

# Application report

## Microwave disinfection reduces listeria in food production operations effectively

**The latest listeria scandal has disturbed many consumers. This is why food producers are searching for new ways of protecting their production facilities against listeria and other bacteria reliably, efficiently and securely. With the vötschoven microwave disinfection chambers, weisstechnik offers a tried-and-tested solution for simple, reliable and environmentally-friendly disinfection of transport containers, belts and other production tools made of plastic. The patented procedure was developed in cooperation with the Norwegian partners SINTEF and Plastservice, and was tested by a leading Norwegian salmon producer, Nordlaks.**

### Food safety protects consumers and producers

Listeria are bacteria that are also created when processing fresh fish, poultry and meat. They can reproduce even at low temperatures and in vacuum-packed food, which makes them highly dangerous for consumers. Listeriosis is generally harmless in healthy adults, however it is extremely dangerous for people with poor immune systems, older persons, children and expectant mothers, and can lead to serious or potentially fatal infections. This is why it is extremely important for meat and fish-producing companies to take all necessary steps to ensure perfectly

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hygienic production to protect consumers against health risks and the company against the consequences of a food recall.

### **Create hygienic production conditions**

When fish, poultry and meat are processed and produced, they come into contact with conveyor belts, containers and other production equipment. These need to be cleaned extremely carefully and hygienically. Whilst this is relatively easy on new containers with smooth surfaces, it becomes more of a problem as the containers become older. Older containers are often damaged or even cracked which means that water can penetrate the insulation layer. This also applies to the conveyor belts. Here, too, some areas are difficult or impossible to reach, for instance the joints. Due to the fact that classic cleaning procedures with chemical agents or UV light reach their limits here, listeria can make use of the good conditions to reproduce almost without restriction at these points.

### **Test project confirms a reduction rate of up to 99.99 %**

Nordlaks Produkter AS, one of the leading Norwegian salmon producers with an aquaculture facility, recognised this problem back in 2012 and cooperated on a pilot project with Plastservice, a supplier for repairing plastic boxes, and **weisstechnik**. The question here is whether and how microwaves can prevent listeria growth. To find this out, transport containers and belts were thermally treated in an industrial microwave disinfection chamber. Here, the microwaves penetrate the plastic and heat the water in the still-wet freshly-washed containers and belts for a short period thereby destroying the listeria. With excellent success, as verified in examinations by the independent SINTEF Institute in Norway. The reduction rate on conveyor belts is 99.9%, for transport containers

even 99.99% (log reduction factor RF 3 and 4). In contrast to the UV-light treatment method, the effect is not just superficial but also reaches parts that cannot be accessed or are difficult to access, for instance inside the container or on the belt joints.

### **Microwave disinfection chambers ensure environmentally-friendly hygiene**

The now patented procedure is based on industrial microwave disinfection chambers that ensure even distribution of the microwaves thanks to their hexagonal form. All microwave-transparent plastics, such as PE, PP and PTFE, can be disinfected in the ovens. Thanks to the inner volume of 4,200 litres, it is also suitable for large transport containers of up to 1,000 litres. The chambers work with high-performance 2.45 Ghz magnetrons and are available as standard with 24 kW, optionally 36 kW. They are durable and suitable for industrial use and are made of stainless steel (outside 1.4301, inside 1.4404); they can be easily integrated into the existing production chain - as a batch version for individual configuration or as a continuous solution. They meet all relevant specifications of the Machinery Directive 2006/42/EG and the DIN EN 60519-6.

### **Patented procedure has been used successfully since 2018**

After the test phase, Nordlaks Produkter has been working very successfully with the microwave disinfection process since 2018. Plant manager Arne Andersen explains: "The biofilm load on the containers is a huge challenge in the food industry and cannot be ruled out to 100%. But the microwave technology reaches a success rate of up to 99.99%. The described procedure improves food safety considerably." A further advantage: No chemicals or aggressive cleaning agents are required for

the microwave disinfection. This means that the procedure not only protects consumers but also the environment.

**For more information, please visit: <https://www.weiss-technik.com/en/products/produkte-detail/vhm-hephaistos-patented-microwave-technology>**

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Picture 1:



The microwave disinfection chambers are also suitable for large containers with volumes of up to 1,000 litres and ensure reduction rates of up to 99.99 %.

Picture 2:



The patented procedures are suitable for reliable disinfection of all microwave-transparent plastics such as PP, PE or PFTE.

Picture 3:



The microprocessor-controlled process ensures reliable and high reduction rates without the use of chemical cleaning agents.

### **The Weiss Technik Companies**

The Weiss Technik Companies offer under the slogan - Test it. Heat it. Cool it. - solutions that are used around the world in research and development as well as in the production and quality assurance of numerous products. With more than 21 companies at 15 locations, our experts provide you with optimum support and high operational reliability for your systems. The products under the brand **weisstechnik**<sup>®</sup> include environmental simulation and climatic engineering as well as containment solutions. With the test systems from the field of environmental simulation, different environmental influences around the globe can be simulated in time-lapse. The product is tested under real load for its functionality, quality, reliability, material resistance and service life. The dimensions of the test equipment range from laboratory test cabinets to test chambers for aircraft components with a volume of several hundred cubic meters. The Weiss Technik Companies are part of the Schunk Group based in Heuchelheim near Gießen, Germany.

### **Schunk Group**

The Schunk Group is an internationally active technology group with around 8,100 employees in 29 countries. The company offers a broad range of products and services from the fields of carbon technology and ceramics, environmental simulation and climate technology, sintered metal and ultrasonic welding. The Schunk Group generated sales of EUR 1.065 billion in 2015 and thus exceeded the billions threshold for the first time.