

Factsheet

Disposal of Hazardous Waste – Basic Principles

1. Definition

Hazardous waste is waste that – based on its composition, physico-chemical or biological properties – requires special technical and organisational measures to dispose of it in an environmentally friendly way. For example, this category includes accumulators, batteries, paints, lacquers, adhesives, acids, alkalis, solvents, medication, mercury (incl. mercury thermometers), chemicals, bleach, aerosol cans, gas cartridge, mineral oils, pesticides, wood preservatives and insecticides. Hazardous waste must be collected and disposed of separately. **Disposal in the household trash or the sewage system is prohibited.**

2. General principles

The following principles must be heeded when handling hazardous waste:

- Avoiding waste takes priority over waste recycling and waste disposal.
- Wherever possible, hazardous waste must be collected separately.
- Any accumulated hazardous waste must be labelled and declared accurately.
- Existing container labels are not to be pasted over or overwritten.
- Waste containers must be filled solely with the kind of waste for which they have been authorised.
- Waste containers must not be filled over 90% of their capacity. The contents of the waste containers must not leak out (pay attention to the volume increase due to the expansion of the materials, caused, for instance, by high temperatures).
- The exterior of the containers to be disposed of must be clean and free from adhering chemicals (use suitable funnels for filling purposes).
- Always close waste containers tightly.
- Place and store waste containers in suitable locations only (e.g. canisters for liquid waste in an appropriate safety cabinet or laboratory fume hood).
- Check waste containers regularly.
- Highly reactive substances must be deactivated by the producer of the waste prior to disposal (e.g. alkali metals, peroxides, metal hydrides, Raney nickel, metal alkyls or azides).
- Hazardous waste must not give off any gases and must always be fully reacted (e.g. acid hydrolysis).

- Substances that are unstable at room temperature and, thus, may react dangerously, must be inactivated in the laboratory (e.g. certain organic azides).

Please note: Employees of the hazardous waste disposal stations (SAE`s) are obliged to reject hazardous waste that does not meet the aforementioned conditions.











3. Responsibilities and skills

The person who produces hazardous waste is responsible for the hazardous waste until its definite disposal (e.g. high-temperature combustion). Additionally, this responsibility also includes classifying, labelling and packaging the hazardous waste correctly. The person producing / handing in the waste may be held responsible for erroneous declaration, labelling and packaging.

The staff at the SAEs will not accept any unlabelled, wrongly labelled or unsafely packed hazardous waste. Hazardous waste of this kind must be taken back by the users.

4. Disposal containers

For the disposal of hazardous waste the containers G1–G8 and F1 (see Table 1) are available from the SAEs free of charge. Sharp containers (SP) must be procured by the person handing in the waste (e.g. in the HCI Shop).

No.	Description	Photo	No.	Description	Photo
G1	10-litre canister (HDPE)		G6	30-litre bucket (HDPE)	
G2	5-litre canister (HDPE)		G7	1-litre wide-neck bottle	
G3	1-litre canister (HDPE)		G8	30-litre VAT container	
G4	250-ml bottle (HDPE)		F1	200-litre barrel	
G5	10-litre bucket (HDPE)		SP	sharp container (HCI Shop or external suppliers)	

Tab. 1: Disposal containers (example images)

Containers G1–G4 must be used for liquid waste (halogenated solvents, non-halogenated solvents, acidic solutions, alkaline solutions, photographic chemicals etc.). G5–G7 are suitable for solid hazardous waste or as repackaging, e.g. for the disposal of original containers. F1 is used in order to collect waste oil and emulsions. G8 is a special container for biomedical waste, which is used for the disposal of carcasses.

5. Packing hazardous waste

Hazardous waste must be disposed of in the containers provided (filling level < 90%, no contamination from outside, closed tightly). Chemicals in original containers (orig. cont.) may be handed in if they are sealed, not contaminated on the outside and closed correctly.

Please note: old, brittle plastic containers or containers with defective seals must be emptied into another container or packed into a stable, suitable second packaging.

Hazardous waste which may outgas (e.g. peroxides, peracetic acid, reacted and, if necessary, diluted nitric acid containing waste) must be supplied with a diaphragm cap with pressure compensation. Such caps are available at the SAEs.

6. Labelling hazardous waste

The disposal containers must be labelled. Labels and hazard symbols are provided for free. These must be attached before filling and, if possible, completed in advance (the fields "UN and VeVA" are completed by the SAE staff). Depending on the chemical properties of the hazardous waste, GHS hazard symbols (Globally Harmonised System for the classification and labelling of chemicals) must be attached; e.g. corrosive, toxic or highly flammable.

Sonderabfälle / déchets spéciaux / rifiuti speciali	
UN	VeVA
	Inhalt / Content (%): _____ _____ _____
	pH: ____ Nano: <input type="checkbox"/> ja <input type="checkbox"/> nein
	Institut/ Professur/ Gruppe: _____
Begleitschein-Nr.	Datum/ Visum: _____
ETH Zürich	



Sonderabfälle / déchets spéciaux / rifiuti speciali	
Halogenierte Lösungsmittel / halogenated solvents	
UN 1992	VeVA 07 07 03
	Inhalt / Content (%): _____ _____ _____
	pH: ____ Nano: <input type="checkbox"/> ja <input type="checkbox"/> nein
	Institut/ Professur/ Gruppe: _____
Begleitschein-Nr.	Datum/ Visum: _____
ETH Zürich	

Fig. 1: General and specific labels for hazardous waste

Required information about the hazardous waste (must be submitted by the person handing in the waste)

- Content (chemical description) and indication of the approximate amount (% , ppm etc.) of the main components and of particularly hazardous or environmentally toxic substances
- pH value (aqueous solutions)
- For nanomaterials, tick the "yes" box; otherwise, please tick "no"
- Institute, group or chair (= owner of the waste)
- Date and signature of the person responsible (person who hands in the waste)

Exception

Chemicals and products in intact original containers do not need to be labelled, provided the composition is unchanged and the labels available are legible.

7. Classification of hazardous waste

Hazardous waste is classified based on the waste's hazardous properties and/or its manner of disposal, which is in accordance with Appendix 1 of the Ordinance on Lists for Handling Waste of the Federal Department of Environment, Transport, Energy and Communication (DETEC). The hazardous waste should be assigned to a hazardous waste category by the person handing it in (see Appendix 9). However, mixtures, solutions or unknown substances may not allow a clear classification. In such cases, the classification must be discussed with the SAE's specialists at ETH Zurich. Please contact us via sonderabfall@ethz.ch or complete the [online form](#).

8. Legal foundations

For the storage and handling of hazardous waste, the provisions of the Chemicals Act and other regulations apply:

- Umweltschutzgesetz (USG), SR 814.01 (Environmental Protection Act (EPA), SR 814.01)
- Verordnung über die Vermeidung und die Entsorgung von Abfällen (VVEA), SR 814.600
- Verordnung über den Verkehr mit Abfällen (VeVA), SR 814.610
- Verordnung über Listen zum Verkehr mit Abfällen, SR 814.610.1
- Verordnung über den Verkehr mit Abfällen, tierischen Nebenprodukten (VTNP), SR 916.441.22
- Einschliessungs-Verordnung (ESV), SR 814.912
- Verordnung über die Beförderung gefährlicher Güter auf der Strasse (SDR), SR 741.621
- Gewässerschutzverordnung (GSchV), SR 814.201 (Waters Protection Ordinance (WPO), SR 814.201)
- Chemikaliengesetz (ChemG), SR 813.1 (Chemicals Act (ChemA), SR 813.1)
- Chemikalienverordnung (ChemV), SR 813.11 (Chemicals Ordinance (ChemO), SR 813.11)
- Verordnung über die Unfallverhütung (VUV), SR 832.30

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9. Appendix: Hazardous waste categories

Hazardous waste is classified based on the waste's most dangerous property. The categories "radioactive substances" (disposal according to radiation protection concept) and "infectious or genetically modified biological substances" (inactivation in accordance with the biosafety concept) are described in detail elsewhere. The owner must return "corrosive, toxic, or reactive gases" to the suppliers or destroy those substances in the laboratory. These three hazardous waste categories are specified here solely for the sake of completeness.

1. Explosive and self-decomposing, self-igniting substances
2. Toxic substances
3. Corrosive substances (acids and alkalis)
4. Solvent waste
5. Oxidants
6. Substances that are hazardous to the environment
7. Other laboratory chemicals
8. Other hazardous waste
9. Empty, contaminated packaging and contaminated materials

1. Explosive and self-decomposing, self-igniting substances

1a Explosive and self-decomposing substances

Explosive substances and objects used for explosive purposes are amenable to the *Sprengstoffgesetz* (Explosives Act). They must be disposed of accordingly by the person in charge of explosives (they must not be disposed of with hazardous waste).

Examples: pyrotechnic objects, rockets (hail cannons, fuel rockets, fireworks), ammunition, explosives and fuses.

Please note: ETH Zurich's SAEs will not accept any explosives.

Laboratory chemicals or reaction products with explosive properties (GHS: H 201–204, 240–241)¹ may only be handed in to ETH Zurich's SAEs under certain conditions:

- They must be stable at room temperature.
- They must not have any contaminants that might cause hazardous reactions.

Substances which become hazardous while drying out (EUH001) must be stabilized. In order to do so, add water or a suitable solvent (see safety data sheet of the respective chemical).

	Explosive waste
Examples	Organic peroxides, picric acid and picrates, diazo compounds, nitroamines, nitro-compounds, azides.
In particular	If possible, destroy waste in the laboratory
Hazardous reactions	Avoid friction and the build-up of heat (refrain from opening old containers). May react violently with oxidants or reductants. Might form explosive substances with heavy metals (azides, picrates etc.).
Containers	Whenever possible, submit in original containers (container type: orig. cont.).

¹ H statements: hazard statement in accordance with Globally Harmonised System (GHS) for the classification and labelling of chemicals

Substances forming peroxide

- For substances forming peroxide which are hazardous without being concentrated, the following applies: pure substances and non-stabilised or untested mixtures including solutions, should be disposed of ideally within six months at the latest. Otherwise, the waste needs to be tested for peroxides and if need be destroyed in the laboratory while respecting stringent safety precautions in accordance with good laboratory practice, or the peroxide present must be annihilated. These substances include among others:

potassium (metallic), potassium amide, sodium amide, 1,1-dichloroethene divinyl ether, divinyl acetylene, diisopropyl ether, 1,3 butadiene, chlorobutadiene, tetrafluoroethylene.

- For substances forming peroxide which are hazardous through being concentrated (e.g. evaporation, vaporisation), the following applies: pure substances and non-stabilised or untested mixtures including solutions, should be disposed of ideally at the latest within twelve months. Otherwise, the peroxide present must be measured and destroyed. These substances include among others:

1,1-diethoxyethane, isopropylbenzene, cyclopentane, cyclohexane, cocylooctane, 1,3-butadiene, dicyclopentadiene, diethylene glycol dimethyl ether, ethylene glycol dimethyl ether, diethyl ether, p-dioxane, furan, propyne, methylcyclopentane, methyl i-butyl ketone, tetrahydrofuran, tetrahydronaphthalene, vinyl ether, cyclohexanol, 4-heptanol, 4-penten-1-ol, 2-phenylethanol, 1-phenylethanol, 2-butanol, cyclohexen-1-ol, decahydronaphthalene, 3-methyl butan-1-ol, 2-pentanol, isopropanol, tetrahydronaphthalene.

Please note: Laboratory chemicals which have become unstable due to ageing (peroxide formation), drying out or concentration may not be brought to the SAEs. If such expired chemicals are found in the laboratory, please inform the department of SSHE immediately.

Polymerising substances

- Monomers which have a tendency towards severe self-polymerisation due to the formation of peroxides should not be stored longer than 24 hours without inhibitors. These substances include:

acrylic acid, acrylonitrile, 1,3-butadiene, chlorobutadiene, chlorotrifluoroethane, methyl methacrylate, styrene, tetrafluoroethane, vinyl acetate, vinyl acetylene, vinyl chloride, vinylpyridine, 1,2-dichloroethene.

1b Self-igniting substances

Self-igniting substances include pyrophoric and self-heating substances.

Substances (including mixtures and solutions) are pyrophoric if they already ignite in small amounts within five minutes after coming into contact with air (GHS: H250). Substances and objects (including mixtures and solutions) are capable of self-heating if they heat up themselves without any energy input in contact with air and may catch fire (GHS: H251).

	Self-igniting waste
Examples	Metal alkyls (butyllithium), white phosphorus, pyrophoric metal dusts, Raney nickel.
In particular	As a rule, store waste under protective gas and/or in inert liquids. If possible, destroy waste in the laboratory.
Hazardous Reactions	May react violently with oxidants or reductants. May react violently with water.
Containers	Whenever possible, submit in original containers. Defective containers will not be accepted at ETH Zurich's SAEs.

1c Substances reacting violently with water

Substances which form flammable gases and, in some cases, may self-ignite when they come in contact with water (GHS: H260/261).

	Waste that reacts violently with water
Examples	Alkaline metals, alkaline earth metals, hydrides, carbides, phosphides, sulphides.
In particular	As a rule, store waste under protective gas and/or in inert liquids. If possible, destroy waste in the laboratory.
Hazardous reactions	May react violently with water and form (self-igniting) flammable gases.
Containers	Whenever possible, submit in original containers. Defective containers will not be accepted at ETH Zurich's SAEs.

2 Toxic substances

2a Cyanides

	Solid salts and solutions containing cyanides
Examples	Sodium cyanide, potassium cyanide, potassium hexacyanoferrate.
In particular	Aqueous solutions must be adjusted to a pH level > 12 in the laboratory.
Hazardous reactions	Reacts violently with acids.
Containers	Plastic containers (HD polyethylene), container types: G1–G3 or orig. cont.

2b Inorganic azides

	Solid salts and solutions containing inorganic azides
Examples	Sodium azide.
In particular	Aqueous solutions must be adjusted to a pH level > 12 in the laboratory.
Hazardous reactions	Reacts violently with acids. Can form highly explosive compounds with metals and their salts.
Containers	Plastic containers (HD polyethylene), container types: G1–G3 or orig. cont.

2c Mercury (compounds)

	Waste containing mercury
Examples	Mercury in metallic form or as an inorganic or organic compound.
In particular	Some organomercury compounds such as dimethylmercury are toxic and can be absorbed by the skin. This kind of waste must be at least double-packed. Always collect elemental mercury in sealed plastic containers.
Hazardous reactions	As metallic mercury has a corrosive effect on many metals (formation of amalgam), never collect mercury in metal containers.
Containers	Plastic containers (HD polyethylene), container types: G1–G3 or orig. cont.

2d Arsenic

	Waste containing arsenic
Examples	Arsenic in elemental form or as an inorganic or organic compound, including arsenides (GaAs), cacodylates (cacodylate buffer).
In particular	Indicate pH value in aqueous solutions. Indicate the chemical compound on label.
Hazardous reactions	Arsenic waste must be collected in sealed containers. It must be guaranteed that no arsine is formed (arsenides and acid).
Containers	Plastic containers (HD polyethylene), container types: G1–G3 or orig. cont.

2e Heavy metals

	Solid salts and solutions containing heavy metals
Examples	Toxic metals and metalloids are classified as heavy metals: Ag, Au, Be, Cd, Co, Cr, Cu, Ir, Mo, Ni, Os, Pb, Pd, Pt, Rh, Sb, Se, Sn, Tl, Zn.
In particular	The pH value and concentration of the heavy metals must be indicated on the label. Solutions containing nitric acid must have completely reacted (formation of nitrous gases!) → Waste containing arsenic and mercury must be disposed of separately.
Hazardous reactions	Reacts violently with azides, acetylene and picric acid (formation of explosive salts).
Containers	Plastic containers (HD polyethylene), container types: G1–G3 or orig. cont.

2f Ethidium bromide

	Ethidium bromide and other dyes intercalating in DNA
Examples	Ethidium bromide (EtBr), GelRed, CYBR Green and other EtBr replacement products, including gels and consumable material.
In particular	Contamination of the disposal containers must be strictly avoided.
Hazardous reactions	-
Containers	Plastic containers (HD polyethylene), container types: G1–G7 or orig. cont.

3 Corrosive substances (acids and alkalis)

General information on acidic waste:

Acids and acidic, aqueous solutions must not contain any of the following substances as they may react violently.

- Cyanides: Formation of toxic gases
- Azides: Formation of toxic gases
- Metals that are not fully reacted: Excess pressure, formation of hydrogen

Please note:

- Mercury or arsenic compounds must be disposed of as mercury or arsenic waste in accordance with 2b or 2c, respectively.
- Acidic solutions containing heavy metals must be disposed of as solid salts and solutions containing heavy metals in accordance with 2d.
- Nitrating acid ($\text{H}_2\text{SO}_4/\text{HNO}_3$) must be rendered harmless in the laboratory.
- Aqua regia (HNO_3/HCl) must be fully reacted; it must be diluted with water until a ratio of at least 1:1 has been achieved.
- Piranha solution must be left open in the fume hood for at least 24 hours after use. Canisters must have gas draining valves.

3a Hydrofluoric acid

	Hydrofluoric acid (fluoric acid)
Examples	Hydrofluoric acid, bifluorides (hydrogen fluorides), fluorosilicic acid solution and other inorganic acids containing fluorine.
In particular	Please note: highly toxic substance that can be absorbed by the skin. The exterior of containers must be free from hydrofluoric acid remainings.
Hazardous reactions	Forms toxic gases with cyanides, cyanates, azides etc. Reacts violently with metals (fusions which are not fully reacted), oxidants, amines, concentrated sulphuric acid and other substances.
Containers	Plastic containers (HD polyethylene), container types: G1–G3 or orig. cont.

3b Nitric acid

	Nitric acid
Examples	Nitric acid, aqua regia, nitrating acid
In particular	HNO_3 / HCl mixtures must be diluted with water at least 1:1. Destroy nitrating acid in the laboratory.
Hazardous reactions	Please note: nitric acid reacts exothermally with many substances (metals, organic substances) and may form nitrous gases (excess pressure, toxic gases). Forms toxic gases with cyanides, cyanates, azides etc.
Containers	Plastic containers (HD polyethylene), container types: G1–G3 or orig. cont. Use gas drainage valve for canisters (provided by SAEs).

3c Other inorganic acids

Highly concentrated acids (e.g. fuming sulphuric acid) must be diluted before being added to a hazardous waste container.

Please note: add acid to water, never the other way round.

	Other inorganic acids
Examples	Sulphuric acid, hydrochloric acid, phosphoric acid, boric acid, hydrogen sulphates.
In particular	If possible, collect acids separately.
Hazardous reactions	Forms toxic gases with cyanides, cyanates, azides etc. Reacts violently with metals (digestions which are not fully reacted), oxidants, amino compounds.
Containers	Plastic containers (HD polyethylene), container types: G1–G3 or orig. cont.

3d Organic acids

	Organic acids
Examples	Acetic acid, propionic acid, butyric acid, oxalic acid (carbonic acids), sulphonic acids.
In particular	If possible, collect organic acids separately.
Hazardous reactions	Reacts violently with oxidants, concentrated sulphuric acid, nitric acid and other acids more.
Containers	Plastic containers (HD polyethylene), container types: G1–G3 or orig. cont.

3e Acid chlorides and anhydrides

	Organic and inorganic acid chlorides and anhydrides
Examples	Acetic anhydride, phosphorus pentoxide, phosphorus oxychloride.
In particular	Hand in reactive acid anhydrides and chlorides in sealed, suitable containers. Destroy reaction residues in the laboratory only.
Hazardous reactions	Reacts, amongst other things, violently with water (heat generation, formation of corrosive gases).
Containers	Container type: orig. cont.

3f Bases (alkalis)

Alkaline/basic inorganic substances and their aqueous solutions must not contain any substances that might react with them in a hazardous manner.

- Not fully reacted base metals (Mg, Al etc.): excess pressure, formation of hydrogen

	Bases (alkalis)
Examples	Sodium hydroxide, potassium hydroxide, calcium hydroxide, alkaline aqueous saline solutions, bases, ammonia and other inorganic alkaline (basic) substances.
In particular	If possible, collect bases separately. Always hand in ammonia in sealed, suitable containers.
Hazardous reactions	Reacts, amongst other things, violently with acids. May generate heat when in contact with water. May form hydrogen when in contact with base metals.
Containers	Plastic containers (HD polyethylene), container types: G1–G3 or orig. cont.

4 Solvent waste

4a Non-halogenated (chlorinated) solvent waste

As a rule, non-halogenated solvent waste can be collected together in one container. The proportion of halogenated or chlorinated compounds must be < 2%.

	Non-halogenated (chlorinated) solvents, washing liquids and mother lyes with a halogen or chlorine content of <2%
Examples	Alcohols, ketones, aliphatic and aromatic hydrocarbons (ethanol, methanol, pentane, hexane, acetonitrile, diethyl ether, ethyl acetate).
In particular	The contents must be indicated as accurately as possible on the label.
Hazardous reactions	May react violently with oxidants and other reactive substances.
Containers	Plastic containers (HD polyethylene), container types: G1–G3 or orig. cont.

4b Halogenated (chlorinated) solvent waste

As a rule, halogenated solvent waste can be collected together in one container.

Please note:

Non-halogenated yet volatile, toxic or CMR substances such as benzene, carbon disulphide and solvents with a high sulphur content must be disposed of as halogenated solvent waste.

	Halogenated (chlorinated) solvents, washing liquids and mother lyes
Examples	Chloroform, dichloromethane, tetrachloroethylene, trichloroethane and other toxic or CMR substances (e.g. benzene, hexamethylphosphoric triamide).
In particular	Collect in the smallest possible tight containers and dispose of directly. The contents must be indicated as accurately as possible on the label.
Hazardous reactions	May react violently with strong bases. Please note: possibly, chloroform and acetone may react violently (highly exothermally).
Containers	Plastic containers (HD polyethylene), container types: G1–G3 or orig. cont.

5 Oxidants

5a Inorganic oxidants

Oxidants may intensify a fire. Extremely strong oxidants can cause fires or even explosions (GHS: H270/271/272).

	Inorganic oxidants
Examples	Inorganic peroxides (hydrogen peroxide), persulphates, nitrates, permanganates.
In particular	Perchloric acid and concentrated nitric acid are also strong oxidants. However, they are disposed of as other inorganic acids in accordance with 3c. Diluted Javelle water (sodium hypochlorite) is disposed of as a base.
Hazardous reactions	May react violently with reductants. May ignite flammable materials such as wood.
Containers	Plastic containers (HD polyethylene), container types: G2-G4, F1 or orig. cont.

5b Organic peroxides

Organic peroxides are comparatively unstable, temperature-sensitive compounds. The majority are flammable; some organic peroxides are highly flammable, others merely low-flammable and some are even explosive. Even gentle rubbing with a spatula may cause some of these substances to degrade spontaneously.

	Organic peroxides
Examples	Peracetic acid, benzoyl peroxides, alkyl hydroperoxides, dialkyl peroxides, peresters, peracids, percarbonates, diacyl peroxides, ketone peroxides, perketals.
In particular	Heat-sensitive organic peroxides that have to be transported refrigerated (< 20°C) cannot be accepted by the SAEs.
Hazardous reactions	Organic peroxides are heat-sensitive. They must always be stored in cool places.
Containers	Plastic containers (HD polyethylene), container types: G2-G4, F1 or orig. cont.

6 Substances that are hazardous to the environment

6a Pesticides

	Pesticides
Examples	Pesticides (fungicides, herbicides, insecticides), plant protection agents, pesticide.
In particular	If possible, pesticides must be returned to the supplier.
Hazardous reactions	Fumigants (e.g. phosphides) may react violently with water or humidity.
Containers	Orig. cont.

6b Halogenated waste

	Halogenated waste
Examples	Organohalogen substances, isoflurane, chloroform/phenol (trizol), fluorinated polymers etc.
In particular	Halogenated solvents, see 4b.
Hazardous reactions	Besides possible toxic effects to humans, the majority of these compounds are harmful to the environment (ozone-depleting, sometimes extremely harmful to the aquatic environment).
Containers	Plastic containers (HD polyethylene), container types: G1–G7 or orig. cont.

6c Disinfectants

	Disinfectants
Examples	Stabimed, Gigasept, Korsolex, Mucasol.
In particular	Disposal in accordance with <i>Merkblatt chemische Inaktivierung</i> (AWEL Kanton Zürich).
Hazardous reactions	Chlorinated disinfectants react with acids (formation of chloric gas).
Containers	Plastic containers (HD polyethylene), container types: G1–G3 or orig. cont.

6d Aqueous solutions containing antibiotics

	Aqueous waste, harmful to the environment
Examples	Heat-stable antibiotic residues (including: Chloramphenicol, Gentamicin, Kanamycin, Vancomycin, Penicillin G, Ampicillin) in cell culture supernatants.
In particular	Disposal in accordance with <i>Merkblatt Antibiotika-haltige Flüssigabfälle</i> (AWEL Kanton Zürich).
Hazardous reactions	-
Containers	Plastic containers (HD polyethylene), container types: G1–G3.

7. Other laboratory chemicals

7a *Inorganic chemical waste*

Inorganic laboratory chemicals which do not correspond to any aforementioned category.

	Inorganic waste
Examples	Metal salts without arsenic, mercury, other heavy metals, cyanides, azides.
In particular	Indicate composition on label.
Hazardous Reactions	See corresponding safety data sheet.
Containers	Plastic containers (HD polyethylene), container types: G1–G3 or orig. cont.

7b *Organic chemical waste*

Organic laboratory chemicals which do not correspond to any aforementioned category.

	Organic waste
Examples	Other organic waste which has harmful, toxic, flammable or corrosive properties.
In particular	Indicate composition on label.
Hazardous reactions	See corresponding safety data sheet.
Containers	Plastic containers (HD polyethylene), container types: G1–G7 or orig. cont.

8 Other hazardous waste
8a Waste oil and emulsions

	Halogen-free machine, gear and lubricating oil (including mineral oil mixtures)
Examples	Non-halogenated (non-chlorinated) machine, gear and lubricating oil (including silicone oils from heated baths).
In particular	Halogenated or chlorinated special oils (Krytox, Flombin) must be disposed of as halogenated waste (6b).
Hazardous reactions	May react violently with strong oxidants.
Containers	Plastic containers (HD polyethylene), container types: G2–G4, F1 or orig. cont.

	Halogen-free machining emulsions and solutions
Examples	Cutting oils and cooling lubricant emulsions.
In particular	Indicate composition on label.
Hazardous reactions	See corresponding safety data sheet.
Containers	Plastic containers (HD polyethylene), container types: G1–G4, F1 or orig. cont.

8b Batteries and accumulators

	Lead acid batteries and lead accumulators
Examples	Car batteries, starter batteries, storage systems (UPS).
In particular	Poles must be covered (e.g. tape).
Hazardous reactions	Short circuit if poles touch conductive objects. Sulphuric acid may leak out.
Containers	Palette containers in the SAEs.

	Lithium batteries and lithium accumulators
Examples	Lithium polymer, lithium ion, lithium metal batteries and accumulators.
In particular	Poles must be covered (e.g. tape). Defective batteries (bulging, overheated, otherwise damaged) must be reported to SSHE and must not be brought to the SAEs without prior notification.
Hazardous reactions	Short circuit if poles touch conductive objects. Bulging or overheated batteries can also start burning with a delay. Toxic gases may form during the process (hydrogen fluoride).
Containers	Special containers in the SAEs.

	Household batteries
Examples	Nickel-cadmium batteries, nickel-metal hydride batteries, alkaline batteries.
In particular	Wet batteries (acid, alkali) must be disposed of as lead-acid batteries and lead accumulators.
Hazardous reactions	Short circuits may cause fires.
Containers	Special containers in the SAEs or containers at the collection points of the respective building area (Facility Management).

8c *Photographic chemicals*

	Fixative
Examples	Fixing baths, fixing solutions.
In particular	Always collect fixatives separately from developers.
Hazardous reactions	-
Containers	Plastic containers (HD polyethylene), container types: G1–G4 or orig. cont.

	Developer
Examples	Water-based developers and activator solutions.
In particular	Solvent-based developers must be disposed of separately (laboratory chemicals). Always collect developers separately from fixatives.
Hazardous reactions	-
Containers	Plastic containers (HD polyethylene), container types: G1–G4 or orig. cont.

8d *Paint, lacquer and adhesive waste*

	Paint, lacquer and adhesive waste
Examples	Paint, lacquer, enamel, stripper, shellac, varnish, polish, liquid filler and liquid lacquer base including thinner.
In particular	Unused liquid synthetic resin and starting products for certain 3D printing techniques (Poly-Jet, SLA) may be disposed of as paint waste.
Hazardous reactions	See corresponding safety data sheet.
Containers	Plastic containers (HD polyethylene), container types: G1–G7 or orig. cont.

8e Spray cans and aerosols with flammable or inert gases

	Spray cans, aerosols
Examples	Spray cans that contain asphyxiating or flammable gases, or fuel.
In particular	Aerosols with toxic or corrosive properties must be returned to the respective suppliers.
Hazardous reactions	Without protective caps, fuels (highly flammable gases such as butane) may escape and cause fires and/or explosions.
Containers	In the original container with a protective cap (orig. cont.).

8f Objects which pose an injury risk (sharps)

	Sharps
Examples	Syringe needles, scalpels, blades, glass Pasteur pipettes, snap-off ampoules, slides.
In particular	Sharps which stem from biological safety laboratories must be inactivated in accordance with ETH Zurich's biosafety concept before disposal. This is usually achieved via autoclaving. Sharps from the use of radioactive substances must be cleared via measurement and may only be disposed of in strict compliance with the radiation protection legislation. Sharps contaminated with hazardous chemicals (e.g. toxic substances, cytostatics etc.) must be labelled.
Hazardous reactions	-
Containers	In sharp containers (container type: SP). Pasteur pipettes and laboratory glass shards that are not biologically contaminated may be collected in the containers G5 and G6 and handed in.

8g Carcasses (animal bodies)

	Carcasses
Examples	Laboratory animals' carcasses.
In particular	If need be, infectious animal carcasses must be inactivated in accordance with the biosafety concept before disposal. In case of animal carcasses contaminated with radioactive substances, the radioactivity must have decayed before disposal. Animal carcasses must be stored deep-frozen.
Hazardous reactions	If stored too long at room temperature, the formation of gas may cause excess pressure in the disposal container.
Containers	Special containers for biomedical waste (container type: G8).

9 Empty, contaminated packaging and contaminated materials

9a Empty contaminated packaging

Please note: as a rule, packaging that contained hazardous substances should be cleaned thoroughly. Moreover, the hazard labelling must be rendered unrecognizable so that the packaging can subsequently be disposed of as household waste or be recycled as waste glass or waste metal. If it is not possible to clean the packaging, it is regarded as empty, contaminated packaging, which must be disposed of as hazardous waste.

Examples of the cleaning of frequently used packaging:

1. Cleaning of packaging

- Non-halogenated solvents (ethanol, acetone, ethyl acetate etc.):
Use up the remaining solvent or collect it as solvent waste. Leave open the bottle in a laboratory fume hood overnight to enable minor residual amounts (<1% of the content) to evaporate.
- Halogenated solvents (methylene chloride, chloroform, trichloroethene etc.):
Use up the remnants or collect them as halogenated solvent waste. Leave open the bottle in a laboratory fume hood overnight to enable tiny residual amounts (<0.1% of the content) to evaporate.
- Acids and bases (hydrochloric acid, phosphoric acid, sodium hydroxide solution etc.):
Rinse out empty packaging three times with water in a laboratory fume hood using personal protective equipment (safety goggles, gloves, lab coat). Collect the rinsing water as acid or base/alkaline waste.
- Empty packaging with solid, non-reactive substances:
Dissolve the remnants with a suitable solvent (water, alcohol etc.) and collect them as hazardous waste (depending on the material property: solvent, halogenated solvent, acid or base etc.).

2. Render the hazard labelling unrecognizable or label the packaging as EMPTY

3. Disposing of the empty and cleaned packaging

- Dispose of glass bottles without seals as waste glass.
- Put plastic containers unclosed in the municipal waste.
- Dispose of open metal containers (thin metal, steel) as waste metal.

Please note: do not clean packaging that contain particularly hazardous, especially reactive remains (GHS: H300/310/330; e.g. toxic substances, substances which react violently with water such as acid chloride, concentrated sulphuric acid etc.); always dispose of as hazardous waste instead.

	Empty contaminated packaging containing hazardous remains
Examples	Packaging with remains of toxic substances, insoluble substances with hazardous properties, reactive substances.
In particular	Leaky packaging must be placed in a second packaging.
Hazardous reactions	See corresponding safety data sheet.
Containers	Orig. cont.

9b Contaminated absorbent materials and consumables

	Contaminated absorbent materials and consumables
Examples	Protective gloves, wipes, plastic pipettes etc.
In particular	Material may be contaminated with small quantities of hazardous substances only. Absorbent material from chemical spills must be disposed of in the same category as the pure substance.
Hazardous reactions	-
Containers	Bags (collected in separate containers), container types: G5 and G6.

9c Filter cakes

Filter and column material as well as drying agents, which are contaminated with highly flammable solvents, must not be disposed of via the municipal waste. If possible, this kind of material should be stored openly in the laboratory fume hood overnight to enable the solvent to evaporate completely. Then, dry material can be disposed of as contaminated absorbent material in accordance with 9b. If this is not possible, these materials (without solvent supernatants) must be disposed of as filter cakes.

	Filter cakes, column material from chromatography, drying agents
Examples	Filter cakes, aluminium oxide, silica gel or Sephadex from flash chromatography, sodium and magnesium sulphate, molecular sieve.
In particular	No liquid must escape from the material (disposal containers G5-G7 are not permitted for liquids).
Hazardous reactions	Due to the large surface area, the flashpoint of a flammable liquid may be reduced.
Containers	Container types: G5–G7.