



STERITUBE Plus
Hygienic filling



STERITUBE Basic
Airsock and cooler



STERITUBE Basic
Greenhouses



VIROBUSTER®

Overview

Welcome to VIROBUSTER®. This leaflet gives an overview of the goals, products and advantages when VIROBUSTER® UVPE Technology is applied for the protection of personnel, animals and products against airborne micro-organisms.

The UVPE (Ultraviolet Pathogenic Elimination) technology eliminates microorganisms in the air. The DNA is blocked in a natural way, therefore cell division is prevented and product decay or infections are no longer possible. The end result is a possible prolonged shelf life, improved product quality, healthier and stronger animals and plants.

The patented product is both in practice and scientifically proven and is currently used by many hospitals, laboratories and the larger food manufacturers.

The fact that consumers want more and more light-, bio- and less salted products, means a steady decline in natural preservatives like fats, sugars, salt and chemical preservatives, the so-called E - numbers.

Ofcourse, this has far-reaching implications for production, logistics and shelf life of products. In addition to changes in recipe, the introduction of a comprehensive TOTAL HYGIENE protocols for production, filling and packaging becomes more and more important.

An improvement in air quality can affect shelf life , flavor , color, and thus the profitability of the products.

VIROBUSTER® being the specialist for air purification provides the following benefits and result



	PRODUCT	PRODUCTION	FINANCIAL
A D V A N T A G E S	<ul style="list-style-type: none"> Prevents cross-contamination No need for preservatives and pasteurization Maintaining freshness, colour and fragrance for fruits and vegetables Healthier and stronger animals with less antibiotics Less dehydration 	<ul style="list-style-type: none"> Safe cooling, drying and filling of a product Blowing and keeping clean of an product by laminar air flow systems Cleaner machinery and conveyors Longer maintenance intervals machinery Use of installation „On Demand“ 	<ul style="list-style-type: none"> New (bio)segments and export opportunities Improved company image by Total Hygiene Concept Energy savings and increased comfort and safety due to higher temperature allowed in cooling cells No weekend labour needed when longer shelf life available Reduced sick leave among employees
R E S U L T S	<ul style="list-style-type: none"> Gas packed Bake-Off bread with more than >180 days shelf life Organic production of rye bread (up to 8 weeks shelf life) Bigger and better harvest in tomato greenhouses Healthier and stronger animals 	<ul style="list-style-type: none"> Less losses through safer filling, cooling and drying Cleaner cooling/heating units and airlocks No need for further chemical cleaning 	<ul style="list-style-type: none"> New customers New market segments Energy savings No more Sunday labor

VIROBUSTER® - Airhygiene

A growing challenge

VIROBUSTER® is the youngest member of the JK-group from Windhagen (DE). JK has been active for more than 35 years on the international market, with its 300+ employees. Its focusses on the development, production and sales of technical equipment for the healthcare, wellness and industrial market.

As a solution to the ever increasing problems in the healthcare-industry pertaining to microorganisms such as MRSA, TBC and Influenza, VIROBUSTER® introduced in 2007 the UVPE (Ultra Violet Pathogen Elimination) technology for air-purification. This technology has been developed in cooperation with national and international institutes. Since its introduction VIROBUSTER® products have served as a reference within the air-hygiene market.

The experience that has been collected from the healthcare market has been put to use by quality managers from the food production, cattle farming, transportation & logistics and agriculture sectors.

One of the daily duties of a quality manager is to make sure that the quality of a product stays warranted by making sure that employees stay disciplined and the overall condition of its production fleet. Here hygiene plays a very important role, but the focus on hygiene can be too narrow. For a total-hygiene-concept several factors must be taken into consideration, such as :

- Washing hands
- Clean clothes
- Clean equipment
- Clean work surfaces
- Clean water
- Clean packaging

AND

- **Clean air**

Especially clean air tends to be forgotten, as the quality difference between summertime and wintertime air demonstrates to be an important factor. In the summertime the air is very humid and warm, thus creating an ideal condition for moulds and bacteria to thrive, increasing the chance of products perishing as opposed to wintertime when its cold and dry.

VIROBUSTER® improves air quality with its products and concepts, calling it air-hygiene, and takes the first step into the future.



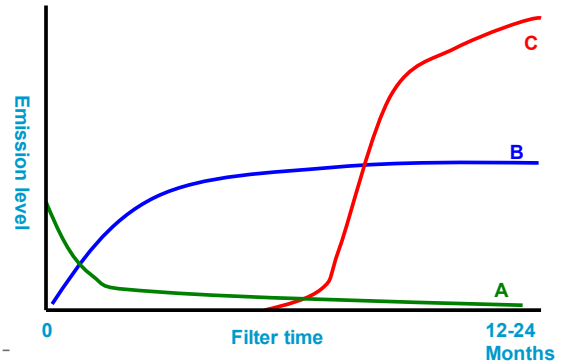
VIROBUSTER® - State of arte

Good, but not enough

Due to the fact that filters catch and do not kill, the living organism caught by the filters on the filter bed can emit VOC's which can be harmful. Next to these mVOC's also environmental VOC's and material VOC's can be emitted. Three levels of emissions of VOC's can be classified:

- A: Chemical emission from filter materials
- B: Emissions resulting from chemical reactions on the filter bed (VOC's)
- C: Organic Emissions (mVOC's)

(Source: Atze Broerstra 2005)



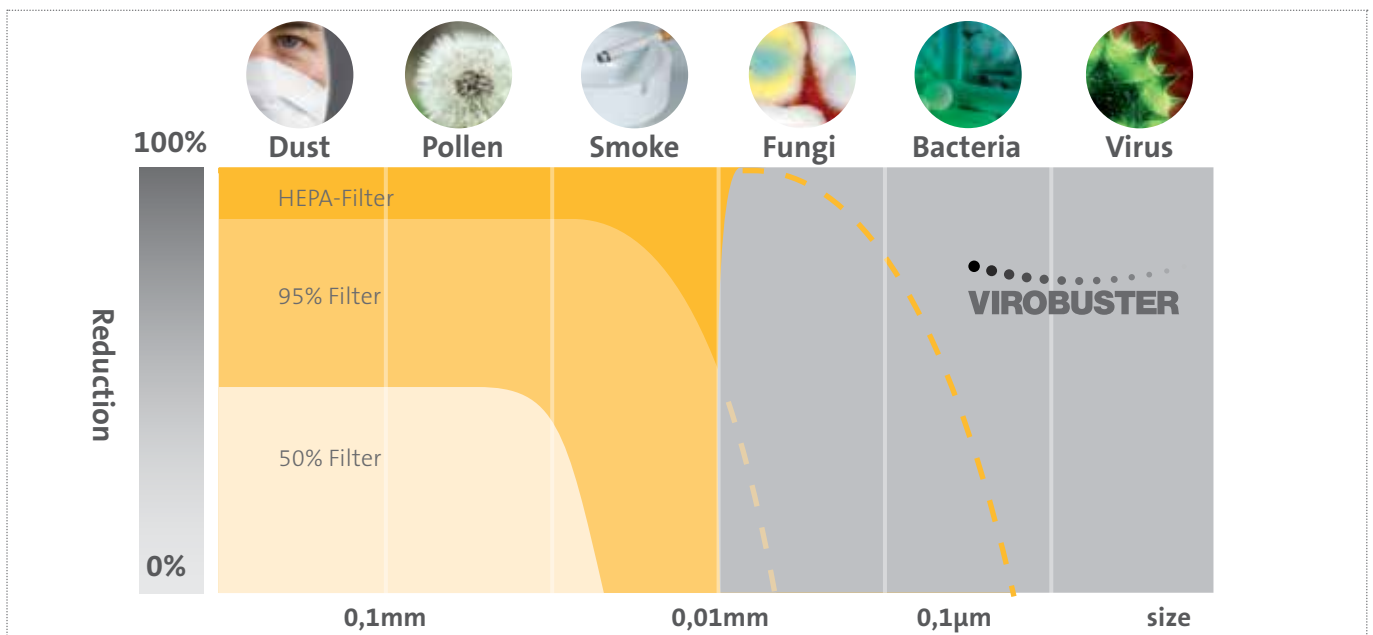
Resulting in

- Extra dust load on the filter bed due to dusty areas
- Enhanced growth of organisms on the filter bed when installations are turned off to optimize costs
- The emitted (m)VOC's can influence colour, freshness, taste for products and health and mood for animals and humans due to the inherent toxicity of its components

The combination

The combination of filtration and VIROBUSTER® opens new possibilities and advantages

- The microorganisms are killed before they are collected in the filter, preventing VOC's emitted
- Filters stay "cleaner", have longer service intervals and Less rapidly increasing pressure drop
- Filters are no longer bio waste, and a specialized (and expensive) exchanging is no longer needed.
- UVPE + F9 is meets or even exceeds HEPA (H14) biologically and against lower costs

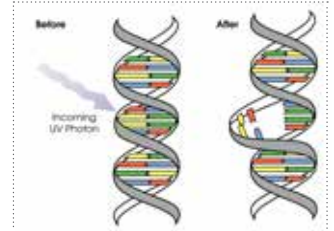


VIROBUSTER® - Our technology

Natural, safe and effective

UVPE - Ultra Violette Pathogen Elimination Technology

It has been a well-known fact the UVC light has a sterilizing effect on micro-organisms. UVC light (254nm) causes thymine bridges to be formed in DNA, preventing the duplication of this DNA. This in turn prevents an micro-organism (mould, bacteria or virus) from duplicating and thereby preventing an infection.



Water treatment facilities based upon UVC have been deployed worldwide.

VIROBUSTER® has been the first to adapt this concept to an standardized and effective form for practical air-treatment and we named it our UVPE (Ultra Violet Pathogen Elimination) Technology



UVPE Technology

- Significant improvement of the air quality in air conditioning installations (HVAC)
- UVPE Technology, no chemicals, non-polluting and no ozone.
- Highly efficient thru patented light source setup, reflector technology and modular design
- >99% elimination of moulds, bacteria and viruses
- High intensity prevents mutations from forming

Modularity


A Duracell battery is THE example for a standardized product with unparalleled diversity towards practical applications (toys, electronics, machines etc.) without the user needing to know in detail its inner workings. Air quality equals electricity as a need to have at its disposal without needing to think to heavily about it.


VIROBUSTER® recognized this wish at an early stage and reacted by introducing Modularity. A standardized module that produces the correct, safe and purified air without hassle and using it when needed. As with the Duracell battery the capacity can be increased by combining multiple modules.



VIROBUSTER® - Our products

Innovative, flexible and safe to use

Product	Art.Nr.	Description	Temp. (°C)*
	50000721	STERITUBE BASIC	(15-35°C)
	50000723	STERITUBE BASIC Teflon	(05-15°C)
	500001030	BASICTUBE	(15-35°C)
	500001031	BASICTUBE Teflon	(05-15°C)
	500001104	BASICTUBE Stainless Steel	(15-35°C)
	500001105	BASICTUBE Stainless Steel Teflon	(05-15°C)
Technical specifications <ul style="list-style-type: none"> • Dimensions 230 x 180 x 1003 mm (LxBxH) • Electric power 190 Watt • Pressure drop 150 m³/h - 2 Pa 300 m³/h - 13 Pa 400 m³/h - 23 Pa • Airflow 150 - 800m³/h • Biological reduction > 99 % (Bas. Subtilis. Sporen) • Maintenance 9.000 hrs (lamps en ART**) 			

Product	Art.Nr.	Description	Temp. (°C)*	
	50000713	STERIBASE WALL 150 BASIC	(15-35°C)	
	50000715	STERIBASE WALL 150 BASIC Teflon	(05-15°C)	
	50000705	STERIBASE 150 BASIC	(15-35°C)	
	50000707	STERIBASE 150 BASIC Teflon	(05-15°C)	
	Technical specifications <ul style="list-style-type: none"> • Dimensions BASE 450 x 450 x 1770 mm (LxBxH) • Dimensions WALL 180 x 270 x 1720 mm (LxBxH) • Electric power 220 Watt • Noise level 150 m³/h - 51 dB(A) • Flow 150 - 300m³/h • Biological reduction > 99 % (Bas. Subtilis Sporen) • Maintenance 9.000 hrs (lamps en ART**) 			

Advantages of VIROBUSTER® products en Modularity

- Standardized (validated) module for every application
- High air volumes possible
- No customer specific design, only standardized concepts
- Retro-fit into existing installations possible
- Stand-alone availability, without the need incorporate in existing installations
- Minimal thermal influence on passing air. Heat expelled by external convection
- Modules can be fitted with an optional fan and valve, and act as an HVAC system independently from an existing HVAC system
- All pressure hierarchy concepts (positive pressure, flush, negative pressure, exhaust, LAF and dilution) possible
- Day and night mode possible by deactivating unused modules (energy conservation)
- “Safe change” possible : maintaining systems without interrupting supply to user

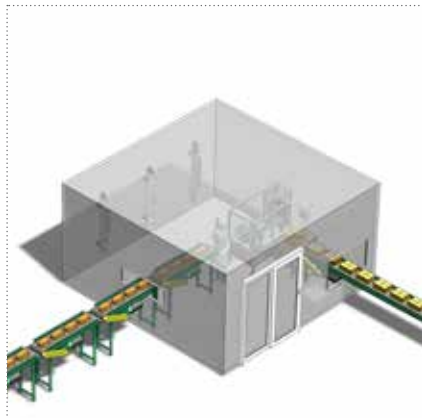
* environmental temperature

** Advanced Reflector Technology

VIROBUSTER® - Our concepts

Pioneering, simple and inexpensive

VIROBUSTER® not only delivers an product, but also solutions that translate into simple and inexpensive practical usage. Below a listing of our technical air-hygiene concepts.

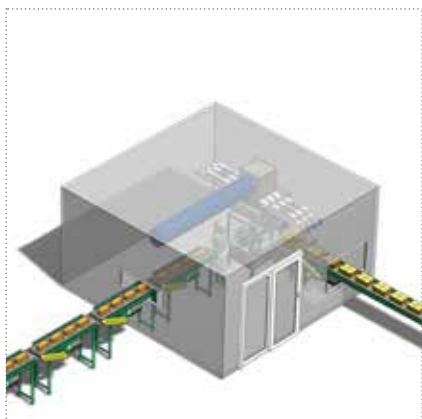


1. STAND-ALONE

The application of STERIBASE and STERIBASE Wall products is well suited for spaces that have no HVAC system or where such an installation is not possible.

The advantages:

- Plug & Play (230 volt)
- Quick usability
- No installation work, cheap implementation
- Minimal and variable arrangement and positioning
- Competition-less efficiency thru maximal air distribution

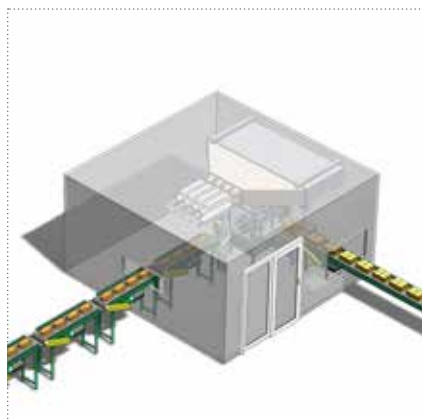


2. AIRSOCKS

The STERITUBE BASIC and BASICTUBE offer the possibility of providing sterilized air to so-called Airsocks. The modules can be positioned in front or between Airsocks.

The advantages:

- No more biological contamination within the Airsock
- Longer maintenance intervals
- High-Care zoning possible



3. COOL/HEAT UNITS

Even in spaces that require constant conditioning, the VIROBUSTER® products STERITUBE and BASICTUBE can be placed in front of cooling or heating units.

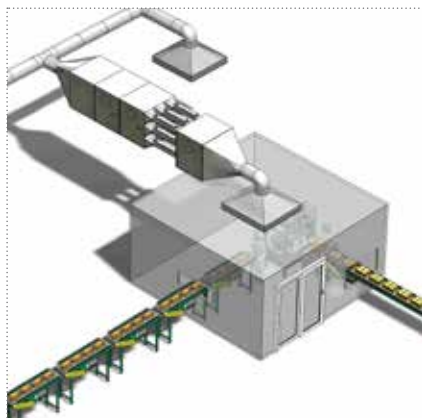
The advantages:

- No more biological contamination within cooling or heating units
- Steadier output
- The units themselves are no longer a biological contaminant
- No more unpleasant odours

VIROBUSTER® - Our concepts

Pioneering, simple and inexpensive

Through the download section of our industrial homepage on www.virobuster.com you can find a handbook which deals with all concepts in detail and explanations how to configure the ideal configuration.

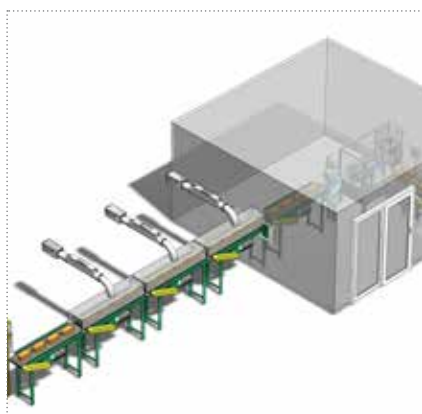


4. OVERPRESSURE

VIROBUSTER® products can be incorporated into almost every air handling unit (AHU) with no problems at all. Form and capacity are secondary, as the configuration can be changed with (standardized) adaptors to fit any AHU.

The advantages:

- Conforms to VDI 6022 (DE)
- Cleaner AHU components downstream, no more unpleasant odours
- Steadier output
- Both retro-fit and incorporation during construction possible

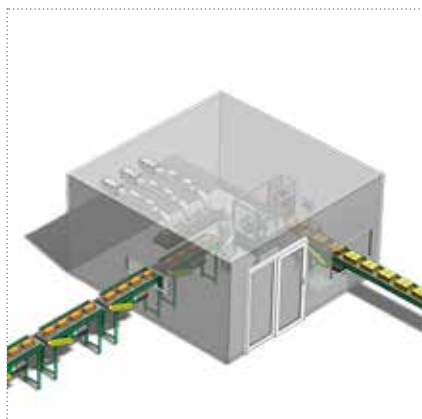


5. CONVEYOR

The influence of air on conveyor systems is greatly underestimated. Products sometimes spend hours traveling thru contaminated spaces. The STERITUBE can be built as a tunnel around the conveyor belt and produce an overdraft of clean air and prevent products from getting contaminated.

The advantages:

- Save passage thru dirty spaces
- Preventing cross-contamination
- Forced cooling and drying made possible with clean air



6. LAMINAR AIR FLOW

Often there is a moment where products are exposed or reach a temperature which enables moulds to become active. At these times during production, its good to know that an overflow of sterile air is present to keep moulds away from the products.

The advantages :

- Only deployed at point-of-care, not the entire building
- Quick usability
- No installation work and thereby cheap implementation

VIROBUSTER® - Application areas

Safe for everyone

(Food) Production – Organic with a longer shelf.life

Complaints, or reputation damage thru sick customers are the biggest nightmare for manufactures of edibles and groceries. This is why prevention, total-hygiene-concepts and discipline all fit together. Air-hygiene cannot be left out of this.

- Prevents cross-contamination of products
- Prevents yeasts of contaminating end products
- Longer shelf-life thru lowered microbiological presence
- Less to no preservatives needed



Veterinary - Healthy and strong animals

Animal well-fare has been a growing consideration these past few years. The goal is not only ethical responsible farming, but also stronger and healthier animals without using too much antibiotics. Here air-hygiene also tends to be neglected or forgotten when it comes to the prevention of infections or hygiene measures.

- Prevents cross-contamination of animals mutually, or to other stables
- The animals will grow stronger and healthier and have better perform
- Less antibiotics or other medicines needed



Transport & Logistics - Safe and secure

The spoilage of products during transportation or storage is a significant problem. Only controlling the temperature during transportation and storage is not sufficient, because low temperature only reduces bacterial growth, it does not prevent it. Air just passing a conditioning installation, can easily carry bacteria and fungi from one to another animal or product.

- Prevents cross-contamination
- Longer shelf life thru lowered microbiological presence
- Less to no preservatives needed to keep products from spoiling during transportation or storage

Fruit & Vegetables - Guaranteed freshness and taste without chemicals

The influence of smaller “pests” such as moulds and bacteria can be just as damaging as the larger counterparts which are actively combated. The influence from water and air on plant grow and consequently harvest quality is significant. Air-purification lowers the pathogenic pressure and results in stronger and bigger crops and ultimately a better harvest in terms of quality and quantity.

- Healthier and larger crops
- Qualitative and quantitative better harvest
- Less or no use of fungicides or pesticides



Cooling cells

THE Method to reduce micro-organism growth, is to reduce the ambient temperature and the humidity (RH) in a space. Colder air requires of course complicated installations and special clothing for employees. By keeping the air clean, less micro-organism or none at all will be present in the space which means a higher temperature would be allowed (if BRC allowed).

- Lower concentration or no micro-organism present
- Energy savings due to higher working temperature for the installation (cools less hard)
- Increased comfort (and so productivity) for employees
- Less dehydration for products
- Much better cheese ripening due to higher temperature possible.

VIROBUSTER® - Referenties

Foodproduction

Unilever - Rotterdam (NL)

Protection of bottling line

Concepts : LAF

Several bottling lines are protected thru VIROBUSTER® STERITUBES (LAF Concept). Creates a High-Care zone amidst Standard-Care



Bakkerij Holland (NL)

Increasing shelf-life of gas-containing packaged bread

Concepts : HVAC, Conveyor belts and LAF

Bakery Holland wanted to offer its gas-packed bake-off bread to the market. This meant a complete switch of their hygiene system, as the shelf-life had to be closely monitored. The complete line from the oven (conveyor belts, cooling tower, buffer zone and packaging department) was protected thru 42 STERITUBES.



VIROBUSTER® - References

Foodproduction

Bakkerij Soma (NL)

Production of organic black bread

Concepten: Stand-alone, HVAC en Conveyor belts

Bakkerij Soma expanded their product line with organic black bread. The use of preservatives was prohibited and pasteurization was rejected as it changes the consistency and taste.

The complete line from the oven (conveyor belts, cooling tower, buffer zone and packaging department) was protected thru 21 STERITUBES.



Bakkerij Fuite (NL)

Daily fresh pastry

Concepten: Airsock and cooling unit

To lower the risk of spoilage Bakkerij Fuite decided to retro-fit their installation with STERITUBES. Additionally positive-pressure was implemented using STERITUBES.



VIROBUSTER® - References

Transportation & Logistics

Cuppers Carrosseriën (NL)

Animal trailers

Concepts : HVAC

Cuppers, as a specialist in the field of animal trailers, recognized the need with their customers for safe and healthy transportation and developed a trailer that incorporates VIROBUSTER® STERITUBES. The installation of 16 STERITUBES maximizes safety and well-fare for the animals.



Colruyt (BE)

Cheese storage

Concepts : Stand-alone

Due to the confined nature of the warehouse, the decision was made to use 12 wall-modules to continually rid the air of micro-organisms which come from the cheese. This resulted in a dynamic, low and save equilibrium of air-borne micro-organism. This in turn guarantees the shelf-life and the cheese can be safely transported to the adjacent partitioning and packaging area.



VIROBUSTER® - References

Fruits & Vegetables

Proeftuin Zwaagdijk (NL)

Research into the effects of Botrytis control in the air at a tomato greenhouses (one with and one without VIROBUSTER®)

Concepts: HVAC and Airsocks

Two identical greenhouses next to each other were seeded with the same tomato-seed. One of these greenhouses was fitted with a VIROBUSTER® installation. After one year it was concluded that the “clean” greenhouse had produced larger and stronger crops and thus provided a quantitative and qualitative better harvest.



TROUBLED WITH ODOUR NUISANCE IN THE VICINITY ?

Besides air-purification VIROBUSTER® also provides de-odourification of exhaust gasses The Odourtube is an ingenious, proven concept that has many advantageous,

For more information

www.odourtube.com




ODOURTUBE
DE GEUR NEUTRALISATOR



STERIBASE WALL 150
Cheese warehouse

colruyt

STERITUBE Basic
High-Care department



STERITUBE Basic
Cooling down bread



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