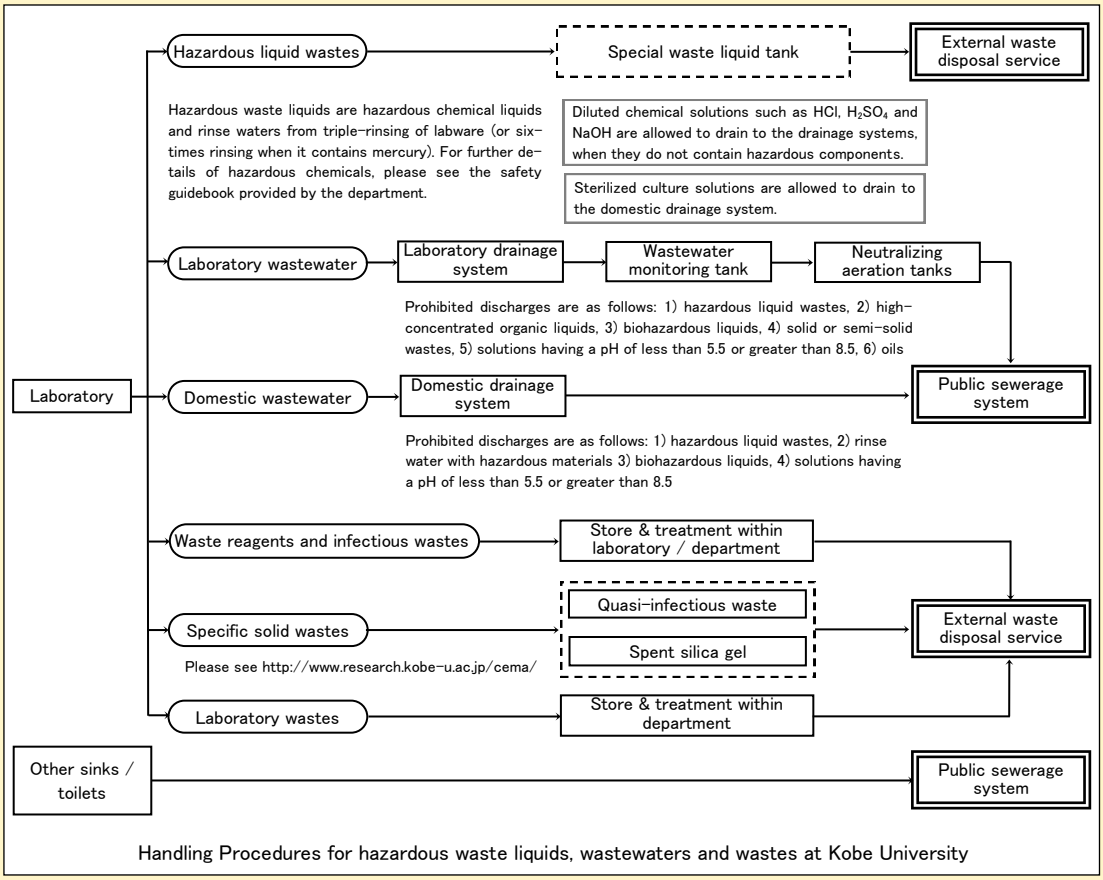
- Small size wastes generated by experiments, whether burnable or non-burnable (to be placed in plastic bags approx. 45 l in capacity.)
- Empty regent bottles (to be placed in plastic bags approx. 45 l in capacity after washing and drying; do not remove the label.)
- Empty 18-liter square cans used for reagents (remove all of the remaining liquid.)
- Glass, pieces of metal, needles, etc. (sharps should be wrap in paper or placed in can and attach a notice saying "DANGER".)

＊For detailed instructions, you should consult to student office of the department.

Among healthcare wastes, infectious wastes, etc. are highly recommended to consult to student office of the department.

Handling Procedures for hazardous waste liquids, wastewaters and wastes at Kobe Univ.

Wastewater discharged to the sewage system is broadly classified as laboratory wastewater and domestic wastewater. Laboratory wastewater refers to wastewater produced from washing equipment used in experimental laboratories. Domestic wastewater includes wastewater from toilets, washrooms, kitchenette sinks, kitchens, student dormitories, canteen kitchens, and showers at sports facilities. The following flow chart shows the handling procedures for hazardous waste liquids, wastewaters and wastes at Kobe University. For further details, please see the safety guidelines provided by relevant department. Acceptable concentrations of various hazardous substances in the public sewerage system are governed by legislation and are detailed on page 7.



Handling Procedures for hazardous waste liquids, wastewaters and wastes at Kobe University

Handling and Storing of Hazardous Liquid Waste

Laboratory waste is categorized according to the chart on page 5: Hazardous Liquid Waste Recovery Classification Chart. At Kobe University, any waste generated by education and/or research must be sorted and stored according to pre-determined procedures as required for its treatment. An external waste disposal service is then given the task of further treatment, once this initial sorting and storage has been completed. In some cases, it can be difficult to determine the exact nature of liquid discharge generated by an experiment. For this reason, the person with the best understanding of the nature of the experiments to be carried out should carry out appropriate preprocessing (initial processing) before any waste liquid is allowed to be generated. If there is any doubt as to how a waste liquid should be appropriately sorted or stored, the Center for Environmental Management should be contacted for details on appropriate sorting.

Sorting and Storing Laboratory Waste Liquid

Dos & Don'ts in Sorting & Storing Waste Liquid

Kobe University Special Waste Liquid Tank

1. Store all waste liquid in special waste liquid tanks provided by Kobe University (see image).
2. Store mercury wash water up to and including the sixth batch; store other wash waters up to and including the third batch.
3. Fill in the request slip clearly and accurately with the following information: name of representative waste handler, classification number, volume (L), main substances, and pH. In some cases, classification number or volume may be changed by depending on the judgment of the center.
4. Neither tanks containing waste liquid containing unidentified or unknown substances nor tanks with incorrect or incomplete request slips will be collected.
5. The waste liquid should be 5 L or more, not to exceed 20 L. Please contact the Center for Environmental Management if you wish to store less than 5 L of waste liquid.
6. Screw the lid on tightly, to prevent any leakage. Do not use damaged tanks.
7. Only reuse the tanks to store waste liquid from the same classification.
8. In the case of mixed waste, request slips should indicate the main substances contained within the waste, and relevant classification indicated. (For oil-based liquid waste, classification should be according to lowest flash point)
9. Osmium, thallium, and beryllium (Classification I-3) should not be mixed with other heavy metals and should be sorted in separate tanks.
10. Substances listed in Classification II-12 should only be present in minute amounts (mg/L levels). If levels are not minute, the waste liquid should be classified as IV.
11. Oil-based waste liquid must never be mixed with heavy metals.
12. Waste reagents are not classified as waste liquid.
13. High BOD waste liquid should be classified as I-1 or I-2 and if it contains any destructive fungi , sterilize it.
14. Formalin aqueous solution should be classified as I-1 or I-2 .
15. Aqueous solutions containing ethidium bromide should be classified as I-3 when containing heavy metal.
    If no heavy metal is present, classify as either I-1 or I-2 according to pH.
    Gels can be collected as solid laboratory waste after being vaporized.
16. In principle, waste liquid should not contain any solid items (sediment, pieces of glass, pipette chips).

Any questions should be directed to the Center for Environmental Management
(E-mail: cema@research.kobe-u.ac.jp, Tel: 078-803-5991)

Pharmaceutical Waste Liquid Recovery Classification Chart

Classification I) Aqueous ordinary waste liquid

Classification	Substances contained
Ⅰ-1	Acid waste liquid (2<pH≦7) other than those listed in Classification II
Ⅰ-2	Alkaline waste liquid (7<pH<12.5) other than those listed in Classification II ・Photographic developing solution
Ⅰ-3	Waste liquid containing heavy metal other than those listed in Classification II-3 through II-9 ・Photographic fixing solutions ・Osmium ・Thallium, beryllium
Ⅰ-4	Waste liquid containing flourine Waste liquid containing boron

Classification II) Aqueous waste liquid requiring special management

Classification	Substances contained
Ⅱ-1	Strongly acidic waste liquid (pH2 or less)
Ⅱ-2	Strongly alkaline waste liquid (pH12.5 or more)
Ⅱ-3	Waste liquid containing mercury or mercury compounds
Ⅱ-4	Waste liquid containing cadmium or cadmium compounds
Ⅱ-5	Waste liquid containing lead or lead compounds
Ⅱ-6	Waste liquid containing organophosphorus
Ⅱ-7	Waste liquid containing hexavalent chromium compounds
Ⅱ-8	Waste liquid containing arsenic and arsenic compounds
Ⅱ-9	Waste liquid containing selenium and selenium compounds
Ⅱ-10	Waste liquid containing cyanogens compounds
Ⅱ-11	Waste liquid containing simazine Waste liquid containing thiuram Waste liquid containing thiobencarb
Ⅱ-12	Waste liquid containing trichloroethylene Waste liquid containing tetrachloroethylene Waste liquid containing 1,1,1-trichloroethane Waste liquid containing 1,1,2-trichloroethane Waste liquid containing dichloromethane Waste liquid containing 1,1-Dichloroethylene Waste liquid containing 1,2-Dichloroethylane Waste liquid containing 1,3-Dichloropropene Waste liquid containing *cis*-1,2-Dichloroethylene Waste liquid containing benzene Waste liquid containing carbon tetrachloride Waste liquid containing 1,4-Dioxane

Classification III) Oil-based, ordinary waste liquid

Classification	Substances contained
Ⅲ-1	Waste liquid other than those listed in Classification IV with a flash point of 70° or more (e.g. solutions containing organic solvents)

Classification IV) Oil-based waste liquid requiring special management

Classification	Substances contained
Ⅳ-1	Waste liquid with a flash point of less than 70° (e.g. solutions containing organic solvents)
Ⅳ-2	Waste liquid containing trichloroethylene
Ⅳ-3	Waste liquid containing tetrachloroethylene
Ⅳ-4	Waste liquid containing 1,1,1-trichloroethane
Ⅳ-5	Waste liquid containing 1,1,2-trichloroethane
Ⅳ-6	Waste liquid containing dichloromethane
Ⅳ-7	Waste liquid containing 1,1-Dichloroethylene
Ⅳ-8	Waste liquid containing 1,2-Dichloroethane
Ⅳ-9	Waste liquid containing 1,3-Dichloropropene
Ⅳ-10	Waste liquids containing *cis*-1,2-Dichloroethylene
Ⅳ-11	Waste liquids containing benzene
Ⅳ-12	Waste liquids containing carbon tetrachloride
Ⅳ-13	Waste liquids containing 1,4-Dioxane

1）Substances that pose a risk to human health

Dioxins and dioxin-like compounds

Category	Discharge Standards
Dioxins and dioxin-like compounds	10 pg-TEQ/Lor less

Others (mg/L or less)

Category	Discharge Standards		Category	Discharge Standards	
	Higashi-Nada/ Chuo/Tarumi Treatment Area	Port Island Treatment Area		Higashi-Nada/Chuo/ Tarumi Treatment Area	Port Island Treatment Area
Cadmium and cadmium compounds	0.03	0.03	1,1,1-Trichloroethane	3	3
Cyanide compounds	0.7	0.3	1,1,2- Trichloroethane	0.06	0.06
Organophosphorous compounds	0.7	0.3	Trichloroethylene	0.3	0.3
Lead and lead compounds	0.1	0.1	Tetrachloroethylene	0.1	0.1
Hexavalent chromium compounds	0.35	0.1	1,3-Dichloropropene	0.02	0.02
Arsenic and arsenic compounds	0.1	0.05	Thiuram	0.06	0.06
Mercury, alkyl mercury	0.005	0.005	Simazine	0.03	0.03
Alkyl mercury compounds	To be undetected	To be undetected	Thiobencarb	0.2	0.2
Polychlorinated biphenyl	0.003	0.003	Benzene	0.1	0.1
Dichloromethane	0.2	0.2	Selenium and other compounds	0.1	0.1
Carbon tetrachloride	0.02	0.02	Boron and other compounds	230	230
1,2-Dichlorethane	0.04	0.04	Flourine and other compounds	15	15
1,1-Dichloroethylene	1	1	1,4-Dioxane	0.5	0.5
cis-1,2-Dichloroethylene	0.4	0.4	Ammonia, ammonium, nitrite and nitrate compounds	100 *	100 *

* Based on "*Water Pollution Control Law*". The value is total amount of ammonium (multiplied by 0.4), nitrite and nitrate.

2）Substances that pose a risk to the living environment

Category	Discharge Standards
Phenols	5 mg/L or less
Steel and steel compounds	3 mg/L or less
Zinc and zinc compounds	2 mg/L or less
Iron and iron compounds (soluble)	10 mg/L or less
Manganese and manganese compounds (soluble)	10 mg/L or less
Chromium and chromium compounds (soluble)	2 mg/L or less

3）Conditions that may damage facilities or equipment

Category	Discharge Standards
Temperature	Less than 45°C
Iodine consumption	Less than 220 mg/L

* Does not apply to facilities producing 500 m³ or less of wastewater per month

** At the Port Island Treatment Area, a concentration of half this total is criterion for exclusion

4）Conditions & substances that may impact sewage treatment facilities

Category		Discharge Standards
Potential Hydrogen (pH)		More than 5 – less than 9
*Biochemical oxygen demand (BOD)		2,000 mg/L or less
*Suspended solids (SS)		2,000 mg/L or less
n-hexane extract content	*a) animal/vegetable oil and fat content	150 mg/L or less
	b) Mineral oil content	5 mg/L or less
Nitrogen		1,200 mg/L or less**
Phosphorus		160 mg/L or less**

Promoting Energy Saving

Turn off lights, air conditioners, computers, and experimental equipment at the switch when required. Help prevent the wasteful use of energy

<Lights: save energy>
- Turn off unnecessary lights when leaving rooms and in corridors during daytime.

<Coolers and air conditioners: save energy>
- Turn off coolers when leaving a room; try to keep its use to a minimum
- Keep normal room temperature at 19°C for heating and at 28°C for the air conditioning
- Don't rely on the air conditioner alone; dress appropriate to the season
- Use blinds during the summer to keep direct sunlight out and reduce the use of the air conditioner
- Close windows and doors when the air conditioner is in use to reduce the level of air conditioning required
- When using the air conditioning, use heat exchange ventilation; at other times, open the windows or conduct other ventilating actions
- Always clean air conditioning filters before the change of each season

<Computers & lab equipment: standby energy saving>
- Unplug computers, OA equipment and experimental equipment whenever you can; reduce standby energy
- Turn computers, printers, copy machines and other OA equipment to energy saving mode.

<Elevators: energy saving>
- Don't use elevators when you don't need to; take the stairs instead

<Toilets: water saving & energy saving>
- Save water when using the toilet by only flushing when required
- Close the lid on Western-style toilets after use to save energy

Turn off unnecessary lights

Keep room temperature at 28°C in summer, 19°C in winter

Turn things off, switch to sleep mode

Take the stairs where you can

Make every day an energy saving day

Center for Environmental Management
URL : http://www.research.kobe-u.ac.jp/cema/
E-mail : cema@research.kobe-u.ac.jp
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