13. CHEMICAL WASTE

FUNDAMENTAL PRINCIPLES FOR DISCHARGE OF CHEMICALS TO DRAINS

1) All chemicals must be managed in accordance with the information in section 13 of the safety data sheet (see LU's chemicals register KLARA). **Only in those cases where the safety data sheet clearly describes that the product may be poured out into the drain may it be managed in that manner.** The product may only be poured out when it is flushed with abundant quantities of water.
2) If there is no safety data sheet to consult (for instance if it is a half-finished/new chemical or compound) it is never to be poured into the drain.
3) Nor may chemicals be poured if, as a result of their properties, they could entail a risk for the employee of breathing/skin exposure or fire risk (see the safety data sheet's risk instructions as well as observing any protective measures such as access to ventilation) or damage to pipes, for instance on the basis of their acid or alkaline properties. A pH range of 5–11.5 is acceptable, so adjustment can be necessary.

This means that only solutions which **without any doubt whatsoever are entirely harmless** for staff, water traps, pipe systems, plumbers, various cleansing processes, the Öresund strait and its organisms, both short and long term, may be poured into the drain.

THE PRODUCTS BELOW MUST ALSO BE MANAGED AS CHEMICAL WASTE:

- Certain residues of drugs, (see under *12. Pharmaceutical waste*).
- Scintillation liquid without alpha emitting substances and with low activity concentration, see details *14.3 Scintillation liquid*.
- Photo chemicals, e.g. developer
- Workshop chemicals, e.g. glue and paint residues, oils
- Spray bottles with residues
- Thermometers (NB – electronic thermometers must be sorted as *6.3 Electronics*)
- Mercury electrodes
- Mercury switches
- HPMV (high pressure mercury vapour) bulbs
- Lead containers
- Old electronic equipment which can, for instance, contain oils with PCB
- Large liquid-filled batteries, e.g. car batteries
- Pointed/sharp materials, e.g. razor blades and broken laboratory glass which are, or may be, contaminated with chemicals

Materials and packaging which have come into contact with chemicals as above, must, in certain cases, also be managed as chemical waste.

This applies for example to:

- Containers or packaging which have contained certain substances hazardous to health or to the environment (see details under *Chemically contaminated packaging and materials,* below).
- Other materials, such a gloves, paper towels and pipette tips, which have come into contact with certain substances hazardous to health or to the environment (see details under *Chemically contaminated packaging and materials,* below).

NB! Pointed/sharp materials, such a razor blades and broken laboratory glass must *always* be placed in packaging which cannot be penetrated, e.g. cannula containers, and managed as chemical waste, see Packing and labelling, below.

NB! Laboratory glass is not manufactured from the same type of glass as glass packaging for food and may never be placed in an ordinary glass collection even if it is not contaminated with chemicals.

If there is uncertainty about whether waste is hazardous or not, see the relevant safety data sheet and/or the Waste Ordinance (2011:927), appendix 4, or contact Sysav Industri for information on classification and management, see *15. Contact persons hazardous waste.*

CHEMICALLY CONTAMINATED PACKAGING AND MATERIALS

Packaging and materials which have contained substances, or been in contact with substances, which are labelled with a danger symbol or danger pictogram must in *certain cases* be managed as chemical waste.

Packaging labelled with a skull and crossbones (T or T+, i.e. poisonous, carcinogenic, mutagenic, toxic to reproduction or allergenic) or “the dead fish” with risk phrase 50/53, or strongly corrosive with risk phrase R35 (see figures 10–12 below), must *not* be placed for recycling in the packaging collection system. It must instead be delivered as hazardous waste to Sysav Industri for special disposal.

Other materials, e.g. gloves, paper towels, pipette tips and broken laboratory glass, which have been in contact with chemicals labelled as above must also be managed as chemical waste.

Figure 10: Danger symbol for Very poisonous/Poisonous (T or T+)

Figure 11: Danger symbol for Environmentally hazardous (R50/53)

Figure 12: Danger symbol for Corrosive (R35)

From 2015 newly produced chemicals must be labelled with a danger pictogram in accordance with the CLP ordinance instead of the danger symbols above. The danger symbol "skull and crossbones" (T or T+) has been replaced by a danger pictogram with a skull and crossbones (GHS06) *and* a danger pictogram for health risk (GHS08) (see 13 and 14 below).

Figure 13: Danger pictogram for "Poisonous" (GHS 06)

Figure 14: Danger pictogram for "Health risk" (GHS08)

The "dead fish" danger symbol with risk phrase 50/53 has been replaced by danger pictogram "Environmentally hazardous" GHS09 and the danger symbol for corrosive has been replaced by the danger pictogram "Corrosive" (GHS05), see figures 15 and 16 below.

Figure 15: Danger pictogram for "Environmentally hazardous" (GHS09)

Figure 16: Danger pictogram for "Corrosive" (GHS05)

Packaging with these labels, as well as materials such as gloves, paper towels, pipette tips and broken laboratory glass, which have been in contact with chemicals labelled as above, must be managed as chemical waste.

Other packaging with danger symbols or danger pictograms may be sorted and managed as ordinary waste (non-hazardous waste) if the packaging is *drip and dust free*. Assessment as to whether a packaging is drip and dust free must be made case by case since this varies with regard to the packaging material, the appearance of the packaging and the viscosity of the contents.

In the event of uncertainty as to this assessment, the packaging should be sorted as hazardous waste.

Other materials, such as gloves, paper towels and pipette tips, which have *not* been in contact with chemicals labelled as above, must be placed into a plastic bag and can then be sorted as residual waste.

WASTE LEGISLATION, CHEMICAL WASTE

A risk assessment of the management of chemicals, in which the management of waste is included, must provide the basis for the management of chemical waste. See AFS 2011:19 *Chemical work environment risks*. There is a module for risk assessment of chemicals in KLARA.

In storing chemical and low-level radioactive waste, remember to use containers which are resistant to the chemicals stored in them and to check that the storage containers are in good condition. Waste containers for chemical waste must be kept clean on the outside (AFS 2014:43 Section 26). In order to prevent evaporation and any spills the receptacles must have a lid or other closing devices. The storage receptacles must be labelled so that all who manage them will know what they contain. Preferably use the original packaging.

STORAGE

See *9.6 Storage of hazardous waste in waste sorting rooms.*

PACKING AND LABELLING

Packing and labelling of chemical waste is included in Lund University's agreement with Sysav Industri. On the removal form for chemical and low-level radioactive waste, available on the Staff Pages, see under *Depositing the waste/Ordering of removal*, below, you can state whether you want Sysav Industri to pack the waste.

Proceed as follows:

- If possible, leave the waste in the product's original packaging.
- If the waste cannot be delivered in the product's original packaging – ensure that the packaging will tolerate the chemical involved (there are type-approved varieties of packaging) and label the storage container with information on the risk in

printed letters, risk pictograms, and key words or risk symbols with a risk notation (can be printed out from KLARA) if they are to be used for the chemical products which have formed the waste, and with the waste category according to the Waste Ordinance.

- If the chemical belongs to group A or B according to AFS 2011:19 this must clearly appear from the packaging.
- Note that sharp/pointed materials which are, or may be, contaminated by chemicals, must be packed so that the packaging cannot be penetrated. For example, in a glass jar/glass bottle, plastic box/cannula container from Sysav Industri or other closed packaging

If you pack the waste yourself it is important to follow the instructions below.

Packaging materials for chemical waste

Unmarked box including bag and tape for closing 	One size: 38 litres: Maximum weight 13 kg, measures: 340x270x430 mm. Black liner bag

- Pack in an unmarked box (see above) with absorbant material, e.g. vermiculite, in the plastic liner bag.
- Label the box with information on what it contains, e.g. on a label for chemical waste (http://www.staff.lu.se/sites/staff.lu.se/files/label_chemical-waste.png) Note that Sysav will label the box in accordance with legislation for dangerous goods (ADR). LU staff thus must not do this themselves.
- Do NOT close the box. Sysav Industri will do this in connection with pickup. If you close the box yourself you will also be responsible for doing the labelling pursuant to the legislation for dangerous goods (ADR/ADR-S).

SPECIAL MANAGEMENT ON PACKING OF CERTAIN CHEMICAL WASTE

- Waste containing mercury must be packed separately

- Waste containing other heavy metals must be packed separately
- Halogenated and non-halogenated solvents must be kept separate both in containers and in boxes.
- Ensure that peroxygen chemicals (EUH 019/R19) do not have any risk of explosion, e.g. by means of a peroxide test.

Chemicals are not to be packed together if they could react with each other and cause:

- Exothermal reactions
- Develop flammable, suffocating, oxidising or poisonous gases
- Creation of corrosive substances
- Creation of unstable substances

Scintillation containers: Labels for *Chemical waste, Liquid scintillation solution* or *Low-level radioactive waste* must be placed on the box. See *14.3 Scintillation liquid*.

NB! If there is the least uncertainty about packing, contact Sysav Industri for advice, or let Sysav Industri pack the waste (advice about, and help with, packing of chemical waste is included in Lund University's agreement with Sysav Industri), see *15. Contact persons hazardous waste.*

STORAGE OF CHEMICAL WASTE

See *9.6 Storage of hazardous waste in waste sorting rooms*.

DEPOSITING THE WASTE/ORDERING REMOVAL

Removal of chemical waste is done via the removal form for chemical and low-level radioactive waste which is available on the Staff Pages: http://www.staff.lu.se/support-and-tools/premises-and-parking/waste-hazardous-waste-and-recycling. Follow the instructions on the form.

Order pickup often enough that large quantities of hazardous waste never need to be stored in the organisation. This is to minimise risks both to the environment and to human health.

NB! If possible – meet up with Sysav Industri at the time of pickup. If you are unable do so, arrange so that you are available on the telephone.

Certain activities also have scheduled removal of chemical waste, e.g. activities where a lot of solvents are used. See local instructions at the department/division.

FINAL PROCESSING

The hazardous waste is sorted, classified, packed for transport and removed by Sysav Industri. At Sysav Industri the waste is stored temporarily for further transport to an approved facility for final disposal. Some waste, such as oil, will be sent for recycling.

Certain types of chemical waste, e.g. halogenated solvents, require high temperature incineration in special facilities.

13.1 GAS CYLINDERS

IN MOST CASES

Gas containers are retrieved by the gas supplier where there is an agreement with LU. There is a common agreement, with other higher education institutions, relating to gas cylinders with AGA Gas AB. Under the heading *Delivery,* the agreement states that AGA Gas AB will deliver to the ordering entity pursuant to Intercoms DDP (Delivered Duty Paid[3]) at a designated location and in an agreed way, as well as transporting empty gas cylinders cost-free. Deliveries with order values exceeding SEK 2000 will be delivered with free shipping.

If the gas cylinders which the supplier provides require a change of gas regulators or connections at the ordering unit the supplier must, without cost, provide gas regulators and connectors adapted to the gas cylinders which are delivered.

Where necessary, bottle carriers may be included without additional cost.

NB! AGA will accept only AGA containers.

Read more about the agreement with AGA Gas AB in Lupin (Proceedo).

IN OTHER CASES

In cases involving a gas container from another supplier, e.g. Air Liquide, removal is ordered from that supplier (with whom there is a previous agreement) or, if there is an agreement with a local gas supplier, from the latter. The 20 cylinders and 50 cylinders are owned by the gas supplier and are individually labelled (except for very old cylinders which may lack such labelling). Contact details for Air Liquide can be found at:
http://www.airliquide.se/sv/kontakt-forsaljning.html

IF NONE OF THE ABOVE APPLIES

In cases where gas cylinders are not covered by any of the agreements described above, where it is not possible to find out who the supplier is and where the cylinders cannot be disposed of via any of the gas suppliers, Sysav Industri can take care of these gas cylinders according to the procedure for chemical waste. For information on ordering of removal etc. as for chemical waste, see *13. Chemical waste*

Charging for the cost of gas cylinder removal is done as for chemical waste, i.e. to the relevant faculty office/equivalent.

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[3] DDP (Delivered Duty Paid) means that the supplier is responsible for transport and delivery, including responsibility for following rules on import, taxes and customs.

14. RADIOACTIVE WASTE

Radioactive waste is divided up into low-level radioactive waste, medium-level radioactive and high-level radioactive waste, as well as liquid scintillation solution. For radioactive waste, the Swedish Radiation Safety Authority's (SSM) rules as well as Lund University's local rules are to be followed, see below.

QUALITY HANDBOOK FOR RADIOACTIVE WASTE

There must be a quality handbook (journal) in which all low-level radioactive, medium-level radioactive and high-level radioactive waste is registered. The information must be saved for at least five years.

STORAGE OF RADIOACTIVE WASTE

A storage place for radioactive waste must be marked with a sign conforming to figure 17 below.

Figure 17: Sign for marking of storage place for radioactive waste.

Information on storage of low-level radioactive waste can be found under *9.6 Storage of hazardous waste in waste sorting rooms*. For information on storage of other radioactive waste, contact the radiation safety officer.

Contact the radiation safety officer for information on ordering of signs.

14.1 LOW-LEVEL RADIOACTIVE WASTE

For low-level radioactive waste, the Swedish Radiation Safety Authority's waste management instructions, SSM FS 2010:2, as well as its errata sheet must be followed.

The Swedish Radiation Safety Authority's instructions on management of radioactive waste and emissions from activities with open radiation sources:

http://www.stralsakerhetsmyndigheten.se/Global/Publikationer/Forfattning/SSMFS/2010/SSMFS-2010-2.pdf

Errata sheet, with activity concentrations:

https://www.stralsakerhetsmyndigheten.se/Global/Publikationer/Forfattning/SSMFS/2010/R%c3%a4ttelse-SSMFS-2010-2.pdf

SPECIAL REQUIREMENTS FOR ACTIVITY LEVELS FOR LOW-LEVEL RADIOACTIVE WASTE

In connection with removal, transport and incineration of low-level radioactive waste there are special requirements as to activity levels, activity concentrations, packaging and checking of the waste.

Low-level radioactive waste means that the radioactivity per package is not to exceed 1 limit value (L) per time (see exception levels SSM FS 2010:2 errata sheet) and 10L limit values per month and local agreement.

PACKING AND LABELLING

The waste must be packed in a designated brown cardboard box for chemical waste, see below.

Packaging materials for low-level radioactive waste

Unlabelled box including bag and tape for closing 	One size: • 38 litres: Maximum weight 13 kg, measures: 340x270x430 mm. Black liner bag

- Pack the waste in a plastic bag. If the waste contains liquid, fill the plastic bag with some form of absorbant material, e.g. vermiculite, in an amount sufficient to absorb the entire liquid content.
- Place the bag with its contents in the cardboard boxes provided with a plastic liner bag.
- Do not close the plastic bag or the box, wait for Sysav Industri.
- Fill in the sender information in the printed field on the top of the box.