# Sustainable Products for Every Lab

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SARTORIUS



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# Introduction

At Sartorius, sustainability is at the heart of everything we do. Our innovative laboratory solutions are designed with the entire product life cycle in mind, from pre-manufacturing to disposal, to minimize environmental impact. We believe no action is too small. It is essential to adopt lifecycle thinking to improve sustainability by considering environmental impacts from raw materials to end-of-life. We continuously refine design and manufacturing processes to increase efficiency, reduce waste, and lower energy consumption. Additionally, we optimize logistics to minimize carbon emissions from shipping. Through ongoing research into materials and design, we continuously strive to reduce our environmental footprint and enhance product recyclability.

# Our Commitment Is Exemplified in Our Products:

- **Pipette Tips:** They are manufactured in a facility powered by renewable energy, using bulk raw materials to minimize packaging waste and transport emissions. We offer various packaging options, allowing customers to buy in bulk, which further reduces waste. Optimized packaging also decreases the number of shipments required per product, lowering our overall environmental impact.

- **Picus® 2 Pipettes**: Along with being manufactured in sustainable facilities, these electronic pipettes' long-lasting design reduces the need for frequent replacements, and their components are easy to maintain, repair, and recycle. The packaging is made from fully recyclable cardboard. Picus 2 pipettes are easy to diassemble for recycling. Moreover, Sartorius service centers can help you with their recycling.

- **Quintix® Pro Balances:** These lab balances are designed with sustainability at their core. They are manufactured through a climate-conscious production process using recycled materials like aluminum and eco-friendly packaging. They offer power-saving modes, and an automatic dim function reduces display brightness when not in use. Additionally, a digital user manual minimizes paper consumption while providing quick access to information.

- **Vivaflow® SU:** It is responsibly designed to help reduce your research footprint. Our TFF cassettes contain 30.5% less plastic and are supplied with tailored tubing kits to suit exactly how you will use Vivaflow®. Raw materials are sourced more locally and we manufacture the housing entirely in-house. In the redesigned packaging, we have replaced plastic bubble wrap with environmentally friendly cardboard inserts and the manual with a concise quick-start guide.

- **Sartolab® RF|BT:** These filtration products are made from recyclable materials and produced using 100% renewable energy. Our packaging is designed to minimize plastic and cardboard usage. Distribution methods reduce CO2 emissions by 30% after optimizing the logistics and supply routes, while the innovative design conserves space and minimizes waste. Additionally, the product can be recycled like plastic waste, provided it has not been exposed to biohazards.

- **Biosart® 250 Funnel:** It is a smarter and more sustainable solution for microbiological testing. Designed to be autoclavable up to 50 times, it significantly cuts waste by up to 95%. With up to 88% lower $CO_2$ emissions, the Biosart® 250 Funnel represents a significant step toward greener labs and ensures reliable performance, providing efficient and precise filtration every time.

- **Arium® Pro and Arium® Comfort:** You receive both clean lab water and a cleaner carbon footprint by designing water systems that prioritize sustainability from the very beginning to end of life. Arium® Pro and Arium® Comfort are built with 100% renewable electricity, shipped via optimized channels to reduce carbon emissions, and equipped with iJust software that reduces water use, cutting cleaning cycles by 50%.

# Pipette Tips

## Overview

Pipette tips are essential tools in any laboratory setting. Sartorius Optifit pipette tips are standard tips that are available with various purity and packaging options. The Safetyspace® filter tips, on the other hand, are always pre-sterilized and designed to safeguard against cross-contamination of reagents and samples alike.

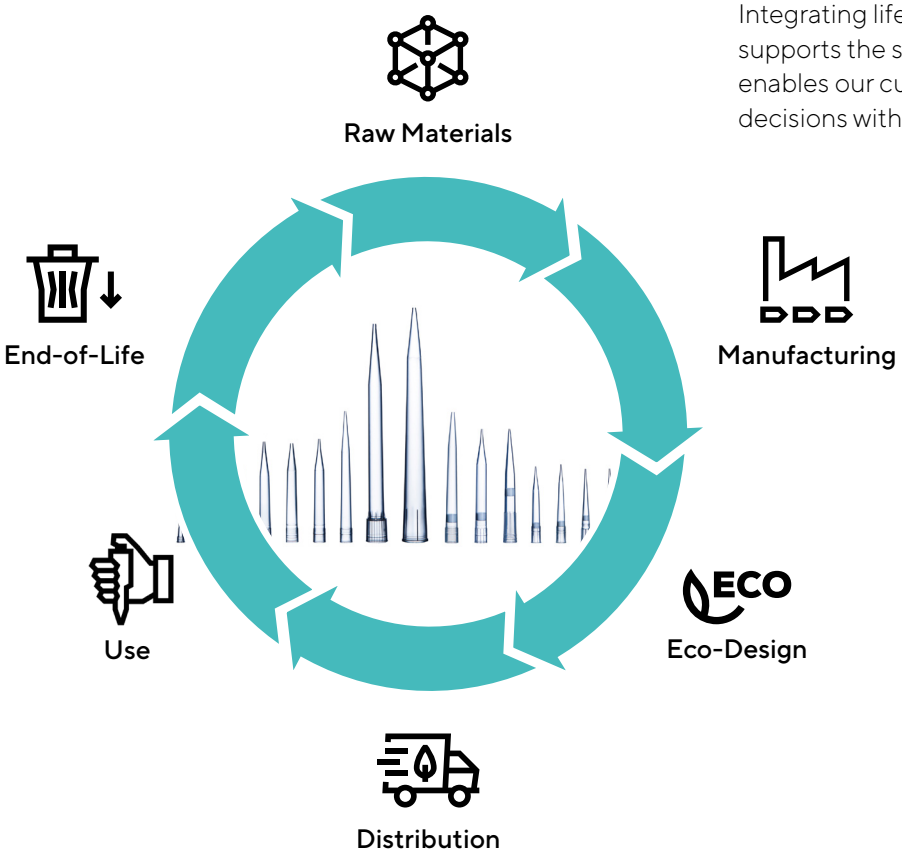
## Life Cycle Thinking

At Sartorius, we are committed to sustainability and are actively seeking innovative ways to reduce the ecological footprint of our products, including pipette tips.

Adopting life cycle thinking is key to enhancing sustainability and considering the environmental impacts from raw materials to end-of-life disposal. We are dedicated to refining our production methods, boosting efficiency, minimizing waste, and cutting energy use. We also consider the environmental toll of shipping practices and are committed to optimizing logistics to reduce carbon emissions.

Our ongoing research into materials and designs aims to lessen environmental impact and enhance the recyclability of our pipette tips. Guided by Life Cycle Assessment (LCA) screenings, we gain valuable insights that drive the development of more sustainable products and deepen our understanding of their ecological footprints.

Integrating life cycle thinking into our operations not only supports the sustainability of our pipette tips but also enables our customers to make environmentally conscious decisions with confidence.



# Raw Materials and Manufacturing

Sartorius pipette tips are produced with the utmost attention to purity and quality and are manufactured in accordance with ISO 9001 and ISO 13485 standards, within a Class 8 cleanroom environment. Additionally, our environmental management system is independently certified to meet the ISO 14001 standard.

Our pipette tip production plant in Kajaani, Finland, operates on 100% renewable electricity. Waste heat from production is repurposed to heat the facility, reducing our reliance on district heating. We have also transitioned to LED lighting throughout, cutting energy use by up to 30% in specific areas, like our warehouse.

The plastic raw materials for our pipette tips are stored in silos and bought in bulk, minimizing packaging waste and transport emissions. Our manufacturing process is continuously improved to decrease plastic waste. Any production waste is collected by a local recycler and repurposed for making other plastic items, such as buckets and boxes. Altogether, our tip manufacturing site has achieved a total waste recovery rate of 98%.

Sartorius's Finnish manufacturing and office facilities have teamed up with a local Carbon Neutral Waste Management service. We measure the carbon footprint of our waste management and offset $CO_2$ emissions through Gold Standard-certified afforestation projects. In 2023, we invested in permanent carbon sinks to neutralize our waste emissions. This initiative, combined with thorough waste sorting and reduction, is crucial in our mission to diminish our operational carbon footprint.

*Sartorius manufacturing plant in Kajaani, Finland*

# Product Design

The quality of consumables is inherently tied to their initial design and the precision of their manufacturing. A pipette and its corresponding tip form an integrated system, engineered to function seamlessly as a unit. When paired with Sartorius Optifit or Safetyspace® Filter Tips, Sartorius pipettes deliver optimal performance.

Our tips are manufactured using diamond-polished molds, ensuring a consistently smooth surface that minimizes liquid retention and enables precise, accurate liquid dispensing.

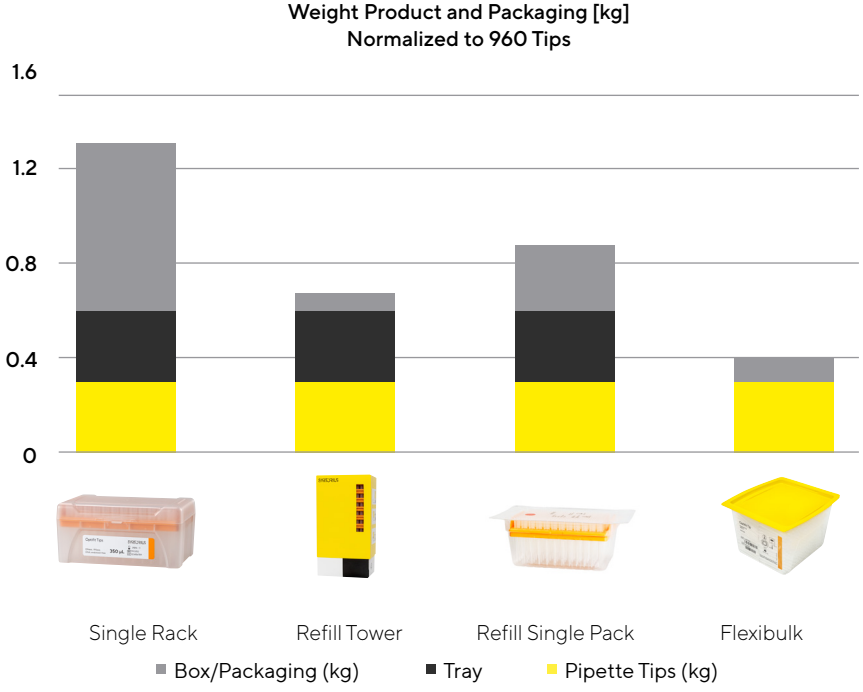
The compatibility between the pipette and tip, supported by our high-quality manufacturing standards, is key to obtaining reliable and repeatable results. Improved precision and accuracy in pipetting leads to reduced variability in results, thereby minimizing the necessity for repeated pipetting and experiments. Consequently, this efficiency translates into a decrease in overall tip consumption.

Optifit Refill trays and bulk tips are designed for full compatibility with Sartorius tip boxes across our product range, extending the lifespan of each tip box. The durable construction of our tip boxes and trays supports repeated autoclaving, maintaining purity and broadening the range of applications for both refill and bulk tips.

# Packaging Design

Packaging plays a pivotal role in preserving the integrity and quality of our products. It protects pipette tips from damage, contamination, and degradation, ensuring they arrive in perfect condition to the end user.

Recognizing the diverse needs of laboratory applications, we offer a variety of packaging options. Our selection includes Single Rack, Refill Tower, Refill Single Pack, and Bulk options. Laboratories that choose Refill or Bulk packaging can significantly reduce waste output. These choices are especially advantageous for eco-conscious labs aiming to cut down on plastic consumption.




*The type of packaging influences the plastic content per product. Refill and bulk products offer environmental benefits as they contain less plastic and packaging material. The picture shows the total weight of a sales unit that contains altogether 960 pipette tips. The comparison was made with the 350 µl tip variant.*

Single Rack


Refill Tower


-50%
Reduced Plastic Weight

Refill Single Pack

-30%
Reduced Plastic Weight

FlexiBulk


-70%
Reduced Plastic Weight

*Reduced plastic weight per tip (normalized with 960 tips) when compared to a single-rack product. Comparison done using 200 µl Optifit Tips.*

All of our cardboard packaging is 100% recyclable, and some packages even incorporate recycled content. All of our cardboard is from sustainable sources.

# Time to ACT

The Refill Tower has earned the ACT Ecolabel an eco-certification from an independent third party that assesses various sustainability factors. 'ACT' stands for Accountability, Consistency, and Transparency, the core principles of this label. Much like nutrition labels provide details on food contents, the ACT Ecolabel offers a clear view of a laboratory product's environmental impact. It rates products on multiple sustainability criteria, making it easier for users to compare their ecological effects.

ACT.
The Environmental Impact Factor Label

# Distribution

We have optimized our packaging and palletizing designs to enhance shipping and sterilization efficiencies. This optimization maximizes space utilization during transit, reducing the number of shipments required per product and, as a result, lowering transportation-related carbon emissions. Additionally, we prioritize overland and maritime freight as our main transportation methods.

We are in the process of transitioning to wooden pallets that are 27% lighter (10.6 kg compared to 14.5 kg). To mitigate contamination risks, our pallets are made from virgin material and are not reused.

# Disposal

The cardboard packaging for our product sales units is fully recyclable. Both the tip box and tray are manufactured from 100% polypropylene. The recycling of pipette tips, tip boxes, and trays is subject to local regulations and laboratory practices. While recycling is preferred, it may not always be practical due to contamination risks or the use of hazardous substances. Products that have not been in contact with hazardous materials can be considered plastic waste and recycled as such. The materials used in the FlexiBulk and Refill Single Pack packages are mixed plastics; please adhere to local recycling guidelines.

# Materials

| | | |
|---|---|---|
|  | Tip | **Polypropylene (PP)** |
|  | Tip Filter | **Polyethylene (PE)** |
|  | Tip Tray and Rack | **Polypropylene (PP)** |
|  | Tip box wrapping | **Polymide (PA) \| Polyethylene (PE)** |
|  | Single Refill Package | Cover: **Polyamide (PA) \| Polyethylene (PE)** Container: **Polyethylene terephthalate (APET) \| Polyethylene (PE)** |
|  | FlexiBulk® package | **Polyethylene terephthalate (APET) \| Polyethylene (PE)** |
|  | Bulk bag | **Low-density polyethylene (LDPE)** |
|  | Cardboard package | **Cardboard** |

Moving forward, Sartorius remains dedicated to sustainability in every facet of our products' life cycle. We continually seek innovative methods to improve our environmental performance, ensuring that our high-quality pipette tips are not only dependable for laboratory use but also produced with responsibility.

# Picus® 2

## Overview

Sartorius Picus® 2 electronic pipettes are the ideal tools to accompany you in daily, repetitive liquid handling in laboratories, where the accuracy of your results, speed and ergonomics are important. Their fully electronic control guarantees consistent, user-independent results, and their lightweight, ergonomic design gives you total convenience.

## Life Cycle Thinking

Adopting life cycle thinking is key to enhancing sustainability and considering the environmental impacts from raw materials to end-of-life. We continuously refine our design processes and manufacturing methods to increase efficiency, reduce waste, and lower energy consumption. Furthermore, we consider the implications of shipping and strive to optimize logistics to minimize carbon emissions.

# Manufacturing

Our pipette manufacturing plants in Helsinki and Kajaani, Finland operate with 100% renewable electricity. The waste heat from production is redirected to provide heating for the manufacturing or storage facilities, thereby reducing the consumption of district heat. Additionally, we have upgraded all the lighting to LED lights.

More than half of Picus ®2 components are manufactured in-house, which means we are controlling more stages of the manufacturing process and its impact to environment. Our plastic component manufacturing total waste recovery rate is 95%.

Sartorius's manufacturing and office facilities in Finland have partnered with a local Carbon Neutral Waste Management service1. The carbon footprint produced by our waste management is measured and the $CO_2$ emissions are offset through Gold Standard certified afforestation projects. In 2023, we invested in permanent carbon sinks to neutralize our waste emissions. Alongside diligent waste sorting and reduction efforts, this service helps to counteract any remaining emissions, playing a vital role in our strategy to reduce our operational carbon footprint.

Our quality and environmental management system is certified by independent third party to meet ISO 9001, ISO 13485, and ISO 14001 standards.

**Learn more about carbon neutral waste service** (in Finnish):
Hiilineutraali jätehuolto | L&T

*Sartorius manufacturing plant in Kajaani, Finland*

# Product Design and Use

Long-lasting products reduce the need for frequent replacements, thereby conserving resources and minimizing waste. Pipettes are typically used for many years, commonly more than 10 years can easily be achieved with a proper maintenance program. Designing Picus® 2 pipettes to be easily maintainable and repairable extends their usable life and prevents unnecessary disposal. High quality materials and manufacturing technologies ensures stable performance of the product year after year. Sartorius also is committed to secure and long-term supply of spare parts for our pipettes.

A pipette and its corresponding tip constitute an integrated system, designed to function seamlessly together. When Sartorius pipettes are paired with either Optifit tips or Safetyspace® filter tips, they achieve their full intended performance. The compatibility between the pipette and tip and the overall quality of the manufacturing process is paramount for ensuring reliable, reproducible results. This in turn minimizes the necessity for unnecessary pipetting repetitions thereby reducing the overall usage of pipette tips, as well as the liquids pipetted.

The tips, a vital part of your daily work, generate significant portion of the total environment impact when using Picus® 2 pipette. For a deeper understanding of our approach to offer more sustainable pipette tips, we invite you to read more from the Sartorius pipette tip fact sheet. Make a choice that benefits both your research and the environment with Sartorius tips.

# Packaging Design and Distribution

Packaging has a critical role in maintaining the integrity and quality of the products during transport. Packaging safeguards pipettes from potential damage and degradation while ensuring that they reach end users in pristine condition. By minimizing the packaging size, we can streamline logistics, improve storage efficiency, and reduce the material usage.

Picus® 2 packaging is made with 100% FSC certified cardboard.

# After Sales Service

Longevity and reliability of pipette are pivotal to your success. That's why we are committed to providing repair, maintenance, and calibration services.
Extend the life of your instruments with our expert technicians who are dedicated to keeping your instruments in peak condition. Regular maintenance can prevent unexpected breakdowns, extend the lifespan of your equipment, and save you from the cost and environmental impact of frequent replacements.

Regular calibration for optimal accuracy and repeatability is the cornerstone of quality. Our accredited calibration services guarantee that your instruments perform to their original specifications, ensuring consistent results and reducing the likelihood of errors that could lead to waste. By optimizing the functionality and extending the life of your instruments through spare part availability and our services, you're actively reducing waste and conserving resources.

In summary, product service plays a crucial role in enhancing product sustainability by promoting longevity, efficiency, and responsible end-of-life management, all of which contribute to reducing the overall environmental impact of our products.

# End-of-Life

The product sales unit packaging that is made from cardboard, is fully recyclable. Disposing electronic devices, like electronic pipettes, should be done according to local guidelines. For least environmental harm you should look for a solution that separates components like plastics, metal, electronics, and battery, and that the components are not glued together. Picus pipettes are easy to diassemble for recycling. Sartorius service centers can help you with recycling electronic pipettes.

Waste from Electrical and Electronic Equipment (WEEE) must be sorted and disposed accordingly. This enables recovery and recycling of rare and valuable raw materials and prevents hazardous materials from ending up in the environment.

To minimize electrical waste, Picus® 2 pipettes are delivered with a universal USB charging cable. Other charging options like charging stands and adapters can be ordered separately as needed.

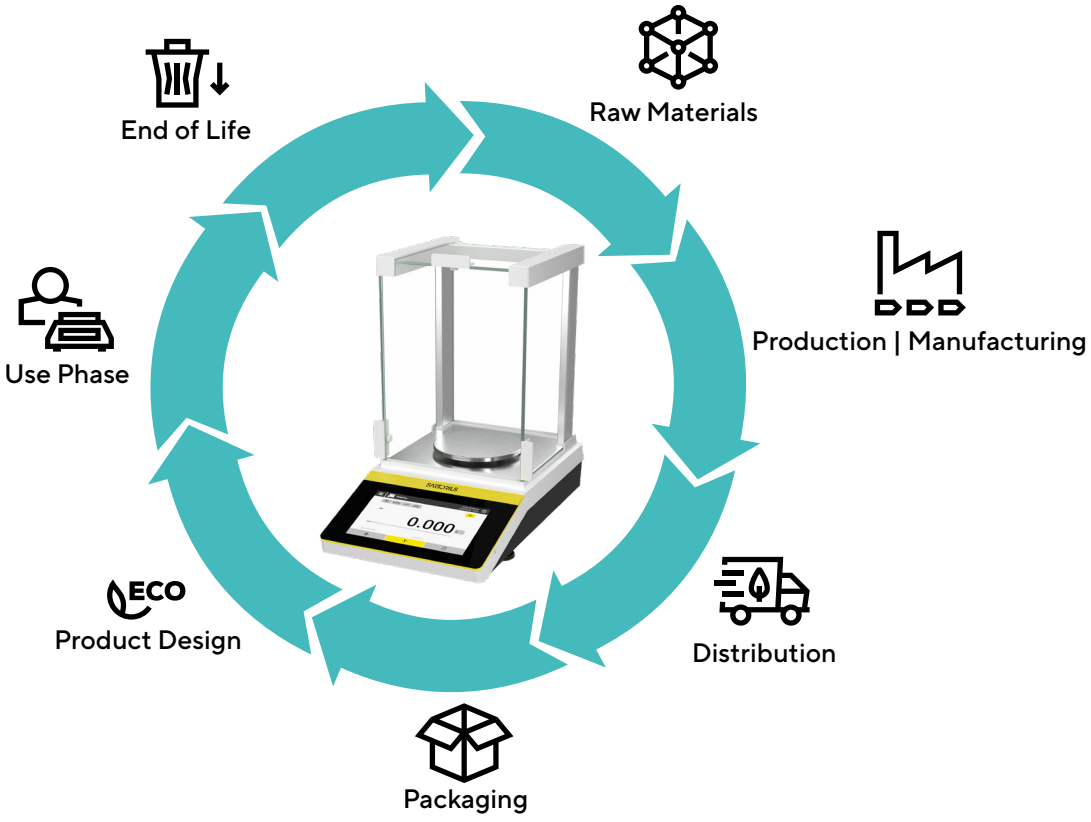
# Quintix®Pro

## Quintix® Pro – Life Cycle Thinking

Quintix® Pro lab balances embody a significant innovation, with life cycle thinking at the core of their design and development. The early implementation of a screening Life Cycle Assessment (LCA) has been instrumental in creating a product that stands out for its technical excellence and commitment to environmental sustainability. This proactive strategy has enabled us to address potential environmental impacts from the start, positioning Quintix® Pro as a great choice in eco-friendly innovation within our industry.

Our dedication to sustainability is integral to the Quintix® Pro. We've chosen materials like aluminum with recycled content to ensure high technical performance while embracing renewable energy in our production. We've also phased out non-recyclable packaging, reinforcing our commitment to waste reduction and the circular economy.

The design of Quintix® Pro reflects our holistic approach to product life. Energy efficiency, serviceability, and end-of-life recyclability are deliberate design choices that prolong the product's lifespan and minimize its environmental footprint. By considering the full life cycle of Quintix® Pro, sustainability remains a central focus from inception to disposal.



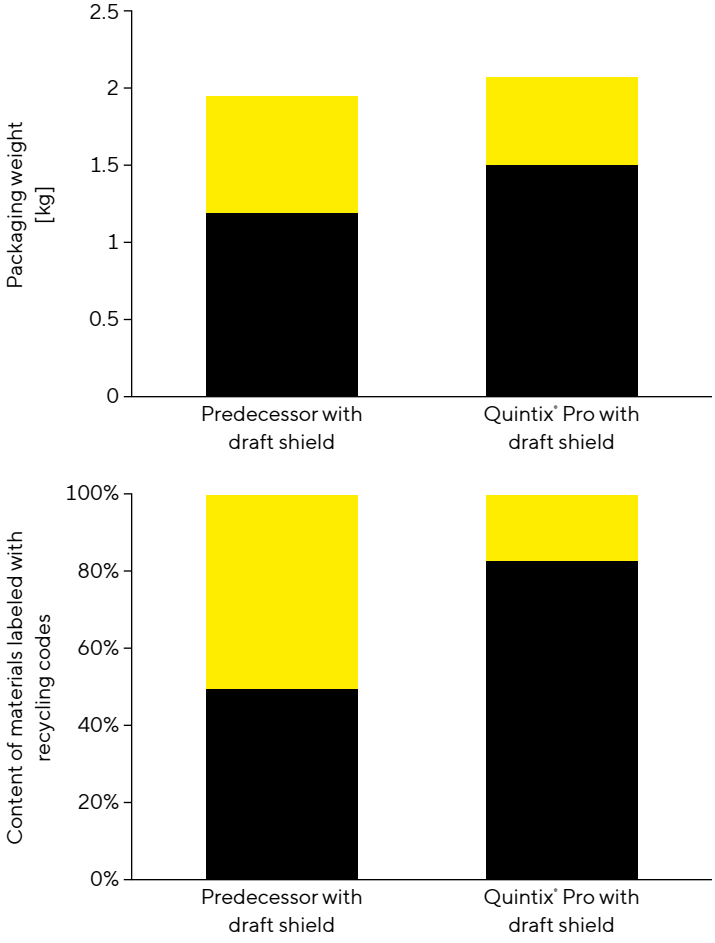

**1. Raw Materials**
The Quintix® Pro line showcases our commitment to sustainability, utilizing aluminum with a substantial recycled content sourced within Europe, reducing our carbon footprint. Our sourcing strategy prioritizes recycled materials to diminish environmental impact. With 20% recycled content in high-volume parts like the carrier plate, we conserve resources and support the circular economy.

### 2. Production | Manufacturing

At the heart of Quintix® Pro production is our Goettingen, Germany facility, where we manufacture a significant portion of the Quintix® Pro family using 100% renewable electricity. We boast a 91% recycling rate and are on track for zero-waste production by 2030. Every piece of aluminum scrap is recycled, ensuring full material utilization. Our operations, certified by the ISO 14001 Environmental Management System, are a testament to our commitment to environmental excellence.

### 3. Distribution

Quintix® Pro balances reach their destinations through optimized distribution channels, favoring sea transport over air to enhance environmental efficiency. Strategic distribution hubs and consolidated shipments further reduce our carbon footprint. This logistical approach ensures timely delivery and demonstrates our commitment to sustainable transportation practices.

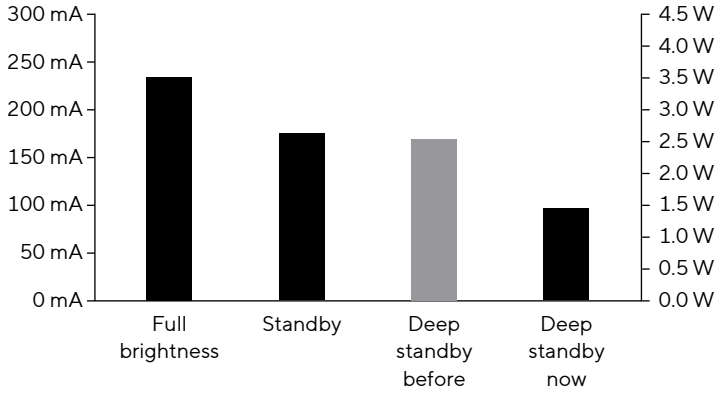



### 4. Packaging

We have significantly reduced our reliance on new plastic by using protective bags made from 80% post-consumer recycled material. Our cardboard boxes contain 60% to 100% recycled material, and for the Quintix® Pro with draft shield, we've increased the recycled content in packaging to over 70%. Most packaging materials are labeled with recycling codes to streamline the recycling process.

### 5. Product Design

Energy efficiency is a key design principle of the Quintix® Pro, featuring low power electronics and intelligent backlighting that dims to save energy and extend product life. The deep-standby mode cuts energy use by more than half for an average 8-hour, 5-day-a-week operation. We've also digitized and integrated the manual and operation instructions into the Quintix® Pro user interface, reducing the printed version by 30% to lessen our environmental impact.




### 6. Use Phase

The balance is designed with replaceable and repairable parts, promoting longevity and reducing the need for frequent replacements. Our service model includes a network of local service hubs close to our customers, reducing the need for extensive logistics and further cutting our carbon footprint.

### 7. End of Life

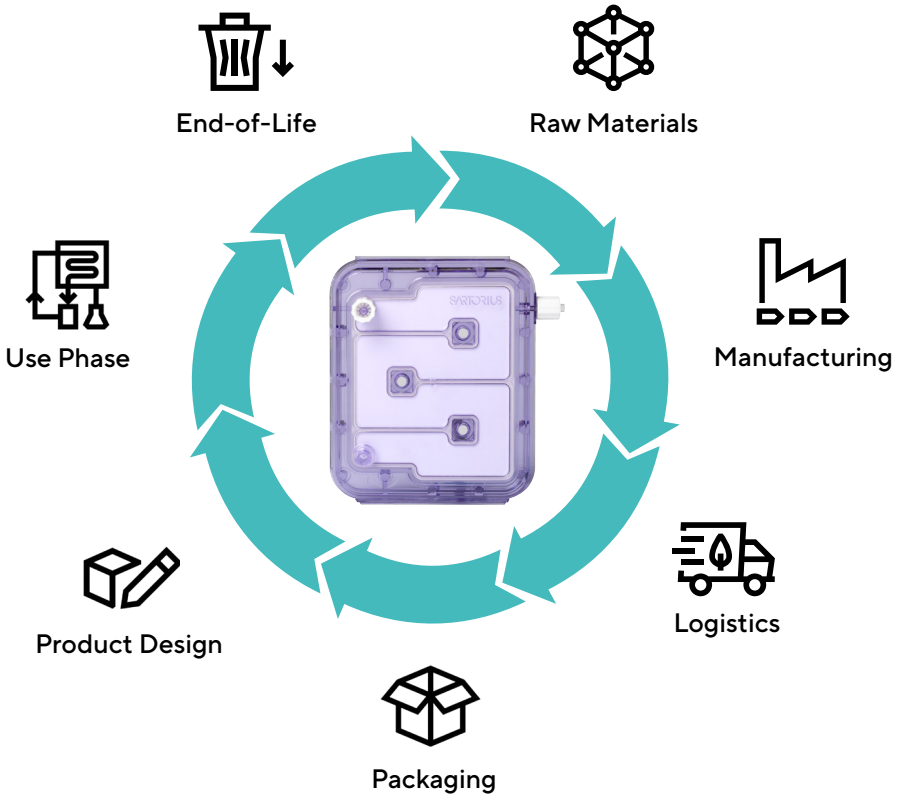
As a Quintix® Pro balance nears the end of its usable life, its design facilitates easy disassembly for recycling. We avoid using restrictive technologies, like adhesives, to simplify the recycling process. This design philosophy is consistent with our goal of creating products with their end-of-life disposal in mind.

# Vivaflow® SU

## Overview

Vivaflow® SU is a next generation tangential flow filtration (TFF) cassette, designed to simplify ultrafiltration and diafiltration of 100-1,000 mL samples in research laboratories. Each cassette is supplied ready to use for fast and intuitive setup right out of the box. In addition, the advanced flow path and extended range of membranes deliver faster process speeds and higher recoveries for virtually any molecule, without the need for expensive equipment or complicated process optimization.

Now, in addition to making TFF more accessible to research scientists, Vivaflow® SU has reinvented the TFF cassette with sustainability at its core.




## Raw Materials

**Revolutionary Reductions**

Each Vivaflow® cassette begins with a handful of raw materials. For Vivaflow® SU, the housing has been completely redesigned and is now made of medical grade polycarbonate, which is certified renewable by the International Sustainability and Carbon Certification (ISCC) PLUS program.Polyethylene has also been introduced as a membrane support, and our commitment to local sourcing has brought the entire production process much closer to home. These changes have increased the product's recyclability potential and ensured a sustainable origin by reducing the complexity and carbon emissions of our supply chain. The result? A remarkable 30.5% reduction in plastic use and less dependence on crude oil (Figure 1), marking a significant step towards a greener future.

**Figure 1.** Each Vivaflow® SU cassette (teal) uses 30.5% less plastic than the previous generation Vivaflow® 50 (grey).

ISCC International Sustainability & Carbon Certification

# Manufacturing

### Process Precision

We've transformed manufacturing with a cutting-edge heat staking assembly process, reducing production time by 40%. Each second saved in production contributes to a more sustainable operation. While we continue to explore renewable energy options, our manufacturing facility already excels in efficient waste management practices that align with circular economy principles. In addition, Sartorius is committed to converting all its production sites, including the Stonehouse facility, to 100% renewable electricity by 2030.

# Logistics

### Streamlined Supply

Our distribution network remains as efficient as ever, with a strong focus on optimizing the journey from raw material to delivered product. For Vivaflow® SU, we now source raw materials more locally and manufacture the housing entirely in-house (Figure 2). We have also maintained our commitment to ambient shipping conditions for the finished product, ensuring that it reaches you without the need for energy-intensive cooling.

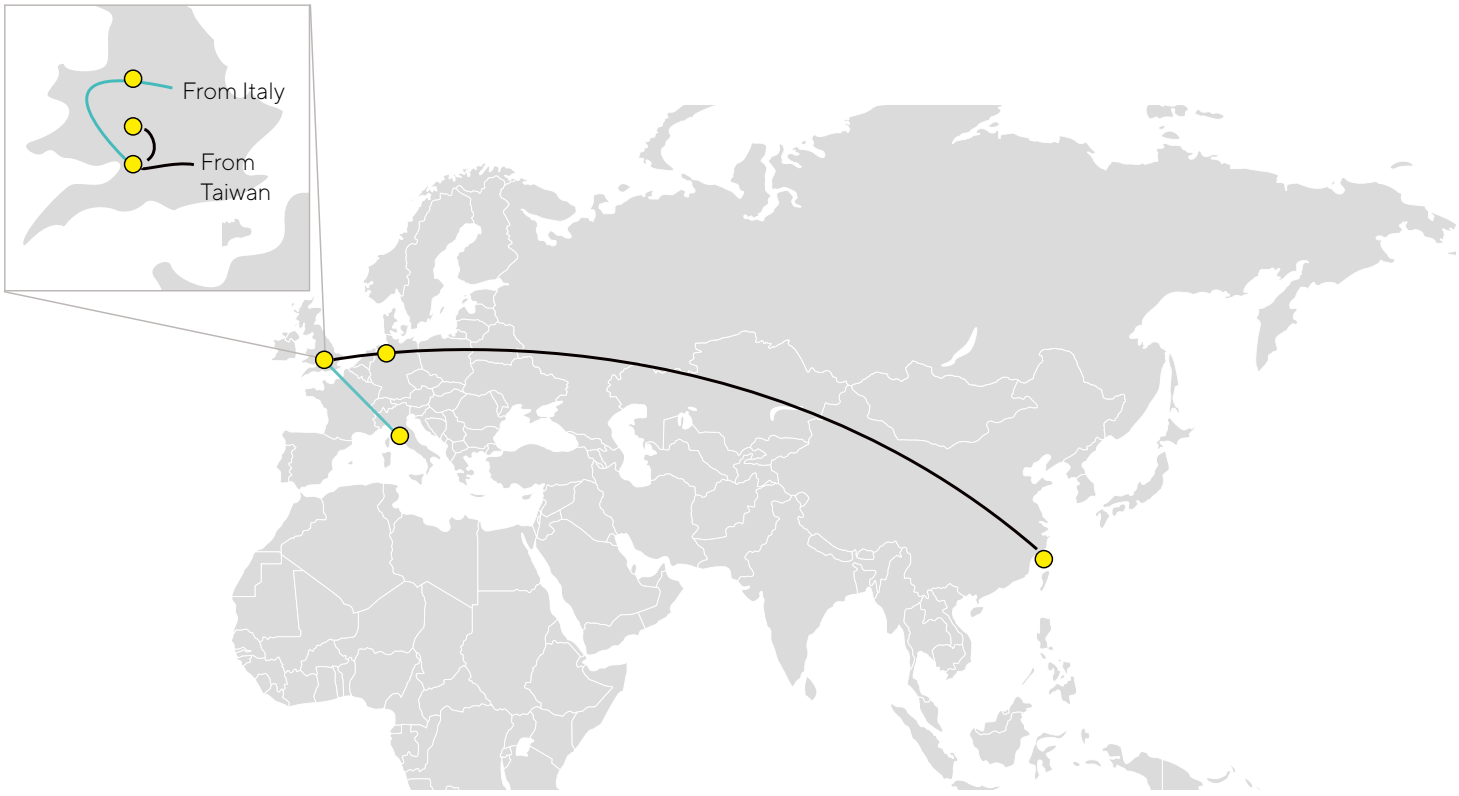



**Figure 2.** Local raw material sourcing and in-house production of the Vivaflow® SU housing (teal) have reduced the length of our supply chain by over 8,500 km.

# Packaging

### Recycling-Ready

We have redesigned the packaging for Vivaflow® SU to replace plastic bubble wrap with environmentally friendly cardboard inserts, a simple change that underscores our commitment to sustainability. While there is a slight increase in packaging weight (Table 1), the overall benefits more than compensate for this. Our new design also maintains the same overall shipping volume for delivery to our customers, ensuring that sustainability doesn't come at the cost of distribution efficiency.

| | Vivaflow® SU | | Vivaflow® 50 | |
|---|---|---|---|---|
| **Inner packaging** | Cardboard (PAP) | 39 g | Bubble wrap (PE) | 5 g |
| **Outer packaging** | Cardboard (PAP) | 59 g | Cardboard (PAP) | 59 g |
| **Printed materials** | Quick start guide (PAP) | 5 g | Instruciton Manial (PAP) | 30 g |
| **Total weight** | | 103 g | | **94 g** |

**Table 1.** The packaging for Vivaflow® SU cassettes is entirely paper based, making it easier to recycle.

# Product Design

### TFF Reimagined

Vivaflow® SU takes the core principles of our original Vivaflow® cassettes even further, to conserve resources and simplify processes for our research customers. The all-in-one housing and advanced flow path eliminate the need for expensive equipment, reducing both cost and environmental impact. While the lifespan of Vivaflow® SU remains unchanged at launch, we are exploring ways to enhance throughput and efficiency in future updates.

# Use Phase

### TFF Reimagined

Ergonomics take center stage with improved, directional Luer connectors for more intuitive setup and a leak-free process. We have also minimized waste by tailoring the included tubing kits to your specific application needs (Figure 3). This offers more versatility, enabling you to process both small and large feed volumes efficiently, while ensuring that every component of Vivaflow® SU serves a clear purpose. In addition, pre-washing is now an optional step that, if omitted, saves 100 mL of water per run (Table 2). Similarly, the single-use design and the retained ability to perform continuous diafiltration with Vivaflow® SU support even greater water savings compared to reusable cassettes and dialysis.

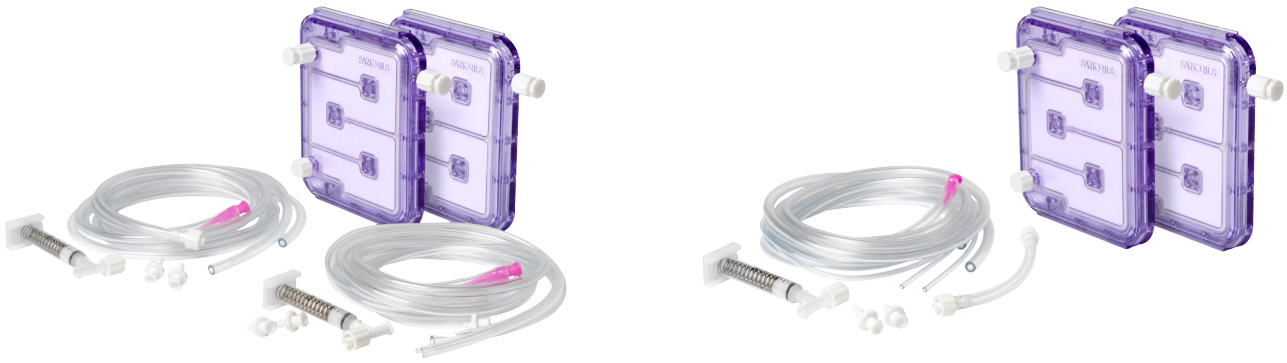


**Figure 3**. Vivaflow® SU cassettes are supplied with tubing kits to either run each cassette individually (left), or to run both cassettes in series (right), so that every component is always used and never goes to waste

| Process | Product(s) | Vivaflow® SU | Vivaflow® 50R | Vivaflow® 50R Dialysis Cassette |
|---|---|---|---|---|
| | **Method(s)** | UF/DF | UF/DF | UF and Dialysis |
| **Water Consumption** | **Pre-Washing** | 0.0 L | 0.1 L | 0.1 L |
| | **Cleaning** | 0.0 L | 1.2 L | 1.2 L |
| | **Buffer Exchange** | 0.25 L | 0.25 L | 30 L |
| | **Total** | 0.25 L | 1.55 L | 31.3 L |
| Potential Water Savings with Vivaflow® SU | | | 1.3 L | 31.05 L |

**Table 2**. By omitting the now optional pre-washing step and making use of Vivaflow® SU for buffer exchange as an alternative to reusable TFF cassettes and dialysis, a substantial reduction in water consumption can be achieved.

# End of Life

### No Parts Unused

We understand the challenges of recycling heat-staked products, but our tubing kits are easily separable and recyclable if uncontaminated. Additionally, our customized kits ensure you receive only what you need, minimizing waste. We also encourage practices that enhance the sustainability of Vivaflow® SU. For instance, proper sample clarification before TFF helps to maximize throughput, ensuring that the full capacity of each cassette can be utilized.

Further information on recyclability can be found in the Guide to Recycling and Responsible Disposal of Lab Filtration and Chromatography Products.

Together, we are not only advancing biotechnology but also paving the way for more sustainable future in life science research.

# Sartolab® RF | BT

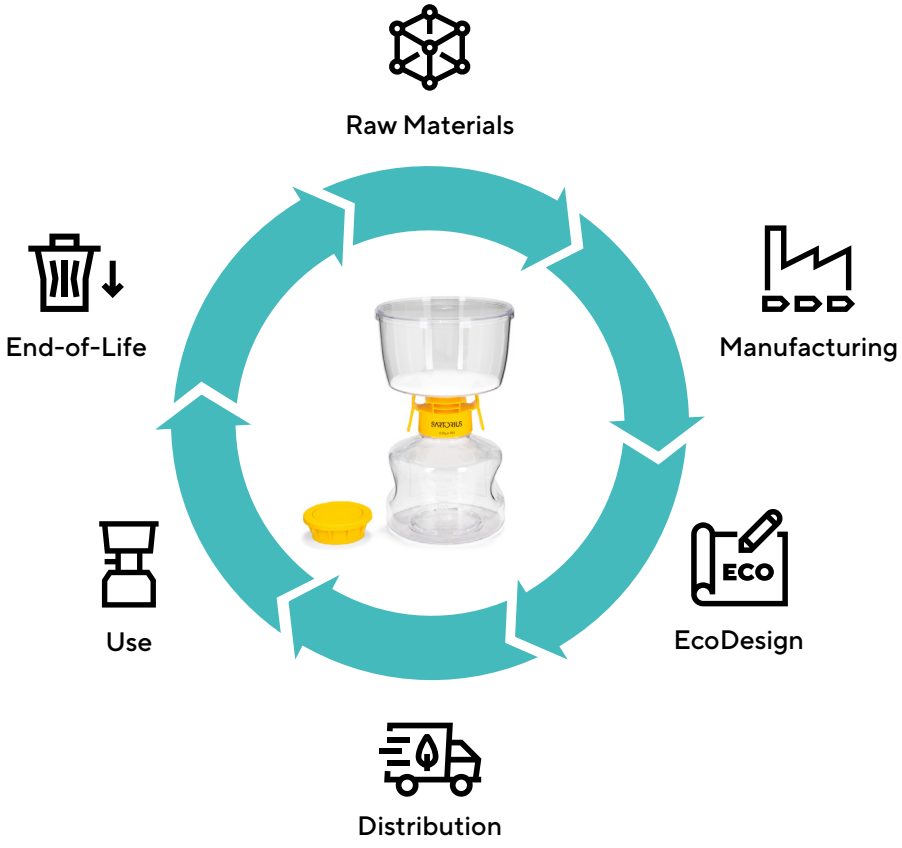
## Overview

Sartolab® RF|BT vacuum filtration units are designed for research purposes, specifically for the filtration of small volumes ranging from > 50 mL to 1 L. The Sartolab® RF system includes a receiver flask attached to the filtration funnel. The Sartolab® BT is a bottle top filter (filtration funnel) that comes without a receiver flask. This allows you to use your own receiver flasks and/or expand the filtration capacity, depending on the particle load of the liquids being filtered.

These filtration products are designed to handle a variety of liquids, including hazardous substances. Consequently, recycling options may be limited after use. Despite these limitations, we remain committed to sustainability and continue to explore ways to minimize our environmental impact while delivering high-quality, efficient solutions for your research needs.

## Life Cycle Thinking

Sartolab® RF|BT products are developed with a strong commitment to life cycle thinking, a holistic approach that comprehensively understands the environmental impacts of a product or service throughout its entire life cycle, from raw material extraction to end-of-life disposal. This approach, embraced by Sartorius, allows for a thorough assessment of environmental impacts and helps identify opportunities for improvement at each stage, thereby minimizing our environmental footprint and enabling us to offer sustainable and efficient solutions. The production of Sartolab® RF|BT products is a testament to this commitment, as sustainable practices are employed throughout the manufacturing process. This enables our customers to make informed decisions that align with our commitment to responsible practices and contribute to our sustainability targets. By choosing Sartolab® RF| BT, you are not only opting for high-quality products but also supporting a sustainable future.



# Raw Materials & Manufacturing

All Sartolab® RF|BT vacuum filtration Units are manufactured in an ISO 13485 certified plant and class 8 cleanroom to assure the highest level of purity. All Sartolab® RF|BT are produced on the same production line at Helsinki, Finland plant, which operates entirely on 100% renewable energy and utilizes energy saving technologies throughout the whole product manufacturing cycle.

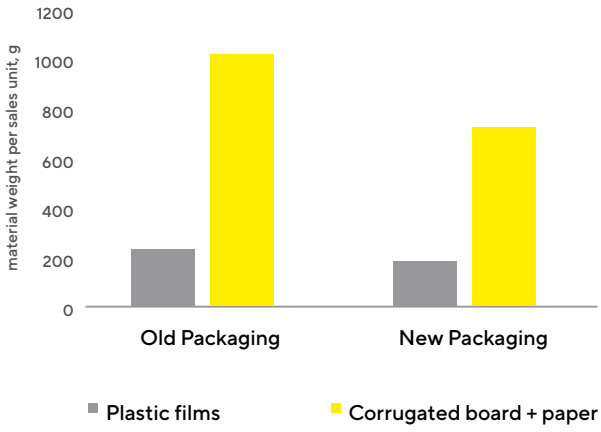
Additionally, the use of modern technology, injection molding tools fitted with pressure sensors and quality control systems, enhances product quality, and minimizes production waste, with less than 5 % of total used plastics ending up as waste.

**Material**

| | |
|---|---|
| Funnel, lid, bottle | Polysterene (PS) |
| Tubing connector, funnel adaptor, screw cap | High Density Polyethylene (HDPE) |
| Membrane filter | Polyethersulfone (PES) |
| Packaging | Cardboard (PAP)<br>PET\|PE and PE\|PA multilayer film |

# Packaging

**Figure 1.** *Sartolab® old vs new packaging for 150-250ml product variants*




Product packaging plays a crucial role in preserving product quality by protecting items from damage, contamination, and deterioration. However, it also contributes significantly to environmental waste. Sartorius is committed to creating product packaging that effectively protects products while minimizing environmental impact.

We have redesigned the Sartolab® RF|BT packaging for 150–250 mL products to be narrower, resulting in a 22 % reduction in use of plastic packaging film . We have also optimized our cardboard shipping boxes, reducing the cardboard material used per sales unit by approximately 11 %.

Our cardboard packaging, which accounts for 81 % of packaging weight, is 100 % recyclable and. partially sourced from recycling streams, contributing to sustainability by reducing waste and conserving natural resources. Furthermore, our revamped product packaging and box arrangement allow us to fit twice as many products per pallet (576 pcs vs 288 pcs) for some variants , enhancing our shipping efficiency and requiring less transports per product.

# Distribution

In addition to modifying Sartolab® RF|BT product packaging, we have also made changes to optimize product transportation efficiency and to reduce $CO_2$ emissions. These changes include:

- Optimized palletizing: By positioning RF1000 boxes sideways on pallets, we can ship twice as many boxes per pallet.
- Transition to 50 % lighter wooden pallets (12 kg vs. 24 kg) Note: to avoid contamination risks, our pallets are made of virgin material and we do not use reusable pallets.
- Switch to 40 % thinner pallet stretch foil at our Helsinki, Finland plant (12µm thick foil instead of 20µm).

Sterilization is a crucial process for Sartolab® RF|BT products to ensure high purity operations. Recently we switched to another sterilisation provider. With the same level of sterilization quality this transition allowed us to optimize transportation logistics and brought approx. 30 % reduction of carbon footprint associated with truck distribution.

# Product Design

The shape of funnel allows them to be stacked inside each other. This design results in less volume in the bin, which is beneficial for customers who pay based on the volume of waste.

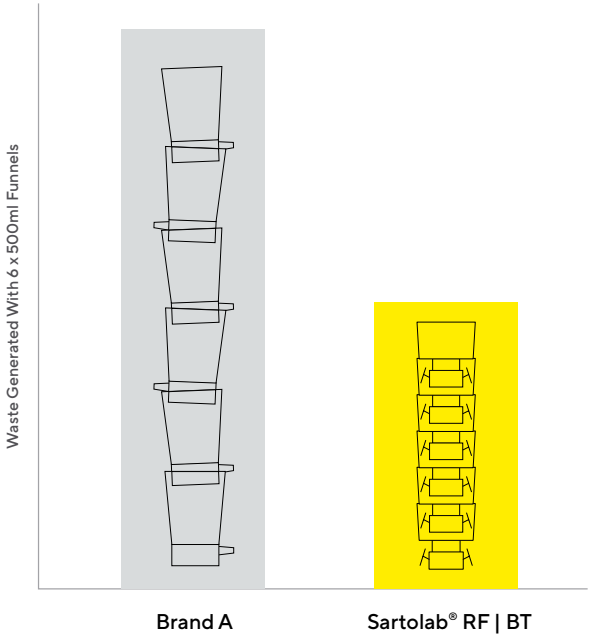
Below are the key product design features that enable efficient storage and help avoid product waste due to accidental tipping or dropping:

- Large bottles ensure stability during standalone filtration.
- Direct compatibility with the Sartolab® Multistation for easy sample manipulation.
- Packaging includes peel-offs at every corner for easy opening, even with gloves on.
- Packaging design features a finger hole for easy transportation of multiple units with one hand.
- Products are stackable, optimizing space in the fridge and the bin.
- Good visibility of graduation lines on funnels and bottles improves readability and user convenience.

# Disposal

Sartolab® products, due to their usage, are often categorized as biohazardous waste. However, key components like the bottle and receiver flask are made from polystyrene plastic, and the yellow bottle cap is made from HDPE, both of which have high recycling potential. If a Sartolab® product hasn't been in contact with biohazardous substances, it can be disassembled and treated as plastic waste. This practice encourages responsible waste management and supports environmental sustainability.

## How Much Space Does Your Waste Take?




# Sustainability at Sartorius

Sartorius is committed to contributing to a future wheremore people have access to better medicine. At the sametime, we take on responsibility for the impacts of ouroperations wherever they occur. Taking into account theconcerns of its stakeholders,

Sartorius has defined six strategic sustainability topics:

- **Climate Action**
- **Resources and Circularity**
- **Water & Effluents**
- **Supply Chains**
- **Social Responsibility**
- **Corporate Governance**

**For more information, visit:**
www.sartorius.com/en/company/corporate-responsibility

# Biosart® 250 Funnel: Sustainable and Efficient Filtration Solution

## Reuse of Biosart® 250 Funnel for a Precise and Eco-Friendly Filtration

The Biosart® 250 Funnel is designed for efficient microbiological testing of pharmaceuticals, food, beverages, and water. It allows for quick performance of the filtration steps required in routine processes and ensures reliable results. These sterile funnels can be used with Sartorius gridded membrane filters placed onto the stainless-steel bases of a vacuum manifold. Biosart® 250 Funnels offer the additional benefits of reduced waste and resource savings through the option for reuse.

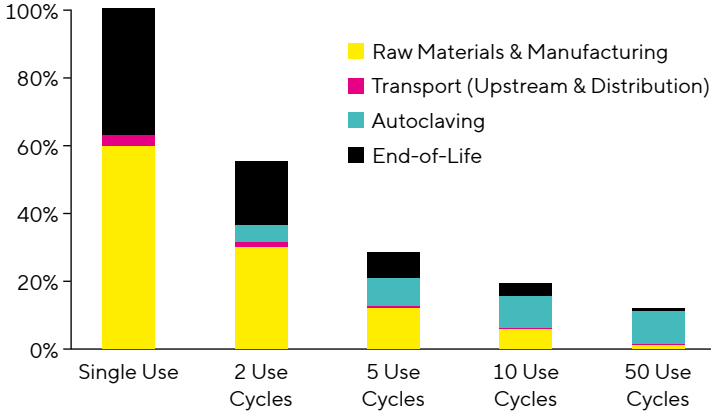
## At a Glance

- Sterile, ready-to-use 250 mL plastic funnels, compatible with vacuum manifolds and Sartorius membrane filters
- Autoclavable up to 50 times
- Possesses elasticity due to its polypropylene (PP) construction, ensuring optimal sealing with a bayonet-type closure
- Marked graduations at 50, 100, 150, 200, and 250 mL for a convenient volume measurement
- Large inner diameter ensures a high flow rate. No liquid retaining due to its conical shape


## Relative Reduction of Carbon Footprint Single vs. Reuse of Biosart® 250 Funnel

Reusing Biosart® 250 Funnels can significantly reduce the resource demand and carbon footprint compared to a single-use application. Biosart® 250 Funnels are made of polypropylene. The analysis below compares different scenarios - Single use versus multiple use cycles including autoclaving after each use cycle. The carbon footprint of the Biosart® considers the impact of raw materials, injection molding in Goettingen using renewable electricity, transport of materials to Sartorius and transport of the product to an average customer in Europe. For the end-of-life, the incineration processes including energy recovery were modelled. The electricity demand for autoclaving was measured and considered in the analysis assuming an average European electricity mix.

**Relative Reduction of $CO_2$ Footprint Single vs. Reuse Biosart® 250 Funnel**



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## Sustainability Benefits

- **Reusable:** Autoclavable up to 50 times, reducing resource use and waste by up to 95%
- **Lower Carbon Footprint:** Up to 88% less $CO_2$ emissions compared to the single-use option
- **Renewable Energy:** Utilizing renewable electricity for cleaning and autoclaving can further reduce environmental impacts

## Order Information

| Description | Order No. |
|---|---|
| 50 Biosart® 250 funnel packed in bags | 16407--25----ALK |
| 50 Biosart® 250 funnel individually packed | 16407--25----ACK |

**For further information and orders, visit** sartorius.com

# Arium® Pro and Arium® Comfort – Life Cycle Thinking

The Arium® Pro and Arium® Comfort water purification systems exemplify our commitment to sustainability, setting a new standard in eco-friendly laboratory solutions. By considering the full lifecycle of the product, from raw materials to end of life, we ensure that sustainability is a central focus.

In our manufacturing processes, we prioritize the use of renewable energy sources, further enhancing the sustainability. The energy-efficient design of the Arium® Pro and Arium® Comfort significantly reduces electricity demand, aligning with our mission to lower the environmental footprint of laboratory operations. Engineered for longevity, the system features ease of maintenance.

Our commitment to environmental responsibility drives us to continuously explore innovative ways to enhance the sustainability of our products. With the Arium® Pro and Arium® Comfort, we deliver a high-quality solution that supports a sustainable future for laboratories worldwide.

**1. Production | Manufacturing**
At our Goettingen, Germany facility, we manufacture a significant portion of the Arium® Pro and Arium® Comfort family using 100% renewable electricity. We maintain a 91% recycling rate and are on track to achieve zero-waste production by 2030. Our ISO 14001 Environmental Management System certification demonstrates our commitment to environmental excellence.

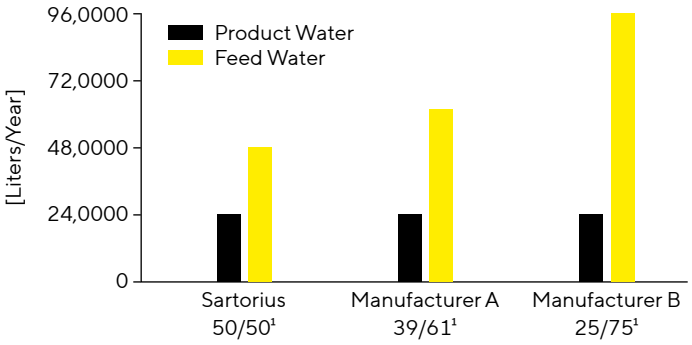
**2. Distribution**
We deliver Arium® Pro and Arium® Water systems through optimized distribution channels, favoring sea transport over air to decrease carbon emissions. We use strategic distribution hubs, local warehousing in key regions, and consolidated shipments to further reduce our carbon footprint. This logistical approach ensures timely delivery and reflects our commitment to sustainable transportation practices.

**3. Packaging**
The updated packaging of the Arium® Pro and Arium® Comfort includes cardboard material, protective foam, and protective bags for the individual parts of the instrument. The cardboard material contains 67% recycled fibers. Recently, we switched the foam material from expanded polystyrene to polyethylene, which is more likely to be recycled worldwide.

**4. Product Design**
We designed Arium® Pro and Arium® Comfort Water systems for efficient use. They feature an ECO mode that users can activate during periods when no water is dispensed, but the system needs to remain operational. The ECO mode guarantees high water quality through periodic recirculation and automatic rinsing. When ECO mode is activated, either manually or automatically, the system switches off the display backlight.

To reduce the required feed water volumes, we have implemented the iJust software in Arium® Comfort Water systems. iJust optimizes the performance of reverse osmosis technology. It selects the operating parameters based on the hardness and $CO_2$ content of the feed water, ensuring not only high product water quality but also efficient use of resources. As a result, users need 50% fewer cleaning cycles per year.

**Figure 1:** *Water Usage in Comparison With Other Manufacturers´ Systems and Potential Savings With iJust*




¹ Ratio between product water and concentrate water

**5. End of Life**
We designed the Arium® Pro and Arium® Comfor Water system with replaceable and repairable parts to promote longevity. Our local service hubs, located close to our customers, reduce the need for extensive logistics. We advise disposing of electronic devices according to local guidelines. You must sort and dispose of Waste from Electrical and Electronic Equipment (WEEE) accordingly. This process enables the recovery and recycling of rare and valuable raw materials and prevents hazardous materials from ending up in the environment.

Additionally, we have established a take-back program for replaced UV lamps across Europe in cooperation with EARN (European Advanced Recycling Network). We recycle used UV lamps locally and responsibly, thus reducing environmental impact and promoting a circular economy.

# Product Comparison

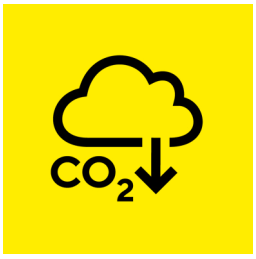
Sartorius is at the forefront of promoting sustainability within laboratory environments through its Lab Essentials Portfolio. This comparison table provides a comprehensive overview of these products, highlighting their contributions to sustainable practices.

| Product | Reduced energy consumption | Plastic reduction | Packaging efficiency | Renewable materials | Improved recyclability | Shortened supply distances | Green electricity | No waste to landfill |
|---|---|---|---|---|---|---|---|---|
| Pipette Tips (Optifit, SafetySpace) | | | ■ | | ■ | | ■ | ■ |
| Picus® 2 Electronic Pipette | ■ | | ■ | | ■ | | ■ | ■ |
| Quintix® Pro Standard Laboratory Balances | ■ | | ■ | ■ | ■ | | ■ | ■ |
| Vivaflow® SU TFF Cassettes | | ■ | ■ | ■ | ■ | ■ | | |
| Sartolab® RF\|BT | | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| Biosart® 250 Funnel | | ■ | ■ | | ■ | | | |
| Arium® Pro and Comfort | ■ | | ■ | | ■ | | ■ | ■ |

# Sustainability at Sartorius

Sartorius is dedicated to shaping a future where improved medicine is more accessible to many. Concurrently, we acknowledge and address the impacts of our operations globally. Taking into account the concerns of its stakeholders.

Sartorius has defined six strategic sustainability topics:




**Climate Action**

**Resources and Circularity**

**Water and Effluents**

**Supply Chains**

**Social Responsibility**

**Corporate Governance**

**For more information, please visit:**
www.sartorius.com/en/company/sustainability

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