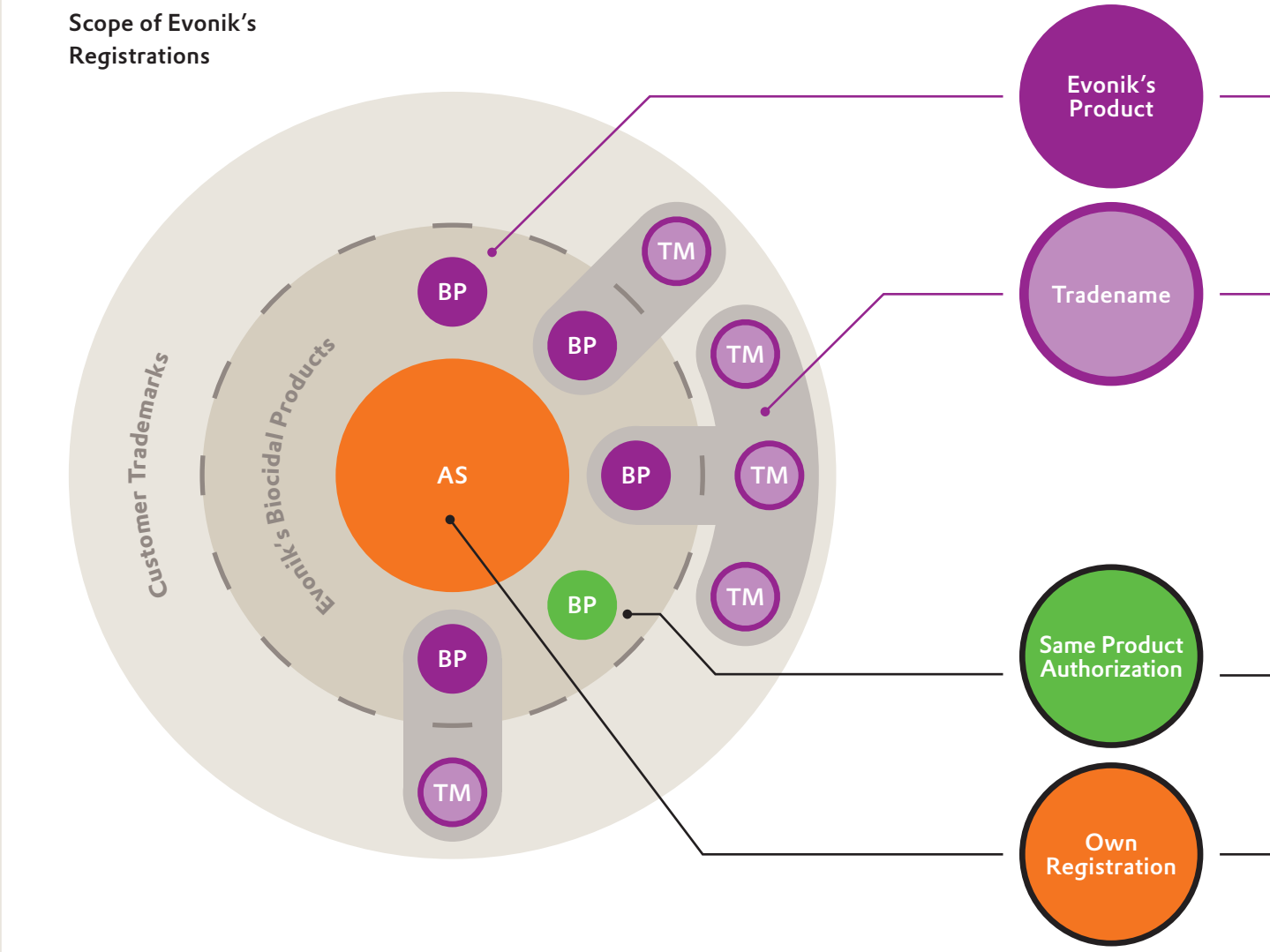
BIOCIDES

Hydrogen Peroxide and
Peracetic Acid for disinfection.

OXTERIL®
PERACLEAN®
CLARMARIN®

EVONIK
POWER TO CREATE

OUR WAYS TO PLACE BIOCIDAL PRODUCTS ON THE



From 2020 the European Biocidal Product Regulation (BPR) replaces old national regulations for Hydrogen Peroxide and Peracetic Acid. The BPR defines the marketing authorization procedure for biocidal products. Only authorized products are allowed to be sold on the market. The main rule of the BPR: no authorization – no market.

- Evonik is a supplier of active substances Hydrogen Peroxide and Peracetic Acid.
- Evonik also offers its own portfolio of Biocidal Products under the brand names OXTERIL®, CLARMARIN®, and PERACLEAN®. They are designed to be used by end users as well as service providers.
- Evonik offers to include private labels of service providers into its dossiers (Tradename Model). The tradename (TM) biocides have the same formulation and proven efficacy as corresponding Biocidal Products from Evonik. The marketing authorization holder (MAH) of the private labels is Evonik.

EUROPEAN MARKET

Marketing Authorization Holder:
Evonik

Value for the customer:
No BPR related effort & expenditures

Marketing Authorization Holder:
Customer

Value for the customer:
Higher degree of operational freedom

EVONIK IS A MEMBER OF CEFIC'S PAR AND PEROXYGENS GROUPS AND PROVIDES A FULL SPECTRUM OF SERVICES FOR THE MARKET ACCESS STRATEGIES

EVONIK PARTICIPATES ACTIVELY IN REGISTRATION OF HYDROGEN PEROXIDE AND PERACETIC ACID AS ACTIVE SUBSTANCES AND BIOCIDAL PRODUCTS UNDER THE BPR

- Evonik offers same product authorization model, including corresponding letters of access, to service provider, which pursue the simplified authorization procedure, according to the Regulation (EU) Nr. 414/2013.
- As a co-owner of active substance dossier, Evonik supports service providers in their own BPR registration procedure and issues, in accordance to the CEFIC operation rules, Letters of Access active substance "Hydrogen Peroxide" and "Peracetic Acid".

BP – Biocidal product from Evonik

TM – Tradename of a customer

BP – Biocidal product from a customer

AS – Active substance

ACTIVE SUBSTANCES & BIOCIDAL PRODUCTS

Active Substances from Evonik

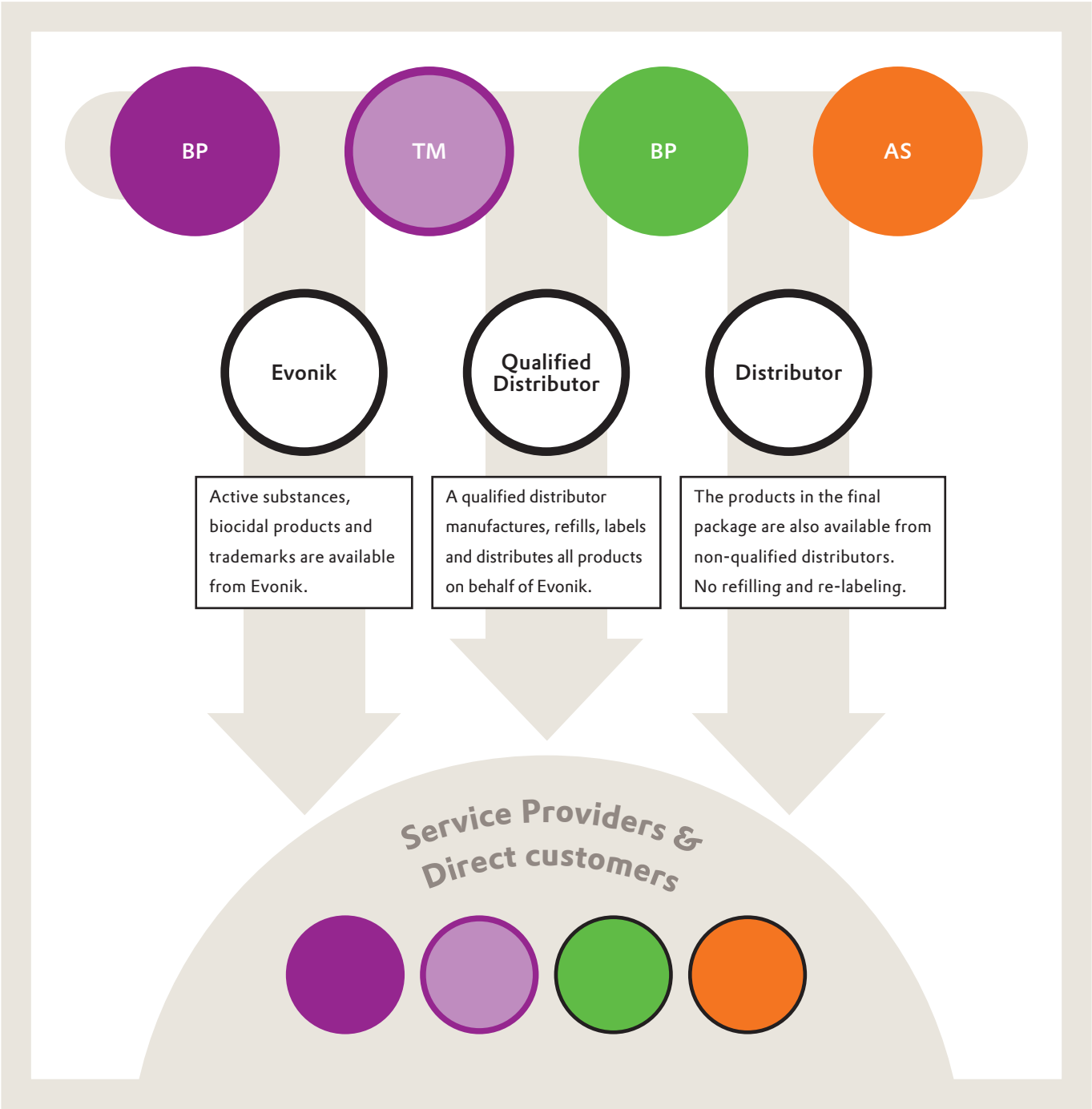
AS Name	Product Type supported	Product lines
Hydrogen Peroxide	PT 1 - 6	HYPROX® AS PERSYNT® LC
Peracetic Acid*	PT 1 - 6, 11, 12	PERACLEAN® AS

For a chemical to become an **Active Substance** a successful approval via active substance authorization is required. Only Article 95 listed suppliers are allowed to place Active Substance on the market.

A **Biocidal Product** contains Active Substance, as an ingredient to have an action against harmful organisms. The efficacy of the entire Biocidal Product formulation has to be proven in its specific application field, grouped into product types (PT).

Biocidal Products undergo biocidal product authorization and can be offered on the market after successful registration only. Active Substance itself cannot be used instead of biocidal product.

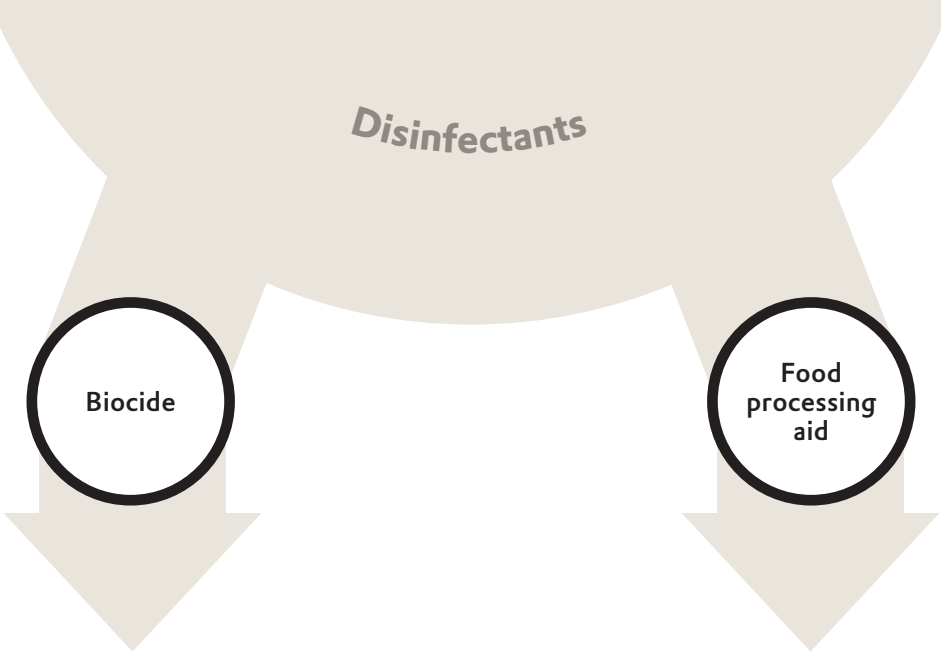
SUPPLY CHAIN CONCEPT



Evonik has established a Distributor Qualification Program. For detailed options on participation in the Distributor Qualification Program, including other supply chain relevant questions, please contact your regional sales representative.

- BP – Biocidal product from Evonik
- TM – Tradename of a customer
- BP – Biocidal product from a customer
- AS – Active substance

FOOD AND BEVERAGE



Disinfection of various surfaces and equipment falls usually into the scope of the BPR. Typical examples are the disinfectants used in Cleaning-In-Place programs.

BPR

Disinfectants used during the manufacturing of various foods or food additives are usually considered to fall under the Food Safety Regulations. Disinfection of sugar liquor, during the extraction step exemplifies a non-biocidal application.

Food Safety Law

Disinfectants for the use in food area fall into the scope of either the biocides regulation or corresponding Food Safety Law regulations. The exact assignment of a product to the related regulatory field is realized by case-by-case consideration and depends on the intended purpose as well as the claims made for the product concerned. In the case of ambiguity, **please contact us.**

Aseptic Filling

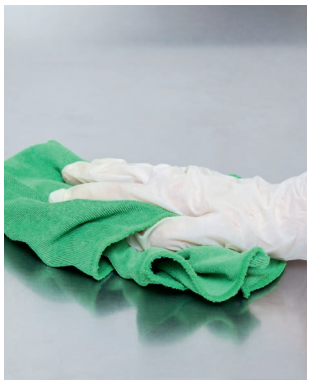
Aseptic packaging is used to protect food and beverages all along the supply chain and to guarantee a high quality of the packed foods along with long shelf life. For disinfection of various packaging materials hydrogen peroxide and peracetic acid are utilized. Various technologies were developed for aseptic filling: bath, spray, vapor and rinse. Bath and spray technologies are mainly used for carton-based packages. Vapor and rinse methods are utilized for PET material.

OXTERIL® 350 SPRAY, OXTERIL® 350 BATH, PERACLEAN® 5 FB (*), OXTERIL® 350 SPRAY S, PERACLEAN® 15 FB (*)

Cleaning-In-Place

Cleaning-In-Place (CIP) is an integral part of the total hygiene conception in food & beverage facilities. CIP is a multi-step procedure for cleaning of a complete items in plant or pipeline circuits under closed system conditions, without dismantling. Peracetic acid and hydrogen peroxide are widely used in the disinfection step and reduce the total number of microorganisms to a harmless level.

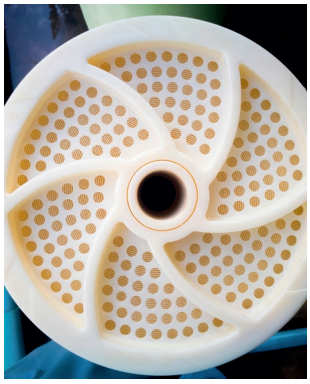
OXTERIL® 350 BATH, OXTERIL® 350 SPRAY, PERACLEAN® 5 FB (*), PERACLEAN® 15 FB (*)



Industrial and institutional cleaning

Among the most important aspects in food manufacturing is the need to clean and disinfect the food processing plant and equipment sufficiently to produce food free of physical, allergenic, chemical and microbiological hazards. During the disinfection step of food-contact surfaces the number of undesirable micro-organisms is substantially reduced. Due to their ecological benign character, peroxygens are becoming the first choice as disinfectants in the food area.

CLARMARIN® 350, CLARMARIN® 500, PERACLEAN® 5 FB (*)



Membranes

The cleaning and disinfection of reverse osmosis membranes is an important procedure in drinking water manufacturing plants. After the membranes have been used for some time, they become contaminated, with pollutants such as colloids, biofilms and other biological matter. Frequent cleaning and disinfection procedure help preventing bio-fouling and contribute in a large extent to long-term high performance of the reverse osmosis module. Peroxygen based disinfectants are widely used in this application.

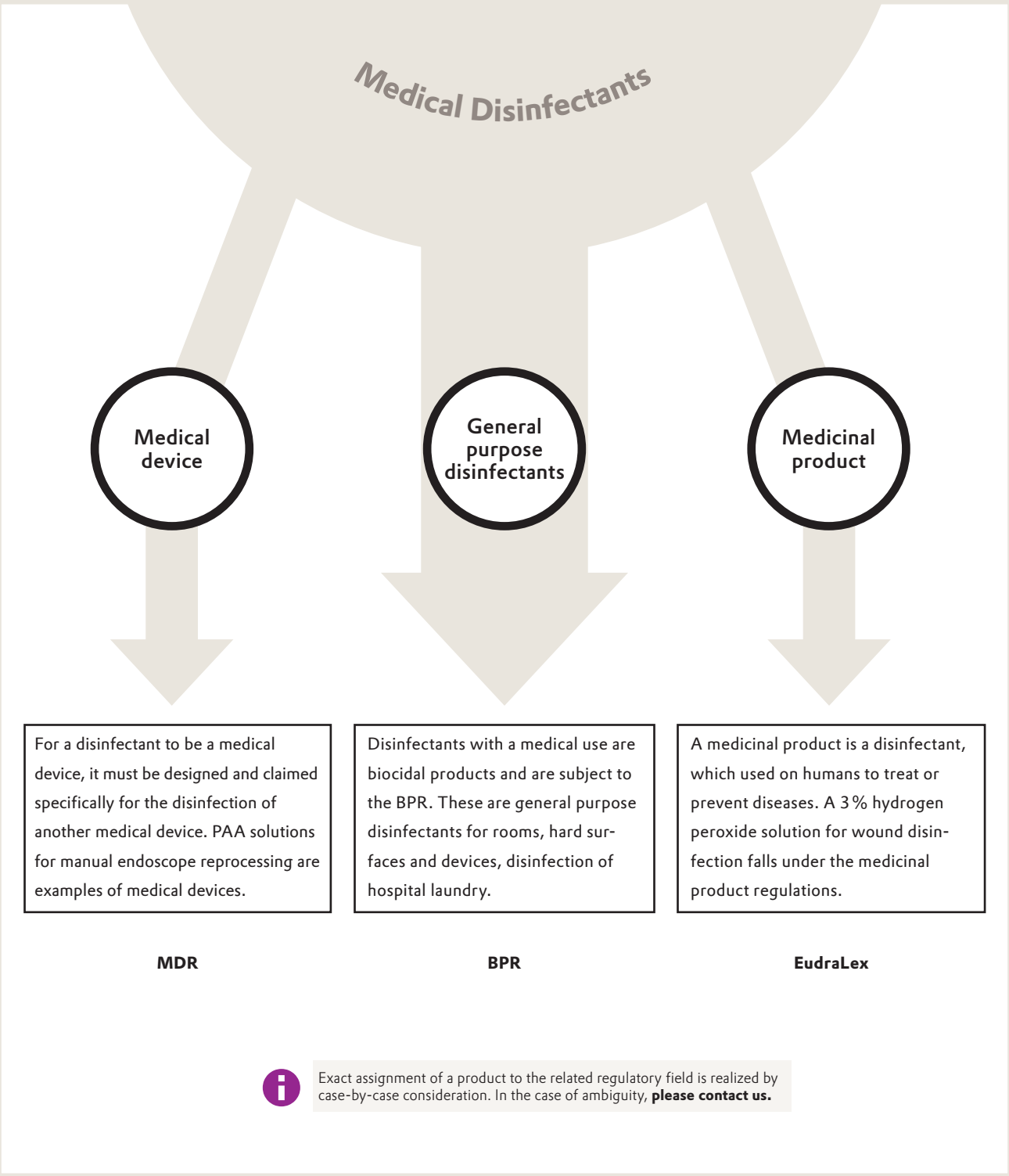
PERACLEAN® 5 FB (*), PERACLEAN® 15 FB (*)

Drinking water distribution systems

Tap water intended for human consumption is subject to stringent micro-biological and chemical standards, which make sure it can be consumed daily without any harm. Along with preparation of drinking water itself, maintenance of installations, piping and tanks, which includes cleaning and disinfection, is of crucial importance. Biocidal agents, e.g. hydrogen peroxide, are utilized to ensure hygienically clean conditions of the installation.

OXTERIL® 350 BATH, OXTERIL® 350 SPRAY, PERACLEAN® 5 FB (*), PERACLEAN® 15 FB (*)

MEDICAL AREA



Exact assignment of a product to the related regulatory field is realized by case-by-case consideration. In the case of ambiguity, **please contact us.**

Disinfectants for the use in medical area fall into the scope of either the biocides regulation or the medical device regulations or the regulations, covering medicinal products for human use.

The exact applicability of the corresponding law depends the intended purpose as well as the claims made for the product concerned.

Industrial and institutional cleaning

Clinically relevant pathogens often persist on inanimate surfaces for weeks or even months. Hence, in healthcare settings, cleaning disinfection of surfaces is part of the multi-barrier system for preventing nosocomial infection. Proper risk assessment is the basis for applying disinfection procedures. Here, focus is on those surfaces that are directly touched by personnel and patients are exposed to frequent contamination. Cleaning and disinfection of floor and walls of buildings, hospital rooms, laboratories as well as of various sorts of equipment is an integral part of numerous cleaning protocols across medical areas. Active oxygen compounds are often the choice of various service providers.

PERACLEAN® 5 HC (*), PERACLEAN® 15 HC (*)

Laundry Care

In the chemo-thermal disinfection of laundry, especially originating from hospitals, nursing homes and other medical care institutions, peracetic acid and hydrogen peroxide are used in the washing stage as a disinfectant and bleaching agent. The primary goal for laundry treatment is to prevent possible pathogen transfer among patients. Disinfectant is usually added in the main wash cycle and targets the elimination of spores and viruses. Sometime disinfection step is done after application of detergents and prior to the dewatering cycle. Textile disinfection is essential for infection prophylaxis for patients and staff in numerous medical facilities.

CLARMARIN® 350, PERACLEAN® 5 LD (*),
PERACLEAN® 10 LD (*), PERACLEAN® 15 LD (*)

VHP-Process

The bio-decontamination of surfaces contaminated with microorganism within critical, enclosed areas is an important consideration to pharmaceutical and other facilities. A safe and reliable way to disinfect such equipment as isolators, laminar flow cabins and whole cleanrooms involves exposure of the surface to gas-phase hydrogen peroxide. Vaporized hydrogen peroxide disinfection, being a low temperature process, is also commonly used to treat various heat-sensitive devices. Hydrogen peroxide containing air is generated by means of special equipment. Depending on the cycle parameters, hydrogen peroxide is present in a form of vapor, condensed vapor or as a mist.

OXTERIL® 350 SPRAY

ANIMAL HYGIENE

Animal housing

Good housing is an integral part of the animal welfare. Proper hygienic condition helps to avoid bacterial, viral, and parasitic infection and related illness in animals. Dry cleaning and washing usually precede the disinfection procedure. During the first two steps gross contamination, organic material of various sorts (e.g., soil, manure, bedding, feed, exudates) are removed from production areas or equipment. Disinfecting solutions are usually applied by mean of special thermofogging equipment or by high-pressure cleaners. Classical use of various spraying and mopping techniques is also very spread in the animal hygiene. Peracetic acid based biocides are widely used in sanitation procedures on preparation of premises for new livestock.

PERACLEAN® 5 AH (*), PERACLEAN® 5.1 AH (*), PERACLEAN® 15 AH (*), PERACLEAN® 17 AH (*)

Hoof hygiene

Hoof health is an essential element in animal husbandry. Prevention of hoof related diseases via the use of formalized sanitation programs is widely applied in animal hygiene. Prophylactic hoof treatment with disinfecting products helps reducing cattle lameness, which is a clinical sign of discomfort as an animal walks. Depending on lameness severity, the mobility can be limited to a very high extent. Lameness of dairy cows can reduce, for example, production of milk and contribute to reproductive problems, without noticing pain and suffering. Biocidal products based on peracetic acid are utilized in special mechanized hoof washing facilities or in conventional footbaths to deactivate pathogens and contribute in this way to animal well-being.

PERACLEAN® 5 AH (*), PERACLEAN® 5.1 AH (*), PERACLEAN® 15 AH (*), PERACLEAN® 17 AH (*)

Animal drinking water

A clean, safe water supply is essential in animal husbandry, especially for various poultry arts. Often drinking water is also used as a carrier for various feed supplements and medicaments, boosting hereby a formation of biofilms and bacteria growth in water. Microbial contamination above the acceptable levels in drinking water directly affects chicken health and farm's performance. Reducing the bacteria level down in the drinking water keeps animals healthier by preventing the pathogens to travel from one animal to another. Peracetic acid is a secondary disinfecting agent utilized in animal drinking water management.

PERACLEAN® 5 AH (*), PERACLEAN® 5.1 AH (*), PERACLEAN® 15 AH (*), PERACLEAN® 17 AH (*)

Equipment

Cleaning and disinfection of various equipment (e.g. animal transport vehicles, footwear and other utensils) belongs to general practices in the farm biosecurity conceptions. The key objective of numerous hygiene protocols, response plans and management systems is to prevent the transfer of pathogens from animals to humans and to reduce the spreading of animal diseases within logistical network. Oxidizing disinfectants, based peracetic acid, are very effective against many viruses and other pathogens and remains highly active over a long period of time.

PERACLEAN® 5 AH (*), PERACLEAN® 5.1 AH (*), PERACLEAN® 15 AH (*), PERACLEAN® 17 AH (*)

WATER TREATMENT

Sewage and waste water

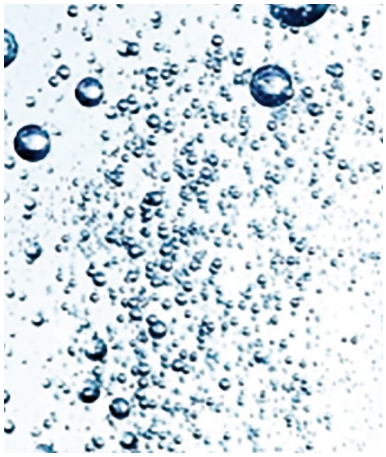
Overall quality of effluent streams from sewage treatment plants is often subject to numerous European and national regulations, which define ecological status of the treated water. Effluents are of good ecological quality if they fulfill specific requirements. Very often, an environmental permit is required to discharge liquid sewage effluent into the environment. Sometimes the treated wastewater is used for agricultural irrigation, where also certain acceptance criteria applies. A post-disinfection procedure of wastewater is applied, if it is necessary to reduce or control the microbiological load. Being effective against a number of fecal coliforms and due to high deactivation efficacy, peracetic acid is quite often dosed to the effluent streams.

PERACLEAN® 2 WT (*), PERACLEAN® 5 WT (*), PERACLEAN® 15 WT (*)

Process water

Process water is often a part of various technical processes. The process water cycle usually consists of a large reservoir, piping, distribution, consumption points as well as water collecting points for the water reuse. Disinfection step is a widely used procedure, used in the regeneration cycle for the microbial control. Biocidal products with peracetic acid as an active substance commonly applied in a broad array of industrial applications to control the growth of microorganisms such as bacteria, algae and fungi in process water.

PERACLEAN® 2 WT (*), PERACLEAN® 5 WT (*), PERACLEAN® 15 WT (*)



Cooling Water

Liquid cooling is an essential prerequisite for numerous industrial processes. Water from natural sources is commonly used for this purpose. Cooling towers, heat exchangers or chill water systems often suffer from corrosion phenomena as well as formation of deposits, including extensive microbiological growth. Unless special precaution measures are taken, it can lead to flow restrictions, reduced operating efficiency, higher maintenance costs and unscheduled outages. Peracetic acid solutions are utilized as preservative to assure microbiologically clean water and prevent biofouling in to the cooling cycle. It increases overall reliability and performance of the cooling systems of various industrial facilities.

PERACLEAN® 2 WT (*), PERACLEAN® 5 WT (*), PERACLEAN® 15 WT (*)

Slimicides

Slime formation is a common negative phenomenon, which accompanies the paper manufacturing process. Polysaccharides, leached from the pulp, act as nutrients and favor the microbial growth. Formation of microbial slime causes critical failures in papermaking process and reduction in the quality of paper. The uncontrolled slime growth can also result in the breakages of paper mass and, as a consequence, a stoppage of the production line. Therefore, it is necessary to treat process water of the papermaking machine to prevent microbial contamination of the water cycle. Use of peracetic acid as conservative reduces microbiological activity and prevent interruptions of the manufacturing process due to the slime.

PERACLEAN® 2 WT (*), PERACLEAN® 5 WT (*), PERACLEAN® 15 WT (*)

NEW RULES FOR BIOCIDAL PRODUCTS

1. **Biocidal products are regulated by the biocidal product regulation. No unregistered products can be used as biocidal products.**

2. **No registration – no market**

3. **Biocidal product must be registered for each single application and can be used only for those applications, which are stated on its label.**

4. **The label of biocidal product is a part of authorization procedure and contains all relevant application specific information including directions of use.**

5. **A biocidal product is defined by its registration number**

6. **A biocidal product has a marketing authorization holder, who is responsible for its claims and placing on the market**

7. **A biocidal product can be sold under multiple tradenames. A tradename of a biocidal product must refer to one registration number only.**

USES OF HYDROGEN PEROXIDE & PERACETIC ACID

PT	Active Substance	Biocidal use
PT2	PAA / H_2O_2	Laundry disinfection
	PAA	Disinfection of sewage and waste water
	PAA / H_2O_2	Disinfection of non-porous hard surfaces and equipment
	PAA / H_2O_2	Cleaning-in-Place (CIP)
	PAA / H_2O_2	Disinfection of drip irrigation water
	PAA	Treatment reverse osmosis membranes
	PAA	Disinfection of greenhouses
	PAA	Disinfection of process water
PT3	PAA / H_2O_2	Disinfection of animal housing
	PAA	Disinfection of boots in foot baths
	PAA	Hoof disinfection
	PAA	Disinfection of equipment
	PAA	Disinfection of transport trucks
PT4	PAA / H_2O_2	Aseptic packaging
	PAA / H_2O_2	Disinfection of non-porous hard surface and equipment
	PAA / H_2O_2	Cleaning-in-Place (CIP)
	PAA / H_2O_2	Disinfection of drinking water distribution systems
PT5	PAA	Drinking water for animals
PT11	PAA	Preservation of cooling water in once-through systems
	PAA	Preservation of cooling water in recirculating cooling systems
PT12	PAA	Slimicide in pulp and paper industry

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