

Instructions for the Management of Special Waste

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The objective of this document is to provide guidelines for the proper management of special waste produced in the Laboratories and Technical Services at Lens.

1. Recipients, Terms, and Definitions

Recipients: This document applies to all professors, researchers, technical and administrative staff employed by the University of Florence or affiliated with other entities (CNR-Ino, INRIM, etc.) operating in Lens laboratories; students, PhD candidates, collaborators, research fellows, and all personnel, structured or unstructured, working at Lens.

Definitions:

Waste: any substance or object derived from human activities or natural cycles, of which the holder disposes or intends or is required to dispose (Art. 183, Legislative Decree 152/2006).

Waste is classified (Art. 184, Paragraph 1, Legislative Decree 152/2006):

- by origin into:
 - urban waste
 - special waste
- by hazardousness characteristics into:
 - non-hazardous waste
 - hazardous waste

Hazardous Waste - defined as:

- special waste and non-domestic urban waste expressly identified as such with a specific asterisk in the European Waste Catalogue (EWC or CER) code (see definition below). Such waste is classified as hazardous from its origin pursuant to Directive 2008/98/EC;
- waste whose hazardous nature depends on the concentration of hazardous substances and/or intrinsic hazardous properties, as described in the Annex to Decision 2014/955/EU.

Biological Waste: any material, in liquid or solid state, derived from laboratory or chemical-biological research activities that contains or has been contaminated by biological agents. A biological agent is defined as any microorganism, even if genetically modified, cell culture, and human endoparasite that could cause infections, allergies, or poisoning; biological agents include

bacteria, viruses, fungi, parasites, human and animal cell cultures. Biological waste produced in universities is similar to waste contaminated with infectious biological fluids produced in healthcare settings, and thus its collection and disposal must be conducted with special precautions to prevent infections, ensuring high levels of health protection for operators and the environment.

Temporary Storage: the storage of waste, before disposal, at the site where it is produced (Art. 183, Paragraph 1, letter m, Legislative Decree 152/2006), with the following requirements:

- prohibition of mixing hazardous waste from different hazard classes (HP - Hazardous Property, see below for CER code definition) and prohibition of mixing hazardous and non-hazardous waste;
- compliance with packaging and labeling standards for hazardous waste;
- adherence to temporal or quantitative constraints for collection and initiation of recovery or disposal operations.

European Waste Catalogue (EWC, in italian CER): a periodically revised list of types of waste, including urban, hazardous special, and non-hazardous special waste, intended either for disposal or recovery. Recently, three new codes have been added to the list (for a total of 842 entries), and descriptions for some existing entries have been modified. (See excerpt from the Commission Decision of December 18, 2014 (2014/955/EU) with the European Waste Catalogue, Official Journal of the European Union).

Hazardous waste is also assigned a hazard class indicated by the acronym HP (Hazardous Property, EU Regulation No. 1357/2014 of December 18, 2014), followed by a number from 1 to 15.

<https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32014D0955>

2. Actors Involved in Waste Management at Lens

In the context of waste management for activities carried out at Lens, the following roles are identified:

- **Facility Manager:** The Director of Lens, responsible for the waste-generating unit.
- **Laboratory Responsible:** Faculty or technical staff, responsible for laboratory activities or assigned to them. They are responsible for correctly identifying and selecting the appropriate EWC code for special waste generated in the laboratory (in case of doubt, they should consult with the disposal company); they appoint the Laboratory Delegate. The Responsible's role includes ensuring compliance with procedures outlined in the Regulation and instructing new laboratory members.
- **Laboratory Delegate:** responsible for transferring special waste to the temporary storage. The Laboratory Delegate is a key figure within the laboratory for the collection and separation of special chemical and biological waste, labeling of collection containers, and transferring them to temporary storage, in coordination with the Operations Delegate.
- **Operations Delegates:** in charge of supervising the proper execution of the transfer operations for special waste produced by various laboratories to the temporary storage.

In Annex 1, the Responsibles and Delegates for the 2024/2025 year are listed.

3. Temporary Storage at Lens

Access to the temporary storage is permitted only to the Operations Delegates, who accompany Laboratory Delegates when they need to transfer their waste. The temporary storage is located in the structure at the center of the Lens courtyard and consists of three rooms:

- **Room 50:** storage area for chemical and biological waste and empty containers.
- **Room 49:** designated for the storage of unused electronic equipment.
- **Room 48:** storage for metal scraps and shavings, generally produced by the Mechanical Workshop.

4. Operating instructions for the collection of special waste

The operational procedure assumes an in-depth knowledge of the chemicals (substances and mixtures) and biological agents used in the Lens laboratories and their incompatibilities, which will not be detailed in this document. Regarding the chemical and biological risks associated with these products, operators should refer to the Risk Assessment Document and appropriate safety guidelines for proper handling, whether they are used as active components in a reaction/experiment or as waste.

For waste collection, the following are available:

- **HDPE Collection Containers (5L or 10L):** Used for liquid chemical and biological waste. The filling volume should not exceed 80-85% of the container's capacity to avoid liquid leaks or plastic swelling due to vapor pressure.
- **55L Black HDPE Collection Buckets:** For biological (or sanitary) waste with infectious risk, labeled with the biohazard symbol.
- **55L Yellow HDPE Collection Buckets:** For all other types of special waste.

4.1 Chemical Waste

After obtaining the appropriate container, waste should be properly separated at the production site, avoiding the mixing of chemically different waste types or creating dangerous mixtures. In the case of liquids, note the contents of the container as it fills (especially in the case of mixtures), as the composition will need to be declared when transferring it to temporary storage.

4.2 Biological Waste

The collection of biological waste varies according to its physical state:

- Liquid biological waste (e.g., cell culture medium, bacterial culture suspension) should be collected in a 5L or 10L container.
- Solid biological waste (e.g., plastic materials used for in vitro cell culture, Petri dishes for bacterial colony growth on solid media) should be collected in the BLACK bucket with an internal plastic bag. It's essential not to compress the bag's contents, avoid overfilling, and not to use containers for purposes other than those indicated. Regulations prohibit placing sharps inside or reopening containers once closed.

- Sharp or pointed waste (e.g., needles, syringes, scalpels, slides) should be collected in specific rigid plastic safety containers (AGO BOX) labeled “Infectious Sharps Waste”; after sealing, they should be placed in the BLACK container with the bag.

The procedure for closing containers and tanks for hazardous infectious sanitary waste involves:

1. Wearing disposable gloves,
2. Carefully sealing the bag with the appropriate tie without compressing or touching the contents,
3. Removing gloves and washing hands,
4. Always keeping containers upright and never inverting or stacking them improperly.

4.3 Electronic Equipment

Small electronic items (DVD players, hard drives, various boards, circuits) should be collected in a YELLOW bucket; larger equipment (computers, printers, various devices) should be placed directly in Room 49 only after the item has been removed from the inventory, if it has an inventory number.

4.4 Other Types of Waste

- Used alkaline batteries should be taken to the collection point located in the “Aule” Building; other types of batteries must be disposed of according to their EWC code.
- Large amounts of plastic or paper packaging should be placed in the Alia bins outside the building (until it is full and no more);
- Wooden crates, pallets, and any items that do not fall under the above procedure or the frequently used EWC codes list should be reported to the Operations Delegates before any action.

Annex 2 lists the main types of waste produced at Lens and the relevant EWC codes.

4.5 Procedure

When a Chemical/Biological container is full or when disposing of general waste, follow these steps:

1. Weigh the container/waste and obtain a label (see Annex 3), which can be downloaded from the website (https://lens.unifi.it/media/attachments/Etichetta_per_Rifiuti_Speciali.pdf) or

requested at reception. **The label is a crucial part of preparing special waste**, and it should be filled out completely, including the detachable portion, for each individual container/waste. Attach it visibly to the container/waste after cutting along the dashed line to keep the detachable portion for the Operations Delegate. Besides the CER code, physical state, and weight, a brief description of the waste, the laboratory number, and the names of the Laboratory Responsible and Delegate should be included.

2. The Laboratory Delegate contacts one of the Operations Delegates, who will open the temporary storage at agreed times for waste transfer and will receive the detachable tag.

4.6 Additional Important Information

- A common supply of cleaning solvents, particularly 5L acetone cans and pump oil, is available. Contact the Operations Delegates if needed.
- **Chemistry Laboratory:** Since it is accessible to all, in addition to adhering to standard coexistence rules, Laboratory Responsibles must ensure that authorized users have completed the chemical risk safety course and meet minimum requirements for responsible laboratory and equipment use. Containers for disposing of frequently used products in the Chemistry Laboratory are placed under the hood and in the cabinet below. It is crucial to record the waste type as the container is filled.

5. Prohibitions

In compliance with current regulations regarding special waste, it is strictly prohibited to:

- Abandon or store waste uncontrolled on the ground or in the soil;
- Dispose of hazardous and non-hazardous special waste with municipal or sorted waste;
- Release any kind of waste, whether liquid or solid, into surface or groundwater, or discharge it into the sewage system;
- Transport solid or liquid special waste in areas not within the Lens buildings' property;
- Accumulate or store special waste outside the designated Temporary Storage areas;
- Deliver to the Operations Delegate for Temporary Storage any containers other than those described above or that are not properly labeled.

Annex 1

LIST OF LABORATORY RESPONSIBLES AND DELEGATES 2025

OPERATIONS DELEGATES	LABORATORY	ROOM	RESPONSIBLE	DELEGATE
Laura Bussotti Chiara Corsi Irene Costantini Caterina Credi Caterina Dallari	COMPLEX PHOTONICS	LAB 9	Francesco Riboli	Francesco Riboli
	NANOPHOTONICS	LAB 10	Francesca Intonti	Nicoletta Granchi
	NANOPHOTONICS	LAB 11	Francesco Biccari	Francesco Biccari
	BIOPHOTONICS	LAB12	Caterina Credi	Caterina Dallari Caterina Credi
	BIOPHOTONICS	LAB 12A	Irene Costantini	Danila Di Meo Irene Costantini
	DYNAMICAL PROCESSES AND SOFT MATTER	LAB 19	Paolo Foggi	Laura Bussotti
	DYNAMICAL PROCESSES AND SOFT MATTER	LAB 20	Renato Torre	Andrea Taschin
	QUANTUM SENSING	LAB 21	Nicole Fabbri	Santiago Hernández-Gómez
	QUANTUM GASES	LAB 24	Carlo Sias	Carlo Sias
	QUANTUM SENSING	LAB 25	Davide Mazzotti	Jacopo Galli
	HIGH PRESSURE CHEMISTRY AND PHYSICS	LAB 29	Mario Santoro	Demetrio Scelta
	HIGH PRESSURE CHEMISTRY AND PHYSICS	LAB 30	Matteo Ceppatelli	Milo Agati
	CHEMISTRY LAB	LAB 31	Caterina Credi	Caterina Dallari Laura Bussotti
	BIOPHYSICS LAB	LAB 31A	Ludovico Silvestri	Danila Di Meo
	BIOPHOTONICS	LAB 32	Martino Calamai	Chiara Caldini
	MECHANICAL WORKSHOP	LAB 33,34	Ahmed Hajeb	Ahmed Hajeb
	HIGH PRESSURE CHEMISTRY AND PHYSICS	LAB 36	Samuele Fanetti	Sebastiano Romi
	QUANTUM PHOTONICS	LAB 37	Costanza Toninelli	Costanza Toninelli
	BIOPHOTONICS	LAB 43	Martino Calamai	Chiara Caldini
	QUANTUM SENSING	LAB 44	Guglielmo Tino	Leonardo Salvi
	QUANTUM GASES	LAB 45	Giovanni Modugno	Giovanni Modugno
	QUANTUM GASES	LAB 46	Giacomo Roati	Giulia Del Pace

Annex 2

LISTS OF THE MAIN TYPES OF WASTE PRODUCED AT LENS AND CORRESPONDING EWC CODES

- **ACIDS:** Acidic aqueous solutions, including the rinsing water of chromic mixture. Caution when handling concentrated acids: in this case, make small additions of concentrated acid into water/diluted acidic solutions; CER 160506*
- **HYDROFLUORIC ACID:** CER 060103*
- **BASES:** Basic aqueous solutions, including TiO₂ suspensions; CER 160506*
- **DYE SOLUTIONS:** CER 160506*
- **BIOLOGICAL MATERIAL (SOLID OR LIQUID):** including gloves, plastics, paper, etc., used in the handling of biological material; CER 180103*
- **AROMATIC COMPOUNDS** (benzene, toluene, etc.) to be handled under a fume hood; CER 140603*
- **HALOGENATED ORGANIC SOLVENT MIXTURE:** chloroform, dichloromethane, carbon tetrachloride, trichloroethylene, etc.; CER 140602*
- **NON-HALOGENATED ORGANIC SOLVENT MIXTURE:** methanol, ethanol, acetone...; CER 140603*
- **CONTAMINATED GLASS, METAL, PLASTIC, VARIOUS CONTAINERS:** contaminated with oil or solvents, broken glassware, used Pasteur pipettes; CER 150110*
- **PAPER, RAGS, FILTERS CONTAMINATED WITH HAZARDOUS SUBSTANCES:** paper contaminated with oil or solvents, gloves, plastic syringes, etc.; CER 150202*
- **OILY EMULSIONS AND NON-HALOGENATED SOLUTIONS FOR METALWORKING:** CER 120109*
- **NON-HAZARDOUS ELECTRONIC MATERIAL:** CER 160214
- **HAZARDOUS ELECTRONIC MATERIAL:** monitor etc.; CER 160213*
- **NON-CHLORINATED MINERAL OIL:** CER 130205*
- **FERROUS MATERIAL FILINGS AND SHAVINGS:** CER 120101
- **NON-FERROUS MATERIAL FILINGS AND SHAVINGS:** CER 120103
- **PLASTIC FILINGS AND SHAVINGS:** CER 120105
- **LEAD BATTERIES:** CER 160601
- **REFRIGERANT LIQUIDS:** CER 160114

Annex 3

RIFIUTO SPECIALE PERICOLOSO	
CODICE C.E.R	Descrizione rifiuto
LABORATORIO:	Preposto
Stato fisico:	Peso:
	

Codice CER e stato fisico _____

Descrizione del Rifiuto (per le miscele inserire i principali componenti e le percentuali stimate) _____

Quantità: Kg _____

Laboratorio _____ Delegato di Laboratorio _____