

As part of environmental conservation efforts, the Nagaoka University of Technology (NUT) categorizes the wastewater generated on campus into the following four types, domestic wastewater, experimental wastewater, experimental liquid waste, and rainwater. NUT has set up an operation management system and mechanism for the disposal of experimental liquid waste, from collection to external treatment. In this section, “experimental liquid waste” refers to the liquid waste originated from experiments and cleaning solutions of laboratory containers through the second rinse. Cleaning solutions discharged after the third rinse and cooling water are categorized as “experimental wastewater.” Solid waste is categorized as “experimental waste.”

Precautions and practices associated with each type of waste are detailed below.

1 Domestic wastewater

Domestic wastewater is the wastewater produced by human activities in households, such as water from toilet, wash basin, bath, and laundry. Domestic wastewater is collected by the drains of each building and is passed through the dedicated piping towards its discharging destination at the Nagaoka City’s public sewer system.

2 Experimental wastewater

Experimental wastewater passes through a dedicated drain installed in each laboratory. The released experimental wastewater passes through a dedicated pipeline, undergoes water quality testing regularly, and is discharged into the public sewage system (Nagaoka City).

Researchers must take extra care not to confuse the drain for experimental wastewater with the drain for domestic wastewater.

3 Experimental liquid waste

In accordance with Nagaoka University of Technology Rules of Handling Experimental Liquid Waste (Regulation No. 44; April 1, 2004), experimental liquid waste is separated and stored in designated containers in laboratories. The classification method is described in the **handbook for the treatment of experimental liquid waste**. The separated and stored experimental liquid waste are transported and stored temporarily in designated locations or in temporary storage areas that have been set up specifically for this purpose in each department or academic center.

The experimental liquid waste is collected according to the disposal application submitted by the discharger. The collection of organic and inorganic experimental liquid waste is outsourced to a specialized company for off-campus treatment.

4 Rainwater

Rainwater drainage from the site, such as water flow from the building roof and roads, is discharged through a dedicated pipeline or drainage ditch into the Osawa River. It is therefore crucial for researchers to stay alerted to any potential risk of water pollution as the water flow from the site is discharged directly into the river.

5 Experimental waste

Experimental waste refers to granules, powders, precipitates, sludge, and solids of harmful substances as well as unnecessary waste reagents generated by educational and research activities. Because such experimental waste falls under the category of industrial waste and/or specially controlled industrial waste, its disposal must be taken care of by external specialized companies. These companies must be contacted through the Section of Contracts, Division of Financial Affairs.

It is the sole responsibility of each laboratory to properly sort and store its generated experimental waste according to the designated categories. Each major and center on campus will be responsible for transporting their stored experimental waste using appropriate specified transportation methods to the locations for their collection by the specialized company.

During carriage or transportation, experimental waste must be appropriately labelled. Each label should clearly state the name of the laboratory, date, and classification type of the experimental waste. Labels must be attached to every waste container (i.e., plastic bags and cans). A university-wide format for the labels has been prepared and made available for this purpose. In addition, it is the sole responsibility of each laboratory to contract a specialized company for the collection of reagent bottles with remaining solution or unopened reagent bottles marked for disposal. Such waste may not be disposed in normal disposal areas (please contact the Section of Contracts, Division of Financial Affairs).

Any further questions regarding the disposal of experimental waste can be directed to the Safety and Health Management Committees selected by each major and center. Unknown classifications must always be consulted prior to disposal. Discretionary disposal with ambiguous classification might cause accidents or fire, leading to a large social problem.

The table below shows the classification of experimental waste at NUT (see item 3 above for information pertaining to experimental liquid waste, which, similar to experimental waste, is categorized as industrial waste).

Table 7 Categories of Experimental Waste at Nagaoka University of Technology

Categorization number and type	Examples of waste
1. Quasi-Infectious Waste	<ul style="list-style-type: none"> • Waste from the Physical Education and Health Care Center • Syringes and Quasi Syringe (glass or plastic) • Needles
2A. Incombustible Laboratory Waste (Metals)	<ul style="list-style-type: none"> • Metal products, pieces, polishing chips and cutting chips (18-liter drum volume limit) • Metal foils (e.g. aluminum foil) • Scalpels (non-medical use) • Metal reagent cans (<u>washed and dried</u>) (e.g. 18-liter drum)
2B. Incombustible Laboratory Waste (Glass)	<ul style="list-style-type: none"> • Glass products, pieces, and scraps • Glass reagent bottles (<u>washed and dried</u>) (Labels do not require removal. Removed caps must be disposed as Category 3) • Glass petri dishes and ampoules
2C. Incombustible Laboratory Waste (Others)	<ul style="list-style-type: none"> • Ceramic products (e.g. crucible), their fragments and powders • Concrete pieces (garbage bag volume limit), gypsum • Other incombustible composite material • Silica gel • Desiccants (e.g. CaCl₂ calcium chloride, MgSO₄ magnesium sulfate, Na₂SO₄ sodium sulfate)
3. Combustible Laboratory Waste	<ul style="list-style-type: none"> • Papers used in experiments (e.g. Kimwipes, filter paper) • Gauze, absorbent cotton used in experiments • Plastic petri dishes, tubes, pipettes, etc. • Gloves (rubber or vinyl) • Plastic reagent bottles (<u>washed and dried</u>) (Labels do not require removal) • Plastic caps of reagent bottles • Sterilized culture medium • Autoclave-sterilized waste in regular garbage bag (no biohazard symbol)

As mentioned above, researchers in each major and center must follow the administrative instructions and implement the disposal protocol for liquid waste and waste discharged following the experiments and practical training. It is important that the researchers adopt a sense of responsibility, awareness, and cooperation concerning the treatment and disposal of waste.

Refer to the handbook for the treatment of experimental liquid waste.