

Cleaning chemicals

There are three main classes of cleaning compounds:

- **detergents**
- **alkalies**
- **acids**

Detergents

This broad group of chemicals widely used as in households as in food industry brings different type of soil from surfaces into foams and emulsions that could be easily rinsed off .

Alkalies

Alkaline compounds are effective for dissolution of proteins and removal of fats. Example of alkalis are sodium hydroxide (caustic soda) and potassium hydroxide. These compounds are hazardous to personnel and mostly used in CIP – automatic dosing system is recommended.

Acids

Acids, both organic and inorganic, are commonly used for the removal of mineral deposits such as hard water scale or milkstone. Acids are potentially corrosive to construction materials and must be used with care.

When chemical cleaning is performed it is necessary to use low-pressure sprays, foam or gel. Foam and gel are more viscous than sprayed agents and preferred as they are not prone to aerosol formation. The selection of the correct detergent for given application should be always done in cooperation with the detergent supplier.

The plant downtime and labour associated with cleaning is major cost of any food processing operation.

Sources of soil

Primary source of soil is from processed food product itself. Microbiological biofilms mainly contribute to the soil build ups on drainage surfaces. These films vary in their solubility depending upon such factors as heat effect, age, dryness, time, etc. It is essential that personnel involved in the cleaning process design have understanding of the nature of the soil to be removed before selecting a detergent and cleaning method. The rule of thumb is that acid cleaners dissolve alkaline soils (minerals), and detergents dissolve acid soils and food wastes (proteins).

HACCP

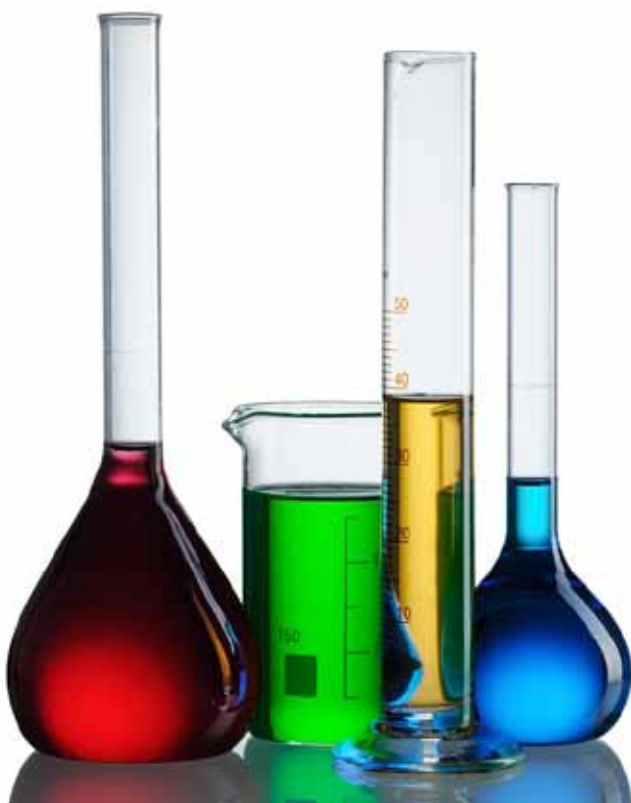
Hazard Analysis Critical Control Point (HACCP) for cleaning and disinfection of drainage.

HACCP is systematic approach to identify, evaluate and control hazards that are significant for consumer safety. It focuses on prevention rather than reliance on testing.

Cleaning and disinfection processes of drainage must be safe by design and therefore be included in the HACCP study and also they should be integrated to appropriate prerequisite program. This program should highlight the critical steps in the cleaning process, the critical limits and how these are monitored.

The main risk of microbiological cross contamination for food products comes from floors and drainage. The risk is associated with usage of high pressure water where microbes from floor and drainage systems are disseminated via created aerosols in the whole production area. Right flooring, drainage design and cleaning processes could minimize the risk through effective elimination of microbes from those surfaces.

The aim of this material is to provide information about the principles and options available for cleaning and disinfection of drainage systems in food processing plants. It should help to integrate drainage cleaning procedures into the HACCP system and also offers simple step-by-step guide how to hygienically clean drainage in food processing facility.



ACO *cleaning procedures for drainage*

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Cleaning procedures for stainless steel drainage





The ACO Group offers sustainable, integrated drainage systems designed to protect your business and the environment. Our aim is to constantly improve every aspect of safety, hygiene and functional performance. We believe our systems and services are truly unique, delivering unparalleled benefits to everyone involved in project delivery or subsequent operation.

ACO Worldwide

With over 60 years experience in the design and manufacture of drainage components ACO have developed a unique global competence that has resulted in development of innovative and award winning products. As a recognized leader in many of our markets, our success is attributable to anticipating and understanding our customer needs: whether a large international producer or independent local operator, our resources extend to provide the levels of service and product excellence that are only possible from global research, development and production facilities that are implemented with local considerations in mind.





ACO. Cleaning principles for drainage.

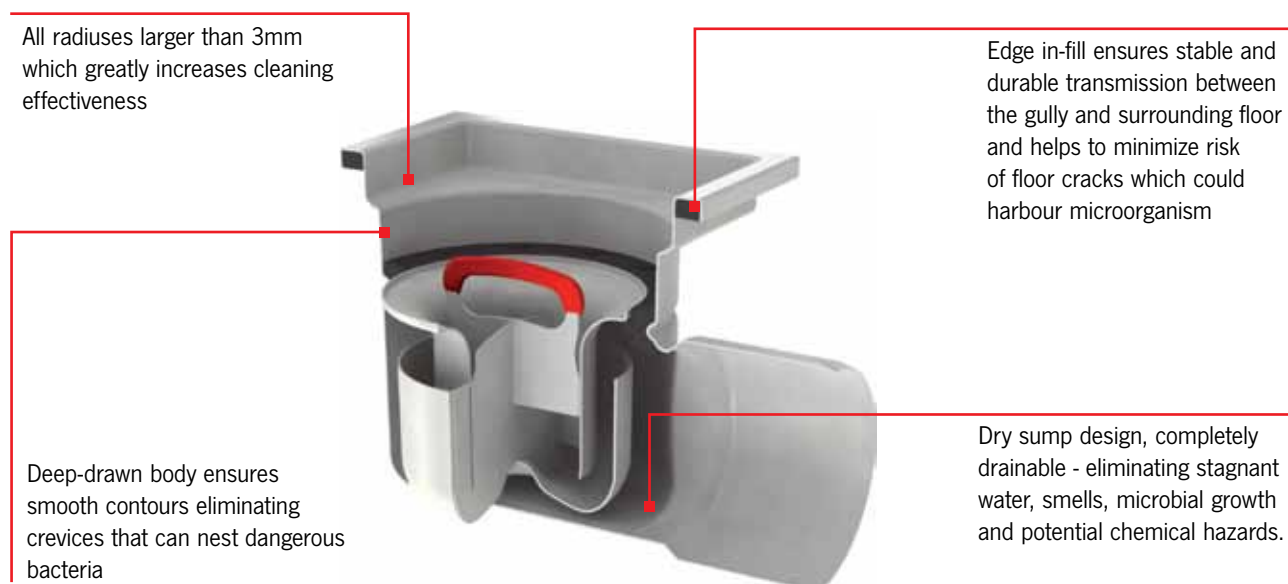
Drainage is a critical component affecting the hygienic performance of food production facilities. Effective drainage helps mitigate hazards from the external environment and is central to the safe and hygienic operation internally. Within the food production facility, surface liquids present a potential hazard of microbiological contamination. Liquids may be part of the cleaning process, or

may originate from specific equipment discharge points, or be simply the result of accidental spillage. Quite often the liquids contains other components – organic matter being prevalent. Floor drainage components cater for these situations through three core functions - interception, conveyance of fluids, and the ability to act as a barrier. Effective cleaning of drainage in food

processing plants reduces risk of contamination and spoilage of food during preparation, processing, and storage. The main objective of cleaning is to remove soil to obtain clean surface and thereby reduce number of microorganisms. A further reduction of microorganism can be obtained by disinfection step.

Principles of cleaning

The principles of cleaning involve the use of the combination of thermal, kinetic and chemical energy. The cleaning processes are always combination of these factors and time of these to work. The key point to appreciate is that all equipment – including drainage – in food processing plant should have hygienic design, which is easy to clean and disinfect. Otherwise cleaning process is time and energy consuming and not cost effective. All surfaces of ACO stainless steel drainage are hygienically designed – no sharp corners, edges, dead spaces and crevices. Our drainage is easily accessible for cleaning and visual inspection.



The effectiveness of cleaning depends on number of factors:

- Soil types and properties
- Material, design and surfaces
- Water and cleaning chemicals
- Cleaning procedure
- Cleaning parameters like temperature, time, flow velocity and concentration of chemicals



Plant cleaning

It is important to consider that the manufacturing environment is a potential source of pathogens and/or spoilage organism. Drains, drain channels, walls, floors and roofs near air intakes are known to be significant source of microorganism.

There are two different types of surface to be cleaned:

Product contact

All equipment that intentionally or unintentionally (e.g. due to splashing comes to contact with final product), or from which product or condensate may drain, drop or be drawn into the main product or product container.

Non product contact surface

All other exposed surfaces, including surfaces associated with equipment such as support structures, control panels and external surfaces. It will also include surfaces related to the manufacturing environment, such as floors, walls and drain channels.

We also differentiate cleaning process as whether are applied dry or wet.

Dry cleaning

Dry cleaning is essentially the mechanical removal of soils using sweeping, brushing, wiping and vacuuming. Environments typically to be cleaned by dry methods include plants producing flour, cocoa, dry milk products, dry soups and dry infant formulae.

Wet cleaning

Wet cleaning involves application of fluids, usually water based, to achieve the desired cleaning result. This can be applied to Open Plant Cleaning (OPC): surfaces to be cleaned have to be made accessible to fluids. In addition some components maybe physically removed from production area and cleaned separately – Cleaning out of place (COP). Drainage systems require wet cleaning.

Last is distinction between whether a cleaning process is done manually or automatically.









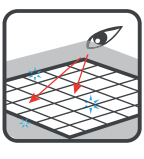
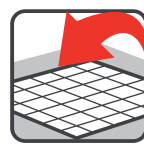

Manual cleaning

Manual cleaning is generally considered as very labour intensive and, therefore often very expensive. The manual tools should be hygienic – resistant to used chemicals and suitable for a specific operation. On top of it operators should be properly trained to be able to do cleaning as expected to achieve clean surfaces. ACO drainage has all elements of hygienic design – that makes cleaning of ACO drainage much simpler and faster when compared to competition products.


Automatic cleaning


Utensils and dismantled parts of equipment are cleaned and disinfected automatically in industrial dishwashing machines, tray or tunnel washers (automatic COP). CIP is also defined as automatic cleaning system.


ACO gully, slot, box and tray channel *manual cleaning*


-  Remove all present foodstuffs, raw materials, wrapping materials and tools.
-  Cover all equipment that could be contaminated.
-  Remove excess dirt from floor and gratings and place into designated container.
-  Remove gratings.
-  Remove and empty silt basket and foul air trap.
-  Place collected wastes and dirt into designated container. Rinse grating, silt basket and foul air trap with clean water. Replace foul air trap into original position.
-  Wash all surfaces with designated detergent and designated hand brush.
-  Rinse all surfaces with clean water.
-  Visually check surface cleanliness - repeat cleaning if necessary.
-  Replace silt basket and grating to original position.
-  Rinse entire equipment with clean water to prime foul air trap.


ACO gully, slot, box and tray channel *chemical cleaning*


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1. Remove all present foodstuffs, raw materials, wrapping materials and tools.
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2. Cover all equipment that could be contaminated.
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3. Remove excess dirt from floor and gratings and place into designated container.
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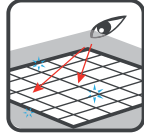
4. Remove gratings.
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5. Remove and empty silt basket and foul air trap.
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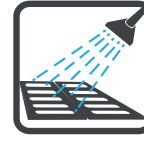
6. Place collected wastes and dirt into designated container. Rinse grating, silt basket and foul air trap with clean water. Replace foul air trap into original position.
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7. Apply foam to all surfaces.
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8. Leave foam in for 15 minutes.
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9. Rinse off foam with clean water.
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10. Visually check surface cleanliness - repeat cleaning process if necessary.
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11. Replace silt basket and grating to original position.
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12. Rinse entire equipment with clean water to prime foul air trap.

Cleaning procedures overview with recommended procedures for floor and stainless steel drainage

These instructions are for guidance only. **Always follow manufacturers instructions.**
All procedures have to be verified and adjusted to the application specific.

Frequency	Procedure	Physical agents	Chemical agents	Examples of chemical cleaning agents suitable for ACO stainless steel drainage
Daily	Removal of organic deposits (fats, proteins, saccharides and polysaccharides)	<ul style="list-style-type: none"> • Steam • High pressure water • Mechanical / kinetic energy (brushes, CIP medium velocity) 	<ul style="list-style-type: none"> • Caustics (sodium hydroxide, potassium hydroxide) • Detergents / surfactants 	Standard chemical agents used for floor cleaning should be sufficient (should be validated)
Weekly	Removal of inorganic deposits that could promote very resistant biofilms	Mechanical abrasive methods – polishing	<ul style="list-style-type: none"> • Nitric acid for SS passivation where chlorine attack could be expected • Inorganic acids (phosphoric acid) • Weak organic acids • Hydrofluoric acid for silicates removal 	<ul style="list-style-type: none"> • Acifoam (JohnsonDiversey) • Acigel (JohnsonDiversey) • Super Dilac (JohnsonDiversey)
Note	Removal of rinse water residues	High pressure air	Alcohols (isopropylalcohol, ethanol)	

Any cleaning procedure, including those recommended by equipment suppliers, must be properly validated at the equipment, where this will be applied and on the soil that could be expected even after certain time of usage.

Always follow manufacturers instructions to avoid damage to the equipment.

