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# GUIDELINES FOR THE MANAGEMENT OF SEPARATE WASTE COLLECTION AT THE UNIVERSITY OF PADUA

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## INTRODUCTION

The University of Padua has identified its institutional commitment to supporting the goals of the 2030 Agenda as a priority and in 2018, it launched the "*UniPadova Sostenibile*" project, promoting sustainable development at all levels and in all contexts, with an inclusive approach that values diversity.

The University's commitments and actions in terms of sustainability are clearly outlined in the "*Sustainability Commitment Charter*," which links scientific and technological innovation with management strategies, goals, and measures to be implemented. It also emphasizes communication aspects and the involvement of all members of the university community. The first document, covering the 2018-2022 period, was drafted with a focus on enhancing cultural heritage, improving the physical and psychological well-being of staff and students, valuing personnel, optimizing resource use, promoting sustainable building practices, simplifying processes, and advancing digitalization all to generate a significant impact across social, economic, cultural, and environmental dimensions.

With the adoption of the *Sustainability Commitment Charter* (2023-2027), for the second five-year period, the University has committed to responsible resource management, considering availability, cost-effectiveness, and environmental impact, this includes discouraging waste and promoting consumption reduction.

Key actions in this area include:

- Promoting Green Public Procurement (GPP) principles within the University and the surrounding territory, implementing innovative guidelines for selecting products, services, and suppliers.
- Optimizing procurement services and fostering circular economy processes to minimize the environmental and social impact of product and service purchases.
- Strengthening digitalization efforts and reducing paper and toner consumption, favoring the procurement of recyclable products and materials.
- Encouraging waste separation across University facilities, raising awareness and educating the university community on waste management.
- Recycling and reusing products and their components, supporting reuse at all levels in line with circular economy principles, such as refurbishing IT equipment.
- Implementing interoperable procedures and sustainability criteria in asset management, adopting environmentally sustainable building practices and regeneration strategies for campus development.

## SUSTAINABILITY AT THE UNIVERSITY

Sustainable waste management in Italy dates back to the Ronchi Decree of 1997, which introduced the "5R strategy" five key actions aimed at ensuring responsible waste management within a circular economy framework:

1. **Reduction**: Decreasing waste production by making responsible purchasing and usage decisions, using fewer resources to minimize waste generation.
2. **Reuse**: Recovering and repurposing products before they become waste, thereby extending their lifespan.
3. **Recycling**: Converting waste materials into new raw materials through industrial processes, reintegrating them into the production cycle.
4. **Collection**: Separating waste to facilitate its treatment and recovery.
5. **Recovery**: Extracting resources from waste to limit the consumption and waste of non-renewable resources, including energy recovery from waste, contributing to more efficient resource management.

These principles are interconnected and essential for effective waste management, fostering a circular economy that minimizes environmental impact.

Currently in force, Legislative Decree No. 152 of April 3, 2006, known as the "*Environmental Code*," aims to enhance quality of life by safeguarding and improving environmental conditions and promoting the prudent and rational use of natural resources (Article 2). Specifically, Part Four (*Regulations on Waste Management and Remediation of Contaminated Sites*) focuses on sustainable and responsible waste management.

The decree stipulates that municipalities regulate urban waste management through specific regulations that adhere to principles of transparency, efficiency, effectiveness, and cost-effectiveness, with the goal of reducing environmental impact. It also sets specific waste separation targets and promotes public awareness of proper waste separation practices.

Reducing the negative per capita environmental impact in cities, particularly in waste management, is a crucial goal. This translates into the need to prevent, reduce, recycle, and reuse materials actions that align with two of the 17 Sustainable Development Goals (SDGs) set by the 2030 Agenda, signed by 193 UN member states.

Specifically, the SDGs related to proper waste management are goal 11, Sustainable Cities and Communities, which focuses on urban sustainability and goal 12, Responsible Consumption and Production, which promotes sustainable resource use and waste management. These goals are represented by the following icons:

At the national level, the National Strategy for Sustainable Development (SNSvS), approved by the Interministerial Committee for Economic Planning (CIPE) with *Resolution No. 108/2017*, serves as a coordination tool for the implementation of the 2030 Agenda.

*TOWARDS ENVIRONMENTAL AWARENESS*

The University of Padua, in pursuit of these objectives, promotes actions aimed at reducing environmental impact, such as minimizing waste production through procurement strategies that enable prevention, reduction, recycling, and reuse of products and materials. Over the years, the University has developed a management system for hazardous and non-hazardous special waste through centrally managed tenders, ensuring disposal through authorized companies that prioritize reuse and the recovery of materials and energy. New contracts now require that at least 50% of hazardous and non-hazardous special waste of non-chemical and non-healthcare origin be sent for recovery, leading to an overall recovery rate of 95% for special waste.

The adoption of resource and waste management strategies by our University aligns with the principles of the circular economy and strengthens the transition toward a sustainable development model through a holistic approach to resource management.

Effectively reducing environmental impact cannot be limited to improving waste sorting alone. Instead, it requires a comprehensive strategy that involves the entire supply and resource management chain, including the procurement of green and easily recyclable materials, the implementation of a reuse platform to encourage product repurposing, and contracts with companies that promote the recycling of special waste. The actions undertaken through the adoption of the *Sustainability Commitment Charter* not only support an efficient resource management system but also enhance awareness among students and staff, fostering virtuous behaviors and contributing to the creation of a more responsible and innovative academic environment.

The *Guidelines* serve as a tool to implement and promote, through clear and simple instructions, an effective waste separation system within the University's spaces. They are designed to engage the academic community in developing environmental awareness, ultimately reducing waste and preserving resources.

## THE MANAGEMENT OF SPECIAL WASTE AT THE UNIVERSITY

Given its educational and formative role, and considering waste management as an activity of public interest, the University of Padua has undertaken numerous initiatives aimed at protecting the environment and human health. Over the years, the University has developed internal recycling programs designed to recover materials, contributing to the dissemination and promotion of actions aimed at environmental preservation. The University has also promoted circular economy policies, allowing various materials to be reused in subsequent production cycles, thereby minimizing waste as much as possible.

The production and management of special waste are particularly complex due to the large number of buildings, each with specific or multifunctional purposes, and the significant variation in waste composition depending on the place of origin. This heterogeneity makes waste management a challenging task, requiring targeted strategies to meet the specific needs of each environment. For this reason, the University of Padua has implemented a unified organizational framework to ensure consistent waste management across all University facilities. A total of 32 Temporary Storage Sites have been established at various University locations to facilitate the efficient collection and packaging of waste, ensuring compliance with current environmental and safety regulations.

Given the complexity of waste management regulations and the University's waste production activities, the development of Operational Instructions has become essential over time. These instructions support the *Technical Regulation for the Management of Waste Produced by the University of Padua*, which is currently in force. The Operational Instructions serve as a valuable tool for all personnel involved in waste management, from the initial production of waste to its delivery at temporary storage sites.

The documents can be accessed at the following link: ***https://www.unipd.it/gestione-rifiuti-speciali***

In compliance with the provisions of *Legislative Decree 152/2006 "Environmental Code",* the University adheres to the waste management hierarchy established by law:

- Prevention
- Preparation for reuse
- Recycling
- Other forms of recovery (e.g., energy recovery)
- Disposal

Waste management at the University is carried out in accordance with these principles, promoting the responsibility and cooperation of all stakeholders involved in the production, distribution, use, and consumption of goods that generate waste. The University's approach is based on effectiveness, efficiency, cost-effectiveness, transparency, technical and economic feasibility, and compliance with current regulations on participation and access to environmental information.

A key aspect of this effort is the training and awareness program for the academic community, aligned with the University's strategic objectives and change management initiatives. This program is designed to implement the *Action Lines* defined in the *Sustainability Commitment Charter*, fostering environmental awareness among students and staff.

The University of Padua's commitment to waste management policies that support health and environmental protection is demonstrated through the following initiatives:

- Sorting waste by type within University facilities to optimize treatment processes and maximize reuse.
- Identifying the most effective treatment and disposal methods whenever possible, to enhance recovery and recycling efforts.
- Expanding internal programs for material reuse, including multiple life cycles, and minimizing the purchase of chemical/biological products by redistributing unused materials among different facilities.
- Final waste disposal through energy recovery methods, such as waste-to-energy incineration.
- Ensuring that authorized waste disposal companies transport full loads, reducing trips and consequently lowering carbon dioxide ($CO_2$) emissions.
- Raising awareness among University personnel about environmental protection and sustainability.

## SEPARATE WASTE COLLACTION

*GENERAL GUIDELINES*

With the amendments introduced by *Legislative Decree 116 of 2020* of the Environmental Code, urban waste is now defined as “both unsorted and separately collected waste, including that produced by non-domestic users”. As a result, waste generated in a university setting that is similar in nature and composition to household waste is classified as urban waste.

Through the "*Memorandum of Understanding*" signed in 2020 with *AcegasApsAmga* and the *Municipality of Padua*, the University of Padua has established a collaborative framework to plan and implement initiatives aimed at improving waste management and reducing the impact of urban waste collection, particularly in areas where University facilities and activities are concentrated.

The methods for collecting, sorting, and disposing of this waste depend on the management system of the company responsible for separate waste collection in the relevant municipality. The guidelines provided in this document are specific to the *Municipality of Padua* and follow *AcegasApsAmga*'s recommendations. Facilities located in other municipalities must verify compliance with local waste management regulations.

The University of Padua implements separate collection for the following waste types:

- Paper and cardboard;
- Plastic packaging and cans;
- Glass packaging;
- Residual waste (non-recyclable);
- Organic waste.

*UNI 11686: COLOR CODIN AND WASTE BIN IDENTIFICATION*

The UNI 11686:2017 regulation, titled "*Visual Identification Elements for Urban Waste Collection Containers*," establishes important guidelines for standardizing the color coding of waste bins.

The adoption of UNI 11686 across Italian municipalities would standardize the colors and visual elements used to identify waste bins nationwide. This would help users easily recognize the appropriate bins for different waste types, regardless of the city they are in.

The University, in purchasing new containers for separate waste collection and in accordance with the standards applied by the Municipality of Padua, has adopted the UNI regulation with appropriate colors and graphics.

The color scheme for new 5 waste bins is:

- Yellow: Plastic;
- Brown: Organic Waste;

- Blue: Paper;
- Green: Glass;
- Gray: Non-recyclable waste

*WASTE COLLECTION REGULATIONS AND PROCEDURES AT THE UNIVERSITY*

The quality of material separation is a key factor in the entire recycling process, as it enables waste to be transformed into a new resource.

In addition to following the waste separation guidelines provided by the local municipality, users can rely on environmental labeling symbols found on product packaging. These symbols are designed to inform consumers and facilitate correct recycling, thus enhancing the value of the waste produced. A non-exhaustive list of these symbols and their meanings is available at:

**https://www.unipd.it/sites/unipd.it/files/2019/RICICLIAMO19.pdf**

It is important to remember that the collection of hazardous urban waste such as: medication, lead batteries, spray can, or other materials classifies as urban waste but marked with hazard symbols, cannot be disposed of through standard separate waste collection, instead must be treated as special waste and sent for appropriate disposal.

To improve and optimize waste separation, the introduction of new waste containers in the University facilities includes the removal of individual office waste bins and the replacement of old containers. Each type of waste must be sorted at the source and placed in the designated bins provided by the Asset and Service Management Office, located in specific areas within University building.

Waste bins:

- Are placed in common areas such as hallways, atriums, and designated collection spaces;
- Are sorted by waste type: plastic, paper and cardboard, glass, residual waste, organic waste;
- Must be filled appropriately to avoid excessive weight during movement, particularly for glass and paper bins.

The University's cleaning service is responsible for emptying the bins and ensuring that waste is deposited into the municipal roadside containers managed by *AcegasApsAmga*.

If additional bins are needed or an existing one needs replacement, requests must be submitted via ticket to the Asset and Services Management Office.

## BINS PHOTOS


*Fig.1 Paper*


*Fig.2 Plastic*


*Fig.3 Residual waste*


*Fig.4 Organic waste*


*Fig.5 Glass*

## PAPER AND CARDBOARD (BLUE BIN)

The quantities of paper and cardboard produced during regular activities should be collected according to the procedures described below.

In the case of special activities, such as: moving, discarding documents from archives, or removing magazines and books from libraries, these should be treated as special waste.

Paper waste must be mainly composed of clean paper, meaning as free from impurities as possible. Any plastic or metal components should be removed from paper packaging and collected in appropriate bins.

Paper cups, cardboard, and food bags without obvious food residue can be collected in the paper and cardboard container.

Special attention should be paid to composite containers, which are made from multiple materials that cannot be manually separated (e.g., Tetrapak). In these cases, the labeling on the packaging should be checked to identify the predominant material. For example, Tetrapak containers should be collected with paper and cardboard since they are primarily made of paper.


| YES | NO |
|---|---|
| ✓ Non-compostable paper cups | × Thermal paper (receipts) |
| ✓ Paper bags and pouches | × Greasy and dirty paper and cardboard |
| ✓ Clean or slightly soiled food and beverage cartons | × Soiled wipes and hygienic tissues |
| ✓ Tetrapak containers | |
| ✓ Sheets | |
| ✓ Newspapers, magazines | |

## PLASTIC PACKAGING AND CANS (YELLOW BIN)

Plastic packaging and cans must be empty, free from liquid or solid residues. They should preferably be rinsed and reduced in volume. It is good practice to flatten bottles longitudinally. Flattening them from top to bottom might not be effective for the recognition by machinery at sorting platforms, potentially hindering the recycling process.

Plastic, aluminum, or tin containers and consumables from laboratory activities that are contaminated with specific chemical or biological agents cannot be sent to the standard recycling stream. Such waste must be managed as special hazardous waste, in accordance with their nature and level of danger, and assigned specific EWC codes.

## GLASS PACKAGING (GREEN BIN)

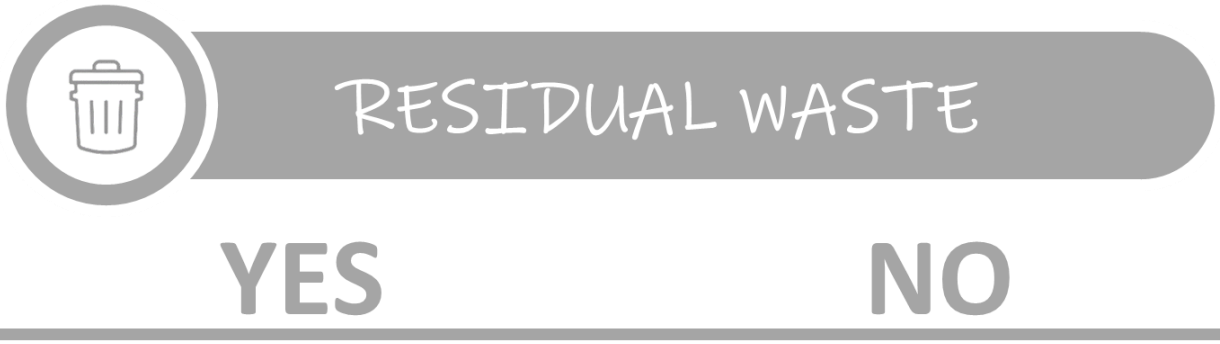
In the context of waste separation, only glass defined as “packaging” can be disposed of in the glass collection. Therefore, are included in this category only bottles, jars and containers. Excluded from the glass collection are: glasses, Pyrex glass, composite glass, glass with a netting, crystals and mirrors.

Glass packaging coming from laboratory activities that is contaminated with specific chemical or biological agents cannot be sent to standard recycling. Such waste must be managed as special hazardous waste, based on their nature and danger level, and assigned specific EWC codes.


| YES | NO |
| --- | --- |
| ✓ Bottles | × Glasses and Pyrex glass containers |
| ✓ Glass containers without caps and lids | × Containers with hazardous substance symbols |
| ✓ Jars and containers for food | × Fluorescent lamps and neon tubes |
| | × Laboratory glassware |

## RESIDUAL WASTE (GREY BIN)

Non-recyclable or residual waste includes all those materials that cannot be recycled. The “residual dry fraction” represents what remains after a proper separation of recyclable materials.




- ✓ Sanitary pads, wipes and tissues
- ✓ CDs, DVDs, VHS tapes, floppy disks, acetate sheets
- ✓ Pens, markers, adhesive tape, glue, rubber bands
- ✓ Thermal paper, pyrex glass cups and containers

- × Medications and hazardous substances
- × Neon lamps and tubes
- × Batteries and WEEE (Waste Electrical and Electronic Equipment)

## ORGANIC WASTE (BROWN BIN)

Organic waste includes all waste from food scraps and leftovers, as well as tissues and napkins that have come into contact with them. For optimal reuse of this waste, scraps should be placed in biodegradable bags


If the waste you intend to dispose of is not listed in the above categories, you can find the necessary information at the following link:

https://www.ilrifiutologo.it/casa_rifiutologo/

Un QR- code: Condividi la tua opinione – Share your opinion – Raccolta Differenziata in Ateneo – Waste segregation at the University of Padova

https://docs.google.com/forms/d/e/1FAIpQLSfbA8XPOoYU39e9iReZmh73VR9_swVhjr4mwX765UtHKsaSOg/viewform?usp=sharing