camfil FARR

systems for turbomachinery

Camfil Farr Power Systems	Application brochure
Power Systems	
Camfil Farr - clean air solutions for turbomachinery	

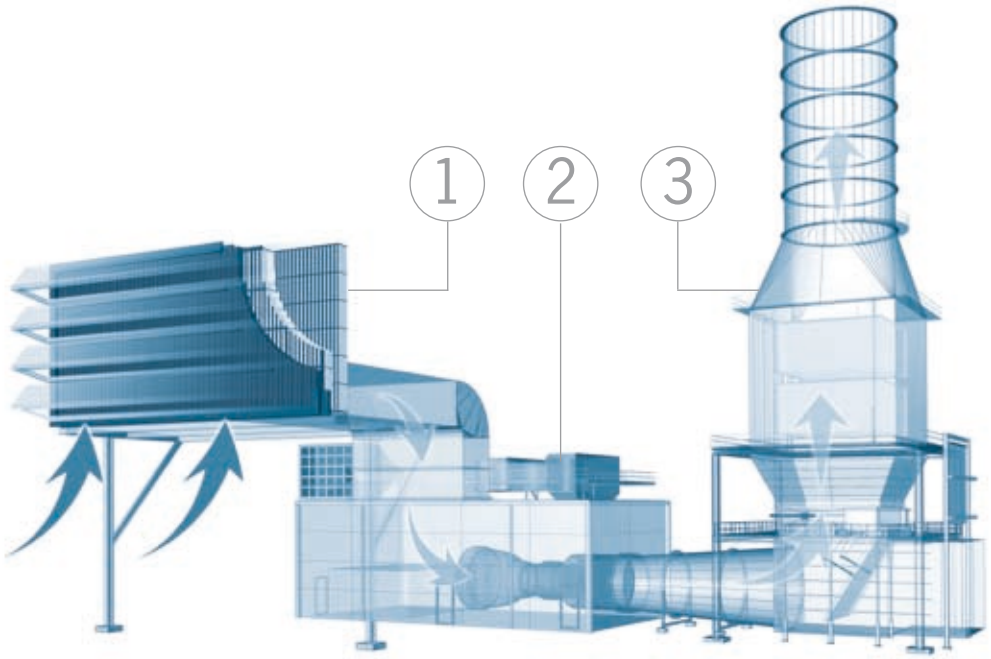
we protect people, machines and the environment

Clean air and a quiet environment are vital life quality factors in modern society. Also in the power, oil & gas industries, it's important to optimise these factors. A correctly designed, rational system minimises engine degradation, leading to lower operating costs, optimum efficiency and less environmental impact. Camfil Farr Power Systems has extensive experience of dimensioning, designing and manufacturing different system solutions in all conceivable environments. With our complete product and system offering, we can provide your installation with the right solution, including everything from the inlet system, enclosure and ventilation to exhaust and damper systems. You can benefit from this expertise when you want to improve or retrofit old equipment to better match modern efficiency and performance requirements. Once in operation, our aftermarket service ensures that you get high reliability and maximum return on your investment.

The heart of our systems

We have over 40 years' experience in developing and supplying air intake systems. The heart of all our systems is their filter elements, which are specially developed according to individual requirements, the environment and the optimum operating economy. No matter which system you choose, we help you achieve the right filter combination. With our LCC (Life Cycle Cost) programme, we study various key factors and then choose the best solution. As part of the Camfil Farr Group, the world's leading company for air filters and clean air solutions, we have access to a wide range of filters. Through continuous strong focus on R&D and development of

test methods and standards, we also play a leading role in furthering the industry's development and ensuring customer benefit.



Optimum solutions – from air inlet to top of stack

1. Inlet systems

Air contains particles including, dust, sand and industrial pollutants, which can cause engine degradation and unnecessary machine wear. In order for gas turbines, diesel engines and compressors to work optimally, their inlet systems must supply them with clean air at the correct temperature.

We offer systems for facilities on land, offshore, in desert environments and in other environments with a high degree of natural and human-generated pollution.

Our systems are built to deliver the maximum possible efficiency combined with the minimum possible pressure drop. This optimises the facility's operating economy. A carefully adapted inlet system minimises environmental impact and streamlines turbine operation.

2. Enclosures and ventilation

Our protected enclosures reduce noise to a level that is acceptable for the surrounding environment, and protects machinery from the stresses and strains caused by Mother Nature. A well-dimensioned ventilation system allows the machinery to operate at the optimum ambient temperature, while safely venting out any gas and fuel emissions.

3. Exhaust systems

Exhaust systems are often customised to meet noise level requirements, space requirements and profitability goals. Numerous factors are taken into account when designing the systems, such as thermal stress at high temperatures, expansion etc. A design that ensures constant flow and low pressure drop is fundamental to ensure optimum, reliable operation.

reducing risk of costly downtime

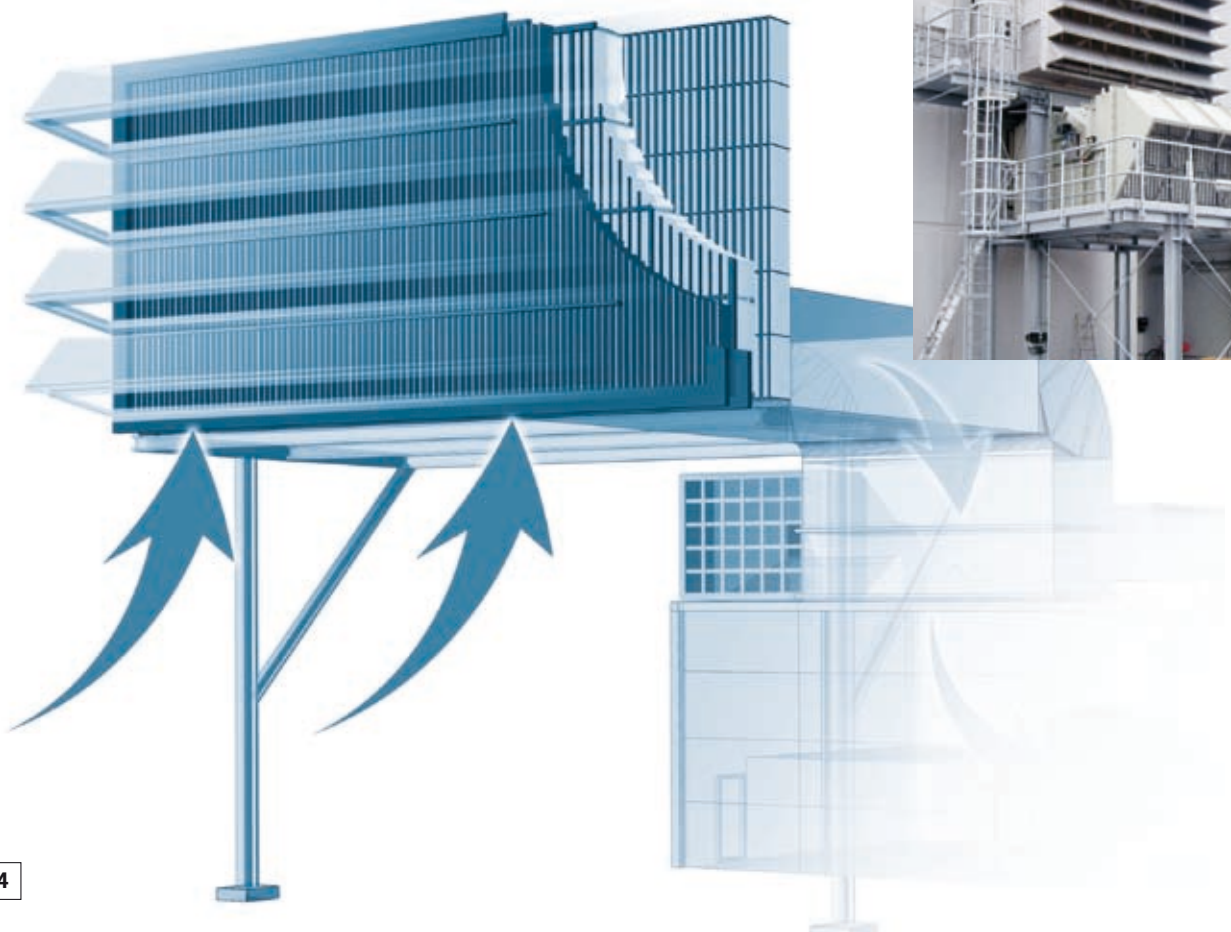
An inlet system's purpose is to purify the air and protect the gas turbine from harmful external impact.

The installation of a correctly adapted inlet system prolongs the life of the installation, cuts operating costs and raises the machine's efficiency, while reducing the risk of costly unplanned downtime.

An inlet system can be adapted to meet countless different requirements. Besides an optimal filter combination, the system also needs to be supplemented with suitable weather protection devices and, if necessary, anti-icing systems or insect guards. If the machine is installed in an area with high temperatures, inlet cooling is an option that increases the machine's performance.

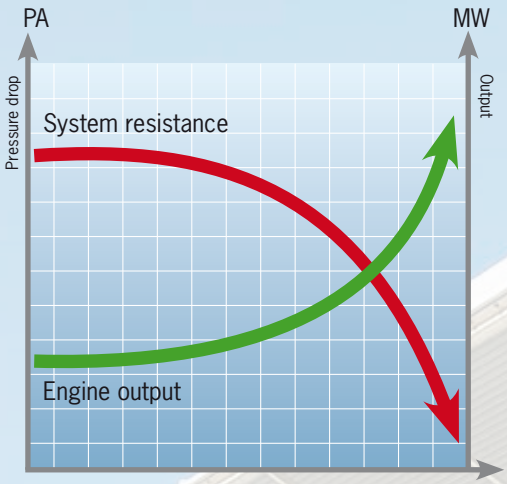
Details such as water separation and drainage are vital to a well-functioning inlet system. When our designers develop your specific solution, they take these details into account, while also ensuring that the systems are simple to assemble and maintain.

Our inlet systems are constructed in alternative materials such as coated carbon steel, marine grade aluminium and stainless steel.



Features
– inlet systems

- protects against dirt
- increases engine efficiency
- cuts maintenance costs
- reduces nuisance noise
- high efficiency – cleaner environment
- flexible design



Low pressure drop – higher engine output

reducing disturbing noise and providing effective protection

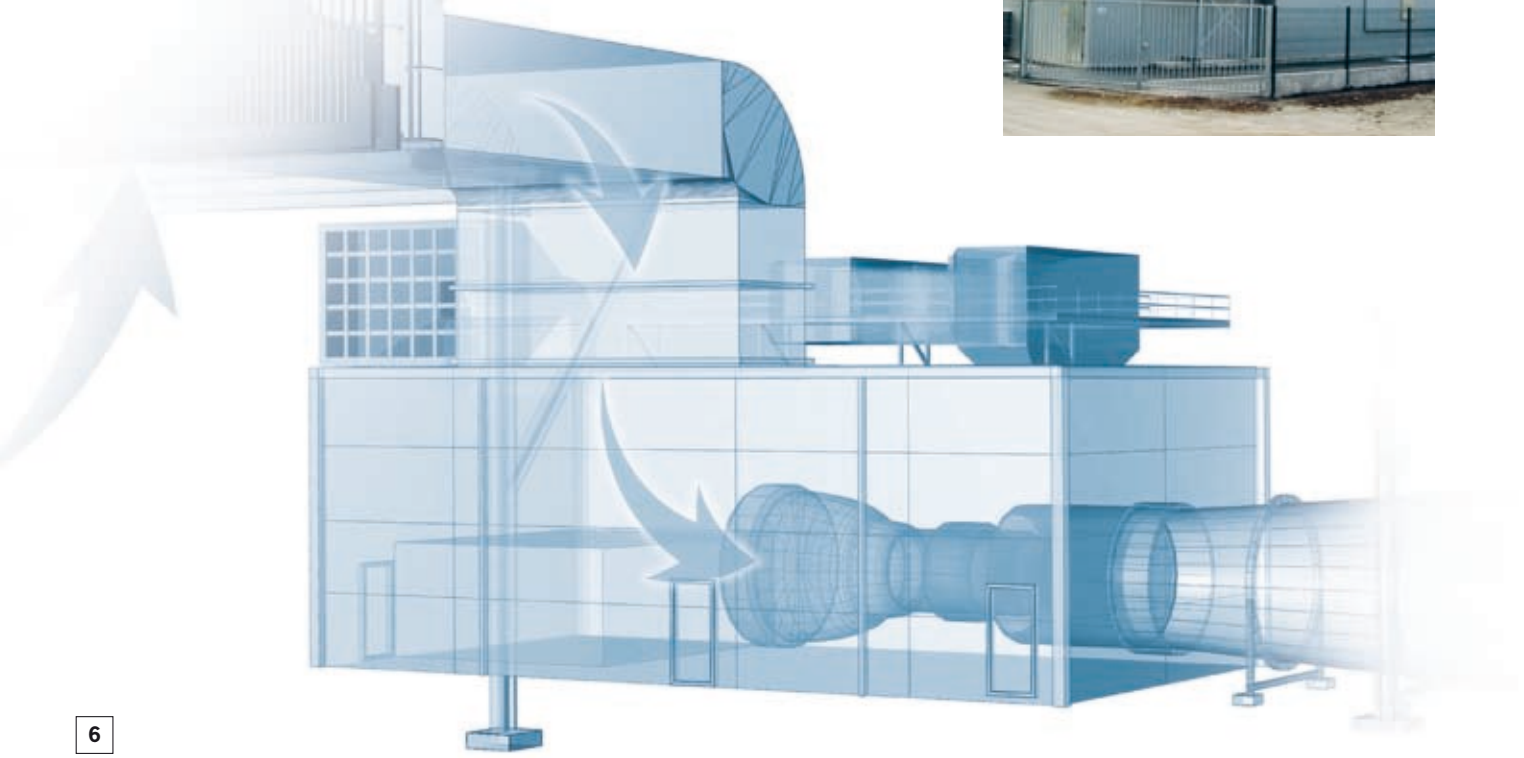
Turbomachines need to be protected against weather and excessive temperatures. The surrounding environment must also be protected from the high noise levels generated by the machinery. This is done most effectively by enclosing the machine and installing silencers beside the inlet and outlet openings. An enclosure also provides effective protection against fire and varying weather conditions.

Our enclosures are built as an integrated part of the system. Lighting, easy-to-open doors, lifting beams and service areas are just some of the features inherent in our designs. Our most commonly used materials are coated carbon steel, stainless steel and aluminium.

The enclosures can be delivered skid mounted or as free-standing modules. The systems are effectively insulated against vibrations.

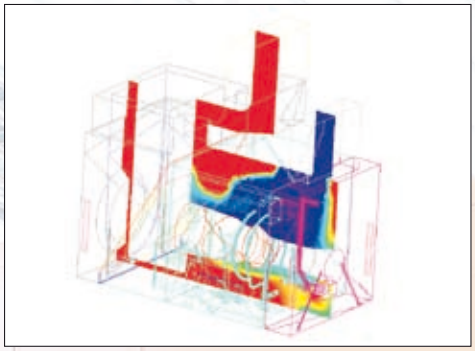
Our enclosures are designed with efficient ventilation to cool the air, thus ensuring reliable, safe engine operation.

The ventilation systems are equipped with filters, fire dampers, silencers and fans to ensure safe, even operation. Speed-controlled fan engines make it possible to vary the air flow, maintain constant temperature and minimise power consumption.



Features
– enclosure and ventilation

- dampens nuisance noise from the gas turbine
- protects against fire and varying weather conditions
- provides an attractive exterior
- facilitates servicing and inspection
- ensures even ventilation, optimum temperature and safe operation
- offers protection in the event of gas leakages

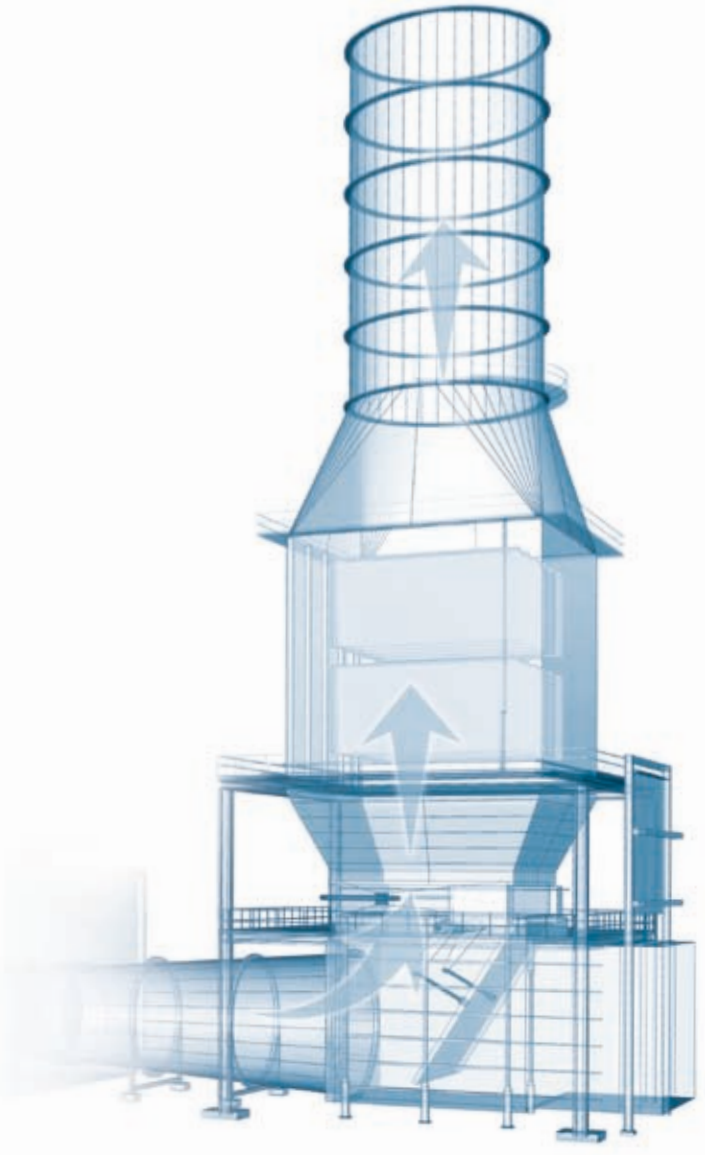


CFD analysis for optimal ventilation

the right system solution – a wise investment

Exhaust systems are necessary to guide the exhaust flue gases of gas turbines into the atmosphere. In simple cycle installations, the exhaust flue gas leave the gas turbine through a diffuser, turning box or elbow, bypass stack and are released into the atmosphere.

In combined cycle installations, the exhaust flue gas leaves the gas turbine through the diffuser into a diverter damper.



The position of the diverter damper is correctly adapted to the selected mode of operation, either leading the exhaust flue gas through the bypass stack or through a heat recovery steam generator into the atmosphere.

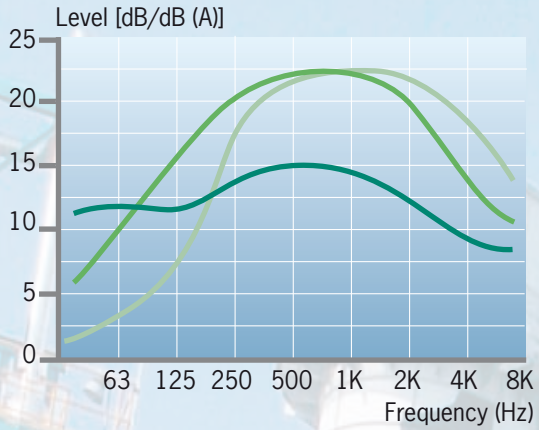
Use of exhaust systems behind the gas turbines is mandatory as the exhaust flue gases have temperatures of 400°C-650°C and contain harmful substances that may not be freely released into the atmosphere. The noise emitted by gas turbines is also at a health risk level, and must be reduced through noise reduction measures. The most frequently used method is the installation of an absorbing silencer splitter in the bypass stack.

Our advantage is that we can design and deliver the whole exhaust system, from the gas turbine's exhaust flange to the connecting flange of the heat recovery steam generator, which has the following basic components:

- exhaust diffuser
- diverter damper
- bypass stack with silencer on a turn-key basis worldwide.

Features
– exhaust

- reduces low-frequency noise
- flow-efficient design
- withstands vibration and thermal stress
- tolerates very high temperatures
- dampers for safe maintenance



High-frequency tuned absorption splitter

Low-frequency wide spectrum relaxation splitter

Absorption splitter combined with panel resonator

Functional principle of absorption silencers

many good reasons for choosing us as your supplier

Long experience

Camfil Farr Power Systems has been supplying cost-effective air intake systems and acoustic solutions to the industry for over 40 years. Our success is based on a development process in close collaboration with our customers and suppliers. Each solution is unique for you, as our customer.

Global presence

Thousands of our installations are used worldwide, around the clock, year after year. We operate globally but work locally. You always have a Camfil Farr representative close at hand. We understand your needs – and speak your language.

Experience of project management

We're used to leading and managing projects. Our project team performs all contracts in close collaboration with our customers. Each project has its own project manager who ensures that the customer's requirements and preferences are met throughout the course of the project.

Production

All production takes place at our own factories, or is carried out by carefully selected subcontractors in our global network. This means that production can often be carried out close to the location where the equipment will finally be delivered.

Certification

We supply systems for gas turbines from 1 MW to over 300 MW. All our activities are controlled by our ISO-9001-certified quality control programme. We are also a certified SCC (Security Certificate Contractor), which is of crucial importance when performing installation and assembly operations.

Service and aftermarket

We have a carefully selected aftermarket service for spare parts and upgrade. Safe service guarantees reliable function and ensures you get the highest possible return on your investment.

We believe in long-term partnership – we're with you all the way

On world standards...

...Camfil Farr is the leader in clean air technology and air filter production.
Camfil Farr conducts its own product development and R&D, and has worldwide local representation.
Our overall quality goal is to develop, produce and market top-quality products and services that always exceed our customers´ expectations.
We see our activities and products as an expression of our quality.

To achieve overall high quality, it is necessary to establish an internal work environment where all Camfil Farr's employees can succeed together. This means an environment characterised by openness, confidence and always doing what's right for our customers.

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