



**viledon<sup>®</sup>**

## **PROTECTING THE FOOD WE EAT**

**HYGIENIC AIR FILTRATION SOLUTIONS  
FOR THE FOOD AND BEVERAGE INDUSTRY**

FREUDENBERG  
FILTRATION TECHNOLOGIES

 **FREUDENBERG**  
INNOVATING TOGETHER



# COMPLETE AIR FILTRATION SOLUTIONS FROM A SINGLE SUPPLIER

WE OFFER ALL THE EXPERTISE AND SUPPORT YOU NEED

Freudenberg Filtration Technologies has been at the forefront of industrial air filtration for over 60 years. Our hygienic air quality solutions enable you to meet the latest standards and guidelines whilst reducing costs, minimizing your environmental impact and gaining competitive advantage.

Whether you are working with Zone H (High Risk), Zone M (High Care) or Ambient High Care conditions Freudenberg Filtration Technologies can provide the expertise to ensure you meet your regulatory requirements. Our experts can work with you from the earliest planning stages of your filtration project, right through to construction and commissioning. With our Viledon® filterCair program, we also offer tailored service packages that ensure the efficient running of your filtration systems on an ongoing basis.

## Freudenberg Filtration Technologies offers you

- a complete design, construction and installation program for modifying or building air filtration systems in the food and beverage industry.
- an individually tailored air quality management package, including an air filter program plus service support and warranties.
- a comprehensive air filter program covering classes ISO ePM10 (G4 to EN 779) to U15, which meets the highest demands of efficiency and operational reliability.



Simply scan the QR code to view our image film:

[www.freudenberg-filter.com/en/company](http://www.freudenberg-filter.com/en/company)





### **Dedicated to your specialist needs**

We offer a complete spectrum of solutions and products for every aspect of food and beverage production. This includes achieving hygienic air quality, potable water from wastewater and protecting product quality, from industrial pollution, by removing all major contaminant gases. Decades of experience, worldwide project references and the role we play in shaping some of the industry's most important regulatory standards are all testimony to our expertise in this demanding sector.

### **A dependable long-term partner**

Freudenberg Filtration Technologies is part of the Freudenberg Group, a family-owned company that employs around 48,000 people in over 60 countries across the globe. Founded in 1849, Freudenberg has built its worldwide reputation on innovation strength, creativity, reliability, corporate responsibility and long-term business partnerships. This backing enables us to manage and deliver turnkey solutions of all sizes, from one-off projects to major service contracts.



# SPECIALISTS IN THE FOOD AND BEVERAGE INDUSTRY

## FREUDENBERG SOLUTIONS ENSURE OPTIMUM PROTECTION AND EFFICIENCY FOR YOUR PRODUCTION PROCESSES

Air quality is a central prerequisite of food safety. Environmental air of a specified quality – temperature, humidity, particle concentration and quality of air – is required both to reduce the possibility of contamination and to protect the health and welfare of employees. This is what Freudenberg solutions deliver.

### Getting the right structures in place

In the food and beverage industry, a hygienic and controlled production environment ensures smooth processes and guarantees compliance with the strict regulations imposed by legislative bodies.

The key to getting the right system lies in defining the precise requirements of your processes. We can work with you to assess and evaluate your current supply and exhaust air ventilation systems, and make recommendations and design, install and maintain an appropriate solution.

### Understanding HACCP (Hazard Analysis & Critical Control Points)

The HACCP management system addresses food safety through the analysis and control of hazards. It is based on 7 principles:

1. Conduct a hazard analysis
2. Determine the critical control points (CCPs)
3. Establish critical limits
4. Establish monitoring procedures
5. Establish corrective actions
6. Establish verification procedures
7. Establish record-keeping and documentation procedures

### The value of a formalized management system

All areas of the food and beverage industry are legally obliged to provide the conditions necessary to protect food while it is under their control. HACCP defines a framework that makes achieving these goals a matter of routine.

In terms of air quality, HACCP helps to avoid potential cross-contamination due to poor ventilation control. For example, preventing allergens (proteins) from passing into allergen-free production areas.

This framework also guards against inadequate maintenance of air handling units (AHUs) and the filter systems they contain. Contaminated filters can support bacterial growth, whilst damaged or poorly fitting filters will allow all sorts of impurities to enter production areas, from pests to fungal spores.



### Our expertise is your peace of mind

As members of EHEDG, we directly contribute to defining standards that reduce and avoid hygiene problems in food production. Our work in helping to shape important developments in hygiene standardization directly benefits your process efficiency. Clean air increases employee comfort, maintains a safe working environment and controls the quality of the process air that comes into contact with food. The issue of air filtration is specifically covered in EHEDG Document 30.

### We do the hard work for you

Our experience and expertise in industrial filtration means that we can take care of all necessary technical and compliance issues for you.

From status analysis to system design, construction and commissioning, right through to consumables and ongoing regulatory and quality management, Freudenberg Filtration Technologies offers you complete service from a single supplier.



Dairy products



Cooked chilled food



Cooked meats



Processed fruits and vegetables



Bakery products



Confectionery

# INTRODUCING THE EHEDG ZONE CONCEPT

## DEDICATED AIR MOVEMENT DESIGN CONCEPT FOR THE FOOD AND BEVERAGE INDUSTRY

In low concentrations, natural components in the air, such as dust particles, bacteria or spores, are not usually harmful to people. In the food and beverage industry, however, the tiniest airborne impurities can lead to contamination. This can in turn reduce the shelf life of a product, or worse.

The industry uses a zone concept to protect beverages and foods in each production process. The zones split production facilities into rooms according to hygiene level: “high” (high-risk), “medium” (high-care), and “basic” (low-risk). The purity level required varies depending on the product being produced.

### Understanding the zone divisions

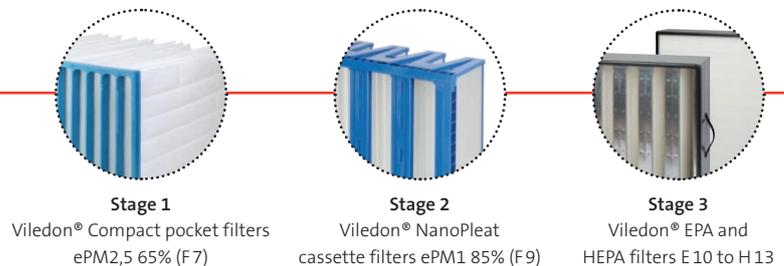
The **high hygiene (high-risk)** zone is where products requiring the highest level of hygiene are processed and packed. The objective is to effectively control all product contamination hazards.

In contrast, in the **medium hygiene (high-care)** zone, the objective is to control or reduce the creation of hazardous sources immediately before a Zone H area, or to protect food-processing equipment against contamination.

Zones that require only a low level of hygiene are called **basic hygiene (low-risk)** zones. Examples include areas used for storing pre-packaged goods.

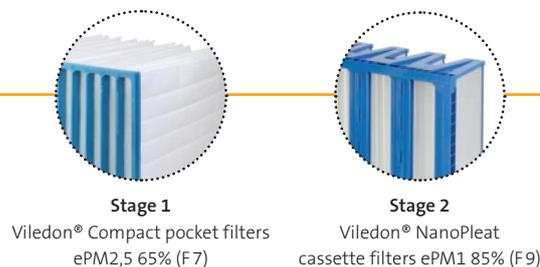
### HIGH HYGIENE (HIGH RISK)

3 filter stages:  
filter classes ePM2,5 65% + ePM1 85% + E10 to H13 (F7 + F9 + E10 to H13)



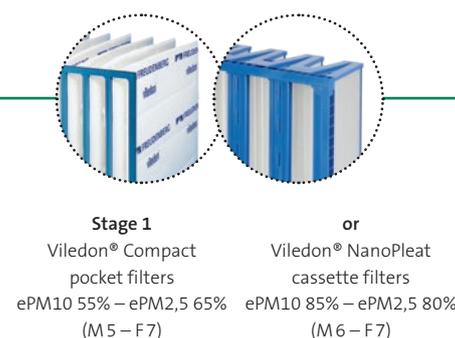
### MEDIUM HYGIENE (HIGH CARE)

2 filter stages:  
filter classes ePM2,5 65% + ePM1 85% (F7 + F9)



### LOW HYGIENE (LOW RISK)

1 filter stage:  
filter classes ePM10 55% to ePM2,5 65 – 80% (M5 to F7)



Classification of filter classes ePMx are based on test standard ISO 16890.

Classification of filter classes from M5 to F9 are based on test standard EN 779:2012.

### Make sure you have the right filters for each zone

Choosing reliable air filters and systems is essential to ensure that you meet the stringent industry hygiene requirements. The multi-stage Viledon® air filter systems reliably remove particles and germs from the air and provide maximum clean air quality in every processing step.



To ask for our foodsafe certificates simply visit the link:

[www.freudenberg-filter.com/en/world-of-industrial/food-and-beverage](http://www.freudenberg-filter.com/en/world-of-industrial/food-and-beverage)



# PROVEN SUCCESS IN SPECIALIST SECTORS

HERE IS JUST A SMALL SAMPLE OF SOME OF THE PROJECTS WE HAVE SUCCESSFULLY COMPLETED WITHIN THE FOOD AND BEVERAGE INDUSTRY

## MILK PROCESSING INTO BUTTER AND CHEESE



Wyke Farms in the UK is a family-owned dairy processing company, well known for producing a range of multi-award winning Cheddar cheese products. They were also the first UK Cheddar brand to achieve 100% self-sufficiency in green energy.

### Project requirements

- Treatment of all process waters to surface water discharge.
- Tertiary treatment to potable-quality water for recycling.

### Complete turnkey solution

- Low-energy aerobic membrane bioreactors with jet aerators, ultrafiltration and reverse osmosis and UV disinfection.
- Totally automated system, featuring our own software and remote access for plant monitoring.

### Customer benefits

- Lower water consumption and reduced wastewater volume with improved discharge condition.
- Low energy consumption, flexible operation and active energy management.

## VILEDON FILTERCAIR SERVICE AT A CONVENIENCE FOOD PRODUCER



Large producer of freshly prepared convenience foods, to leading supermarkets and stores, with a requirement for a service and maintenance contract to ensure continued hygienic air quality and audit compliance.

### Project requirements

- The company produces a range of products manufactured under high care conditions, requiring hygienic air quality to be maintained within their ventilation systems.

### Complete turnkey solution

- Regular monitoring of all filtration systems.
- Filter efficiency to be maintained to food industry guidelines.
- Hygienic conditions to be maintained within AHU's.
- The regular monitoring and maintenance of all relevant equipment linked to the contract.
- Local Exhaust Ventilation testing to be performed as required under the contract terms.
- Suitably trained personnel only to be used on site.
- Waste to be handled as per their environmental policy.

### Customer benefits

- Hygienic air quality standards are established and maintained to Zone H (High Risk) and Zone M (High Care) areas.
- Effective ventilation to plant providing the required number of air changes and overpressure where required.
- High quality, synthetic, non-fiber shedding filters.
- Regular service and maintenance visits to customer site to ensure that hygienic air quality is being maintained.
- All filter waste removed from site.
- Documented record of work carried out at each visit as per HACCP requirements.



Simply visit the link for more references:

[www.freudenberg-filter.com/en/world-of-industrial/downloads](http://www.freudenberg-filter.com/en/world-of-industrial/downloads) 

## ENGINEERING PROJECT AT A UK BAKERY



Design, supply, install and commission a ventilation and environmental control system at a UK Bakery. A new production line was being installed with the potential to add a further, similar line at a later date. The ventilation system needed to provide filtered air to both mixing and packing areas, maintaining overpressure within the bakery.

### Project requirements

- Filtration of all air supplied via the ventilation system to be free of mold and yeast.
- Air filtration to achieve relevant grade using EN 779:2012 filters, positively clamped to ensure a leak free seal.
- Provision of a balancing air supply for the oven fans, based on an extraction volume of 2.0 m<sup>3</sup>/s.

### Complete turnkey solution

- Two supply air systems installed, each with an air handling unit and ductwork, together with eight roof-mounted extraction fans.
- Ductwork designed to allow the installation of additional branches and droppers at a later date.
- Textile ducts fitted to feed supply air to separate locations.

### Customer benefits

- Hygienic air quality, free from mold and yeast spores
- Effective plant ventilation, providing employee comfort and a safer working environment.
- Synthetic, non-fiber-shedding filters in a leak free clamping mechanism.
- Balanced air supply ensuring efficient extraction from oven areas.

## AIR POLLUTION CONTROL AT A UK BAKERY



With the installation of a new production line in this leading UK bakery, there was a need to design, supply, install and commission a dust control system to extract airborne dust from an operator work area by means of two dust control booths.

### Project requirements

- Rate of air movement away from the operator must be within the current EH40 workplace exposure limit (WEL) of 10 mg/m<sup>3</sup>.
- Target reduction to 2 mg/m<sup>3</sup>, as suggested by the UK health and safety guideline HSE SIM 01/2007/09.
- Minimum air movement of 0.5 m/s in a specified zone from the front face of the extraction plenum.

### Complete turnkey solution

- Two dust control booths installed with flush-fitting stainless steel extraction plenums – both able to operate simultaneously.
- Internal ductwork supplied in 304 grade stainless steel
- External dust control unit for continuous operation with a fully automatic, self-cleaning, open pleat filter cartridge system.

### Customer benefits

- Operator protection in accordance with the legal limits.
- Safe and effective removal of flour dust from the working environment.
- ATEX compliant dust control unit, as defined by Directive 94/EC.
- Fully automatic filter cleaning.



# CUSTOMIZED PRODUCT, SOLUTION AND SERVICE PORTFOLIO

OUR HOLISTIC APPROACH MEANS YOU CAN GET EVERYTHING YOU NEED FROM A SINGLE PARTNER

## OPTIMIZING OUTCOMES

Seamless integration across disciplines ensures that we deliver the right solutions, services and products at the right point to maximize the efficiency of your production processes.

We provide cutting-edge system solutions for industrial air filtration that set benchmarks worldwide. These range from indoor air and cleanroom technology (contamination control) to dust removal technology (air pollution control).



## PRODUCTS: HIGH-PERFORMANCE FILTERS, DELIVERED WHEN YOU NEED THEM

Under the Viledon® brand, Freudenberg Filtration Technologies offers top-quality, highly reliable filtration products to meet every need within the food and beverage industry.

### Achieving maximum air filtration reliability

Our multi-stage filter concept is both simple and efficient: well-matched filter stages using Viledon® air filters of various classes and designs. This usually involves two-stage prefiltration, consisting of pocket and cassette filters, which removes coarse to fine particles. To deal with the finest particles, the final stage typically includes Viledon® EPA/ePM10 ≥ 95%, HEPA and ULPA filters.

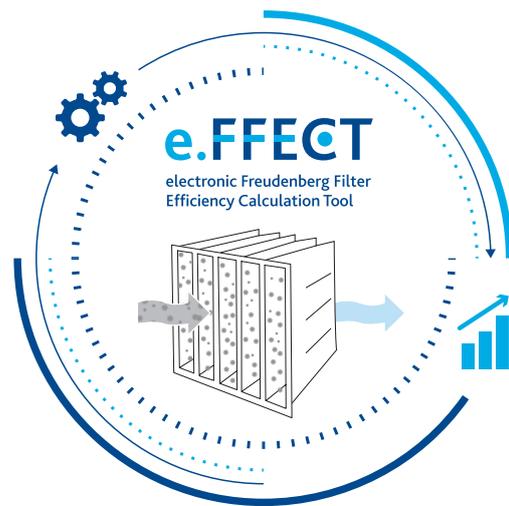
Using our self-developed e.FFECT software tool, we can precisely define the type and combination of filters that will best achieve your goals on the basis of your actual operating conditions and the site-specific particulate matter concentration of the ambient air.

### Viledon® air filters for prefiltration

Viledon® offers a comprehensive air filter program of filter classes ISO ePM10 to ISO ePM1 according to ISO 16890 (G4 to F9 according to EN 779) for prefiltration, meeting the highest demands of efficiency and operational dependability.

### Viledon® air filters for finest filtration

Viledon® EPA/ePM1 ≥ 95%, HEPA and ULPA meet the toughest clean-air and sterility requirements in demanding air-conditioning technology and sensitive processes. Effective prefiltration protects these high-quality filters and considerably extends their operational lifetime.



**Viledon® Compact pocket filters**  
ISO coarse 70% to ISO ePM1 80%  
according to ISO 16890  
(G4 to F8 according to EN 779)

- High-performing, economical and energy efficient.
- Cost-efficient Compact pocket filters are resilient in continuous operation and achieve superlative performance based on high clean-air quality.



**Viledon® NanoPleat cassette filters**  
ISO ePM 10 85% to ISO ePM1 85%  
according to ISO 16890  
(M6 to F9 according to EN 779)

- Extremely hydrophobic (water-repellent) and moisture-resistant up to 100% relative humidity.
- Water droplets simply roll off the material's surface.
- Consistently high arrestance with efficient, energy-economical operating characteristics and long useful lifetimes.



**Viledon® EPA and HEPA and filters**

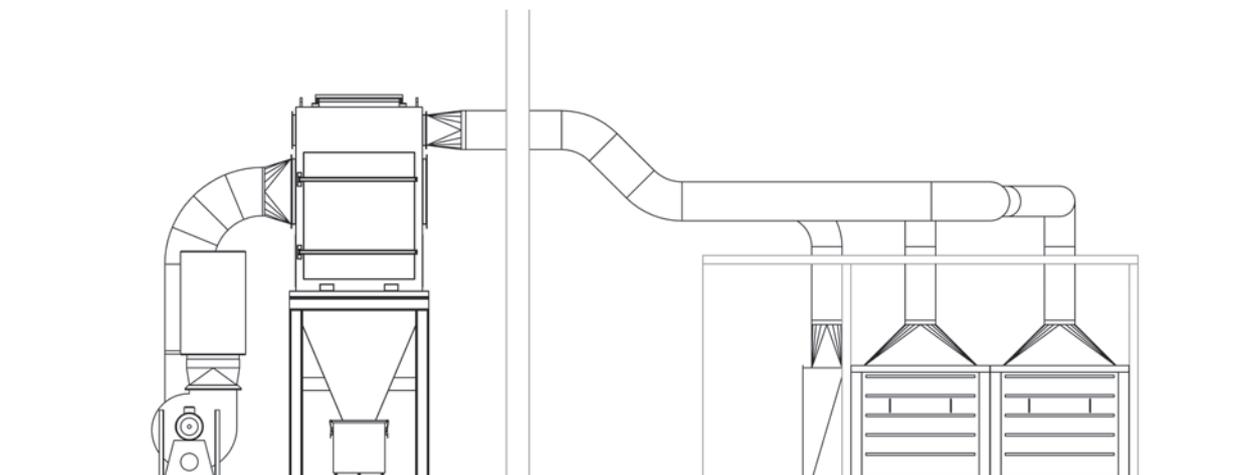
- High-arrestance micro-glass-fiber papers ensure homogeneous media velocity coupled with low pressure drops, even at a high volume flow.
- Reliable particle and germs arrestance in a cost-efficient and economically way.



## SYSTEM SOLUTIONS: FREUDENBERG ENGINEERING

The key to an energy efficient and hygienic air quality ventilation system is customized system design. Our Engineering division provides a complete design, supply, installation and commission program, for new constructions or refurbishment projects.

Our Engineering teams are based all over the world and are able to provide project managed solutions regardless of size. Each engineering solution customized to meet the expectations of any operational food manufacturing facility as they expect their controlled manufacturing environment.





## FREUDENBERG ENGINEERING SERVICES FOR THE FOOD AND BEVERAGE INDUSTRY

### Construction

- Filter systems
- Steel filter housings
- New build and retrofitting
- Remedial work to existing plant
- General ventilation solutions and installation
- Ventilation extensions and improvements
- Product cooling solutions
- High risk and high care controlled space design and upgrade
- Over pressurization climatic engineering
- Extract systems design and installation
- Factory temperature control
- Air Handling Unit (AHU) refurbishment and upgrade
- Air pollution control (LEV), system design and installation

### Equipment and Support

- Single and multi-stage Viledon® filter walls
- Air handling units
- Ductwork fitting
- Fans
- Motors
- Control units
- Electrical equipment
- Cooling test rig
- Chiller units
- Pipework
- Ventilation surveys
- Tank pressure units



## SERVICES: VILEDON FILTERCAIR AND ENERGY EFFICIENCY

**Viledon® filterCair is a unique, customizable filter management package that ensures you enjoy maximum benefit from our top-quality Viledon® filters. This flexible package comprises a comprehensive filter program plus service support and warranties.**

Choosing Viledon® filterCair also ensures that you guard against inadequate maintenance of air handling units (AHUs) and the filter systems they contain. Malfunctioning or heavily soiled filters support bacterial growth and allow all sorts of contaminants to enter production areas, from pests to fungal spores and microorganisms.

Viledon® filterCair ensures a high-performance, economically efficient, environmentally friendly system solution with excellent whole-life-cost value.

We offer you a full range air quality and pollution control services, from routine inspections to complete service and maintenance programs. These include the supply of all filter consumables and the full maintenance of air handling units and air pollution control equipment.



### Service and maintenance solutions

- Airflow mapping and over-pressurization solutions
- Remedial AHU repair and upgrades
- Ductwork installation and modifications
- Air pollution equipment maintenance and servicing
- Fan and motor repair and installation
- Energy cost reductions and system optimization



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**Your benefits at a glance:**

- Reduction of stock holding and stock administration costs
- Reduction of order costs
- Less capital tied up in stock
- Reduction of fire risk and increase in available production space
- Improved and stabilized air quality
- Improved planning and fewer suppliers
- Continuous improvement and process optimization

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### Maximizing energy efficiency

As a global technology leader with many years of experience, we understand the complex needs of industrial filtration, especially in the food and beverage industry.

Our comprehensive portfolio of products, solutions and services enables us to develop system solutions with high energy efficiency, tailored to your individual needs. In this way, we help you meet your day-to-day business challenges while conserving resources, reducing CO<sub>2</sub> emissions, driving down costs and gaining competitive advantage.

### Key services

- Energy efficiency trials using energy monitor
- Energy efficiency audits of filter systems
- Energy cost analysis
- Recommendations for energy savings and waste reduction

### Viledon® air filters reduce energy and resource consumption

Thanks to their excellent performance, Viledon® filters reduce pressure drops in air filter systems, save valuable energy, avoid unnecessary costs and reduce CO<sub>2</sub> emissions.



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#### Your benefits at a glance:

- Long service periods combined with a low pressure drop
- Best energy efficiency performance according to EUROVENT
- Viledon® filters (ISO ePM10 to ISO ePM1) are certified according to ISO 16890 (previously G 4 to F9 according to EN 779:2012)
- Environmentally friendly and easy disposal

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This document provides non-binding information. Freudenberg Filtration Technologies GmbH & Co. KG does not accept any liability for the completeness and correctness of the contents. Liability and warranty shall be governed solely by the provisions of the underlying delivery relationships.

**FREUDENBERG FILTRATION TECHNOLOGIES**

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