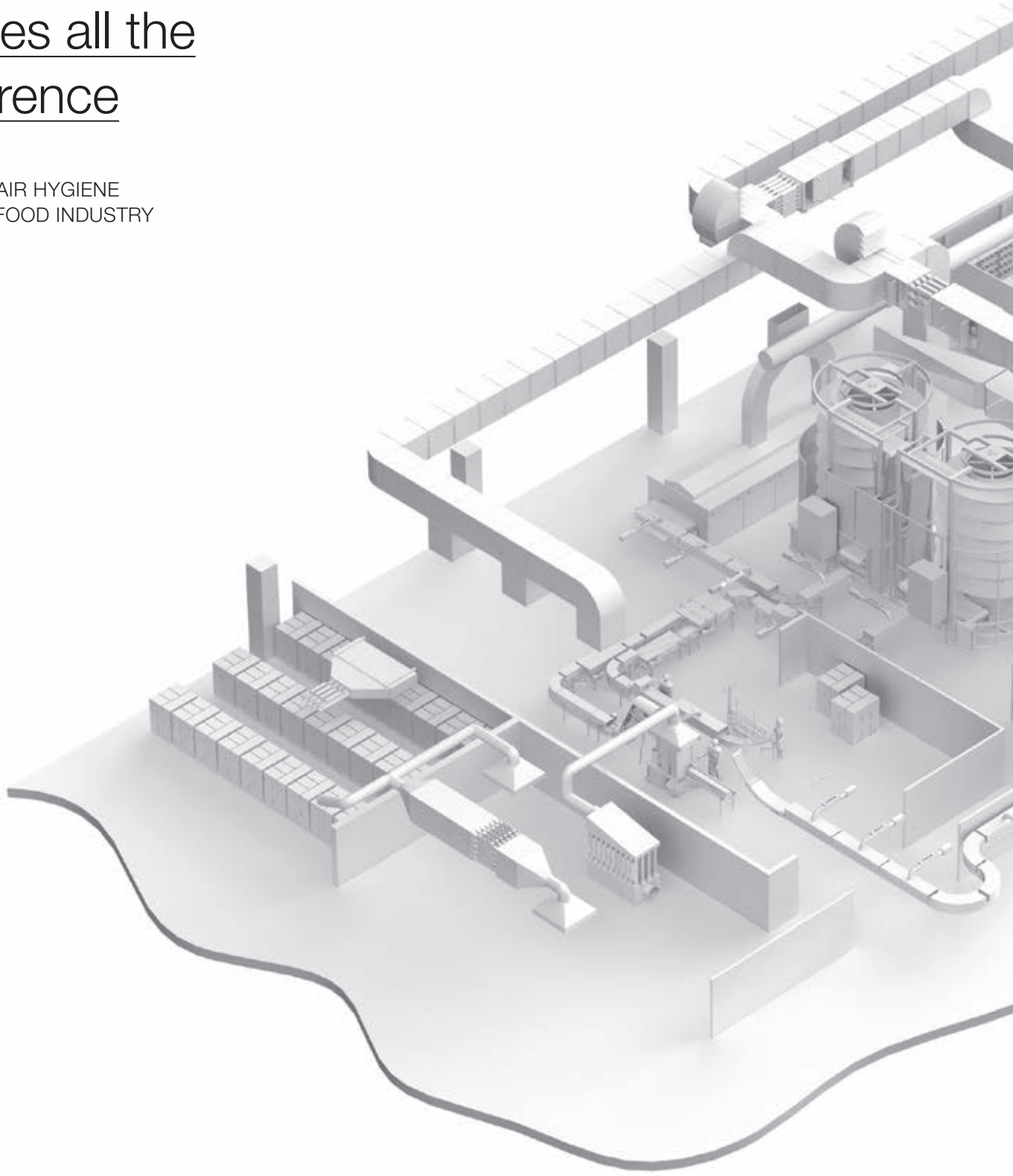
Clean air makes all the difference

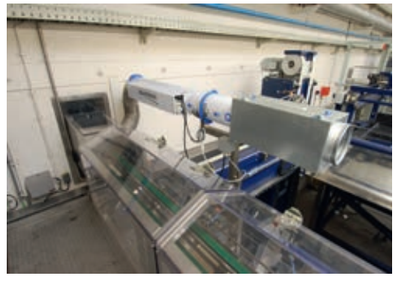
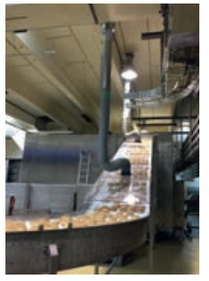
OPTIMAL AIR HYGIENE
FOR THE FOOD INDUSTRY



VIROBUSTER







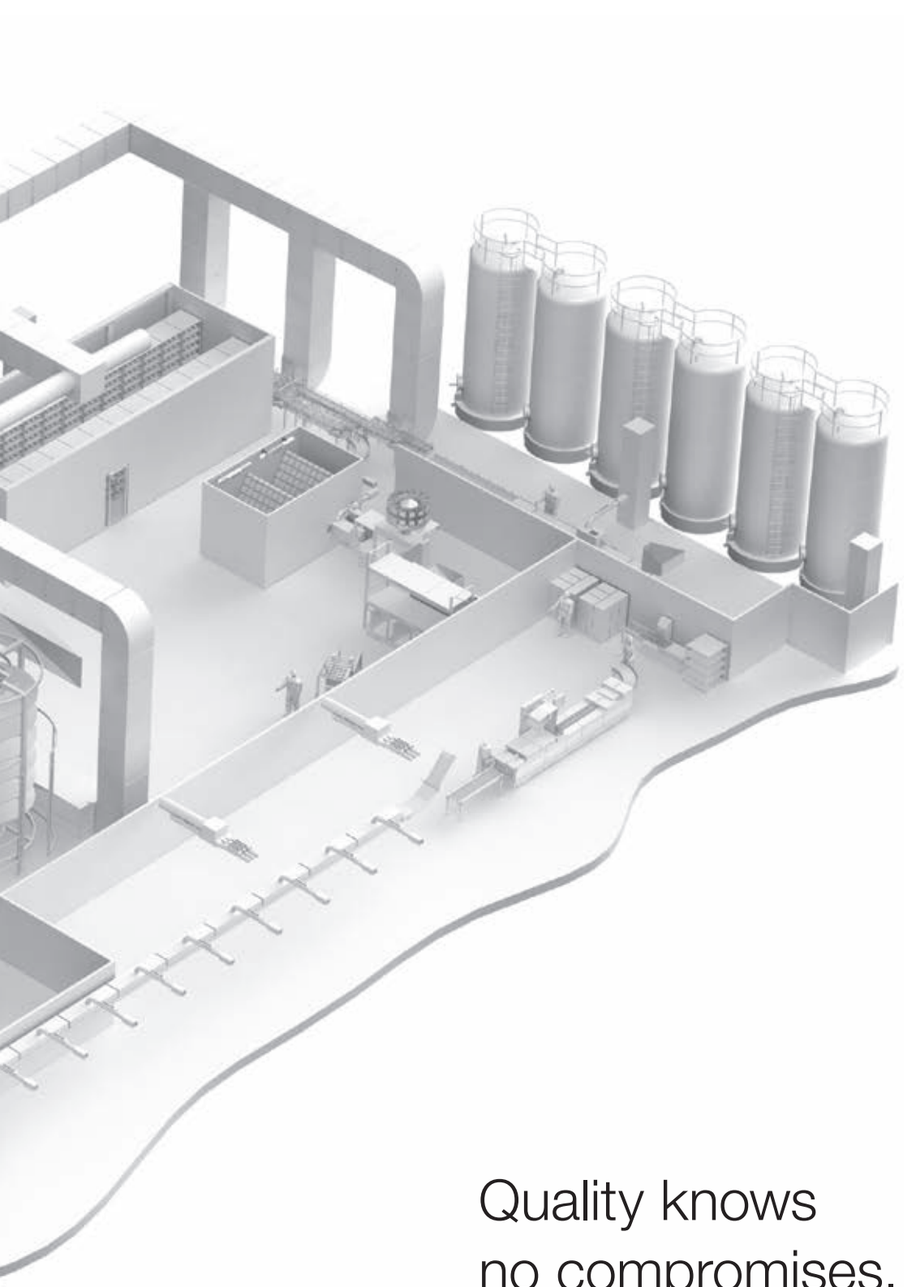








VIROBUSTER

Quality knows
no compromises.
Neither does
sustainability.

Contents

Introduction

Consumer behaviour is changing

Today’s consumer wants more

A new era has begun in the food industry, bringing with it a growing number of educated consumers demanding a healthy and natural lifestyle with a focus on the topic of nutrition: consumers are no longer willing to compromise on transparency or health safety. Whether bread for breakfast or salad dressing for a barbecue – food should be light, fresh, ideally organic and of high quality, which in turn also means as free from additives as possible. These changing consumer habits requiring the decline of preservatives are on everyone’s

mind. Fats, sugars, and salts as well as chemical preservatives – so-called ‘E numbers’ – are challenging brands and retailers to rethink the status quo. This is impacting both the production of the merchandise as well as its shelf life.

→ An unrelenting focus on quality has become a decisive competitive advantage, which to a large extent is dependent on the benefits of exceptional air quality.

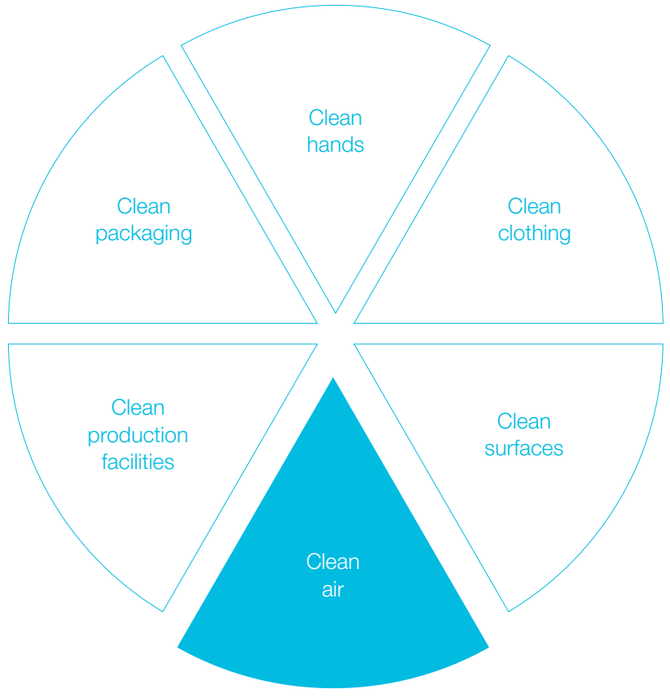
‘Customers were more critical than ever, even before the coronavirus pandemic. The current crisis has clearly highlighted the problems in the current food system and made health, hygiene and safety even more important criteria regarding the choice of food. Transparency, sustainability and quality are increasingly becoming the focus of consumers.’

Hanni Rützler
Food Report 2022

Why?

Why is clean air so important?

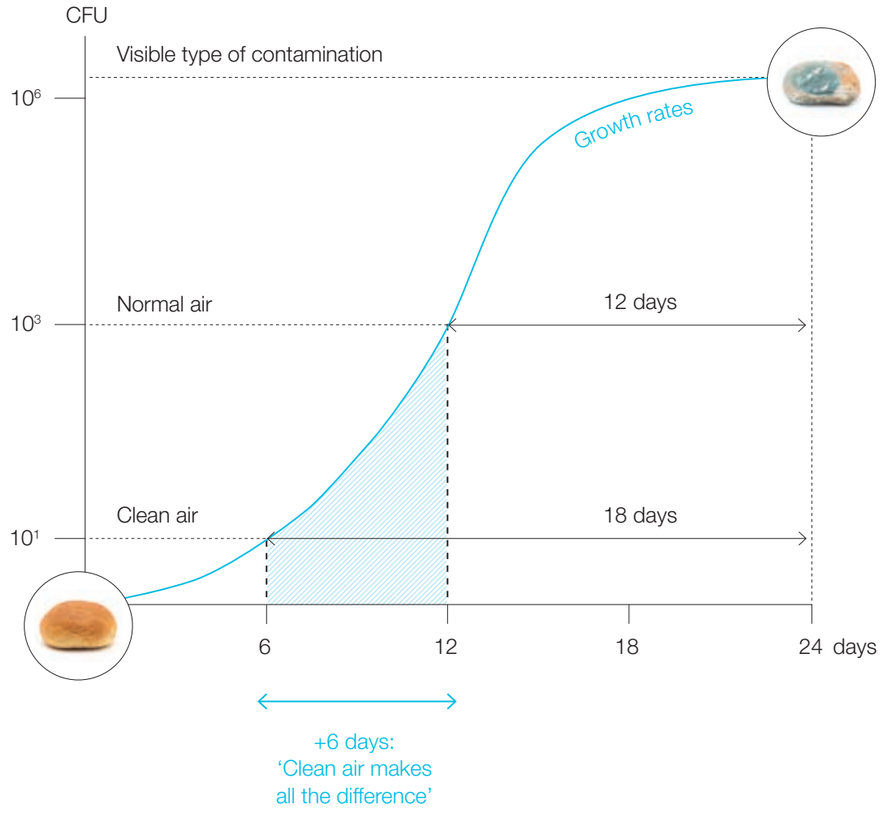
‘State of the art’ is not enough



Targeted air purification in the food industry is often underestimated. However, it is the key to greater product quality and customer satisfaction. During the process of baking, cooling and deep-frying and even the downstream process of cooling, transport, and packaging (naturally occurring) microorganisms which are common in the air we breathe can contaminate previously ‘clean’ foods, thus reducing the shelf life and quality, commonly referred to as biological failure.

→ Germ-free air, on the other hand, significantly extends the shelf life of fresh, semi-finished and finished products.

EXTENDED SHELF LIFE –
USING THE EXAMPLE OF BAKED GOODS



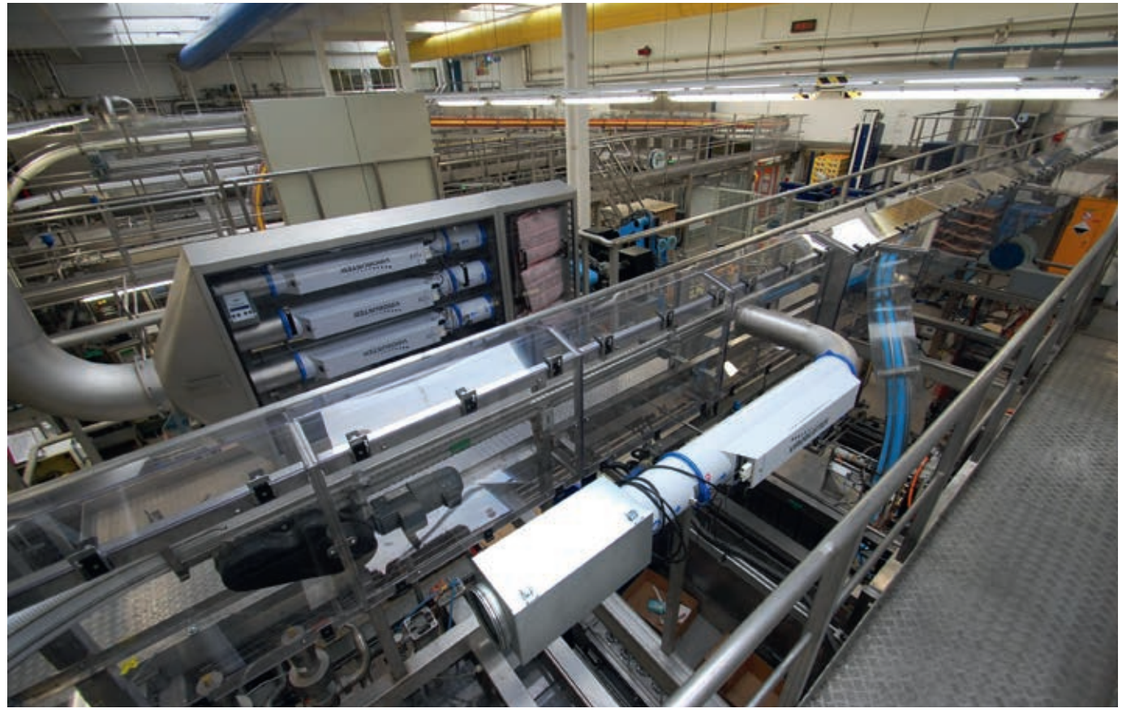
This is where the unparalleled highly efficient UV-C technology for air hygiene from VIROBUSTER comes in with its patented UVPE air disinfection process. While older processes such as HEPA and other micro filters only capture and collect live microorganisms, VIROBUSTER renders them truly harmless. With its unique UVPE technology up to 99.99% of all bacteria, fungal spores and viruses in the air are inactivated.

→ Air that is safe for production, transport, and storage is not only clean, but also germ-free.

→ This also pays off economically.

‘The results of the series of tests show that the decontamination rate of UV irradiation is > 99.9%.’

Dr Andreas Bermpohl
Biotec GmbH



Germ-free air not only safeguards the product during production, transport, and storage, but also provides additional benefits such as dependable financial planning.

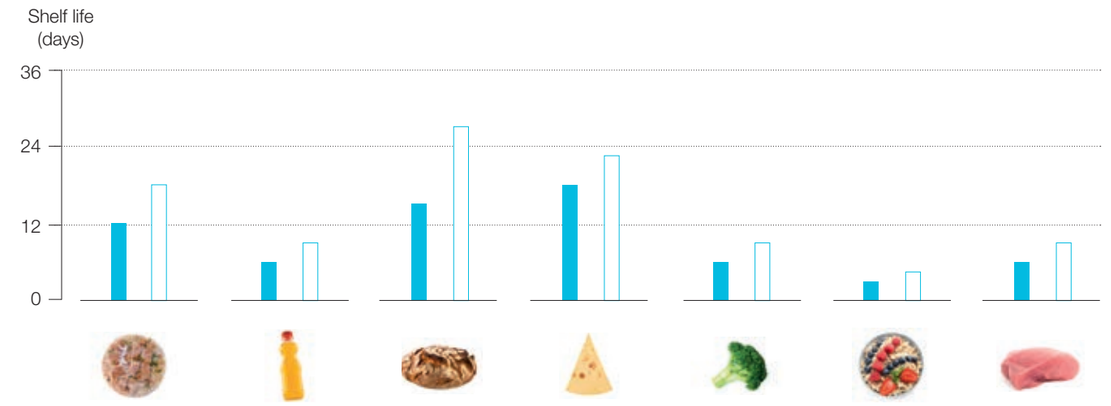
HARD FACTS:
Lower costs due to:
– improved product quality
– reduced cleaning intervals
– fewer preservatives
– optimised formulations
– energy-saving ambient conditions

SOFT FACTS:
Lower follow-up costs due to:
– minimised customer complaints
– reduced recall risk
– new export options
– new outlets (organic market)

We create a safety zone in every relevant area of the production process.

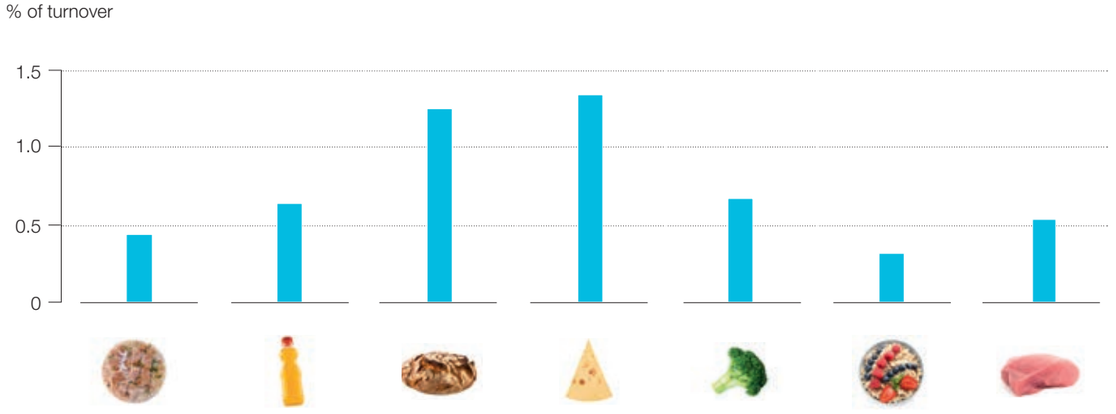
SHELF LIFE

In principle, the shelf life of products can always be significantly increased by the targeted use of germ-free air in various production processes. The extent to which the shelf life is extended varies according to the respective product, the processing, the structural conditions and the chosen solution.



ECONOMIC EFFICIENCY

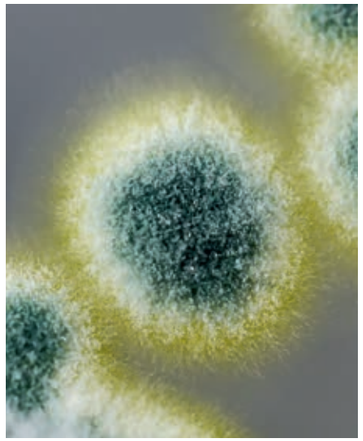
Optimal air hygiene holds the potential for increased sales and margins. Why? If, for example, the shelf life of goods is extended, expensive recalls and waste are reduced or avoided. New export markets become realistic thanks to extended delivery distances, and even new markets, such as in the organic segment, can be tapped by optimising production and avoiding the use of preservatives.



	BAKERY PRODUCTS	CHEESE	POTATOES
Investment in VIROBUSTER			
VIROBUSTER devices	€35,000	€120,000	€72,000
Turnkey project	€287,500	€388,125	€490,000
Maintenance and energy expenditure	€55,000	€77,466	€78,650
Production capacity (year)	6,960 kg	20,000,000 kg	116,000,000 kg
Turnover (year)	€5,568,000	€50,000,000	€83,520,000
	€48,720 (no preservatives)	€70,000 (no natamycins)	€40,600 (no preservatives)
	€6,037 (less yeast)	€250,000 (less drying out due to higher RH % in maturing rooms)	€15,000 (less gas during packaging)
	€55,680 (fewer complaints/recalls)	€50,000 (0.1% additional benefits)**	€83,520 (fewer complaints/recalls)
	€55,680 (1% additional benefits)*	€77,466	€167,040 (0.2% additional benefits)***
Life cycle costs (per year/per kg)	€83,750/1.2 cents	€116,278/0.58 cents	€127,650/0.11 cents
Life cycle margin (per year/per kg)	€166,117/2.38 cents	€370,000/1.85 cents	€306,160/0.26 cents

* No inert gas packaging, less cleaning, less weekend work, new export markets, etc. ** Less cleaning/treatment of cheese surface, fewer recalls/complaints, new export markets. No contamination of storage area, faster maturation, etc. *** Logistical advantages, less cleaning, higher temperature in storage and transport, new export markets, etc.

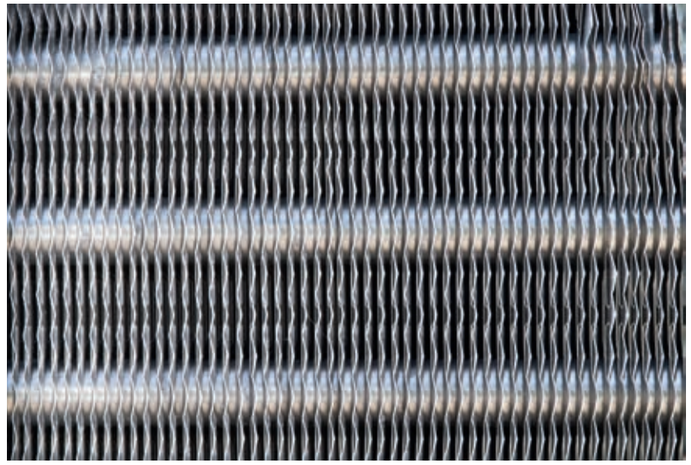
Less is more here



The equation is very simple, AND IT WORKS: Disinfected air means fewer preservative and a longer shelf life. The use of few preservatives lets the consumers know you are aware of their wishes and care about their concerns, which expands your markets to many more health-conscious consumers, not to mention that these measures allow for new recipes and more variety. As if this was not enough, the benefits keep coming with an extended sales life cycle, waste reduction and energy savings. The bottom line is not only improved profitability, but also that you are being noticed by the health-conscious consumers and their desire for a more preservative-free product.

Advantages of UV-C for the food industry:
– Safe product with optimum quality
– Extended shelf life
– Fewer preservatives
– Increased productivity and cost-effectiveness
– Energy savings
– Less drying equals more weight
– Development of new organic and export markets
– Convincing sales model
– Increased customer acceptance

Air quality matters



We know indoor air quality either from ambient air or air being recirculated through air coolers is generally germ-infested and results in problems for product quality. Since 2002, we have been using our expertise to identify and eliminate sources of contamination as well as providing our customers with custom solutions designed specifically for their application. Our Steritubes are 99.99% effective at disinfecting the air and permanently eliminating various mold and bacterial spores as well as viruses and bacteriophages in a single pass.

‘In less than eight years, VIROBUSTER has efficiently and effectively supported a global industry that needed help. With a solid line of products, all designed for air sterilisation, VIROBUSTER has become a leader in its industry. This is the latest generation of air decontamination.’

Professor P. Englis
Born Global Firms

How?

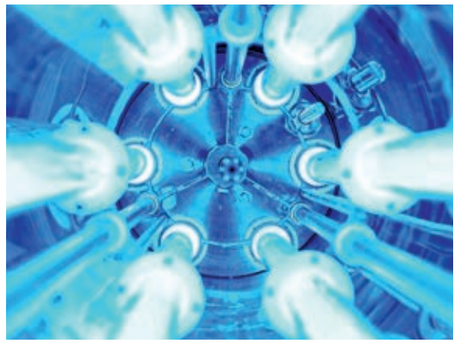
How does VIROBUSTER ensure the best air hygiene ever?

Air hygiene at its best

High hygiene standards are essential for the food industry and elaborate clean rooms or inhouse aseptic lines are common, but the cost associated with these systems can be prohibitive. Through the use of Steritubes VIROBUSTER can work within your existing plant layout with virtually no downtime during installation and implementation, enabling you to provide a high-quality product without investing millions in old outdated technology. Additionally our hybrid solution is scaleable and can be precisely regulated for energy efficiency.

- Simple switchover from low or medium care to high care (organic production) at the touch of a button – and back.
- Our solution can create clean area zones putting the safe clean air only where you need it, rather than across the entire room or building.
- In contrast to conventional solutions (clean room/aseptic lines), only a fraction of the investment, operating and maintenance costs are incurred – with the same level of safety.

The UVPE process from VIROBUSTER outperforms conventional



UV-C solutions more than 600 times

UV-perfected – that's a fact

HOW DOES VIROBUSTER CLEAN THE AIR?

All VIROBUSTER devices rely on patented UVPE technology. The indoor air is treated within a closed system with concentrated UV-C light – which is additionally amplified by reflectors. This is significantly more efficient than conventional UV-C solutions. This intensity ensures that the DNA/RNA of microorganisms such as bacteria and viruses is damaged to such an extent that they can no longer reproduce. In just one go, up to 99.99% of the microorganisms are inactivated in this way.

IS THERE ANY EVIDENCE THAT THE TECHNOLOGY WORKS?

UV-C light has been used for sterilization since the beginning of the 20th century – for example, in the treatment of drinking water. The UVPE technology from VIROBUSTER further refines this process – in a closed unit that uses reflectors to achieve uniform, very intense irradiation of the entire air volume. Efficacy has been demonstrated in various studies and certification procedures. In repeated studies in 2006, 2011, 2013, 2020 and 2021, the hygiene institute Biotec GmbH came to the conclusion that 99.99% of the living microorganisms in the air are already inactivated in the first go. The Fraunhofer Institute for Building Physics IBP has also clearly demonstrated room hygiene efficiency in 2021. The effectiveness of this technology has been proven in practice many times, especially in the food industry. Another important proof is the fact that several thousand VIROBUSTER devices have been used successfully since 2002, especially in demanding environments such as hospitals and the food industry.

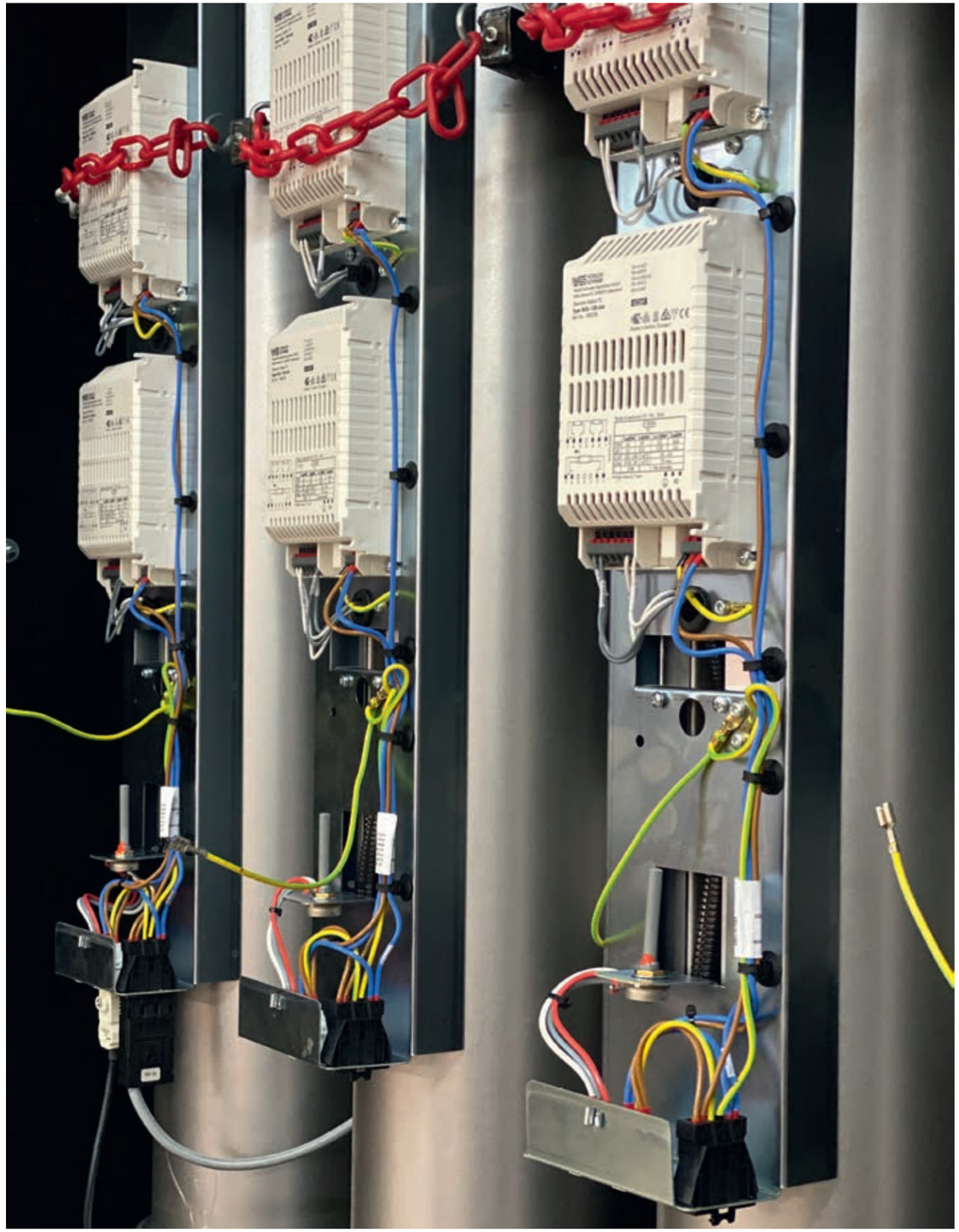
WHAT IS THE DIFFERENCE BETWEEN AIR DISINFECTION AND AIR PURIFICATION?

Conventional air purification is based on filters filtering out the fine particles from the air and collecting them. Air disinfection inactivates fungal spores, bacteria and other microorganisms without trapping them.

WHY IS THE STATUS QUO INSUFFICIENT?

With conventional air purifier's base on HEPA or other filter types, microorganisms are captured where they remain alive – this type of filter can only be changed while wearing complete protective clothing. UV-C by contrast, does not collect these microorganisms, but deactivates them. However, conventional UV-C solutions are too weak to inactivate mold and spores in a single pass. Our UVPE technology, on the other hand, can clean significantly larger volumes of air in one pass, meaning rooms can be completely disinfected more quickly. Other drawbacks to HEPA technology are the high cost of retrofitting and since they have to be constantly running, they are largely inefficient and have high maintenance costs. VIROBUSTER by contrast can be switched on and off as needed and requires very little maintenance in comparison.

	HEPA	UV-C	VIROBUSTER UVPE
Viruses	—	✓	✓
Bacteria	✓	✓	✓
Fungi	✓	—	✓



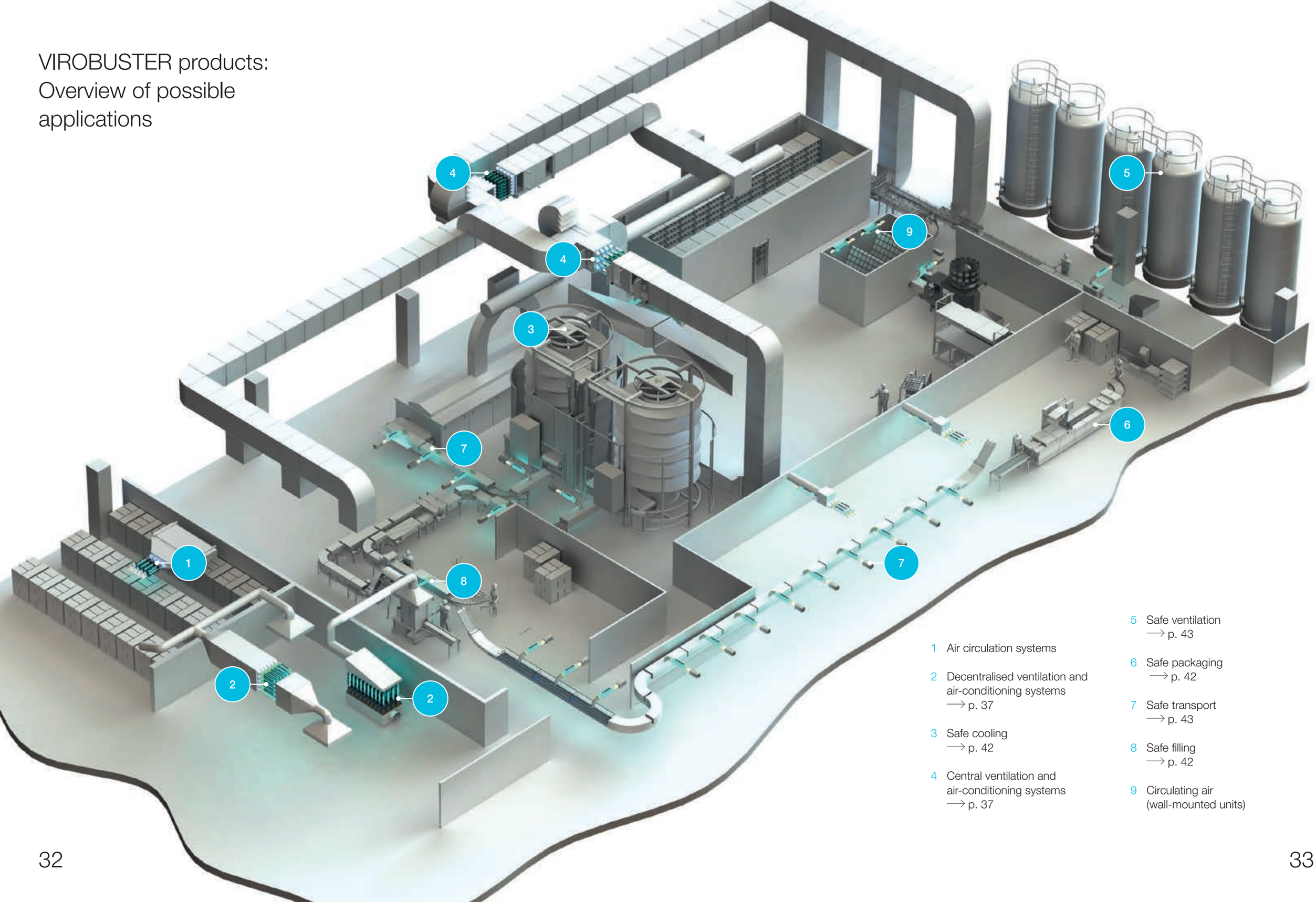
TECHNICAL DATA
STERITUBE UVPE/UVPE XL

		STERITUBE UVPE	STERITUBE UVPE XL
Electrical output per module		190 W	2.0 kW
UV-C power per module		68.4 W	800 W
Fluence (J/m²)		300 m³/h: 204 500 m³/h: 122 800 m³/h: 77	3,000 m³/h: 840 6,000 m³/h: 419 9,000 m³/h: 279
Nominal volume flow	Mould	300 m³/h	3,000 m³/h
	Bacteria	500 m³/h	6,000 m³/h
	Viruses	800 m³/h	9,000 m³/h
Pressure loss (Pa)		300 m³/h: 13 500 m³/h: 45 800 m³/h: 85	3,000 m³/h: 15 6,000 m³/h: 35 9,000 m³/h: 55
Dimensions L × W × D (mm)		1,000 × 180 × 230	1,500 × 516 × 576.5
Weight (kg)		10	55

What solutions?

What applications are there?

VIROBUSTER products: Overview of possible applications



1 Air circulation systems

2 Decentralised ventilation and air-conditioning systems
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3 Safe cooling
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4 Central ventilation and air-conditioning systems
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5 Safe ventilation
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6 Safe packaging
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7 Safe transport
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8 Safe filling
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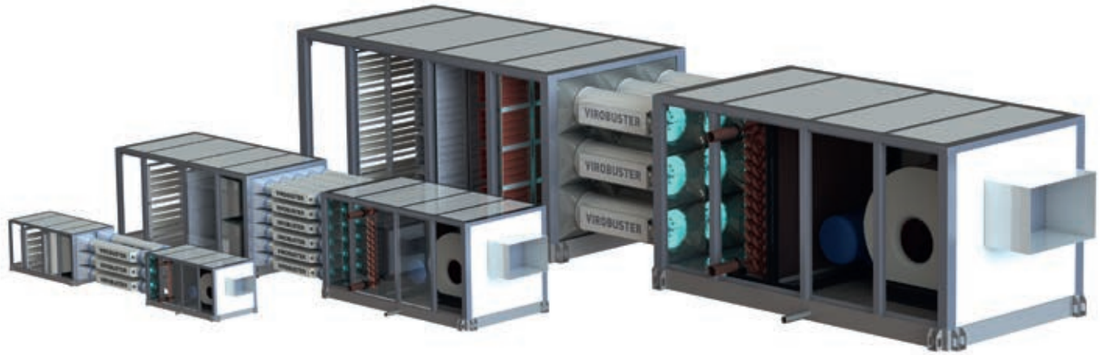
9 Circulating air (wall-mounted units)

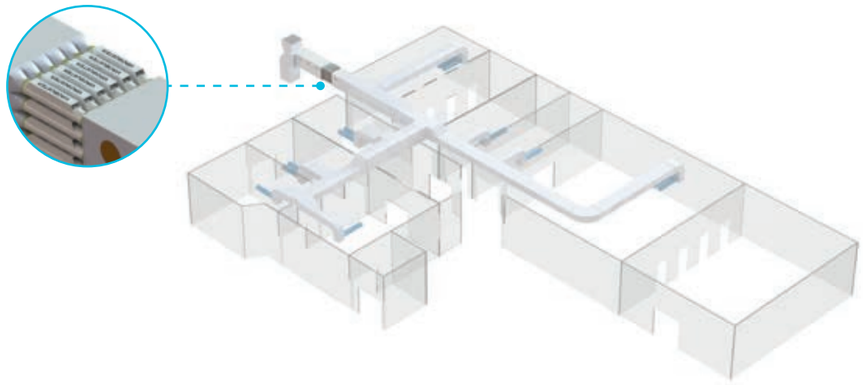
The best product for the best products



Clean air is essential. And at VIROBUSTER, it’s a question of possibilities. Whether as a process or as a building solution – in practice, there are basically two ways to implement an air disinfection concept conveniently, economically and flexibly and to sustainably increase product quality.

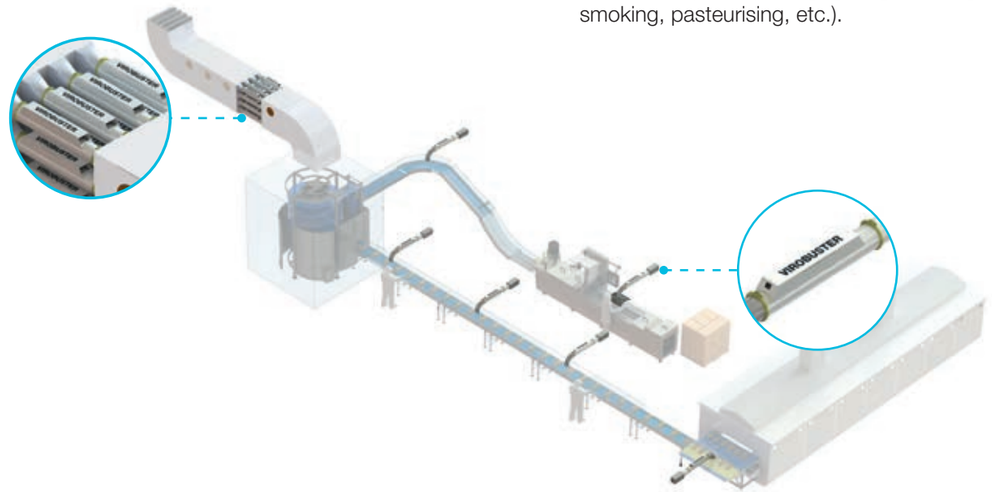
THE BUILDING SOLUTION

If the building consists of several individual closed rooms with processes such as preparation, cooking or packaging being performed independently of each other, a building-wide solution for air disinfection is appropriate.



THE PROCESS SOLUTION

A process solution, in turn, promises the best effects if no clear ‘spatial structure’ is discernible and all processes are grouped together in one or more lines. The process solution offers contamination protection after the so-called ‘zero point’ (baking, grilling, cooking, steaming, smoking, pasteurising, etc.).



By the way: whether retrofitting or installing new systems – thanks to the modular design, different performance spectra and air volumes can be realized depending on the initial situation and requirements.

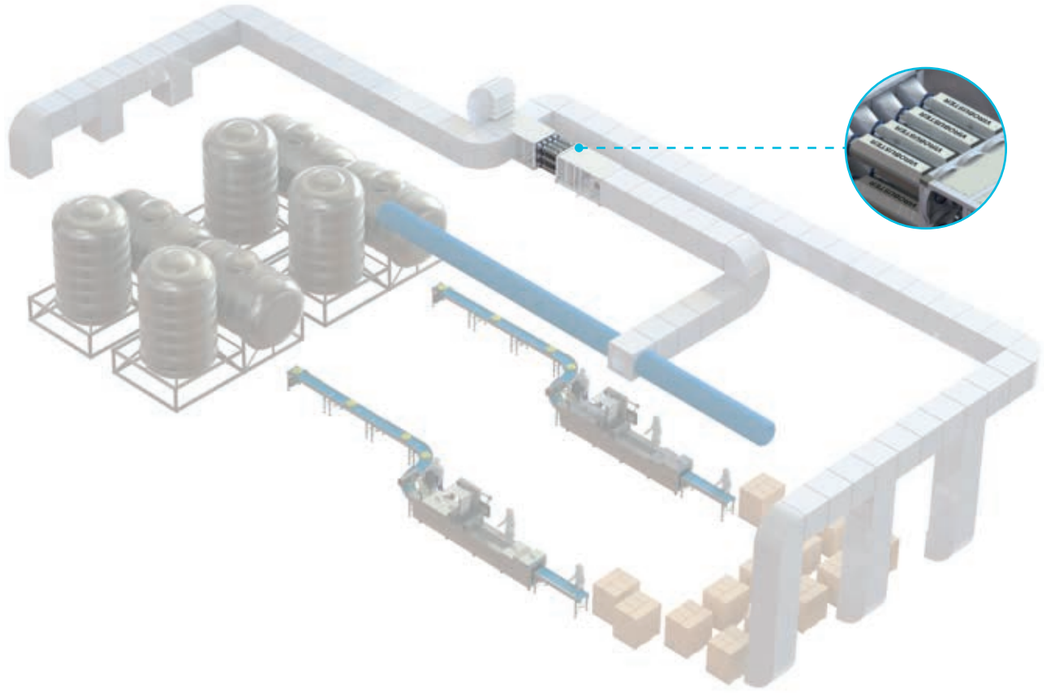
VIRTUAL CLEAN ROOM

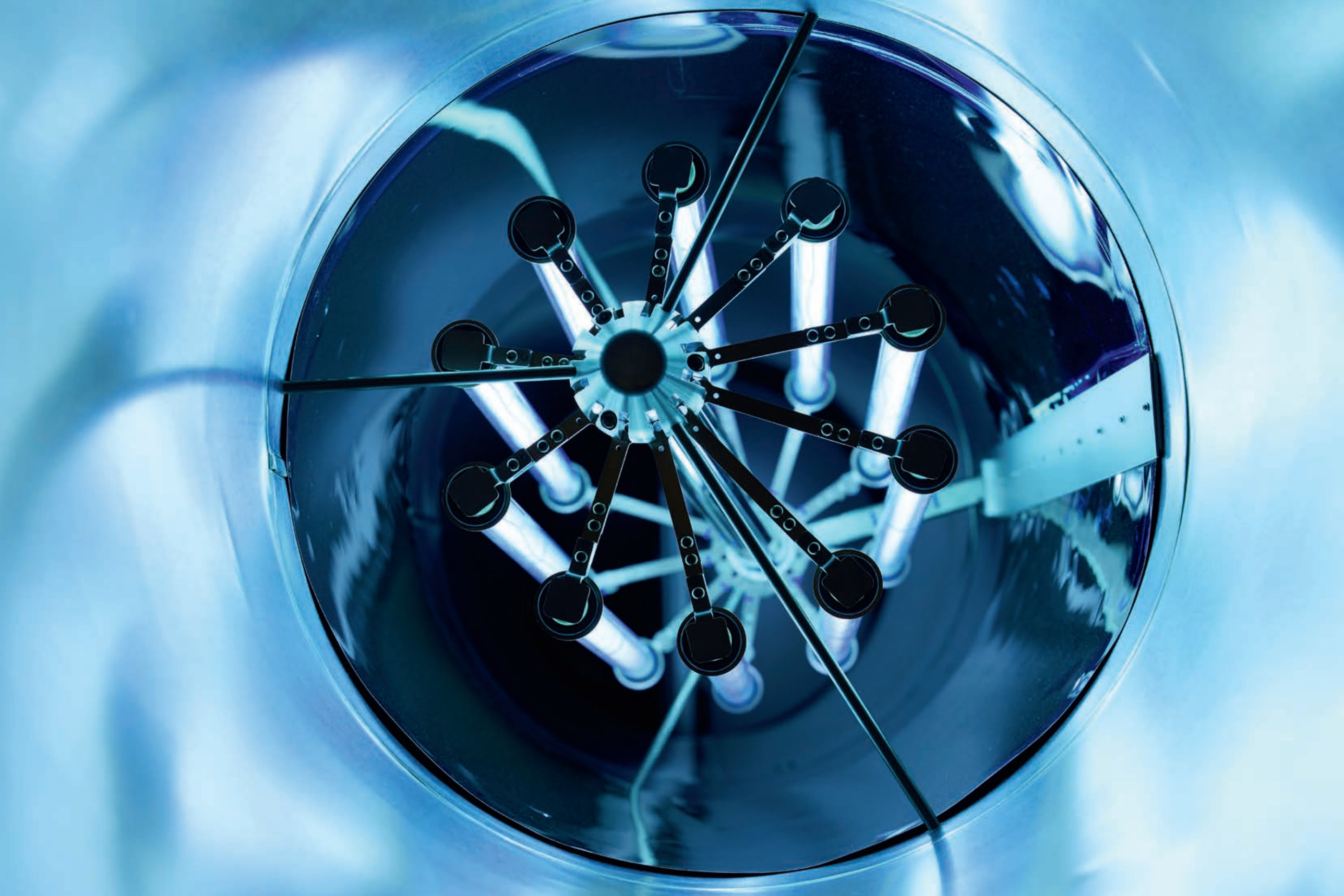
VIROBUSTER offers a unique solution as an alternative to structurally clean rooms using elaborate HEPA systems and associated hygiene regulations: the virtual clean room.

Yet completely clean rooms are in fact rarely or never necessary. It's a question of specific areas of risk that are subject to high-care requirements.

We analyze and simulate the risk areas in your production halls and derive targeted airflow recommendations for optimum air quality. This guarantees high care – right where you need it and exactly when you need it.

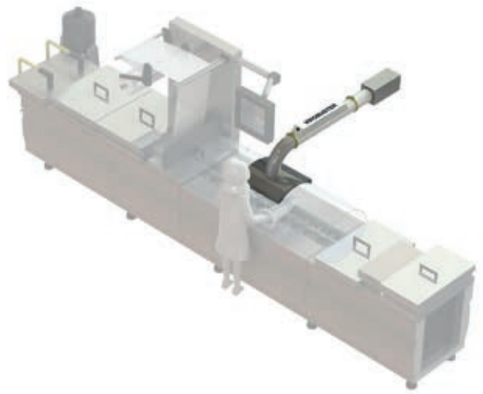
<u>The advantages:</u>
– less staff
– less cleaning work
– flexible use (on/off mode)
– cheaper alternative for aseptic filling





SAFE PACKAGING/FILLING

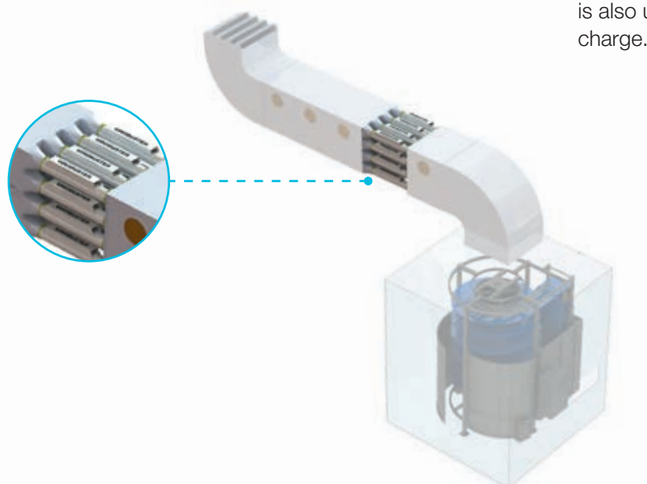
Special air showers and simple overpressure prevent contaminated air from spreading and reaching bottling or packaging units.



SAFE COOLING

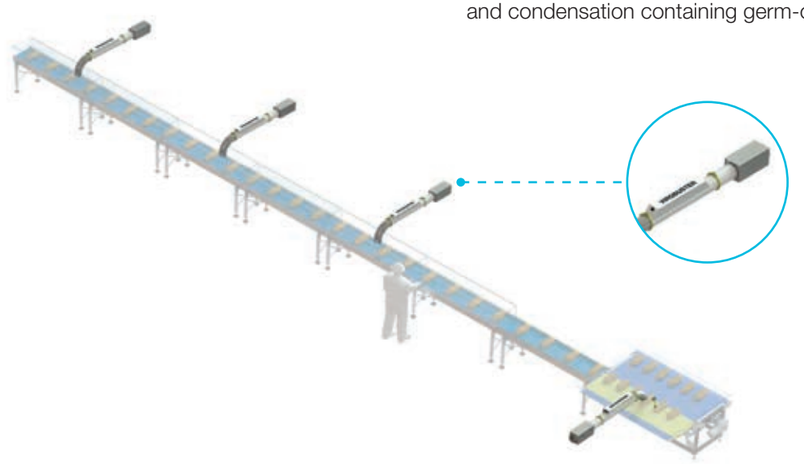
Cooling your product involves dissipating heat while protecting the product from live germs as well as preventing it from drying out during the process.

VIROBUSTER makes use of a different operating principle: with the sterilized air, recirculating air can be established in summer without the system becoming contaminated (adiabatic). During the cooler seasons, the outside air is also used to cool the system down. And it's free of charge.



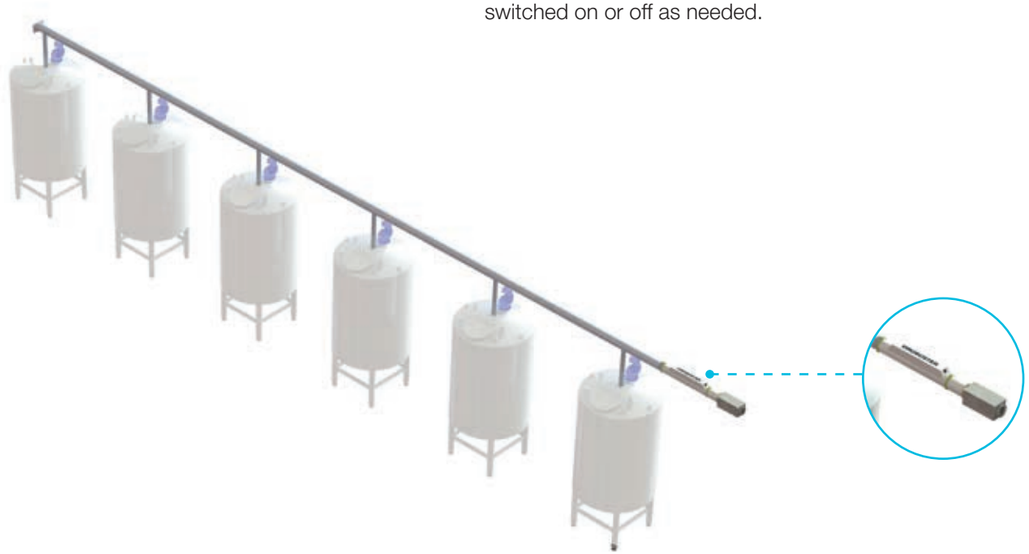
SAFE TRANSPORT

Transport is a particularly sensitive area. To prevent the product from coming into contact with contaminated air, VIROBUSTER recommends enclosing the conveyor belt and supplying germ-free overflow air via central or local systems. This eliminates the possibility of sedimentation and condensation containing germ-contaminated air.



SAFE VENTILATION

When whipping, mixing or emptying, air is drawn into the tank. If the air is not germ-free, contamination of the product or the tank surfaces occurs during a cleaning and drying cycle. VIROBUSTER can ensure the air entering the tanks is germ free and can be conveniently switched on or off as needed.



For whom?

Industries and references

Now let’s bring it all together

The food industry is as diverse as it is complex. The influence of germs and aerosols can have significant qualitative and economic effects. Contaminated air forces companies to cool or store products in a refrigerated environment. As a result, they dry out quickly.

During transport for cutting and packaging, the goods are again exposed to external influences: contaminated condensate, for example, is formed as soon as the goods are removed from colder rooms.

With VIROBUSTER you can turn your production area into a safety area – we create a targeted protection zone (high care) for cooling tunnels, cooling towers, storage areas, and conveyor belts. Our patented UVPE technology inactivates the mold spores, bacteria and other microorganisms in the air by up to 99.99% with optimised UV-C light.

This professional solution has proven itself in the food industry since 2002 and offers a wide range of industries, such as bakeries, dairies and manufacturers from the convenience food sector, maximum security for a gentle and sustainable production process.

Industries and
references

Advantages – using the example of
→ The potato industry

FARM FRITES

Product:
Chips of different sizes are pre-fried and then delivered to supermarkets and wholesalers as frozen or chilled goods.

Process:
Chips are sterile after being removed from the frying process, once removed they are placed onto a conveyor which transfers them through a cooling tunnel to be packaged in protective atmosphere packaging or flash-frozen for bulk packaging and distribution. To prevent germs from the surrounding air from contaminating the chips, resulting in biological failure, the supply air is disinfected while flowing through Steritubes from VIROBUSTER.

Cost-effectiveness:
With a longer shelf life and significant energy savings, the main advantages are obvious. As soon as products are germ-free, storage and transport at higher temperatures can also be considered.

Advantages – using the example of
⟶ Convenience food

UNILEVER/
UPFIELD

Product:
Expanding existing production lines for spreads and sauces to include an organic product (margarine) usually requires an aseptic production line, as the margarine and packaging material come together with other products during the bottling process. Clean rooms were not an option – VIROBUSTER established hybrid paths in conjunction with the existing plant as a process solution.

Process:
In the central ventilation and air-conditioning system and in the form of autonomous stand-alone solutions, VIROBUSTER Steritubes were installed. They keep the margarine tanks at overpressure, enclosed conveyor belts are supplied with germ-free air, and the filling plant is supplied with germ-free overpressure via a direct connection to the VIROBUSTER system via an air shower.

Cost-effectiveness:
The Steritubes can be (de-)activated in a targeted manner: once organic products are produced, the now hybrid production line will be able to switch from low and medium to high care, thereby eliminating the need for preservatives, improving formulations and extending shelf life. Compared to the aseptic or clean room solution, only a fraction of the investment, operating and maintenance costs are incurred.

Advantages – using the example of
→ A dairy

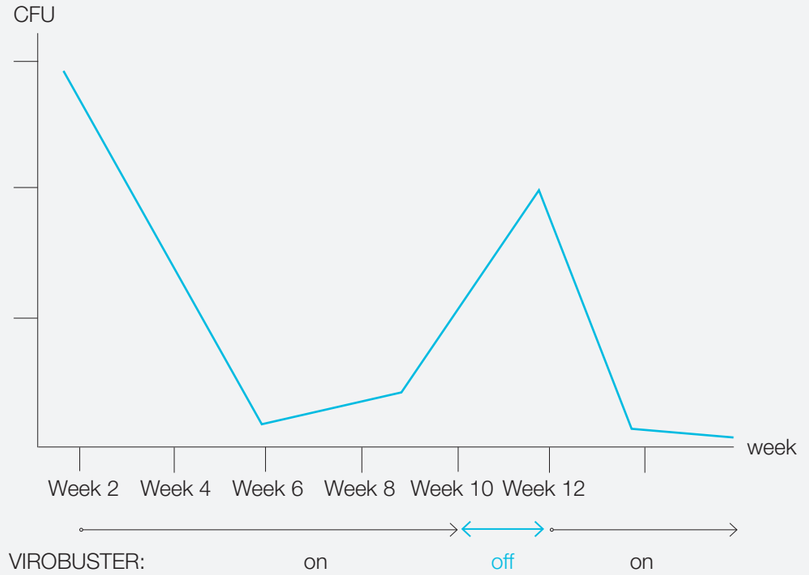
BAYERNLAND

Product:
Raw milk is usually processed into products such as cheese, butter and other fresh products in large production rooms where contact with indoor air is unavoidable. However, with a targeted approach to sensitive production areas, VIROBUSTER is able to provide protection from molds, yeasts, and other microorganisms exactly where it is needed.

Process:
The process of disinfecting recirculated air guarantees continuous air hygiene in large production areas. VIROBUSTER accomplishes this with compact air circulation units positioned strategically throughout the area without the need for expensive ducting or installation requirements.

Cost-effectiveness:
Product quality can be ensured thanks to a continuous flow of germ-free air protecting the environment during production, conveying, and packing.

EXAMPLE OF AN AIRBORNE GERM ANALYSIS



Advantages – using the example of
⟶ The baking industry

BAKKERIJ FUITE

Product:
Fresh confectionery products are produced daily for supermarkets – from cream tartlets to apple strudel.

Process:
Both ingredients and semi-finished products are supplied either by bakeries themselves or chilled by external suppliers. Highest hygienic measures such as protective clothing and clean air are essential when assembling the goods. By keeping the indoor air germ-free using the VIROBUSTER system, cross-contamination via germs as well as condensed germs is excluded – and biological failure is prevented.

Cost-effectiveness:
Depending on the conditions, the shelf life of baked goods can be significantly extended, reducing expensive recalls and waste, opening up access to new export markets and other markets, and reducing or eliminating weekend work altogether. It also improves the feel and appearance of the goods.

‘Thanks to VIROBUSTER, we were able to extend the shelf life of our baked goods by several days. This makes a lot of difference when it comes to fresh products; the sales cycle in the supermarket is extended and waste is significantly reduced.’

Klaas Fuite
Bakkerij Fuite

Advantages – using the example of
⟶ Transport and storage

BERDEX

Product:
When transporting animals most authorities around the world require enclosed containers in an effort to prevent the spread of diseases and viruses.

Process:
To prevent the animals – in this case, either 800 small piglets or 80 large breeding boars, which are supplied with oxygen and air-conditioned during transport – from becoming infected, the supply air is provided via a VIROBUSTER system. This also prevents contamination by contaminated air when the transporters come near animals for slaughter – for example, on the motorway or on farms.

Cost-effectiveness:
UV-C systems from VIROBUSTER are the first choice in virus protection from such viruses as swine fever (PPRS virus). Additional advantages over traditional filter systems are the ability to simply switch the system on or off since there is no need for continuous operation and trailers equipped with our system may cross borders into protected or restricted areas without any restrictions.

Advantages – using the example of
⟶ The baking industry

BAKKERIJ SOMA

Product:
In addition to multigrain and black bread, Soma bakery produces a number of special products for European supermarkets.

Process:
Since yeasts are used in dough processing it is essential to avoid contact between the naturally contaminated air in the dough department and the sterile baked breads. The VIROBUSTER system is used to provide a clean disinfected air environment so the breads can be safely removed from the oven by a robot, cooled, sliced, and packaged.

Cost-effectiveness:
Under normal circumstances, in order to avoid using preservatives, the bakery would have to pasteurize the product prior to packaging. This not only requires a considerable amount of energy, but also significantly affects the appearance, feel and taste of the bread. VIROBUSTER Steritubes provide a cost-effective and flexible alternative that contributes to both product quality and reduced energy costs.

Advantages – using the example of
⟶ The potato industry

AVIKO

Product:
Potato products of various sizes and shapes are blanched and then sold as frozen or chilled products to supermarkets and wholesalers.

Process:
The products come out of the blanching line sterile and are cooled in a protective atmosphere while travelling on an enclosed conveyor belt to be packaged or deep-frozen. The disinfected incoming and circulating air creates an environment which prevents biological failure.

Cost-effectiveness:
In addition to an improved look and feel, the longer shelf life created also means lower costs. Recalls and waste are reduced, new export markets are available, organic segments of the market are available as well, and weekend work can be reduced or eliminated altogether.

Conclusion

The solution
that suits you

Our service lets you breathe a sigh of relief

You don’t just want to buy equipment. You want a solution that offers your customers the highest possible quality and security. We offer you exactly the service you need.

ADVICE

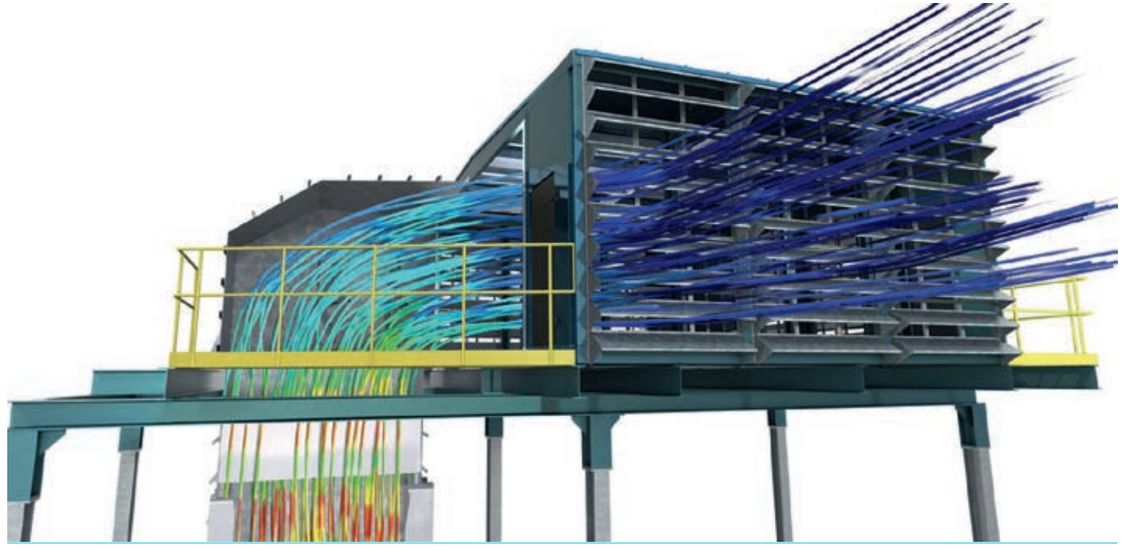
How are your processes structured? For which rooms is UV-C air disinfection important? Do you need a solution for equipment or a process? Our team will be pleased to advise you – including questions about retrofitting and new systems. We can analyze sensitive areas using CFD models and thus develop a customer-specific solution.

ASSEMBLY

Our selected partners assemble the system turnkey. We will also be happy to supply you with the Steritubes separately if your own equipment manufacturers integrate the solution. Turnkey or pure delivery – the choice is yours.

SERVICE

Only when your system is up and running will it bring security. With maintenance and spare parts, we ensure that your air is reliably disinfected. If you have any questions, please do not hesitate to contact us.



‘With us, every single piece of equipment is made in Germany. The high processing quality of our production in accordance with the medical device standard is of course TÜV-certified.’

Thomas Rous
Managing director
VIROBUSTER International GmbH

VIROBUSTER:
Trust since 20 years

VIROBUSTER has made a name for itself as an internationally active company with German roots: active on the market since 2002 with the unique UVPE technology, UV-C air disinfection has established itself as the problem solver in hygienically demanding environments such as hospitals and laboratories – but, above all, in the food industry. The products and solutions that reliably create flexible high-care environmental conditions can now be found in over 25 countries.

The basis of the company's success since its founding in 2002 is the invention of UVPE (Ultra Violet Pathogen Elimination) technology, an invention which is unique in the market. It is the world's first modular and efficient UV-C solution. As the market leader, VIROBUSTER holds numerous active property rights and patents and consistently drives technological development forward. As a result, new, innovative and customer-specific solutions are constantly being created internally. At the same time, the independent family-owned company regularly participates in the research activities of renowned universities and institutes and is represented on several (international) standardization committees.

At the company's headquarters in Windhagen, VIROBUSTER operates its largest production site, which cooperates closely with other locations in Stuttgart and the Netherlands, guaranteeing consistently high manufacturing quality.

Evidence of effectiveness
Fraunhofer Institute for Building Physics IBP 2021
Hygieneinstitut biotec GmbH 2006, 2013, 2020, 2021, 2022
Kowalski 2009
HDZ NRW Ruhr-Universität Bochum 2009
Various proofs from customers in the food industry
Chairman of DIN and Member of the VDI

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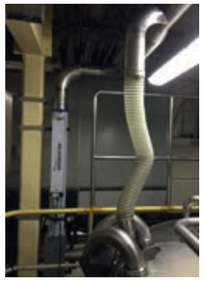





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info@virobuster.com
virobuster.com

Concept and text
Yvonne Egberink, Cologne
info@yvonne-egberink.de
communicationWorks.de

Design
Pascal Küppers, Cologne
bureau@pascalkueppers.com
bureaukueppers.com

Photos
VIROBUSTER
Alfred Büllesbach, Asbach
IST Metz, Nürtingen
iStockphoto.com

Prepress and proofreading
ADDON Technical Solutions
Düsseldorf

Print
Clasen GmbH, Düsseldorf

Virobuster International GmbH
Köhlershohner Strasse 60
53578 Windhagen, Germany
Tel. +49 (0)2224 818 780
info@virobuster.com
virobuster.com

The air disinfection specialist.
Since 2002. Made in Germany.

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