



AIR FILTERS FOR TURBOMACHINERY



Clean air solutions for turbomachinery

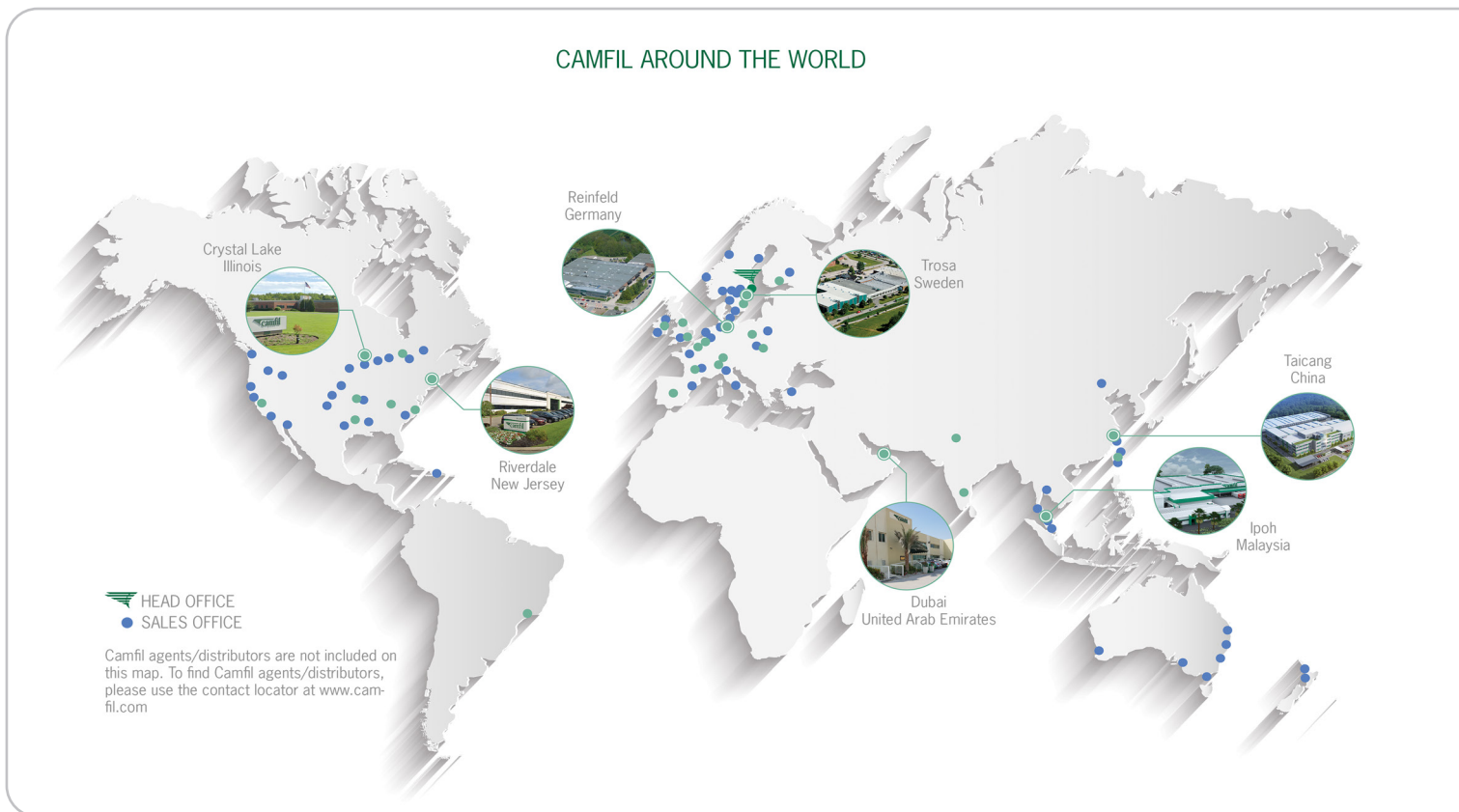
WORLD LEADER IN CLEAN AIR TECHNOLOGY

As a leading manufacturer of premium clean air solutions, Camfil provides commercial and industrial air filtration solutions that improve worker and equipment productivity, reduce energy usage, while benefiting human health and the environment. Headquartered in Stockholm, Sweden, the Camfil Group has over 31 manufacturing sites, 6 R&D centers, local sales offices in 35+ countries, and about 5,200 employees and growing.

For more than five decades, Camfil Power Systems, a fundamental division of the Camfil Group, has been dedicated to delivering clean air solutions to the turbomachinery sector. Our commitment to providing exceptional engine protection, increased efficiency, longer service life, minimal pressure drop, and top-notch quality is a source of immense satisfaction. As a result, our customers can rely on us to ensure maximum availability, reliability and profitability.

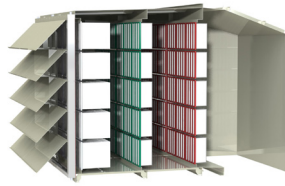
As an established international leader in air filtration, We are committed to forging long-lasting partnerships with our customers, based on our ability to assess their requirements and provide complete air filtration solutions.

CAMFIL AROUND THE WORLD



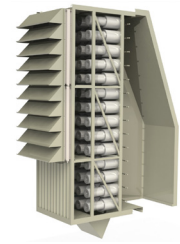
SYSTEM SOLUTIONS

Our extensive [portfolio](#) has enabled us to provide a wide range of installations to different turbines across various environments, including industrial, desert, offshore, arctic, and marine settings. This expertise in designing systems for diverse environments is a valuable asset that all our customers can benefit from.



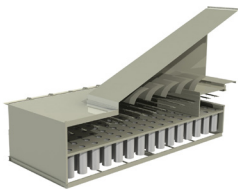
CAMFLEX STATIC FILTER HOUSING

Static filter system works in all environments, including humid and offshore areas. It allows for flexible adaptation of filter combinations as per the changing environmental conditions, while also cutting down on maintenance and overhaul costs.



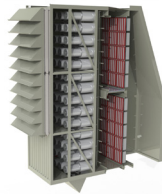
CAMPULSE SELF-CLEANING FILTER HOUSING

A self-cleaning system, ideal for areas that are prone to dust or snow storms, with a pulsing system that extends the filter service life and reduces the need for frequent filter changes.



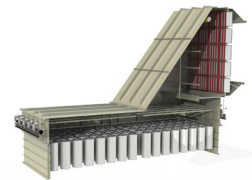
TENKAY FILTER HOUSING

Tenkay Filter Housing offers superior pulse cleaning performance with the added convenience of quick and easy filter changes. It also comes equipped with built-in rain protection.



COMBINED CAMPULSE FILTER HOUSING

A 2-stage gas turbine inlet system has the ability to be upgraded with air treatment options, while also offering the option for weather protection. It is perfect for use in harsh environments, excluding offshore areas.



COMBINED TENKAY FILTER HOUSING

A 2-stage pulse system features an easy and quick filter change, along with built-in rain protection. Additionally, it offers better pulse cleaning performance and positive sealing, eliminating any by-pass risk.

SERVING THE TURBINE INDUSTRY FOR OVER 50 YEARS

Gas turbines need good air quality for reliable output. Camfil Power Systems offers filtration and acoustical solutions, including the PowerEye predictive analytics service for air intake filters and gas turbines, to maintain peak performance and optimize maintenance practices. We are committed to engineering sustainable filtration technologies to reduce our customers' carbon footprint and accelerate global emissions reduction.

Our turbomachinery business units are located in Sweden, Canada, India, China and Germany, from where they support all countries globally. [CONTACT US](#)



MORE POWER GREATER EFFICIENCY

Camfil has a long history of supplying systems to the turbomachinery industry. Our engineers work closely with OEM's to develop optimum solutions in terms of performance, reliability, and economy.

User benefits

The prime function of the inlet filter system is to protect turbomachinery from pollutants in the inlet air. Particles entering the engine can cause erosion or fouling to the turbine's internals. Erosion is mainly caused by relatively coarse particles that are larger than 5 µm. Smaller, submicron-sized particles foul turbine blades and cooling holes, which rapidly reduces performance and becomes a serious threat to the turbine.

Hot corrosion is an accelerated corrosion of metal surfaces that results from the combined effect of oxidation and reactions with sulfur compounds and other contaminants such as chlorides. Effective capture of small particulate and airborne salt is therefore of vital importance for long and efficient operation.

A properly designed filter system gives the user:

Performance

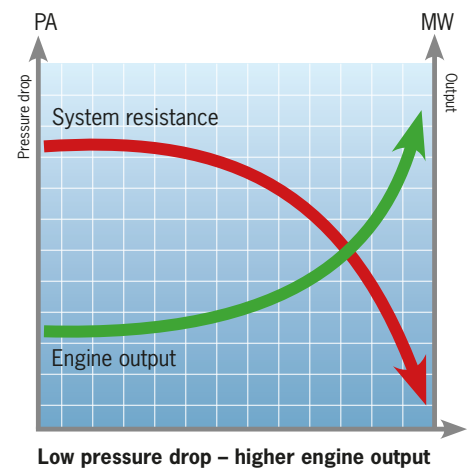
Low pressure drop provides high power output, and high dust holding capacity increases filter service life, which reduced maintenance requirements.

Reliability

The engine will be protected from risk of damage from erosion, fouling, and hot corrosion.

Economy

High filtration efficiency results in less fouling and less degradation, which is the key to maintaining maximum efficiency and power.



LIFE CYCLE COST IS THE KEY

The industry is increasingly demanding that filter systems are optimized, not just in terms of price but with consideration to the overall expenses associated with the air intake system. This includes costs associated with filter usage, compressor cleaning, CO₂ emission expenses, energy consumption and other related factors. The Life Cycle Cost (LCC) programme was developed in response, and is aimed at determining the lowest total cost of a filter solution over a specific time period. The LCC computations include various

factors such as engine sensibility, energy costs, running time, filter price, different environments and filter characteristics. By providing the lowest total cost, the LCC helps identify the most appropriate combination of filters for a particular site condition.



For example:

100 Pa less operating pressure drop at the intake system will increase the turbine output by approximately 0.2 % and reduce fuel consumption by approximately 0.1%. Camfil can run calculations to determine the optimum combination of filters needed for the lowest total cost over a given time period. Camfil's calculations are based on real life testing data from a large number of sites.

EXTENSIVE TESTING CAPABILITY

It is difficult to judge the performance of air filters just by looking at them. The particles they should catch are often invisible to the human eye. Since some filters can last for a very long time, laboratory testing is used to compare filters. For laboratory testing to be fair, industry standards are established to define the method of testing. ISO, a global committee of industry experts that release international standards, has published the first turbomachinery-specific standard for air intake filters, [ISO 29461](#). This is the most comprehensive standard for selecting turbine filters, considering all the most important parameters.

The present standards are:

- ISO 29461-1:2021
- ISO 29461-2:2022

The upcoming standards are:

- ISO 29461-3 (Releasing after 2023)
- ISO 29461-4 (Releasing after 2023)

ISO 29461-1:2021

This is the first international test standard for reporting the efficiency and dust holding capacity for the entire range of air intake filters for gas turbines, compressors, and other turbomachinery applications. It presents a uniform method for testing filters that enables operators to more easily compare and select air inlet filters.

ISO 29461-2:2022

This is the first international standard for reporting an air intake filter's endurance in fog and mist environments, as well as its resistance to water penetration. Using the data provided by ISO 29461-2, turbomachinery operators have the information needed to select the filter that would perform the best in wet environments. It measures the hydrophobicity and pressure drop of the entire filter element,

and can be applied to all turbomachinery air intake filters.

ISO 29461-3

This standard will report the mechanical integrity (burst test) of air intake filters to a final pressure drop. It helps operators select filters that would be able to withstand structural damage from foreign object damage (FOD) and maintain their efficiency.

ISO 29461-4

This standard will report how filters will operate in coastal and offshore applications where they are exposed to significant concentrations of salt spray. It measures the rise in pressure drop with constant salt spray, as well as the salt efficiency over time against wet and dry

forms.

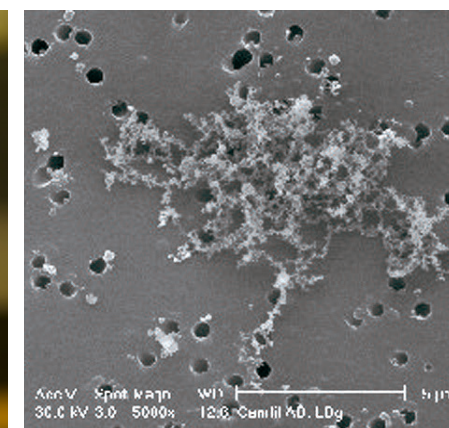
Several test rigs around the world

We were the first company to own Eurovent 4/9 / EN 779 test rigs. The rigs have been tested so that they give the same results as independent test labs. By having a number of our own test rigs, we can test new and used filters from the field to build up our own database on how filters work and perform in real life.



INDEPENDENT LABORATORIES

All our final filters used in turbomachinery applications undergo in-house testing as well as independent laboratory testing to certify efficiency, pressure drop, dust holding capacity, and burst pressure.



AIRCAIR TURBO SERVICES

[AirCair Turbo Services](#) have been developed to help power generation and oil & gas operators monitor the air quality around their facilities, the performance of their air intake system(s) and the impact of air on their turbomachinery assets. AirCair Turbo Services will keep your turbine fleet operating at peak performance with minimal downtime. We take care of your air so you can breathe easy knowing that your turbines are protected.

TAKING CARE OF YOUR AIR

Turbomachinery engines can ingest thousands of tons of air each day, air that is constantly changing over time. Harmful contaminants in this air can foul

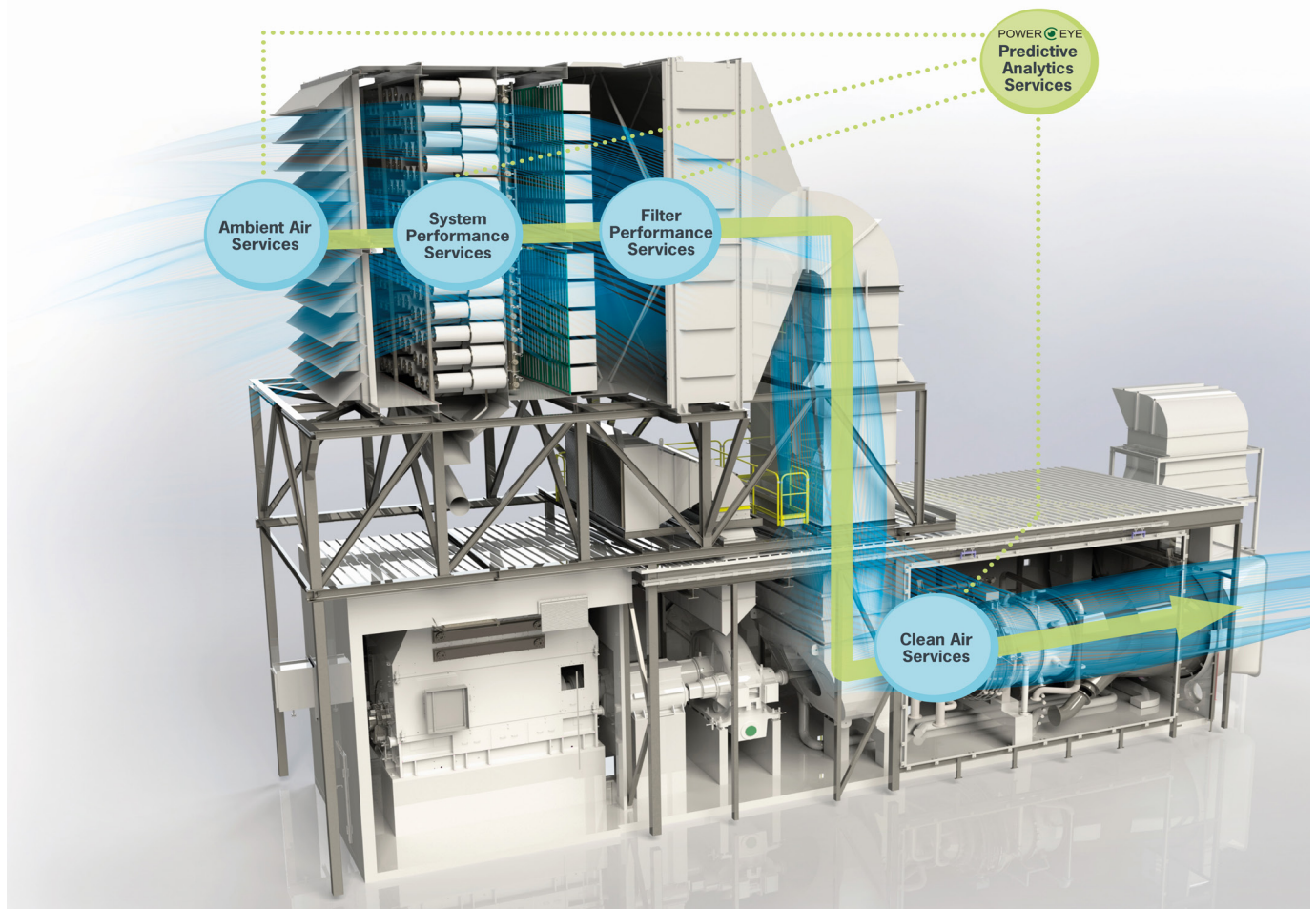
your engines, corrode critical components and degrade engine performance, leading to reduced power output and revenue loss. So, it is critical to understand what's in the ambient air around your assets so you can ensure your filtration system is keeping them safe.

That's where our AirCair™ Turbo Services come in. We deliver expertise and insights built on a worldwide network of filtration experts and predictive analytics tools that pull from decades of real-world historical data. Our team will work closely with you to improve existing systems or help define the optimal solution for new investments using our AirCair Services, educational programs

like Test & Learn Events, and proprietary Life Cycle Cost (LCC) Analysis tool.

WE HELP ALONG THE ENTIRE AIRFLOW PATH

Our AirCair Turbo Services help along the entire path of airflow through your turbines by monitoring the ambient site condition 24/7 in real time, selecting the most cost-effective air intake solutions, identifying the risk of fouling and corrosion, validating the performance of the existing system and confirming the cleanliness of the engines.



AIRCAIR TURBO SERVICES

PREDICTIVE ANALYTICS SERVICES

Optimize schedules for water washes and filter changes and accurately predict power output.

- Historical turbine performance analysis
- PowerEye predictive analytics service

AMBIENT AIR SERVICES

Assess your site conditions to optimize filter and new air inlet system requirements.

- Environmental assessment result
- Air sampling
- Site corrosivity analysis
- Air Monitoring Station

SYSTEM PERFORMANCE SERVICES

Get a health check of your entire air inlet system, upgrade recommendations and expert installation.

- Full air inlet system inspection
- Plant optimization site survey
- Filter installation supervision

FILTER PERFORMANCE SERVICES

Get the insights you need to compare filters, assess remaining life and identify the root cause of failures.

- In-depth filter testing
- CamLab mobile test rig

CLEAN AIR SERVICES

Validate the cleanliness of your GT engines and the effect it has on performance.

- Particle Count
- Compressor water wash analysis



TEST & LEARN EVENTS

Our State-of-the-art R&D Centers in Malaysia, Canada and Sweden host an exclusive event every year in the exciting world of air filtration. If you are interested in gas turbine design & operations, register for a course at Camfil's [Test & Learn](#) and develop valuable skills that will shape your decision-making process, whether you are designing or retrofitting a system, managing a gas-fired power plant, or managing the maintenance of a gas turbine. The training will focus on site conditions and how to mitigate any risks with a well-designed auxiliary system.

OBJECTIVES

- Understand the basic theory of air filters and gas turbines.
- Identify environmental/site conditions in order to determine the types of contaminants that are affecting your gas turbines.
- Describe the principles of engine degradation (erosion, fouling, and corrosion), and how to mitigate these risks with a well-designed inlet system appropriate for your site conditions.
- Explain how to design an inlet system according to your site conditions.

- 2 full training days
- Lab testing & demonstrations
- Course booklet
- Lunches and dinners
- Networking opportunity
- 16 professional development hours

MONTREAL, CANADA



IPOH, MALAYSIA



TROSA, SWEDEN



COURSE OUTLINE

Module 1: Gas turbines

- Theory of gas turbines
- Types of gas turbines
- Brayton Cycle
- Gas Turbine vs. Piston Engine
- Applications
- Energy Market

Module 2: Theory of filtration & test standards

- Impact of ambient particulates on the gas turbine
 - Erosion, fouling and corrosion
 Impact on carbon intensity
- How filtration works
 - Filtration principles
 - Demonstrations
- From reactive to predictive mode

*Module 2.1 Filter media fabrication techniques

Module 3: Lab testing - standards and applications

- Test standards
- Environmental challenges
- Site analysis

Module 4: New system selection + Life Cycle Cost analysis (LCC)

- System selection techniques
- Life Cycle Cost analysis
- Applications

Module 5: Scope of supply

- Types of systems
- Design techniques:
 - Ventilation systems
 - Enclosure systems
 - Silencers
- Weather protection
 - Inlet Cooling technologies
 - Inlet Heating technologies

*Module 5.1 Acoustics

*Module 5.2 Molecular Contamination Control (MCC)

Module 6: Filter applications

- Existing unit evaluation
 - Barrier & pulse cartridge filter selection
- Optimizing maintenance

Test demonstrations

- Hydrostatic head tester: determines the filter media's resistance to water penetration.
- Mullen burst tester: measures the burst strength of filter media.
- Filter test rig: used to evaluate product performance. Filter solutions tested for salt efficiency and moisture resistance, high load conditions such as high airflows and pressures.

*Lab demonstrations are a part of each module training.

*A certificate of completion will be given to attendees who complete the training.

TESTIMONIALS

Haitham Al-Farra,
Cranfield University



When I was invited to attend the event on behalf of the university, I was not sure if the long trip to Sweden would be worth it. However, the event turned out to be one of the best learning experiences I have had. The presentation given was so comprehensive that it opened new windows in front of me for more research and innovation. In general, everything was perfect and professional, especially with the sales and marketing team who managed to bring the best out of the company during the whole event. "Camfil" will be a name that I will always remember for the rest of my career.



Steve Ingstov, Principal
Engineer, Watson Cogen



I am very impressed with the Test & Learn Center experience, and I'm not being polite. I thought I understood filtration but I learned a lot of things. We both learned from each other, and that's how it should be.



Aizenberg Constantine,
Mechanical Engineer, Gas
Turbines Section, IEC



Technical training at the Camfil Test & Learn center is a unique experience, granting the platform to both receive a much needed additional knowledge and also to share experience with other training participants, whether they are Camfil employees, agents, GT manufacturers, GT owners or other filter users. The training was both practically fruitful on a professional level and very enjoyable on a personal level, mostly due to kind and caring organization by Camfil. We would recommend this training both to the newcomers to the field of filtration and to the already seasoned GT managers and engineers, since all can learn something new and none will be disappointed. Thanks again for the excellent hospitality and experience.



THE VALUE RATING

The filters you select to protect your gas turbines can have a huge impact on your operations. Filters with low efficiency and high pressure drop reduce your turbine's output and increase fuel consumption and CO₂ emissions.

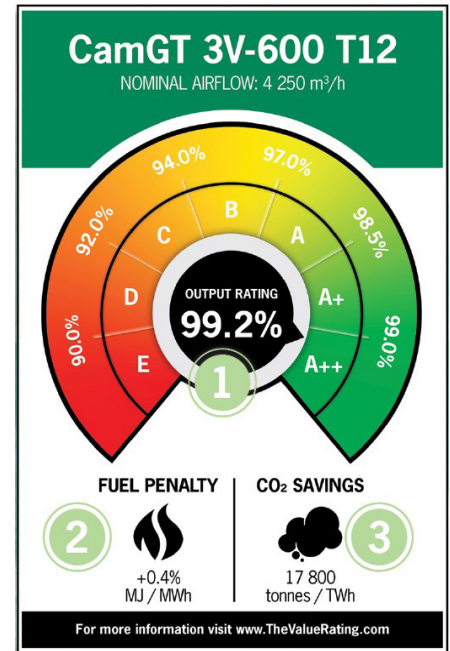
Powered by Camfil, [The Value Rating](#) makes it simpler for operators to evaluate the quality of gas turbine final filters. It directly translates the impact filter efficiency, pressure drop and dust holding capacity will have on the performance of the gas turbine as it relates to power output, fuel consumption and CO₂ savings. The Value Rating is a comprehensive reading, which tries to integrate pressure drop and dust holding capacity and efficiency from ISO 29461-1 report. This makes it simpler for the turbine users to select between filters. Use The Value Rating Calculator to evaluate your filters before you buy!

1. Output Rating- full load case
The OUTPUT RATING is a projection of the average yearly power output you

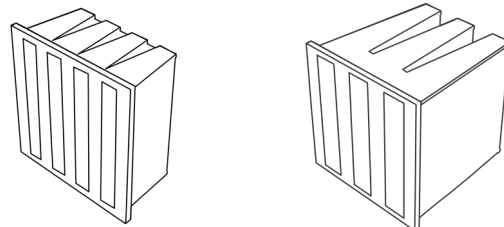
can expect from your turbines as they will have degraded due to filter pressure drop, as well as fouling caused by particles getting past the filters. Using the filter's efficiency and the estimated effects of pressure drop on turbine output, we can calculate this value.

2. Fuel Penalty- The FUEL PENALTY value indicates how much more fuel you must use to compensate for degradation due to fouling and pressure drop. The degradation of your engine output won't be seen directly if you're running at part load, but your fuel budget will be affected.

3. Carbon Savings- The CO₂ SAVINGS index compares how many tonnes of CO₂ you could save per TWh of produced power against a T6 (ISO ePM10) 60% filter – a basic, industry-standard entry-level final filter.



Compare various filters to find the best solution for optimizing the performance of your gas turbine by selecting the most suitable filter for it:



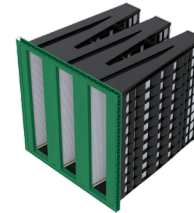
	Filter A (T10)	Filter B (T10)
Output Rating	A (98.4%)	A+ (98.8%)
Fuel Penalty	0.7% MJ / MWh	0.6% MJ / MWh
CO₂ Savings	16 300 tonnes / TWh	16 900 tonnes / TWh

THE VALUE RATING OF FINAL FILTERS



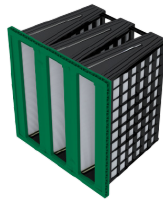
CamGT 4V-300

The Value Rating	T8	T9	T10	T11	T12
Output Rating %	93.7	94.7	98.40	98.80	98.90
Fuel Penalty MJ / MWh	3.10%	2.60%	0.70%	0.50%	0.40%
CO ₂ Savings tonnes / TWh	6 800	8 800	16 300	17 200	17 500



CamGT 3V-600

The Value Rating	T8	T9	T10	T11	T12
Output Rating %	92.40	94.80	98.80	99.00	99.20
Fuel Penalty MJ / MWh	3.80%	2.60%	0.60%	0.50%	0.40%
CO ₂ Savings tonnes / TWh	4 000	8 900	16 900	17 400	17 800



CamGT 3V-440

The Value Rating	T8	T9	T10	T11	T12
Output Rating %	93.8	94.8	98.80	99.00	99.10
Fuel Penalty MJ / MWh	3.10%	2.60%	0.60%	0.50%	0.40%
CO ₂ Savings tonnes / TWh	6 900	8 900	16 900	17 300	17 700



CamPGT

The Value Rating	T8	T9	T10
Output Rating %	91.8	94.7	97.6
Fuel Penalty MJ / MWh	4.1%	2.6	1.1%
CO ₂ Savings tonnes / TWh	2 800	8 800	14 700



CamPulse GTC (con/cyl)

The Value Rating	T9	T10
Output Rating %	94.8	98.4%
Fuel Penalty MJ / MWh	2.6%	0.7%
CO ₂ Savings tonnes / TWh	8 800	16 200



CamPulse GTC (cyl/cyl)

The Value Rating	T9	T10
Output Rating %	94.8	98.5%
Fuel Penalty MJ / MWh	2.6%	0.7%
CO ₂ Savings tonnes / TWh	8 900	16 400



CamPulse Cambrane

The Value Rating	T12
Output Rating %	99.2%
Fuel Penalty MJ / MWh	0.40%
CO ₂ Savings tonnes / TWh	17 800

BOOST TO REDUCE

Upgrading the air intake system of a plant is one of the easiest, most cost-effective ways to reduce its carbon footprint. When you use more efficient air intake filters that are adapted to your environmental and operational conditions, you get cleaner-running engines with less fouling, corrosion and reduced air resistance across the system. The engines

don't have to work as hard, so they use less fuel. Burning less fuel for the same output means less CO₂ produced, stopping CO₂ before it's ever released. Depending on your environment, operations, and current solution – you could slash your total CO₂ emissions by more than 5% per year, per megawatt hour produced.

Upgrading from a standard filtration solution to an optimized high-efficiency EPA solution may cut your CO₂ output by thousands of tonnes per turbine each year. Multiply that saving across your entire fleet to see the true impact of this painless, simple retrofit.

3 FILTER FEATURES TO CONSIDER:

There are three properties that allow for filters to reduce carbon impact:

EPA Efficiency

High efficiency EPA filters (per ISO 29461-1) virtually eliminate degradation, keeping your engine in pristine condition.

Hydrophobic Construction

Advanced hydrophobic media and superior filter design eliminate water bypass and dissolved contaminants from entering your gas turbine.

Low and stable pressure drop

Advanced design, improved drainage, extended depth, and patented aerodynamic features allow a filter to maintain a low and stable pressure drop throughout its life.

CALCULATE YOUR SAVINGS

LEARN MORE ABOUT HOW FILTRATION TECHNOLOGY IMPACTS CO₂ EMISSIONS

CO₂ EMISSIONS
CALCULATOR

CO₂ TAX
CALCULATOR

CARBON SAVINGS WITH AIR INLET FILTERS

Replacing standard intake filters with more efficient filters has proven to reduce emissions.


In the case highlighted below, upgrading from a standard T6 filter to an T12 hydrophobic filter could **save you up to 35 000 tonnes in CO₂ emissions, per year, or a 5% reduction from your total emissions per megawatt hour produced. This is equivalent to removing 18 000  from the road!**

Table: A comparison of the carbon savings achieved with different filter combinations

Air inlet filters		Impact on heat rate	Emissions related to filtration	Yearly conclusions		
Prefilter	Final filter	Heat rate reduction vs. baseline (kJ/kWh)	Tonnes of CO ₂ per year	Tonnes CO ₂ savings vs baseline	Total CO ₂ reduction vs. baseline (%)	Equivalent cars removed from the road
Bag filter T2	Bag filter T6	0	38 000			
30/30 GT T3	Composite T8	180	24 000	14 000	2.0%	8 000
30/30 GT T3	Composite T9	270	17 000	21 000	3.0%	12 000
Cam-Flo Hybrid T7	CamGT 3V-600 T10	395	7 000	31 000	4.5%	17 000
CamGT 3V-600 T8	CamGT 3V-600 T12	440	3 000	35 000	5.0%	18 000

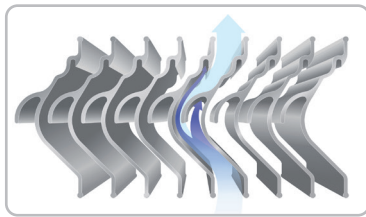
Assuming part load application; Heat rate: 8 600kJ/kWh; Operating hours: 8 000; Power output: 200 MW

Assuming the average car travels roughly 20 000 km a year, following European Environment Agency 2020 vehicular carbon emissions target of 95g CO₂/km

Depending on your environment, you could eventually reduce your emissions even further. [Contact](#) your nearest Camfil representative and ask about our CO₂ emissions calculator to find out how much you can reduce your emissions and boost your profits. www.camfil.com

TURBOMACHINERY AIR FILTRATION PRODUCTS

CAMVANE GT



The CamVane GT weather louvre/vane separator is made of specially designed profiles which effectively capture water droplets from the air stream and function as an excellent water separator. It is produced in aluminium, plastic or stainless steel which gives good corrosion protection. The louvres are made in customer specified sizes, are easy to install and maintain low pressure drop with a low noise level. The CamVane is also available with a heating cable to prevent snow and ice accumulation on the vanes.

CAMCLOSE



The CamClose is a lightweight, pleated panel air filter designed to extend the life of gas turbine final filters. It features a low, stable pressure drop with a high dust holding capacity that is suitable for all environments and is available as a hydrophobic or coalescing air filter. It features built-in clips and a patented pressure drop port for hassle-free operations.

Filter classes: T2, T5, T6 per ISO 29461-1:2021

CAMCLOSE COMPACT



The CamClose Compact is a G4 pleated panel filter designed to extend the life of gas turbine final filters. A plastic air filter, the CamClose Compact features a low, stable pressure drop with a high dust holding capacity that is suitable for all environments and is available as a hydrophobic/coalescing filter.

Filter classes: T2, T5, T6 per ISO 29461-1:2021

30/30 GT



The 30/30 GT is a panel filter designed to prolong the life of final filters by offering low initial pressure drop. An economical filter, the combination of high performing pleated filter media and a unique radial pleating technology makes the 30/30 GT G4/MERV 8 air filter suitable for most areas.

Filter classes: T3 per ISO 29461-1:2021

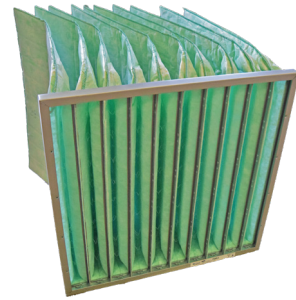
HI-CAP GT



Hi-Cap GT is a bag filter that protects the final filter by removing coarse particles from the airstream. Widely used as a prefilter, it is available with a plastic header and synthetic media. The Hi-Cap GT pocket bag air filter is suitable for industrial environments with large amounts of coarse dust and installations exposed to turbulence and/or recurring high humidity.

Filter classes: T2 per ISO 29461-1:2021

CAMFLO GT HYBRID



The Cam-Flo GT Hybrid premium inlet filter bags protect the final filter by utilizing breakthrough Hybrid media technology. The Hybrid is a coalescer filter element with excellent water handling capabilities for extended life, stable performance, and carefree operations. It is suitable for harsh environments, including applications exposed to turbulent airflow.

Filter classes: T6, T7 and T9 per ISO 29461-1:2021.

CAMFLO GT HYBRID HV

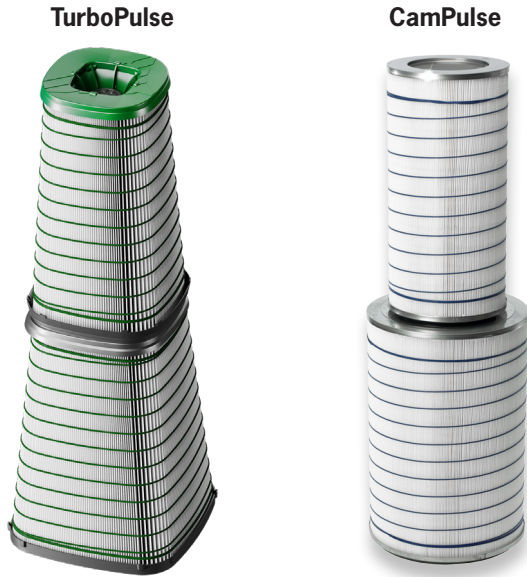


The Cam-Flo GT Hybrid HV is a high velocity air filter/coalescing pre-filter that protects the final filter by delivering stable performance in high airflow installations. In combination with the CamGuard, the HV air filter bag allows on-line filter replacement, thereby increasing outage intervals. It is suitable for harsh environments, including applications exposed to turbulent airflow.

Filter classes: T7 per ISO 29461-1:2021.

CAMPULSE

TurboPulse and CamPulse are advanced air filter elements for self-cleaning systems. TurboPulse features a patented inner cage with aerodynamic vanes for effective cleaning and the lowest pressure drop, enhancing filter life. It has incinerable, corrosion-free ABS caps, a strong plastic inner cage, and a superior SureGrip gasket. CamPulse filters, with two conical elements, have durable galvanized steel caps and an expanded metal core for stability under high pressure. Both offer four media options compliant with turbomachinery manufacturers' performance specifications.



MEDIA OPTIONS

Blended Media

80/20: Suitable for most demanding applications, including desert and arctic environments, the 80/20 is a cartridge pre-filter with robust construction features and surface loading media technology for good pulsability.

Filter class: T5 per ISO 29461-1:2021

Synthetic Media

GTC: The combination of depth-loading coarse fiber media and a nanofiber core is the ideal solution for removing hygroscopic particles in areas of high humidity, such as coastal and tropical environments. A non-discharging synthetic media with unique properties gives the filter a high level of efficiency over its entire lifetime.

Filter class: T9 per ISO 29461-1:2021

GTC10: Enhance engine protection in coastal locations, as well as locations where there are small hydrocarbons, salt, corrosive particulates, or when there is high sulfur quantity in the fuel. This is ideal in applications where performance and capacity drive maintenance and life cycle cost considerations.

Filter class: T10 per ISO 29461-1:2021

Membrane Media

CamBrane: This synthetic media consists of multiple layers, including a sub-micron particle membrane, which are perfectly balanced. Additionally, a hydrophobic pre-filter layer with high dust loading capacity ensures outstanding performance in both dry and humid conditions.

Filter class: T12 per ISO 29461-1:2021

TENKAY



Vertically hung self-cleaning air filter cartridge providing high performance in a single stage of filtration. Camfil's HemiPleat® pleat design ensures uniform pleat spacing and maximum utilization of the filtration media. Offering leak-free performance, the filter media is factory bonded to a closed steel bottom pan and to a top clamping plate. A triple helical cord is bonded to the outer surface to prevent media distortion during backflushing. A wide variety of models are available with header, gasket, and media options to meet your particular needs. The Tenkay is available with the same media configuration as the CamPulse cartridge filters.

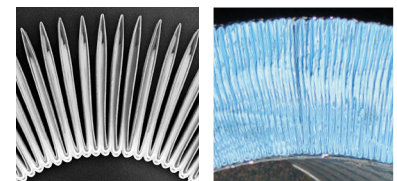
TENKAY-GOLD CONE



The Tenkay Gold-Cone air filters are designed with a vertically integrated cartridge that allows for easy installation and removal. These filters also offer exceptional energy performance, meaning they operate efficiently to provide optimal air quality.

Featuring an injection molded inner cone in the center of the cartridge, cleaning is accomplished by pulse waves that emanate outward from this inner cone providing enhanced cleaning for more efficient operation and reduced service requirements. The additional media area further lowers the pressure drop and extends the cartridge filter life.

HEMIPLEAT™



Typical industry packed media pleats

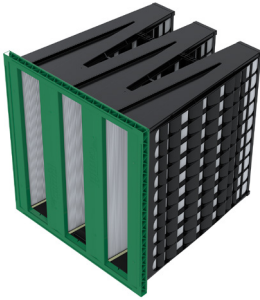
HemiPleat® breathable media pleats

HemiPleat™ open pleat technology

Camfil's state-of-the-art in pleating technology is the key to the superior performance in operating and maintenance for pulse cleaning cartridges. Synthetic beads hold the pleats wide apart, and the spacing in the HemiPleat® design gives greater media utilization and more effective filtration, providing enhanced performance.



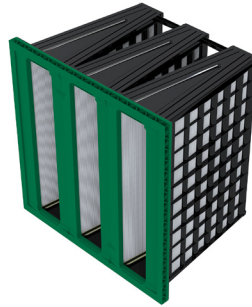
CAMGT 3V-600



The market leader and state of art, high-capacity filter for turbo machinery. Its unique design with vertical pleats assures that performance is maintained in humid or wet conditions, guaranteeing a long service life and an economical filtration solution. The CamGT has a solid, airtight frame and a new technique for fixing the media to the frame: the double-sealing design.

Each filter grade is aerodynamically optimized in order to provide the lowest possible pressure drop and longest available life. Combined with its sturdy and heavy duty design, the filter withstands a continuous pressure drop of over 6250 Pa, the CamGT's high efficiency and low pressure drop guarantee optimum protection and engine

CAMGT 3V-440



performance under the most demanding operating conditions.

The CamGT is suitable for both onshore and offshore installations where its exceptional performance is maintained during periods of high humidity and extensive fog. Air inlet filters are sometimes exposed to extreme peaks in pressure drop; and to prevent the media packs from bulging or bursting, aerodynamic grids are added to the air exit sides.

CamGT 3V-600: The design features a 600 mm deep frame fitting almost 50 square metres of media in one single cartridge. The unparalleled filtration area offers the lowest pressure drop in the industry

CAMGT 4V-300



for this type of filter. A longer replacement cycle also removes all disposal requirements significantly.

CamGT 3V-440 and CamGT 4V-300:

The CamGT 3V-440 (440mm deep frame) and CamGT 4V-300 (300mm deep frame) include new and improved patented features that prevent pressure spikes, and increase availability and reliability. Both filters are available in reverse configurations. The CamGT 4V-300 is also available in an XL version with 26% more media.

Filter classes per ISO 29461-1:2021:

CAMGT 3V-600: T8 - T13

CAMGT 3V-440: T8 - T12

CAMGT 4V-300: T7 - T12

CAMPGT



The CamPGT offers a solution with areas with dry environments and where considerations for high humidity and hygroscopic dust are less important. The compact filter is designed with horizontal pleats and is, just as the other CamGTs, fully incinerable.

To ensure no risk of filter damaging during handling and installation, external exposed pleated packs are equipped with protective integrated sealed mesh.

Filter classes: T7 - T10 per ISO 29461-1:2021.

CAMPGT BOX TYPE II



CamGT Box Type



CamGT 4V-300 with Distance Frame

Based on the same unique filter pleat design as the standard CamGT, the box type version is set into a rigid enclosing plastic frame. It is therefore very suitable for upgrading existing filter systems from older box type filters to a modern high performance filter product. Just like the standard CamGT, its performance is maintained in humid or wet conditions, making it also suitable for operations in salty environments.

Combined with its sturdy and heavy duty design, the CamGT's high efficiency and low pressure drop guarantee optimum protection and engine performance under the most demanding operating conditions.

An alternative is to use the Spacer Frame with a standard CamGT filter. The spacer frame remains a permanent installation and the GT filter is replaceable. Also available in XL-version.

Filter classes: T7 - T10 per ISO 29461-1:2021.

RESEARCH & DEVELOPMENT

At Camfil, we are deeply committed to R&D and quality control, performing rigorous laboratory testing, under controlled conditions, as well as field trials in actual site conditions. We design, develop, and build our own production equipment to maximize our control over the quality and performance of the filtration products that we manufacture.

Always at the forefront of emerging technologies, Camfil is a recognized filtration leader and is continuously developing new materials to optimize clean air solutions. We work closely with media suppliers to select medias that meet our very high quality standards.

Design Proficiency

Finite Element Analysis (FEA) is employed to simulate the structural behavior of designs to ensure they meet the required specifications of the final product. Additionally, Computational Fluid Dynamics (CFD) is used to analyze airflow and optimize the design for maximum performance and efficiency.

Simulation models are created to predict filter behavior, which is validated with prototype or product testing. Our engi-

neers design with modern manufacturing techniques in mind to ensure not only consistent and reliable production but also to take advantage of the benefits of different manufacturing methods. This approach provides greater innovation and flexibility in the design process, resulting in air filters that are innovative, high-performing and produced to the highest quality standards.

Prototyping Expertise

Our engineers use rapid prototyping with 3D printing and CNC Machining to quickly build preliminary models. This enables them to test and refine their ideas before full-scale production. Prototyping helps engineers identify and resolve any issues early in the development process, leading to a more efficient and cost-effective outcome.

Testing capabilities

Camfil operates four Power Systems R&D laboratories located in Malaysia, Sweden, Canada and UAE. We strive to stay current with the latest developments in ISO standards. Our test rigs are designed to accommodate these new standards, ensuring that our products meet the most up-to-date ISO require-

ments. We operate multiple test equipment to measure the filter life, efficiency, water performance, pressure drop, and other performance metrics of air filters.

We have multiple CamLabs, that have been commissioned across the world to test and compare how different filters would perform in actual site conditions. Measured parameters include ambient dust concentrations, airflow, pressure drop, filter efficiency, temperature and relative humidity. The results show the optimal filtration solution for the site, while minimising the total life cycle cost of ownership.

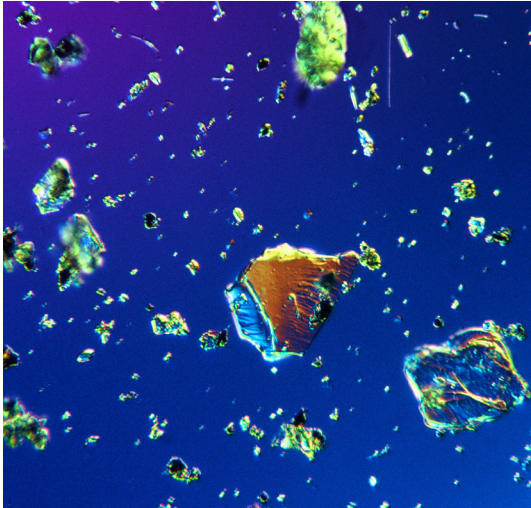
Camfil has the expertise to design and build custom testing equipment for product development needs, providing greater control and accuracy. This saves costs and provides flexibility in testing schedules, allowing for a faster product development process.

Gas Turbine Filter Test Rigs

Camfil's full-scale test rigs are commissioned at the operator's site to evaluate performance in challenging conditions by adjusting parameters such as airflow, humidity, temperature, and salt content. The rigs can be used with air that enables rapid prototyping, product validation, competitive product evaluation, research, and development testing.



Camfil has the world's biggest fleet of mobile labs with capabilities to set up tests in Europe, America, UAE and Asia.



Camfil Power Systems

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 31+ manufacturing sites, six R&D centers, local sales offices in 35+ countries, and about 5,200 employees and growing. We proudly serve and support customers in a wide variety of industries and in communities across the world. To discover how Camfil can help you to protect people, processes and the environment, visit us at www.camfil.com.

www.camfil.com

For further information please contact your nearest Camfil office.

CAMFIL - Clean Air Made for Improving Life