DRAFT FOR REVIEW

PR3-P01-V100

Reusable packaging system design – Specifications and recommendations

Part 1:
Collection points

Version 1.0
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Contents

Foreword

PR3 is a public-private partnership between corporate, government and NGO stakeholders that has created a standard for the design of reusable packaging systems and is testing it in collaborative demonstration projects. PR3's goal is to transform disconnected, proprietary, and small-scale reuse models into shared interoperable public-private systems. The standard is meant to integrate, de-risk, and support reuse initiatives globally.

PR3 founding partners, funders and advisors include Break Free from Plastic, Cisco, City of Seattle, Nestle, Plastic Solutions Fund, SAP, and The Ellen MacArthur Foundation.

This document was prepared by PR3 with input from its partners. It represents the views of PR3 only and does not indicate the views of any of PR3's partners.

This is a working draft document and is subject to change.

This edition (Version 1.0) cancels and replaces any previous editions.

A list and links to all parts in the PR3 Reusable Packaging System Design standard can be found on the PR3 website, see https://www.resolve.ngo/pr3.htm.

Any feedback or questions on this document should be directed to PR3 Technical Director Claudette Juska at cjuska@resolv-advisor.org.

Introduction

Single-use packaging is a critical threat to human health and the environment. Research shows that reuse has the greatest potential to dramatically reduce plastic production and greenhouse gas emissions compared to other packaging and waste interventions.

As reusable packaging systems have emerged in recent years, they have been designed independently and are mostly small-scale, disconnected, and proprietary. They each operate within their own systems for collection and reverse logistics. As more enter the market, they will sow confusion, inconvenience, and inefficiencies for companies, workers, and consumers, and bump up against each other in their quest for scale.

PR3 has developed the Reusable Packaging System Design Standard with the goal of transforming these hundreds of disconnected reuse systems into a shared and interoperable public-private system that is more convenient and affordable and has the ability to truly scale.

This document represents the component of the standard that focuses on reusable container *collection points*. It provides detailed instructions for aligning container collection locations and systems between multiple brands and companies so that collection and other reverse logistics can be shared. Sharing of this collection infrastructure is the lynchpin for propelling reuse to scale.

The intended users of this document are companies that manufacture, own and/or operate container collection points. By adopting the requirements and recommendations within this document, companies and cities can prevent numerous, proprietary reuse models with independent collection points from competing for street and retail space, which would create confusion and inefficiencies for consumers and cities.

This document does not preempt any existing standards or regulations for street furniture or signage, or for container/recycling/waste collection infrastructure or collection points.

This document is one of multiple parts that together make up the Reusable Packaging System Design Standard. Other parts include collection points, containers, digital, incentives, labeling, and washing. A list and links to all parts in the standard can be found on the PR3 website, see https://www.resolve.ngo/pr3.htm.

Reusable packaging system design – Specifications and recommendations

Part 1: Collection points

1 Scope

This document specifies minimum requirements and recommendations for reusable container collection points.

It is applicable to collection points that service a variety of containers from multiple brands and companies that are designed according to Part 2: Containers.

It is applicable to three different types of collection points, which are listed here and described in detail throughout the document:

- Staffed collection locations
- Automated collection machines
- Passive collection bins

This document is intended only for collection points that are part of a shared, interoperable reuse ecosystem. It is not intended for collection points that operate in independent reuse systems.

This document does not preempt or supersede any industry, local, state, regional or national standards.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document.

PR3-P02 – Reusable Packaging System Design Standard – Part 02: Containers

PR3-P03 – Reusable Packaging System Design Standard – Part 03: Digital

PR3-P04 – Reusable Packaging System Design Standard – Part 03: Return incentives

PR3-P05 – Reusable Packaging System Design Standard – Part 05: Labeling

3 Terms and definitions

For the purposes of this document, the terms and definitions given in the Glossary of Terms and the following apply.

In all clauses, the following verbal forms are used:

- Requirements are indicated by “SHALL” or “SHALL NOT”
- Recommendations indicated by “SHOULD” or “SHOULD NOT”
- Permission is indicated by “MAY” or “MAY NOT”

3.1
staffed collection locations
private establishments that have employees to help facilitate the collection of reuse containers

3.2
automated collection machines
standalone machines designed to collect reusable containers and located inside private establishments or outside in public spaces

3.3
passive collection bins
bins located in private locations, such as homes

3.4
container
asset
piece of primary packaging, such as a bottle, cup, or jar, that is used to safely and hygienically deliver goods from a business to a consumer and is designed to be reused in an industrial reusable packaging system

3.5
logistics provider
business involved in moving assets through the reuse supply route, including collecting, sorting, aggregating and/or transporting assets. E.g. the company that collects assets from collection points; the company that sorts and aggregates assets at a recovery facility; the company that redistributes assets to cleaning or filling sites.

3.6
reuse ecosystem
system for reusable containers/assets in a given region that provides shared collection and reverse logistics between brands and companies.

3.7
reuse identification card
Card that holds value for deposits or other incentives associated with container returns. The card is available to consumers/system users, in addition to smart phone apps and credit cards. A system administrator can pay out the cash value to card holders.

3.8
return incentive
Something of value that is given to users that return used assets/containers to a collection point. Incentives can be deposits that are returned, discounts that are given via coupons or forthcoming purchases, etc.

4 Requirements for staffed collection locations

Note: Staffed collection locations are establishments that have employees to help facilitate the collection of reuse containers. At these locations, individuals interact with employees to return their container and receive credit for the return, such as a deposit, discount, or other incentive. These can be establishments that are designed for the sole purpose of collecting for reuse and recycling or they can be located inside businesses like supermarkets, cafés or convenience stores. At these locations, employees are responsible for verifying that the container is part of the reuse ecosystem before accepting it.

4.1 Collection

Collection points that are located within an establishment that sells products SHALL at least be designed to collect all the reuse containers that the business sells. I.e., a business that sells a reusable container must also collect it.

Businesses MAY accommodate additional containers sold at other locations and are encouraged to do so when possible.

Used containers that are part of the reuse ecosystem SHALL be aggregated, by employees or consumers, into a passive bin to be collected by the logistics provider(s).

Bins MAY be provided with a lid that can seal the bin closed.

Bags MAY be used instead of bins when necessary, as long as they can be completely closed or sealed.

Bins SHOULD be reusable.

Single-use bins SHOULD NOT be used.

Collection points SHALL follow container collection schedules that are consistent with regulatory sanitation standards and industry best practices for waste and recycling.

Bins SHOULD NOT be left outside an establishment unless a lockable storage location is available.

Note: Unlike single-use containers that enter the waste or recycling streams, reusable containers have value and theft prevention is an essential component of collection point design.

Bins SHALL align with local infrastructure, e.g. where box trucks are used for collection, bins are designed for easy loading onto trucks. They include flexible connectors wherever possible to ensure adaptability.

Bins SHALL be cleaned and sanitized before being reused according to regulatory sanitation standards and industry best practices for waste and recycling.

4.2 Digital

A digital tag SHOULD be applied to the bin as described in Section 7 below.

Note: This digital tag will enable proper accounting, including for determining the balance of deposit inputs and outputs, as well as determining costs and payments for servicing collection points and containers.

4.3 Incentives

Collection points SHALL ensure that a return incentive associated with a container is awarded to the person that returns the container to a collection point.

Note: Detailed requirements for administering incentive programs are provided in PR3's Standard Part 4: Incentives [insert link].

To maximize accessibility, collection points SHALL accommodate users that are not connected to a smart phone app or credit card.

Collection points SHALL always offer incentives in the form of either cash, printed coupons, or credit to a reuse ID card (in regions where they exist)

Collection points SHALL be able to accommodate a variety of incentive models, including:

- Where deposits exist: the person who returns the container SHALL be awarded the deposit amount via a phone app, cash, printed coupon, or reuse ID card.
- Where discount incentives exist: the person who deposits the container SHALL be awarded the discount via a phone app, printed coupon, or must otherwise be awarded the discount on site.
- Where subscription/penalty models exist: the person who deposits the container SHALL be credited in some form for returning the container.

5 Requirements for automated collection machines

Note: Automated collection machines are standalone collection points that can be located indoors or outdoors. They can be in private locations, like stores and cafes, or in public locations like street corners and parks. These are not staffed. Instead, consumers interact with the machine to insert their container and receive a return incentive. These machines are tech-enabled and consumers must first scan the container before inserting it, so that the machine can verify it is part of the reuse ecosystem. Consumers can also be

required to scan a phone app or reuse ID card when depositing a container in order to receive credit for the return via a deposit, discount, or other incentive.

5.1 Collection

Collection points that are located in private business locations SHALL at least be designed to collect all the containers that the business sells. I.e., a business that sells a reusable container must also collect it.

Businesses MAY accommodate additional containers sold at other locations and are encouraged to do so when possible.

Collection points that are located in public spaces SHALL be designed to collect containers that follow Part 2: Containers and are part of the regional reuse ecosystem.

Note: This might include a growing range of container shapes and sizes made from a range of packaging materials and sold by a variety of venues. These include takeaway cups, takeaway food containers, and containers for manufactured consumer goods including bottles, jars, etc., made from plastics, glass and/or metals.

Collection points SHOULD be designed to be adaptable to accommodate future container formats.

Collection points SHALL follow container collection schedules that are consistent with regulatory sanitation standards and industry best practices for waste and recycling.

5.2 Accessibility

Machines, especially those in public spaces, SHALL be designed to accommodate and protect people with disabilities.

Local accessibility regulations SHALL be followed.

At a minimum, collection points SHALL comply with the Americans with Disability Act regulations, especially relating to:

- Section 307 Protruding objects
- Section 308 Reach Ranges

5.3 Machine design

5.3.1 Internal collection bins

Machines SHALL aggregate used containers in a removable bin that can be collected by the logistics provider(s).

In standalone public machines, the collection bin SHALL be contained inside the machine, E.g., machines that are located on street corners.

Machines located inside private locations MAY have collection bins located behind the machine.

Machines located inside private locations MAY rely on workers to assist with moving containers into the collection bin.

Bins MAY be provided with a lid that can seal the bin closed.

Collection bins SHOULD be reusable.

Single-use bins SHOULD NOT be used.

Bags MAY be used instead of bins when necessary, as long as they can be completely closed or sealed.

Bins SHALL align with local infrastructure, e.g. where box trucks are used for collection, bins are designed for easy loading onto trucks. They include flexible connectors wherever possible to ensure adaptability.

Bins SHALL be cleaned and sanitized before being reused according to regulatory sanitation standards and industry best practices for waste and recycling.

5.3.2 Food and beverage waste

Machines and their bins SHALL be designed to accommodate significant food and beverage waste.

Machines SHALL be designed so that exposure to food and beverage waste does not disrupt the functioning of the unit.

Machines SHOULD include internal overflow bins for excess liquids that can be regularly monitored, rotated and sanitized. and/or should be regularly monitored, rotated and sanitized.

5.3.3 Reliability and safety

Machines SHALL be designed to incorporate robust mechanism reliability.

Machines SHOULD be designed to minimize container damage. For example, dropping containers onto moving platforms that lower with weight can minimize glass breakage.

Machines placed outdoors SHALL:

- Be designed for environment readiness including extreme cold, extreme heat, rain, etc.
- Take into account street furniture guidelines and best practices. For example: Seattle's Streetscape Design Guidelines and New York City's Department of Transportation Furniture Design Guidelines

Machines SHALL follow UL/EN safety standards for vending machines where appropriate, until/unless specific standards are created for reuse collection points. E.g., see UL 751

Machines SHALL align with local safety standards and best practices for waste and recycling container design. E.g., The Solid Waste Association of North America publishes the American National Standard for Waste and Recycling, including safety requirements for Waste Containers

5.4 Digital

A digital tag SHALL be applied to the machine and the internal collection bin as described in Section 7 below.

Note: This digital tag will enable proper accounting, including for determining the balance of deposit payments and costs for servicing collection points and containers.

Machines SHALL scan containers to verify they are part of the reuse ecosystem before accepting them.

Note: Per PR3 Digital Standards, containers that are part of the reuse system will have barcodes, QR codes and or other tagging technology that a collection point can read to verify that a container is part of the system. Container data fields and tagging protocols are described in detail in PR3's Digital Standard.

5.5 Incentives

Collection points SHALL ensure that a return incentive associated with a container is awarded to the person that returns the container at the collection point.

Note: Detailed standards for administering incentive programs are provided in PR3's Incentive Standard[insert link].

To maximize accessibility, collection points SHALL accommodate users that are not connected to a smart phone app or credit card.

Collection points SHALL always offer incentives in the form of either cash, printed coupons, or transfer of funds to a reuse ID card (in regions where they exist)

Collection points SHALL be able to accommodate a variety of incentive models, including:

- Where deposits exist: the person who returns the container must be awarded the deposit amount via a phone app, cash, printed coupon, or reuse ID card (in regions where they exist.)
- Where discount incentives exist: the person who returns the container must be awarded the discount via a phone app, printed coupon, or must otherwise be awarded the discount on site.
- Where subscription/penalty models exist: the person who deposits the container must be credited in some form for returning the container.

5.6 Security

Note: Unlike single-use containers that enter the waste or recycling streams, reusable containers have value and theft prevention is an essential component of collection point design.

Machines SHALL be secured with locking mechanisms so that only the logistics provider can remove bins/containers from inside the machine.

Machines located outside SHOULD be secured through an anchor or other locking mechanism.

6 Requirements for passive collection bins

Note: Like most waste and recycling bins, passive reuse collection bins are not tech-enabled. Bins are located in private locations, like homes, and must be serviced by logistics providers that can scan or count containers before aggregating with other containers at a recovery facility. Logistics providers are required to award proper credit for incentives to the bin owner and remove containers that are not part of the reuse ecosystem.

6.1 Collection

Note: Unlike single-use containers that enter the waste or recycling streams, reusable containers have value and theft prevention is an essential component of collection point design.

Bins SHOULD not be left outside unless a lockable, secured storage location is available.

6.2 Digital

A digital tag must be applied to the bin as described in Section 7 below.

Note: This digital tag will enable proper accounting, including for counting deposit payments and costs for service.

6.3 Incentives

The logistics provider(s) SHOULD use the digital tag to track the containers that are collected in each bin.

The logistics provider(s) SHALL provide proper incentive amount to the bin owner.

Note: Models for delivering the incentive can vary and are discussed in more detail in PR3 Standard Part 4: Incentives. The incentive may, for example, be provided through an account where the costs of service and value of incentives are balanced and proper payments are transferred on a monthly or quarterly basis.

7 Digital requirements

Note: The following digital requirements apply to all types of collection points. More detaileds about these requirements are provided in Part 3: Digital.

Note: All the various stakeholders in a reuse ecosystem need to be able to exchange data between their systems. In addition, digitizing collection points will allow the reuse ecosystem to collect and analyze data that will lead to optimization of collection point placement, collection and transport routes, improvements in system design and more accurate environmental accounting.

Collection points SHALL incorporate a digital tag that includes the data fields in Table 1.

Note: The data fields are described in more detail in Part 3: Digital.

Table 1: Mandatory Data Fields for Collection Points

Field Name	*Data Type*	*Description*
Collection Point ID	Numeric	Name/ID of the collection point. This is the company's ID for the collection point. Can be numerical ID or text.
Collection Point Location	Alphanumeric	Latitude and longitude of collection point installation
Collection Point Type	Validated options	Type of collection point, e.g. machine, staffed business, passive, etc.
Company Contact	Alphanumeric	Contact info for Company Name
Company Name	Text	Registered company name of the collection point owner/operator
Company Role	Validated options	Role(s) of the company within the supply chain, e.g. collection point owner/operator

The digital tag MAY be a barcode, QR code, RFID or other technology that is aligned with the scanning technology available to the logistics provider(s) that will be servicing the collection point.

Note: Recommendations for the digital language and protocols to incorporate these data fields into the digital tag is described in detail in Part 3: Digital.

Collection bins inside collection points SHOULD include unique IDs assigned by the logistics provider(s) and/or collection point owner/operator.

Logistics provider(s) SHOULD collect data on the number and type of containers collected at each collection point that they service.

Note: Protocols for collecting data are described in Part 6: Reverse logistics. This data will not only facilitate payments and fee schedules, but will also be essential for optimizing collection locations, scheduling and transport routes.

8 Labeling & education requirements

Note: The following requirements apply to all types of collection points. More details about these requirements are provided in PR3 Standard Part 5: Labeling & education [insert link].

Collection point labeling and signage SHALL follow existing local regulations and standards for reuse labeling. For example:

- In Germany, a "Refill" logo for reusable bottles is standardized. These types of regulated labels should be added to collection points to clearly identify them as locations where the reusable containers are accepted.

- In Indonesia, reusable containers are regulated by the Ministry of Public Works and Housing Regulation No. 03/PRT/M/2013.
- In Seattle, the public utilities department does not currently have standard labeling for reuse.

Collection point labeling and signage SHALL accommodate users with disabilities, including those that are color blind, visually impaired and/or hearing impaired. Local regulations should be followed.

At a minimum, collection points SHALL comply with the Americans with Disability Act regulations, especially relating to Chapter 7: Communication Elements and Features

Collection points SHALL incorporate the reuse symbol that is described in PR3 Standard Part 5: Labeling & education [insert link].

Collection points SHALL incorporate the color yellow, as described in PR3 Standard Part 5: Labeling & education [insert link].

Collection points SHALL incorporate a digital tag, as described in Section 7.

Collection points SHALL specify clear instructions for container return through visual and verbal cues.

Instructions for container return SHOULD include directions for disposing food and beverage waste before the container is inserted into the collection point.

Annex A
(informative)

Recommendations for machine design

Machines SHOULD incorporate container nesting, where possible, in order to optimize collection and transport logistics

Machines SHOULD easily accommodate multiple item returns from the same customer. E.g., if consumers are required to scan an app to access the collection point or redeem deposits, the collection point should only require consumers to scan the app once for multiple containers

Machines and their internal collection bins SHOULD be manufactured with recycled materials whenever possible. The materials and recycled content should be documented for environmental accounting purposes. This information may be associated with the collection point ID per PR3 Digital Standard protocols.

Like parking meters and bike sharing systems, machines SHOULD be designed to utilize solar or other renewable energy for their power requirements, wherever possible.

Like parking meters and bike sharing systems, machines MAY utilize cellular technology to enable communication with logistics providers and alert the provider about fill levels, malfunctions, etc.

Machines SHOULD be designed with secondary packaging needs in mind, i.e. consider if/when the container will need to be inserted into secondary packaging (e.g. crates or washing trays) and whether the collection point design can influence or improve that process

Machines SHOULD be designed to minimize consumer time spent at collection point (i.e., time spent scanning and inserting containers). Time guidelines are currently under development

Machines SHOULD be designed with an eye to future adaptation to additional product and container categories, including e-commerce packaging. As a growing number of products and containers are designed for reuse, adaptable collection points will save system costs and resources.

Annex B
(informative)

Guidelines for machine placement

B.1 Guidelines for public spaces

To help accommodate significant food and beverage waste, locate the collection point, when possible, near waste and/or compost bins into which consumers can deposit food and beverage waste.

An optimistic goal for placement of collection points in high density, high traffic areas is 10 collection points for every 5,000 residents.

Where possible, locate collection points in close proximity to existing waste, recycling and composting bins. This will help facilitate proper food and beverage waste disposal and help minimize food and beverage waste inside the collection point.

Placement is *encouraged* in these areas:

- Locations near public transit stops
- Within mixed use business areas that have a frequent pedestrian presence. Mixed use business areas may include a combination of retail, commercial, residential, and civic space. Frequent pedestrian presence may be distinguished by the number of pedestrians to pass a particular location depending upon the type of street or adjacent businesses
- Within common areas that are public gathering zones
- On public sidewalk right-of-ways adjacent to businesses
- On or near street corners and at mid-block determined by block length. Receptacles provide service to more pedestrians when located on corners. Receptacles may be placed at mid-block as necessary to provide adequate service
- Locations that permit easy service access - for both collection and cleaning. Receptacles must be placed in locations where there is easy access for service vehicles and for personnel to service the container safely
- Locations that permit easy inspection access. Receptacles must be placed in locations where they can be easily inspected
- Locations that do not impede pedestrian traffic flow. Often waste collection cans are positioned near the curb, within the right of way that is normally occupied by utility poles and street sign posts
- Locations that do not impede vehicular parking and/or traffic flow

Placement is *discouraged* in these locations:

- On narrow sidewalks (less than 5-ft wide) with grassy planting strips. Cans cannot be placed directly in the pedestrian right-of-way. They must be placed near the street curb on sidewalks that are wider than 5-ft
- In any location that could potentially impede access to ramps or handrails

Consider relocating the Collection Point:

- If found to have several attempted instances of dumping. E.g., depositing personal trash from one's home or business trash
- If found to have several instances of filling up more quickly than the collection company can service. In this case, consider adding additional locations along the pedestrian path
- If found to be the subject of repeated vandalism, including fires or graffiti
- If found to be the subject of repeated instances of theft, including attempted theft of the containers inside the receptacle

B.2 Guidelines for private spaces

Placement is encouraged in private locations near where many reuse containers are sold or used, such as:

- common gathering areas in commercial developments,
- office spaces,
- parking lots in supermarkets, shopping malls, multi-unit residential developments, and
- residential neighborhoods.

Collaboration is encouraged between the private and public sectors to identify locations, including in business improvement districts.

Annex C
(informative)

Reference of Existing Collection Models

The below types of collection systems already exist for reuse, recycling and other waste collection and are provided here for reference.

C.1 Staffed collection depots for recycling and reuse

These vary and exist in many locations. For example, in British Columbia, Encorp operates depots for bottle collection (mandated by a deposit return scheme.)

- can be independently operated, for-profit or non-profit
- mostly indoor
- security easier to ensure

C.2 Staffed return counters inside commercial locations

Coca-Cola's reusable bottle program in Brazil is one example in which retailers manually collect empty reuse bottles from consumers.

- mostly indoor
- security easier to ensure

C.3 Automated reverse vending machines

These are currently used in many locations where there are deposit return schemes (e.g. Germany, Oregon, Michigan). For examples, see Tomra reverse vending machines

- public setting (e.g. street corners, public transit)
- private settings (e.g. offices, apartments)
- commercial settings (e.g. retailers)
- indoor or outdoor
- security level will vary

C.4 Public, passive bins

Some reuse companies have established or are piloting this type of collection, see CupClub and Starbucks.

- public setting (e.g. street corners, public transit)
- private settings (e.g. offices, apartments)
- commercial settings (e.g. retailers)
- these might be indoor or outdoor
- indoor or outdoor
- security level will vary

C.5 Private, passive bins

Waste and recycling operate this way in much of the developed world, see Waste Management's residential service program for example.

- household level
- industrial collection
- security easier to ensure
- consolidated at collection points by workers

C.6 Door-to-door collection

Zero-waste cities deploy door-to-door collectors for recycling and waste collection in the Philippines, for example. New companies (Ridwell) in the U.S. do this for hard-to-recycle items.

- household level
- security easier to ensure
- consolidation at collection points by workers

C.7 Informal collection

In Columbia, AB-InBev relies on the informal waste sector to collect reusable bottles and return them for payment. Much of the global south depends on informal collection of PET bottles for recycling.

Bibliography