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Collection and disposal of hazardous waste

In connection with the work taking place at AU ROSKILDE, a considerable amount of hazardous waste is generated. In order to ensure that hazardous waste is disposed of properly, these guidelines describe all types of hazardous waste that are currently being produced in the department, as well as a description of how this waste should be handled. Thus, the guidelines should help ensure that the hazardous waste is both handled in a safe manner in terms of the working environment and disposed of in an environmentally sound manner.

The types of waste mentioned in these guidelines include chemical waste and the so-called "special waste", which is a generic term for several types of hazardous waste, which, for various reasons, must be handled differently than "normal" chemical waste.

Chemical waste, which must be disposed of as hazardous waste via FORTUM, is collected at the laboratory in suitable buckets/slumping cylinders, after which it is collected by personnel from the Technical Section/Operations Department, which is responsible for packing the waste properly.

In order to avoid improper packing, it is important that only approved people from the Technical Section/Operations Department pack bottles and solid waste in drums etc. Departmental staff is therefore not permitted to pack hazardous waste in drums etc. to be disposed of via FORTUM.

In order to ensure that the Technical Section/Operations Department is able to identify the chemical waste, it is the laboratories' responsibility to ensure correct labelling of the contents of buckets/slumping cylinders. In the following, the different types of chemical waste are described along with the corresponding correct labelling.

Liquid waste must be packaged and shipped in the waste bottles/UN approved containers. Therefore, it must be ok that the bottles placed for waste may be disposed of, if this is not the case, it is the user's responsibility to transfer the waste into other bottles that may be disposed of. An example could be if a 5 litre Duran/Pyrex bottle has been used for waste from HPLC. Here, the HPLC user must transfer the waste into other containers that can be disposed of.

In cases where waste cannot be determined to be one of the types of waste described, it must be assessed specifically, in collaboration with the person responsible for declaring hazardous waste, how the waste should be disposed of.

On the work environment site, there is a spreadsheet with an overview of many of the most commonly used chemicals and their waste groups.

[Link to Excel spreadsheet with frequently used chemicals and their waste groups](#)

[Link to AU's website with further information about waste management](#)

Collecting hazardous waste from the departments

The Technical Section/Operations Department is responsible for collecting hazardous waste from the two departments, ENVS and ECOS, twice a week: Tuesday and Thursday morning. (tox room waste in the period 10-12)

The waste must be correctly packaged (sealed packaging) and labelled and be placed at one of the locations in the department that serves as a storage space for hazardous waste. The person in the department, who is responsible for disposing of hazardous waste, will agree with the Technical Section/Operations department upon where the waste should be placed for pick-up.

Places, where hazardous waste is placed prior to collection, currently include:

ENVS: Ventilated cupboard in room D 1.10.

EMBI/ECOS: Ventilated cupboard in room B 1.37, valve-controlled cupboard in room B 2.35, room B 2.39, and room B 2.01/2.05.

ENVS: Ventilated cupboard in room C 1.13, ventilated cupboard in room C 2.09, ventilated cupboard in room C 2.13 and a trolley in the corridor next to the tox rooms, however not in direct sunlight

If, for special reasons, there is a need to dispose of hazardous waste apart from in connection with the two weekly collections, this must be agreed upon with the Technical Section.

Description of the different types of hazardous waste

In the following, each type of hazardous waste is described in more detail, and it is described how the waste should be packaged and labelled when disposed of. For practical reasons, a distinction is made between chemical waste and other types of hazardous waste, here referred to in the generic term "special waste".

Chemical waste

The labels to be used for marking the different types of hazardous waste are designed to ensure that waste that should not be mixed is separated in the disposal process from AU ROSKILDE and that the waste is declared in accordance with the recipient's (FORTUM) requirements.

This also means that highly reactive chemicals (derivatisation reagents, oxidization agents, etc.) should preferably be inactivated prior to being disposed of as waste. If this is not practically possible, please contact the person responsible for waste to assess whether the waste can be included in our normal types of waste, or whether the chemical must be collected completely separately.

In addition to labelling that places the waste in one of our waste types, waste containing carcinogenic substances must be labelled in accordance with the Danish working Environment Authority's requirements while it is handled internally in AU ROSKILDE. This labelling obligation only applies if the content of the waste of carcinogenic substances is greater than 0.1%. As the waste is typically collected little by little in a container, it can be difficult to know when the content of carcinogenic substances in the mixture is so great that the container must be labelled.

AU ROSKILDE has therefore decided that the waste container must be labelled when chemical residues are transferred to the container that are covered by requirements for labelling for cancer. This means that the person who first transfers a chemical labelled for cancer risk must put a special label on the container, regardless of whether subsequent transfers of chemical residues could result in a dilution of the waste that may cause the labelling requirement not to be necessary.

Solid waste

In practice, a distinction is made between several different types of solid waste, which are described below.

Paper, disposable gloves, needles, empty packaging, broken glass, glass pipettes, pipette tips, remnants of solid chemicals

(Laboratory waste, group H-2).

Materials that have been in contact with hazardous chemicals are collected at the laboratory in plastic bags placed in plastic buckets clearly marked "paper, disposable gloves, etc., group H-2". Needle boxes with used needles can also be collected in the buckets. Used needles must always be disposed of in approved needle boxes. Filled plastic bags are closed and marked with small labels with the text "laboratory waste, group H-2".

Sharp or pointed materials that have been in contact with hazardous chemicals are collected in the laboratory in plastic bags placed in plastic buckets clearly marked "Glass waste, group H-2". Small residue from solid chemicals can also be collected here. (Residual liquid chemicals are disposed of as liquid waste in slumping cylinders). Filled plastic buckets must be closed with tight fitting lids prior to collection. They must be placed at the site for the collection of hazardous waste in the laboratory.

Empty containers and empty chemical containers are placed at the site for collection of hazardous waste in the laboratory.

Unused chemicals

(Laboratory waste, group Z-1).

Residual quantities of unused chemicals (e.g. to be disposed of in connection with clean-up or because the chemicals are expired) are disposed of in the original packaging or other solid, tightly sealed packaging with a clear indication of the content. The chemicals are collected without further packaging by the Technical Section/Operations Department in plastic buckets labelled "UNUSED CHEMICALS". If, in special cases (e.g. in connection with a major clean-up), many unused chemicals are involved, collection must be agreed upon in advance with the Technical Section/Operations Department.

If you need to dispose of many unused chemicals, you must pack them in a large plastic bucket labelled "UNUSED CHEMICALS". A list of the bucket contents should also be made. The list must accompany the bucket.

Large glass bottles

Empty glass containers (1 litre or more) containing hazardous chemicals must be rinsed (if deemed necessary) with an appropriate solvent followed by water. Labels, hazard labels, etc. must be removed from the glass bottle before it is used for waste, and when filled it must be closed tightly with a screw cap prior to collection. They must be placed at the site for the collection of hazardous waste in the laboratory. The bottles are stored by the Technical Section/Operations Department, as, to the extent possible, they are reused as slumping cylinders for disposal of liquid hazardous waste.

Contaminated soil

Contaminated soil must be collected separately in suitable packaging, which is then placed in the plastic bucket marked "contaminated soil" and labelled with the type of contamination. The person responsible for waste must be contacted prior to placing the waste at the site for the collection of hazardous waste in the laboratory.

Waste containing mercury

(Waste group K-5).

Solid waste containing mercury (e.g. broken thermometers or mercury-containing batteries) should be packaged appropriately before being collected at the laboratory and labelled "Waste containing mercury". They must be placed at the site for the collection of hazardous waste in the laboratory.

Batteries

Batteries are collected separately in appropriate packaging, e.g. plastic bags etc. They must be placed at the site for the collection of hazardous waste in the laboratory. It is not necessary to differentiate between types of batteries.

Labels

Labels to be used in the labelling of the different types of solid waste are shown in Figure 1.

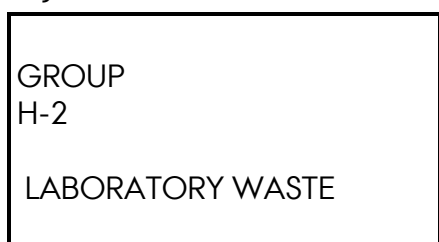


Figure 1. Small labels to be used for labelling of plastic bags containing different kinds of solid laboratory waste (6.6 cm x 3.5 cm).

<p>GROUP</p> <p>H-2</p> <p>LABORATORY WASTE</p> <p>Paper, disposable gloves, needle boxes, empty packaging, etc.</p>	<p>GROUP</p> <p>H-2</p> <p>LABORATORY WASTE</p> <p>Broken glass, glass pipettes, pipette tips, remnants of solid chemicals</p>	<p>GROUP</p> <p>H-2</p> <p>LABORATORY WASTE</p> <p>Empty containers, cans and chemical containers.</p>
<p>GROUP</p> <p>Z-1</p> <p>LABORATORY WASTE</p> <p>Unused chemicals</p>	<p>GROUP</p> <p>K-5</p> <p>WASTE CONTAINING MERCURY</p> <p>Solid waste: Broken thermometers etc.</p>	<p>CONTAMINATED SOIL</p> <p>Contaminated with_____</p> <p>Note! Remember to contact the person responsible for waste!</p>

Figure 1 (continued). Labels to be used when labelling different types of solid waste. (actual size is approx. 10.5 cm x 15 cm)

Liquid waste

When collecting liquid waste, a distinction is made between waste containing organic-chemical substances and waste that does not contain organic-chemical substances.

Liquid organic-chemical waste

Liquid organic-chemical waste is collected UN-approved 5-litre plastic containers.

Bottles/containers may only be filled 90% to prevent the cylinders/containers from exploding, e.g. in connection with great temperature changes, where the liquid may expand.

Filled, closed slumping cylinders are placed at the site for the collecting hazardous waste in the laboratory. The Technical Section is responsible for collecting slumping cylinders, provided they are labelled as described below.

Existing types of liquid organic-chemical waste are:

Organic waste that does not contain mercury or organic-bound halogen or sulphur
(Waste group C-1/H-1).

These are residues of solvents (methanol, acetone, acetonitrile, ethyl acetate, ethanol, hexane, toluene, Isooctane and Isopropanol)

Disposable glass containing chemical-containing liquids
(Laboratory waste, group H-3).

Disposable glass containing organic solvents (e.g. analysis solutions) is collected in thick plastic bags or UN approved containers, which are closed to and marked with small labels with the text "Laboratory waste, group H-3" and the name of the solvent. Small packaging must be sealed so that the contents cannot leak.

However, it is a good idea to use a bucket e.g. to collect vials over a longer period of time.

They must be placed at the site for the collection of hazardous waste in the laboratory.

Aqueous phenol and formalin solutions
(Waste group H-4).

These include aqueous phenol solutes, aqueous formaldehyde solutions, waste from the autosampler (ammonium analysis).

Scintillation fluids
(Laboratory waste, group H-3).

Disposable glass with solutions (scintillation liquid: INSTA Gel Plus/Ultima Gold TM etc./Filter Count TM (NB! Radioactivity < 6000 DPM/ml)) is collected in thick plastic bags (0.07mm) or other suitable packaging, which are sealed and labelled with small labels with the text "Laboratory waste, group H-3" and the name of the solvent (labels are available). Small packaging must be sealed so that the contents cannot leak. However, it is a good idea to use a bucket e.g. to collect vials over a longer period of time. - To be placed at the site for collection of hazardous waste in the laboratory.

Organic waste containing halogens or sulphur, but not mercury
(Waste group B2). (Remember the cancer label).

Mainly consists of the solvent dichloromethane.

Organic waste containing mercury

(Waste group K-1: Liquid) and (Waste group K-5: Solid): (Remember cancer label if required). Contact the person responsible for waste!

Disposable glass with medicine residues

(Laboratory waste, group Z-2).

Disposable glass containing organic solvents (e.g. analysis solutions) is collected in thick plastic bags or UN approved containers, which are sealed and marked with small labels with the text "Laboratory waste, group Z-2" and the name of the solvent. Small packaging must be sealed so that the contents cannot leak. However, it is a good idea to use a bucket e.g. to collect vials over a longer period of time.

They must be placed at the site for the collection of hazardous waste in the laboratory.

Figure 2 Small labels to be used for labelling of plastic bags containing different kinds of solid laboratory waste (6.6 cm x 3.5 cm). (6.5 cm x 3.5 cm).

GROUP H-3 LABORATORY WASTE vials Liquids containing chemicals Type_____	GROUP H-3 LABORATORY WASTE Scintillation fluids Liquids containing chemicals	GROUP Z-2 LABORATORY WASTE Medicinal waste Liquids containing chemicals Type_____
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Labels to be used to label slumping cylinders containing liquid organic-chemical waste are shown here:

GROUP C-1 ORGANIC WASTE Conc. > 50% Without: Mercury and organically bound halogen or sulphur	GROUP H-1 ORGANIC WASTE Conc. > 50% Without: Mercury and organically bound halogen or sulphur
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<p>GROUP</p> <p>B-2</p> <p>ORGANIC WASTE WITH HALOGEN</p> <p>Dichlormethan</p> <p>Without Mercury</p> <p>With: Organically bound Halogen</p>	<p>GROUP</p> <p>K-1</p> <p>MERCURY WASTE</p> <p>Aqueous mercury solutions. NB! Contact the person responsible for waste!</p> <p>With: Mercury</p>	<p>GROUP</p> <p>Z-1</p> <p>LABORATORY WASTE</p> <p>Unused chemicals</p>
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Figure 2 continued: Labels to be used to label slumping cylinders with liquid organic-chemical waste (actual size is approx. 10.5 cm x 15 cm).

Unused chemicals, liquid

(Laboratory waste, group Z-1).

Residual quantities of unused chemicals that cannot be disposed of in accordance with the above descriptions (e.g. to be disposed of in connection with the clean-up or because the chemicals have expired) are disposed of in the original packaging or a UN approved canister labelled "UNUSED CHEMICALS" with a clear indication of the contents. The chemicals are collected without further packaging and are collected by the Technical Section/Operations Department in plastic drums with vermaculite. If, in special cases (e.g. in connection with a major clean-up), many unused chemicals are involved, collection must be agreed upon in advance with the Technical Section/Operations Department.

Liquid inorganic-chemical waste

Small amounts of liquid inorganic-chemical waste that do not contain heavy metals or other hazardous liquids are poured into the sink while flushing with water. All other liquid inorganic waste is collected. When in doubt as to whether the waste may be poured into the sink or it is to be collected, the waste should be collected. The person responsible for handling hazardous waste at AU ROSKILDE may be contacted for specific guidance.

Liquid inorganic-chemical waste is collected as acidic or alkaline waste. A distinction is made between waste containing very acidic and slightly acidic waste. Very acidic waste is defined as waste containing concentrated mineral acid diluted less than five times. Different types of very acidic waste may not be mixed, but must be collected separately. Currently, only nitric acid is collected as very acidic waste.

Very acidic waste is collected in 5-litre UN-approved plastic containers.

For inorganic waste containing mercury, chromium or cyanide, contact the person responsible for waste (see 3.4.8).

The Technical Section/Operations Department is responsible for collecting slumping cylinders, provided they are labelled as described below.

The existing types of liquid inorganic-chemical waste are:

Aqueous waste, from analysis for nitrite, nitrate and PO₄

(Waste group H-5).

Small amounts of sulfanilamide, naphthylethylenediamine dihydrochloride (NED) and some cadmium from column (<1%) additionally from PO₄: Ammonium molybdate, ascorbic acid, potassium antimony tartrate, sulfuric acid and potassium phosphate. (check if H4 is better suited)

Very acidic waste that does not contain mercury and hydrofluoric acid

(Waste group X-1).

Phosphoric acid > 25%

Hydrochloric acid > 20%

Sulphuric acid > 15% and < 95%

The acids may not be mixed in the same waste bottle, but must be collected in separate containers.

Very acidic inorganic waste, with hydrofluoric acid

(Waste group X-10).

This type of waste contains aqueous solutions of hydrofluoric acid from AAS (with a maximum of 60% hydrogen fluoride).

Labels to be used to label slumping cylinders containing liquid organic-chemical waste are shown here:

<p>GROUP</p> <p>H-5</p> <p>INORGANIC WASTE</p> <p>NITRITE + NITRATE and PO₄ analysis</p> <p>Acidic solution</p> <p>Small amounts of sulfanilamide, naphthylethylenediamine dihydrochloride (NED) and some cadmium from column (<1%) additionally from PO₄: Ammonium molybdate, ascorbic acid, potassium antimony tartrate, sulfuric acid and potassium phosphate.</p>	<p>GROUP</p> <p>X-1</p> <p>INORGANIC ACID WASTE</p> <p>STRONG MINERAL ACID</p> <p>HYDROCHLORIC ACID</p> <p>PHOSPHORIC ACID</p> <p>SULPHURIC ACID</p> <p>Without: Mercury, nitric acid or hydrofluoric acid</p>	<p>GROUP</p> <p>H-4</p> <p>Ammonium</p> <p>Aqueous waste from the Ammonium analysis.</p>
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<p>GROUP</p> <p>X-2</p> <p>INORGANIC ACID WASTE</p> <p>NITRIC ACID < 65%</p>	<p>GROUP</p> <p>X-10</p> <p>INORGANIC ACID WASTE</p> <p>STRONG MINERAL ACID</p> <p>HYDROFLUORIC ACID</p> <p>With: < 60% hydrogen Fluoride</p>
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Figure 3: Labels to be used to label slumping cylinders containing liquid inorganic-chemical waste. (actual format is approx. 10.5 cm x 15 cm).

CN waste

Special rules apply to cyanide waste, as it may be reactive. It must never be mixed with acidic waste - pH must be kept above 10. It must not exceed 3% - otherwise it must be diluted. Ask the person responsible for waste (see the end of this document).

O waste (reactive waste):

Note! O waste must always be collected, packaged and packed in a separate plastic drum.

Always contact the person responsible for waste!

1. Oxidising substances (O1) include:

Borate and Perborate
Bromates and Perbromates
Chlorates and Perchlorates
Chromates and dichromates
Hydrogen peroxide
Hypochlorites (solid)
Iodates and periodates
Manganates and Permanganates
Red lead
Nitrite and nitrate salts
Inorganic peroxides

2. Organic peroxides (O2) include:

Acetone peroxide
Acetylacetoneperoxide
Cyclohexanoneperoxide
Dibenzoyl peroxide
Methylenketone peroxide

3. Substances that develop acid vapours from contact with water (O3) include:

Aluminiumchloride (water-free)
Chlorosulfonic acid
Ferric chloride (water-free)
Phosphorus oxychloride
Silicon tetrachloride
Sulphur dichloride
Thionyl chloride
Titanium tetrachloride

4. Substances that develop flammable gases by contacting water (O4) include:

Alkali metals
Aluminium (powder)
Amides of metals
Carbides – chlorosilanes
Ferrosilicium
Hydride
Lithium aluminum hydride
Phosphides
Silicides

Substances that react **extremely** violently with water (O4) include:

Phosphorpentaoxid

Special waste

Special waste is a generic term for a number of different types of hazardous waste, which are produced in the laboratories and, for various reasons, cannot be handled in the same way as the other chemical waste. This includes tox room waste, radioactive waste and microbiological waste.

Tox room waste

The term "tox room waste" covers all waste that is created in connection with sample preparation, etc. in ATMI/MIMI's tox room. A distinction is made between liquid and solid waste.

As a general rule, this waste must be disposed of as H and B waste, waste containing PAH is disposed of as H waste (see previous labels).

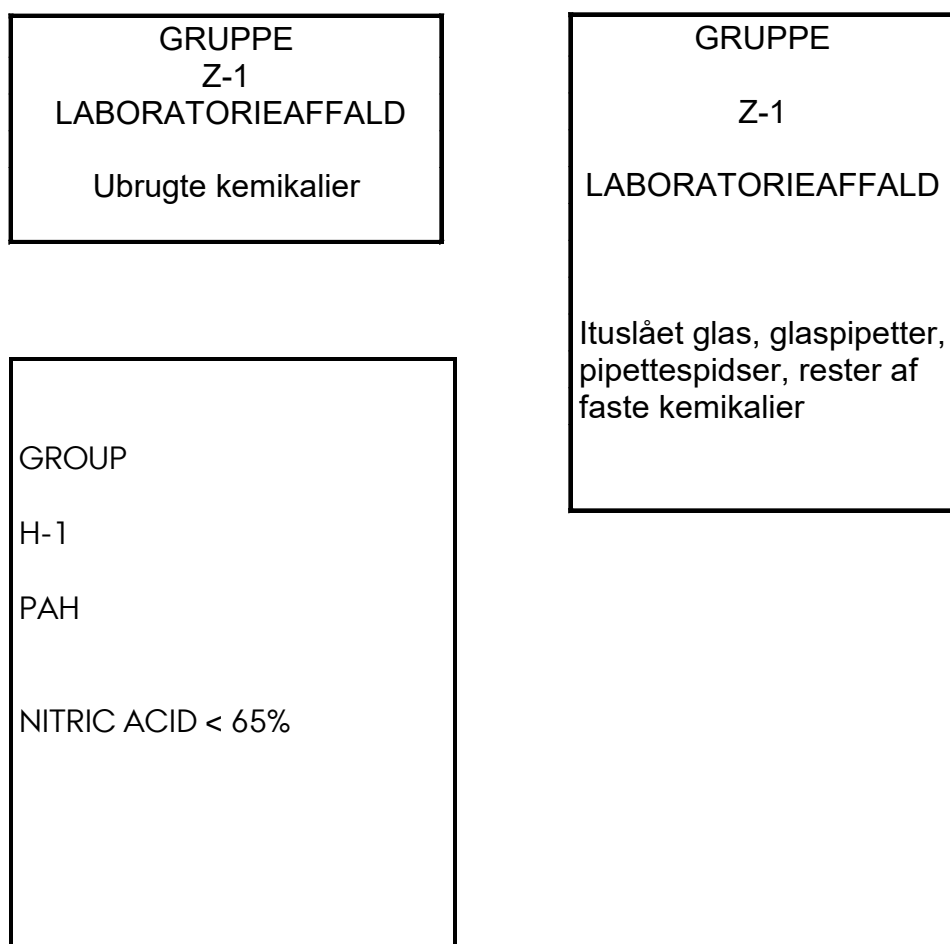


Figure 4. Labels to be used especially in the tox room (label format: 6.5 cm x 3.5 cm and 10.5 cm x 15 cm).

Microbiological waste/Biologically active waste

Biologically active waste is defined as waste containing living microorganisms. Biologically active waste may not be poured into drains/sewer. Biologically active waste and contaminated/used laboratory equipment must be disposed of either as clinical-risk waste or microbiological autoclave waste. Moreover, a distinction is made between waste with and without hazardous chemical substances, e.g. medicine residues.

Autoclavable microbiological waste not containing hazardous chemical substances.

Solid waste: Packed as "clinical-risk waste".

Liquid waste: In the laboratories, autoclaved waste must be collected in closed steel buckets labelled "Class 1 waste" and then be transported to the autoclave room to be autoclaved. This type of waste e.g. includes cultures with genetically engineered bacteria, cultures with bacteria and soil/water samples with bacteria, i.e. washable laboratory equipment that has been in contact with biologically active material. The steel bucket must be autoclaved. Upon autoclaving, the contents are poured into the sink and the glasses are put aside for washing.

Autoclavable microbiological waste containing hazardous chemical substance

Solid waste: Packed as "clinical-risk waste".

Liquid waste: The waste is not autoclaved, but is inactivated with Rodalon before mixing with other types of liquid waste. The waste is then collected in slumping cylinders as described for hazardous chemical waste, i.e. depending on whether the dangerous chemical substance is organic or inorganic. Description of labelling etc., see section 3.4.1 on chemical waste.

Clinical-risk waste (solid waste)

Clinical-risk waste is collected in the autoclave room (B. 2.39) in a special double sack, a plastic sack inside a yellow paper bag, marked "clinical-risk waste". When the sack is full, it is sent for incineration.

In the laboratories, this clinical risk waste is collected in plastic bags, which are sealed and placed in the sack with clinical-risk waste in the autoclave room.

This type of waste includes disposable laboratory equipment made of plastic and glass, including agar plates that have been in contact with biologically active materials, microorganisms on agar plates with PAH compounds, other solid waste with microorganisms and PAH compounds, infected needles in the approved needle box.

Radioactive waste

Remember that it is important to minimise the amount of radioactive waste that is sent to Risø. However, NOT by dilution, but by optimising the experimental design and by separating the waste produced in the isotope labs into radioactive and non-radioactive waste.

Radioactive waste is defined as waste with an activity > 6000 DPM/ml (0.1 MBq/L, liquid waste) or > 6000 DPM/G (0.1 MBq/kg, solid waste). REMEMBER that each isotope is collected separately.

No radioactive waste is stored at AU ROSKILDE. All radioactive waste from AU ROSKILDE-Roskilde is disposed of as described below to Risø's treatment station via ECOS, which is responsible for contacting Risø - as required - in connection with the collection of the waste.

This means that when radioactive waste is to be disposed of from the laboratory, the person who produced the waste must ensure that

- 1) ECOS' contact person is informed
- 2) The waste is marked correctly and placed on the ECOS storage place for radioactive waste (cupboard with suction in B 0.39).
- 3) The waste must be accompanied by information about the quantity, type and activity of the isotope. In addition, please state the sender's name and department at AU ROSKILDE.

A distinction is made when collecting liquid and solid radioactive waste. Labels to be used for labelling of radioactive waste are shown in Figure 5.

Liquid radioactive waste

In order to plan for Risø's further processing of the waste, when collecting liquid radioactive waste a distinction is made between several different things:

- A) Which radioactive isotope waste contains. The fluids are collected (if possible, each isotope separately) in used solvent glass bottles (available from the Technical Section/Operations Department)
- B) With or without organically bound halogen,
- C) aqueous or non-aqueous waste.

Liquids with > 1% halogen content are labelled radioactive B waste, organic (B-2) or aqueous (B-3) as well as the content (e.g. radioactive organic waste, B-2, ^{14}C -PCP). The waste bottle is stored in a fume cupboard or cupboard with suction until the time of disposal.

Liquids with < 1% halogen content are labelled radioactive H waste, organic (H-2) or aqueous (H-3) as well as with the type of isotope (e.g. ^3H , ^{14}C). Remember the cancer label, e.g. in connection with PAH. Stored in a fume cupboard or cupboard with suction until the time of disposal.

Vials containing scintillation fluids are collected as solid waste (see above).

Before the bottle is deposited at Risø, radioactivity per litre must be determined and noted on the bottle. The person producing the waste is responsible for this.

There may be no living microorganisms among the radioactive waste. The microorganisms can be killed with a Rodalon ethanol solution (1% Rodalon, 70% ethanol) and then considered radioactive waste.

The price of processing liquid radioactive waste at Risø is calculated per litre (DKK 20/litre June 1999 prices).

Solid radioactive waste

Solid radioactive waste is settled with Risø according to weight. Therefore, If possible, use plastic containers e.g. to collect scintillation vials. As of June, the price for processing solid radioactive waste at Risø is DKK 1999 175/Kg.

Scintillationsvials are collected in tightly sealed plastic containers and marked with the quantity (kg), isotope and, if possible, total activity. The containers must be stored in B 0.39 until further disposal.

Paper, gloves, glass, etc., which are known to be or suspected of being contaminated with radioactive material, are collected in heavy plastic bags and stored in metal waste bins labelled radioactive solid waste. The activity in a bag must not exceed 50 MBq for ^{14}C and ^{32}P . For ^{32}S and ^3H , the activity must not exceed 500 MBQ per bag. Glass waste must, of course, be wrapped so that it cannot cut a hole in the bag. Used ^{14}C ampules must be in closed vials.

If radioactive waste occurs where there is a risk of exceeding these dose limits when depositing the waste in the laboratories' metal bins, the waste must be collected separately and the bag marked with approx. activity, isotope type, department and date and must be delivered to RISØ's processing station as soon as possible as described above .

"Non-radioactive" liquid waste

If the radioactivity of the liquid waste is below 0.1 MBq/l (< 6000 dpm/ml), this is referred to as non-radioactive according to current orders. If, at the same time, the liquid does not contain hazardous substances and the Danish Health authority's general rules for the disposal of radioactive material (ministerial order 954) are otherwise fulfilled, the liquid can, in principle, be disposed of through AU ROSKILDE's drainage system. As a general rule, radioactivity is not disposed of through the drains at AU ROSKILDE.

We are connected to Risø's wastewater pipes, which, after normal purification and control measurement for radioactivity, lead the water into Roskilde Fjord. Even the smallest radioactivity from AU ROSKILDE may affect Risø's monitoring system.

Occasionally small quantities of 'non-radioactive' water, e.g. the last cleaning of glass equipment, can be disposed of via AU ROSKILDE's drainage system. In agreement with Risø (cf. letter dated 22.64.92), AU ROSKILDE may emit a maximum of 10 kBq per day. Volumes of activity exceeding the 10 kBq/day (e.g. from large volumes of water that are difficult to handle) will be accepted, provided that the treatment station is notified in advance and that the Danish Health authority's general rules for the disposal of radioactive material (ministerial order 954) have also been met. In this connection, be aware of the rule stating that the total monthly volume of activity from an institution must not exceed 50 MBq. However, this is a high level of activity, which AU ROSKILDE should only approach in special cases.

In order to keep track of the total amount of radioactivity that is disposed of via AU Roskilde drainage system, a logbook is kept of the total emissions of radioactivity of

AU Roskilde's drainage. The logbook is kept in the ECOS laboratory B 0.39 in the top drawer by the sink. There is only one logbook for all of AU Roskilde's isotope labs. Before you choose to dispose of the liquid via the drainage system, the previous discharges of the day and the month must always be checked in the "discharge logbook". The logbook must state the date, the isotope and the amount of activity to be poured out. In addition, the current background value and the name of the person carrying out the disposal are noted.

When others, apart from BIOS, need to dispose of aqueous waste of this type, the contact person at ECOS must be contacted first.

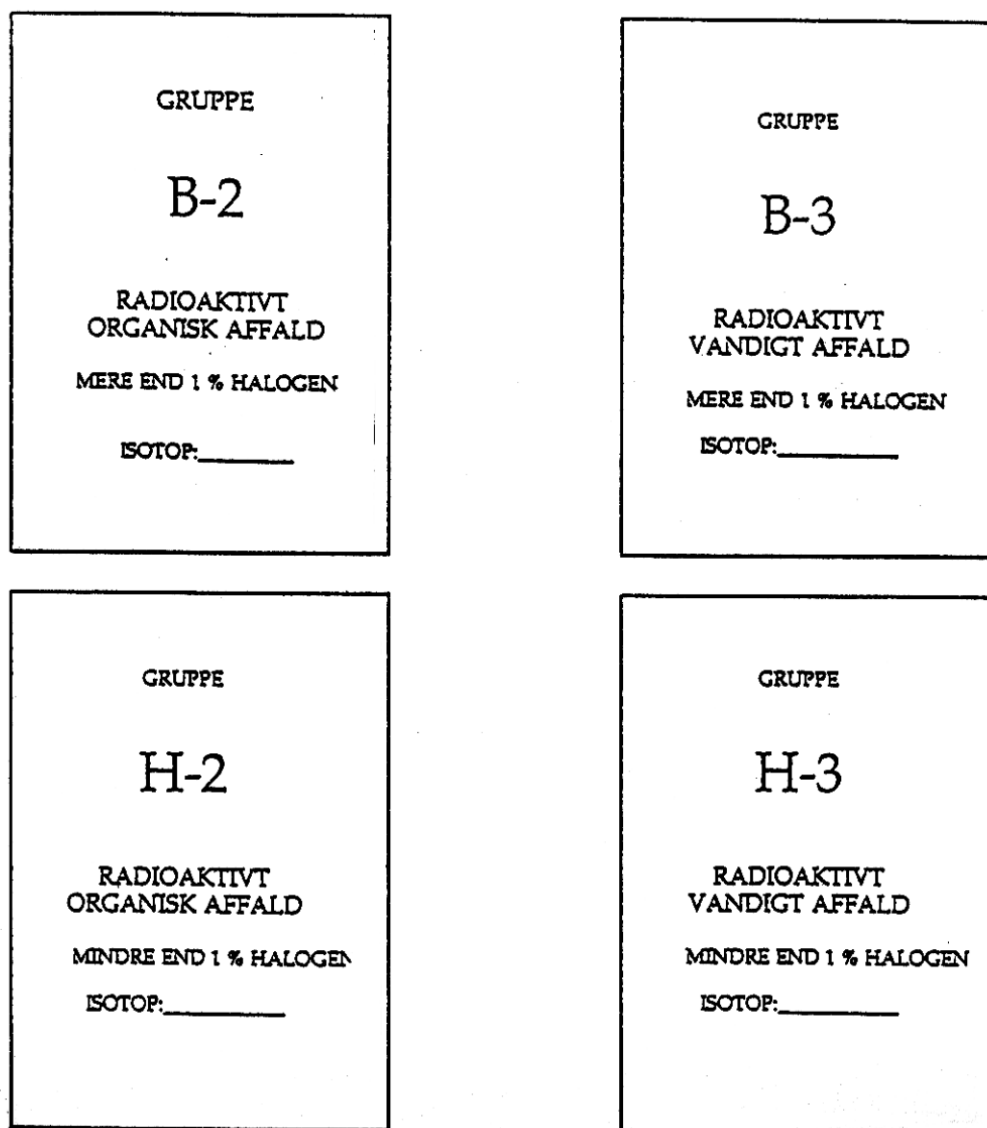


Figure 5. Labels to be used when marking radioactive waste.
(actual size is approx. 10.5 cm x 15 cm).

Labelling carcinogenic waste/substances

Below is an example of a label to be used when labelling waste containing carcinogenic substances. In accordance with the Danish Working Environment Authority's ministerial order¹, the label must be yellow with black text.

The hazard symbol is not required. Labels only containing the text can also be used.



¹The Danish working Environment Authority's Ministerial Order No. 140 of 17 February 1997 on measures to prevent the risk of cancer when working with substances and materials, etc.

Persons responsible for waste

Listed below are the people who are responsible for handling hazardous waste at AU ROSKILDE as a whole and in the individual sections.

AU ROSKILDE:	Stephan Bernberg (daily occupational health and safety manager)
AU, waste consultant:	Cathrin (Trine) Guldager Sørensen
ENVS:	Pia Lassen Tina Thane
ECOS:	Martin Mørk Larsen Sandra Drewes Fabricius
DCE:	Hanne Bach (contact with public authorities in general) Benny Steen Jensen (waste to leave our facilities)