

Pure Safety
Intelligent Technology
**Milk- Cheese-
& Dairy Industry**





Pure Safety Intelligent Technology

Ortner: Innovative cleanroom technology from Austria

Ortner Reinraumtechnik GmbH develops and manufactures systems and technologies for industries whose day-to-day work requires a germ-reduced environment. As a system supplier for airlocks, isolators, clean air systems and decontamination processes, we have bundled know-how and experience for 30 years. As a European innovation leader in cleanroom technology, the Austrian family-owned business has established itself on the international market with state-of-the-art technology and reliable service.

The result: fast, safe and reliable processes to protect people, products, animals, research work and the environment against sources of contamination and particles.

Consistently high product quality

The production in a microbiologically clean and particle-free environment is a central issue in the milk and cheese processing sector. Ortner develops systems and technologies that in treatment and processing of milk **deliver consistently high product quality and safety** - from production of products to packaging. They can be optimally integrated into the customer's manufacturing processes.

Ortner develops customized solutions through industry-specific know-how and expert teams consisting of process engineers from universities and Ortner's development management. Using comprehensive AFMS analysis (approved food manufacturing systems), each project can be individually planned and developed according to the specific requirements.

Gentle and natural extension of product life

A germ-free environment as well as the highest standards of production, safety and hygiene are essential when working with the sensitive raw material of milk and the milk, cheese and dairy products.

This is the only way to meet the requirements for freshness, the absence of preservatives and shelf life, as well as statutory hygiene requirements.

All production steps in dairy and cheese processing are subject to strict hygiene regulations. Ortner offers innovative and technically sophisticated solutions to make production areas low-germ without affecting the quality of the food: **The lowest possible germ count or colony-forming unit (CFU) is achieved with no chemical preservatives or additives.**

The advantages: Increased shelf-life in a natural way, extended transport and storage capacity, avoiding returns, dispensing with or reducing the use of preservatives. This creates an immediate quality and competitive advantage for our customers.

Ortner solution for keeping critical zones clean

Innovative products and solutions in the laminar flow area ensure the safe production and packaging of milk, cheese and dairy products: from production plants and machines to processing rooms through to the service counter. Protection against germs is essential specifically in critical areas such as cutting/slicing and packaging rooms or ripening rooms.

Innovative processes such as UVC-surface sterilization and filter technology are used to produce a germ-free environment. UVC-rays are part of sunlight and can sterilize without the use of chemicals and heat, thus stabilizing the quality of products. In doing so, Ortner places great emphasis on maintaining product quality as well as on flexible, customer-oriented solutions and standards that far exceed legal requirements.





What advantages do Ortnor plants/systems offer?

The systems for the milk-, cheese- and dairy sector are designed to

- ensure the **quality of the original product** during the entire production and refining process and thereby
- increase the **quality of the finished product**

How does the customer benefit?

Ortnor system solutions ensure a **competitive advantage** through:

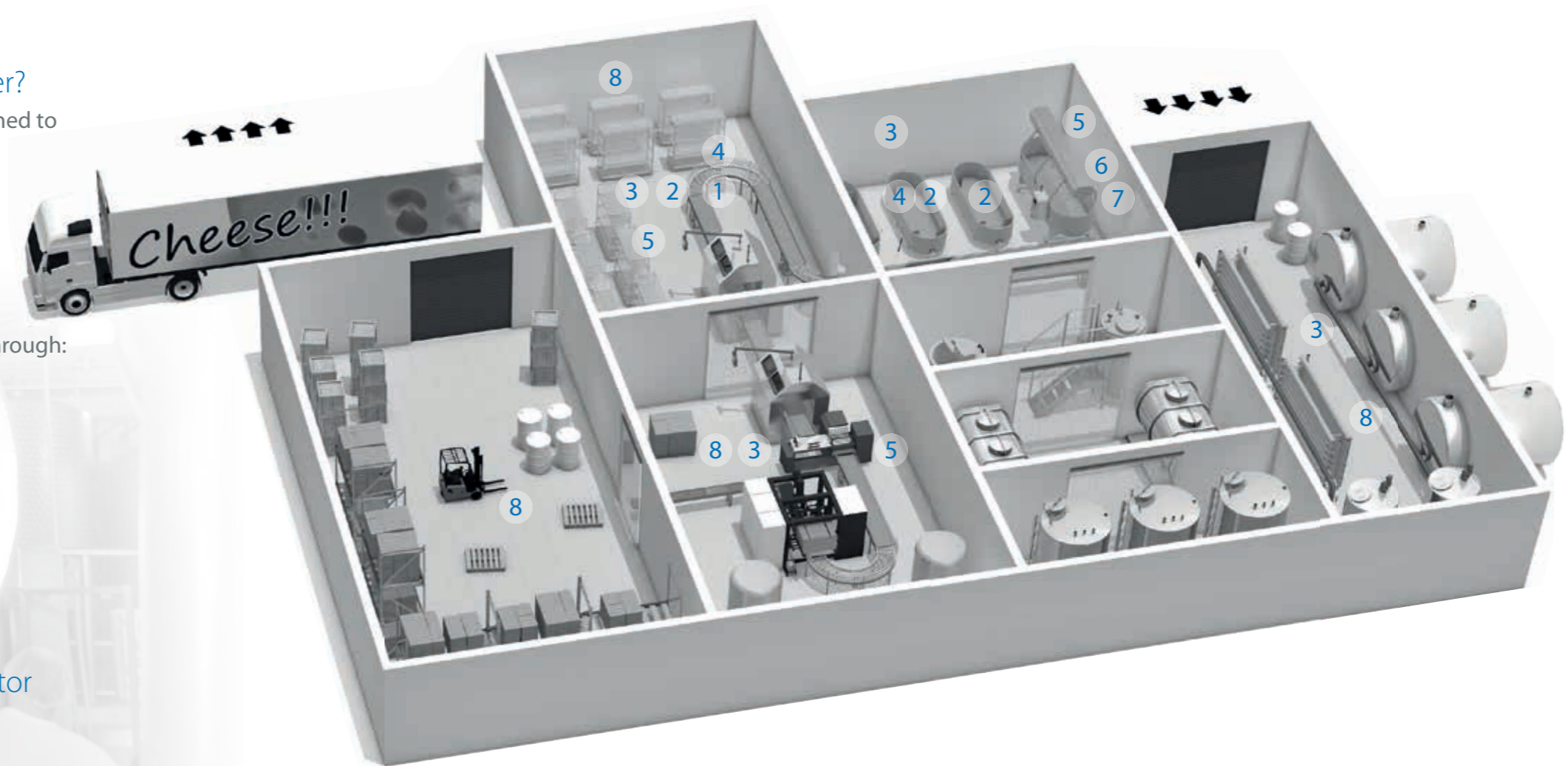
- gentler production options
- maintaining product quality
- controlled production environment
- stable, consistent production conditions
- longer product life cycles
- longer transport and storage capacity
- avoidance of returns

Advantages for the milk-, cheese- and dairy sector

- guarantees consistently high product quality through to the packaged goods
- increased product safety
- lowest possible germ count (CFU) <1
- gentle handling without chemical preservatives or additional thermal processes
- guarantees longer shelf-life
- keeps critical zones clean

Why to choose Ortnor

- system solutions through harmonized products and technologies
- innovative hygiene design thanks to cleanroom technology
- infrastructure-independent systems
- low investment costs
- energy-optimized operational management





Parent category	Category	Laminarflow DecAx	Filter Fan Unit Aseptic	Hygienic Cube	Hygienic Forced Air Cooler	PDc-Cleanroom Clothing	PDc-Wardrobe System	PDc-Personnel Air Lock	PDc-Textile Air Duct System
		AIR DECONTAMINATION				PHOTODYNAMIC SURFACE DECONTAMINATION			
Protection concept	Selective protection		x			n.a.	x	x	
	Line concept	x				n.a.			
	Room concept			x	x	n.a.			x
Airflow concept	Rectified air flow (laminar)	x	x				n.a.		x
	Turbulent air flow			x	x	n.a.	n.a.	x	
Achievable germ count	Germ count (special mold and spore-forming)	CFU < 1 per m ³ air	CFU < 1 per m ³ air	CFU < 50 per 100 m ³ room volume	CFU < 50 per 100 m ³ room volume				
Reachable cleanroom class	GMP	B	B			A	B	B	B
Application areas	Logistic- and transfer areas (e.g.: storage warehouses, buffer zones, corridors/aisles)		x	x	x				x
	Pre-production (e.g.: unpacking of high caliber products, peeling rooms, care areas, machine loading upper- and lower foil)		x	x	x				x
	Manipulation and primary packaging (e.g.: slicer areas, goods packaging, skin packaging, marination, filling areas)	x	x	x	x				x
	Cooling areas (e.g.: cooling tower, cooling tunnel, cold storage)		x	x	x				
	Locks areas (e.g.: personnel locks, material locks)					x	x	x	
	Ripening rooms			x					
Air speed	> 0,45 m/sec		x	x		n.a.	n.a.	x	
	< 0,45 m/sec	x			x	n.a.	n.a.		x
Installation height	< 2500 mm	x					x		x
	> 2500 mm		x	x	x			x	



Laminarflow DecAx



Ortner leverages special technology to meet both the requirements of the dairy industry and state-of-the-art cleanroom technology: FlowLine DecAx is a complex laminar flow system with an integrated sterilization system. It is specifically designed to prevent microbiological recontamination.

The technology: DecAx is a cleanroom system specifically designed for processing and primary packaging: It filters the air and sterilizes the interior surfaces of devices based on a low turbulence displacement flow. The system's 2-stage design is referred to as "hurdle technology". The DecAx product line easily meets the stringent requirements in terms of **product safety** and **germ reduction** when it comes to processing milk, cheese and dairy products.

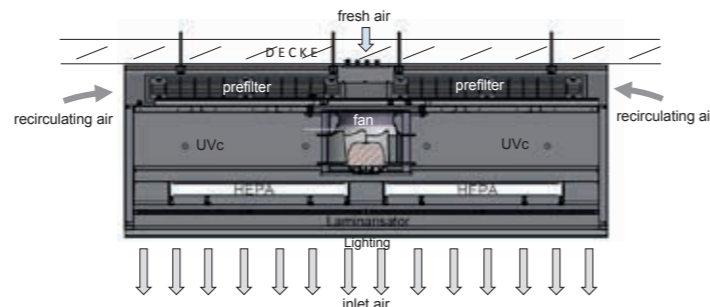
The advantages: Microbiological cleanliness combined with the fast drying of machines and processing rooms thanks to sorption technology result in only short interruptions to production and high-quality end products. Surface decontamination in the interior areas of the systems and the effective treatment of the filter cells allow the service life of HEPA filter media to be extended to 5-7 years (instead of the conventional 12-16 months) in microbiologically contaminated areas.

Ortner PLUS

- Proven system for extending the shelf-life of food using cleanroom technology
- CFU <1 achievable in proximity to product thanks to the "hurdle technology"
- Microbiological safety thanks to HEPA filter and surface sterilization
- Very high filter life
- Energy-efficient LED lighting creates a particularly pleasant working environment
- Ready to plug-in and factory-qualified system
- Complies with GMP and HACCP guidelines

Options

- External touch panel
- Variable air guidance skirt possible
- Remote control



Technical specifications

- Casing**
Stainless steel 1.4404 brushed
- Power consumption**
5 kW / 6,5 A
- Voltage**
400 VAC / 50 Hz
- Control system**
BI – LED
- Filter stages**
G4 / H14
- Filter monitoring**
Electrical differential pressure switch
- Sterilization**
UVC-lighting technology 2 x 30 watts
- Air concept**
Low-turbulence laminar flow – recirculation mode
- Air speed**
0,2 – 0,45 m/s
- Air volume (circulation rate)**
1800 – 4000 m³/h per module
- Ventilation connection for external air**
Max. 1000 m³/h
- Lighting**
LED 2x55 Watt
- Version**
Hygiene version*

Dimensions	L1 x W1 (mm) L2 x W2 x H (mm)
L1/W1 lower edge	2500 x 1000
L2/W2 upper edge	2500 x 1300 x 800
	+ 200 mm built-up air guidance skirt



- 1] The DecAx system sucks in the room air and supplies it directly above the respective working area, sterilized and particle-free
- 2] Low turbulence displacement flow for optimal air filtration and
- 3] surface disinfection minimizes re-contamination risk in the production process
- 4] Specially designed to avoid microbiological recontamination in the processing area





Filter Fan Unit Aseptic



- ### Ortner PLUS
- CFU <1 achievable by means of selective air guidance
 - Long-term microbiological safety thanks to filtration and surface sterilization
 - Extended filter life of up to five years
 - Ready to plug-in and factory-qualified system
 - Easy installation and commissioning
 - Complies with GMP and HACCP guidelines

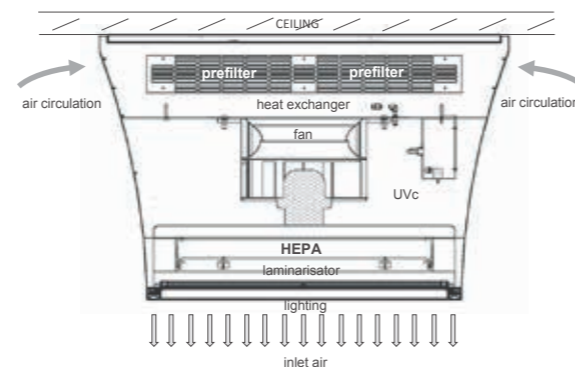
With the Filter Fan Unit Aseptic, Ortner opens up new horizons in the fields of safety and shelf-life for the milk, cheese and dairy sector. The Aseptic FFU's create a particle and germ-free environment and are thus particularly suitable for critical areas such as manipulation and primary packaging areas.

The technology: The Aseptic Filter Fan Units are special multifunction filter-fan modules developed as a selective protective concept for food production. They can be used as an extension unit for production and filling systems or as freely installed clean air modules.

The advantages: In addition to the filtration of particles and germs by HEPA filters, the integrated UVc-surface sterilization results in lasting microbiological stability and very long filter life. The germ-free air is supplied in direct proximity to the product and creates a microclimate around production areas at risk. Aseptic FFU are clean recirculation systems, which, in addition to offering selective protection, also contribute to improving room air quality. Flow characteristics can be significantly improved with the optional cooling coil fittings.

Options

- External touch panel
- Variable air guidance skirt underneath
- Cooling coil 1,5 kW – dry cooling
- Workplace lighting LED



Technical specifications

- Casing**
Stainless steel 1.4404 brushed
- Power consumption**
2,5 kW / 3,5 A
- Voltage**
400 VAC / 50 Hz
- Control system**
BI – LED
- Filter stages**
G4 – H14
- Filter monitoring**
Electrical differential pressure switch
- Sterilization**
System interior sterilization UVc 1 x 30 watts
- Air concept**
Low-turbulence laminar flow – recirculation mode
- Air speed**
0,2 – 0,5 m/s
- Air volume (circulation rate)**
Max. 1800 m³/h
- Lighting (option)**
LED 2 x 55 watts
- Design quality**
Hygiene version*

Dimensions	L1 x W1 (mm) L1 x W2 x H (mm)
L1/W1 lower edge	1000 x 1000
L2/W2 upper edge	1300 x 1300 x 800



- 1| Freely installed clean air modules for a particle-free environment
- 2| Safe environment for people and products
- 3| Optimized air quality throughout the entire processing area
- 4| The germ-free air is supplied in direct proximity to the product and creates a microclimate around production areas at risk



* Hygiene version: good cleanability, no dead spaces, resistant to conventional cleaning agents V4A-1.4404.



Hygienic Cube



Since production facilities in the dairy sector are often difficult to keep germ-free on all surfaces, Ortner has developed flexible equipment such as the hygienic cube. Hygienic cubes are autonomous units that ensure permanent air circulation.

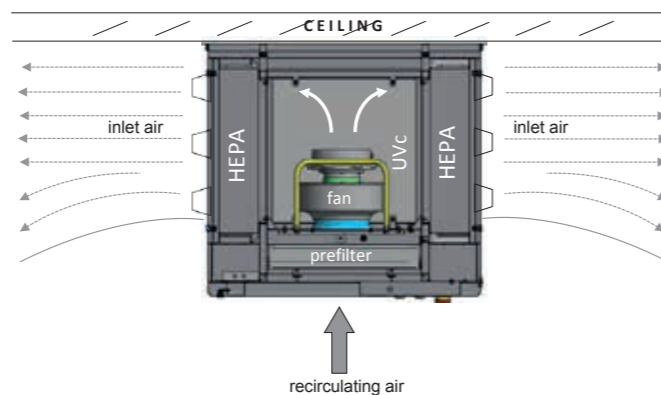
The technology: The cleanroom quality is achieved by means of the dilution principle. Their high air volume makes hygienic cubes ideally suited for meeting cleanroom requirements. Application areas include both large and small room volumes, such as production rooms, logistics and transfer areas, pre-production, processing and primary packaging, ripening rooms as well as colling areas.

The advantages: The system operates exclusively in recirculation mode. The particle and microbiologically contaminated production air is sucked in by the hygienic cube, filtered free of particles, sterilized with UVC-irradiation and discharged. The system is designed to allow installation of the clean air outlet on one side, two sides, three sides or even on all four sides.

- ### Ortner PLUS
- Established room protection concept to extend the shelf-life of food
 - Low investment costs and low energy costs
 - CFU <50/100 m³ room volume achievable
 - Microbiological safety thanks to integrated UVC-sterilization
 - Internal surface sterilization prevents recontamination during the production process
 - Selective air discharge on one, two, three or four sides
 - Ready to plug-in and factory-qualified system
 - Complies with GMP and HACCP guidelines

Options

- External touch panel
- Optional laminarizator instead of nozzle plate
- Multi-sided air outlet (standard design: two-sided air outlet)



Technical specifications

- Casing**
Stainless steel 1.4404 brushed
- Power consumption**
2,5 kW / 3,5 A
- Voltage**
400 VAC / 50 Hz
- Control system**
BI – LED
- Filter stages**
G4 – H14
- Filter monitoring**
Electrical differential pressure switch
- Sterilization**
UVC-lighting technology 1 x 20 watts
- Air concept**
Recirculation mode
- Air volume (circulation rate)**
Max. 3000 m³/h (4 x 750 m³/h)
- Air guidance system**
Induction flow by means of jet nozzles
- Version**
*Hygiene version

Dimensions

L x W x H (mm)

1080 x 1080 x 1000



- 1| The hygienic cube sucks in air, filters it free of particles and blows it out again free of germs
- 2| Flexible use from production to transfer and processing through to storage and cooling area
- 3| Germ-free production environment for guaranteed freshness and shelf-life
- 4| Maximum cleanroom conditions directly at the site of food processing





Hygienic Forced Air Cooler



The Hygienic Forced Air Coolers are cleanroom systems that have been specially developed to meet stricter hygiene requirements such as those in the milk, cheese and dairy sector. They constitute a real alternative to conventional room air coolers thanks to filter and sterilization technology. Applications range from general cold-storage rooms to cooled production rooms.

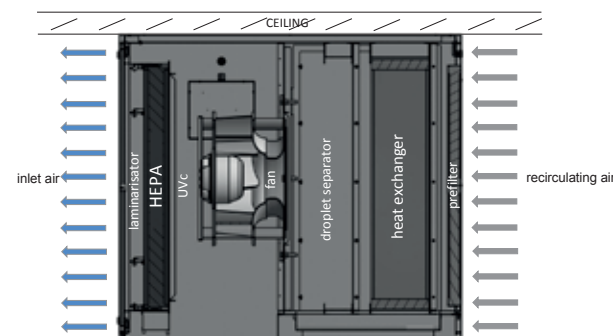
The technology: Designed as a room protection concept, hygienic forced air coolers operate based on the principle of low-turbulence mixed flow. The flow generated in the process is ideally suited to optimally distribute the cooled air in the surrounding area without producing high turbulence or strong air drafts. To minimize the microbiological risk, the hygienic forced air coolers come equipped with two filter stages (1x coarse filter and 1x HEPA filter) and integrated UVC-sterilization in addition to the high-performance cooling coil.

The advantages: Hygienic Forced Air Coolers are purely interior recirculation systems (without any air ducts or connections to infrastructure ventilation systems). In combination with air dehumidifiers or in rooms with a relative humidity of <50% rh, media temperatures of -7 °C can be used. Doing so even helps you achieve low room temperatures or high cooling capacities.

- Ortner PLUS**
- Established room protection concept for increased production safety
 - CFU <50/100 m³ room volume achievable
 - Microbiological protection concept based on cooling, HEPA filter and integrated UVC-sterilization
 - Optimized flow pattern – ideal cooling air distribution with reduced turbulence
 - Can be combined with other systems such as: Aseptic FFU, DecAx and CleanCloud
 - Ready to plug-in and factory-qualified system
 - Complies with GMP and HACCP guidelines

Options

- External touch panel
- Jet nozzles at the air outlet



Technical specifications

- Casing**
Stainless steel V4A 1.4404
- Power consumption**
2,5 kW / 3,5 A
- Voltage**
400 VAC / 50 Hz
- Control system**
BI – LED
- Filter stages**
G4 – H14
- Filter monitoring**
Differential pressure switch
- Sterilization**
UVC-lighting technology 1 x 30 watts
- Air concept**
Low-turbulence airflow
- Air volume (circulation rate)**
Max. 4500 m³/h
- Cooling capacity**
12,8 kW (8 kW) [7,2 kW]
- Cooling medium**
-7 °C (-1 °C) [+6 °C]
- Medium volume**
Approx. 2900 l/h
- Throw distance**
3 – 5 m (up to 8m with jet nozzles)
- Air speed**
Approx. 1.2 m/s
- Version**
Hygiene version*

Dimensions	L x W x H (mm)
	1300 x 1040 x 1160



- 1| Cleanroom technology for maximum hygienic requirements
- 2| Two filter stages as well as active UVC-sterilization minimize the microbiological risk during the production process.
- 3| Use in refrigerated production rooms
- 4| Internal recirculation system with ingenious protection concept



* Hygiene version: good cleanability, no dead spaces, resistant to conventional cleaning agents V4A-1.4404.



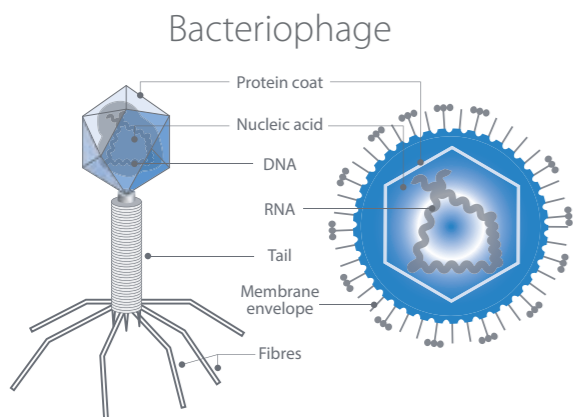
Photodynamic Disinfection certified Technology "PDcT"

What is PDcT?

Ortner has developed an effective microbiological germ deactivation technology that uses light and a photosensitizer to effectively deactivate microorganisms on surfaces.

The entire food processing chain under pure conditions and its environment must be considered as complex ecosystems. The decisive factor in doing so is to differentiate microorganisms into useful and so-called "problem germs". Useful microorganisms do not necessarily have to be eliminated in order to create a clean production environment for food. On the contrary: Especially to prevent the formation of anti-resistance, the mechanisms of useful microorganisms must be made useable.

This is precisely the principle on which the new PDc Technology for the disinfection of complex surfaces is based.



What does photodynamic mean?

Photodynamic refers to a reaction of light with light-absorbing molecules. This results in surface-bound singlet oxygen with a high disinfectant effect. Once the light energy is removed, the molecule changes back to its original state.

The science behind it ...

PDc Technology function

Photodynamic Disinfection certified Technology (PDcT) is a **method newly developed and patented by Ortner**: The interaction of a photosensitizer with visible light produces singlet oxygen, resulting in the **effective microbiological inactivation of germs** on surfaces.

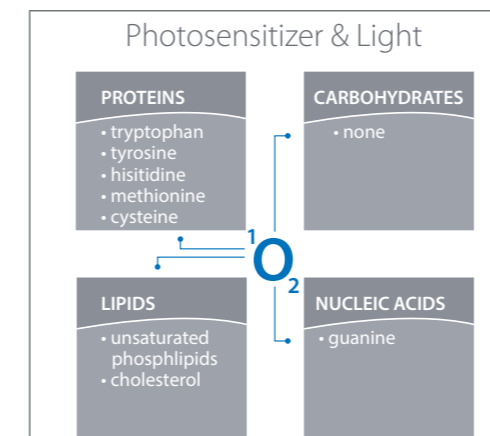
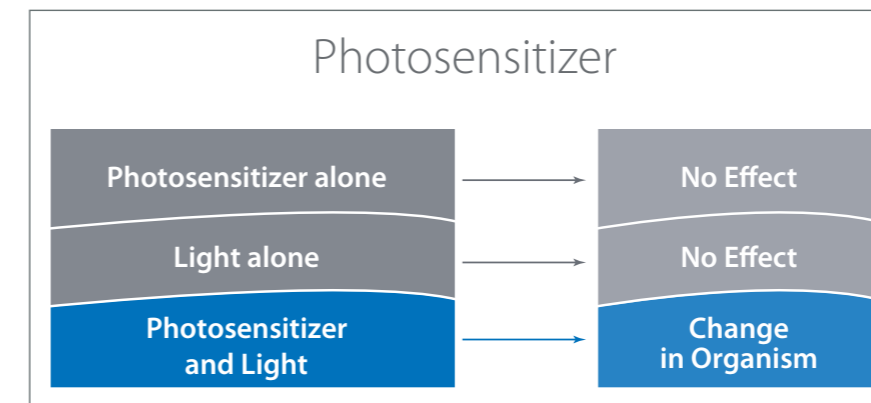
PDcT is **safe for use on humans**, making it possible for the first time ever to decontaminate people in their working environments and thus **minimize the transmission of germs from one person to another**.

The effects of using a photosensitizer and light

Irradiation generates highly reactive oxygen species that destroy the cellular structure of viral and bacterial membranes by oxidation and lead to the elimination of germs.

The PDc Technology uses a specially developed dye as the photosensitizer

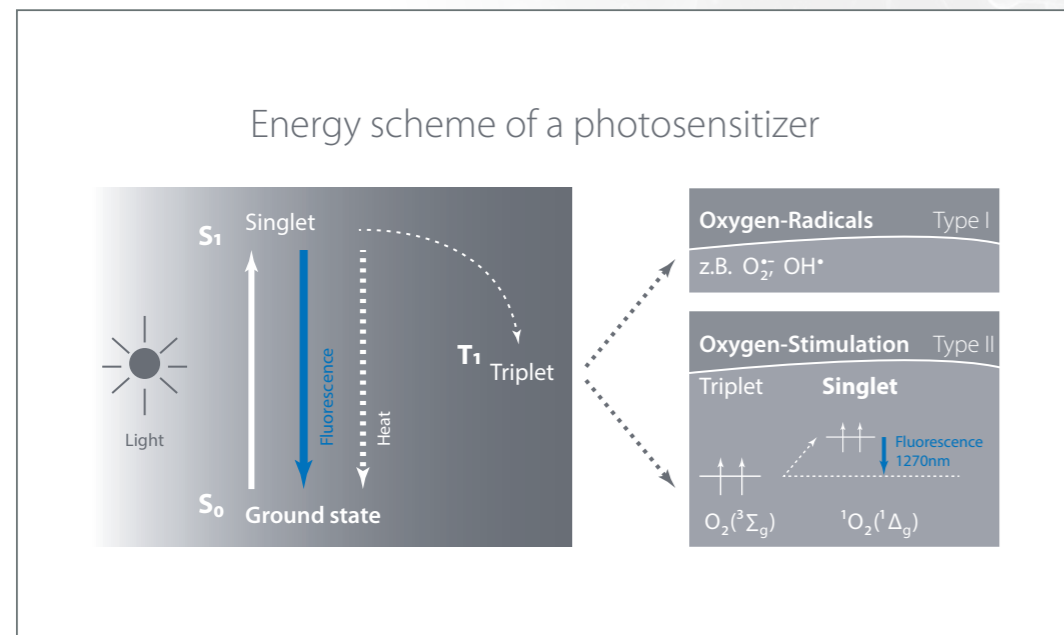
This dye works only on surfaces and is activated by irradiation with harmless visible light.



A photosensitizer is a molecule that can absorb light quanta and transfer the energy to a second molecule. The combination of photosensitizer and light creates surface-bound singlet oxygen (1O_2).

PDcT Mode of Action

The photodynamic effect is mediated by photo-oxidative reactions. Through the use of a special textile dye and a suitable light source, light-induced oxygen production is utilized as a disinfectant at the "point of use," that is, in close proximity to the microorganisms.



The photodynamic effect is mediated by photo-oxidative reactions. In the Type I process, an interaction develops between an energized photosensitizer and the surrounding substrates, generating radicals and radical ions such as HO^{\cdot} and superoxide anions ($O_2^{\cdot-}$). The Type II mechanism generates a singlet state of oxygen by directly transferring energy from the triplet state. In both cases the reactive oxygen oxidizes the cell wall, and the peptides and lipids of the plasma membrane.

PDcT results have been scientifically tested by independent institutes:
(based on the study by the Fraunhofer Gesellschaft IPA Institute)

- Germs were eliminated on cleanroom fabric after four minutes with high safety for a stable process
- 90% elimination of germs after 3.7 minutes
- 99% elimination of germs after 6 minutes
- Safety for people
- **No risk of sensitization**
- **Good skin compatibility**
- **Proven reactive oxygen species in the ROS test**

What does certified mean?

The photodynamic effect is a delicate coordination of three elements:

Light - color - fabric

All three elements are tested by respected scientific institutes and found to be good for application in practice.



Fabric development in cooperation with TITV Greiz e.V.



Fabric compatibility tested and confirmed by the Hohenstein Institute



Microbiologically tested and confirmed by Graz University of Technology, Research Center for Pharmaceutical Engineering RCPE and the Fraunhofer Institute IPA



Overall system tested by Fraunhofer Institute IPA, Graz University of Technology and the Research Center for Pharmaceutical Engineering RCPE



Airlock technology tested and certified by Fraunhofer Institute IPA



Light development: JOANNEUM RESEARCH Forschungsgesellschaft mbH



PDc Technology with a wide range of applications



PDc-Cleanroom Clothing



PDc-Wardrobe System



PDc-Textile Air Duct System



PDc-Personnel Air Lock



An innovative development in close cooperation with



European innovation leader in the field of cleanroom technology

- Responsible for:
- Technology
 - Devices



The German cleanroom clothing specialist

- Responsible for:
- Fabric
 - Clothing



The German dye manufacturer

- Responsible for:
- Dye
 - Dyeing process



PDc-Cleanroom Clothing

The PDc-Cleanroom Clothing is an innovative further development of conventional cleanroom clothing with an additional high disinfecting effect.

The status quo: Wearing conventional cleanroom clothing in cleanrooms and hygiene areas is a matter of course. Different types of textiles, materials and fabrics cover the needs of different industry requirements. Extensive studies and qualification tests confirm the skin compatibility, wearing comfort and retention capacity of Ortner products.

The innovation: PDc-Cleanroom Clothing is a special type of cleanroom clothing: cleanroom fabric, dyed with special dye, produces an antimicrobial effect with no side effects for the skin when exposed to light.

The product is available in various designs with the appropriate supplements.

Clothing options

- Overall
- Two-piece outfit
- Overcoat
- Head cover with mouthguard
- Apron
- Cover cloth

+

Ortner PLUS

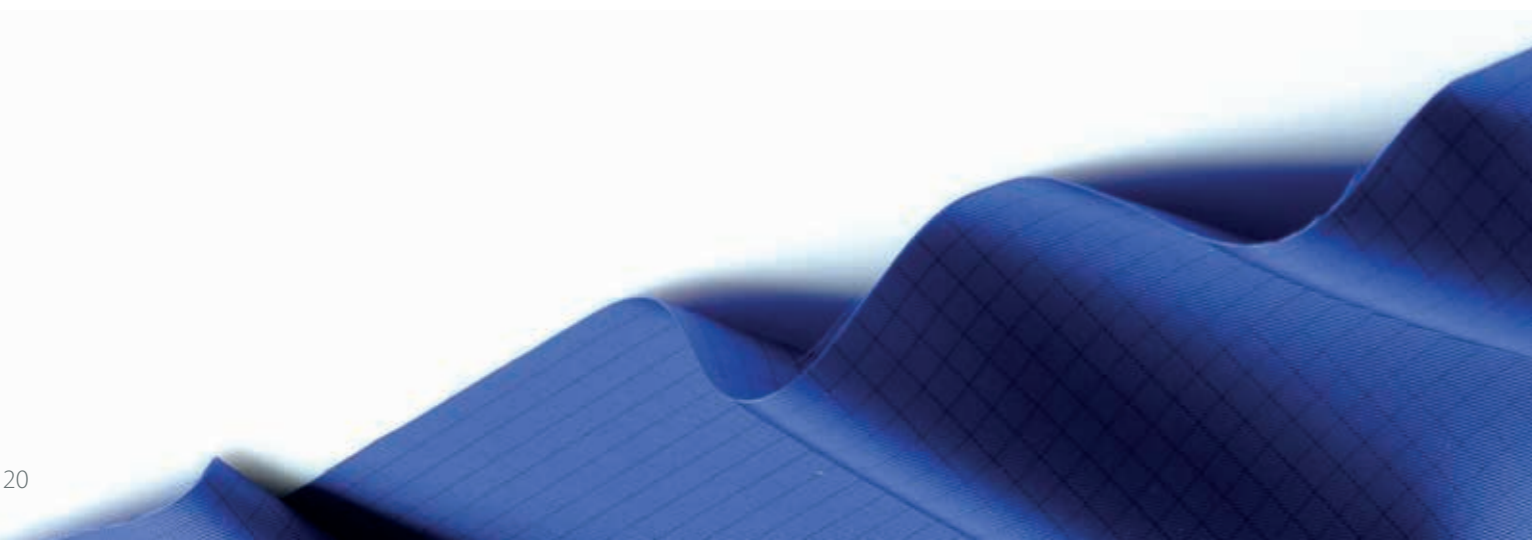
- Surface sterilization of the fabric in the dressed state avoids the costly process of changing garments and constant changing of clothing during work
- No side effects for human skin
- Good wash resistance
- Research and testing institutes – Graz University of Technology, RCPE “Research Center Pharmaceutical Engineering”, IPA Fraunhofer, Hohenstein Institute, Joanneum Research, Denkendorf, TITV “Textile Research Institute”

Options

- Design/shape according to customer requirements

Technical specifications of PDc-Dastat fabric

- Fabric type**
Dastat-PDcT Type: K21-78-41-A2 and K11-78-31-A
- Fabric material**
Polyester (PES)
- Grammage**
88 g/m²
- Air permeability**
Approx. 50l/min, dm²
- Color**
Blue
- Wash fastness**
Color change 4-5 at 4-5 bei 60 °C ISO 9237-C06
- Wash resistance**
> 80 wash cycles according to RKI at 70 °C with no loss of effect
- Antibacterial effect**
Approx. 99% (Laboratory Graz University of Technology / Roombiotic)
- Microbiological effectiveness**
Gram-positive / gram-negative / protein / lipids / nucleic acids
- Cleanroom class suitability**
At least C according to GMP / ISO 5-6



Carsten Moschner, Dastex Reinraumzubehör GmbH & Co. KG

"Extensive tests have confirmed the function, efficiency, effectiveness and suitability of the photodynamic fabric for industrial use. Independent scientific institutes such as the prestigious Hohenstein Institute for Textile Innovation and the well-known Fraunhofer Institute IPA have carried out extensive tests and the technology has even been awarded with a prize."

PDc-Wardrobe System



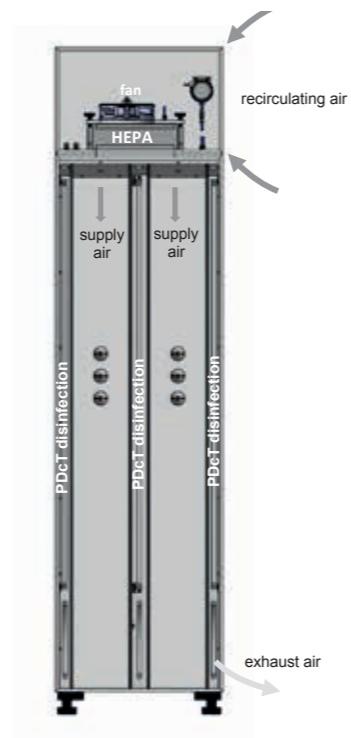
Ortner PLUS

- Innovative cleanroom technology including in the wardrobe
- Very good disinfecting performance
- Tested and validatable processes
- Appealing and practical design
- Very versatile thanks to modular technology

Conventional wardroom systems for cleanroom or hygiene clothing are designed exclusively for storing the clothing. Version, design and technology are generally not very different. The PDc-Wardrobe system from Ortner, on the other hand, is a completely new process for the flexible and safe disinfection of clothing.

The technology: Photodynamic disinfection is based on lighting technology in the cabinets and specially manufactured and dyed clothing. The wardrobe cabinets are also designed as standard as cleanroom cabinets with mechanical ventilation and HEPA filters that protect the clothing against contamination. An ingenious technology guarantees both energy-optimized functioning and safe surface disinfection of the textile. The PDc-Wardrobe system is designed for both small businesses with individually assigned wardrobes and large wardrobes for multiple employees.

The cabinets are made of special HPL panels and are available as single cabinets or cabinet lines. The florescent lighting technology and electronics are installed with an occupancy monitoring system, a process control system and a safety system. The operating status is indicated by LED signal lamps. Occupancy monitoring ensures that the cabinet is not in operation when empty.



Options

- Special versions, design, technology, size etc. at customer request (special solution)

Technical specifications of wardrobe

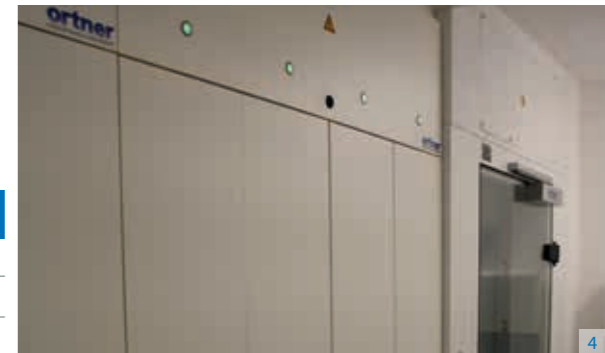
- Casing**
HPL panels FM Compact similar to RAL 9016
- Power consumption**
230 VAC / 7,5 A / 3,5 kW - 4x
- Control unit**
Fully automatic
- Occupancy control**
Sensor technology
- Air performance**
Max. 400 m³/h
- Filter technology**
HEPA H14
- Process time**
Approx. 15 min (increase in performance time)
- Sterilizing effect**
75% - 99% var. above/below (mean value 90%)
- Light source**
PDc-fluorescent tubes
- Sound**
<61 dB(A) Standby <45 dB(A)

Technical specifications of clothing

- Manufacturer/supplier**
Dastex
- Textile type**
Dastat-PDcT type: K21-78-41-A2 and K11-78-31-A
- Clothing type**
Overall, overcoat, two-piece outfit, head cover, mouthguard

Dimensions	cabinet module W x D x H (mm)
4 cabinet set	1200 x 600 x 2300
6 cabinet set	1800 x 600 x 2300
Equipment module	600 x 300 D x H (W= adapted to set)

- 1] Specially developed lighting technology for the photodynamic disinfection of clothing
- 2] Mechanical ventilation and a HEPA filter are standard features of the wardrobe
- 3] Sophisticated technology ensures safe surface disinfection of the textile
- 4] Built-in electronics with occupancy monitoring, intelligent process control and safety system



Dipl.-Biol. Markus Keller, Fraunhofer IPA

"The PDc Technology is an innovative clothing system which can selectively reduce possible contamination of the textile surface based on a sustainable technology. The jury for the Fraunhofer Cleanliness Technology Award »CLEAN!« considers this system to be suitable for use in biological laboratories, pharmaceutical clean rooms C and D, as well as for the clinical environment, but also in the packaging sector of the convenience food industry."



PDC-Personnel Air Lock



Ortner PLUS

- High decontamination and cleaning action with one passage through airlock
- Personnel decontamination without endangering the person
- Microbiological germ reduction of up to 98%
- JET nozzle impulse produces targeted vibrations on the textile and optimizes the cleaning effect
- Visualization of the airlock process inside the lock

As people tend to be the greatest risk of contamination, the implementation of personnel airlocks in the dairy sector is an important issue.

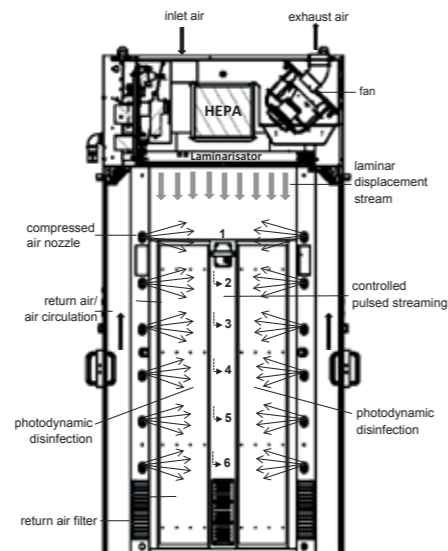
The status quo: Conventional personnel air showers are designed exclusively for cleaning particles and as barrier systems between cleanroom classes. Scientific studies have demonstrated the cleaning efficiency of different manufacturers' products, technologies and processes, and the cleaning effect is generally considered to be very low.

The innovation: The PDC-Personnel Air Lock is a highly effective and certified personnel airlock with JET-nozzle technology for the physical cleaning of particles and photodynamic disinfection technology for minimizing microbiological contamination.

The technology: Two main functions are the basis of the PDC-Personnel Air Locks: On the one hand, demonstrable and validatable and highly efficient particle cleaning. On the other, the main focus is on effective disinfection of the clothing.

The advantages: The airlock processes can be variably adjusted to suit the respective requirements and can be used with all necessary functions for both loading and unloading.

- Options**
- Stainless steel 1.4301 Exterior brushed Interior always 1.4301, powder coated with RAL9016
 - High-pressure fan system*
 - H₂O₂ fumigation connection
 - Additional airlock direction
 - Remote maintenance
 - Potential-free contacts
 - Compressed air reservoir
 - Foot position sensors



* For applications where on-site compressed air is not available or not desired, the PDC personnel air shower can also be equipped with a high-pressure fan. Output remains the same as the compressed air system.

Technical specifications

- Casing**
S 235 ELO RAL 9016
- Voltage**
400 VAC/50 Hz/10 A
- Compressed air**
6 bar oil-free
- Compressed air consumption**
Approx. 200 l/cycle
- Nozzle outlets**
24 pcs
- Door lock**
E-door lock
- Doors**
2 all-glass doors ESG
- Doorway clearance**
W x H 800 x 2000 mm
- Door stop (freely selectable)**
DIN L (unclean) / DIN R (clean)
- Air discharge speed**
Approx. 40 – 55 m/s
- Airflow volume**
Approx. 2000 m³/h
- Test equipment**
Aerosol testing terminals
- Recirculation air filter / prefilter**
HEPA H14 filter / G3
- Signaling**
Signal light (red / green)
- Visualization**
Touch panel
- Control unit**
Siemens
- Position monitoring**
Electronic proximity sensors
- PDC-light source**
16 x 80 watts, 4 x 14 watts
- Sterilization performance**
Lower body approx. 80%, upper body up to 98%, mean value approx. 90% (IPA 2015)
- Particle cleaning performance**
15 – 25 µm approx. 50% / 50 – 100 µm approx. 98% (IPA 2015)
- Cleanroom clothing / textile**
Dastat K21-78-41-A2
- Weight**
Approx. 700 kg



- 1] Special cleanroom clothing with photodynamic effect and irradiation with special lighting technology form the basis for the disinfection effect > 90% (depends on irradiation duration)
- 2] State-of-the-art control and visualization technology ensure safe and informative operation
- 3] The JET-pulse system cleans off the particles, which are then discharged from the airlock chamber by the vertical displacement flow
- 4] The position and posture of the person is predefined and monitored by sensors



Dimensions	W x H x D (mm)
	1300 x 2700 x 1300



Dr. Robert Gfrerer, Ortner Reinraumtechnik GmbH

"The new PDC-Air showers offer a package of technological innovations, an excellent cleaning effect and an effective decontamination in a personal air shower. The JET-nozzle pulse produces fast vibrations and supports the cleaning effect, the modern nozzle technology ensures the right angle of incidence and finally the perfect displacement airflow helps to ensure the successful cleaning."



PDc-Textile Air Duct System



Ortner PLUS

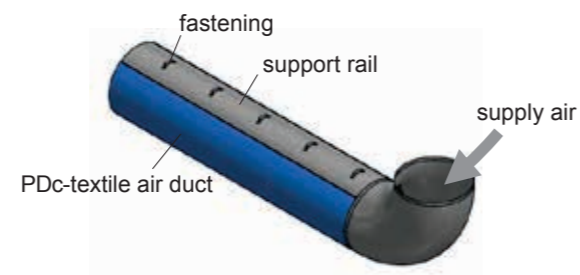
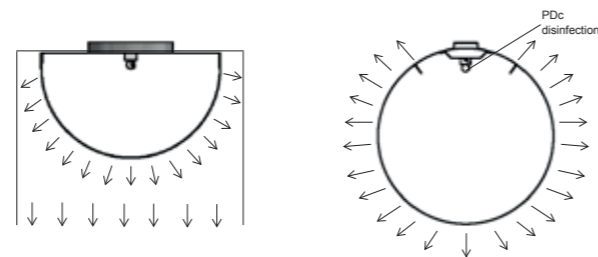
- The PDc-Dastat fabric prevents the growth potential of microorganisms
- High retention capacity of the textile air hose (filter effect similar to an F7 filter)
- PDc-Dastat fabric ensures the photodynamic effect even after 80 washing processes
- Easy installation and very easy to maintain

Air supply via textile ducts is a well-established system in the milk, cheese and dairy sector. The advantage is draft-free air supply and even air distribution.

The status quo: The functioning of conventional textile air ducts is based solely on this effect. In the event of unfavorable climatic conditions there is a risk of surface contamination occurring on the textile surface. Although the risk can be minimized by special impregnation it cannot be completely excluded.

The innovation: This is where the PDc-Textile Air Duct System comes in. The photodynamic disinfection principle eliminates nearly all the microorganisms. The durable disinfecting effect allows minimization of the upstream filter unit design or reduction to filter class F9 (no HEPA filters required) for clean room requirements. The PDc-Textile Air Duct System consists of a longitudinal supporting structure, equipped with fastening and mounting devices, hook-and-loop fastener for the textile air duct and built-in lighting technology. The textile air duct is simply mounted on the supporting structure and irradiated from the inside. Flexibility is ensured by special additional components such as arc elements, tees, branches, connecting systems, connecting elements, etc.

- Options**
- 90° / 45° bends / distribution systems / connectors
 - Prefilter systems
 - Central air supply / ventilation equipment

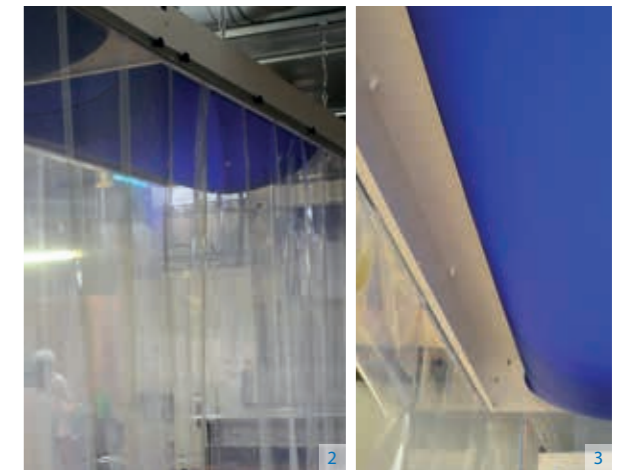
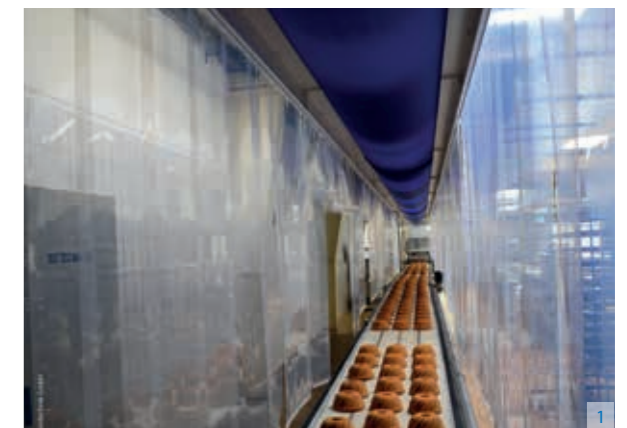


Technical specifications

- Textile duct diameter**
NW 200 – 800 mm *
- Textile duct fabric**
Dastex L11-78-31-A or Dastat PDcT K21-78-41-A2
- Air permeability**
150 m³/h/m² at approx. 100 Pa
- Filter effect**
Approx. F7
- Disinfection effect**
>90% to 99% (depending on irradiation time)
- Wash resistance**
> 80 wash cycles according to RKI
- Lighting technology**
Fluorescent tubes
- Power rating**
230 V / 50 Hz – 30 W/lfm
- Operational control**
Central switching On/Off
- Supporting structure**
Galvanized sheet metal V2A 1.4301
- Duct fitting**
Hook-and-loop fastener



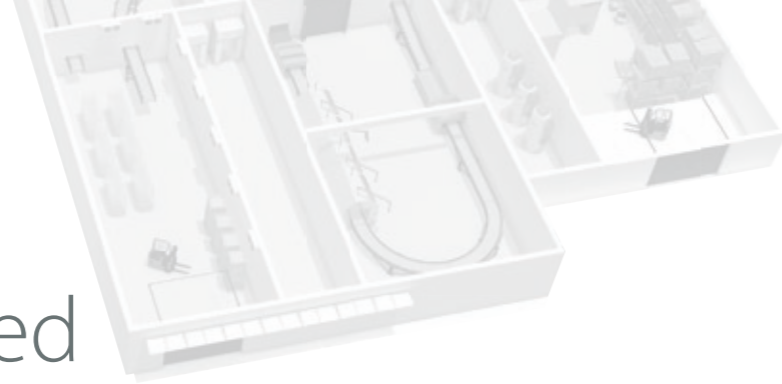
- 1] The combination of a cleanroom textile, a photoactivatable dye and a special light source form the basis for up to 99% germ reduction
- 2] The system consists of a longitudinal supporting structure
- 3] The textile hose is simply mounted on the supporting structure and irradiated from the inside
- 4] Versatile use thanks to modular connection systems



tech talk

Mark Dohmen MBA, M. Dohmen GmbH

"The light-induced disinfection (photodynamic) is based on a special reaction of light and the presence of a certain dye - the so-called photosensitizer. If the right light wave hits the fabric, the photosensitizer automatically activates and forms highly reactive oxygen. This oxygen, in turn, inactivates possible germs and bacteria."



AFMS - Approved Food Manufacturing System

Analysis for individual cleanroom equipment

Widely differing production conditions in the milk and cheese processing sector mean that very different germ propagation rates can occur in practice. Ortner has developed a special process to help determine the individual requirements or equipment requirements for an optimized cleanroom: **AFMS (approved food manufacturing systems).**



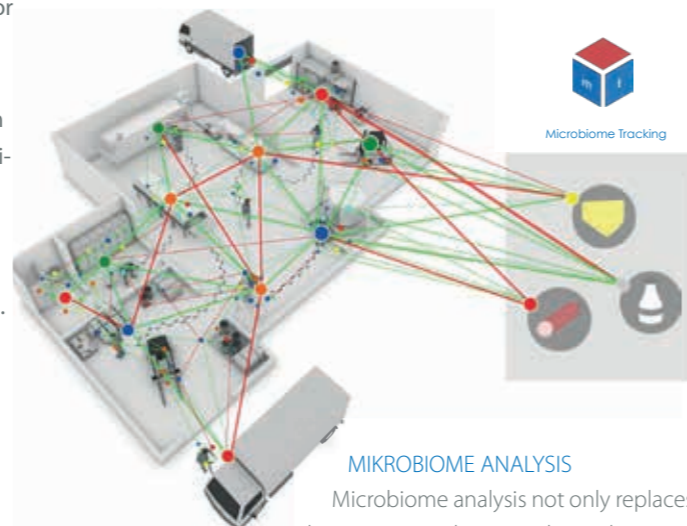
Ortner PLUS

- Precise risk classification and cleanroom classification
- Optimal cleanroom dimensioning
- Precise analysis of all relevant factors affecting the production environment
- Optimum product safety
- Efficiency and long-term cost savings

AFMS is a versatile analytical method to ensure optimal production safety in the milk, cheese and dairy sector. Ortner offers this analysis as an additional, independent service.

AFMS aims to verify potentials for reducing the germ load and thus prolonging shelf life and to point out various possibilities for improvements.

AFMS takes into account all influencing factors such as the room concept, personnel and material flow, air conditioning and ventilation technology, personnel behavior and hygiene, cleaning plan, production process and product handling. Based on the evaluation of such data and sophisticated **germ and particle tracking**, a concept for optimal cleanroom equipment is created.



Glossary

AFMS
AFMS (approved food manufacturing systems) is a service offered to determine the custom-tailored requirements or equipment requirements for an optimized cleanroom. Decontamination refers to disinfection measures in cleanrooms to protect persons, objects or unprotected surfaces against hazardous contamination.

GMP
Good Manufacturing Practice: Guidelines to ensure the quality of production processes and environment in the production of medicines and active ingredients as well as in cosmetics, food and feedstuffs.

H₂O₂
Hydrogen peroxide is a colorless liquid compound (when diluted) consisting of hydrogen and oxygen. H₂O₂ is a very strong oxidizing agent for most substances which, as such, reacts violently with substances such as copper, brass or potassium iodide and thus acts as a strong disinfecting agent.

HEPA filter
High efficiency particulate air filter; particulate filters are used for filtering bacteria, viruses and pollen, etc., out of the air.

CFU
Colony-forming unit. Unit used to quantify microorganisms. A microbial load of less than one germ per cubic meter <1 CFU of air can be considered as practically germ-free. Sterilization and disinfection refers to methods used to eliminate living microorganisms, including their dormant stages (e.g. spores) from materials and objects. The condition of the materials and objects obtained by doing so is referred to as "sterile".

Laminar flow system
Flow technology used to clean air masses in a laminar – i.e. low-turbulence – manner. Air is sucked in, filtered and discharged again free of particles and germs.

Microbiologically clean and particle-free
Microbiology is a field in which the smallest possible amounts of 0.5 µ and 5 µ particles and only minimal amounts of microorganisms (according to GMP = good manufacturing practice) are permitted.

PDc Technology
Photodynamic Disinfection certified Technology (PDcT) is a newly developed method patented by Ortner that uses light in combination with a photosensitizer to effectively deactivate microorganisms on surfaces. PDcT is safe for use on humans, making it possible for the first time ever to decontaminate workers in their working environments and thus minimize the transmission of germs from one person to another.

Cleanroom
A cleanroom is a room in which the concentration of airborne particles is kept as low as possible. The production and maintenance of the desired cleanroom atmosphere requires a closed and pressure-tight room in which constant temperature, humidity and pressure conditions can be maintained. Cleanroom classes: Cleanrooms are defined according to ISO cleanroom classes. ISO 14644-1 specifies (depending on the relevant product) the number of particles of a given size allowed in a cubic meter of air. Ortner strives to develop systems and processes that exceed the usual standards by far.

Semiconductor technology: Main contamination – particles; ISO 14644-1 and 2
Food technology: main source of contamination – microorganisms; VDI 2083
Pharmacy: main source of contamination – germ count; EU GMP (Good Manufacturing Practice)

UVC Technology
UV-C rays, which are part of sunlight, sterilize without the use of chemicals and heat and thus cause no change to product quality.

Maximum allowable concentrations of particles according to DIN EN ISO 14644-1/2015 and EU GMP Guide Annex 1/2009

Cleanroom Class	ISO 14644	Fed.Std. 209D	0,1 µm	0,2 µm	0,3 µm	0,5 µm	1,0 µm	5,0 µm	Proposed microbial limits (production)				
			particles/m ³	particles/m ³	particles/m ³	particles/m ³	particles/m ³	particles/m ³	Air Sample	Settle Plates	Contact Plates	Glove Print 5 fingers	
ISO 1	-	-	10	-	-	-	-	-	RRKL	cfu / m ³	cfu / 4 hours	cfu / plate	cfu / glove
ISO 2	-	-	100	24	10	4	-	-	A	< 1	< 1	< 1	< 1
ISO 3	1	1.000	1.000	237	102	35	8	-	B	10	5	5	5
ISO 4	10	10.000	10.000	2.370	1.020	352	83	-	C	100	50	25	-
ISO 5	100	100.000	100.000	23.700	10.200	3.520	832	-	D	200	100	50	-
ISO 6	1000	1.000.000	1.000.000	237.000	102.000	35.200	8.320	293	average value				
ISO 7	10.000	-	-	-	-	352.000	83.200	2.930					
ISO 8	100.000	-	-	-	-	3.520.000	832.000	29.300					
ISO 9	-	-	-	-	-	35.200.000	8.320.000	293.000					



Alliances secure our future.

“One hand is stronger than five fingers!”

Our customer base has steadily grown over the decades. We have learned a lot from our customers and have grown together with them. Our success would nevertheless not have been possible without our likewise steadily growing and powerful partner network. And the future will present us with even greater challenges. This is why we work closely with a wide range of interest and dialogue groups, industrial clusters and research facilities around the world by sharing scientific expertise, data and know-how to be prepared for Industry 4.0, automation, modularity and an increasingly globalized economy.

Safety and cleanliness recognize no limits or compromises. Neither in our heads nor in the development and production of our custom-tailored system solutions. We cultivate intensive and honest business relations, as long-term partnerships reflect not only the basic values of the owner family but also the entire company image. Establishing international contacts and uniting different perspectives. Fair cooperation characterizes our everyday work. We are proud of this and hold fast to it. At all levels and in all areas that are relevant to our further development.

Thank you for your reliable cooperation.

Network Factor 1: **Measuring System**

Clean room or hygiene projects cannot be implemented without extensive measuring technology. The challenges of digitalization / Industry 4.0 require high-precision measuring systems and practical monitoring.



Briem specializes in professional monitoring solutions and measuring technology. Longevity and future-orientation are indispensable necessities. This is why we consider it crucial to use high-precision measuring instruments with state-of-the-art technologies.

Network Factor 2: **Limit Detection**

Product and personal safety is largely ensured by disinfecting and decontamination technology. Limit detection in the high and low concentration range is a complex technology, which only a few specialists have mastered.

Dräger

Dräger is one of the most renowned companies in the fields of medical and safety technology. Dräger is very proficient in measuring technology for H₂O₂ concentrations, humidity, and temperature unlike any other. The company has been a reliable partner for our projects for many years.

Network Factor 3: **Filter Technology**

Filters and filter technology are at the heart of any definition of purity and a main factor for safety, energy, and operating costs. The pure production of filters is no longer the major challenge for filter suppliers today. Instead, short delivery times, special packaging, and participation in innovative solutions is the name of the game.



Jack Filter has invested in state-of-the-art manufacturing technologies and covers virtually the entire range of solids filters. It is important to us to have a competent partner for filter technology in our network.

Networked thinking and actions are the basic prerequisites for successful clean-room projects. After all, clean room technology is an interdisciplinary technology that encompasses more than 100 professions and competencies. In order to create future-oriented innovations, one has to change patterns of action and thought and create interfaces to other industries. A prerequisite for this is a proven network.

Network Factor 4:

Ceiling Systems and Filter Fan Units

The classic ventilation and air conditioning technology for clean rooms is increasingly being replaced by filter fan unit technology. The mini-environment philosophy, the selective clean-room concept as well as the high flexibility of FFU technology are impressive arguments for economic concepts. This requires complementary products, such as clean room cover systems.

M+W GROUP

M + W Products offers a portfolio of clean-room products for different production processes, thereby creating the best conditions for the highest hygiene standards. It is particularly important to us to have an international, innovative partner in this product segment with M + W Products.

Network Factor 5: **Sealing Technology**

Sealing technology is particularly important for sterilization and decontamination processes. The challenge in plant and system development is to find sealing systems in which leakage can be measured and monitored during the process.

flohreus

Flohreus is the leading company in the field of elastomer technology and specializes in pneumatic inflatable seals. These systems can be used to seal a wide range of applications. Gaskets or seals are typical wear components. Therefore, we need a partner who will ensure high product quality and support us with forward-looking stock levels in order to remedy possible failures as quickly as possible.

Network Factor 6: **Plastics Technology**

The use of stainless steel is widespread in clean rooms of the life science industry. In recent years, the plastics industry has developed very innovative plastics and composite plastics. This opens up new perspectives in clean room and apparatus engineering.



k-tec offers the possibility to produce a plastic deformation with functional elements. This makes functional design elements possible and at the same time creates considerable cost advantages. We need partners in the area of decontamination who are able to master the complex plastics technology, make our products look very nice and are, above all, service-friendly.

Network Factor 7: **Fastening Systems**

An innovative and secure connection technology is required so that the processing technique of welding can be mostly dispensed with and used only where it is absolutely necessary. Modern clean room technology is borrowing from other industries, such as the automotive and aerospace industries. Modern connection and fastening systems are an important building block for the development of modern clean room solutions.



Bossard is an international specialist group for high-quality screw and connecting elements. High serviceability, cost reduction, and flexibility are the driving force behind the use of modern joining technology. In order to be able to select the ideal component from an almost unmanageable range of products, we need a partner who can advise us best.

Network Factor 8: **Glass Technology**

The use of glass in the immediate area of food production is only possible under special protection conditions. Glass is a material that is underestimated in many respects, its flexibility is not well-known, and it offers almost unlimited possibilities of use. Glass has already made itself a name in classical clean room technology. There is still a need for catching up in building technology and mechanical engineering.



Preschern is not only concerned with customized but also system solutions that make a valuable contribution to the development of know-how and the general state of the art. Innovative glass solutions in combination with protective foil technology are good alternatives to conventional stainless-steel technology.

Network Factor 9: **Clean Room Attire**

People are the largest source of contamination in all sanitary and clean-room areas. The right clothing is therefore all the more important. Particles and germs can be significantly minimized during the production process by correct clothing. Design, processing quality, and the right material play a decisive role.



Dastex has been a competent partner for the optimal range of hygienic and clean room garments since 1979. In order to offer our customers a complete package, it is important to us to have an innovative garment and fabric partner who is willing to seek out new paths, such as PDcTechnology.

Network Factor 10:

Color and Coating Technology

One of the challenges for color and coating technology in food processing companies is taking innovative paths while at the same time meeting the strict requirements of the HACCP guidelines.



M. Dohmen is the leading company in the dye sector. Colorants and formulations with special effects (such as self-cleaning or disinfecting) will play a crucial role for the next generation of clean room technology. In order to be able to develop new solutions such as PDcTechnology, it is important for us to have a network partner with innovative power and visionary thinking.

Network Factor 11:

Structural and Civil Engineering

The foundation of all trades is structural and civil engineering. The biggest problems and budget overspending are caused by a lack of coordination and detailed planning between precision and structural engineering. Investing sufficient time and effort in preplanning and interface coordination results in enormous benefits for all concerned.



Niedermühlbichler is a construction and civil engineering company, which has been particularly successful in the commercial and industrial sector. We need a partner who is ready to coordinate all details with us and other trades from the first hour of a project to completion.

Network Factor 12: **Hall Technology**

Building construction has changed significantly in the last few decades. Prefabricated components and light-weight construction are prevalent. Short construction times, high flexibility, and acceptable investment costs constitute the main arguments for modern hall technology.



Mayer plans and builds industrial and commercial halls with special architectural and technical requirements. This construction technology is ideally suited for the hygienic sector. It is an advantage to have a partner in our network who in addition to being proficient in hall technology, has the highest level of competence in interior design.

A reliable supplier industry and a functioning network are needed to achieve an excellent clean-room environment.

Network Factor 13: **Logistics**

Well thought-out logistics concepts determine success for large or small projects. The logistics competence includes a lot more than just the delivery of parts. Just-in-time delivery, storage and interim storage, transportation to the installation site, packaging and disposal, etc., are some of the major challenges facing the logistics industry today.



LHI is a company operating throughout Europe, which is specifically geared to the needs of trade and industry. Our technicians and assemblers need a logistics partner that covers all the above-mentioned services and works in cooperation with us.

Network Factor 14: **Financing**

For larger projects, pre-financing and interim-financing must be ensured. Particularly in the case of projects abroad and new markets, it is important to have a partner who can handle the circumstances and risks involved.

BKS Bank

BKS Bank is a regional, listed banking institution with a particular strength in the business sector. Companies with local and international focus are well advised there. It is important to us to have a partner with whom we can discuss sensitive topics openly and shape long-term corporate development.

Network Factor 15: **Insurance**

The influencing factors in inter-disciplinary clean-room technology are manifold. Risk and hazard assessments (FMEA analyzes) are self-evident in life science projects. Concluding insurance policies which are appropriate for these processes will ensure security and freedom for the people involved.



Generali is among the 4 leading insurance groups and the 50 largest companies in the world. With 450 plus companies is the Generali Group present in more than 60 countries. It is crucial for us to have a partner that helps us avoid damage. The focus is on active cooperation and the training of our project managers for the most diverse challenges.

Our commitment to sustainability

The earth is exhausted and the climate is changing. According to a study of the UN Resource Panel, humanity's extraction of natural resources has increased threefold since the seventies.

As a future-oriented company, we are aware of the huge responsibility on us and we take action accordingly. We are certain that successful management is only possible in the long term if the natural living conditions remain intact. We have therefore anchored the principle of sustainability firmly in all of our processes. From the development and manufacture of our products, through the product life cycle and use of resources, down to the use and disposal of products. A focus on regional value creation and social responsibility also influences our strategic planning, as does research and development of alternative decontamination techniques.

"Doing more than simply what you have to do" is the credo to which we are deeply committed!



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