

FOAM CLEANING SOLUTIONS FOR THE FOOD & BEVERAGE INDUSTRY



FOOD SAFETY THE CHALLENGE

Today's food supply chain stretches across borders and oceans. As it grows longer and more complex, the need for proper food sanitation and foodborne illness prevention increases.

To ensure food is safe, businesses around the world are aiming to implement proactive, effective food safety solutions from farm to fork. Ecolab is there to help them find the right solutions.



BENEFITS OF OPEN SURFACE HYGIENE

The first business purpose of Food & Beverage manufacturers is reliably delivering safe food on time in full to contract partners such as food retailers in order to meet the high expectations of the consumers.

Applying highest manufacturing standards in the production processes lays the foundation for consistently highest product quality that meets the standards of the brand.

In carrying out cleaning and disinfection procedures consistently to the required standards, Food and Beverage companies can conform to their quality, safety, legal, commercial and ethical responsibilities.

In addition to producing safe food, there are further benefits gained in providing a safer and more pleasant working environment that is easier to maintain. A consistent hygiene performance impacts directly on the overall image of a factory, its products and management.

Good
Hygiene
Practices

Food
Safety

Product
Quality
Brand Protection
Compliance



CLEANING REQUIREMENTS IN THE FOOD & BEVERAGE INDUSTRY

In the Food and Beverage processing industry, you primarily deal with surfaces that have direct (e.g. chopping boards, conveyors) and indirect (e.g. doors, floors and walls) contact with foodstuff.

Product deposits must be removed regularly to eliminate nutrient sources that can support the growth of unwanted microorganisms, e.g. salmonella, listeria, campylobacter, etc..

If cleaning and disinfection procedures are not successful the level of spoilage and/or pathogenic microorganisms will increase and products may become contaminated directly with microbes, spores and/or toxins.

It is also important to recognize that old residues can contaminate the current production batch and change the organoleptic quality (taste, texture and smell) of the product being processed.

Cleaning is

- a vital procedure in food & beverage manufacturing in order to ensure and maintain food safety
- the complete removal of residues and soil from surfaces, leaving them visually clean so that subsequent disinfection will be effective

Disinfection ...

- takes place subsequently to thorough cleaning
- is recommended to be a separate process step
- will be compromised if cleaning was not effective
- inactivates or destroys microorganisms in order to prevent their exponential growth

CLEANING IS PART OF THE PRODUCTION PROCESS

Everything starts with the desired outcome -
CLEAN SURFACES, READY TO PRODUCE SAFE FOOD.

Considering the process of producing food and beverages as a whole, frequent cleaning of the manufacturing facilities is an integral part of it. Whereas cleaning takes place behind the scenes, it is the everyday basis for the production of safe food. Consistently applying the highest standards to the same extent to both, the manufacturing and the cleaning process, helps safeguard product quality and safety in the long term.

Depending on the individual need for the utilization of production capacity the available time for cleaning can be relatively short. Prerequisites for utilizing the short cleaning time efficiently are reliably performing cleaning equipment and effective cleaning compounds, well-matched for sustainable cleaning procedures.



Considering all relevant parameters such as customers' objectives, plant conditions, water quality, soiling to be removed, surface materials to be cleaned, etc. right at the beginning of planning and projecting a cleaning system for a Food & Beverage site, helps set the right priorities and smooth installation and start-up.

ECOLAB is committed being a strategic partner right from the start.



ACT

- Reliably remove organic residues
- Avoid mineral deposits
- Safeguard microbiology
- Prevent biofilm formation

FOAM CLEANING

Foam cleaning is the globally recognized method for cleaning open surfaces in the Food and Beverage industry. Disinfectants may also be applied as foams.

The economy of foam is expedient in processing environments requiring:

- Application of cleaning solution to large and difficult to reach areas in a short period of time
- Extended contact times of the cleaning solution
- Less manpower for cleaning
- Control of the used cleaning products
- Faster surface hygiene processes
- Increased operators' safety when handling chemistry

PROTECT

- Value of surface materials
- Be safe for operators
- Be ecologically & toxicologically safe
- Must enable extended production time

FOAM CLEANING MUST:

CONTROL & PREVENT

- Entirely cover the surfaces to be cleaned
- Be controllable
- Ensure efficiency
- Be consistent as not all facilities can be checked after every cleaning

THE ECOLAB ALLROUND OFFERING

Building on our strong engineering and application expertise, we support our customers from blue-print to start-up, and beyond with dedicated maintenance planning and regular service to grant them peace of mind.



FOAM COMPOUNDS FOR CLEANING & DISINFECTION

Our recommendation of the adequate cleaning regime requires some information about specific site parameters such as the type of products produced at the site, types of soiling to be removed; number of shifts or product changes, sewage parameters, surface materials to be cleaned, and any kind of limitations (incl. cleaning time, water, air) to be considered according to the specific plant. In the optimal case plans, drawings can be shared or a physical onsite survey can be made at existing plants. Based on all relevant information our experienced sales consultant will quote a complete cleaning program, this may also include products and tools for environmental hygiene, personal hygiene and other relevant applications, based on an overall cost/benefit analysis for the specific factory.

Our Ecolab foam compound program is fine-tuned to the specific needs in Food, Dairy, Beverage, Brewery plants. This includes neutral, low-, medium- and high-alkaline foam agents, chlorinated formulations and acid products suitable for daily cleaning purposes up to troubleshooting.

The foam characteristics range from conventional foam for smaller areas to be cleaned, advanced foam for larger areas requiring longer contact time, right up to thin film foam technology for smart cleaning and easy rinse in case of time and water restrictions. As a standard, our foam cleaners and disinfectants are tested, approved and/or listed by relevant OEMs of food and beverage manufacturing equipment.

They comply with Kosher/Halal standards. Our foaming disinfectants are tested according to standards EN1276, EN1650, EN13697 (BPR EU 528) against worst case microorganisms. They are locally registered across the EU countries.

APPLICATION	DISINFECTION	CLEANING		
FOAM TECHNOLOGY	CONVENTIONAL		ADVANCED	
ACIDIC	✓	✓	✓	DECENTRALIZED FOAM SYSTEMS
NEUTRAL	✓			
LOW ALKALINE		✓	✓	
MEDIUM ALKALINE	✓	✓	✓	
HIGH ALKALINE		✓		
CHLORINATED ALKALINE	✓	✓	✓	
ACIDIC		✓	✓	CENTRALIZED FOAM SYSTEMS
NEUTRAL	✓			
LOW ALKALINE		✓		
MEDIUM ALKALINE	✓	✓		
HIGH ALKALINE		✓		
CHLORINATED ALKALINE	✓	✓	✓	

FOAM APPLICATION EQUIPMENT

Every Food & Beverage manufacturing site has different requirements in terms of cleaning open surfaces. Meeting every individual cleaning demand while being fully committed to safety, ergonomics and flexibility is our aim.

Ecolab provides state-of-the-art foam cleaning equipment technology embracing highest operators' safety standards, hygienic design, robustness and durability.

Our comprehensive set of foam equipment components can be varied and combined, most convenient to individual needs.

The bigger the choice, the harder to choose? Our Ecolab representatives, engineers and application managers are well experienced and trained to ask the relevant questions in order to consult on the most advantageous system suiting your requirements.

Parameters to be considered are, e.g. top operational priorities of the plant; owner of the cleaning process; water quality and availability; dimensions and geometry of the plant; types of products produced; types of soiling to be removed; frequency and sequence of cleaning; departments to be cleaned; etc.

No matter whether you are in a need to replace a single foam station or to build a new processing plant, there is a customized solution for every demand, from planning to implementation and beyond.



HYGIENIC DESIGN

A crucial factor for the consistent success of cleaning is the accessibility of surfaces to be cleaned.

Hygienically designed food and beverage manufacturing equipment and environments (incl. floors, machine levelling systems, walls, overhead installations, ceilings, doors, etc.) support easy access and avoiding spray shadows and harborages.

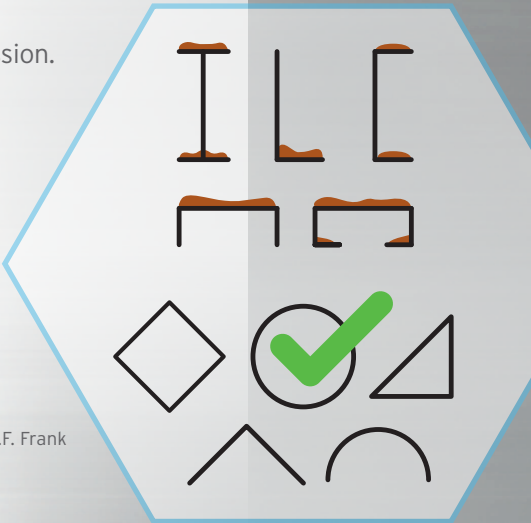
Harborages facilitate the collection of residues and fostering microbial growth, thus the formation of **BIOFILMS** having the ability to re-contaminate cleaned surfaces or even the produced foodstuff.

This increases the risk of reduced shelflife and disease transmission. Extracellular polymeric substances associated with biofilm, that are not removed by cleaning, provide attachment sites for microorganisms newly arrived to the cleaned system.

BIOFILM formation can also cause the impairment of heat transfer and corrosion to metal surfaces.

Some of the methods used to control biofilm formation include mechanical and manual cleaning, chemical cleaning and sanitation, and application of hot water.¹⁾

¹⁾Biofilm Formation and Control in Food Processing Facilities, R.A.N. Chmielewski and J.F. Frank



ECOLAB, FOR DECADES, PROVIDES PROFESSIONAL EXPERTISE & CONSULTING TO FOOD & BEVERAGE MANUFACTURERS ON THE ENTIRE CLEANING PROCESS.

Equally, manufacturing facilities and cleaning equipment need to be hygienically designed. Ecolab is a member of the European Hygienic Engineering Design Group (EHEDG) for many years, actively contributing to the EHEDG guidelines regarding cleaning, disinfection procedures and their validation.

Guidelines for hygienic design of food processing facilities are not obligatory for cleaning equipment, however, Ecolab together with our strategic partners (Nilfisk Food, Denmark) for adoption of hygienic design elements in order to facilitate equipment care, e.g. component materials used are suitable for permanent contact with the relevant ranges of chemical compounds, water qualities, temperatures and pressure.

Equipment housing is easily removable for inside and outside cleaning, the interior of the equipment is spacious for easy maintenance and care.

CENTRALIZED FOAM SYSTEMS

Special requirements in terms of compound selection apply for centralized systems with pre-diluted foam agents. Application solutions of the compounds are fed from a central mix station via fix installed pipework to the various foam stations across a plant.

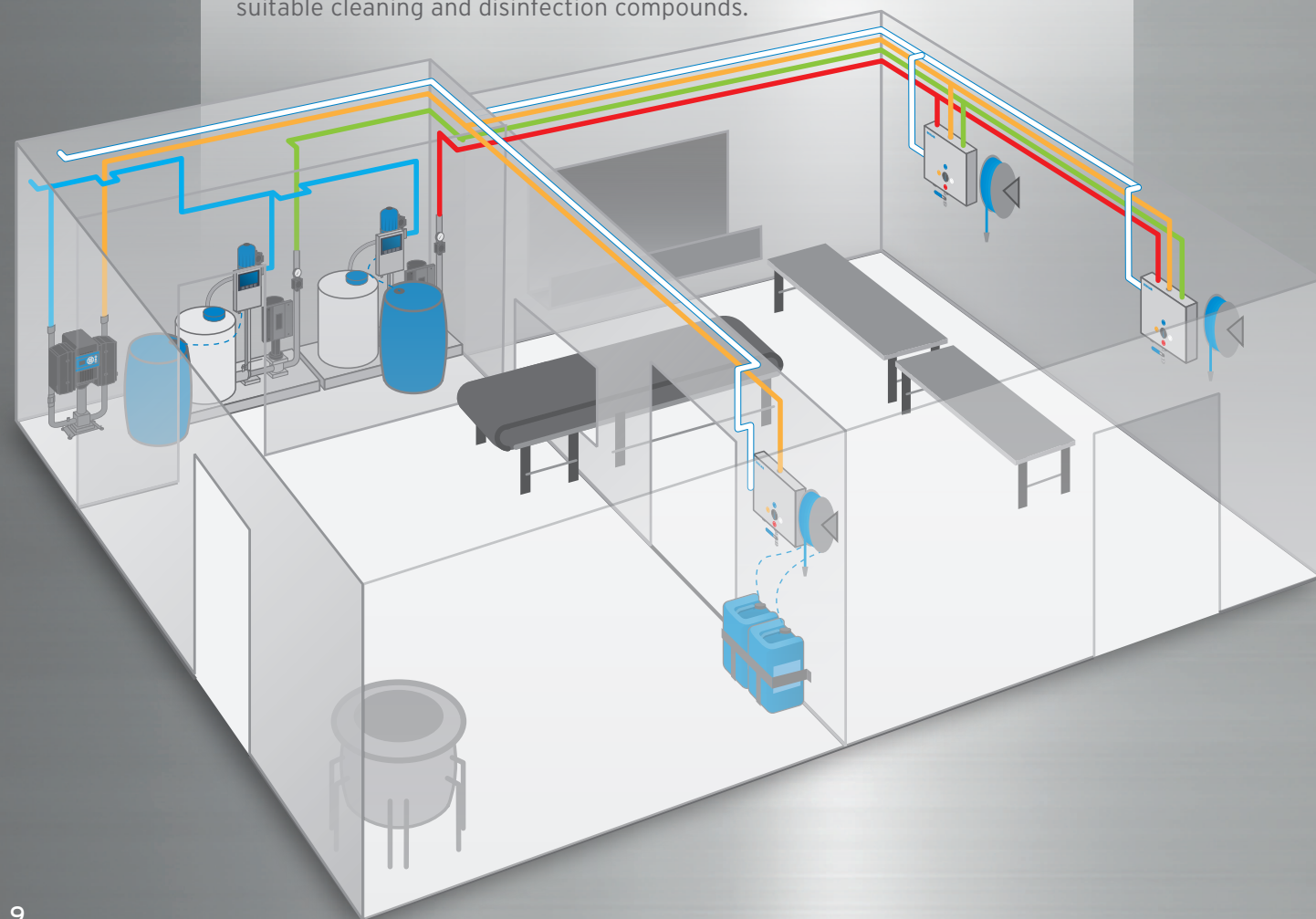
Centralized systems are recommended in case there is the same cleaning regime across the entire or the majority of the plant. The lengths and bifurcation of the pipework, as well as the idle time of the application solution in the pipework, may cause an interaction between cleaning solution and piping material in the long-term.

In order to prevent any long-term effects, e.g. scaling or corrosion inside pipework, Ecolab has done research, development and testing on the impacting parameters such as water quality, pipework materials and welding techniques as well as product composition in order to give the right recommendations for our customers operating centralized foam systems.

In terms of centralized systems for pre-diluted chemistry, the choice of the application equipment is closely related to the correct choice of cleaning and disinfection compounds. In order to delight in operating a centralized foam system in the long term, you can rely on our expert's advice for the optimal projection according to your needs, perfect welding workmanship for the pipework and regular maintenance for the running system with the most suitable cleaning and disinfection compounds.

ADVANTAGES OF CENTRALIZED SYSTEMS

- Increased operator safety
- Increased Food Safety /Food Defense
- Reduced preparation time for cleaning



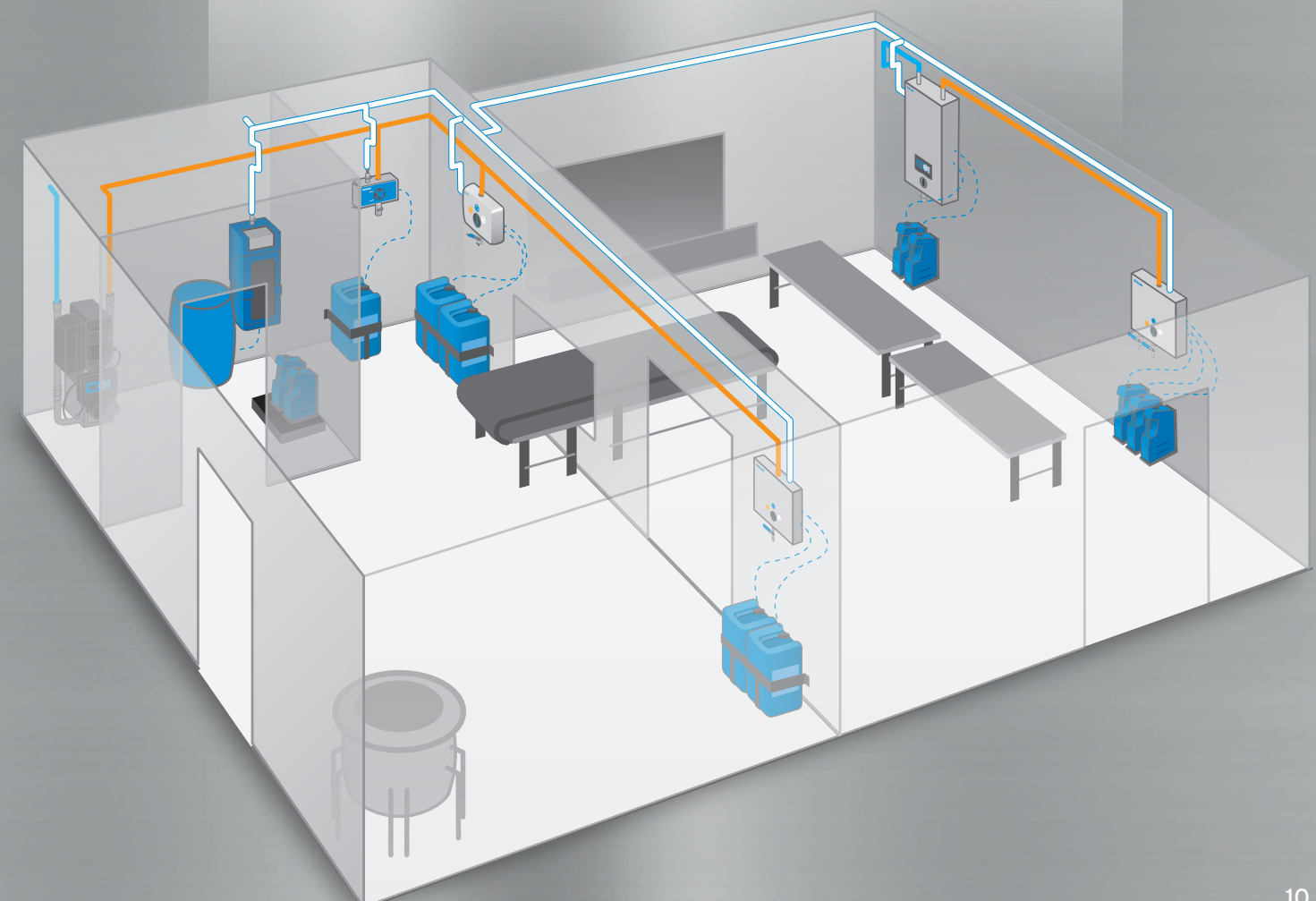
DECENTRALIZED FOAM SYSTEMS

In decentralized foam systems, the concentrated foam compounds are dosed locally to the pressurized water stream at the point of use or they are diluted with water in tanks of mobile cleaning units. Points of use in decentralized systems include all standalone foam units used for foam cleaning.

Those can be wall mounted satellites for automated or manual operation supplied with pressurized water via pipework from boosters or main stations, with tap water pressure or mobile foam units with mix tanks or satellites mounted to a trolley as independent mobile stations being connected to water and pressurized air in various places throughout the production facilities.

Decentralized Foam Systems represent the most flexible setup for foam cleaning, and thus, allow different cleaning regimes by department.

However, they do imply transfer and presence of foam compound concentrates inside the production area during cleaning hours. Clearly, there is granted higher responsibility to cleaning operators for cleaning preparation and parameter setting at the points of use, as handling of foam product concentrates and operating foam application equipment in a safe and correct way requires training and education.



MIX & MATCH

When it comes to the optimal combination of the foam equipment with the cleaning and disinfection compounds Ecolab is rightly positioned to help with our insight and expertise.

Various components built-in to our foam cleaning equipment such as sealings, valves, suction hoses, being in frequent contact with cleaning chemical concentrates and or application solutions is thoroughly tested in order to create a solid basis for our recommendations.

HYBRID 7 stands for the NEW NORM in Open Plant Foam Cleaning.

Smart components (electronics, software, mechanics) enhance benefits regarding

- Connectivity
- Robustness
- Guided Service
- Remote Support



- CONNECTIVITY**

Check equipment performance of powered units by various parameters via web & app

ROBUSTNESS

New polymeric material reducing scaling & corrosion on injectors and non return valves

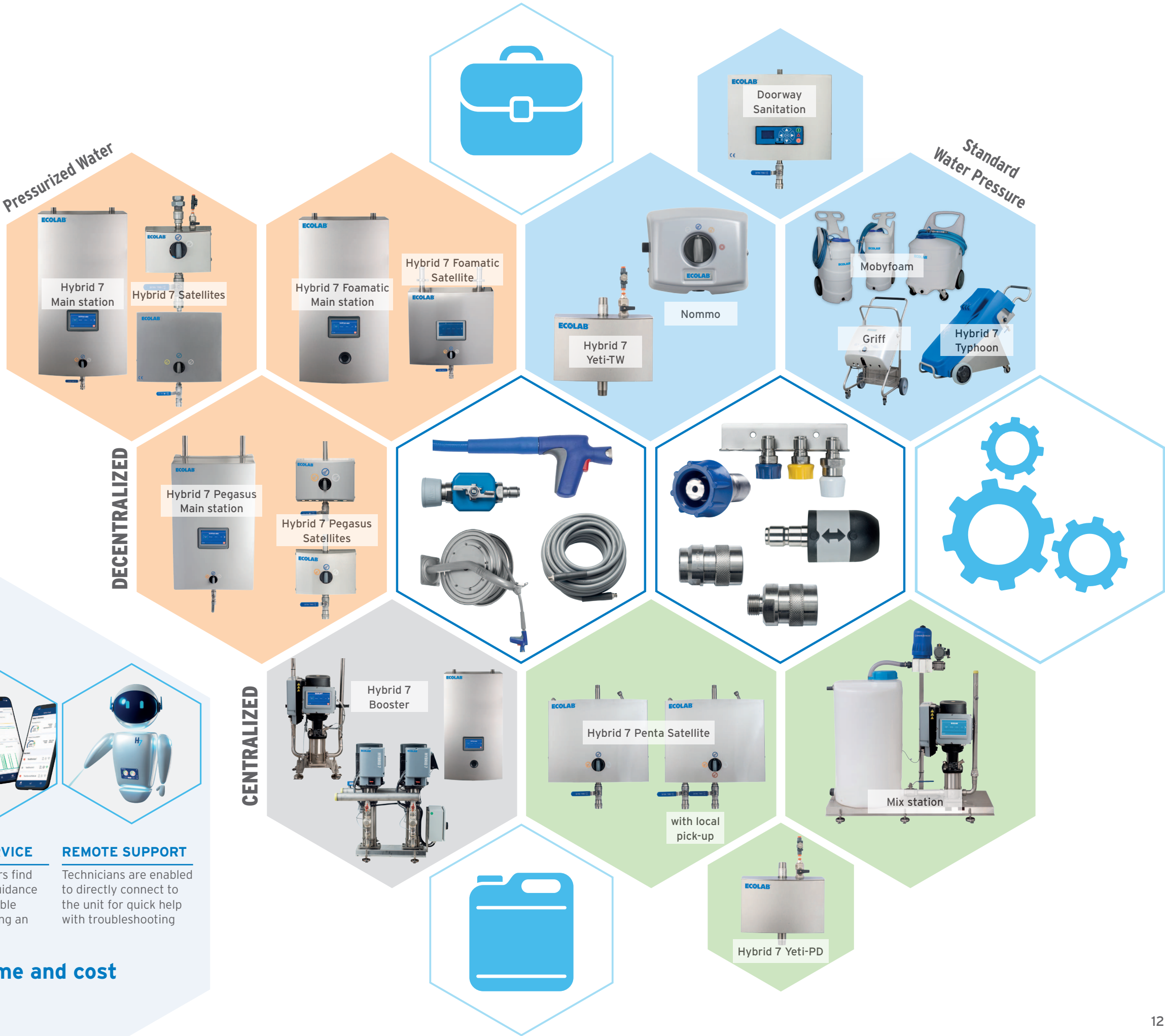
GUIDED SERVICE

Service partners find step-by-step guidance instantly available at units for doing an expert job

REMOTE SUPPORT

Technicians are enabled to directly connect to the unit for quick help with troubleshooting

Minimize equipment downtime and cost



SERVICE AND MAINTENANCE

Service and Maintenance are an integral part of Ecolab solutions. It spans the entire customer relationship, and particularly on new installations or applications.

The earlier the involvement of the Ecolab service team the more beneficial the overall outcome for our customers.

Depending on our customers' needs, our local Ecolab sales consultant teams up with the application and engineering experts for a concerted project approach. This way, all technical, application-specific and commercial aspects are appropriately considered from the beginning.

Once all relevant project parameters are gathered and discussed during a survey, planning and projection can start in order to generate an adequate quotation. When the customer agrees to the Ecolab offer, equipment is ordered and the installation is planned. In parallel, the required documentation, on equipment as well as on cleaning and disinfection compounds, is shared with the customer. The hygiene plans by application area in the customer plant are prepared and customized.

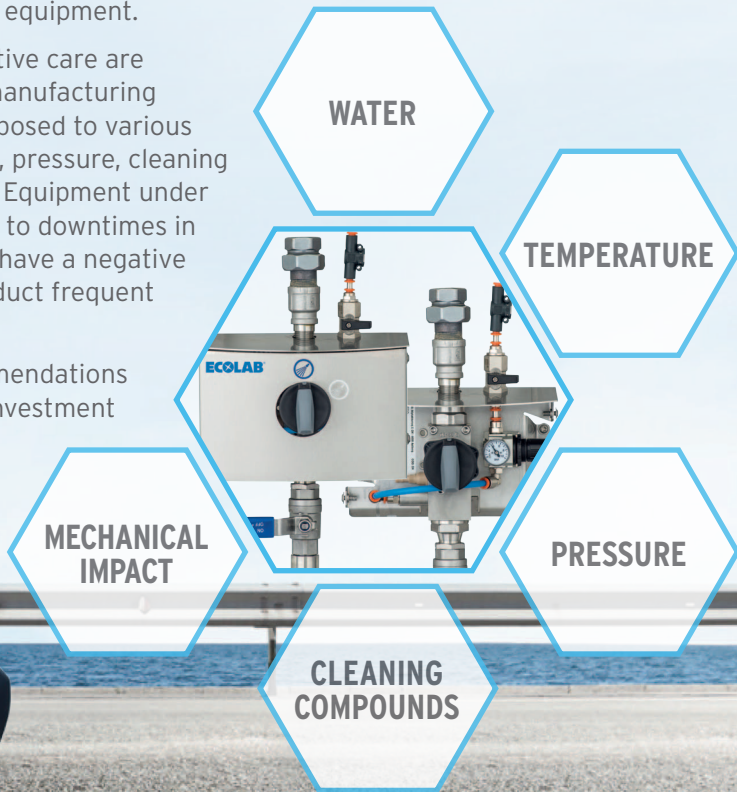
Cleaning processes, and thus, production operations can run efficiently. This helps our customers performing to their operational and sustainability targets at full return on invest.

CLEANING EQUIPMENT NEEDS CARE

For the purpose of sustainability and profitability, manufacturing facilities require a considerable amount of care, and so does cleaning equipment.

For durable performance, frequent maintenance and preventive care are required for the cleaning equipment. As a natural process, manufacturing facilities, as well as cleaning equipment, are permanently exposed to various factors impacting their newness, such as water, temperature, pressure, cleaning compounds, mechanical impact, which may lead to attrition. Equipment under heavy duty not taken care of can lead to failure and at worst to downtimes in production. In order to prevent any breakdown, which could have a negative impact on the plant's operational efficiency, it is vital to conduct frequent service and maintenance.

Our customers benefit from readily available service recommendations and maintenance agreements to achieve the full return on investment with their foam cleaning system.



As soon as the equipment installation is ready for start-up an appointment is arranged with all individuals to be involved, incl. cleaning operators, in order to train them on equipment as well as cleaning and disinfection compounds with special focus and emphasis on safety instructions. In order to keep track on updating all cleaning staff at the customer site, a separate and/or repeated onsite hands-on training is recommended.

The after sales service will be organized according to the customer's needs and Ecolab World Class Service standards. In order to prevent any breakdown caused by wearing in disregard of recommended maintenance, we commend our maintenance agreement. This contains all benefits of preventive action to avoid breakdown:

- Frequent maintenance
- Exchange of wearing parts as recommended or on demand
- Beneficial service rates in case of need for trouble-shooting or ad-hoc service
- Guided service and Remote support reduce reaction time, and minimize downtime and cost.



CLEANING EXPERTISE NEEDS TRAINING

Cleaning open surfaces involves a large part of manual action which is usually performed by individuals.

Especially in the food manufacturing sector, cleaning is primarily performed at night, the work is often done by cleaning service providers. The condition of the facilities to be cleaned can vary from day to day.

Despite the great experience of the cleaning providers, it is a constant challenge to clean against standard operation procedures, made for standard situations, in a daily varying environment with different grades of soiling or shortened cleaning time, e.g. in case of production overruns.

Between the priorities of harsh working conditions such as low temperature, high humidity, time pressure, and highest demands for optimal cleaning results, there is a need for safe, ergonomic, robust cleaning equipment.

Training the operators on safe and efficient use of both, equipment and cleaning compounds, is key to the daily success of cleaning.

The understanding of the purpose of cleaning and its impact on Product Quality and Food Safety are fundamental for, holistic, diligent and responsible execution of the cleaning tasks.

Ecolab supports you with operator specific training regarding guidelines, hygiene requirements, functionality of cleaning compounds and equipment to create awareness for a responsible execution of all cleaning tasks.



FOAM EQUIPMENT OVERVIEW

DECENTRALIZED

PRESSURIZED WATER
20-25 bar

STATIONARY EQUIPMENT

Hybrid 7 Main station

Hybrid 7 Pegasus Main station

Hybrid 7 Foamatic Main station

Hybrid 7 Satellites

Hybrid 7 Pegasus Satellites

Hybrid 7 Foamatic Satellite

AUTOMATED DOSING 5 - 20 bar

STANDARD WATER PRESSURE
2-5 bar

STATIONARY EQUIPMENT

Hybrid 7 Yeti-TW

Nommo

Doorway Sanitation

AUTOMATED DOSING 2 bar

MOBILE EQUIPMENT

Mobyfoam

Griff

Hybrid 7 Typhoon

CENTRALIZED

Hybrid 7 Booster

Mix station

Hybrid 7 Penta Satellite with local pick-up

Yeti-PD

ACCESSORIES
PISTOLS, NOZZLES,
COUPLERS, HOSES

Hybrid 7 Pistol

Hybrid 7 Hose

Hybrid 7 Couplers

Hybrid 7 Nozzles

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FOAM COMPOUND OVERVIEW

Our Ecolab foam compound program is fine-tuned to the specific needs in Food, Dairy, Beverage, Brewery plants. This includes neutral, low-, medium- and high-alkaline foam agents, chlorinated formulations and acid products suitable for daily cleaning purposes up to troubleshooting.

The foam characteristics range from conventional foam for smaller areas to be cleaned, advanced foam for larger areas requiring longer contact time, right up to thin film foam technology for smart cleaning and easy rinse in case of time and water restrictions. As a standard, our foam cleaners and disinfectants are tested, approved and/or listed by relevant OEMs of food and beverage manufacturing equipment.

They comply with Kosher/Halal standards. Our foaming disinfectants are tested according to standards EN1276, EN1650, EN13697 (BPR EU 528) against worst case microorganisms. They are locally registered across the EU countries.

All our foam compounds are concentrates, developed for low dosing applications with full cleaning performance and optimal cost control. Thus, we help protect the environment and safeguard your production facilities.

APPLICATION	DISINFECTION	CLEANING		
		CONVENTIONAL	ADVANCED	
ACIDIC	P3-topactive DES Toptactive OKTO	Topaz AC1 Topaz AC3 Topaz AC5	Topaz AC2 Topaz AC4 Topactive 500	DECENTRALIZED FOAM SYSTEMS
NEUTRAL	P3-topax 91 P3-topax 990			
LOW ALKALINE		Topaz LD2 Topaz LD3	Topactive LA Topaz LD1	
MEDIUM ALKALINE	P3-topax 960	Topaz MD2 Topaz MD5	Topactive 200 Topaz MD1 Topaz MD3 Topaz MD4	
HIGH ALKALINE		Topaz HD1 Topaz HD2 Topaz HD3		
CHLORINATED ALKALINE	P3-topax 66	Topactive 314 Topaz CL1 Topaz CL4 Topaz CL5	Topaz CL2 Topaz CL3	CENTRALIZED FOAM SYSTEMS
ACIDIC		Topaz AC3 Topaz AC5	Topaz AC2 Topaz AC4	
NEUTRAL	P3-topax 990			
LOW ALKALINE		Topaz LD2 Topaz LD3		
MEDIUM ALKALINE	P3-topax 960 P3-topax 970	Topaz MD2 Topaz MD5		
HIGH ALKALINE		Topaz HD3		
CHLORINATED ALKALINE	P3-topax 66	Topactive 314 Topaz CL1	Topaz CL3	

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MANUAL CLEANING INSIGHTS

TAKE CONTROL OF YOUR CLEANING PROCESS

Knowing the foam cleaning equipment is performing, is one thing.

What about 24/7 transparency into cleaning activity parameters at the level of each foam cleaning satellite and compliance with your SSOPs?

Let's talk about **Manual Cleaning Insights (MCI)** that digitally tracks and measures manual cleaning activities to provide straightforward insights that ensure controlled, dependable results.

MAKE SURE IT'S CLEAN FROM START TO FINISH

Ecolab **MCI** gives you 24/7 visibility into the cleaning and disinfection process, helping you:

- Verify cleaning and disinfection activities
- Save money by reducing re-cleaning to promote on-time production starts
- Improve efficiency by identifying suboptimal resource usage
- Save time by standardizing and verifying procedures

Partner with Ecolab to solve your toughest manual cleaning challenges. Our complete program delivers peace of mind by combining powerful chemistry with smart technology and world-class service.

SMART.
CLEAR.
CONNECTED.



BETTER CLEANING INSIGHTS MEAN BETTER CLEANING OUTCOMES

FOOD SAFETY AND BRAND REPUTATION



- Maintain food quality and integrity with verifiable cleaning processes that help prevent microbiological and chemical contamination
- Enable correlation of C&S data to food safety and quality issues to improve product shelf life and reduce recalled or scrapped product

PRODUCTIVITY



- Monitors and verifies phases in the cleaning process to reduce recleans and increase on-time production starts
- Improves efficiency by providing data that lets you identify training opportunities and ensure your team's timely completion of tasks

RESOURCE OPTIMIZATION AND DATA CAPTURE

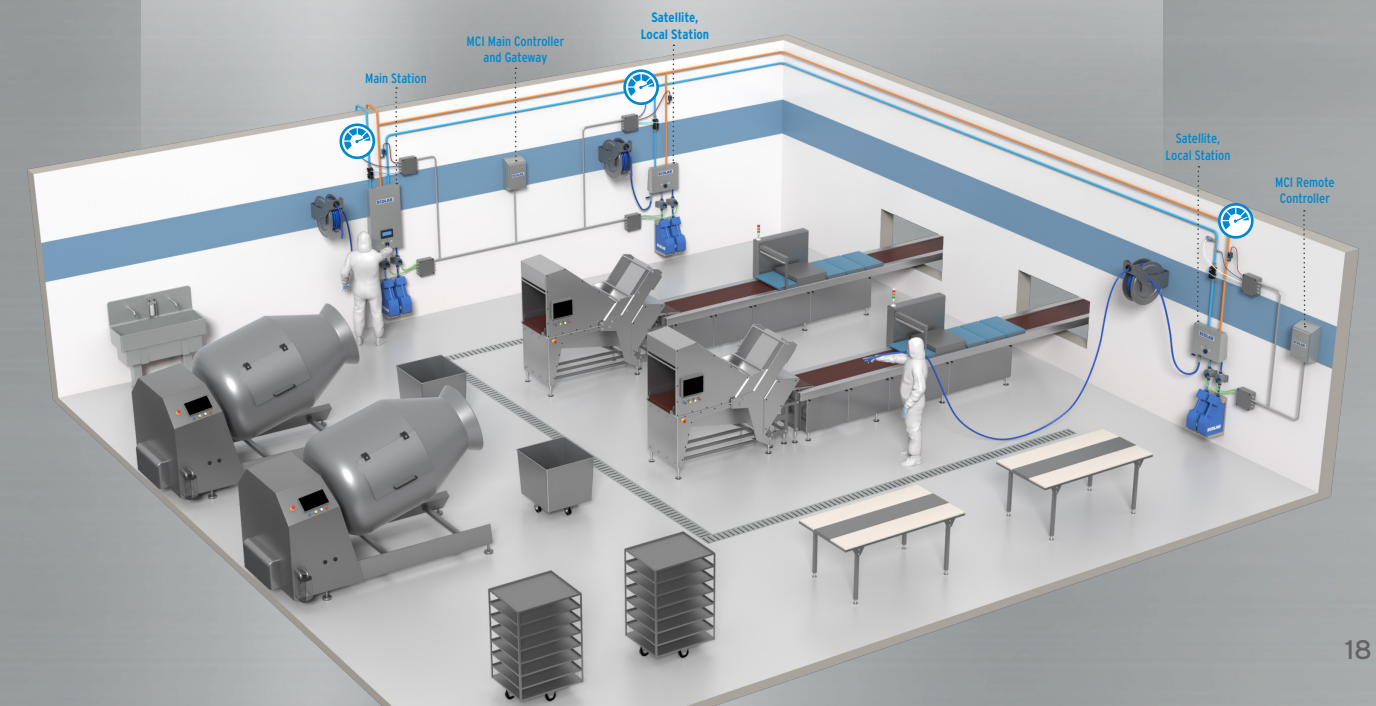


- Monitors resource usage and compares it to benchmarks to help avoid under- or over-usage and optimize total cost of operations
- Automatically captures, stores and analyzes data to improve insights, identify root causes and reduce time needed to prepare data for audits

SUSTAINABILITY



- Sets limits and exceptions to help reduce water consumption, energy costs, optimize the cleaning process and preserve equipment asset life
- Helps reduce food scrapping and waste
- Helps minimize burden on effluent by optimizing chemistry usage



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