

Safety - working with Cadmium

IGEM EPFL 2023

11th October 2023

1 Introduction

Cadmium is a hazardous heavy metal known for its potential to bioaccumulate inside the human body. It poses severe health risks, including inhalation toxicity, mutagenicity, and pronounced aquatic toxicity [1]. Working with such heavy metals, in a laboratory setting, necessitates stringent safety precautions. This document outlines essential guidelines for safely handling cadmium chloride. All referenced materials and resources are appended for further reference.

2 cadmium safety datasheet

You will find enclosed to this document the safety data sheet of cadmium chloride from Sigma-Aldrich, our provider[1, 2].

3 Buying cadmium

Cadmium trade is subjected to strict regulations. Prior to acquiring this compound, we were mandated to secure approval from the Occupational Health and Safety (OHS) organization at EPFL. Their guidance was instrumental in establishing our protocol, ensuring safety measures, and managing both storage and waste disposal. [3, 4].

4 Laboratory safety measures [3, 5]

- All operations involving cadmium should be conducted within a fume hood.
- Utilize gloves of at least 0.2 mm thickness (Nitrile rubber recommended), a P3 mask, EN 166 standard safety glasses, and a protective lab coat.
- Operate within a white plastic container.
- If feasible, opt for assays from providers who facilitate waste disposal post-experimentation. For instance, we employed the HACH cadmium test.[6]

- The HACH test features innovative caps designed to minimize contamination risks. These caps present an advantage over traditional powder sachets or liquid reagents by eliminating potential spillage or contamination issues. They are designed to contain reagents securely within the vessel cap, offering enhanced safety. Their glassware is precision-crafted, and their cuvettes have flat bases, ensuring stability.
- HACH facilitates the return and proper disposal of used test cuvettes, thereby managing waste associated with their kit.
- All other waste, including items like pipette tips, should be deposited in specialized toxic waste bags designed explicitly for hazardous chemical disposal. Liquid wastes should be collected in a dedicated container that contains solely Cadmium as a chemical. (refer to the waste management section for detailed guidelines)

5 Waste management [3, 5]

- Utilize nitrogen to inhibit cadmium oxidation.
- Reserve the designated yellow waste bins (specifically for chemical disposal at EPFL) exclusively for cadmium-related waste. Ensure they are labeled appropriately and sealed at the end of the day. Open only when disposing of cadmium-related materials.
- For all solid waste, use plastic bags, securely fastened with cable ties, and deposit them into the yellow waste bins.
- Ensure the lid of the liquid waste container displays a "vent system" label.
- At the conclusion of each day, if there have been additions to the cadmium liquid waste, introduce 5 mL of Incidin Pro.
- Clearly label the liquid waste container with both the chemical name and its corresponding CAS number.
- Monitor the pH of the waste using pH strips, ensuring it remains between 3 and 10.
- For decontamination: First cleanse work surfaces and equipment with HCl, followed by a thorough water rinse. Allow HCl-soaked tissues to air dry in the fume hood before disposing of them in the designated solid waste container.
- Employ a protective paper lining on work surfaces, discarding it post-experiment.

References

- [1] Cadmium chloride 99.99 trace metals 10108-64-2, . URL <http://www.sigmaaldrich.com/>.
- [2] . URL <https://www.sigmaaldrich.com/IS/en/sds/aldrich/202908>.

- [3] Laboratory safety, . URL <https://www.epfl.ch/campus/security-safety/en/lab-safety/>.
- [4] Chemical authorisation, . URL <https://www.epfl.ch/campus/security-safety/en/chemical-authorisation/>.
- [5] Cadmium - ESPI metals, . URL <https://www.espimetals.com/index.php/msds/476-Cadmium>.
- [6] Test en cuve cadmium 0,02-0,3 mg/l cd | hach suisse - aperçu | hach, . URL <https://ch.hach.com/test-en-cuve-cadmium-0-02-0-3-mg-l-cd/product?id=26370276331>.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Version 6.9

Revision Date 14.04.2023

Print Date 11.10.2023

GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking**1.1 Product identifiers**

Product name : Cadmium chloride

Product Number : 439800

Brand : Aldrich

Index-No. : 048-008-00-3

REACH No. : A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.

CAS-No. : 10108-64-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Chemie GmbH
Industriestrasse 25
CH-9471 BUCHS

Telephone : +41 81 755 2511

Fax : +41 81 756 5449

E-mail address : technischerservice@merckgroup.com

1.4 Emergency telephone

Emergency Phone # : +41 43-508-2011 (CHEMTREC)
+41 44-251-5151 (Tox-Zentrum)
145(Tox Info Suisse)

SECTION 2: Hazards identification**2.1 Classification of the substance or mixture****Classification according to Regulation (EC) No 1272/2008**

Acute toxicity, Oral (Category 3), H301

Acute toxicity, Inhalation (Category 2), H330

Germ cell mutagenicity (Category 1B), H340

Carcinogenicity (Category 1B), H350

Reproductive toxicity (Category 1B), H360



Specific target organ toxicity - repeated exposure (Category 1), H372

Short-term (acute) aquatic hazard (Category 1), H400

Long-term (chronic) aquatic hazard (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008

Pictogram



Signal Word

Danger

Hazard statement(s)

H301	Toxic if swallowed.
H330	Fatal if inhaled.
H340	May cause genetic defects.
H350	May cause cancer.
H360	May damage fertility or the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.

Supplemental Hazard Statements

none

Restricted to professional users.

Reduced Labeling (<= 125 ml)

Pictogram



Signal Word

Danger

Hazard statement(s)

H301	Toxic if swallowed.
H330	Fatal if inhaled.
H340	May cause genetic defects.
H350	May cause cancer.
H360	May damage fertility or the unborn child.
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Precautionary statement(s)

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	understood.
P260	Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	: CdCl_2
Molecular weight	: 183,32 g/mol
CAS-No.	: 10108-64-2
EC-No.	: 233-296-7
Index-No.	: 048-008-00-3

Component	Classification	Concentration
Cadmium chloride Included in the Candidate List of Substances of Very High Concern (SVHC) according to Regulation (EC) No. 1907/2006 (REACH)		
CAS-No. 10108-64-2 EC-No. 233-296-7 Index-No. 048-008-00-3	Acute Tox. 3; Acute Tox. 2; Muta. 1B; Carc. 1B; Repr. 1B; STOT RE 1; Aquatic Acute 1; Aquatic Chronic 1; H301, H330, H340, H350, H360, H372, H400, H410 Concentration limits: $\geq 0,01\%$: Carc. 1B, H350; $\geq 7\%$: STOT RE 1, H372; $0,1 - < 7\%$: STOT RE 2, H373; M-Factor - Aquatic Acute: 10 M-Factor - Aquatic Chronic: 10	$\leq 100\%$

For the full text of the H-Statements mentioned in this Section, see Section 16.



SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice

First aiders need to protect themselves. Show this material safety data sheet to the doctor in attendance.

If inhaled

After inhalation: fresh air. Immediately call in physician. If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

In case of skin contact

In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

In case of eye contact

After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed

If swallowed: give water to drink (two glasses at most). Seek medical advice immediately. In exceptional cases only, if medical care is not available within one hour, induce vomiting (only in persons who are wide awake and fully conscious), administer activated charcoal (20 - 40 g in a 10% slurry) and consult a doctor as quickly as possible.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media

For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Hydrogen chloride gas

Cadmium/cadmium oxides

Not combustible.

Ambient fire may liberate hazardous vapours.

5.3 Advice for firefighters

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information

Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.



SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Avoid generation and inhalation of dusts in all circumstances. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling

Work under hood. Do not inhale substance/mixture.

Hygiene measures

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions

Tightly closed. Dry. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.

hygroscopic Air sensitive. Store under inert gas.

Storage class

Storage class (TRGS 510): 6.1A: Combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated



SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

8.2 Exposure controls

Personal protective equipment

Eye/face protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0,11 mm

Break through time: 480 min

Material tested: KCL 741 Dermatril® L

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0,11 mm

Break through time: 480 min

Material tested: KCL 741 Dermatril® L

Body Protection

protective clothing

Respiratory protection

required when dusts are generated.

Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Recommended Filter type: Filter type P3

The entrepreneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer.

These measures have to be properly documented.

Control of environmental exposure

Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

- a) Physical state Beads

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b) Color	white
c) Odor	odorless
d) Melting point/freezing point	Melting point/range: 568 °C - lit.
e) Initial boiling point and boiling range	960 °C at 1.013 hPa
f) Flammability (solid, gas)	No data available
g) Upper/lower flammability or explosive limits	No data available
h) Flash point	No data available
i) Autoignition temperature	No data available
j) Decomposition temperature	No data available
k) pH	No data available
l) Viscosity	Viscosity, kinematic: No data available Viscosity, dynamic: No data available
m) Water solubility	457 g/l at 20 °C - OECD Test Guideline 105- soluble
n) Partition coefficient: n-octanol/water	No data available
o) Vapor pressure	13 hPa at 656 °C
p) Density	4,050 g/cm ³
Relative density	No data available
q) Relative vapor density	No data available
r) Particle characteristics	No data available
s) Explosive properties	No data available
t) Oxidizing properties	No data available

9.2 Other safety information

No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

No data available

10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

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10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

Air Avoid moisture.

no information available

10.5 Incompatible materials

Oxidizing agents, Bromine trifluoride

10.6 Hazardous decomposition products

In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - male - 107 mg/kg

LC50 Inhalation - Rat - male - 2 h - > 4,5 mg/m³ - aerosol

Dermal: No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitization

No data available

Germ cell mutagenicity

May alter genetic material.

In vivo tests showed mutagenic effects

Test Type: in vitro test

Test system: *S. typhimurium*

Metabolic activation: with and without metabolic activation

Result: negative

Carcinogenicity

This is or contains a component that has been reported to be carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification. Chronic exposure to cadmium may cause lung and prostate cancer.

Possible human carcinogen

Reproductive toxicity

May cause congenital malformation in the fetus.

Presumed human reproductive toxicant

Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

Causes damage to organs through prolonged or repeated exposure.



Aspiration hazard

No data available

11.2 Additional Information

Endocrine disrupting properties

Product:

Assessment

The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

Repeated dose toxicity - Rat - male - Oral - NOAEL (No observed adverse effect level) - 0,2 mg/kg - LOAEL (Lowest observed adverse effect level) - 0,5 mg/kg

Acute inhalation exposure to cadmium fumes may cause "metal fume fever" with flu-like symptoms of weakness, fever, headache, chills, nausea, vomiting, dizziness, sweating, muscular pain, cough and difficulty breathing. Acute pulmonary edema may develop within 24 hours and reaches a maximum by three days. The first chronic effect of exposure to cadmium is generally kidney damage, manifested by excretion of excessive protein in the urine, followed by anemia, teeth discoloration and loss of smell. Cadmium also is believed to cause pulmonary emphysema and bone disease.

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	flow-through test LC50 - Carassius auratus (goldfish) - 0,748 mg/l - 96 h Remarks: (ECHA)
Toxicity to daphnia and other aquatic invertebrates	static test EC50 - Daphnia magna (Water flea) - 0,036 mg/l - 48 h
Toxicity to algae	static test ErC50 - Pseudokirchneriella subcapitata (algae) - 0,070 mg/l - 72 h (OECD Test Guideline 201) Remarks: (referred to the cation)
Toxicity to bacteria	Respiration inhibition NOEC - Sludge Treatment - 0,2 mg/l (OECD Test Guideline 209)
Toxicity to fish(Chronic toxicity)	Growth inhibition NOEC - Jordanella floridae - 0,0081 mg/l - 100 d
Toxicity to daphnia and other aquatic	mortality LOEC - Daphnia magna (Water flea) - 0,002 mg/l - 21 d



invertebrates(Chronic toxicity)

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

Bioaccumulation Salvelinus fontinalis - 266 d
- 3,4 µg/l(Cadmium chloride)

Bioconcentration factor (BCF): 882

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Endocrine disrupting properties

Product:

Assessment : The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

12.7 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 2570

IMDG: 2570

IATA: 2570

14.2 UN proper shipping name

ADR/RID: CADMIUM COMPOUND (Cadmium chloride)

IMDG: CADMIUM COMPOUND (Cadmium chloride)

IATA: Cadmium compound (Cadmium chloride)

14.3 Transport hazard class(es)

ADR/RID: 6.1

IMDG: 6.1

IATA: 6.1

14.4 Packaging group

ADR/RID: III

IMDG: III

IATA: III

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14.5 Environmental hazards

ADR/RID: yes

IMDG Marine pollutant: yes

IATA: no

14.6 Special precautions for user

Tunnel restriction code : (E)

Further information : No data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

This material safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006.

Authorisations and/or restrictions on use

REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59). : Cadmium chloride

REACH - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles (Annex XVII) : Cadmium chloride

National legislation

Seveso III: Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances. : ACUTE TOXIC

: ENVIRONMENTAL HAZARDS

Other regulations

Observe work restrictions regarding maternity protection in accordance to Dir 92/85/EEC or stricter national regulations where applicable.

Take note of Dir 94/33/EC on the protection of young people at work.

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H301	Toxic if swallowed.
H330	Fatal if inhaled.
H340	May cause genetic defects.
H350	May cause cancer.
H360	Toxic if swallowed.
H372	Fatal if inhaled.
H373	May cause genetic defects.
H400	May cause cancer.
H410	May damage fertility or the unborn child.



Full text of other abbreviations

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - Agreement concerning the International Carriage of Dangerous Goods by Road; AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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LE PROGRAMME COMPLET POUR LES SURFACES EN JUSTE

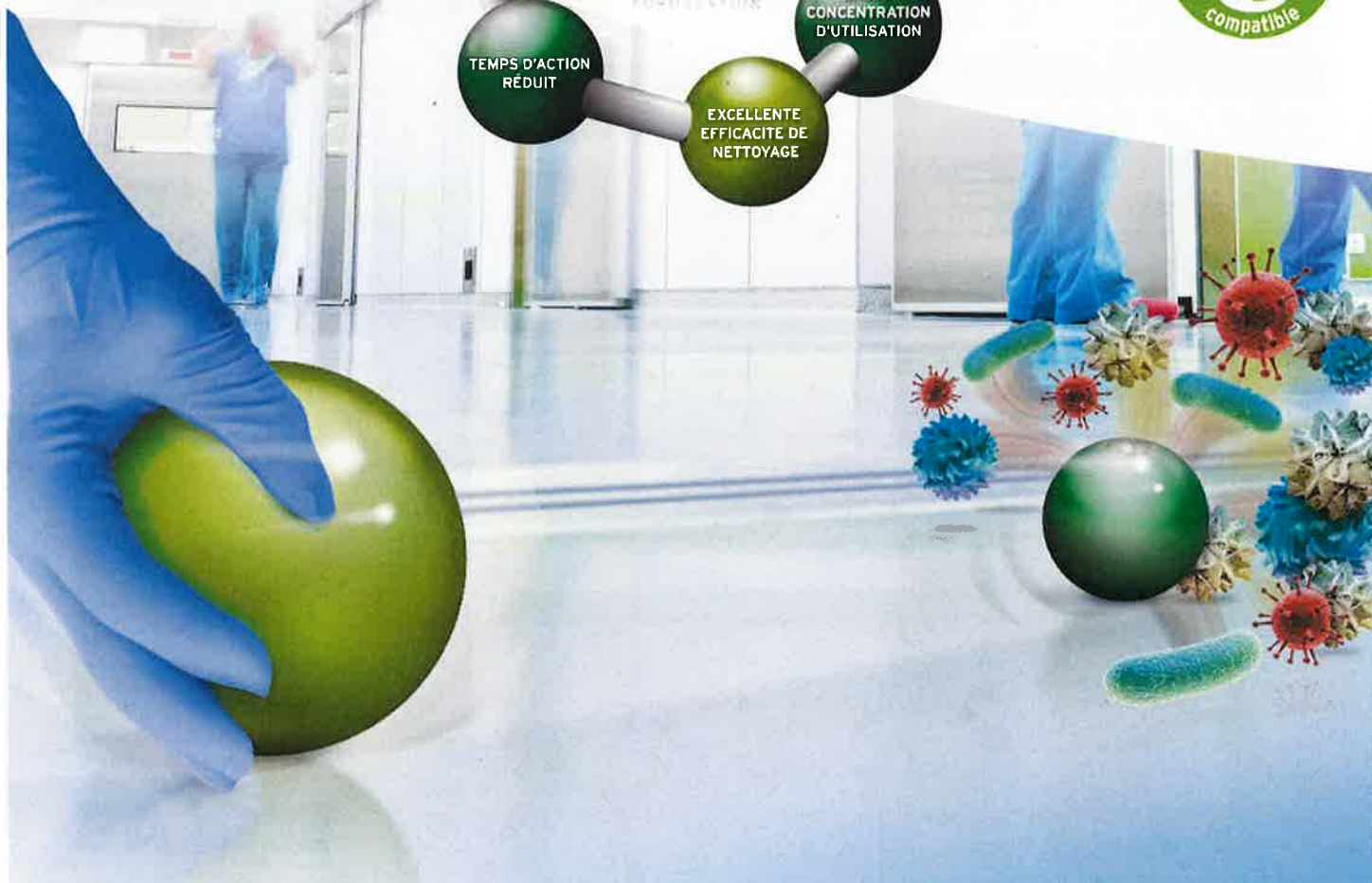
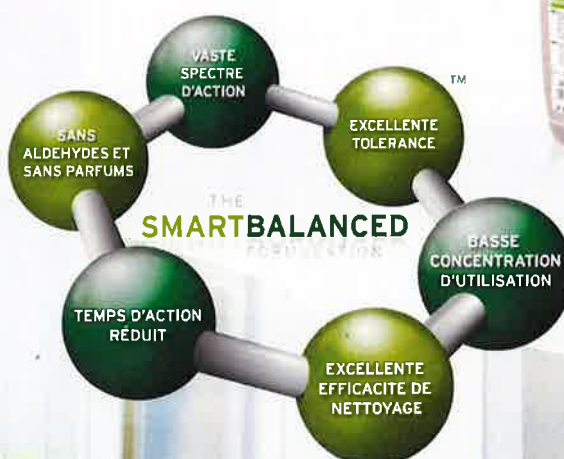


Incidin™ Pro

Désinfectant de surfaces pour produits médicaux et surfaces de tout type

Avec sa nouvelle formule SMART-BALANCED, Incidin™ Pro établit des nouveaux standards dans le domaine du nettoyage et de la désinfection professionnelle des surfaces.

- ▲ Votre Pro pour la rapidité
- ▲ Votre Pro pour l'efficacité
- ▲ Votre Pro pour la tolérance



Incidin™ Pro

Désinfectant de surfaces pour produits médicaux et surfaces de tout type

Notre prestation	Votre bénéfice
Vaste spectre d'action - testé selon les derniers standards NF EN	Désinfection et nettoyage efficaces
Temps d'action restreint avec des concentrations d'utilisation réduites	Économies de temps et de coûts
Excellente efficacité de nettoyage	Surfaces propres avec une importante compatibilité du matériau
Excellente tolérance	Compatible avec les métaux, le linoléum, le PVC, la céramique, le caoutchouc et le plastique



Le programme complet en juste 60 minutes

- ▲ Efficacité* testée par la norme EN 16615 : 0,5 % après 30 minutes
- ▲ Efficacité* contre le norovirus : 1 % après 60 minutes
- ▲ Efficacité tuberculicide* : 1,5 % après 60 minutes
- ▲ Efficacité mycobactericide, 1,5 % après 60 minutes

* Charge testée selon les dernières normes NF EN et sous une charge élevée

EFFICACITE	CONCENTRATION %	ml/L	TEMPS D'ACTION min.
Liste VAH (bactéricide, levuricide)			
Désinfection de surfaces selon la directive DGHM 2001 par des moyens mécaniques sous une charge réduite et élevée	0,5 / 1	5 / 10	30 / 15
Contrôle selon la directive DVV/RKI			
Action virucide limitée (y compris les VIH, HBV, HCV) selon la recommandation 1/2004* du RKI	0,25 / 0,5	2,5 / 5	30 / 15
Norovirus (MNV)*	1,5	15	30
Rotavirus*	1 / 1,5	10 / 15	60 / 5
Adénovirus*	2	20	60
Papovavirus / Polyomavirus / SV40*	1,5	15	15
Normes EURO (charge faible et élevée)			
NF EN 13727 (bactéricide)	0,25	2,5	5
NF EN 13624 (levuricide)	0,25	2,5	5
NF EN 14348 (mycobactéricide)	1,5	15	60
NF EN 14476 (norovirus, MNV)	1 / 1,5	10 / 15	60 / 30
Normes EURO essai à 4 zones (charge élevée)			
NF EN 16615 (bactéricide)	0,5	5	30
NF EN 16615 (levuricide)	0,5	5	30
Désinfection de surfaces selon la directive DGHM 2001 (charge faible et élevée)			
Mycobactéricide, moyens mécaniques	2 / 4	20 / 40	120 / 60

* DVV 2015 (test de suspension)

Distributeurs :

ECOLAB (SUISSE) GMBH
Kägenstrasse 10
41155 Reinfach
+41 (0) 61 466 94 66
www.ecolabhealthcare.ch



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RAPIDE.
EFFICACE.
COMPATIBLE.



Désinfection de surfaces
pour produits médicaux



Concentré désinfectant
liquide pour la désinfection
de surfaces de tout type.
CH CHZN 3555

MODE D'EMPLOI

Préparez la solution active dans la concentration d'utilisation souhaitée en diluant le concentré dans de l'eau de qualité au moins potable (max. 30°C).

Nettoyez la surface à traiter à l'aide d'un chiffon humide. Veillez au mouillage homogène. Les règlements de prévention des accidents prescrivent le port de gants de protection.

Les désinfectants contenant des amines ou bien des dérivées d'amines et les désinfectants contenant des aldéhydes ne doivent pas être employés en alternance.

Au préalable de tout changement, il faut un nettoyage intermédiaire approfondi.

COMPOSITION

Substance active dans 100g :
10,0 g 2-Phénoxyéthanol,
8,0 g N,N-bis-(3-aminopropyl) dodecylamine,
7,5 g chlorure de benzalkonium

EXPERTISE

Tests microbiologiques, virologiques, toxicologiques et écologiques exhaustifs.

Sur demande, le dossier d'expertise pourra être mis à votre disposition.

INFORMATIONS DE COMMANDE

Produit	Unité de conditionnement	N° d'article
Incidin™ Pro Sachet doseur	400 x 20 ml	30 765 60
Incidin™ Pro Flacon doseur	3 x 2 L	30 766 80
Incidin™ Pro Bidon	6 L	30 767 60

STOCKAGE

Le produit dans l'emballage original ne doit pas être stocké à une température supérieure à 25°C.

À stocker dans un local frais, sec et à l'abri du soleil.

VEILLEZ A LA PRUDENCE LORS DE L'UTILISATION DE PRODUITS BIOCIDES ET MEDICAUX. L'ETUDE DE L'ETIQUETTE ET DES INFORMATIONS SUR LE PRODUIT EST OBLIGATOIRE AVANT TOUTE UTILISATION. PRODUIT RESERVE A L'USAGE PROFESSIONNEL.

ECOLAB

HC 994 Mise à jour 02/2018

Working with a toxic chemical – Cadmium chloride

CAS: 10108-64-2

Health Hazards		Reference values	
Chronic toxicity	Acute toxicity	BEI	TLV
		2 µg/g creatinine	0.001 mg/m ³
STOT-RE1, C1B, M1B, R1B	T+2 (Inhalation) ; T3 (Oral)		

Legend:

T:	Toxicity: categories 1, 2 and 3
C:	Carcinogenic: 1A (for humans), 1B (for animals, potentially for humans) and 2 (suspected)
M:	Mutagenic: 1A (for humans), 1B (for animals, potentially for humans) and 2 (suspected)
R:	Reprotoxic (alteration of fertility and/ or of the foetus' development): 1A (for humans), 1B (for animals, potentially for humans) and 2 (suspected)
STOT:	Specific Target Organ Toxicity (SE – single exposure, RE – repeated exposure) categories 1 and 2
TLV:	Recommended airborne exposure limit for 8h work/day (SUVA)
BEI:	Biological exposure index (SUVA)
i:	Airborne dust concentration = breathable dust
CLP:	Regulation on Classification, Labelling and Packaging of substances and mixtures
SUVA:	Swiss National Accident Insurance Fund

More information in the Safety Data Sheet of the product. Read chapters 2 (hazards), 4, 5, 6 (first aid and intervention measures), 7 (handling & storage), 8 (PPE) and 10 (reactivity & stability).

Health hazards

Cadmium and its derivatives are on the list of Substances of Very High Concern (SVHC) according to the REACH regulation.

It is classified as carcinogenic, mutagenic, reprotoxic and has specific target organ toxicity. Cadmium compounds were categorized as carcinogenic in humans by International Agency for Research on Cancer (IARC). The main target organs are the kidney, the skeletal and the respiratory systems. Chronic exposure can lead to lung and prostate cancer.

Acute inhalation exposure to cadmium fumes can cause “metal fume fever” that can lead to acute pulmonary oedema.

Personal protective equipment

- Safety glasses (marked EN 166)
- Nitrile gloves (minimum 0.11 mm) and marked EN374
- Closed cotton lab coat with sleeves extended

Storage and handling

Always handle your cadmium chloride in a fume hood or in a glove box.

The cadmium is kept in its commercial packaging in a restricted area (locked away), inaccessible to non-authorized/trained people.

- Cadmium chloride is hygroscopic and air sensitive, it must be stored under inert gas.

Consider all incompatibilities, also during storage and disposal: cadmium chloride reacts with oxidizing agents and bromine trifluoride.

Disposal protocol

The waste is disposed of as toxic chemical waste containing cadmium.

Make sure to consider all the hazards and check the waste decision tree to find the right OMoD code and labelling information before disposing of the waste.

Contaminated sharp objects can be collected in a plastic waste bucket from the chemical store, marked as toxic waste containing cadmium (OMoD 15 02 02) and be disposed of in the chemical store.

Use the GHD waste bin (cardboard with yellow bag)

IN CASE OF EMERGENCY

Contact the intervention team - dial 115 (or +41.21.693.30.00 from mobile phone)

In case of projections

In the eyes: use the eye-washer until the bottles are empty, then follow the instructions from the intervention team.

On the hands: immediately wash with tap water and continue until the intervention team arrives.

On the body: 1) go under the security shower immediately and, under the running water, remove your soiled clothes. 2) go under a shower (in a changing room, for example) with a mixer tap and a curtain. There you can keep rinsing while removing the remaining clothes at a more comfortable temperature. Follow the instructions of the intervention team.

In case of a spill: call 115. Only the intervention team deals with the spill.

* No OMoD code

* Use secondary bags

* Yellow box for sharps (pipettes)

* 5L container for liquid waste ⊕ Incidin Pro

check pH

~~choose OMoD code accordingly~~

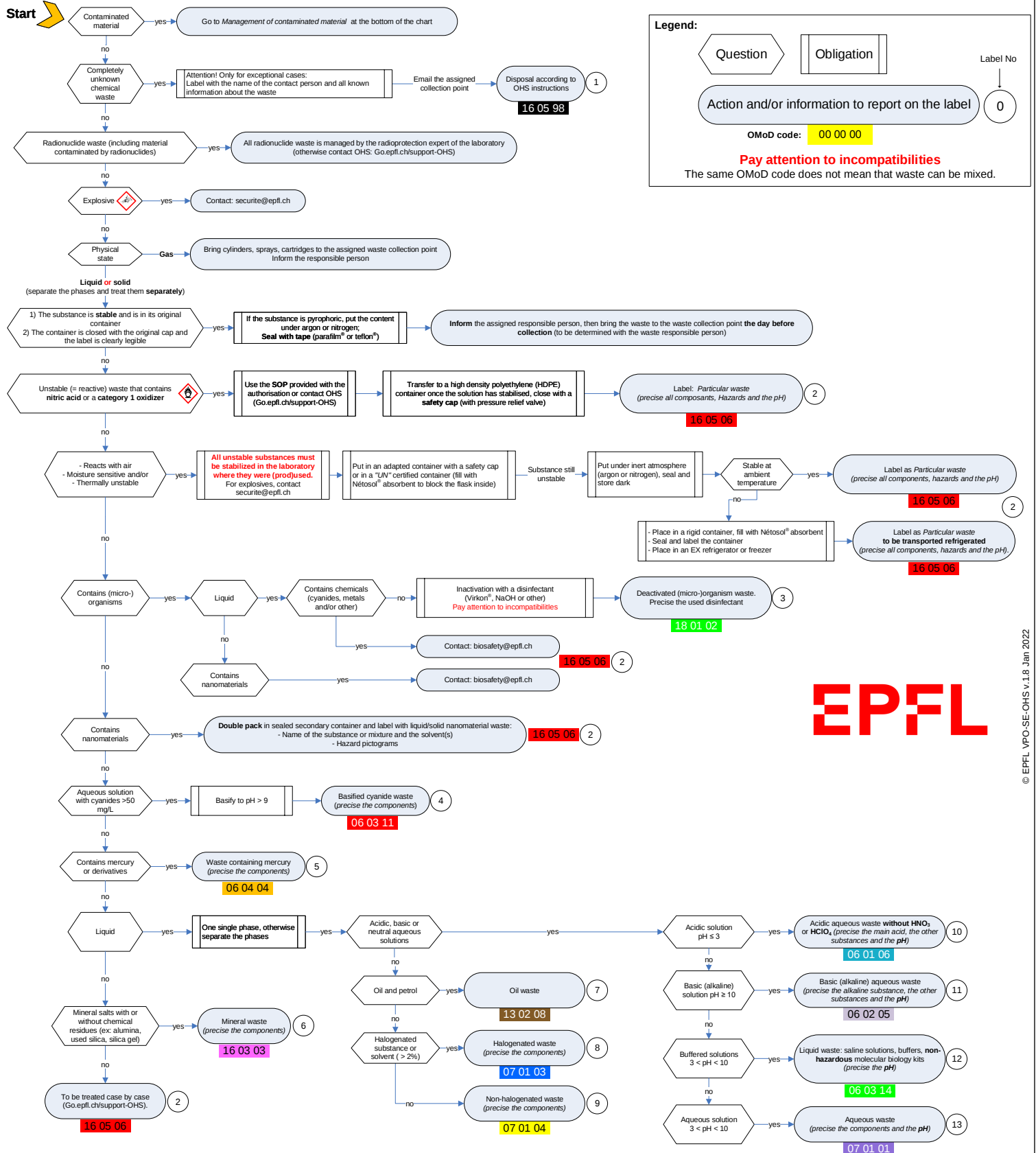
Pas de Virkon!

Use waste label n° 2 (OMoD Code 16 05 08)

Management of special waste:

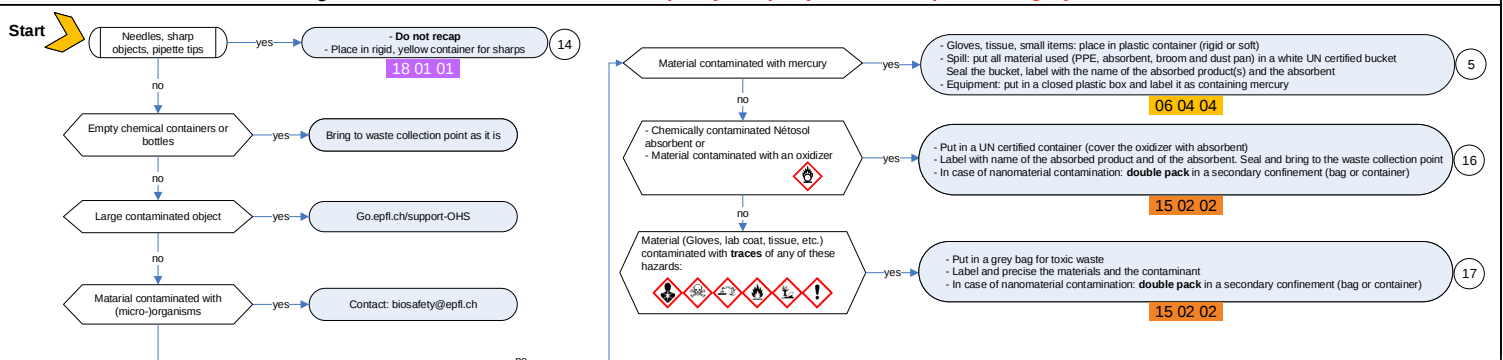
Answer the following questions in order to determine how to package and label your waste. **Only stable substances that are correctly sealed and labelled will be accepted.**

The label must specify the research group, the producer, the date of the 1st addition to the container, a description of the content, the OMOd code and hazard pictograms.



EPFL

Management of contaminated material: All pointy/sharp objects must be placed in rigid yellow containers.



Collection « What should I know? »

Management of special waste at EPFL



Do you know how to safely manage your waste?

EPFL VPO-SE OHS

Occupational Health and Safety (OHS)

If you have any question, open a support ticket:

<https://go.epfl.ch/support-ohs>

V. 1	Oct. 2022
V. 2	Feb. 2023

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INTRODUCTION

To ensure a safe elimination of all special waste¹ that also respects the environment, the Swiss legislation imposes strict rules. This booklet will help you follow these rules and will guide you through the management of special waste and materials contaminated by:

- **Chemicals**
- **Biological material**
- **Nanomaterials**
- **Radionuclides**

Note: This booklet does not cover elimination of waste from vertebrate animals².

In Switzerland, **the producer is responsible for the waste** until the end of the recycling or destruction process. At EPFL, the [assigned consignors](#) (the people in charge of waste collection) take the special waste in charge. Only the consignors can hand over the special waste to external enterprises for valorisation or elimination.

The unit director and the safety correspondent (CoSec) are responsible for verifying that the following rules are respected.

Note: there are differences in waste management between the Lausanne, Sion and Neuchatel campuses. For campus Biotech in Geneva, contact: Sebastien Dornier (sebastien.dornier@fcbg.ch).

The producer of the waste is responsible for the correct preparation and packaging of the waste:

- The **waste must be stable**. All unstable waste **must be stabilized** in the room where it was produced.
- All material or solid object contaminated by chemical or biological substances, radionuclides or nanomaterials is also considered a special waste.
- **Mixing incompatible waste must be avoided**. Sort the waste based on its physical-chemical and toxic properties.
- The list of consignors and special waste collection points is available [here](#).

¹ Special wastes are chemical, biological or radiological wastes that are hazardous to human health and/or the environment and that must be collected and disposed of in a specific way.

² Contact: animalvetservices@epfl.ch

GENERAL RULES

This manual gives information on the rules to follow at each step of the elimination process.



The **special waste** is subject to the Federal Act on the Protection of the Environment (EPA, ref. 814.01) and the Ordinance on the Transport of Waste (OMoD, ref. 814.610). All waste within the OMoD is classified with a six-digit identification code listed in the ordinance of the Federal Department of the Environment, Transport, Energy and Communications (DETEC) concerning the lists for Transport of Waste (LMoD, ref. 814.610.1).

The treatment of **biological waste** is described in the Ordinance on Handling Organisms in Contained Systems (ContainO, ref. 814.912).

The waste containing **radionuclides** is subject to the Radiological Protection Act (RPA, ref. 814.50) and its ordinance (RPO, ref. 814.501).

Our special waste is dealt with by companies specialised in treatment and recycling of special waste. Most of it is sent to the company CRIDEC S.A. in Eclépens.

1) Sorting:

To ensure that the hazardous waste is eliminated correctly it is important that it is sorted as quickly as possible based on its characteristics.

- **Distinction between special waste** (liquid and solid substances) **AND material/ solid objects contaminated by these substances.**
- **Separate** liquids from solids.
- **Separate** sharp/pointy objects that can pierce a plastic bag from other solids (“soft solids” like tissues, gloves, etc.).
- **Never mix** waste that can react together.

The reaction between two substances could initiate a spontaneous fire, or even an explosion, and could create new hazardous substances.

2) Packaging and containers:

The following rules must be followed in order to avoid leaks and unwanted reactions, and to ensure safe packaging of the waste:

- **Only the waste recipients provided by the EPFL shops are accepted.** The use of empty chemical containers for collection of waste is forbidden.
- The recipients must be made out of chemically and mechanically resistant material and the size must be adapted to the waste production rate.
- **Collecting waste in glass containers is forbidden**, unless the liquid is incompatible with other material (f. ex. 98% sulfuric acid weakens HDPE containers in 7 days).
- **It is forbidden to collect waste in food containers.**

For liquid waste:

- The recipients must: 1) **never be filled more than 80%** to avoid splashes, spills and overpressure; 2) be eliminated **at the latest 2 months after the first addition** to the recipient.
- Unless contraindicated, liquids must be collected in **high density polyethylene (HDPE)** containers equipped with a **safety cap** (with a pressure relief valve).



Safety caps (available in different colours)

The following pages describe the different types of packaging and containers available for your waste.

Packaging and recipients	Type of solid waste
	A – BLUE bag. Exclusively household waste <u>NOT contaminated</u> by chemical, biological, nanomaterials or radionuclides. Campus Sion: these bags are BLACK.
	B – GREY bag with toxic pictogram (110 L). Toxic solid objects or objects contaminated by chemicals. No glass, not sharp or pointy objects. No needle, no scalpel blade. No pipette tips. Campus Sion: these bags are BLUE.
	C – WHITE bag with RED stripes for biological waste of P1 type (BSL1) Solid waste from BIO labs. Possible to put some pointy objects (pipettes, tips) if they are double packed. No glass, no needle, no scalpel blade.
	D – RED bag with <i>biohazard</i> pictogram. Solid P2 and P3 waste.



E – Rigid, yellow container (60 L).

Pointy or sharp objects such as glass, pipettes, pipette tips or TLC plates. Both contaminated and non-contaminated material.

No needle, no scalpel blade.



F – White bucket (6, 10, 30 L).

Chemical absorbent OR,

Small amounts of solid chemical or objects contaminated by chemicals (both soft and hard).

No needle, no scalpel blade.



G – HDPE container with large neck.

Small amounts of solid waste.

No needle, no scalpel blade.



H – Rigid plastic yellow bin (30 or 60 L) - with round opening on top.

Biological semi-solid waste for autoclaving.



I – Cardboard box with yellow bag (50 L).

Waste contaminated by genetically modified organisms. For BIO laboratories only.

No glass, no needle, no scalpel blade.



J – Yellow containers with safety cover for needles.

Clean and chemically/biologically contaminated needles and scalpel blades.



K – Chemical in its original container.

Bring to waste collection point as it is (with the original cap and a readable label).

Caution: always inform the consignors if your products are to be stored in a fridge or protected from light, humidity or oxygen.



L - Eurobox at collection point.

EMPTY glass, aluminium or plastic containers with lid.

Bring to waste collection point as it is.

Campus LAUSANNE and SION.



Nétosol® absorbent to use for intercalation.

Fireproof.

Packaging and recipients	Type of liquid waste
	M – HDPE bottles with safety cap (0.5 or 1 L). Liquid waste such as solvents, aqueous solutions (acidic, basic, neutral, cell cultures).
	N - HDPE containers with safety cap (5 L). Liquid waste such as solvents, aqueous solutions (acidic, basic, neutral, cell cultures).
	O - Autoclavable HDPE flasks (30, 60, 125, 250 or 500 mL). Small amounts of liquid chemical or biological waste.
	P - For the SV faculty only: 680 L containers (SV 0515 et AI 0235). Only liquid waste: 1. Aqueous biological solutions containing chemically inactivated microorganisms (corresponds to OMoD code 18 01 02). 2. Saline solutions, buffers and biomolecular kit (corresponds to OMoD code 06 03 14). See : LABORATORIES THAT WORK WITH BIOLOGICAL MATERIAL.

Note: EPFL does not oblige the use of a universal bin model; each research unit can buy the model they prefer (even outside Catalyse), as long as it complies with the following requirements:

1. Fireproof metal bins are highly recommended, in particular for chemistry laboratories.
2. Plastic bins are authorised.
3. Bag-supports are authorised.
4. Bins must either be without lid OR equipped with a lid opened with a pedal.
5. The bins must be adapted to the size of the official EPFL waste bag for contaminated solid waste (90-110 L).

The document [Laboratory waste bins: rules and recommendations for solid contaminated waste](#) gives you some examples of bins and supports that can be used with the grey bags (toxic waste) and the white and red striped bags (biological waste).

3) Labelling:

All waste must be labelled at all times with a label that describes the content, the OMoD code and the associated hazard pictograms. This label must be completely filled in and must be present on the recipient **from the first addition**.

- The label is chosen based on the “Special waste management” decision tree found on: <https://www.epfl.ch/campus/security-safety/en/lab-safety/waste/>

By answering a series of questions, the user will find the label number with the associated OMoD code (legal obligation). To avoid **unstable waste and incompatibilities**, it is important to search for the procedure by starting from **the top of the decision tree, without taking any shortcuts**. At the end of the decision tree, you will obtain a procedure to follow (if applicable) and what label to use.

The waste must be identified with a label that contains the following information:

The Content	The OMoD* code
The Hazard Pictogram(s)	The Name of the producer
The Name of the research group	The Date of the first addition to the recipient

* 6-digit code from the Ordinance on the Transport of Waste.

- The labels are available in the waste collection points or through your assigned consignor.
- To avoid interpretation errors, it is forbidden to use acronyms.

4) Storage:

No matter the storage area (laboratory, workshop, chemistry shops), recipients that contain **liquid waste must be stored in retention trays**.

It is strongly recommended to use a funnel with a lid and a fill level indicator.

	
Closed recipients in retention trays in a ventilated space (fume hood)	Funnel with fill level indicator and lid

It is mandatory to:

- **Store waste separately to limit the risk of hazardous reaction in case of a spill or leak.**
- **Make sure that the recipient is compatible with the content.**

This is essential in order to guarantee safe transport from your laboratory until the destruction of the waste. **All waste that could release volatile compounds (ex: flammable, toxic, etc.) must be stored in ventilated areas and be kept closed to avoid evaporation.**

Authorised ventilated storage areas are ventilated cabinets (preferred) and chemical hoods. A laboratory is not in itself ventilated enough to be used for storage of volatile liquid waste.

While waiting for waste collection, it is imperative to follow the safety requirements:

- Each recipient is identified with a correctly filled in waste label.
- The waste is stored in an appropriate storage area (ventilated cabinet, fume hood).
- Incompatible waste is stored separately.

EXAMPLES/REMARKS :

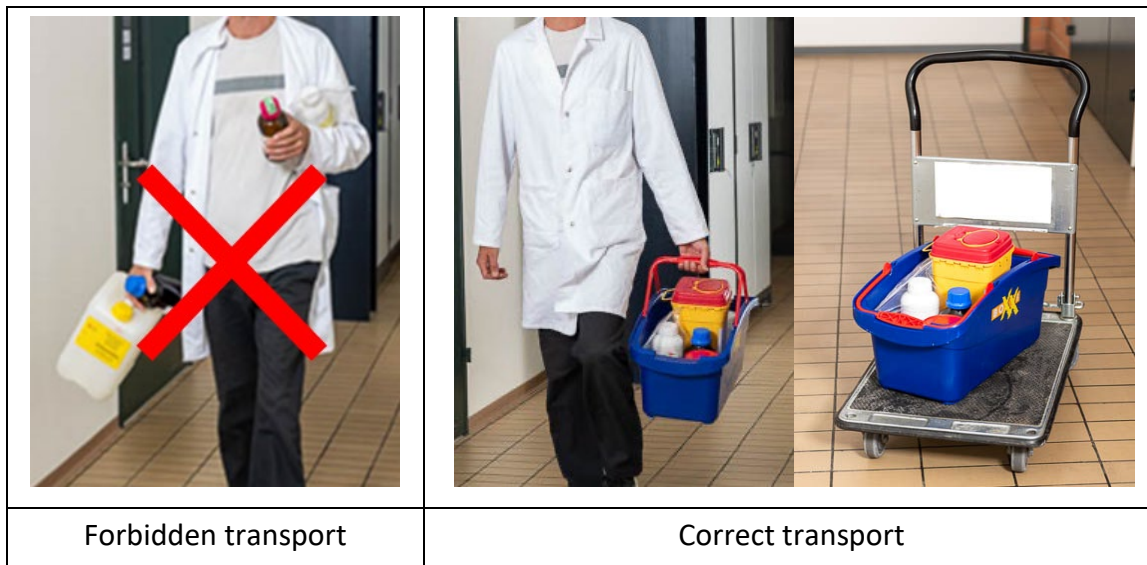
- **Acids and bases** have the same pictogram, but **must be stored separately** because they react with each other (gas and heat release, etc.).
- **Oxidizers et flammable compounds must be stored separately** to avoid ignition.
- **Strong reducing agents (combustibles) and strong oxidizers** can react violently and cause fires or even explosions.
- Pay particular attention to **products that react with water, oxygen** or are **temperature sensitive**.

It is therefore crucial to be aware of the chemical incompatibilities between compounds, both pure and as waste. You can find this information in the **Safety Data Sheet (SDS)**. The essential sections are 2 (hazards), 7 (handling and storage) to get information on ventilation and storage temperature, and 10 (reactivity and stability) that gives information on conditions to avoid and incompatible substances.

5) Transport:

The waste must be transported using **baskets, buckets or trollies** that are available at the shops or through the consignors. After use, these tools must be returned to their place.

- Pay attention not to trip and to unexpected door openings.
- If possible, avoid taking the stairs with your waste.
- Only one person is allowed in the elevator with the waste.



6) Elimination:

Only stable special waste that is correctly packaged will be accepted by the consignors.

Unstable waste must be stabilized in the laboratory where it was produced.

Dispose of your waste at the waste collection points as illustrated below:



SPECIAL WASTE CATEGORIES

In the following pages the most common waste categories at EPFL are described. If your research unit produces waste that does not figure in this document, please contact OHS.

Each unit sets up their waste recovery process that follows the rules described in this document. The user determines what categories can be expected and gets equipped with the appropriate recipients in the shop or from the consignors.

The head of the unit and the safety correspondent (CoSec) are responsible to verify that the rules are respected.

In the laboratories that work with biological material, part of the waste is sent through a different transport and disposal channel. If you work in this type of laboratory, refer to the chapter “[Laboratories that work with biological material](#)”.

CHEMICAL RESIDUE

Residual chemicals can be brought to the collection point if they are:

1. Still in their original container,
2. Closed with the original cap that is still in good state,
3. Have a legible label.

If this applies, it is not necessary to put a label with an OMoD code in the recipient.

COMPLETELY UNKNOWN WASTE

Waste can only be managed as completely unknown waste if it is impossible to identify. This is both hazardous and expensive, so it is only accepted in exceptional cases. If you have completely unknown waste to dispose of, you must contact your consignor who will deal with the waste together with OHS.

Label n°1; OMoD 16 05 98

UNSTABLE WASTE

All unstable (auto-reactive) substances/mixtures must be deactivated (made inert) in the production laboratory.

Label n°2; OMoD 16 05 06

Type of packaging/recipient: M, N, O (See Section Packaging and recipients; page 6-10).

- For some products, such as nitric acid, piranha solution and aqua regia, standardized procedures are available through OHS.
- If the waste remains unstable (reacts with air moisture, with oxygen and/or at ambient temperature) it must be placed under inert atmosphere (nitrogen or argon, or an inert oil) and protected from light. It must be placed in a UN certified transport container that is filled with Nétosol® absorbent, sealed and labelled.
- If the waste must be transported at low temperature, it must be placed in a refrigerator or freezer until it can be accepted by the consignor. Contact the consignor in advance to organise refrigerated transport.

PYROPHORIC WASTE

Label n°2; OMoD 16 05 06

Type of packaging/recipient: Original container

Pyrophoric substances (substances that can catch fire spontaneously in contact with air at temperatures $< 54^{\circ}\text{C}$) must be kept in their original container.

A pyrophoric substance can be taken to the collection point if it respects the following:

• It is in its commercial flask that is not damaged	
• The label is legible	
• It is under inert atmosphere (nitrogen or argon), closed with its original cap	
• Parafilm® or Teflon® tape has been used to seal the part between the neck of the flask and the cap	
The flasks are brought to the consignor or shop following the established transport rules. At the assigned collection point, they will be wedged into a bucket filled with Nétosol® that is then placed in a transport box in metal.	

STABLE CHEMICAL WASTE

1) GASES/BOTTLES UNDER PRESSURE

Take the cylinder, spray or cartridge to the shop or to your waste collection point.

No label is necessary.

2) LIQUID CHEMICAL WASTE

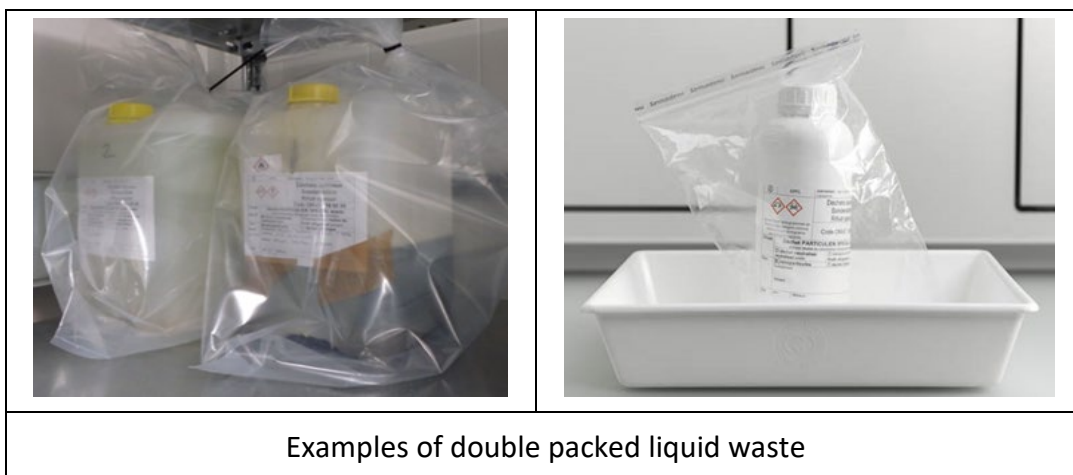
Note: Following the introduction of the Laboratory Directive (CFST 1871), the maximum volume of flammable and/or health hazardous waste containers is 5 liters.

CONTAINS NANOMATERIALS

Label n°2; OMoD 16 05 06

Type of packaging/recipient: M, N, O (See Section Packaging and recipients; page 6-10).

The liquid waste is placed in plastic recipients for special waste and kept ventilated without any incompatible material present. The flask is labelled and sealed in a transparent plastic secondary containment. Both heat-sealing plastic bags and zip lock bags are accepted.



CONTAINS CYANIDES (CONCENTRATION > 50 mg/kg)

Label n°4; OMoD 06 03 11

Type of packaging/recipient: M (See Section Packaging and recipients; page 6-10).

INCOMPATIBILITIES: Do not store with acids.

If the waste contains more than 50 mg/kg of cyanide, it has to be basified to $\text{pH} \geq 9$ in the laboratory. The solution is then transferred to a white plastic waste bottle and kept in a ventilated area.

CONTAINS MERCURY OR ITS DERIVATIVES

Label n°5; OMoD 06 04 04

Type of packaging/recipient: M (See Section Packaging and recipients; page 6-10).

INCOMPATIBILITIES: Do not store with oxidizers.

If the waste contains mercury or any of its derivatives, it must be collected in a white plastic bottle for special waste and kept in a ventilated area.

AQUEOUS SOLUTION WITHOUT SOLVENTS

Acidic aqueous solution (pH ≤ 3)

Label n°10; OMoD 06 01 06

Type of packaging/recipient: M, N (See Section Packaging and recipients; page 6-10).

INCOMPATIBILITIES: Do not store with basic solutions.

Collect in a white plastic container or other compatible recipient adapted to the volume of the waste. Keep in ventilated area. Small amounts (< 20%) of water miscible solvent is allowed in this type of waste.

Alkaline aqueous solution (pH ≥ 10)

Label n°11; OMoD 06 02 05

Type of packaging/recipient: M, N (See Section Packaging and recipients; page 6-10).

INCOMPATIBILITIES: Do not store with acidic solutions.

Collect in a white plastic container or other compatible recipient adapted to the volume of the waste. Keep in ventilated area. Small amounts (< 20%) of water miscible solvent is allowed in this type of waste.

Aqueous solution with 3 < pH < 10

Label n°13; OMoD 07 01 01

Type of packaging/recipient: M, N (See Section Packaging and recipients; page 6-10).

Collect in a white plastic container or other compatible recipient adapted to the volume of the waste. Keep in ventilated area. Small amounts (< 20%) of water miscible solvent is allowed in this type of waste.

ORGANIC SOLVENTS (mixed or pure)

Halogenated solvent waste

Label n°8; OMoD 07 01 03

Type of packaging/recipient: M, N (See Section Packaging and recipients; page 6-10).

INCOMPATIBILITIES: Do not store with strong oxidizers or strong bases.

Collect in a white plastic container or other compatible recipient adapted to the volume of the waste. Keep in a ventilated area. The label must indicate if the waste contains polychlorinated biphenyls (PCB).

Non-halogenated solvent waste

Label n°9; OMoD 07 01 04

Type of packaging/recipient: M, N (See Section Packaging and recipients; page 6-10).

INCOMPATIBILITIES: Do not store with acids or strong oxidizers.

Collect in a white plastic container or other compatible recipient adapted to the volume of the waste. Keep in a ventilated area.

USED OIL WASTE

Label n°7; OMoD 13 02 08

Type of packaging/recipient: M, N (See Section Packaging and recipients; page 6-10).

INCOMPATIBILITIES: Do not store with acids or bases.

The waste is collected in a plastic container that is then sealed and labelled.

PAINT WASTE

Label °18; OMoD 08 01 11 (note: this category does not appear on the waste decision tree).

Type of packaging/recipient: M, N (See Section Packaging and recipients; page 6-10).

INCOMPATIBILITIES: Do not store with acids or bases.

If the waste is still in its original container with its original lid, it can be relabelled as waste by covering the old label with the waste label. If not, the paint is collected in a white plastic container or other compatible recipient adapted to the volume of the waste. Keep in a ventilated area.

3) SOLID CHEMICAL WASTE

It is important to distinguish between sharp or pointy waste from blunt or soft waste. To make sure that the plastic waste bags are not pierced, and to avoid all risk of cuts, all sharp and pointy objects must be placed in **rigid plastic containers** (or in some specific cases, double packed; see biological waste chapter).

Contact OHS if you have any questions regarding this subject.

CONTAINS NANOMATERIALS

Label n°2; OMoD 16 05 06

Type of packaging/recipient: **B** (only in double packaging) or **F, G** (See Section Packaging and recipients; page 6-10).

- To avoid inhalation of nanomaterials, it is highly recommended to generate nanomaterial waste in suspension.
- Label the recipient and double pack it in a transparent secondary container. Transparent heat-sealable bags and zip lock bags are accepted as double packing. Large containers can be placed in transparent plastic bags sealed with a cable tie.

CONTAINS MERCURY OR ITS DERIVATIVES

Label n°5; OMoD 06 04 04

Type of packaging/recipient: **F, G** (See Section Packaging and recipients; page 6-10).

Place in a plastic container adapted to the waste volume.

CONTAINS MINERAL WASTE

Label n°6; OMoD 16 03 03

Type of packaging/recipient: **F, G** (See Section Packaging and recipients; page 6-10).

INCOMPATIBILITIES: Do not store with acids or bases.

Mineral waste (alumina, used silica, silica gel, TLC plates, etc.) must be collected in a recipient or bucket adapted to the waste volume. Keep in ventilated area.

4) CONTAMINATED MATERIAL AND CONTAMINATED SOLID OBJECTS

CONTAMINATED GLASSWARE

Type of packaging/recipient: L, E, F (See Section Packaging and recipients; page 6-10).

Chemically contaminated glassware cannot be evacuated with the recycled glass. Contaminated glassware is brought to the waste collection point (L) without OMoD code on the recipient. If the glassware is broken or cracked: place it in a yellow UN certified container (F, E) and label it with the OMoD code 18 01 01.

NEEDLES AND SCALPEL BLADES

Label n°14; OMoD 18 01 01

Type of packaging/recipient: J (See Section Packaging and recipients; page 6-10).

Needles and scalpel blades **must imperatively** be collected in containers for needles, whether they are contaminated or not.

Reminder: it is not recommended to recap needles. If it must be done, a one-hand technique should be used.

MATERIAL CONTAMINATED BY CHEMICALS

This category concerns material contaminated by substances that have at least one of the GHS pictograms (ex: corrosive, flammable, toxic, etc.). For laboratories that work with biological material, refer to page 24 in this booklet.

Label n°16 or 17; OMoD 15 02 02 (label n°16 if contaminated with an oxidizer).

Type of packaging/recipient: B (soft materials).

As long as it is not sharp or pointy: put all contaminated material (e.g. gloves, wipes and or clothing, plastic tubes, etc.) in a grey plastic bag. Always separate material and objects contaminated with an oxidizer from material and objects contaminated with the other GHS pictograms.

Label n°14; OMoD 18 01 01

Type of packaging/recipient: E, F, G (sharp/pointy material).

Pointy or sharp objects: place in a rigid container.

CONTAMINATED ABSORBENT

Label n°16; OMoD 15 02 02

For contaminated absorbent, reuse the bucket as illustrated below:

When the absorption is done, place the absorbent material and all contaminated items (gloves, broom, shovel) in the white UN certified bucket, seal it and take it to the waste collection point. After use of the absorption kit, cover the label on the bucket with label n°16 as illustrated below.



BULKY OBJECTS OR EQUIPMENT CONTAMINATED WITH CHEMICALS

Labelled by the consignors (OMoD 16 02 13)

Type of packaging/recipient: original packaging OR packaging on pallet.

This concerns bulky objects or equipment that have been contaminated by chemicals and that can not be decontaminated easily (e.g. oven, rotavap, laser, refrigerator, etc.).

1. Contact [OHS](#) – describe the object and the type of contamination.
2. After OHS has answered, the object will be packaged on a pallet and discarded with the chemical waste according to recommendations given by the elimination company.

LABORATORIES THAT WORK WITH BIOLOGICAL MATERIAL

The Ordinance on Handling Organisms in Contained Systems stipulates that the management of biological waste is organised by the BioSafety Officer (BSO) as part of the biosafety program. The BSO ensures that measures are respected in terms of:

- Inactivation methods and decontamination.
- Collection and elimination of solid and liquid waste.

Elimination procedures vary based on the biohazard level and the type of waste (liquid, solid, semi-solid). This document describes the elimination of level 1 and 2 biological material (P1 and P2). For any questions, contact the biosafety team (biosafety@epfl.ch) for information on inactivation and decontamination procedures adapted to your research.

Liquid waste

All liquid biological waste must be **inactivated** before being taken to the collection point. Biological liquids can be inactivated by **autoclaving** or by **chemical treatment**; in the latter case the use of an authorised biocide is mandatory. The biosafety team (biosafety@epfl.ch) can help determine the best adapted procedure, since this depends on the type and volume of waste.

After inactivation, the biological waste is labelled (**label n°3; OMoD 18 01 02**) and taken to the waste collection point. SV laboratories must put this type of waste in the tanks in the rooms AI 0235 and SV 0515.

! Solutions inactivated by autoclave cannot be eliminated in the sink: they are considered special waste and must be eliminated with the OMoD code 18 01 02.

! Saline solutions, buffer solutions and molecular biology kits should not be disposed of down the drain: they are also considered special waste and therefore disposed of under code 06 03 14.

! Never autoclave a biological solution that contains toxic or hazardous chemicals, solvents or bleach (hypochlorite). This can cause **intoxication, explosion and corrosion of the autoclave**.

Solid level 1 waste (BSL1 or P1)

Solid P1 biological material is collected in:

- a) **White and red striped bags** if there is **no** contamination with genetically modified (GM) material. Pointy waste, such as pipette tips and serological pipettes, must be double packed before being placed in these bags.
- b) The **double packed boxes** (yellow bag + carton) are for waste **contaminated by GM**. Cultures on agar can be disposed of in this kind of container.

These types of waste do not need an OMoD label and they must be brought to the assigned waste collection point. For example, for the basic sciences the room is CH B0 93.4.

! Never put needles, scalpel blades or glass in the biological waste bins. The sharp waste must be collected in yellow boxes for sharps (OMoD code 18 01 01).

Solid level 1 waste (BSL1 or P1) contaminated by chemicals

In the laboratories that work with P1 biological material it is in some **specific cases** allowed to put chemically contaminated material in the white and red striped bags or the GM boxes.

The following rules must be respected:

- The chemical is not a volatile toxic compound or an oxidizer,
- There is only a small amount of the chemical,
- Pipette tips and pipettes must be double packed before being placed in the white and red striped bags to avoid piercing the plastic bag.

Solid level 2 waste (BSL2 or P2)

Solid P2 waste must be inactivated by **autoclave**:

- If there is a risk of leakage (ex: solid cultures on agar), it is recommended to use a rigid container for the autoclaving. (**H** - see Section Packaging and recipients; page 6-10).
- For other types of solid waste, autoclavable bags with a biohazard symbol must be used (**D** - see Section Packaging and recipients; page 6-10). After autoclaving, the bag is placed in a red and white striped bag, sealed hermetically and taken to the waste collection point. For example, for the basic sciences the room is CH B0 93.4.
- If the waste contains non-autoclavable material (particularly toxic substances, radioactive waste or nanomaterials), the waste must be eliminated through a particular infection waste channel. Contact the biosafety team (biosafety@epfl.ch) to organise the elimination and to request authorisation from the authorities.

! Systematically separate liquid waste from solid waste.

RADIONUCLIDE WASTE

The Radiological Protection Ordinance (ORP) sets activity limit, the **clearance limit (LL)**, for each radionuclide.

At EPFL, the waste that contains only short-lived radionuclides (less than 60 days) is stored on campus until they are no longer considered radioactive or their activity is below the authorised decay rate. This waste then is eliminated through the waste collection point as inactive waste. Otherwise the waste is sent to the Paul Scherrer Institute (PSI) in Villigen, the Swiss waste central for radioactive waste.

- If the radioactivity is below the clearance limit (LL), the substance is not subject to the legislation and the waste is treated according to its other characteristics.
- **Only the radioprotection expert is authorised** to determine if the waste can be eliminated as non-radioactive, if it has to be stored for a certain period or if it has to be sent to PSI.
- **Each unit that works with radionuclides must imperatively contact the radioprotection team before starting work:** <https://go.epfl.ch/support-ohs>.

CONCLUSIONS

What is the key message?

All **stable special waste** is taken in charge by the assigned consignors and the chemical shops if the waste is **correctly packaged and labelled**. Contaminated material is equally considered special waste.

Auto-reactive or unstable waste must be stabilized or rendered inert in the laboratory where it has been produced.

The recipients must be made out of chemically and mechanically resistant material and be adapted to the elimination process:

- A chemical compound can be brought to the assigned collection point if it is in its original container, closed with its original cap and with its label intact.
- Liquid special waste must be eliminated **at the latest 2 months** after it was produced **or** when the recipient is **80% full**.
- The **reuse** of containers is **forbidden**.
- Liquid waste must be collected in plastic recipients that are closed with a **safety cap**.
- Recipients that contain **liquid waste** are stored in **retention trays**.
- The use of **glass recipients or food containers is forbidden**.

Mandatory information on the label:

- The content
- The OMoD code
- The name of the producer and the research group
- The date of the first addition to the recipient.
- The hazard pictogram(s)

Incompatibilities: the waste must be stored separately based on the risk of hazardous reactions in case of a leak or a spill.

Respect these rules will protect you, your infrastructure as well as all the people involved in the different steps to eliminate your waste.