Safefood 360°

Safefood 360 provides food safety management software for industry leading food processing plants

WHITEPAPER

Cleaning and Disinfection in Food Processing Operations

CONTENTS

QUICK SUMMARY

Those responsible for the management of cleaning and disinfection in a food processing operation often do not fully understand the reasons for plant hygiene or the scientific principles and technology behind effective cleaning. This is essential in order to comply with legal and technical standards and ensure food hazards are controlled.

This whitepaper deals with the essential knowledge required for effective cleaning programs within a food processing operation including reasons for cleaning, the chemistry, principles of disinfection, equipment and methods, GFSI requirements and monitoring of hygiene.

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1 REASONS FOR CLEANING & DISINFECTING

Food safety management systems often place HACCP at the centre of control for specific food hazards. This makes sense particularly where a specific hazard linked to adverse impacts for the consumer can be identified. However, no matter how robust the HACCP system may be it requires a sound program of basic controls that address general hazards, many of which may not be identified. These programs are described as Good Manufacturing Practices (GMP), Pre-requisite Programs (PRP) and Control Points (CP) to name a few. Regardless of the term used they all represent the basic requirement for good practice to provide a safe environment for the manufacture of food. Among the most important of these is the need to clean and sanitize your plant and equipment sufficient to produce food free of physical, allergenic, chemical and microbiological hazards. In addition, it is important that employees understand the reasons why a food plant must be cleaned. Simply instructing people is seldom enough to maintain high standards – they must also understand the reasons why, including:

- To reduce the risks from food hazards – food poisoning and foreign body contamination
- To comply with local and international legislation
- To meet specific customer requirements, e.g. Tesco
- To meet the requirements of global food safety standards (GFSI)
- To maintain positive audit and inspection outcomes
- To allow maximum plant productivity
- To present a hygienic visual image
- To promote safe working conditions for staff, contractors and visitors
- To maintain product shelf-life
- To avoid pest infestation

At the most basic level, the visual appearance of a food factory is an indication of the standards and culture of the company. It has a strong impact on the perception of an auditor or visitor and can influence the overall outcome of audits and securing new business. For this reason, the visual cleanliness of a company is as important as detailed HACCP plans.

Cleaning costs money. It is often perceived as a necessary evil which does not add value to a product directly. The cost of cleaning and indeed the cost of not cleaning are seldom measured routinely by food companies. The typical cost elements of a cleaning programme include:

- Labor and supervision
- Water supply, treatment and purchase
- Water heating
- Cleaning equipment
- Chemicals
- Corrosion
- Monitoring
- Effluent
- Downtime

Of these, labor is normally the biggest factor accounting for over 60% of the total cleaning budget whether resourced under contract or in-house. When cost pressures come to bare usually labor is normally cut back. While this may save money in the short term, over time it will lead to a number of indirect costs including a reduction in shelf life, increase in product complaints, recalls, regulatory restriction and a loss of business. The viability of the business will ultimately be impacted. The next most significant costs are water and chemicals which can vary depending on the source and supplier. In this paper we will cover some of the factors impacting on cleaning and associated costs.

2 CLEANING

Cleaning is a physio-chemical process involving a number of factors.

2.1 Soil

In food processing operations soils and deposits originate from the ingredients used in the preparation of the product. These soils include the following:

Soil	Description
Fats, oils & greases	These are triglycerides of fatty acids and vary from waxy solids to liquids. They are insoluble in water and can change when exposed to air and may oxidise and polymerise to become harder and more closely bonded to the surface. Exposure to high temperature may cause fats to carbonise. Fatty deposits can be recognised by their greasy feel and repellent properties.
Proteins	These are complex large molecules that are normally too large to dissolve in water. They have a specific shape that may change when exposed to high temperatures, a process known as denaturation usually making them harder and more insoluble. This property is important in the temperature of water used to remove protein deposits. Aged protein deposits can be difficult to remove. Many allergens are proteins.
Carbohydrates and starches	These are large molecules which may be insoluble especially after exposure to heat. They are usually derived from plants. Carbohydrate deposits can vary from soft powdery to quite hard.
Lime scale	From water drips and leaks or in hot water tanks, cookers, etc.
Rubber marks	From fork lift trucks
Corrosion deposits	Found on metals such as steel, zinc, aluminium, brass
Adhesives	From label application processes
Inks & dyes	From ink jet coders and packaging processes
Algae	Found in moist areas especially where high levels of condensation are present
Fungi	Found in moist areas especially near chills and freezers and silicon sealants

Not all the deposits mentioned pose a serious risk; however, all create a poor visual appearance. Some act as an excellent substrate for absorbing other soils and micro-organisms. The key point is that each is chemically different and requires different cleaning methods. Therefore, it is important

to identify the typical soils present and design your program accordingly.

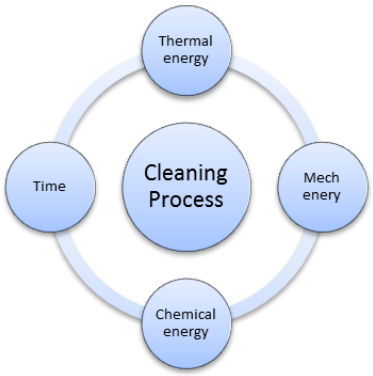
2.2 Substrate

The substrate is the materials of construction found in food processing plants. The standard of materials can vary with their ease of cleaning and resistance to corrosion with chemicals. The ideal material standard is smooth, non-porous, abrasion resistant and inert.

Substrate	Description
Stainless Steel	A high grade is best. In cheaper forms there is a tendency to pitting corrosion in the presence of chlorine.
Zinc and Aluminium	Used as a coating on steel; both can often be found in food plants and may cause problems as they are easily attached by strong alkalis and acids. Problems encountered include corrosion, brittleness and poor surfaces for cleaning.
Concrete	May become porous and cracked and easily attached by acids.
Mild Steel	This material will rust in many food environments and should be avoided.
Paints	This includes various coatings and can vary in their level of resistance to chemicals and pressure washers. Flaking can present a risk of product contamination.
Plastics and Rubbers	Can vary in their resistance to chemicals and products. They can become brittle on contact with heat, light and chlorine. They can act as a host to moulds and fungi.

When selecting surface materials, you should ensure they are compatible with the chemical and physical production environment. Prevention of product contamination risks should always be considered when reviewing the specification of materials.

2.3 Cleaning Energies



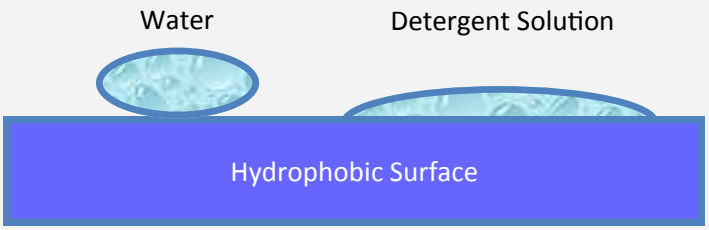
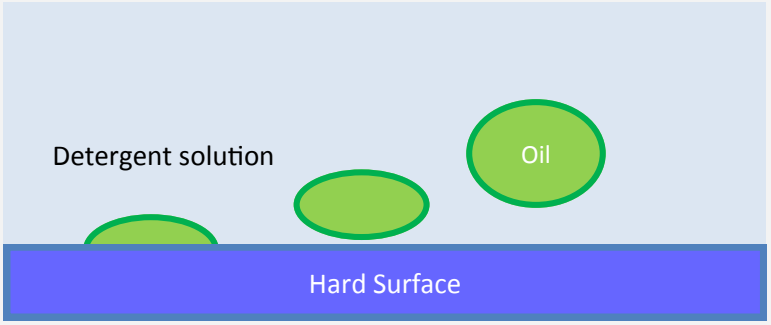
Energy is the core driver behind all cleaning processes. This energy is normally made up of a combination of factors as seen in the illustration.

It is the interaction of the above factors that determine the effectiveness and rate of the cleaning method. Often the aim is to obtain a balance consistent with cost, efficacy and food safety. This is where a knowledgeable chemical supplier can assist in the development of effective cleaning regimes.

Factors	Description
Thermal energy	This is usually in the form of hot water or steam. In general terms an increase of 10ºC in a detergent solution doubles the rate of the chemical reactions involved in cleaning.
Mechanical energy	This can come in the form of brushes, water jets, and turbulent flow in pipes (CIP). A flow rate of about 2 meters/second is needed to create a turbulent flow.
Chemical energy	Depends on the nature and concentration of the detergents used in the cleaning process.
Time	The time required for cleaning can vary depending on the method applied. Soaking can take hours while operations such as machine washing can take seconds.

2.4 Chemical and Physical Reactions of Cleaning

Detergency involves many reactions both physical and chemical. The main physical reactions are:

Physical Reaction	Description
Wetting	This is the displacement of one fluid from a solid surface by another. The displaced fluid may be air or some liquid or semi-liquid such as grease. In the case of cleaning, the fluid displacing it is usually water or a detergent solution. Water is seldom enough for wetting particularly on water resistant or 'hydrophobic' materials. A lack of wetting prevents effective cleaning. Surfactants are normally used for wetting. These are organic molecules with a different charge at each end. One end is hydrophobic and attracts water while the other end attracts oils. Wetting of hydrophobic surfaces: 
Penetration	This is the action which follows wetting where the other agents in the detergent can get to work.
Emulsification	Emulsions are suspensions of small droplets of one fluid in another. Milk is an emulsion of oil (milk fats) in water stabilised by other molecules in the milk. Fats, oils and greases will not naturally disperse in water. First the oil needs to be released from the surface it is resting on. Wetting is the first stage as the detergent undermines the oil-surface attraction and starts displacing the oil into droplets. The process is accelerated at higher temperatures. The droplets will combine together and eventually redeposit. To prevent this surfactants are employed to coat the droplet surface and stabilise the emulsion. 
Dispersion	Similar to emulsification except it involves the breaking up and suspension of solid particles rather than fluid droplets.
Solubilisation	This is taking up of soil components into a true solution (rather than emulsification or dispersion). This may relate to water soluble soils.

The main chemical reactions include:

Chemical Reactions	Description
Hydrolysis	This relates to proteins and carbohydrates. These large molecules are made up of small sub-units (peptides and amino acids in the case of proteins). Hydrolysis involves splitting the molecule at the joints into its smaller units and thereby releasing smaller water soluble molecules. It takes place most rapidly at extreme pH, and alkalis and acids are used for this purpose.
Saponification	This relates to fats, oils and greases. It is a particular kind of hydrolysis where an alkali reacts with triglyceride fat molecules, splitting it in three places to produce glycerol and soap both of which are water soluble.
Chelation	This relates to insoluble metal ions such as calcium, magnesium and iron. These may form scales and provide sites for the accumulation of soil deposits. Chelates bond these ions in water soluble cages removing scale.
Oxidation	Some soils respond well to chlorine in the form of alkaline sodium hypochorite. Colour deposits may be bleached and some proteins or fat deposits may be broken down.

2.5 Detergents

The nature and complexity of the detergent employed depends on the variation of soils, water hardness, temperature of the method, plant surfaces and safety. Detergent suppliers normally have a range of detergents to be employed in varying and specific circumstances. The range of products will include:

- Alkalis: caustic soda, caustic potash, coronate, silicate, phosphate
- Acids: Phosphoric, nitric, citric, glycolic
- Chelates: EDTA, NTA, gluconate, glucoheptonate, citrate, polymeric
- Solvents: Isopropanol, propylene, butyl diglycol, ethers
- Surfactants: Anionic, cationic, non-ionic, amphoteric
- Inhibitors: Organic, inorganic
- Enzymes: protease, lipase, amylase
- Oxidising agents: hypochlorite, isocyanurates
- Stabilisers
- Viscosity modifiers

A detergent solution may contain between 2 and 15 components, blended carefully to specification. It is important to work with a good supplier to correctly identify the correct detergent for your operation. This will save money in the long term as cleaning will be more effective. The failure of a product to work is usually not due to a poor quality product but rather the wrong one. Application and use are also important factors and a good supplier will usually provide training in the correct use of the product.

A 'detergent' is designed to remove soils. Another term used is 'sanitizer' and is often used to describe similar products. However, a 'sanitizer' is usually used to refer to a product containing both a detergent and disinfectant. A 'disinfectant' is a product which kills microbes without employing a soil removal action.

3 DISINFECTION

3.1 Principles of Disinfection

Soil deposits can harbour potentially harmful (pathogenic) microorganisms which if left to grow can present a serious risk to the health of the consumer. In order to control this risk the soil must first be removed using an effective cleaning method, normally including a detergent as previously discussed. Typically the reduction achieved by cleaning is in the order of 3-4 logs per cm2. If the initial loading was 106 cm2 there will remain counts of 102-103 cm2 after cleaning. It is normally necessary to reduce the levels further to a few hundred and this is where the process of disinfection is used. It should be noted that sterilization, which is the elimination of all microorganisms is neither practical nor necessary in the disinfection of food plants.

3.2 Biocidal Effect

The group of chemicals known as disinfectants share many attributes with detergents but are different in terms of their function which is to kill microorganisms that are left on the surface after cleaning. The biocidal effect varies depending on the active component used in the disinfectant. It can be achieved by affecting the integrity of the cell wall or by interfering with critical metabolic reactions inside the cell. Most disinfectants are oxidizing and will react with organic materials including microorganisms. These particular disinfectants include chlorine, iodophors and peracetic acid. They are quick acting and broad spectrum. They are normally not stable in hot water and corrosive on a range of metals and other materials.

Non oxidising disinfectants are typically based on quaternary ammonium compounds which are a class of cationic surfactant, amphoterics, alcohols and aldehydes. They are usually heat stable, less corrosive and have a residual biocidal or biostatic effect.

3.3 Disinfectants – design and choice

The kill effect required from a disinfectant can vary for each microorganism and therefore it should be carefully formulated to ensure it is effective. Some may be ineffective at low temperatures and unsuitable for a chill. Well-designed disinfectants may employ several different biocidal components including surfactants and chelates to support the killing action. Disinfectants should be chosen in conjunction with the supplier, taking into account the surface materials, soils and the specific microorganisms to be controlled. Other considerations include the ambient and solution temperature and the time required.

Cleaning and disinfection may in some cases be combined into one operation using a sanitizer which has the action of both a detergent and a disinfectant. However, it is believed that the two stage approach is more consistent and effective than the single stage sanitizer approach. It is important that non scented chemicals are used in food operations due to the risk of taint.

4 HYGIENE EQUIPMENT AND APPLICATION METHODS

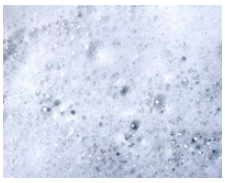
There are a number of methods which can be used to apply detergents and disinfectants.

4.1 Manual Cleaning

Manual cleaning using cloths, mops, brushes, pads, etc. It is normally used in small areas, equipment that is non-water proof or requires dismantling or areas which are difficult to clean by other methods. It is a labor intensive method and may limit the use of certain chemicals for safety reasons. To ensure cleaning is effective the method must be clearly defined and staff trained to an appropriate level.

4.2 Foam Cleaning

This is the common method for cleaning most food operations. A foam blanket, created using a wide range of available equipment is projected from a nozzle and allowed time to act on the soil. It is then rinsed off with the released deposits. Large areas such as floors, walls, conveyors, tables and well-designed production equipment are ideal for foam cleaning.



Foam is a carrier for the detergent. The foam should be applied in an even layer. Coverage rates are quick and chemical usage is economical. Your chemical supplier will advise on the most appropriate chemicals and equipment for your operation. The equipment itself may be mobile, centralised or satellite.

4.3 Spray

Spray cleaning uses a lance on a pressure washer with chemical induction by venturi. This method can be wasteful of chemical and can be slow to produce a foam. It should be used where foaming properties are not essential for the cleaning action.

4.4 Fogging

Aerial fogging uses compressed air or other equipment to generate a fine mist of disinfectant solution which hangs in the air long enough to disinfect airborne organisms. It will also settle on surfaces to produce a bactericidal effect. The system can come in a small portable device or built in automatic central systems. Fogging should never be used as a primary sanitising method. It should be used in conjunction with other methods. It is also important to ensure that coverage and saturation is sufficient and the mist is fine to allow proper action.

4.5 Machine Washing

This is normally an automatic or semi-automatic washing process conducted within a purpose built machine. There are many machine designs depending on the application, e.g. crate washing or utensil washing. They represent a significant capital investment and need to have a clear business case before purchasing. They tend to consume a large amount of chemicals and water. Failure to maintain them correctly can lead to a contamination risk to the product. Chemicals used in these machines should be low foaming. An effective system for controlling the dose of chemical should be employed and temperature control systems should be used where critical.

5 CLEANING IN PLACE (CIP)

CIP or cleaning in place is used extensively for the interior cleaning of pipes, vessels, tankers, heat exchanges, fillers and other enclosed process systems.

CIP involves a programed cycle including timed pre-rinse, cleaning and rinsing stages and can be fully automatic or semi-automatic with a system of valves, pumps and detergent tanks controlled by a microprocessor. There are a number of parameters that need to be specified and controlled for effective CIP.

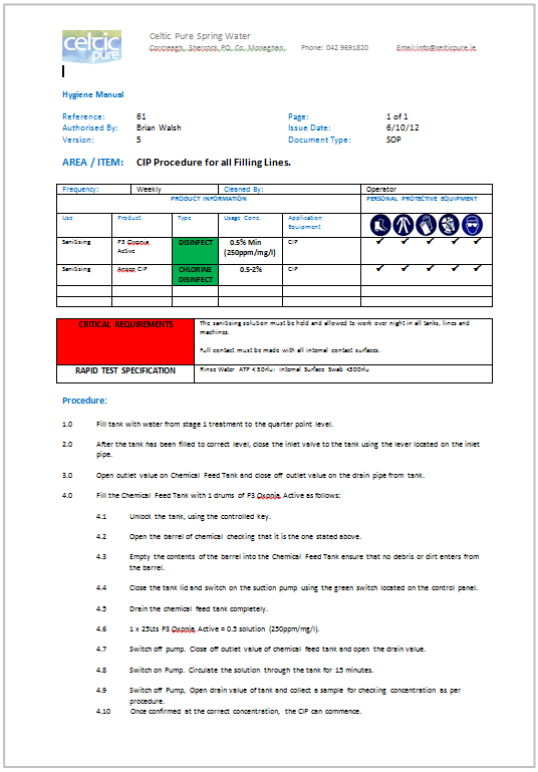
Parameter	Description
Flow velocity	In all parts of the system it should be sufficient to cause turbulent flow. This is around 1.5-2 meters per second. Below this laminar flow will occur which will not yield effective cleaning.
Spray pressure and pattern	Where spray balls and rotating jets are used in large tanks sufficient pressure should be used for full coverage. Typical pressures are 1-3 bar for low pressure systems and 6 bar for high pressure. Flow rates of about 2 times the vessel's volume per hour should be used.
Temperature	This impacts on the rate of chemical reaction. Typical temperatures can be around 85°C.
Detergent control	This is normally achieved through a conductivity meter and control system linked to an automatic dosing system.
Recycling	Required to manage costs and environmental impact. Solution recovery and reuse is ideal but must be controlled to avoid overloading of the solution and contamination risks.

6 CLEANING PROCEDURES

Cleaning is a complex process. To ensure it is conducted correctly a defined and systematic approach is required that takes into account a number of factors previously covered. This approach takes the form of a Procedure and this is usually a legal requirement in addition to a fundamental requirement of global food standards. A collection of these cleaning procedures forms a Cleaning Plan or Program which is plant specific. A typical cleaning procedure includes the following:

- Cleaning method
- Standards
- Frequency
- Chemicals used
- Equipment used
- Time and temperature specifications

Picture on the right displays a Sample Cleaning Procedure.



Celtic Pure Spring Water
Corraragh, Shercock, P.O. Co. Monaghan. Phone: 042 9691820 Email:info@celticpure.ie

Hygiene Manual

Reference:	61	Page:	1 of 1
Authorised By:	Brian Walsh	Issue Date:	6/10/12
Version:	5	Document Type:	SOP

AREA / ITEM: CIP Procedure for all Filling Lines.

Frequency:	Weekly	Cleaned By:			Operator
PRODUCT INFORMATION					PERSONAL PROTECTIVE EQUIPMENT
Use	Product	Type	Usage Conc.	Application Equipment	
Sanitising	P3 Oxonia Active	DISINFECT	0.5% Min (250ppm/mg/l)	CIP	✓ ✓ ✓ ✓ ✓
Sanitising	Acest CIP	CHLORINE DISINFECT	0.5-2%	CIP	✓ ✓ ✓ ✓ ✓

CRITICAL REQUIREMENTS	The sanitising solution must be held and allowed to work over night in all tanks, lines and machines. Full contact must be made with all internal contact surfaces.
RAPID TEST SPECIFICATION	Rinse Water ATP < 50rlu Internal Surface Swab <300rlu

Procedure:

1.0 Fill tank with water from stage 1 treatment to the quarter point level.

2.0 After the tank has been filled to correct level, close the inlet valve to the tank using the lever located on the inlet pipe.

3.0 Open outlet value on Chemical Feed Tank and close off outlet value on the drain pipe from tank.

4.0 Fill the Chemical Feed Tank with 1 drums of P3 Oxonia Active as follows:

4.1 Unlock the tank, using the controlled key.

4.2 Open the barrel of chemical checking that it is the one stated above.

4.3 Empty the contents of the barrel into the Chemical Feed Tank ensure that no debris or dirt enters from the barrel.

4.4 Close the tank lid and switch on the suction pump using the green switch located on the control panel.

4.5 Drain the chemical feed tank completely.

4.6 1 x 25Lts P3 Oxonia Active = 0.5 solution (250ppm/mg/l).

4.7 Switch off pump. Close off outlet value of chemical feed tank and open the drain value.

4.8 Switch on Pump. Circulate the solution through the tank for 15 minutes.

4.9 Switch off Pump, Open drain value of tank and collect a sample for checking concentration as per procedure.

4.10 Once confirmed at the correct concentration, the CIP can commence.

These procedures may be collected into a cleaning manual which should be available to those responsible for cleaning. The cleaning plan may also be summarised in a table and records should be maintained of all completed cleaning activities.

As previously discussed cleaning is a significant cost for food businesses. This may contribute to cleaners and managers combining or omitting individual steps in cleaning procedures. This should be avoided. Training of staff and commitment by management are essential to prevent this. The correct sequence of a general cleaning procedure for surfaces in a food plant is:

- Gross Clean/Preparation
- Pre-rinse
- Detergent application
- Post-rinsing
- Disinfection
- Terminal rinsing

Step	Description
Gross Clean/Preparation	This step is most often omitted by food companies. This prevents effective cleaning of plant surfaces due to food residues remaining. Negative impacts include: • Protection of surfaces and bacteria from the action of detergents • Reaction with and consumption of the detergent • Holding bacteria and resulting in recontamination of the surface A poor gross clean is the single biggest reason for poor or inconsistent bacterial counts on surfaces and for high bacterial contamination in aerosols caused by rinsing. A well designed cleaning procedure will provide for the removal of all food pieces greater than a fingernail before applying detergent. Ideally this should be done dry by hand, scrapping or other physical method. The collected material should be placed in waste receptacles and removed from the area. All ingredients, food and packaging materials should also be removed from the area prior to gross cleaning.
Pre-rinsing	The purpose of this step is to remove deposits which cannot be easily removed by picking, scrapping or other manual form of gross cleaning. Excess water should be removed following pre-rinsing to avoid dilution of the detergent in the following step.
Detergent Application	The purpose of the detergent is to remove the layers of proteins, greases and other food deposits that remain on surfaces. Detergents are not designed to remove large pieces of food deposits or thick layers of fat. It is in these layers that bacteria can survive and grow and make the use of a disinfectant pointless. Foam should be conducted carefully and methodically and there should be a check to ensure that all surfaces have been covered. Detergents should be made up and used according to the suppliers instructions and appropriate time should be allowed for the detergent to work.
Post Rinsing	The purpose of post rinsing is to remove the remaining food deposits. Care should be taken to minimise the amount of splash and aerosol formed which may re-contaminate surfaces. After post rinsing the surface should be free of all visible deposits, layers of soiling and residues of detergent. Any residues of detergent may neutralise the action of any subsequent disinfectant. Any pools or accumulations of water should be removed following post rinse.
Disinfection	Disinfection should only be carried out on a visually clean, well rinsed surface, with minimal amounts of water. Direct food contact surfaces should be disinfected at least daily with other surfaces disinfected on a regular basis. Disinfectants should be used safely according to the supplier's instructions.
Terminal Rinsing	Most disinfectants are safe to leave on non-food contact surfaces without final rinsing. In some sections of the food industry there is a requirement to rinse food contact surfaces with water after disinfection. The standard of the water is important to ensure that the disinfected surface is not re-contaminated.

7 VALIDATION OF CLEANING PROCEDURES

Once a cleaning procedure has been established it is essential that it is validated. This means answering the question – is the procedure as documented capable of controlling the identified hazards? This may include bacterial pathogens or allergens. The method of validating a cleaning procedure is as follows:

- Document the cleaning procedure as it actually exists. At this point you are not concerned with whether it meets specific requirements. This should be done on the job and in conjunction with those who perform the cleaning.
- Identify the general and specific hazards of concern, e.g. pathogens, allergens, etc.
- Identify the monitoring program, e.g. visual, ATP, chemical testing, etc. This will include the standard to be achieved and specific sampling points based on an assessment of risk.
- Conduct the cleaning program as documented a number of times and follow up with the monitoring checks.
- Confirm that the procedure as documented is capable of meeting the monitoring criteria.
- If the procedure is not capable, modify the cleaning method or correct the issue.
- Repeat the above process until the documented cleaning procedure is confirmed as capable of meeting the standard (verified) and approve the procedure.
- Conduct training of employees against the procedure and implement the monitoring program.
- Retain full records of the above data and process including your conclusions.

8 MONITORING OF HYGIENE (VERIFICATION)

Because it is often not possible to determine how 'clean' a surface is and given the number of factors that need to be correct to ensure standards are achieved it is essential that a monitoring program is in place and implemented at all times. A monitoring program is also important to make sure you are not 'over-cleaning' and therefore wasting time, energy and chemicals. In essence, a monitoring program provides verification that surfaces are in fact clean and addressing the identified hazards of a particular food plant.

A typical monitoring program may include one or more of the following:

- Visual inspection
- Microbiological testing
- Rapid testing

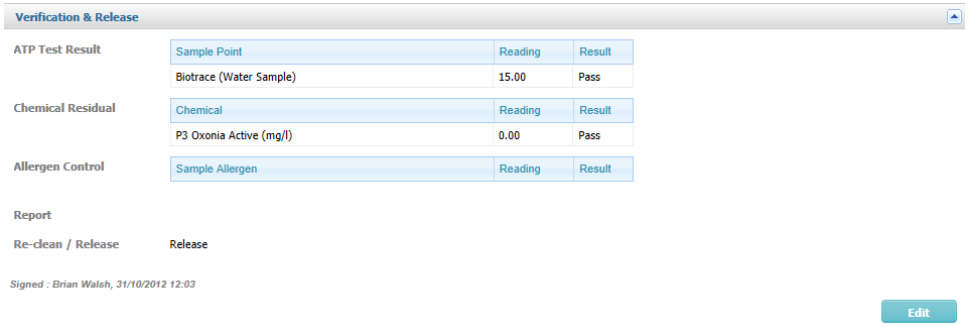
Your HACCP system will reveal specific areas in the operation which require control to ensure safe food production. A risk assessment of these areas will normally indicate that while they are not Critical Control Points (CCP's) they still require control and this is where the monitoring program is important. Once identified, you will need to develop a standard for cleaning which can then be measured and assessed. This will be based on the hazard that needs to be controlled.

Hazards may include:

Hazards	Description
Physical	Contamination from food deposits not removed due to poor cleaning. It may include accumulated chemical deposits such as water hardness.
Biological	Contamination from bacteria and other microorganisms which may survive and grow following poor cleaning and disinfection.
Allergens	Usually protein in nature and may cross-contaminate products due to poor product change over procedures. Particularly important for products with a 'free from' declaration.
Chemicals	Contamination from residual cleaning chemicals remaining from poor rinse steps.

A monitoring program may comprise one or more of the following checks:

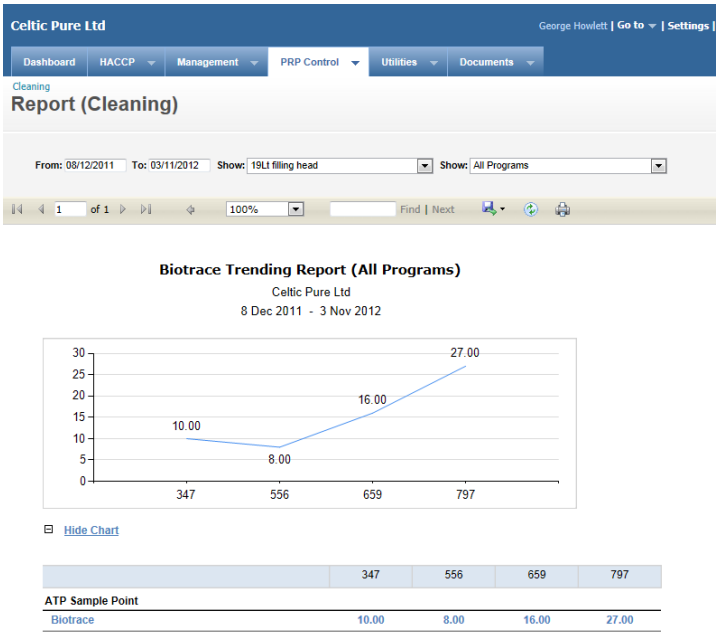
Monitoring Check	Description
Visual Assessment	Visual inspection should only be conducted by trained personnel who understand the procedures and standard to be achieved. If standards are not achieved a re-clean should be conducted. The check should include surfaces that are visible and hidden and focus on remaining food deposits.
Microbiological Testing	This may include traditional micro testing methods from surface swabs. This checking should be carried out on representative sample points that have been identified based on risk assessment. Swabbing may be conducted following cleaning and used for validating cleaning procedures. Micro testing can also be conducted on final product and on rinse water samples. This method has the advantage of measuring directly the viable microorganisms present but can take from 1 to 3 days to obtain results.
Rapid Testing	This includes ATP bioluminescence and allows for real time assessment of cleaning standards and is valuable for 'Go/No Go' regimes. It can be used to optimise cleaning methods and validation of procedures.
Specific Allergen Testing	This can be conducted using rapid testing which can be either general or specific. External laboratory testing may also be used.
Chemical Concentration	This may be checked using titration, test kits or conductivity meters.
Residual Chemicals	This may be checked by titration, pH and conductivity.



Picture: Verification & Release

Results should be reported to management and fed back to cleaning teams for remedial action. Data collected from monitoring programs should be trended to identify any emerging trends.

Picture: Sample Trending Report



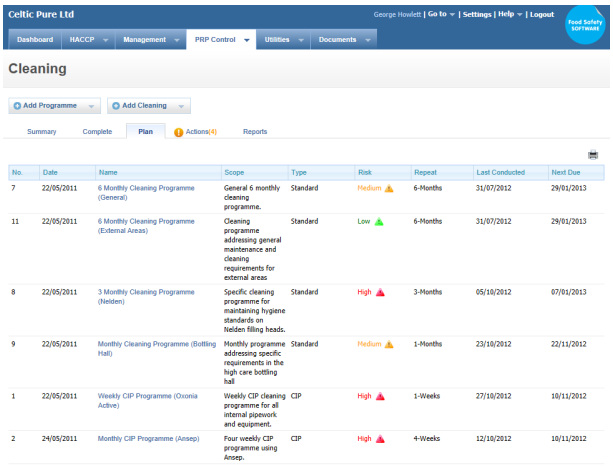
Training of all operators and managers involved in plant cleaning is critically important. It helps develop and maintain a high level of consciousness and understanding of cleaning importance. Training should be planned and focus on the reasons for cleaning, how to clean, cleaning chemicals and refresher training. Records of training should be maintained. Supervision is also essential. Standards of cleaning conducted by staff should be supervised to identify any drift in standards early on.

9 GFSI REQUIREMENTS FOR CLEANING & DISINFECTION

The Global Food Safety Initiative series of approved schemes such as the BRC, SQF, FSSC 22000 and IFS set out clear requirements for cleaning and disinfection of a food plant. These standards address cleaning as a PRP. Under GFSI it is required to have appropriate standards of housekeeping, cleaning and hygiene and these shall be maintained at all times and throughout all stages. Specifically, the requirements call for:

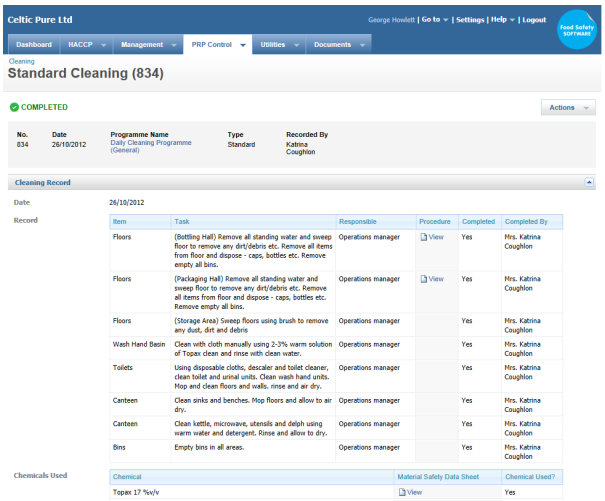
Manufacturing Requirements	Documentation Requirements
Cleaning schedules and records should be available	Cleaning schedules and records should be available in place
Chemicals used should be appropriate for the purpose intended	Chemicals used should be appropriate for the purpose intended
Methods for verification of cleaning and corrective action procedures should be in place	Hygiene inspections should be carried out and recorded
Where appropriate, cleaning equipment should be clearly identified and segregated	

Cleaning Plan Summary



No.	Date	Name	Scope	Type	Risk	Repeat	Last Conducted	Next Due
7	22/05/2011	6 Monthly Cleaning Programme (General)	General 6 monthly cleaning programme.	Standard	Medium	6-Months	31/07/2012	29/01/2013
11	22/05/2011	6 Monthly Cleaning Programme (External Areas)	Cleaning programme addressing general maintenance and cleaning requirements for external areas	Standard	Low	6-Months	31/07/2012	29/01/2013
8	22/05/2011	3 Monthly Cleaning Programme (Nelden)	Specific cleaning programme for maintaining hygiene standards on Nelden filling heads.	Standard	High	3-Months	05/10/2012	07/01/2013
9	22/05/2011	Monthly Cleaning Programme (Bottling Hall)	Monthly programme addressing specific requirements in the high care bottling hall	Standard	Medium	1-Months	23/10/2012	22/11/2012
1	22/05/2011	Weekly CIP Programme (Oxonia Active)	Weekly CIP cleaning programme for all internal pipework and equipment.	CIP	High	1-Weeks	27/10/2012	10/11/2012
2	24/05/2011	Monthly CIP Programme (Ansep)	Four weekly CIP programme using Ansep.	CIP	High	4-Weeks	12/10/2012	10/11/2012

Cleaning Record



Item	Task	Responsible	Procedure	Completed	Completed By
Floors	(Bottling Hall) Remove all standing water and sweep floor to remove any dirt/debris etc. Remove all items from floor and dispose - caps, bottles etc. Remove empty all bins.	Operations manager	View	Yes	Mrs. Katrina Coughlon
Floors	(Packaging Hall) Remove all standing water and sweep floor to remove any dirt/debris etc. Remove all items from floor and dispose - caps, bottles etc. Remove empty all bins.	Operations manager	View	Yes	Mrs. Katrina Coughlon
Floors	(Storage Area) Sweep floors using brush to remove any dust, dirt and debris	Operations manager		Yes	Mrs. Katrina Coughlon
Wash Hand Basin	Clean with cloth manually using 2-3% warm solution of Topax clean and rinse with clean water.	Operations manager		Yes	Mrs. Katrina Coughlon
Toilets	Using disposable cloths, descaler and toilet cleaner, clean toilet and urinal units. Clean wash hand units. Mop and clean floors and walls. rinse and air dry.	Operations manager		Yes	Mrs. Katrina Coughlon
Canteen	Clean sinks and benches. Mop floors and allow to air dry.	Operations manager		Yes	Mrs. Katrina Coughlon
Canteen	Clean kettle, microwave, utensils and delph using warm water and detergent. Rinse and allow to dry.	Operations manager		Yes	Mrs. Katrina Coughlon
Bins	Empty bins in all areas.	Operations manager		Yes	Mrs. Katrina Coughlon

Chemical	Material Safety Data Sheet	Chemical Used?
Topax 17 %v/v	View	Yes

REFERENCES

H. L. M. Lelieveld - Hygiene in Food Processing: Principles and Practices

Huub L. M. Lelieveld, M. A. Mostert, John T. Holah - Handbook of Hygiene Control in the Food Industry

C&C Guidance G55 - Cleaning and Disinfection of Food Factories

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