

Ensuring food safety: Rigorous cleaning processes and strict global standards



Food safety is everyone's business. Our stringent processes guarantee that IFCO RPCs are safe for food transport – every time you use them.



IFCO knows that food safety is just as important to our customers as freshness and quality. That's why we adhere to strictly enforced standards of global hygiene and sanitization.

In the food supply chain, pathogens present a risk to people and crops. Food can become unsafe when it is contaminated with illness-causing bacteria, viruses, parasites or chemicals. Contamination can occur at any stage of the food supply chain.

Because our RPCs are meant to be reused, the cleaning process plays a critical role in ensuring the

food safety of our RPCs. This is why we base our wash and sanitization processes on cleaning science. We also perform ongoing hygiene testing to verify the cleaning process is effective and free from harmful bacteria.



Rigorous cleaning processes, worldwide

IFCO RPCs are designed and constructed of durable foodgrade polypropylene. This material can be effectively washed and sanitized.

As IFCO RPCs pass through the food supply chain, they undergo regular pallet-level monitoring in our closed loop SmartCycle™ pooling management system. Following use, RPCs are collected by IFCO, then taken to our highly automated wash centers. Every IFCO RPC is cleaned individually in a validated process according to strict company guidelines that are used at our wash centers around the world.

IFCO wash facilities follow the highest hygiene procedures, and our industry-leading cleaning processes have been independently certified. Our processes of washing, rinsing and sanitizing are proven to effectively remove / inactivate contaminants, including bacteria and viruses, from RPC surfaces.

Proven systems and a systematic approach

Our proprietary cleaning and sanitation system utilizes an ideal combination of detergent, disinfectant, spray pressure, high water flow, water temperature and wash time to achieve optimal results. Detergents and antimicrobials used in the cleaning process were

validated to be effective against both human and plant pathogens.

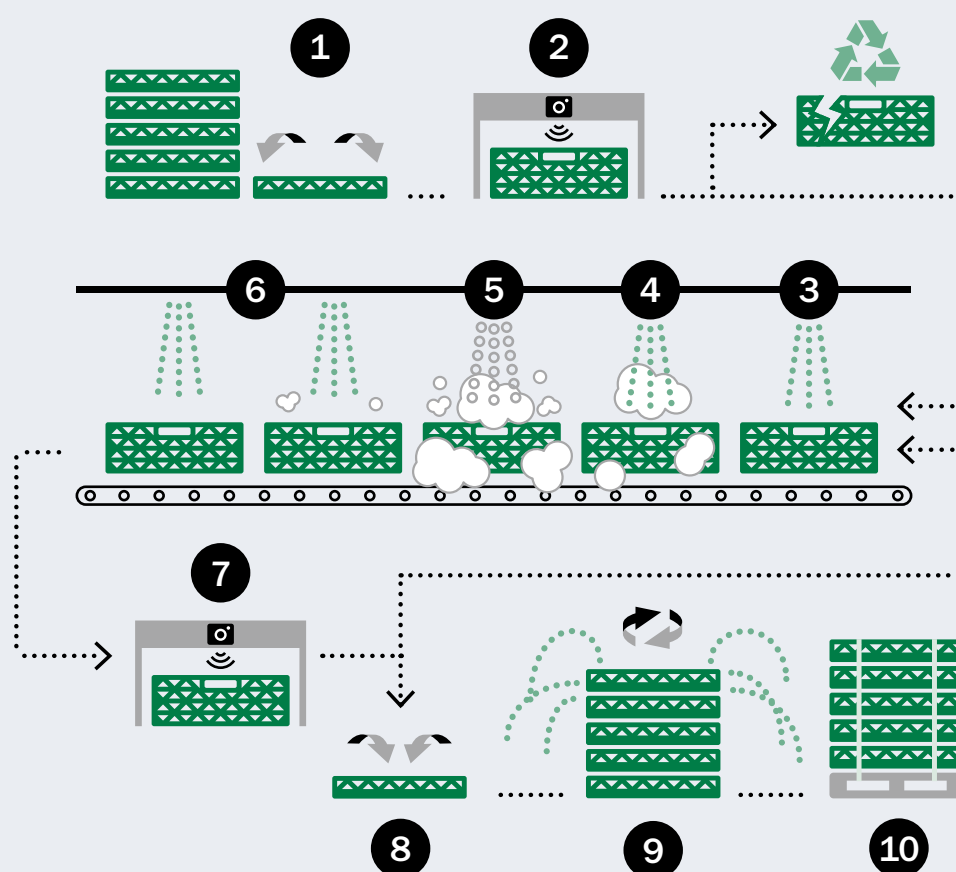
Furthermore, physical separation of incoming and outgoing containers ensures that no cross contamination is possible.

IFCO's SmartGuardian™ continuously monitors wash processes, and the data is regularly validated.

Only IFCO offers this level of safety and validated wash and sanitation processes globally.



IFCO's SmartCycle™ wash process



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| <p>1 RPCs arrive at the IFCO service center and are opened for cleaning</p> <p>2 Mechanical function check: damaged RPCs are sent for repair or recycling</p> <p>3 Pre-rinse with hot water at high pressure to loosen and remove further debris</p> | <p>4 Main wash with hot water at high pressure using highly effective detergents</p> <p>5 RPCs are sanitized using highly effective disinfectants</p> <p>6 Rinsing with fresh water to remove any residual chemicals</p> <p>7 Quality check: RPCs that don't meet IFCO's quality standards are washed again</p> | <p>8 RPCs are folded and stacked</p> <p>9 Centrifugal drying process removes water by spinning the stacked RPCs rapidly</p> <p>10 Stacks are palletized and secured for safety</p> |
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At IFCO, our wash and sanitation processes are built on the science of cleaning. This involves a matrix that has four variables: agitation, concentration, temperature and contact time.

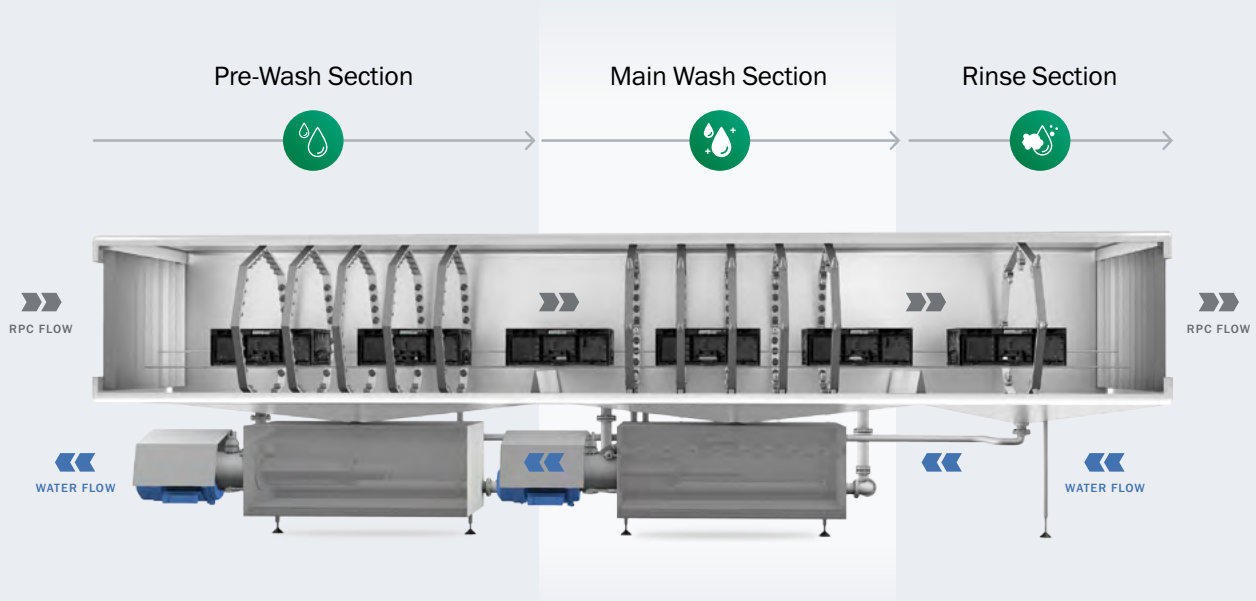
Taking a closer look at the cleaning science involves understanding and mastering the interaction of the variables.

The correct combination of these variables will effectively remove debris, residue and contaminants of all types, as well as pathogens that the crates may be subject to as they move through the supply chain.

With their proven scientific methods, you can rely on IFCO wash and sanitation processes. You can be confident that every IFCO RPC you use meets our strict global standards for hygiene.



IFCO's Tunnel Wash System



IFCO SmartGuardian™



Agitation

Whether a physical spray or force of water flow, agitation loosens soil, debris or contaminants, and detergent lifts them off the surface being washed.



Concentration

Specific detergent concentrations work best at certain temperatures to remove target soils. These vary depending on the type of food or perishable product being transported. Disinfectant concentration used is based on target microorganisms and validated antimicrobial efficacy.



Temperature

Warmer temperatures enhance the surfactants, i.e. the compounds' ability to lift contaminants off surfaces. This is a delicate balance: if water is too hot food soil proteins can adhere to surfaces and disinfectants could evaporate.



Contact time

The optimal contact time is how long disinfectants need to remain on the surface to kill or inactivate target microorganisms. We use oxidizing disinfectants because they are fast, efficient and effective against a broad spectrum of microorganisms.

Continuous monitoring and validation

We continuously monitor all of our cleaning processes and validate their effectiveness at every level. Every IFCO RPC being cleaned and every IFCO wash process is 100 percent monitored using IFCO's proprietary SmartGuardian™ digital software system.

In our cleaning processes, we work to eliminate pathogens that are a threat to food safety. We take a seek-and-destroy strategy for microorganisms. Bacteria or plant viruses that might be found in the food supply chain do not stand a chance against the detergents and disinfectants used in the rigorous IFCO wash process.

Smart Guardian™ monitoring

- SmartGuardian™ records water temperature, detergents and disinfectants used. It stops the wash process if any procedure is operating sub-optimally.
- SmartGuardian™ provides a daily shift report of the operations.
- A label on the pallet confirms that clean and dried RPCs in the stack have passed all IFCO washing and sanitation requirements.

Third-party certification and validation

- Our global sanitation partner guarantees that detergents and disinfectants are effective against a wide range of human and plant pathogens.
- IFCO's tunnel wash system has been validated by a third-party research center on its effectiveness at eliminating attached bacteria from the surfaces of IFCO RPCs and on the removal or inactivation of plant viruses.

IFCO Environmental Monitoring Program

Our pathogen tests include:

- Salmonella
- Listeria
- E. coli
- Campylobacter
- ToBRFV



Hygiene testing and verification

IFCO and independent food safety experts regularly verify our wash process: once our RPCs have been washed, rinsed, sanitized and dried, they are collected from each wash machine and swabbed for both adenosine triphosphate (ATP) and bacterial indicators. Ongoing testing and auditing prove that our processes effectively remove or inactivate contaminants so that IFCO RPCs can be used again and again.

Zonal swabbing

We perform bacterial swabbing of IFCO RPCs and wash machine surfaces. Such testing verifies that both the RPCs and wash machine surfaces have been cleaned effectively. IFCO uses a zonal approach when swabbing for indicator organisms.

Zone 1: The food-contact surface of RPCs. This verifies that the RPC wash processes are effective.

Zone 2: Equipment surfaces on the wash machines. This verifies that these locations are also effectively cleaned and maintained.

ATP testing

At IFCO wash centers, we perform daily adenosine triphosphate (ATP) swabs of the washed, rinsed and sanitized RPCs. ATP monitoring instantaneously detects whether organic matter is present. If detected we can immediately take corrective actions and bring processes back in control.

This stringent testing, verification and validation pays off.

In more than 25 years of pooling operation, no cases of transmission of pathogens from IFCO RPCs have ever been documented.



IFCO has a strong commitment to food safety, and we invest resources and expertise to ensure that our RPCs meet industry and international food safety standards.

IFCO takes food safety seriously. We conform to good manufacturing practices (GMP) and train our employees on food safety, personal hygiene and sanitation.

Our frontline employees are trained in the prevention of food-borne illnesses. They also have an in-depth understanding of the washing and disinfection

processes for food containers. Their job is to make sure that IFCO RPCs are safe for transporting food again and again.

We offer our partners and customers support on proper produce handling and storage, and on installing food safety programs.

In the food supply chain, pathogens present a risk to people and crops. Food can become unsafe when it is contaminated with illness-causing bacteria, viruses, parasites or chemicals. Contamination can occur at any stage of the food supply chain.

To prevent contamination and the spread of food-borne pathogens, use proper food handling, storing, processing and preparation techniques. Choose the right packaging and the right suppliers.

Tip 1: Develop a food safety program

Install a food safety program that identifies your risks, spells out risk control, clarifies training needs, and establishes critical monitoring points. Develop “Food Safety Champions” by fostering compliance with desired food safety behaviors and make food safety the social norm.

Tip 2: Use the right packaging

Select packaging containers that can be properly cleaned and sanitized, particularly for reuse. Made from food-grade polypropylene, IFCO RPCs do not

retain moisture. This prevents mold, fungus and attracting pests. Optimal ventilation helps avoid overripening and spoilage of fresh produce. Our sturdy RPC design protects produce from damage. And you can reduce manual contact with food through our “one-touch handling”.

Tip 3: Store empty packaging correctly

Food safety does not end when the crates are empty. You can contribute to food safety by stacking empty IFCO RPCs indoors, and by not using them as containers for any type of waste.

Tip 4: Involve your partners

To deliver optimal food safety, your suppliers should also follow stringent guidelines. At IFCO, we gladly share food-safety knowledge with other participants in the fresh supply chain. We all have to work together to protect public health as well as crop integrity. This is why we collaborate with food supply chain partners and offer you support.

Used for billions of shipments of perishable goods since 1992, IFCO RPCs have never been linked with the source of a food contamination issue.

Why you should trust IFCO on food safety

We work extremely hard to establish an effective food safety program and standardize our global processes to provide a guarantee of food safety before we deliver the freshest food cost-efficiently.

- Our wash process operation is continuously monitored by our proprietary SmartGuardian™ system that alerts operators if any part of the system is performing at a sub-optimal level.
- Our wash process has been validated by independent third-party research labs to establish the critical limits for our wash process.

- We continuously perform verification testing of IFCO RPCs to ensure that bacteria and viruses do not survive our sanitation process.
- As part of our culture of continuous improvement, we are constantly on the lookout for new food safety threats and ways to mitigate them.

With our proven scientific methods, you can be confident that each IFCO RPC is hygienically clean and safe for food transport – every time you use it.



Need support? Want to know more?
Feel free to contact us!

The easiest way to contact IFCO with questions on food safety is through your local office. We are as close as a phone call, fax or email. Please let us know what concerns you. We look forward to answering any questions you may have. For more information, visit IFCO.com