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**Reusable packaging system  
design standard:**

Container washing, inspection, and  
packing for distribution

Working draft - Version 1.0  
2024

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**RESOLVE**

# RESOLVE

*Draft Standard*

**2024**

## **Reusable Packaging System Design Standard:**

Container washing, inspection, and packing for distribution

**NOTE:** This draft is under development and subject to change; it should not be used for reference purposes.

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Please submit comments to:

Mason Hines, Project Manager

[mhines@resolve.ngo](mailto:mhines@resolve.ngo)

RESOLVE  
2445 M Street NW  
Suite 550  
Washington, DC 20037

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## Foreword

PR3 is an alliance of corporate, government, and non-profit organizations developing standards for reusable packaging systems. PR3 is a project of RESOLVE, a Washington, D.C.- non-profit organization that specializes in creating innovative partnerships to solve critical health and environmental challenges.

RESOLVE is accredited as a Standards Development Organization by the American National Standards Institute. The procedures used to develop this document and those intended for its further maintenance are described in RESOLVE's [Standards Development and Maintenance Program](#).

This edition cancels and replaces any previous editions.

A list of all parts of RESOLVE's Reusable Packaging Design Standards can be found on the PR3 website: <https://www.pr3standards.org/the-pr3-standards>.

Any feedback or questions on this document should be directed to PR3 Technical Director at: <https://www.pr3standards.org/contact>

## Introduction

Research shows that reuse has significant potential to reduce packaging production, pollution, and greenhouse gas emissions compared to other packaging waste interventions. PR3's Reusable Packaging System Design Standards provide shared design and performance requirements for reuse infrastructure and operations. These standards aim to enable interoperability between communities and businesses, which can increase the financial and environmental performance of reuse systems.

This document provides requirements for *washing* containers in a reuse system. The washing of containers is only one aspect of a reuse system. Reuse systems must also include infrastructure for collection, transport, labeling, and data management. Requirements for these other aspects are included in other parts of the PR3 Reusable Packaging Design Standards and are available on the PR3 website: [www.PR3standards.org](http://www.PR3standards.org)

# 1 Scope

This document specifies requirements and recommendations for washing containers in a reusable packaging system.

## 1.1 Inclusions

This standard applies to *primary* packaging. Primary packaging is packaging that comes into direct contact with the product. Primary packaging is sometimes referred to as “consumer” or “retail” packaging.

This standard applies to containers that are part of a system for reuse in which the container is returned to a collection point and then washed, redistributed, and refilled.

This standard applies to containers that meet the requirements of PR3’s [container design](#) standard and are intended to come into contact with food or beverage.

This standard can also be applied to some foodware items that are not traditionally referred to as “packaging”, but are part of a reuse system, such as food utensils and plates.

## 1.2 Exclusions

This standard is not intended for secondary, transport, or tertiary packaging. Secondary packaging holds primary packaging units. Examples of secondary packaging include crates and e-commerce boxes.

## 1.3 Terminology

In this Standard, “SHALL” is used to express a requirement, i.e., a provision that the user is obliged to satisfy in order to comply with the standard; “SHOULD” is used to express a recommendation or that which is advised but not required; and “MAY” is used to express an option or that which is permissible within the limits of the standard.

NOTES accompanying clauses do not include requirements or alternative requirements; the purpose of a note accompanying a clause is to separate from the text explanatory or informative material.

Notes to tables and figures are considered part of the table or figure and may be written as requirements.

Annexes are designated normative (mandatory) or informative (non-mandatory) to define their application.

## 1.4 Units of measure

The values given in SI units are the units of record for the purposes of this standard. The values given in parentheses are for information and comparison only.

# 2 Normative References

This standard refers to the following publications in such a way that some or all of their content constitutes requirements of this document. Where such reference is made, it shall be to the edition listed below.

## **RESOLVE**

- DRAFT RES-001- PR3's Reusable Packaging System Design Standard- Part 02: Container design

## **3 Definitions, abbreviations and symbols**

### **3.1 Definitions**

The following definitions shall apply to this standard:

#### **clean**

to remove food, dirt, and other visual debris from the surface of a container

#### **cleaning agent**

used in a solution with water to remove residue from a container, usually a liquid soap or detergent

Note: A cleaning agent is not used for sanitizing containers even though it may have sanitization properties.

#### **closure**

a packaging component that is separate from the container and used to close or seal a container, such as a bottle cap or jar lid

#### **collection bin**

a receptacle that is used to receive dirty primary packaging containers at a collection point. The same bin may also be used to transport the dirty containers to a recovery or wash facility

#### **collection point**

a designated location for containers to be returned to the system

#### **container**

piece of primary packaging that is used to deliver a product, such as a beverage, food, personal or home care product, to a consumer and is designed to be used in a reusable packaging system.

Note: This can apply to a lengthy list of traditional packaging formats, such as bottles, cups, clamshells, boxes, trays, bags, bowls, jars, as well as items that are not typically considered "packaging" but are used to consume food and beverages, such as utensils and plates.

#### **decommission**

to remove a container from the container pool to refurbish, recycle, or dispose of it

#### **distribution bin**

a receptacle that is used to store and distribute clean primary packaging containers and is enclosed or otherwise protects containers from contamination. Examples include boxes with lids; bags that



are tied closed; bags with drawstring or zipper closures; crates on palletized containers in which the crates or pallets are wrapped in sheeting or materials to enclose and protect the containers from contamination.

**gasket**

a shaped piece or ring of material, usually plastic, rubber, or silicone that seals the junction between two surfaces, such as a gasket on a cup or bottle lid that prevents liquid from leaking out of the container

**food-contact surface**

a surface of a container or of equipment in which food normally comes into contact. E.g. the inside surface of a cup or bottle is a food-contact surface.

**Hazard Analysis Critical Control Point (HACCP)**

a management system developed by the U.S. National Advisory Committee on Microbiological Criteria for Foods and used globally in which food safety is addressed through the analysis and control of biological, chemical, and physical hazards from raw material production, procurement, and handling, to manufacturing, distribution, and consumption of the finished product.

**HACCP plan**

a written document that delineates the formal procedures for following the Hazard Analysis Critical Control Point principles

**non-food-contact surfaces**

surfaces of containers or equipment that food does not normally come into contact. E.g. the outside surface of a cup or bottle is a non-food-contact surface.

**Preventive Control Plan (PCP)**

a written document required for certain food businesses in Canada that demonstrates how hazards and risks to food are addressed

**redistribution**

the process by which a container is distributed to locations where it will be refilled

**refurbish**

refurbish refers to the process of restoring the container to a usable condition and can include both restoring the functionality and restoring the appearance. This may involve cleaning, repairing, or replacing components of the container.

**rinse aid**

substance applied to a water rinse to help ensure effective container drying

**sanitize**

to apply heat or a chemical solution on a cleaned surface to remove microorganisms. When done effectively, the process yields a reduction of 5 logs of representative disease microorganisms of public health importance. This is equivalent to reducing the number of microorganisms on a surface by 99.999%, which is considered a safe level.

**sanitizing agent**

used in a solution with water to sanitize a container, often a chemical such as iodine

**standard operating procedure (SOP)**

established or prescribed methods to be followed routinely for the performance of designated operations or in designated situations

**use-cycle**

one full trip for a container that starts at filling, and includes usage, collection, washing, and redistribution for refilling. One use-cycle is completed when a container is ready to be filled the next time.

**wash**

a five-step process that includes the following steps in order: pre-cleaning, cleaning, rinsing, sanitizing, and drying

**wash facility**

**facility**

an establishment that washes containers that are used in a reusable packaging system.

**washing provider**

an entity that operates a wash facility

**withstand**

maintains its ability to perform its intended function under normal use conditions free of defects such as breaks, open seams, cracks, chips, inclusions, pits, discoloration, flavor or odor taints, or other distortion or damages that could impact product quality or safety

**3.2 Abbreviations**

The following abbreviations shall apply in this standard:

- HACCP** — Hazard Analysis Critical Control Point
- PCP** — Preventative Control Plan
- SDS** — Safety Data Sheets
- SOP** — Standard Operating Procedures

**3.3 Symbols**

The following symbols shall apply in this standard:

[intentionally blank]

## **4 Facility requirements**

### **4.1 Operating procedures**

Facility SHALL have a plan in place for addressing potential hazards. In the U.S. this is referred to as a Hazard Analysis and Critical Control Point (HACCP) plan and in Canada it is referred to as a Preventative Control Plan (PCP).

Note: U.S. FDA publishes information on [HACCP Principles and Application Guidelines](#) and the Canadian Food Inspection Agency publishes information on [Preventive Control Plans](#).

Facility SHALL have standard operating procedures (SOPs) in place for the operations below that are specific to the facility's layout and equipment:

- Pre-cleaning per Section 6;
- Cleaning and sanitizing per Section 7;
- Drying per Section 8;
- Inspection per Section 9; and
- Packing for distribution per Section 10.

SOPs SHALL be located such that employees do not have to leave their workstation to review the SOPs for their operation.

Facility SHALL have a pest control plan in place and documentation of the plan available for review by third parties.

### **4.2 Facility equipment and layout**

All equipment, including temperature and pressure gauges, SHOULD be maintained in good repair.

Facility SHALL have a designated chemical storage area that is away from the container washing and container storage areas.

Facility SHALL have a designated sink or location for disposing of dirty cleaning or mop water.

#### **4.2.1 Handwashing**

Facilities SHALL have a designated handwashing location(s) used only for hand washing and not for dishwashing or food preparation.

Facilities SHALL keep handwashing locations accessible anytime employees are present.

Handwashing locations SHALL include:

- clean water

- soap

Handwashing locations SHOULD include:

- clean water heated to at least 29°C (85°F) degrees
- a means to dry hands such as an air blower, paper towels, or clean cloth towels
- a waste container to collect paper towels that are used to dry hands and/or other non-food waste

#### 4.2.2 Gloves

Gloves SHALL be made available in all locations where:

- dirty containers have the potential to contain hazardous substances, such as chemicals or bodily fluids
- employee's hands are exposed to chemical agents

Gloves SHOULD be made available in locations where:

- employees handle dirty containers, such as where they are unpacked from collection bins and where they are loaded into washing machines or sinks
- employees are exposed to heated water
- employees must touch a food-contact surface (e.g. the top of a plate or inside of a cup)

Gloves SHALL be adequate for the purpose they are intended, such as to block pathogens, prevent cuts, shield from heat or chemicals, etc.

Gloves SHOULD be reusable when:

- they are worn for handling dirty containers, and
- their use is allowed by local regulations, and
- the gloves are washed between uses using the steps in the clause below.

Gloves for handling clean containers MAY be reusable only if:

- their use is allowed by local regulations, and
- the gloves are washed between uses using the steps in the clause below, and
- the gloves are inspected prior to use to ensure they are adequate for the purpose they are intended and do not contain any holes or leaks.

Note: Gloves can be inspected for leaks by inflating the glove with air and then holding it underwater and looking for bubbles.

Note: U.S. and Canadian regulations require single-use gloves for handling food-contact surfaces.

Reusable gloves SHALL be washed using the same 5 step process used for containers and described in Sections 6-8 below, which includes the below steps in order:

1. Pre-clean the gloves by immersing them in water to remove any physical debris
2. Clean inside and outside of gloves using a cleaning agent and water
3. Rinse gloves in clean water

4. Soak in a sanitizing solution following the manufacturer's label instruction or concentrations and temperatures listed in Annex D. The sanitizing solution should contact the gloves long enough to properly sanitize including:
  - At least 7 seconds for a chlorine solution of 50 mg/L (ppm) that has a pH of 10 or less and a temperature of at least 38°C (100°F) or a pH of 8 or less and a temperature of at least 24°C (75°F); or
  - At least 10 seconds for a chlorine solution not specified in the above; or
  - At least 30 seconds for other chemical sanitizing solutions; or
  - At least 30 seconds for hot water at a minimum temperature of 77.2°C (171°F).
5. Hang gloves to dry allowing air to flow around and inside the gloves

Single-use gloves SHALL NOT be cleaned and reused.

Note: Only gloves designed for multiple uses can be reused.

#### **4.2.3 Container staging areas**

Equipment such as a dish table MAY be used to give employees a designated prepping table or place to rest dirty containers waiting to be cleaned.

A dish table designated for resting or staging dirty containers SHALL be labeled as such and located appropriately to follow the facility's workspace flow and prevent clean containers from being placed there and contaminated.

#### **4.3 Signage**

Signage SHALL be posted in a language(s) understood by all employees.

Designated handwashing sinks SHALL be labeled to clearly indicate they are to be used for handwashing only.

Facility SHALL post signs with hand washing instructions at all handwashing locations.

Note: Hand washing steps are included in Annex B.

Documentation, signage near machinery, and/or SOPs SHALL include information on the type of containers/materials that can be washed in the equipment or machinery as well as any special procedures for individual container or material types.

Facility SHALL post Safety Data Sheets (SDS) for all chemicals used in the facility, including SDSs for: cleaning and sanitizing agents, rinse aids, and other chemicals.

Washing machinery SHOULD have an easily accessible and readable data plate affixed to the machine by the manufacturer that indicates the machine's design and operation specifications including the:

- Temperatures required for washing, rinsing, and sanitizing;
- Pressure required for the fresh water sanitizing rinse unless the machine is designed to use only a pumped sanitizing rinse; and
- Conveyor speed for conveyor machines or cycle time for stationary rack machines.

If a data plate is not affixed to the machine per the above clause, then the washing provider SHALL include the information in readily accessible documentation or signage on or near the machine.

Note: It is crucial that employees can easily verify that the machine is operating according to the manufacturer's instructions. E.g. If the water temperature seems low, the employee must be able to easily find and access information on the appropriate water temperature without moving from their workstation to verify the machine is operating correctly or implement control measures if it is not.

Note: If a washing provider is utilizing shared kitchen or washing equipment that does not include the appropriate data plates, to meet the previous clause, the washing provider can post the required information on removable signage on or near the machinery so that employees have access during their shifts.

If the facility uses heated water, instructions for testing the water temperature SHALL be posted in a conspicuous location in the area where temperatures are normally checked.

If the facility uses chemical sanitizing solutions to sanitize containers, instructions for testing solution concentrations SHALL be posted in a conspicuous location in the sanitizing area where concentrations are normally checked.

If the facility uses pressurized hot water to sanitize containers, instructions for testing water pressure SHOULD be posted in a conspicuous location in the washing machine area where concentrations are normally checked.

#### **4.4 Employee safety**

Facility SHALL provide protective equipment, without cost to the employee, that is adequate to protect against potential harm from heated water, chemicals, and container breakage including at a minimum:

- waterproof gloves;
- goggles or safety glasses
- waterproof aprons

Facilities SHALL provide potable drinking water to employees, including enough water so that each employee can drink at least 1 quart per hour, or four 8 ounce glasses, of water per hour.

Facilities SHOULD be adequately ventilated to prevent the inside ambient air temperature from exceeding 30°C (86°F).

Note: The U.S. Labor Department is currently revising occupational heat exposure rules. The current guidance recommends indoor temperatures between 20-24°C (68-76°F) and humidity in the range of 20-60%. More recent regulation in Minnesota sets different heat levels for varying degrees of exertion:

- for heavy work (350 or more kilocalories per hour, heavily lifting or pushing) the heat level cannot exceed 25°C (77°F).
- for moderate work (200-350 kilocalories per hour, light lifting or pushing) the heat level cannot exceed 27°C (80°F).
- for light work (200 kilocalories per hour, which can include standing and performing light hand or arm work) the heat level cannot exceed 30°C (86°F).

Special measures SHALL be put in place if the temperature within the facility exceeds 30°C (86°F), including:

- effective communication by voice, observation, or electronic means is maintained so that employees at the worksite can contact a supervisor when necessary. An electronic device, such as a cell phone or text messaging device, may be used for this purpose only if reception in the area is reliable.
- employees are observed for alertness and signs or symptoms of heat illness. The employer shall ensure effective employee observation/monitoring by implementing one or more of the following: supervisor or designee observation of 20 or fewer employees, or mandatory buddy system, or regular communication with sole employee such as by radio or cellular phone, or other effective means of observation
- one or more employees on each worksite is designated and authorized to call for emergency medical services, and other employees are allowed to call for emergency services when no designated employee is available.
- employees are reminded throughout the work shift to drink plenty of water.
- pre-shift meetings are held before the commencement of work to review the high heat procedures, encourage employees to drink plenty of water, and remind employees of their right to take a cool-down rest when necessary.

## 5 Employee requirements

### 5.1 Training

Employees SHALL be trained to:

- maintain good personal hygiene per Section 5.2
- prevent cross contamination between clean containers and dirty surfaces or containers per section 5.3
- clean and sanitize surfaces and equipment per 5.4

Employees SHALL be trained to follow the provider's Standard Operating Procedures (SOPs).

Employees SHOULD receive food handler's certification if food is handled or packaged within the facility.

Note: Certifications programs vary across jurisdictions. In the [U.S.](#), certification requirements vary by state and county. Whereas, in [Singapore](#), there is a national certification.

## 5.2 Personal hygiene

Note: Additional details are available in the U.S. Food and Drug Administration's [Employee Health and Personal Hygiene Handbook](#) and Canada's [Glove Use and Hand Hygiene Frequently Asked Questions](#).

### 5.2.1 Reporting illnesses

Employees SHOULD report any of the below symptoms to their supervisor:

- vomiting
- diarrhea
- jaundice (yellowing of the eyes or skin)
- sore throat with fever
- a lesion containing pus such as a boil or infected wound that is open or draining and is:
  - on the hands or wrists, unless an impermeable cover such as a finger cot or stall protects the lesion and a single-use glove is worn over the impermeable cover, or
  - on exposed portions of the arms, unless the lesion is protected by an impermeable cover, or
  - on other parts of the body, unless the lesion is covered by a dry, durable, tight-fitting bandage.

Note: The above are symptoms of diseases that are transmissible through food and are taken from [U.S. FDA 2022 Food Code](#).

Employees SHALL report any of the below diagnosed illnesses to their supervisor:

- Norovirus
- Hepatitis A virus
- Shigella spp
- Shiga toxin-producing Escherichia coli (STEC)
- Salmonella
- SARS-CoV-2

### 5.2.2 Handwashing

Note: Handwashing is the act of cleansing hands by applying soap and water, rubbing them together vigorously, rinsing them with clean water, and thoroughly drying them. This process gets rid of dirt and contaminants. Every handwashing stage is important and effectively contributes to soil removal and reduction of microorganisms that can cause illness. Proper handwashing reduces the spread of fecal-oral pathogens from the hands of a food employee to foods. Handwashing can also help reduce the transmission of other pathogens from environmental sources. The fingernails and surrounding areas are often the most contaminated parts of the hand and are also the most difficult part of the hand to get clean.

Employees SHALL wash hands at these times:

- After touching phone



- Always before touching clean containers or clean surfaces
- Before putting on or changing gloves
- After leaving the area where handling clean containers and returning to it
- After using the restroom
- After sneezing, coughing, or using a handkerchief or tissue
- After touching hair, face, or body
- After touching clothing, shoes, or aprons.
- After smoking, eating, drinking, or chewing gum or tobacco
- After any cleanup activity such as sweeping, mopping, or wiping counters
- After handling chemicals that could affect food safety
- After touching dirty dishes, equipment, or utensils
- After handling trash
- After handling money
- After any time the hands may become contaminated

Employees SHALL wash hands in designated handwashing locations only.

Employees SHALL wash hands according to handwashing steps in Annex B.

### **5.2.3 Hand sanitizers**

Employees MAY use hand sanitizers only after hands have been washed and dried.

### **5.2.4 Gloves**

Note: The below clauses apply to both single-use and reusable gloves.

Employees SHALL wear gloves when:

- handling food-contact surfaces, such as the inside of a cup or top of a plate
- handling dirty containers that have the potential to contain hazardous substances, such as bodily fluids
- hands are exposed to hot water or chemicals during the washing process
- handling cleaning or sanitizing agents or other chemicals

Employees SHALL wash hands before putting on gloves.

Employees SHALL put on gloves according to the steps in Annex C.

Employees SHALL remove gloves according to the steps in Annex C.

When wearing gloves to handle clean containers, employees SHALL change gloves:

- as soon as they become dirty or torn; and
- at the same intervals as described in hand washing requirements in Section 5.2.2.

When wearing gloves to handle dirty containers, employees SHALL change gloves:

- as soon as they become torn; and

- after handling dirty containers and before changing to another task.

Employees SHALL wash hands between glove changes.

Reusable gloves SHALL be properly washed between uses following all the washing steps including sanitization in Section 4.2.2. It is not enough to wash reusable gloves while wearing them using the same process that is used for hand washing.

### **5.3 Preventing cross-contamination**

All surfaces that will touch clean containers, including staging tables and sinks, SHALL be washed (i.e. cleaned, sanitized, and air-dried) before starting work (see Section 5.4.2 for surface washing procedures)

Dirty containers SHALL NOT come into contact with surfaces that are meant for clean containers.

The food-contact surfaces of containers SHOULD NOT be touched by anything after it is washed.

If an employee must touch a food-contact surface, gloves SHALL be worn.

Note: To avoid touching the container's food-contact surface, employees can hold dishes/clamshells/bowls along the bottom or edge and hold glasses/cups/bottles by the middle, bottom, handle, or stem, not by the top.

Utensils SHALL be stored with handle up or flat so that they can be grabbed without touching the food-contact surface

Containers SHALL NOT be stored with the opening pointing up. They must be stored upside down or sideways to prevent things from falling into them and airborne contamination.

All chemicals SHALL be stored in the original container or properly labeled with the name of the chemical inside.

Chemicals SHALL be stored in a special designated chemical storage area away from clean containers.

Cleaning supplies SHALL be stored away from the container cleaning area.

Cleaning and mop water SHALL only be disposed of in designated cleaning sinks.

## **5.4 Cleaning and sanitizing surfaces**

### **5.4.1 What to clean and sanitize:**

These surfaces SHALL be cleaned:

- Floors

- Walls
- Surfaces that touch dirty containers
- Storage shelves
- Garbage receptacles

These surfaces SHALL be cleaned, sanitized, and air-dried:

- surfaces and equipment that will touch a clean container, such as a dish drying rack

#### **5.4.2 How to clean and sanitize a surface**

Employees SHALL follow these steps when cleaning and sanitizing a surface:

- Scrape or remove food and debris from surface
- Clean the surface with water and a cleaning agent following the cleaning agent manufacturer's label instructions
- Rinse surface with clean water
- Sanitize surface with a solution of water and a sanitizing agent following the sanitizing agent manufacturer's label instructions for concentration, temperature, and contact time
- Allow the surface to air dry, never wipe the surface to dry it

Employees SHALL clean and sanitize a surface:

- Always before you start using a surface that will touch clean containers
- Anytime you are interrupted and the surface you are using for clean containers may have been contaminated
- After 4 hours if the surface has been used constantly for clean containers
- After you are done using the surface for dirty containers

When handling garbage, employees SHALL:

- not touch washing area surfaces
- not clean garbage container inside the container washing area
- remove the garbage before it starts to overflow
- close the lids on outdoor containers
- keep indoor containers covered when not in use

## **6 Pre-cleaning**

Containers that have dried on food, dirt or other debris SHOULD be pre-flushed, pre-soaked or pre-scrubbed to loosen debris.

Note: Some machinery does not require pre-cleaning

Debris SHALL be wiped from the container into an appropriate compost or waste receptacle and/or removed in a washing machine with a prewash cycle.

If scraping a container is necessary to remove debris, pads and brushes designed for use on food-contact materials SHOULD be used.

Abrasive cleansers and pads that can scratch the food-contact surface and reduce the ability for the container to be effectively cleaned and sanitized SHOULD NOT be used.

Note: Different types of containers will be able to withstand different types of abrasive cleaners and pads and appropriate cleansers, brushes and pads will vary based on the container. I.e. metal containers may withstand more abrasive scraping than plastic containers.

## **7 Cleaning and sanitizing requirements**

### **7.1 Cleaning procedures**

Containers SHALL be washed following these five steps in order:

- Pre-cleaned or wiped to remove debris, if needed, per Section 6,
- Cleaned,
- Rinsed,
- Sanitized, and
- Dried per Section 8.

Containers SHALL be cleaned and sanitized in:

- machine washing equipment following requirements of Section 7.2, or
- three-compartment sink systems following requirements of Section 7.3.

Note: It is not enough to only clean or only sanitize a container. Containers must be first cleaned, then rinsed, and then sanitized. Cleaning and rinsing ensures that visible debris and residue are removed from the container. Sanitizing ensures that non-visible microorganisms and pathogens are removed from the container.

### **7.2 Machine cleaning and sanitizing**

Machinery SHALL be operated in accordance with the machine's data plate and/or other manufacturer instructions.

Measures SHALL be in place to continually monitor whether washing and sanitizing agents, as well as other required inputs, are available.

Note: Some machinery has a light or sound to indicate when the washing and sanitizing agents are low or empty, whereas others do not. If the machinery does not have an automatic indicator, then the facility SOPs should include monitoring for low levels.

#### **7.2.1 Machine loading**

Soiled items to be cleaned in a machine SHALL be loaded into racks, trays, or baskets or onto conveyors in a position that:

- exposes the items to the unobstructed spray during all cycles;
- allows the items to drain; and
- is not overloaded so that each item is effectively cleaned or sanitized.

### 7.2.2 Machine cleaning

Containers SHALL be cleaned using a solution of water and a cleaning agent.

Note: Different types of cleaning agents are available for different types of machines, surfaces and materials, soil types, and water conditions.

The cleaning agent SHOULD be certified by the U.S. Environmental Protection Agency's [Safer Choice program](#) where available.

The cleaning agent SHALL:

- disclose all ingredients;
- only contain ingredients rated "Green Circle" or "Half Green Circle" on the U.S. EPA's [Safer Chemical Ingredient List](#); and
- be used in accordance with the manufacturer's label instructions to avoid risk of chemical burns, or chemical residues finding their way into food, and to ensure materials are washed properly.

Note: There are 65 commercial dish soaps and 58 commercial automatic dishwasher detergents that have been certified by EPA's Safer Choice at a range of price points, demonstrating that products which meet these ingredient criteria are available. Notably, the Safer Choice certification also requires tests of efficacy, demonstrating that products which meet these ingredient criteria are also effective.

Machine manufacturer's wash temperature specifications SHALL be followed.

Note: In spray-type washing machines that use chemicals to sanitize, the required temperature of the cleaning solution is generally not less than 49°C (120°F).

Note: In spray-type washing machines that use hot water to sanitize, the required temperature of the cleaning solution is generally not less than:

- For a stationary rack, single-temperature machine 74°C (165°F)
- For a stationary rack, dual-temperature machine 66°C (150°F)
- For a single-tank, conveyor, dual-temperature machine 71°C (160°F)
- For a multi-tank, conveyor, multi-temperature machine 66°C (150°F)

After being washed, containers SHALL be rinsed with water.

### 7.2.3. Machine sanitizing

After being cleaned and rinsed, containers SHALL be sanitized using either a

- chemical sanitizing agent per Section 7.2.3.1 below; or
- heat per Section 7.2.3.2 below.

### **7.2.3.1 Sanitizing with chemical sanitizing agents**

A sanitizing agent SHALL be used in a solution with water in accordance with the manufacturer's label instructions and the appropriate:

- concentration;
- temperature; and
- contact time.

Minimum concentrations and temperature requirements are provided in Annex D.

The sanitizing agent SHOULD be certified by the U.S. Environmental Protection Agency's [Design for Environment-Certified Disinfectants List](#), where available.

Chlorine SHOULD NOT be used as a sanitizing agent.

Note: Bleach or sodium hypochlorite, a common chlorine-based sanitizing agent, has been linked to asthma and other respiratory issues, can irritate the skin and eyes, and is corrosive to many metals, including metals that are used in packaging such as stainless steel, aluminum, copper and brass. In addition, mixing bleach with other chemicals that are often used as disinfectants, such as ammonia, quaternary ammonium compounds, vinegar, or other acids can create a toxic gas. Bleach was the source of 35,000 poisonings in the U.S. in 2011. For more information see:

- [California Department of Public Health's "Healthy Cleaning and Asthma-Safer Schools Guide"](#)
- [University of California, Berkeley's Center for Environmental Research and Children's Health's "Guide to Green Cleaning, Sanitizing, and Disinfecting"](#)
- [Western States Pediatric Environmental Health Specialty Unit's presentation on "Safer Cleaning, Sanitizing and Disinfecting during the COVID-19 Pandemic"](#)
- [Western States Pediatric Environmental Health Specialty Unit's fact sheet "What's the Problem with Bleach?"](#)

The concentration of the sanitizing solution SHALL be tested at least daily and logged according to the washing provider's SOPs.

Note: Routinely checking sanitizer concentration is one of the most important behaviors, in addition to ensuring washing machine is operating per the parameters on its data plate.

Instructions for testing the sanitizing solution concentration SHALL be posted in a conspicuous location in the washing machine area where concentrations are normally checked, per Section 4.3 above.

If the concentration is not within the appropriate range, corrective actions SHALL be taken according to the washing provider's SOPs.

Containers from sanitization cycles that do not meet the concentration requirements SHALL be re-sanitized.

A sanitizing solution SHALL contact an item long enough to properly sanitize including:

- At least 7 seconds for a chlorine solution of 50 mg/L (ppm) that has a pH of 10 or less and a temperature of at least 38°C (100°F) or a pH of 8 or less and a temperature of at least 24°C (75°F); or
- At least 10 seconds for a chlorine solution not specified in the above; or
- At least 30 seconds for other chemical sanitizing solutions.

### **7.2.3.2 Sanitizing with hot water**

#### **7.2.3.2.1 Temperature**

The temperature of the hot water sanitizing rinse as it enters the manifold SHALL be:

- not be more than 90°C (194°F);
- not less than 82°C (180°F) for most machines;
- not less than 74°C (165°F) for a stationary rack, single-temperature machine.

Note: The maximum temperature is set at this level since this is where water begins to turn into steam.

Instructions for testing the water temperature SHALL be posted in a conspicuous location in the washing machine area where temperatures are normally checked per Section 4.3 above.

Temperature of the hot water SHALL be checked at least daily and logged according to the washing provider's SOPs.

If water temperature is not within the appropriate range, corrective actions SHALL be taken according to the washing provider's SOPs.

Containers from sanitization cycles that do meet the temperature requirements SHALL be re-sanitized.

#### **7.2.3.2.2 Pressure**

The flow pressure of the hot-water sanitizing rinse in a washing machine SHALL be between 100 kp (15 psi ) and 170 kp (25 psi) as measured in the water line immediately downstream or upstream from the hot-water sanitizing rinse control valve.

The final rinse water pressure gauge SHOULD be checked daily and logged according to the washing provider's SOPs.

Instructions for testing the pressure gauge pressure SHOULD be posted in a conspicuous location in the washing machine area where temperatures are normally checked.

If water pressure is not within the appropriate range, correction actions SHALL be taken according to the washing provider's SOPs.

Containers from sanitization cycles that do meet the hot water pressure requirements SHALL be re-sanitized.

#### **7.2.4. Rinse**

A rinse water additive MAY be used.

Note: Some washing machines require the use of a rinse water additive to operate properly.

### **7.3 Manual cleaning and sanitizing**

Gloves SHALL be worn to protect hands from heat and cleaning and sanitizing agents.

#### **7.3.1 Sink designations**

Three-compartment sinks used for container washing, SHOULD NOT be used for:

- cleaning produce, thawing food, or other food preparation;
- cleaning mops;
- cleaning maintenance tools; or
- washing hands.

Three-compartment sinks used for container washing MAY be used for cleaning wiping cloths.

Each section of the three-compartment sink SHALL be thoroughly cleaned and sanitized:

- before each container washing session;
- when switching to containers that are intended to be used for foods that are part of certification programs that have specific requirements, such as Halal foods;
- after being used for thawing or processing food;
- After being used for washing mops, maintenance tools, wiping cloths, or hands; and
- after 4 hours of use for any activity.

If using a four-compartment sink, the first section MAY be used during pre-cleaning, either to house the food waste disposal or as an area to soak containers to make removing hardened food easier.

#### **7.3.2 Manual cleaning**

Containers SHALL be cleaned in the first sink compartment with water and a cleaning agent, such as:

- soap,
- detergent,



- acid or alkaline cleaner,
- degreaser, or
- other cleaning agent.

The cleaning agent SHOULD:

- be certified by the U.S. Environmental Protection Agency's [Safer Choice program](#), where available;
- disclose all ingredients; and
- use detergents that only contain ingredients rated "Green Circle" or "Half Green Circle" on the U.S. EPA's [Safer Chemical Ingredient List](#)

The cleaning agent SHALL be used in accordance with the manufacturer's label instructions to avoid risk of chemical burns, or chemical residues finding their way into food, and to ensure materials are washed properly.

Warm water SHOULD be used for washing, where available.

When warm water is available, the water's minimum temperature SHOULD be between 35°C (95°F) and 49°C (120°F).

When warm water is available, a thermometer SHOULD be kept nearby to ensure the water is at an appropriate temperature.

### **7.3.3 Manual rinsing**

After being washed, containers SHALL be rinsed in the second sink compartment by either:

- immersing the container in clean water inside the sink, or
- spraying the container with clean water in the second sink basin.

Warm water SHOULD be used for rinsing.

When warm water is available, the water's minimum temperature SHOULD be 43°C (110°F).

To ensure sanitary operation when immersing and rinsing foodware, water in the rinse basin SHALL be drained and replaced with fresh water when it:

- cools down below 43°C (110°F), if using warm water;
- becomes visibly soapy or cloudy; or
- once every 4 hours while in use.

### **7.3.4 Manual sanitizing**

After being washed and rinsed, containers SHALL be sanitized in the third sink compartment using either a:

- chemical sanitizing agent per Section 7.3.4.1 below; or
- hot water per Section 7.3.4.2 below.

#### 7.3.4.1 Chemical sanitizing agents

The third sink compartment SHALL be filled with a solution of water and a sanitizing agent in accordance with the manufacturer's label instructions and the appropriate:

- concentration;
- temperature; and
- contact time.

Guidance on proper concentrations and temperatures is provided in Annex D.

Containers SHALL be fully immersed in the chemical sanitizing solution long enough to properly sanitize including:

- At least 7 seconds for a chlorine solution of 50 mg/L (ppm) that has a pH of 10 or less and a temperature of at least 38°C (100°F) or a pH of 8 or less and a temperature of at least 24°C (75°F); or
- At least 10 seconds for a chlorine solution not specified in the above; or
- At least 30 seconds for other chemical sanitizing solutions.

Where available, sanitizing agents from the U.S. EPA's [Design for Environment-Certified Disinfectants List](#) SHOULD be used

Chlorine SHOULD NOT be used as a sanitizing agent.

Note: Bleach or sodium hypochlorite, a common chlorine-based sanitizing agent, has been linked to asthma and other respiratory issues, can irritate the skin and eyes, and is corrosive to many metals, including metals that are used in packaging such as stainless steel, aluminum, copper and brass. In addition, mixing bleach with other chemicals that are often used as disinfectants, such as ammonia, quaternary ammonium compounds, vinegar or other acids can create a toxic gas. Bleach was the source of 35,000 poisonings in the U.S. in 2011. For more more information see:

- [California Department of Public Health's "Healthy Cleaning and Asthma-Safer Schools Guide"](#)
- [University of California, Berkeley's Center for Environmental Research and Children's Health's "Guide to Green Cleaning, Sanitizing, and Disinfecting"](#)
- [Western States Pediatric Environmental Health Specialty Unit's presentation on "Safer Cleaning, Sanitizing and Disinfecting during the COVID-19 Pandemic"](#)
- [Western States Pediatric Environmental Health Specialty Unit's fact sheet "What's the Problem with Bleach?"](#)

#### 7.3.4.2 Sanitizing with hot water

The third sink SHALL have a sanitizing sink heater installed.

The third sink compartment SHALL be filled with water that stays at or above 77.2°C (171°F).

Note: Heaters are made to be mounted underneath the sink and constantly circulate water to ensure it stays at or above the minimum sanitizing temperature of 77.2°C (171°F). The type and specifications of the sink heater depends on the size of the sink compartment.

Containers SHALL be fully submerged in the hot water for at least 30 seconds.

Containers that are not fully submerged in the sink SHALL NOT be deemed sanitized.

Since the water in a hot water sanitizing sink is kept at temperatures hot enough to burn skin, the sink SHALL be outfitted with a rack, basket, or utensils to lower and lift containers in and out of the hot water.

## **8 Drying**

After being cleaned, rinsed, and sanitized, containers SHALL be dried without being touched.

Drying racks, drainboards, and drainage shelves SHALL be self-draining to prevent accumulation of water.

Containers SHALL NOT be cloth dried.

Note: Towel-drying of washed and sanitized containers could result in recontamination of food-contact surfaces.

Containers MAY be stacked while drying.

Containers that are stacked while drying SHALL be stacked in such a way that they can continue to drip or air dry without water accumulating or being trapped inside the container. For example, containers could be situated or stacked at an angle that leaves them somewhat vertical and/or upside down, but could not be stacked horizontally in a way in which water accumulates between containers and cannot drip off.

Containers that are dry MAY be polished with cloths that are maintained clean and dry.

## **9 Inspection**

### **9.1 Standard operating procedures for inspection**

Wash facilities SHALL establish Standard Operating Procedures (SOPs) for inspection of containers.

Inspections MAY be performed either:

- manually by an employee, or
- automated by inspection machinery

NOTE: Sample Standard Operating Procedure (SOP) for inspecting containers for residue and defects is included as Annex A.

## **9.2 Inspection for residue and defects**

Each container SHALL be inspected after it is washed and before it is placed into a distribution bin for residue, including residual water or liquid, after it is washed and before it is placed into a distribution bin.

A container that does not pass the inspection for residue per the above clause above SHALL be rewashed.

Each container SHALL be inspected after it is washed and before it is placed into a distribution bin to ensure it can continue to perform its intended function free of defects, such as breaks, open seams, cracks, chips, inclusions, pits, discoloration, or other distortion or damages that could impact product quality or safety.

Containers that do not pass the inspection for defects per the above clause SHALL be decommissioned.

## **9.3 Inspection for pathogens**

Randomized testing of container surfaces for pathogens SHOULD be performed to verify that the facility washing process and SOPS are working.

Note: This is especially important for containers that are intended for shelf-stable products. The testing frequency should reflect the risk profile of the final product and could be weekly, monthly, quarterly, or biannually, etc.

# **10 Container packing for distribution**

## **10.1 Distribution bin requirements**

If clean containers are intended to be distributed for refilling outside of the facility where they are washed, they SHALL be packed in distribution bins that protect from dirt, dust, and other potential contaminants. Examples include boxes with lids; bags that are tied closed; bags with drawstring or zipper closures; crates on palletized containers in which the crates or pallets are wrapped in sheeting or materials to enclose and protect the containers from contamination.

Distribution bins for clean containers MAY also be used to collect or store dirty containers, as long as the bin is able to be cleaned and sanitized per Sections 10.4 between uses.

Distribution bins that are used to collect or store dirty containers SHALL be cleaned and sanitized per Section 10.4 when switching between carrying dirty containers and carrying clean containers.

If distribution bins are not capable of being cleaned and sanitized per Section 10.4, then:

- distribution bins that previously contained dirty containers SHALL NOT be packed with clean containers
- distribution bins that previously contained clean containers MAY be reused for clean containers
- distribution bins that previously contained dirty containers MAY be used for dirty containers as long as physical debris is removed from the bin between uses and the bin continues to function as intended without posing risk to the containers inside it.

Note: Once the distribution bin is deemed to pose a risk, such as by harboring chemicals or other potentially harmful substances that can be transferred to the containers inside it, then it should be decommissioned.

## 10.2 Distribution bin design

Materials used in the construction of reusable distribution bins SHOULD:

- not impart colors, odors, or tastes to the containers within the bin;
- be durable, corrosion resistant, and nonabsorbent;
- be resistant to pitting, chipping, crazing, scratching, scoring, distortion, and decomposition;
- be made from recycled content where possible; and
- be recyclable

Reusable distribution bins SHOULD be constructed to be:

- sufficient in weight and thickness to withstand repeated transport, washing, and sanitation cycles;
- finished to have a smooth, easily cleanable surfaces, including smooth welds and joints;
- free of sharp internal angles, corners, ledges and crevices that can harbor residue or pathogens; and
- free of breaks, open seams, cracks, chips, inclusions, pits, and similar imperfections.

## 10.3 Distribution bin packing

Distribution bins that were previously used to store dirty containers SHALL be cleaned and sanitized per Section 10.4 before being packed with clean containers.

If the distribution bin is also used to collect or store dirty containers, then the distribution bin SHALL be clearly labeled as either “Clean” or “Dirty” when in use. Example of labeling is a green sticker that says clean and red stickers that say dirty of a suitable size that is easily visible before opening the bin.

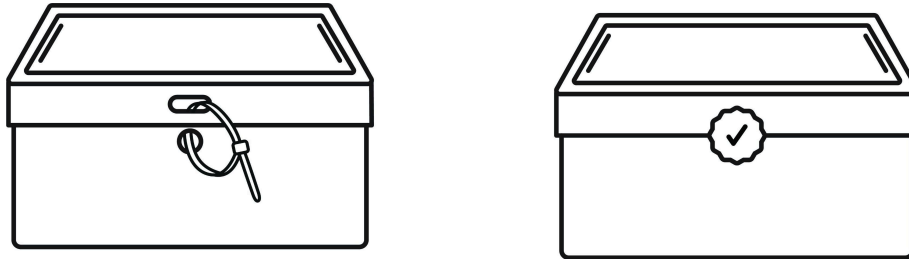
Distribution bins SHALL be completely dry before clean containers are placed into them.

Containers SHALL be completely dry before being placed in distribution bins.

If containers are placed in a distribution bin before they cooled to ambient temperature, then the distribution bin SHOULD be perforated in such a way that heat or vapor can escape.

If the handling of the distribution bins is done by multiple organizations such that the chain of custody is split across organizations, then the distribution bin SHALL be secured with tamper evident closures.

Note: Examples of tamper evident closures include: zip ties around the distribution bin lid that must be cut in order for the bin to be opened; stickers across the bin's closure that would be visibly damaged if the bin was opened.



Examples of tamper evident closures include: zip ties around the distribution bin lid that must be cut in order for the bin to be opened; stickers across the bin's closure that would be visibly damaged if the bin was opened.

#### 10.4 Distribution bin cleaning

Distribution bins SHALL be cleaned and sanitized:

- each time the distribution bins changes its function from containing dirty containers to containing clean containers; and
- at any time contamination may have occurred.

The cleaning and sanitizing procedures used SHALL be based on the type of distribution bin and on the type of soil to be removed.

Distribution bins SHALL be cleaned and sanitized according to either (a), (b), (c) or (d) below:

- (a) Distribution bins are cleaned and sanitized in washing machines following all the requirements specified for containers in Section 7.2;
- (b) Distribution bins are cleaned and sanitized manually in three-compartment sinks following all the requirements specified for containers in Section 7.3;
- (c) If cleaning and sanitizing distribution bins in a machine per (a) or a three-compartment sink per (b) above is impractical such as when the bin is too large to fit into the equipment, then cleaning and sanitizing is done in accordance with the following procedures:
  - Bins SHALL be disassembled as necessary to allow access of the detergent and sanitizing solution to all parts.
  - Bin components SHALL be scraped or rough cleaned to remove food particle accumulation and other residue.
  - Bins SHALL be cleaned to remove or completely loosen soils by using the means necessary such as the application of cleaning agents; hot water; brushes; scouring pads; high-pressure sprays; or ultrasonic devices.
  - Bins SHALL be rinsed so that abrasives are removed and cleaning chemicals are removed.

- After being cleaned and rinsed, bins SHALL be sanitized in using either method (1) or (2) below:
  - (1) hot water manual immersion for at least 30 seconds in water maintained at 77.2°C (171°F) or above; or
  - (2) application of sanitizing chemicals by immersion, manual swabbing, brushing, or pressure spraying methods, using a solution as specified under Annex D above. Contact times shall be consistent with those on manufacturer label use instructions by providing:
- (d) When cloth bags are used as distribution bins, then the bags should be laundered using the same methods used for laundering clothing.

Distribution bins SHALL be inspected according to requirements in Section 9 before clean containers are placed into them.

Distribution bins that do not meet inspection requirements per Section 9 SHALL be rewashed.

## **11 Record-keeping and performance tracking**

Record-keeping protocols for each stage of container washing and packing for distribution SHALL be included in operators SOPs. Such protocols include:

- documentation that concentrations, temperatures, and/or pressures are checked daily and confirmed to be within the proper range
- documentation on pest control

Facilities that wash more than 500 containers per day SHALL:

- document the number and types of containers washed in a facility at least monthly and retain this documentation for at least 24 months; and
- document the energy, water, and chemical usage of the cleaning system on a per container basis and compile this documentation at least monthly and retain this documentation for at least 24 months.

Facilities that wash fewer than 500 containers per day SHOULD:

- document the number and types of containers washed in a facility at least monthly and retain this documentation for at least 24 months; and
- document the energy, water, and chemical usage of the cleaning system on a per container basis and compile this documentation at least monthly and retain this documentation for at least 24 months.

Facilities SHOULD make the data from the above 2 clauses available to local and regional partner organizations on an anonymized basis for the purpose of calculating environmental and social performance of reuse systems.

**Example:**

“per container basis” can mean:

- at a minimum, at least one average across all containers washed at the facility, or
- an average across all containers of the same type that are washed at a facility (e.g. an average for all 8oz cups of the same shape and material)

This would be acceptable: 1,000 containers total are washed in the facility over one month. The facilities total monthly energy, water and chemical usage can each be divided by 1,000.

A more detailed analysis for each individual container type is encouraged, since some containers, such as clamshells, could take up more space and resources in a washing system than cups or bottles.



**Annex A**  
(Informative)

**Sample Standard Operating Procedure (SOP):  
Foodware container manual inspection residue and defects**

**Version No:** [NUMBER]

**Supersedes:** [PRIOR NUMBER]

**Issued on:** [DATE]

**Issued by:** [NAME]

**Objectives:**

To ensure product quality

**Personnel Scope:**

Operator is responsible for manually inspecting containers to ensure the absence of residue and defects that could impact product quality or safety.

**Frequency:**

At a minimum, the operator will inspect each foodware container after it is washed and before it is placed in a distribution bin. Additionally, operators may inspect containers at other points throughout the container recovery and washing process, such as during unpacking of dirty foodware or during loading to and unloading from washing equipment.

**Equipment requirements:**

Adequate lighting

Adequate uncorrected or corrected eyesight

Inspection Log

**Procedures:**

NOTE: The following procedures are for the manual inspection of foodware containers by the human eye. For facilities that have automated inspection equipment, operators should manually inspect a container using the following procedures at least once per shift to ensure inspection equipment is functioning properly.

STEP 1	Wash hand  (Note: Handwashing steps are provided in Annex B.)
STEP 2	Put on gloves

	(NOTE: This step is optional and to be determined by the washing provider. Glove placement steps are provided in Annex C)
STEP 3	<p>Pick up a container and examine it from a distance of approximately one arm’s length or less, roughly 20-50 cm (8-20 inches), and at a minimum of six observation angles roughly including the top, bottom, front, back, left side, and right side for the following:</p> <ul style="list-style-type: none"> <li>a) Residue from foods, beverages, or other marks or objects on the container</li> <li>b) Residual water or liquid that may includes cleaning or sanitizing agents</li> <li>c) Breaks or cracks</li> <li>d) Open seams</li> <li>e) Chips</li> <li>f) Pits</li> <li>g) Discoloration</li> <li>h) Veins or crazing within the material</li> <li>i) Other distortions or damages that could impact product quality or safety</li> </ul>
STEP 4	<p>A container that has a) residue or b) residual water or liquid is sent back to be rewashed.</p> <p>(NOTE: It may be necessary to scrape residue from the container before rewashing)</p>
STEP 5	<p>A container that has any of the defects listed in c) through i) above to such an extent that the intended function of the container is impaired shall be decommissioned.</p>
STEP 6	<p>A container that has any of the defects listed in c) through i) above to only a minor extent that doesn’t impact the ability for the container to perform its intended function shall be given a point for each of the minor defects.</p> <ul style="list-style-type: none"> <li>- If the total points add up to X or less, then the container can be placed into the distribution bin.</li> <li>- If the total points add up to more than X, then the container shall be decommissioned.</li> </ul> <p>NOTE: Operators may set the maximum allowed points to meet the needs of the specific container, product, and/or venue where it is used. For example, a formal venue with high aesthetic standards might set the maximum allowable points to 1, whereas a less formal venue might set the maximum allowable points to 3 or higher.</p>
STEP 7	<p>It is recommended that operators submit containers for lab testing for microorganisms or pathogens to confirm that the washing procedures are effective. Samples should be selected randomly at a regular interval that is appropriate for the container and/or wash facility, such as once per shift, once per week, or once per month, etc.</p>

**Monitoring:**

The following will be recorded digitally or on a hard copy Inspection Log:

1. Operator who inspects foodware containers shall confirm that the above steps were followed by initialing the Inspection Log once per shift
2. Supervisor will conduct a visual inspection of the inspection process once per day to ensure operators are adhering to protocol. They will indicate completion of this task by initialing the Inspection Log.

**Corrective actions:**

If the inspection process is found to not be carried out according to SOPs:

1. Failure to follow process will be noted on Inspection Log
2. Operator will be re-trained to follow SOPs
3. Containers will be re-inspected according to SOPs

**Verification:**

1. On a weekly basis, the facility manager will review all record-keeping documents listed below.
2. If corrective actions occur, the manager will review the corrective action steps within 7 days and revise as needed.
3. The results of internal monitoring and external monitoring should be reviewed on a regular basis to identify trends and measure effectiveness.

**Record keeping:**

Digital or hard copies of the following will be stored so that they are easily accessible:

1. Inspection Log

**Annex B**  
(Normative)  
**Handwashing steps**

Clean hands and exposed portions of arms, including surrogate prosthetic devices for hands and arms, for at least 20 seconds according to the method in Table 1.

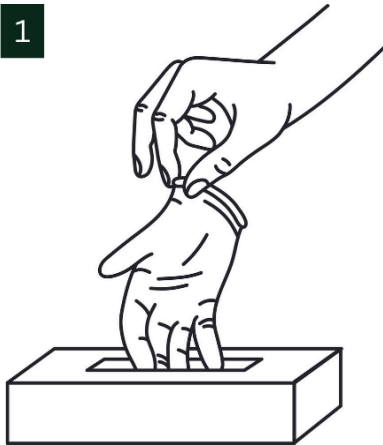
**Table 1 – Hand washing method**

Step 1	Wet hands and arms under clean running water (warm if available);
Step 2	Apply soap and rub all surfaces of the hands and fingers together vigorously with friction for at least 10 to 15 seconds, giving particular attention to the area under the fingernails, between the fingers/fingertips, and surfaces of the hands, arms, and surrogate prosthetic devices;
Step 3	Rinse thoroughly with clean, warm running water; and
Step 4	Thoroughly dry the hands and exposed portions of arms with single-use paper toweling, a heated-air hand-drying device, or a clean, unused towel. Avoid using personal clothing, apron, or used towel for drying hands. Avoid recontamination of hands and arms by using a clean barrier, such as a paper towel, when turning off faucets or touching the handle of a restroom door.

## Annex C (Normative) Glove placement and removal steps

Follow the standard procedures from Figure 1 for glove placement and Figure 2 for glove removal.

**Figure 1 - Glove placement**



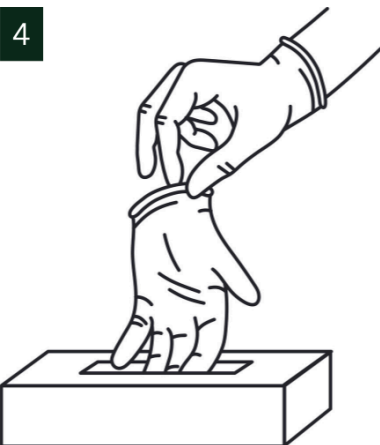
1  
Take out a glove from its original box



2  
Touch only a restricted surface of the glove corresponding to the wrist (at the top edge of the cuff)



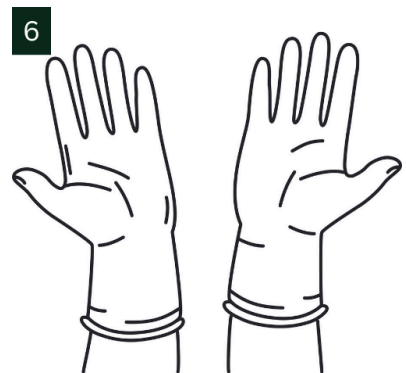
3  
Don the first glove



4  
Take the second glove with the bare hand and touch only a restricted surface of glove corresponding to the wrist



5  
Turn the external surface of the glove to be donned on the folded fingers of the gloved hand, thus permitting to glove the second hand



6  
Once gloved, hands should not touch anything else that is not defined by the indications and conditions for glove use

## Figure 2 - Glove removal



1  
With both hands gloved, grasp the outside of one glove at the top of your wrist, being careful not to touch your bare skin



2  
Peel off this first glove, peeling away from your body and from wrist to fingertips, turning the glove inside out



3  
Hold the glove you just removed in your gloved hand



4  
With your ungloved hand, peel off the second glove by inserting your fingers inside the glove at the top of your wrist.

**Annex D**  
**(Informative)**  
**Sanitizing solution temperatures and concentrations**

**Chlorine**

If chlorine is used as a sanitizing agent, the solution should have a minimum temperature based on the concentration and pH of the solution as listed in Table 1.

**Table 1: Chlorine concentration range**

<b>Concentration Range</b> (mg/L or ppm)	<b>Minimum temperature</b> pH 10 or less °C (°F)	<b>Minimum temperature</b> pH 10 or less °C (°F)
<b>25-49</b>	49 (120)	49 (120)
<b>50-99</b>	38 (100)	24 (75)
<b>100</b>	13 (55)	13 (55)

Note: Chlorine sanitizing agents are often used in low-temperature washing equipment.

**Iodine**

If iodine is used as a sanitizing agent, the solutions should have a:

- minimum temperature of 20°C (68°F);
- pH of 5.0 or less or a pH no higher than the level for which the manufacturer specifies the solution is effective; and
- concentration between 12.5 mg/L (ppm) and 25 mg/L (ppm).

**Quaternary ammonium compounds**

If quaternary ammonium compound is used as a sanitizing agent, the solution should:

- have a minimum temperature of 24°C (75°F);
- have a concentration as indicated by the manufacturer's use directions included in the labeling; and
- be used only in water with 500 mg/L (ppm) hardness or less or in water having a hardness no greater than specified by the manufacturer's label use instructions.

## Bibliography

Many of these guidelines were adopted from the U.S. Food and Drug Administration 2022 Food Code. The full text of the Food Code can be found here:

<https://www.fda.gov/media/164194/download?attachment>

Additional resources include:

U.S. Food and Drug Administration Employee Health and Personal Hygiene Handbook:

<https://www.fda.gov/media/77065/download?attachment>

Conference on Food Protection Guidance Document for Safe Use of Reusable Containers:

<http://www.foodprotect.org/media/guide/cfp-guidance-document-singlepages-final0623.pdf>

Reusable Packaging Association Guidelines and Best Practices for the Safe Use of Returnable Containers in Food Supply Chains:

<https://www.reusables.org/wp-content/uploads/2016/06/RPA-Guidelines-Best-Practices-for-Safe-Use-of-Returnable-Containers-in-Food-Supply-Chain.pdf>