



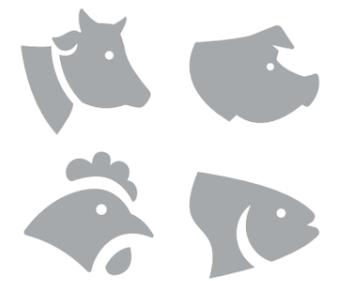
IN PROCESS **DISINFECTION** with **INSPEXX210**

For the Meat, Poultry and Fish Processing Industry

ECOLAB[®]

Everywhere It Matters.[™]

Hygiene in the Meat, Poultry and Fish Processing Industry



Food manufacturing facilities, in particular meat, poultry and fish processing plants, often operate at full capacity. All food processing surfaces and the workplace environment like ceilings, walls, floors and intralogistics, are **cleaned and disinfected at the end of a production shift**.

- This usually happens once all production lines are run empty, the processed food is diligently stored in cooling rooms, and major food debris are removed from the facilities.
- In general, the cleaning and disinfection shift is separated from the production shift.
- Processing surfaces are brought to a hygienic baseline prior to production start on the following day.

This is what can be referred to as 'end-of-shift' cleaning and disinfection.



FOOD BUSINESS OBLIGATIONS ARE RULED BY REGULATION (EC) NO 853/2004:

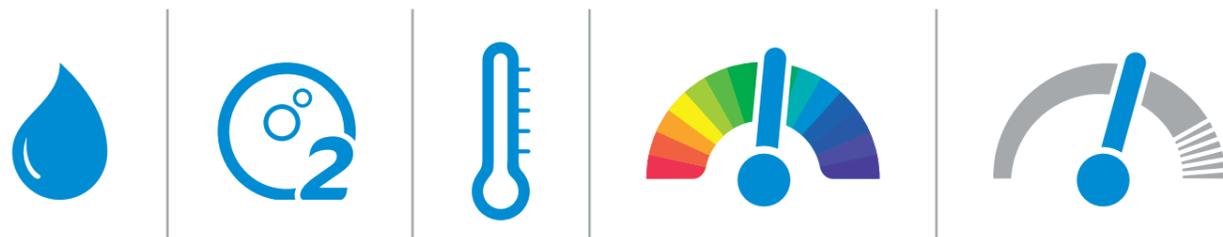
"In rooms where food is prepared, treated or processed ... the design and layout are to permit good food hygiene practices, including protection against contamination between and during operations. In particular: ... surfaces (including surfaces of equipment) in areas where foods are handled and, in particular those in contact with food, are to be maintained in a sound condition and be easy to clean and, where necessary, to disinfect."

The processing environment of a plant processing food from animal origin provides optimal conditions for microbial growth, such as **temperature, relative humidity, available oxygen, nutrients, ph-value, and water activity**. Certain ranges of those **intrinsic and extrinsic factors promote the growth of specific microorganisms, including pathogens**. Amongst those there can be found species that are causing foodborne illnesses that may have a fatal effect with humans, e.g.*.

- *Bacillus cereus*
- *Campylobacter spp.*
- *Clostridium perfringens*
- *Clostridium botulinum*
- *Enterobacteriaceae*
- *Escherichia coli*
- *Staphylococcus aureus*
- *Listeria monocytogenes*
- *Salmonella*

* http://www.epralima.com/infoodquality/Materiais_de_formacao_DE/Mikroorganismen_und_Lebensmittel.pdf

Any suboptimal conditions in the preceding step of animal production bear the risk for a carry-in of pathogens, which can potentially compromise food quality and shelf-life, and in the worst case, be transferred to humans by consumption of the processed food. Other considerable aspects in slaughter and cutting facilities are the **high throughput** and the **process speed**.



... slaughterhouses ... and ... cutting plants must have facilities for disinfecting tools with hot water supplied at not less than 82°C, **or an alternative system having an equivalent effect.**

According to REGULATION (EC) No 853/2004

Every processing step during slaughter, cutting, handling, transportation and packaging, involves food contact surfaces, such as cutting tools and machines, conveyor belts and transportation crates. At every food touch point is organic material (protein, fat, etc.) sticking at the processing surfaces. This accumulates over production time and it provides harborage and nutrients to microorganisms. If there is no intermediate disinfection conducted the **risk for cross contamination** between contaminated and uncontaminated food is rising.

Maintaining optimal hygienic standards is important, especially on food contact surfaces, and the immediate processing environment.



Conventional Procedure

Given the environmental conditions in a meat or poultry plant, including low temperatures, a hot water system consistently maintaining 82°C hot water in open dipping basins has a number of **drawbacks**:

- High humidity in the processing rooms leads to condensation
- Condensed water can cause cross contamination on unpackaged food
- Operators suffer from injuries due to burns (10% of accidents)
- 82°C aren't consistently maintained which leads to insufficient disinfection of processing tools
- Speed of process allows only very short contact times for the hot water, which leads to insufficient disinfection
- Protein residues coagulate on knife blades; a layer is built-up that hinders hot water to reach the knife blade surface for disinfection; overall knives are perceived as less sharp over time
- Build up of residues sticking at the coagulation layer carrying microorganisms and can cause cross contamination of food
- High energy consumption and calcification of water heating system
- Water flow is manually adjusted as needed, frequent water flow and exchange in basins is not controlled

The use of 82°C hot water marks the traditional technology of **"in-process disinfection"** - means disinfection during the production process - in red meat processing in order to contain the microbial growth on processing tools and surfaces.

It is not favorable to be applied in practice in poultry and fish processing, not least because of the potential impact of hot water on the texture and organoleptic properties of poultry meat and fish.

To control the microbial growth in these production facilities cooled processing environment and cold water are predominating. However, in certain processing steps, e.g. evisceration, the risk of cross-contamination between the carcasses by intestinal germs is very high. Organic material is flushed out with cold water and spread to surrounding processing equipment. This supports the growth of pathogens, especially psychrophilic microorganisms like *Enterobacteriaceae*, *Listeria monocytogenes*, or *Salmonella*.

Abandonment of hot water

An alternative system having an equivalent effect like 82°C hot water is permitted to be used in slaughtering and cutting facilities, however, immanent organic soiling and short time treatment due to the process speed do not allow for physical disinfection methods, such as UV-light, biostatic surface treatment, which would require rinsing of the processing surfaces and longer contact times.

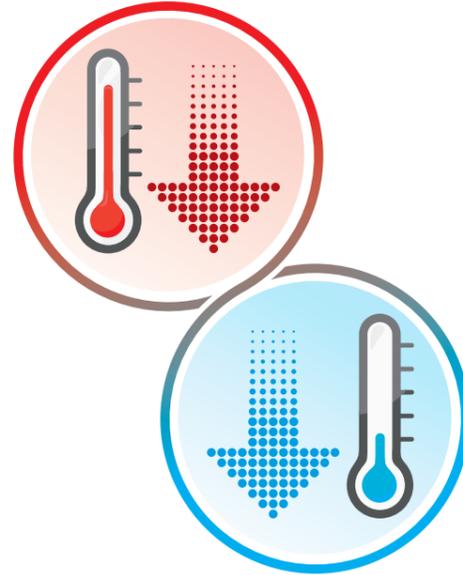
The application of an alternative technology **requires a significant biocidal effect within seconds**. The aim is to apply this at cold temperature in order to overcome the drawbacks of hot water disinfection, e.g. condensation.

One major aspect are the **short disinfection times of 1-2 seconds** at some steps of the slaughter and cutting process, especially with automated processing equipment like bung removers, splitting saws, neck cutters, etc. These extremely short treatment times technically preclude a water pre-and/or post rinse of the processing surface. Greasy, hydrophobic residues on processing surfaces make it difficult for saturation and embedded microorganisms aren't reached.

An effective alternative to 82°C hot water for **"in-process disinfection"** in processing facilities of food from animal origin (red meat and poultry) can be a chemical active based technology that effectively reduces the bioburden on processing surfaces within few seconds. It must be ensured that:

- No toxicological hazard or sensory impairment (impact on texture, smell or taste) is caused by the treated processing surfaces
- A carryover of any residual amounts of the chemical-based application solution from processing surfaces to food must be kept as low as possible
- There must not result any disinfecting or tinning effect on food

Single traditional chemical agents such as sodium hypochlorite or hydrogen peroxide are not able to accomplish the required effects for various reasons, incl. protein error, low temperature failures, high use rates, discoloration of meat, low efficacy, slow and lasting efficacy. **A high performance cold "in-process disinfection" must be fast-acting at low temperatures and in presence of organic residues.**



IN PROCESS DISINFECTION with INSPEXX210

THE INSPEXX TECHNOLOGY

Based on scientific studies and supported by practical experience in the field the Inस्पेxx technology has proven to be

A high-performing methodology for "in-process disinfection", either as an alternative system having an equivalent effect like 82°C hot water in slaughter and cutting lines

Or as a full effective biocide for hard surface disinfection in food processing areas, e.g. conveyor belts or food crates

THE INSPEXX CONCEPT COMPRISES

Fast-acting concentrate Inस्पेxx 210

Safe and reliable dosing equipment with a comprehensive service & maintenance framework

Ecolab expertise, including consulting, execution, validation and verification



Inspexx Concept

Inspexx 210 - Mode of Action

Inspexx 210 is a liquid concentrate based on a mix of peracetic acid and peroctanoic acid. Peracetic acid shows excellent efficacy at low temperatures and does not form any toxic by-products. Peroctanoic acid helps accessing microorganisms on hydrophobic processing surfaces which are covered by organic residues. Its lipophilic properties enable the surface saturation and accelerate the efficacy kinetics.



- The mixed peracids attack different areas of the microorganism cells.
- Peroctanoic acid facilitates the penetration of the phospholipid-bilayer of the cell membranes by the active mixture and helps the peracetic acid to faster access the inside of the bacteria cell.
- Besides the oxidative attack of the cell membrane the DNA of the microbial cell is destroyed.

Alternative to 82°C hot water

With this mode of action Inspexx 210 in application solution shows superior efficacy over 82°C hot water within 1 second. Inspexx 210 requires a remarkably low use concentration of 0.16% in cold water. Through oxidative reaction, the peracid mixture degrades into the naturally present compounds acetic and octanoic acid.

Inspexx 210 application solution complies with the requirements as an alternative method to 82°C hot water for reducing the risk of cross contamination on processing surfaces for food of animal origin. At the same time it eliminates the disadvantages of hot water in the processing facilities.

The Inspexx 210 application solution helps:

- 📍 Reducing the risk of cross-contamination throughout slaughter and cutting lines in processing facilities of food from animal origin
- 📍 Improving food quality and safety
- 📍 Improving overall process hygiene by avoiding condensation and humidity in processing rooms
- 📍 Increasing worker safety by eliminating burns caused by hot water
- 📍 Eliminating the water heating system and associated maintenance requirements
- 📍 Maintaining an elevated hygiene standard across meat, poultry and fish processing plants

Hard surface disinfectant without rinse

While an alternative system to 82° hot water according REGULATION (EC) No 853/2004 is exempted from BPR, hard surface disinfection in food processing areas requires a distinct log-reduction on food processing surfaces.

Also as a biocide (REGULATION (EU) No 528/2012), Inspexx 210 demonstrates an outstanding performance at the same advantageous use conditions:

- 0.16% use concentration
- cold temperatures
- cold water
- in practice short contact times

During processes like conveying ready-to-package food or food crate disinfection Inspexx 210 replace thermal disinfection at the end of the tunnel washing procedure. A final rinse is not required as to workers', food and consumer safety. Inspexx 210 efficacy was demonstrated against bacteria, including *Listeria monocytogenes*, *Salmonella typhimurium*; yeast; fungi according the standards EN 1650, EN 1276, EN 13697. Despite the oxidative active combination, there are no bleaching effects on meat because of the low use concentration.

Toxicological and food law relevant questions regarding the use of peracid mixtures have been discussed by the WHO, their expert committees JEFCA (FAO/WHO expert committee on Food Additives), the European Commission SCVPH (Scientific Committee on Veterinary Measures relating to Public Health) and the EFSA BIOHAZ Panel (EFSA Panel on Biological Hazards) concluding that the use of peracid mixtures is to be classified as safe and credible.

Professional Implementation

As a prerequisite for the implementation of the Inspexx system as an alternative for 82°C hot water, always the local veterinarian is to be involved. The application of Inspexx needs be approved as appropriate by competent instances or authorities depending on the specific national regulations.

Implementing Inspexx is a plant specific project and follows some basic process steps. Ecolab Application and Engineering experts team up at your processing facilities for a targeted and tailored solution, including consulting, projection, project management, start-up, training and ongoing continuous support.

- 1 It starts with a survey in order to assess what changes are to be made to an existing hot water system. Ideally this consists of stainless steel, so it may remain in place.
- 2 Usually, the hot water system can be disconnected from the heating installation and connected to dosing equipment that is designed for cold disinfection.
- 3 The concentrate Inspexx 210 is available in both packsizes, 20L jerrycan and 220L Connexx drum, equipped with suitable adaptors for safe handling of the concentrate.



Dosing Equipment

There are four **different types of dosing equipment** available with buffer tank, for a pre-diluted application solution and for inline dosing.

Depending on the type and dimensions of the processing facility as well as the calculated throughput of application solution, our **Engineering expert** will recommend the most suitable dosing station. The location and installation require a set of prerequisites e.g. flooring, space, ventilation, accessibility, for a **safe and sustainable operation**.

Every type of dosing equipment can be setup as twin installation with an automated switch from an empty Inspexx 210 drum to a spare one. This assures **consistent dosing** of the application solution according to the processing frequency. The dosing equipment generates the application solution at a **consistent level of concentration**. This is distributed throughout the pipework to the disinfection units, e.g. dipping bath for knives, and continuously **exchanged at a rate of 6 times per hour**. This ensures the efficacy of the application solution despite organic load in the dipping baths. In spray installations, e.g. in automated lines, there is all time fresh application solution applied. The used solution is drained.

The dosing equipment **consistently controls the set parameters**, such as concentration of use solution, filling level, empty alarm. The concentration of the **use solution** in the application area can be **verified by titration** or recommended **test strips**.

**HIGH
QUALITY**
dedicated to
SAFETY



Inspexx Power User



Inspexx SD



Inspexx S

Seamless Service & Maintenance

The Inspexx system is available as a full concept only. This is to ensure a seamless implementation and operation of your Inspexx system. The dosing equipment is provided by Ecolab based a **five year rental agreement**. It comes comprehensively equipped with a **spare part kit** and adequate **personal protective equipment** for operators. Operators are **trained** upon implementation and fully **supported by our local Inspexx experts**. There is a dedicated Inspexx **service plan** setup based on the dimension of the dosing equipment, with frequencies from bi-weekly up to quarterly, with a mandatory **annual maintenance**.

Depending on your requirements a **24/7 service** can be agreed. **Swab samples** are frequently taken from the processing surfaces treated with Inspexx solution in order to **check the efficacy** and to verify the **correct operation**. The operator is controlling this on a more frequent basis as the individual plant protocol describes. The operation and function mode are displayed and comprehensively **documented for your complete audit report**.

IN PROCESS DISINFECTION with INSPEXX210

is one element in your barrier hygiene scheme. It is to be embedded in your overall hygiene regime comprising standard surface cleaning & disinfection and personal hygiene measures.

With the **INSPEXX TECHNOLOGY** your operation benefits from an elevated hygiene level throughout the processing lines during the production process.

The hygiene intervention by Inspexx supports:

- Improved Hygiene of the Processing lines and Surroundings
- Increased Food Quality and Safety
- Improved Operator Safety
- Reduced CO₂ footprint
- Cost Control
- Audit Readiness with a clear Protocol and Documentation

As an accompanying measure to protect food from cross contamination during the production process you may consider **air decontamination**. For adequate Ecolab solutions please get in touch with your local Ecolab representative.

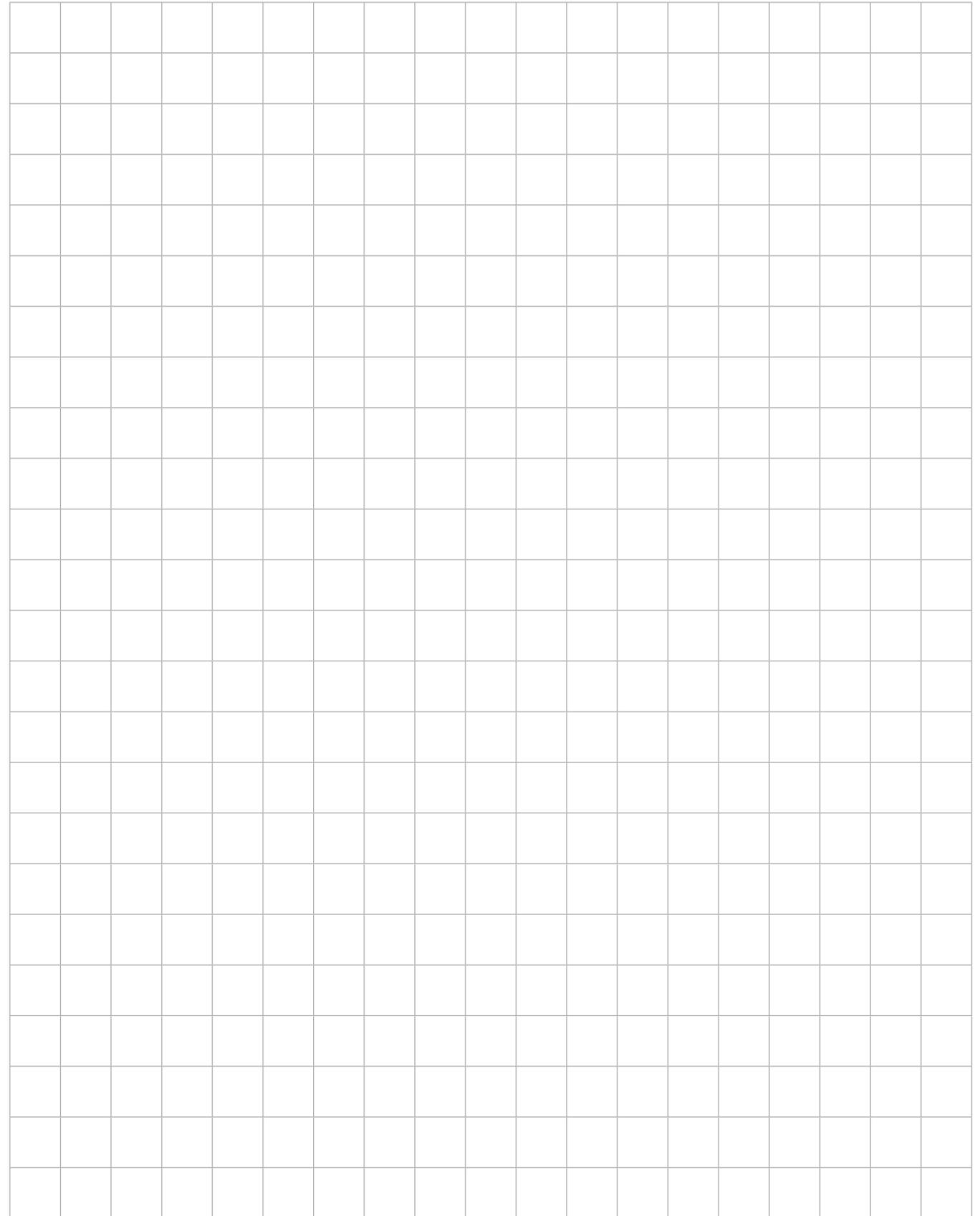
For more industry and application specific information please review the specific fact sheets. For detailed information please contact your local Ecolab representative.



SKETCH



NOTES



Leading Through Partnership

Partnership. Expertise. Solutions that deliver the best results. We work every day to create value for our global customers, empowering them to achieve both environmental and operational goals and advance their sustainability ambitions.

With our unique technology, we provide next-generation solutions that deliver positive results and longterm impact for our customers and the world.



About Ecolab

A trusted partner at nearly three million customer locations, Ecolab (ECL) is the global leader in water, hygiene and infection prevention solutions and services that protect people and vital resources. With annual sales of \$13 billion and 45,000 associates, Ecolab delivers comprehensive solutions, data-driven insights and

personalized service to advance food safety, maintain clean and safe environments, optimize water and energy use, and improve operational efficiencies and sustainability for customers in the food, healthcare, hospitality and industrial markets in more than 170 countries around the world. www.ecolab.com

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Use biocides safely. Always read the label and product information before use.

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