Chemicals in Food Hygiene

VOLUME 1

The optimal usage of cleaning agents, sanitisers and disinfectants to minimise the risk of traces in foods

Foreword

The Global Food Safety Initiative (GFSI) is a non-profit industry association tasked with promoting continuous improvement of food safety management systems to ensure confidence in the delivery of safe food to consumers worldwide. GFSI provides a network for collaboration between some of the world's leading food safety experts from retailer, producer and food service companies, service providers associated with the food supply chain, international organisations, academia and government.

Since GFSI's inception in 2000, experts from all over the world have been collaborating in numerous Technical Working Groups (TWG) to tackle current food safety issues defined by GFSI stakeholders. In 2017, a TWG was established to determine best practices in relation to biocides (defined as the residues from cleaning agents, sanitisers and disinfectants) in the food supply chain. The objective of the work of the group was to ensure consumer protection through the appropriate application of cleaning agents, sanitisers and disinfectants from farm to fork, balancing the risks and benefits associated with their use whilst facilitating the global trade of food.

The TWG:

- Mapped and evaluated the current and pending global regulatory landscape in respect to cleaning agents, sanitisers and disinfectants and their traces in food;
- Established criteria and approaches for risk assessment in the procurement, application and use of cleaning agents, sanitisers, and disinfectants to enable food businesses and primary producers to take risk management decisions;
- Developed guidance on the intended optimal usage of cleaning agents, sanitisers and disinfectants to ensure chemical and microbiological food safety, considering carry-over risks of traces in foods;
- Reviewed and identified gaps in the suitability of existing methods for detection of traces at relevant points in the food production process;
- Developed the GFSI position on the use of cleaning agents, sanitisers and disinfectants and the relationship with microbial resistance.

The TWG produced 2 volumes within one document:

- Volume one of this document provides a high-level overview of the considerations that a food business operator needs to consider in relation to ensuring appropriate hygienic practices. This volume is aimed at a variety of readers, from the food truck operator or farmer through to the global producer of consumer goods. This guidance focuses on the responsible and effective use of chemicals in food hygiene cleaning and disinfection, especially of food equipment and other food contact surfaces, including hands. The aim of the document is to ensure that the risk of traces in food is minimised whilst ensuring microbiological efficacy.
- Volume two provides a more in-depth understanding of risk assessment processes. It includes an overview of existing methods for detection of traces at relevant points in the food production process. Criteria and approaches for risk assessment in relation to the procurement, application and use of chemicals in food hygiene for food businesses and primary producers are provided for use as a guideline along with a number of tools to support the risk assessment process.

Global regulatory environment

With respect to the global regulatory environment, mapping of the related regulations showed differences of approach and a lack of harmonisation between jurisdictions. Whilst the correct use of cleaning agents, sanitisers and disinfectants during production, processing and retail is not usually intended to expose food to substances contained in these chemicals, it is acknowledged that they may lead to the presence of traces in food.

A primary principle of food and related regulation is to ensure the protection of consumers. However, in the case of cleaning chemicals, food business operators have the responsibility to meet two objectives:

- Limiting consumer exposure to traces of active substances contained in cleaning agents, sanitisers and disinfectants, and;
- Ensuring microbiological safety by having effective tools to control organisms to the extent that they cannot cause harm to human or animal health.

The TWG's opinion is that hazard-based management is not appropriate. Every substance and chemical should be assessed in the specific context of the food production, considering a risk / benefit approach.

A human health risk-based risk assessment principle should be the basis for internal risk management and global regulations. The assessment should focus on traces in food and risks associated with food intake.

It will be necessary to follow the principle of a risk / benefit analysis, a case by case decision based on scientific health risk assessment and depending on food type, chemical and microbial results, recommended condition of use and specificity of installations.

As some traces are technically unavoidable, it is not appropriate to attempt a step to ensure achieve zero traces in food. Every substance and chemical should be assessed in the specific context of food production. It is important to implement proportionate measures to mitigate the risks of significant consumer exposure to traces derived from chemical use.

To ensure compliance with regulations, and in the absence of a harmonised regulatory approach, food companies must seek information about local / national legislation in the countries where they sell their product when developing and implementing onsite cleaning, sanitising and disinfection processes.

GFSI TWG position on the use of cleaning agents, sanitisers and disinfectants and the relationship with microbial resistance.

Cleaning agents, sanitisers and disinfectants are vital to food hygiene and are a global public health protection measure. Limiting microbial antibiotic resistance is also a public health priority. Although many factors contribute to the incidence of antimicrobial resistance, the use of antibiotic compounds in human clinical settings and food-producing animals are primary contributors.

At the time of publication of this document, GFSI are in the process of publishing a review on the relationship of the use of cleaning agents, sanitisers and disinfectants on microbial resistance. This review provides an overview, summary and discussion of the current available information and research on the use of chemicals in food hygiene and the development of anti-microbial resistance. The review identified no evidence of causality between appropriate usage of food hygiene chemicals and co-selection, or of antibiotic resistance. The paper makes a number of recommendations related to reducing the risk of anti-microbial resistance, which are covered in the recommendations and guidance sections in volume 1 and volume 2 of this document.

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Executive summary

Good food hygiene is all about controlling harmful microorganisms and traces of chemicals, which could cause illness for consumers. In addition, good food hygiene helps companies produce high quality food products.

Efficient cleaning, followed by approved sanitation and disinfection, reduces the potential for cross contamination within a food facility. These steps are fundamental elements in assuring good food hygiene that will help companies to:

- Comply with legislation;
- Reduce the risk of food poisoning among consumers;
- Protect the company's reputation.

This guidance provides a high-level overview of the considerations that a food business operator needs to consider in relation to ensuring appropriate hygienic practices. It is aimed at a variety of readers, from the food truck operator or farmer through to global producers and restaurant/retail establishments.

The guidance focuses on the responsible and effective use of chemicals in food hygiene to ensure chemical traces are minimised in food as a result of cleaning, sanitising or disinfection practices, especially of food contact equipment and other food contact surfaces including hands. The aim is to ensure that the risk of traces in food are minimised while ensuring microbiological efficacy.

Document templates are included as examples of good practice and can act as helpful starting points for the preparation of the specific facility documents.

Contents

1 - Scope of this guidance

This is a working document developed by the GFSI Chemicals in Food Hygiene Technical Working Group (TWG), providing high-level guidance to food business operators of all different categories of food irrespective of business size and sector (e.g. primary, processing, retail), to assist in their selection and appropriate usage of chemicals in food hygiene.

This guidance focuses on the responsible and effective use of chemicals in food hygiene cleaning and disinfection especially of food equipment and other food contact surfaces including hands.

"Volume 2: Cleaning agents, sanitisers and disinfectants in food businesses: detection of traces and human risk assessment processes" provides information on risk assessment in the procurement, application and use of cleaning agents, sanitisers and disinfectants to enable food producers of all sectors (e.g. primary, processing, retailing) to take risk management decisions.

2 - Background and introduction

Efficient cleaning followed by approved sanitation and disinfection reduces the potential for cross-contamination within a food facility and are fundamental elements in assuring good food hygiene that will help companies to

- Obey the law;
- Reduce the risk of food poisoning among consumers;
- Protect the company's reputation.

Good food hygiene is all about controlling harmful microorganisms and traces of chemicals, which could cause illness. In addition, good food hygiene helps companies produce high quality food products.

Users of chemicals for food hygiene must be guided to follow sanitiser and disinfectant suppliers' instructions for use of their products, i.e. removal of soil (organic and / or inorganic) prior to application, using specified concentrations and methods of application, adhering to indicated contact times and carrying out any post-disinfection measures specified by the supplier. The sanitiser or disinfectant can remain on the equipment / utensil surfaces unless local / national legislation requires a final water rinse afterwards.

3 - Legislation in relation to cleaning, sanitising and disinfection activities in food production

The use of chemicals is not usually intended to expose food or feed to active substances contained in them. This clearly differentiates between the prevailing applications of sanitisers and disinfectants on one hand, and plant protection products / veterinary medicinal products on the other. However, it is acknowledged that the use of cleaning agents, sanitisers and disinfectants during the production, preparation, processing, treatment, packing and transport of animals, plants, food or feed may lead to the presence of traces in food or feed, and those traces may in many cases be unavoidable.

There is no aligned global regulation in relation to cleaning, sanitising and disinfection activities, and food companies must therefore seek information themselves about local / national legislation when developing and implementing onsite cleaning, sanitising and disinfection processes.

4 - Management of cleaning and disinfection

For food business operators, cleaning procedures and frequencies are part of Good Manufacturing Practices (GMP) and food safety management systems, including HACCP. The design of cleaning, sanitising or disinfection programmes is normally based on the outcome of the food business operator's hazard analysis and risk assessment of production and cleaning processes, and relevant regulatory requirements. How to make a detailed, formalised and documented hazard analysis and risk assessment of cleaning processes and chemicals is outside the scope of this User Guidance.

In line with GMP and food safety management systems (e.g. HACCP), food business operators must have a comprehensive, fully evaluated, validated and documented hygiene schedule for all equipment and food facilities. These systems should be prepared in collaboration with company technical and production personnel, cleaning chemical representatives, quality (laboratory / quality assurance) and other suitably qualified personnel.

Figure 1: Process for development of a cleaning and sanitation programme

The following sections set out how food hygiene schedules can be designed in food business operators. The appendices include basic templates to aid with hygiene planning and assessment.

5 - Designing a hygiene schedule

Food business operators designing their first hygiene schedules are recommended to consult experts for assistance, e.g. chemical suppliers, trade associations, equipment suppliers and regulatory officials.

The following sections present issues to consider when designing a hygiene schedule.

Information about active substance(s) in cleaning agents, sanitisers and disinfectants

Material Safety Data Sheets (MSDS) must be supplied covering information on substances being used, e.g. stability and reactivity properties, toxicological information, personal protective equipment (PPE), disposal / waste handling, transport information and regulatory status.

Cleaning agent / sanitisers / disinfectants specification

Relevant points to consider:

- Registration under relevant legislation;
- Applications e.g. sink sanitiser;
- Suitability for various equipment surfaces, e.g. staining and corrosion information;
- Chemical interactions;
- Effective pH and temperature ranges;
- Claims, e.g. efficacy against microorganisms, efficacy of biofilm removal, etc.
- Directions for use, e.g. surface visually clean, dilution;
- Concentration of active;
- Recommended contact time;
- Storage, e.g. to minimise chlorate build-up;
- Shelf life and stability;
- Suitability with respect to various surface materials;
- Organoleptic effects on product, e.g. taste;
- Component traceability;
- Third party endorsements / verifications, e.g. field trial data.

Table 1 gives an overview of commonly used chemicals for cleaning and disinfection.

Table 1: Examples of the types of cleaning agents, sanitisers and disinfectants used in food production (Ref 1)

Purpose	Chemical
Environmental chemicals used in cleaning and disinfection:	Quaternary Ammonium Compounds
	Iodophors
	Chlorine based agents
	Peracetic acid
	Hydrogen peroxide
Hand chemicals used in cleaning and disinfection:	Quaternary Ammonium Compounds (Quats or QACs)
	Iodophors
	Chlorohexidine
	Polyhexamethylene biguanide
	Parachlorometaxylenol
	Triclosan
	Hydrogen peroxide
Carcass chemicals used in cleaning and disinfection:	Hypochlorite
	Chlorate (source of chlorine dioxide)
	Organic Acids

Water treatment chemicals used in cleaning and disinfection:	Chlorine Chlorine dioxide Mono chloramine Ozone

Storage instructions

Storage of cleaning agents, sanitisers and disinfectants can significantly affect their end use or efficacy.

Some regulatory bodies require defined physical and chemical parameters to be monitored and recorded prior to use.

All cleaning chemicals must be kept in their original containers and must never be mixed with other chemicals, even if they are the same chemicals, in order to avoid unintended contamination.

Cleaning chemicals must be stored at appropriate or recommended temperatures in well ventilated areas away from heating, ventilation, and air conditioning intake vents; this helps preventing any fumes from spreading to other areas of the facility.

Storage must be under supplier's specified conditions and in compliance with local regulatory requirements.

First In First Out (FIFO) principles must be followed for use of product batches.

Instructions to minimise by-product build-up

In general, cleaning agents, sanitisers and disinfectants can react with other chemicals in the water, leading to unwanted by-products. The table below of known by-products from commonly known disinfectants also used in food facilities is reproduced from the Guidelines for Safe Recreational Water Environments (http://www.who.int/water_sanitation_health/bathing/srwe2chap4.pdf).

Table 2: Known by-products from commonly known disinfectants also used in food facilities (Ref 3)

Disinfectant	Disinfection by-products
Chlorine/hypochlorite	Trihalomethanes Haloacetic acids Haloacetonitriles Haloketones Chloral hydrate (trichloroacetaldehyde) Choropicrin (trichloronitromethane) Cyanogen chloride Chlorate Chloramines
Ozone	Bromate Aldehydes Ketones Ketoacids Carboxylic acids Bromoform Brominated acetic acids
Chlorine dioxide	Chlorites Chlorate

	Trihalomethanes, mainly bromoform
Bromine/hypochlorite	Bromal hydrate
BCDMH	Bromate
	Bromamines

By-products might be a food safety issue and must therefore be avoided or minimised by following storage recommendations from suppliers. See below for a practical example:

Limiting chlorate contamination

This is currently a hot and challenging topic for many food business operators. Here is a summary of the recommended practices to minimise chlorate build-up during storage of sodium hypochlorite (NaOCl):

- Follow supplier storage directions
- Store correctly:
  - In the dark;
  - In a cool area (degradation to chlorate is very limited at 5°C in the absence of heavy metal contamination. Every 10°C increase multiplies the degradation rate 3 to 4 times);
  - Note degradation is increased when the initial solution is more concentrated (at 20°C 12.5% solution degrades to 10% in 100 days);
  - Store in UPVC reinforced with glass fibre reinforced polymer (GRP) resin or a full post-cured vinylester GRP laminate;
- Do not add new NaOCl to old as this promotes chlorate formation.

Physical separation of chemicals

Cleaning agents, sanitisers and disinfectants are not intended to come in direct contact with food products. Issues to take into consideration are:

- Physical separation of chemicals from food products and process equipment as part of GMP to avoid contamination;
- Following suppliers' guidelines regarding best storage / separation practices for chemicals to avoid unintended reactions between chemicals, e.g. oxidising agents, chlorinated chemicals and acids.

General usage instructions for cleaning agents, sanitisers and disinfectants

The recommendation is to follow the chemical supplier's usage instructions for the product. Local regulatory requirements must also and always be complied with.

Cleaning, sanitising or disinfection should be aligned to prerequisite programs / HACCP-based risk assessments. Cleaning, sanitising or disinfection processes must be managed so they do not compromise the safety of product, e.g. in a multi-line production area, or in relation to product changeover.

A dirty surface cannot be sanitised or disinfected effectively as the biocidal active substance(s) is hindered from coming into

contact with microorganisms trapped in and under soil. Extraneous organic material also dilutes and neutralises biocides before they are applied to surfaces. Neither large quantities of sanitisers and disinfectants nor high-pressure application can replace effective and thorough pre-disinfection cleaning.

Effective cleaning must therefore be carried out before applying a sanitiser or disinfectant to allow an effective reduction in the number of microorganisms.

There should be a pre-determined sequence of cleaning, sanitising or disinfection. The following sections give guidance and basic considerations for developing cleaning, sanitising or disinfection procedures.

In the below table is an example of recommended frequency of cleaning and sanitation activities.

Table 3: Example of recommended frequency of cleaning and sanitation

Areas identified	**Recommended minimum frequency**		
	Daily /or after operation	**Weekly**	**Monthly**
General areas			
Floor and wall next to preparation area	✓		
Doors		✓	
Windows, ceiling, overhead fixtures (e.g. lighting covers and fans)			✓
Production areas			
Food processing equipment (1)	✓		
Food containers and utensils (1)	✓		
Food preparation table (1)	✓		
Sinks, taps, gullies (2) and drains	✓		
Exhaust hood, flue and ventilation systems			✓
Personnel hygiene facilities			
Hand-washing sink and surrounding areas	✓		
Toilets (1)	✓		
Storage areas			
Refrigerator/chiller/freezer units and dry storage area, which includes: - Floors and wall - Food containers - Pallet - Racks - Interior and exterior refrigeration fans			✓
Delivery transport			
Interior cabin of delivery truck	✓		
(1) Requires sanitising after cleaning; (2) Grease traps are to be maintained regularly by engaging licensed/authorised general waste collectors.			

Cleaning process

The cleaning process usually consists of the following steps:

- Remove gross debris from surfaces;
- Apply detergent to loosen soil and microorganisms and hold them in solution or suspension;
- Rinse with water to remove loosened soil and traces of detergent;
- Dry clean or apply other appropriate methods for removing debris;
- Where necessary, sanitise or disinfect.

The choice of detergent depends on the type of soil, age of soil, water hardness, the temperature of the method, the types of surfaces and safety. In general:

- Alkaline detergents are used for the removal of organic soils, while
- Acidic detergents are used on inorganic soils.

Detergent suppliers usually have a range of options for various specific circumstances.

Rinsing is carried out if appropriate to the cleaning method (e.g. CIP, COP, Wet Manual etc.). Rinsing removes soil and detergent traces from equipment surfaces.

Once cleaning has been completed, sanitising or disinfection can be carried out using chemicals appropriate to the type of surface material. For example, caustic products are corrosive to soft metals (e.g. aluminium). The supplier's recommendations may be checked regarding the suitability of chemicals for the type of materials used in the production facilities to clean.

Sanitising or disinfection processes

The sanitising or disinfection process usually consists of the following steps:

- Dilute as per supplier's instructions. If sanitiser or disinfectant is stored after it has been diluted it may not be fully effective owing to its chemical instability. Follow all instructions on product label.
- Apply the sanitiser or disinfectant to food contact surfaces and surfaces where there could be contamination with food (e.g. food splash area, equipment handle), in accordance with instructions, starting at the highest point and working downwards;
- Leave the sanitiser or disinfectant on surfaces for as long as indicated in the supplier's instructions and in compliance with local regulations.

The choice of most appropriate sanitiser or disinfectant depends on the effectiveness and safety precautions, such as: targeted microorganisms, water quality, equipment surface materials, application temperature / time, environmental considerations, associated food label claims and workers' safety.

Cleaning agent, sanitiser and disinfection suppliers usually have a range of options for various and specific circumstances. Advice should always be sought from them.

6 - Hand hygiene

Microorganisms are removed from hands by effective washing and drying.

Sanitising / disinfecting may be required by authorities as an additional precaution, leading to reduced risk of transmission of microorganisms from the operator's hands to foods and food contact surfaces, which could potentially cause critical food safety issues.

(1) For example, cleaning, disposing of waste and handling money
(2) For example, when switching between handling different types of raw materials (meat, vegetable etc.) and ready-to-eat products to prevent cross-contamination

Figure 2: Hand Hygiene Programme

Washing hands is an absolute must:

- When working with different types of food, for example with raw meat then with vegetables;
- After using the toilet;
- After blowing one's nose;
- After coughing and / or sneezing in one's hand;
- Before and after treating a wound;
- After handling waste;
- After performing cleaning activities;
- When re-entering the production area, for example after a break;
- Before putting gloves on.

Sanitising / disinfecting hands: When and how?

Sanitising / disinfecting hands is regarded as being effective when done after each hand wash.

Always consult the chemical supplier to select the correct chemicals to establish appropriate hand hygiene measures.

7 - Minimising traces

of cleaning agents, sanitisers and disinfectants on food contact surfaces

Potential traces of cleaning agents, sanitisers and disinfectants in food are dependent on the levels of cleaning agents, sanitisers or disinfectants on the surface, the effectiveness of removal techniques after treatment and the surface area to volume ratio of the food in contact with the surface.

The areas with the greatest potential to transfer traces of cleaning agents, sanitisers or disinfectants include those with a high ratio of surface area to volume of food, surfaces with crevices and cracks and difficult to reach areas. For example, meat slicers or mincers will be more likely lead to higher traces of cleaning agents, sanitisers or disinfectants in food.

Basic considerations are:

- Assess and justify the need for validation and verification of cleaning, sanitising or disinfection processes;
- Assess and justify the need for monitoring food for traces of cleaning agents, sanitisers and disinfectants;
- If needed, implement a monitoring programme with easy and simple measurable acceptance limits (e.g. pH measurements) and define corrective actions and preventive controls.

Control measure principles

Below are some measures to minimise the potential presence of traces cleaning agents, sanitisers and disinfectants on those surfaces requiring extra attention:

- Inspect treated equipment / utensil surfaces to determine whether the amount of any traces of chemicals used in cleaning, sanitising and disinfection are at the appropriate level. When cleaning includes a rinsing step, this is a very important control measure which needs to be properly validated and verified (see sections 10 and 11);
- Use lower concentrations coupled with longer contact time if sanitiser or disinfectant can be left overnight on production equipment. Consult the chemical supplier, MSDS and instructions if considering this option;
- Only apply detergent, sanitiser and disinfectant as per the product instructions and consult with the chemical supplier if necessary to ensure product suitability for the planned application;
- For larger sites with limited food product ranges, undertake the risk assessment of discarding the first few items off the production line after cleaning;
- Rinse or wipe sanitiser or disinfectant after use. This can substantially reduce traces on the surface. However, rinsing will introduce water into the production area, and increased risk of Listeria monocytogenes, thus potentially compromising hygiene and food safety. Consult the chemical supplier, MSDS and instructions if considering this option;
- Sanitise or disinfect smaller items in a dishwasher if practical to do so. Such sanitising or disinfection processes need to be validated, verified and monitored;
- Follow a validated cleaning, sanitising / disinfecting process that ensures compliance with any regulatory residue limits.

Chemicals used in cleaning, sanitising or disinfection for which no legal residue limit currently exists should be used appropriately, with a view to assuring food hygiene and safety whilst minimising risks.

It is important to note that the most suitable control measure for one food business might not be the same as that for another. For example, some food production facilities are intentionally dry, for which rinsing would be inappropriate. Similarly, the use of water in high risk / care food production facilities should be restricted to minimise the risk for Listeria monocytogenes and ensure food hygiene and safety.

'Volume 2: cleaning agents, sanitisers and disinfectants in food businesses: detection of traces and human risk assessment processes' contains a more advanced and detailed description of how to make a formal risk assessment of critical chemical traces.

8 - Verification and monitoring

Verification is the activity that confirms that the food safety management system, e.g. HACCP plan is being followed. If the HACCP plan is designed correctly, adherence to it will result in safe food.

Monitoring methods may include:

- Visual inspection;
- Microbiological swabs;
- In process / finished product testing;
- Microbiological checks of rinse water;
- Hygiene / housekeeping audits.

Verification activities vary with the type of product and processes; they may include:

- Ensuring that the prerequisites are under control, e.g. the cleaning procedure with specified chemicals and conditions is adhered to;
- Ensuring that the personnel carrying out the verification activities have the appropriate qualifications, training and experience, i.e. they are competent to undertake the verification activity;
- Checking the efficiency of cleaning (including final rinse steps) and sanitation or disinfection, including verifying and formally recording at routine intervals (see Appendices for examples of hygiene recording templates).

The frequency of verification should be based on a risk assessment, e.g. every time for critical processes (e.g. a wet process with rinsing steps) and high-risk food (infant formula), and less frequently for dry processes.

Corrective action must be carried out as and when required to improve cleaning, sanitising or disinfection results.

Possible causes of sanitising or disinfection failure include:

- Not following product instructions;
- Over-diluting sanitiser or disinfectant during pre-mixing or application;
- Incomplete or inadequate cleaning;
- Poor sanitiser or disinfectant penetration or coverage;
- Insufficient contact time on surfaces;
- Inadequate temperature and humidity while the sanitiser or disinfectant is being applied;

- Inactivation or neutralization of the sanitiser or disinfectant by traces of cleaning agents which were not adequately rinsed before the disinfectant was applied;
- Untrained personnel.

9 - Methodology for assessing the efficiency of cleaning, sanitising or disinfection processes and presence of traces in food products

For some food, e.g. infant formula, vegetarian dishes, non-pork meat products or products with allergen free claims, it might be necessary to make a formal and documented validation of cleaning, sanitising or disinfection processes. The validation must demonstrate that the cleaning, sanitising or disinfection processes consistently remove or reduce potential contamination to an acceptable level from:

- Residual products, microorganisms, allergens and soil;
- Traces of chemicals from cleaning, sanitising or disinfection.

In these cases it is recommended to follow general recognised guidelines such as the 'EHEDG Guideline, Cleaning Validation in the Food Industry — General Principles' (April 2016), https://www.ehedg.org/fileadmin/guidelines/DOC_45_E_2016.pdf .

Other useful information can be found in 'Biocides in Cleaning and Disinfection — Working Document, Food & Biocides Industry Group' (October 2016), https://www.chilledfood.org/wp-content/uploads/2018/08/Biocides-Cleaning-and-Disinfection-working-document-industry-guidance-18-10-16-with-updated-best-practice-example-FBIG-logo-in-progress.pdf.

10 - Waste water handling

The food business operator must ensure safe and efficient removal of waste water from the cleaning and disinfection processes.

Basic considerations are:

- Local regulatory requirements;
- Potentially required permission to drain waste water from cleaning and disinfection processes into the public sewerage systems;
- Waste water compliance with local regulatory requirements and approvals at any time;
- Advice from chemical suppliers on proper disposal methods for cleaning and sanitising chemicals and disinfectants.

11 - Chemical disposal

Waste from cleaning agents, sanitisers and disinfectants must be disposed of safely.

Basic considerations are:

- Supplier guidelines;
- Any regulatory requirements for the disposal of chemical containers and / or expired products.

12 - Training

Employees responsible for cleaning must be trained in the correct operation of hygiene schedules and the correct use of cleaning and sanitising chemicals and disinfectants.

The training programme should as minimum cover the following two topics:

- Health & Safety:
  - Appropriate health and safety procedures;
  - Personal protective equipment usage;
  - Storage and handling of detergents, sanitisers and disinfectants;
  - Specifications of those chemicals.
- Cleaning, sanitising or disinfection processes:
  - Background, purpose and appropriate use of chemicals in cleaning, sanitising or disinfection programmes;
  - Review of in-house specific cleaning, sanitising or disinfection processes / procedures;
  - Supervised practical training in specific cleaning, sanitising or disinfection processes including documentation for work carried out, e.g. batch record and log books.

The training must be documented; training documents can be provided by a reputable supplier of cleaning chemicals.

Glossary

Biocide	Disinfectant or sanitising compounds, including: water disinfectants.
Cleaning	The removal of food residues, dirt, grease and other objectionable matter (Codex).
Cleaning agent	Product to clean.
Detergent	A chemical found in cleaning agents.
Disinfectant	A chemical to reduce bacteria to an acceptable level.
Disinfection	The reduction of the number of microorganisms in the environment to a level that does not compromise food safety or suitability (Codex).
Food	Raw, cooked or processed edible substance, ice, beverage or ingredient used or intended for use or for sale in whole or part for human consumption (based on FDA food group definition).
Hygiene schedule	Documentation of procedures appropriate for dismantling or clean-in-place, cleaning and decontaminating (including methods, dosages and chemicals), the frequency of use or equipment and the monitoring procedures to assure compliance with hygiene requirements. The schedule includes in-plant environmental screening and documentation for personnel hygiene systems.
Microbial resistance	The development of tolerant populations through adaptation or selection that compromises the effectiveness of cleaning and / or disinfection.
Residue	Refer to definition in relevant regulation.
Sanitiser	A mix of detergent and disinfectant or a disinfectant.
Trace	Low levels of chemicals present in food but not intentionally added.

Appendices

Advisory note: these templates are examples of good practice, but it is essential that they are re-worked so they are specific to the facilities where they are used. It is particularly important that any instructions, forms or schedules accurately reflect workplace methods, equipment and practices.

Template 1 Cleaning, sanitising or disinfection after operation

Template 2 Cleaning during operation

Template 3 Deep cleaning

Template 4 Cleaning, sanitising or disinfection of special items/areas

Template 5 Cleaning frequencies and cleanliness thoroughness

Template 6 Cleaning, sanitising or disinfection directory

Template 7 Visual cleanliness inspection planning

Template 8 Visual monitoring verification

Template 9 Microbiological monitoring planning

Template 10 Microbiological monitoring verification

TEMPLATE 1: CLEANING, SANITISING OR DISINFECTION AFTER PRODUCTION

Approved, date. ___.___.-___, _____(plant rep)

date. ___.___.-___, _____(control official)

Room area	Hygiene area
Operative	
Precleaning	
Disassembly of machinery	
Pre-rinse	
Washing	
Settling time	
Sanitising or disinfection	
Rinsing	
Removal of protective covers and sanitising or disinfection of protected items	
Drying	

Completion instructions:

The form is used to describe in as much detail as possible, what is to be cleaned and disinfected, how and using what tools, as well as indicating who does the cleaning and disinfection.

TEMPLATE 2: CLEANING, SANITISING OR DISINFECTION DURING PRODUCTION

Approved, date. ___.___.-___, _____(plant rep)

date. ___.___.-___, _____(control official)

Room area	**Hygiene area**
During production	
During a break	
In special circumstances	

Completion instructions:

The form is used to describe in as much detail as possible, what is to be cleaned and disinfected, how and using what tools, as well as indicating who does the cleaning and disinfection.

TEMPLATE 3: DEEP CLEANING

Approved, date. ___.___.-___, _____(plant rep)

date. ___.___.-___, _____(control official)

Room area	Hygiene area
Operative	
Prewash	
Disassembly of machinery, and the cleaning and protection of objects that cannot withstand washing	
Pre-rinsing	
Washing	
Rinsing	
Settling time	
Disinfection **Hot handling**	
Rinsing	
Removal of protective covers and sanitising or disinfection of objects that cannot withstand washing **Description**	

Completion instructions:

The form is used to describe in as much detail as possible, what is to be cleaned and disinfected, how and using what tools, as well as indicating who does the cleaning and disinfection.

TEMPLATE 4: CLEANING, SANITISING OR DISINFECTION OF SPECIAL ITEMS/AREAS

Approved, Date. ___.___.-___, _____(plant rep)

Date. ___.___.-___, _____(control authority)

Factory area:
Cleaning, sanitising or disinfection of special items/areas: -
-
-

Completion instructions:

The form is used to describe in as much detail as possible, what is to be cleaned and sanitised or disinfected, how and using what tools, as well as indicating who does the cleaning and disinfection.

Special items/areas are, for example: waste containers, cold areas, cold plant/equipment, ventilation system openings, pipes, electrical equipment, the surroundings of electrical switches and transport vehicles.

APPENDIX 5: CLEANING FREQUENCIES AND CLEANING EFFICACY

Approved, date. ___.___.-___, _____(plant rep)

date. ___.___.-__,_____(control authority)

Room	(Hygiene area)	Cleaning efficiency and frequency Ordinary	Deep cleaning
Walls: Lower portions			
Upper portions			
Doors			
Ceilings			
Upper constructions (list)			
-Roof beams/struts			
-Electric leads			
-Supporting pillars			
Windows			
Floors			
Stands			
Staircases			
Cupboards			
Surfaces (list)			
-			
-			
Equipment/plant (list)			
-			
-			
-			
Tools (list)			
-			
-			
-			
-			
Special items/areas (list)			
-			
-			
-			
-			
Others			
-			
-			
-			

Completion instructions:

The description of cleaning and sanitising or disinfection must be made for each room. In this description 'room' means a single room or a room group that can be cleaned in the same way.

Work surfaces, equipment and tools in the room are to be listed.

Cleaning frequencies (once a day, as required, weekly, twice yearly) are specified for production area construction, equipment, tools and special items/areas according to their particular requirements.

Cleaning frequencies for ordinary cleaning and deep cleaning are specified (for example after production, during breaks in production, May and December).

Special items/areas are, for example: waste containers, cold/chilled areas, ventilation system openings, pipes, electrical equipment, the area surrounding fuse boxes, electrical switches and transport vehicles.

TEMPLATE 6: DIRECTORY OF DETERGENTS, SANITISERS OR DISINFECTANTS

Approved, Date___.___.-___, _____(plant rep)

Date ___.___.-___, _____(official authority)

Detergent, sanitiser or disinfectant	Usage

Completion instructions:

List all cleaning agents, sanitisers or disinfectants used by the company. Indicate where chemical is used and for what purpose.

TEMPLATE 7: PLANNING OF THE INSPECTION OF VISUAL CLEANLINESS

Approved, Date ___.___.-___, _____(plant rep)

Date ___.___.-___, _____(official authority)

Room area	**(Hygiene area)**	**Inspection prior to commencement of production**	**Inspection,** **Time**	**Inspection,** **Time**
Walls: Lower portion				
Upper portion				
Doors				
Ceilings				
Upper constructions (listing)				
- Roof beams/struts				
- Electric leads				
- Supporting pillars				
Windows				
Floors				
Staircases				
Cupboards				
Surfaces (list)				
-				
-				
-				
-				
-				
Equipment/plant (list)				
-				

-			
-			
-			
-			
Tools (list)			
-			
-			
-			
-			
-			
Special items/areas (list)			
-			
-			
-			
-			
Others			
-			
-			
-			

Completion instructions:

Surfaces washed daily are to be inspected on a daily basis before commencement of production.

Less frequently cleaned surfaces, equipment and tools are to be inspected in accordance with a planned programme. Please ensure that any items listed here are a true reflection of what is used and in place.

TEMPLATE 8: VERIFICATION OF VISUAL CLEANLINESS

Approved, Date. ___.___.-___, _____(plant rep)

Date ___.___.-___, _____(official authority)

Date. ___.__ time___ Operative _____

Room area	**(Hygiene area)**	**Cleanliness rating**	**Corrective action**	**Corrective action completed (operative and time)**	**Approved (operative and time)**
Walls: Upper					
Lower					
Doors					
Ceilings					
Upper constructions (list)					
- Roof beams/struts					
- Electric leads					
- Supporting pillars					
Windows					
Floors					
Stairs					
Cupboards					
Surfaces (list)					
-					
-					
-					
Equipment/plant (list)					
-					
-					

-					
Tools (list)					
-					
-					
-					
Special items/areas (list)					
-					
-					
Others					

Completion Instructions:

Checking visual cleanliness applies to a room area (one room or room group) buildings, equipment, tools and special equipment/plants.

Corrective actions:

1. *Clean again immediately*
2. *Clean at a specified (noted) time*
3. *Clean in combination with deep cleaning*
4. *Remove (work or broken, can no longer be cleaned)*
5. *Modify cleaning programme*

The operative checking visual cleanliness, the operative carrying out corrective actions and the person approving corrective actions are to initial and date the form.

You also may use other systems of verification, for example ATP testing on some critical areas to check that disinfection has been carried out, as this cannot be determined by visual checking.

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