camfil

LIFE SCIENCES INDUSTRY

Clean Air Solutions

GLOBAL LEADER IN AIR FILTRATION FOR LIFE SCIENCES

LEAN SUPPLY CHAIN | INDUSTRY EXPERTS | GLOBAL REACH | REGULATORY COMPLIANCE | FLEXIBILITY & CUSTOMISATION | QUALITY FIRST

Year after year, Camfil stands as a trusted partner, delivering over two million products with precision, consistency, traceability and passion.

Camfil's global reach extends far and wide, to thousands of customers globally, specializing in the demanding domain of life sciences. Our manufacturing footprint allows for multiple sites to provide facilities the most advanced clean air solutions, with an intentionally redundant supply chain to minimize risk. Each facility is ISO-certified and complies to strict manufacturing practices.

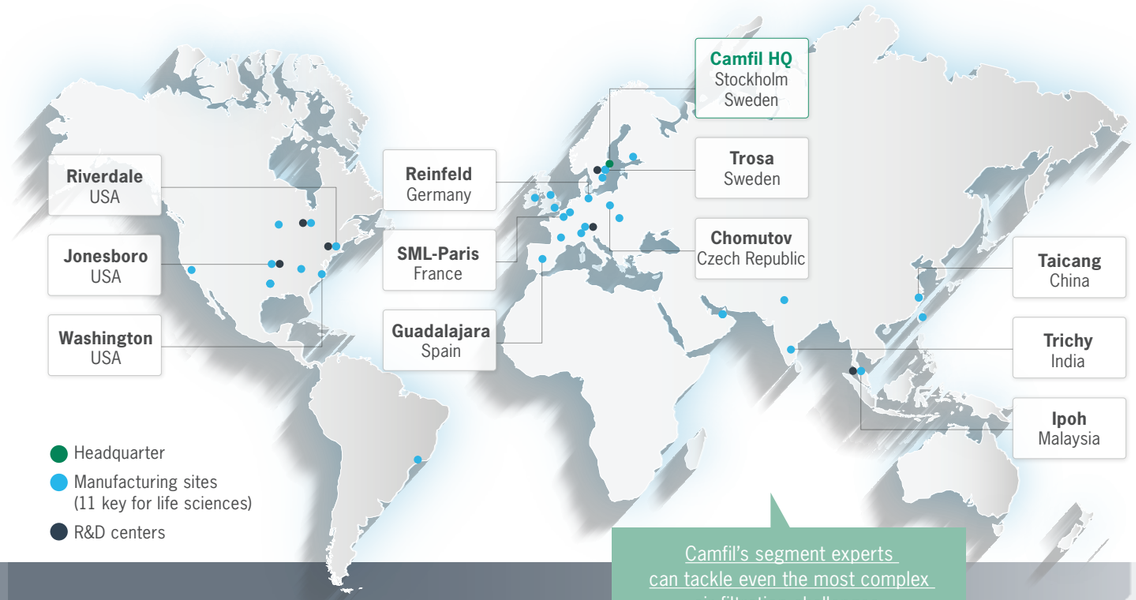
In a world where credibility is key, Camfil serves as a trusted advisor, consistently surpassing industry standards while actively challenging them to drive innovation and excellence. As the only air filter provider worldwide that certifies and tests every HEPA/ULPA filter we manufacture, Camfil ensures that what's on the box is in the box. The foundation of Camfil's partnerships rests on strict adherence to the most stringent local, regional, and international regulations. Our clients, ranging from global pharmaceutical leaders to local enterprises, rely on the consistent quality of Camfil's products and services, regardless of their location.

Great products are one thing, the application knowledge and experience to best utilize them is another. This is again where Camfil stands apart, with a segment management team of industry experts. Armed with deep knowledge of air filtration as well as real-world experience in pharmaceuticals, biotechnology and medical device applications, Camfil's segment experts can tackle even the most complex air filtration challenges.

When you choose Camfil, you choose quality and a partner in excellence. Camfil is focused on delivering solutions that surpass application requirements while aligning seamlessly with the highest industry standards.

Learn more about Camfil's filtration solutions for life sciences.

KEY MANUFACTURING SITES FOR LIFE SCIENCES



Camfil's segment experts can tackle even the most complex air filtration challenges.

CAMFIL AROUND THE WORLD

- **Headquartered in Stockholm, Sweden**
- **6 R&D Centers**
- **30 Manufacturing Sites Worldwide**
- **35+ Countries with Sales Offices**

ENERGY EFFICIENCY & ENVIRONMENTAL IMPACT

FOR OVER HALF A CENTURY, SUSTAINABILITY HAS BEEN THE CAMFIL WAY – IT DEFINES US.

At Camfil, commitment to sustainability, energy efficiency, productivity, and health is not a mere checkbox; it's the very essence of who we are. These foundational principles resonate in every solution, service, and product we manufacture. We are already partnered with some of the biggest names in the industry to reduce their carbon footprint, lower their energy costs and reduce logistics and landfill waste.

The call to slash CO_2 emissions is growing louder, energy costs are escalating, and the awareness of negative health impacts from poor air quality is widespread. As such, the role of energy-efficient air filtration takes center stage. Recognizing the impact of life cycle cost (LCC), Camfil provides the lowest total cost of ownership (TCO) air filtration products.

When analyzing the life of a filter, the spotlight inevitably falls on energy consumption, the most critical factor regarding its operational costs. Astonishingly, over 80% of the cost is tethered to energy!

The exercise of selecting a superior air filter, with a lower differential pressure (energy needed to push air through it), a longer life span and better filtration efficiency can rapidly push an organization's sustainability goals forward!

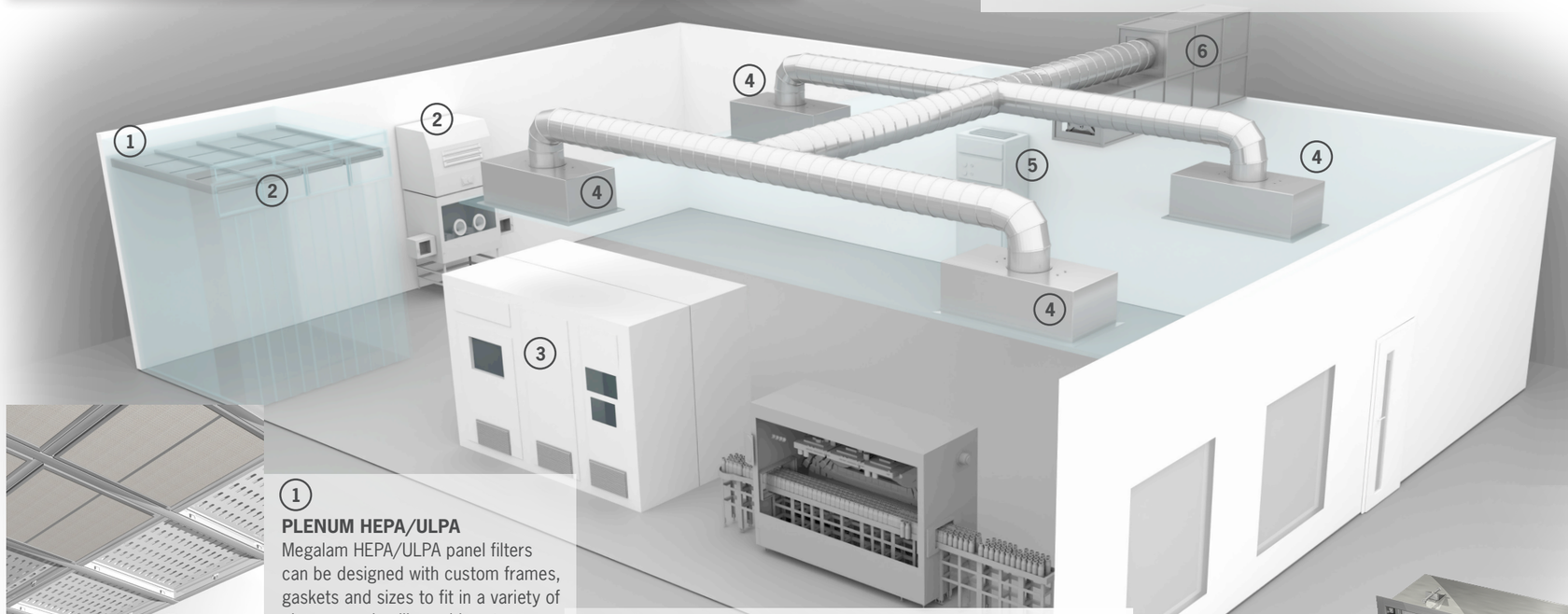
In the realm of life sciences, where compliance is paramount, Camfil's mission extends beyond regulatory adherence; it's about curbing environmental impact. Any batch destroyed impacts the environment, as well as a company's bottom line – quality first. Recognizing the risks, Camfil keeps manufacturing environments top of mind while designing better solutions for air filtration.

Sustainability isn't just a practice; it's a relentless pursuit, shaping a future. Camfil's clean air solutions not only meet compliance standards but also pioneer a new era of efficiency, cost-effectiveness, and waste reduction. In short, saving the world, one filter at a time!

APPLICATION:
STERILE FILL – INJECTABLES FACILITY

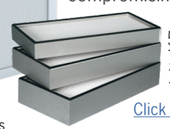
For more than a decade, Camfil has led the way in this complex environment with best-in-class HEPA filtration products. To minimize downtime and risk, Camfil HEPA products are backed by the most advanced and user-friendly terminal HEPA housing solutions, designed for and with the pharmaceutical industry.

Testing and validation of a facility's high-efficiency filters should be accurate, efficient and repeatable. Camfil's filtration solutions help maintain regulatory compliance while meeting even the most challenging production goals.



1 PLENUM HEPA/ULPA
Megalam HEPA/ULPA panel filters can be designed with custom frames, gaskets and sizes to fit in a variety of plenums and ceiling grid systems.

2 MEGALAM® AND MEGALAM® ES
Critical areas require reliable HEPA and ULPA air filtration. No other filter manufacturer in the world tests every single HEPA they produce to ensure top performance and efficiency. The Megalam ES panels also feature a lower average differential pressure, meaning less energy consumption for your critical processes, without compromising safety or quality.



53mm
70mm
100mm

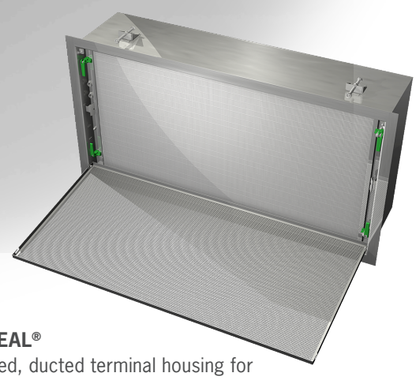
Click here for more information

3 ABSOLUTE D-PYRO

3 TERMIKFIL

3 F SERIES FRK

HIGH TEMPERATURE FILTERS
High-temperature environments or applications that require thermal need specialized filters designed to withstand heating and cooling cycles. Camfil provides the broadest range of high-temperature HEPA filters, engineered for optimal performance in today's most advanced ovens and dryers.
Click here for more information

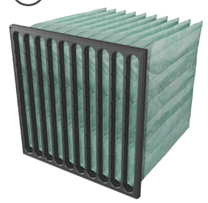


4 PHARMASEAL®
A fully welded, ducted terminal housing for HEPA or ULPA filter installations. Available with bubble-tight, guillotine or radial blade bow tie damper for precise air volume control.
Click here for more information

6

30/30® DUAL 9
A facility's first line of defense against particles. First-stage filtration, or pre-filtration, reduces large-scale particles to enhance the life span of higher efficiency filters. Camfil's pre-filter solutions last longer than any other in the market, allowing for less frequent change-outs and landfill waste reduction.
Click here for more information

6



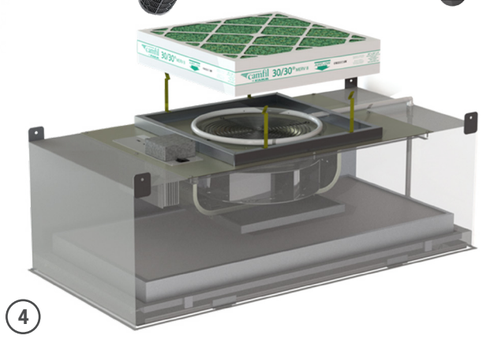
HI-FLO® ES
Designed to last longer while maintaining higher efficiency, the Hi-Flo ES features low energy consumption and high dust holding capacity for longer service. The filter also serves as a prefilter that can be used with, or instead of, a prefilter panel.
Click here for more information

6

DURAFIL® ES
The lowest differential pressure in the industry, period. The most sustainable filter ever, with the longest service life, lowest energy consumption and best-rated efficiency.
Click here for more information

5 CAMCLEANER
CamCleaner Vertical is a free-standing mobile air cleaner designed for corrosion control applications and protection from noxious gases in industrial applications.
Click here for more information

CAMCARB XG
A versatile gas-phase filter for supply, recirculation, and exhaust systems in commercial, industrial and process applications. Innovative conical design ensures maximum media utilization and optimized filter performance Corrosion-resistant filter filled with activated carbon or activated carbon.
Click here for more information



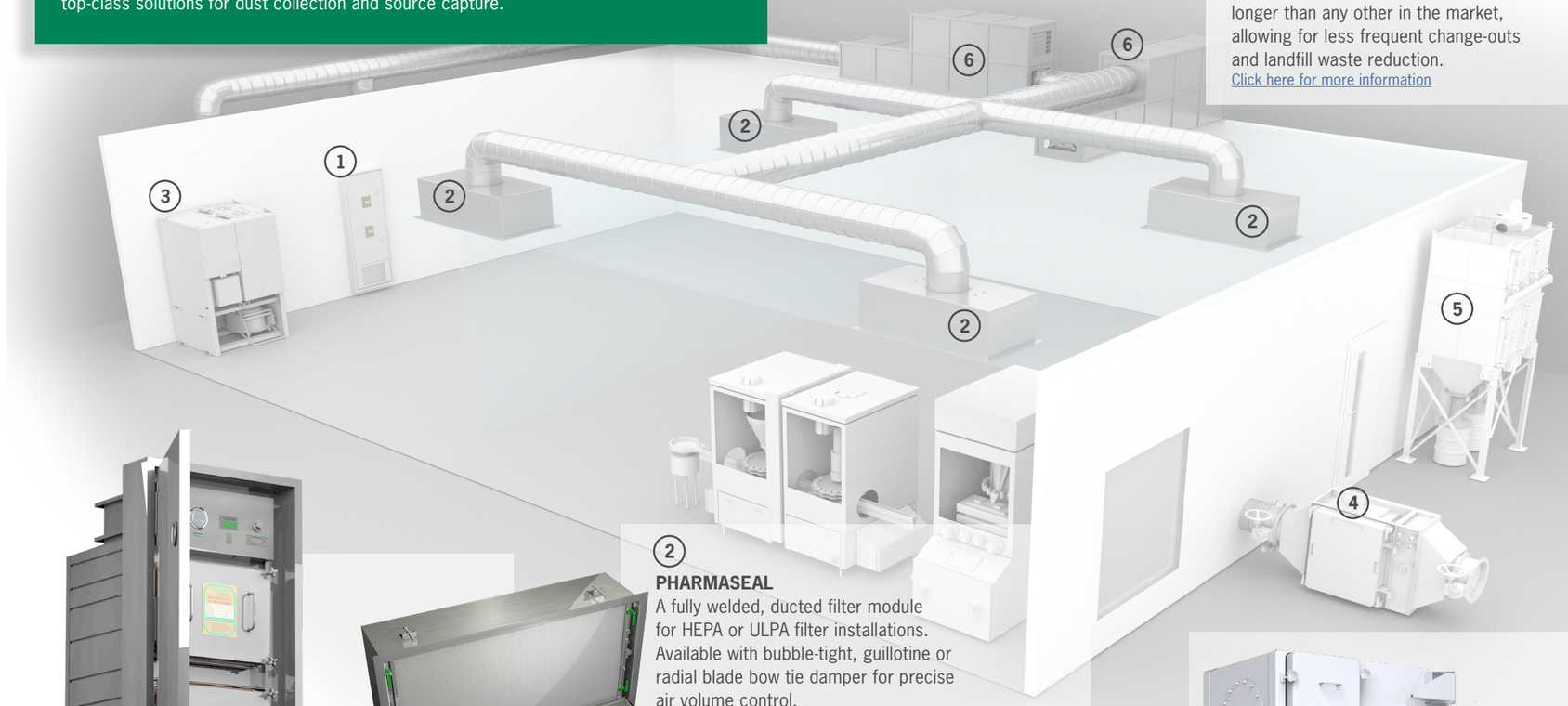
4 PHARMASEAL® FFU
Room side testable fan/filter HEPA ceiling unit. Innovative internal baffles ensure uniform airflow across the filter face and attenuate sound. Includes a proprietary aerosol injection and distribution system for uniform dispersion across the entire face of the filter to certify filter installation.
Click here for more information

APPLICATION:

ACTIVE PHARMACEUTICAL INGREDIENT (API) ORAL SOLID DOSE (OSD) FACILITY

Despite the methodology, wet granulation, dry granulation, direct compression or particle coating, Camfil has a filtration solution to match the application and cleanliness level.

In applications that introduce particulates, specifically during ingredient dispensing/formulation, blending and compression/encapsulation, Camfil offers top-class solutions for dust collection and source capture.



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30/30® DUAL 9

A facility's first line of defense against particles. First-stage filtration, or pre-filtration, reduces large-scale particles to enhance the life span of higher efficiency filters. Camfil's pre-filter solutions last longer than any other in the market, allowing for less frequent change-outs and landfill waste reduction.

Click here for more information

6

DURAFIL® ES

The lowest differential pressure in the industry, period. The most sustainable filter ever; with the longest service life, lowest energy consumption AND best rated efficiency.

Click here for more information

6

ABSOLUTE VG

Tested and certified HEPA filter for hygienic and aseptic supply or exhaust air systems that require a very high airflow and low pressure drop.

Click here for more information

5

GOLD SERIES*

The industry's leading industrial dust and fume collection system which handles all kinds of toxic and combustible dusts, smoke, and fumes from various applications. Configured to me your specific application requirements.

**The only dust collectors in the industry that are potent compound surrogate tested for validated performance, in addition to testing for exposure and explosion, providing unprecedented peace of mind and safety.*

Click here for more information

GOLD CONE CARTRIDGE

The Gold Cone filter cartridge is the only filter available with an inner cone that increases filtration, improves cleaning efficiency, and sustains a lower pressure drop

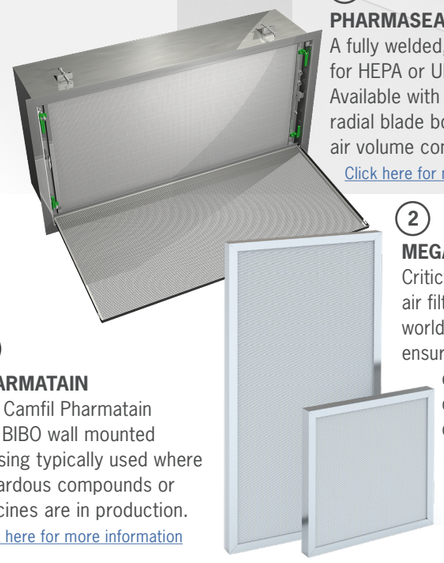
Click here for more information

1

PHARMATAIN

The Camfil Pharmatain is a BIBO wall mounted housing typically used where hazardous compounds or vaccines are in production.

Click here for more information



2

PHARMASEAL

A fully welded, ducted filter module for HEPA or ULPA filter installations. Available with bubble-tight, guillotine or radial blade bow tie damper for precise air volume control.

Click here for more information

2

MEGALAM AND MEGALAM ES

Critical areas require reliable HEPA and ULPA air filtration. No other filter manufacturer in the world tests every single HEPA they produce to ensure top performance and efficiency. The ePTFE media in the Megalam ES panels is compatible with PAO and other challenge oils and boasts a lower average differential pressure, meaning less energy consumption for your critical processes, without compromising safety or quality.

Click here for more information

3

QUAD PULSE

A dust collector specifically designed for life science/ pharmaceutical manufacturing. Features full BIBO containment protection with an integrated HEPA and is ideal for tight spaces.

Click here for more information

4

CAMCONTAIN

Fully welded, bubble tight construction; the ideal filter housing for the filtration and containment of radioactive, toxic or biological particles and gases in highly sensitive application.

CamContain filter housings have been designed to meet the highest safety demands, used in applications where people, animals or the environment are endangered by highly infectious microorganisms.

Click here for more information

HEPA/ULPA APPLICATIONS

HEPA FILTERS / ULPA FILTERS				HIGH TEMPERATURE FILTERS				
MAXIMUM OPERATING TEMPERATURE 160° F		MAXIMUM OPERATING TEMPERATURE 175° F		445/480° F	500° F	650° F	650° F	750° F
ABSOLUTE VG	MEGALAM MEGALAM ES	ABSOLUTE XH/XS	FILTRA 2000	SOFILAIR HT/FR51	ABSOLUTE K	F SERIES FRK	ABSOLUTE D-PYRO	ABSOLUTE F

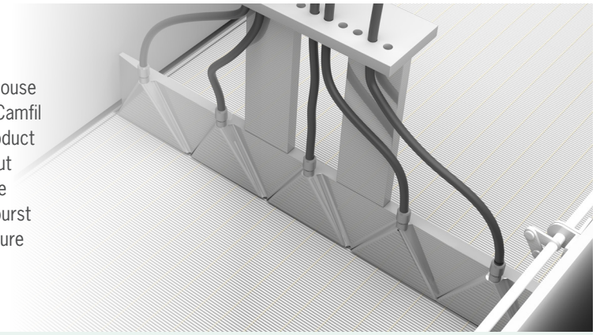
Click here for more information

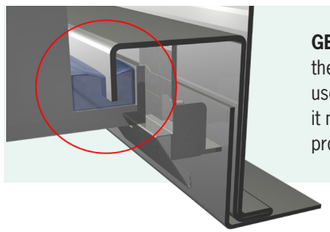
Click here for more information

HEPA AND ULPA FILTERS

HEPA and ULPA filters are used in a wide variety of applications and different components are utilized in the filter's construction depending on its application. Camfil manufactures specific grades of filters to meet local, regional and international standards, including, but not limited to, EN-1822, IEST-CC-034 and ISO 29463.

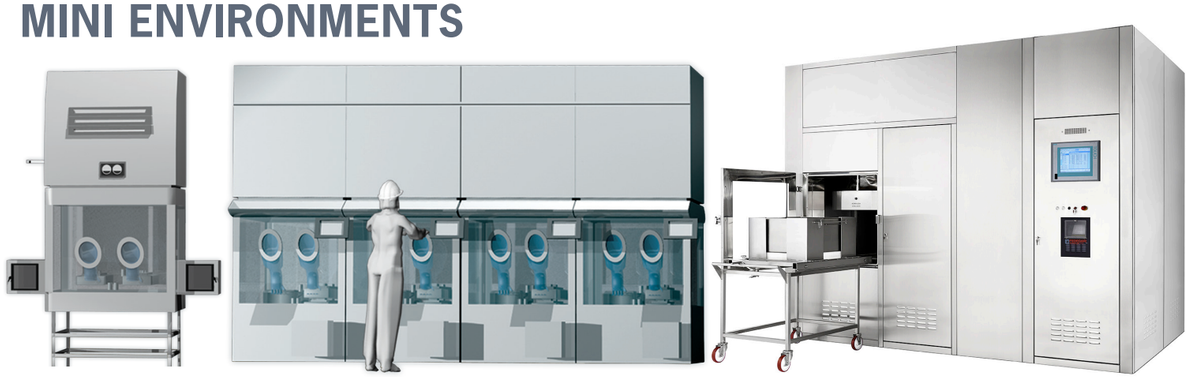
To verify efficiency and function, Camfil constructs proprietary, in-house scanning and pleating machines. Camfil designs ensure consistency of product quality and construction throughout the world. Applications that require shake table testing, high airflow, burst pressure tests, and high temperature tempering are also available upon specific request.





GEL SEAL TECHNOLOGY A wide variety of sealing options are available to prevent air from flowing around the filter and to ensure longevity in specific environmental conditions. For example, Camfil's silicone gel is used in the most critical HEPA applications—such as cleanroom ceilings and containment equipment—where it mates with a knife edge to provide a seal that is both flexible and reliable. Camfil's silicone formulation is a proprietary engineered elastomer, recognized in the industry for its superior stability.

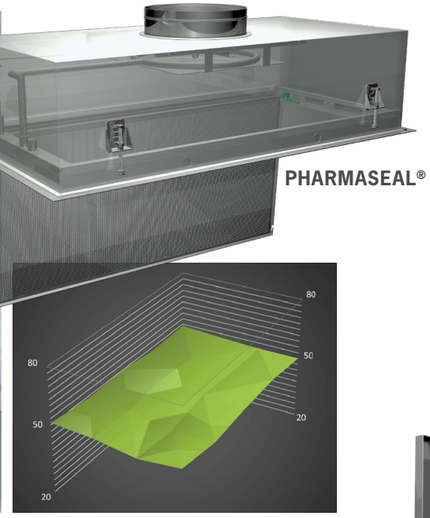
MINI ENVIRONMENTS



At times, critical pharmaceutical manufacturing protocols require special filtration. Camfil produces custom HEPA/ULPA filter solutions for isolators, restricted access barrier (RABS) systems, depyrogenation and drying ovens, and more.

HOUSINGS FOR CONSISTENCY AND COMPLIANCE

TESTING



PHARMASEAL®

UNIFORM AEROSOL DISTRIBUTION

Consistency is critical in any pharmaceutical application. Pharmaseal housings allow operators to reduce their risk of contamination while simultaneously allowing for faster HEPA validation and change.

Fully welded for lasting performance and security, featuring easy access test ports and an internal manifold for uniform test aerosol distribution. Available as a terminal housing or with a fan, to meet the challenges of any facility.

Click here for more information

CONTAINING YOUR PROCESS: BIOSAFETY & CONTAINMENT

Biocontainment is critical when working with potent active pharmaceutical ingredients (APIs) or viral vectors and Camfil is the trusted choice for professionals worldwide. Our high-quality manufacturing and unwavering commitment to protecting both people and the environment demands fully welded, bubble-tight construction, internal validation options, and space-saving technologies.

The Pharmatain is a bag-in/bag-out (BIBO) unit in wall-mounted or freestanding designs. Made of welded stainless steel, it allows safe, room side filter changes within cleanrooms. Options include HEPA, carbon, and prefilters, with gauges, dampers, and scan test capability. A cosmetic door enables easy cleanroom-side access.

PHARMATAIN

Click here for more information

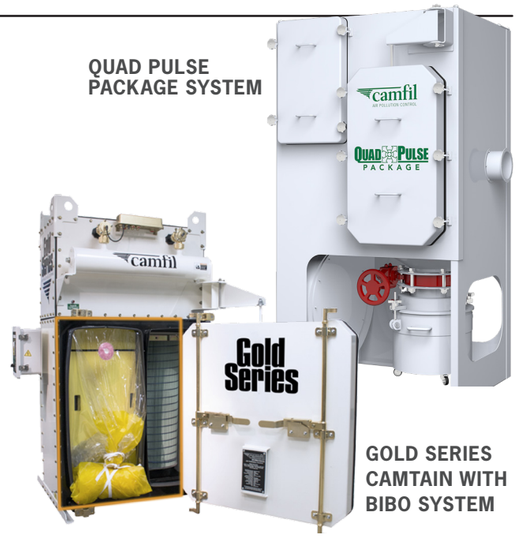
The Camfil CamContain is another BIBO unit, designed with a side-access configuration. It captures life-threatening particulates and protects workers during filter replacement. Typically located in a dedicated maintenance area or on the roof, it is always positioned downstream from production areas handling hazardous compounds or vaccines.

CAMCONTAIN

Click here for more information

PROTECTING THE PROCESS FROM HARMFUL DUST

Camfil APC (Air Pollution Control) has been an expert in the pharmaceutical dust space for over 25 years. The Gold Series Camtain can be used in a wide array of central vacuum applications, tablet presses, coating, fluid bed and spray drying, blending, granulation, raw API processing and central vacuum general ventilation. For smaller-sized applications, the Camfil Quad Pulse Package (QPP) system can fit directly into the preparation space, saving costs on retrofit and outdoor ductwork. The option of safe-change bag-in/bag out (BIBO) systems provides a critical safety barrier, minimizing the potential for process contamination and helping ensure compliance with biosafety guidelines for employee safety. The QPP systems are the only dust collectors that are potent compound surrogate tested for validated performance, exposure and explosion.



QUAD PULSE PACKAGE SYSTEM

GOLD SERIES CAMTAIN WITH BIBO SYSTEM

PROCESSES INVOLVING PHARMACEUTICAL DUST

- Central vacuum
- Tablet presses
- Tablet coating
- Fluid bed drying
- Spray drying
- Blending
- Granulation
- General room ventilation

Blending application

Granulation application

Coater application

Tablet press application

PROTECTING FROM MOLECULAR CONTAMINATION

Molecular contamination (gas) poses varied challenges, including supply air risks from nearby industrial facilities, regulatory exhaust air requirements to prevent environmental release, and managing vapors from sterilization processes to safeguard products from contamination. Airborne molecular contamination control plays a significant role in pharmaceutical production facilities, and only Camfil has the solutions and knowledge to support your control efforts.

GLIDEPACK CAMCARB CYLINDER HOUSING

Click here for more information

AIRIMAGE-COR CORROSION MONITORING SENSOR

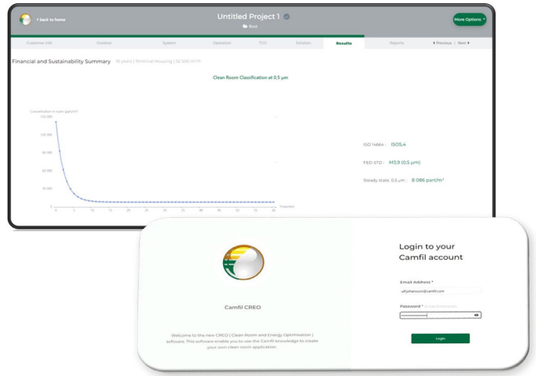
Click here for more information

FOUR PRINCIPAL AREAS OF MOLECULAR CONTAMINANTS:

1. **Odor** - Often at an elevated level in industrial facilities
2. **Irritant** - Some molecular pollutants can cause long-term health effects such as loss of smell and lung damage
3. **Toxicity** - The most dangerous air pollutants are the toxic ones, which can cause serious health effects and even death
4. **Corrosive** - Biggest threat to equipment and machinery and often a problem in microelectronics, pulp and paper, and museums

TYPICAL MOLECULAR CONTAMINANTS:

- **Peracetic Acid (PAA):** Odor, irritation issues (eyes, lungs, skins) and potential corrosion risk
- **Ethylene Oxide (EtO):** Used to sterilize heat-sensitive devices. Emissions can affect workers and adjacent areas if not properly controlled
- **Decontamination Chemistries:** Hydrogen peroxide (H_2O_2) and chlorine dioxide (ClO_2), removal from sterilized areas for faster/safer return to operations
- **Nitrogen Dioxide (NO_2):** Filtration in make-up air to prevent the formation of nitrosamine in APIs or final products
- **Volatile Organic Compounds (VOCs):** Potential for better lab chemistry due to removal, better employee health, removal of nuisance odors



ENGINEERING TOOLS

Constantly looking to improve our own offerings while optimizing the time and resources of our clients, Camfil offers various facility modelling platforms, backed by over 20 years of real-life and lab testing.

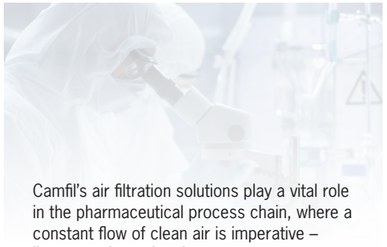
LIFE CYCLE COST (LCC) GREEN provides a facility-wide assessment of your filter spend and how to best reduce your operational costs and CO_2 footprint.

CLEANROOM ENERGY OPTIMIZATION (CREO) offers a user-friendly method to model utility use in your critical environments, while maintaining cleanroom classification/cleanliness levels.

LEADING EXPERTS IN CLEAN AIR TECHNOLOGY

From the beginning, Camfil has stood apart by seeking innovative technology, creating new, user-friendly and sustainable solutions.

Camfil's promise to challenge the status-quo, to create more value for our customers and to protect people, processes and the environment is behind everything we do. Our state-of-the-art tech centers are but one key example of the commitment we maintain, to bring the very best solutions to the critical life sciences industry, all around the world.



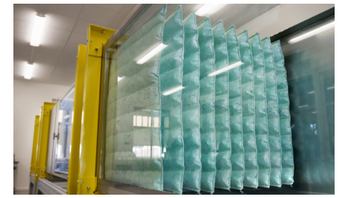
Camfil's air filtration solutions play a vital role in the pharmaceutical process chain, where a constant flow of clean air is imperative – lives may depend on it.

Click here for more information

Find your local contact with our contact locator.

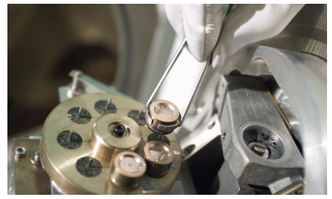
Click here for more information

1. Molecular Lab
- Development of molecular filters
- Climate controlled test rigs for carbon media and full-size molecular filters
- Molecular filter testing per ISO 10121
- Porosity meter

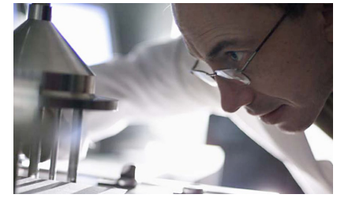


2. APC Lab
- Development of filter solutions for dust collection
- High-speed filter rig
- Climate simulation

3. Process Development Workshop
- Development of process equipment for manufacturing filters
- Fully equipped machine shop
- 3D printer for prototyping



5. IAQ Lab
- Quantitative and qualitative air quality analysis
- Media and fiber development
- Air quality research
- Scanning electron microscope (SEM)



4. Particle Lab 1
- Development of comfort and HEPA filters
- Aerosol research
- Test rig for full-scale filters and smaller filters
- Nano particle measurements using an electrostatic classifier with CPC
- Filter media testing and development accredited to ISO 17025 for EN1822 and ISO 29463 testing

Camfil – a global leader in air filters and clean air solutions.

For more than half a century, Camfil has been helping people breathe cleaner air. As a leading manufacturer of premium clean air solutions, we provide commercial and industrial systems for air filtration and air pollution control that improve worker and equipment productivity, minimize energy use, and benefit human health and the environment.

We firmly believe that the best solutions for our customers are the best solutions for our planet, too. That's why every step of the way, from design to delivery and across the product life cycle, we consider the impact of what we do on people and on the world around us. Through a fresh approach to problem-solving, innovative design, precise process control and a strong customer focus we aim to conserve more, use less and find better ways, so we can all breathe easier.

The Camfil Group is headquartered in Stockholm, Sweden, and has 29 manufacturing sites, six R&D centers, local sales offices in 35+ countries, and 5,700 employees and growing. We proudly serve and support customers in a wide variety of industries and communities across the world.

To discover how Camfil USA can help you to protect people, processes, and the environment, visit us at www.camfil.us.

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