

**HELPING KEEP TURBINES
RUNNING ALL OVER THE WORLD.**



Donaldson
FILTRATION SOLUTIONS

GAS TURBINE SYSTEMS

DONALDSON HELPS KEEP YOU RUNNING

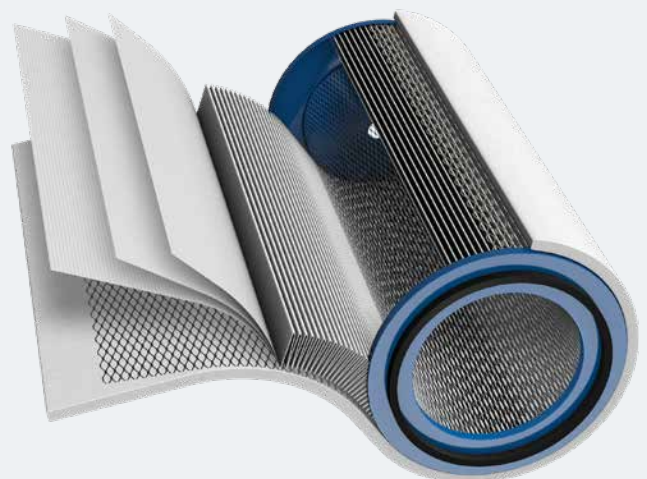
Donaldson is a leading supplier of engineered air intake systems for gas turbines and industrial compressors, for both new and retrofit applications. Our comprehensive technical capabilities, extensive global network, and unrivaled operations and maintenance support help optimize system performance and reduce total cost of ownership in ways no other supplier can match. Our wide breadth of first-fit and aftermarket products and services provide the convenience of a single supplier and one contact for service and trouble-shooting.



Comprehensive Technical Capabilities

Donaldson has in-house engineering expertise and is constantly investing in research and development to improve system designs and filtration technologies. The result is an ever-expanding line of filtration solutions that perform in any application or operating environment to provide:

- Maximum equipment protection, efficiency, and output
- Longer equipment and filter life for reduced downtime
- Reduced total cost of ownership over the life of your equipment



Turbo-Tek® (H)EPA Filtration

Unrivaled Operations and Maintenance Support

With application expertise and the ability to solve your unique challenges, we provide support throughout the product life-cycle with an extensive offering of products and services, including:

- Filter testing and reporting services provide optimal system management and protection
- Technical Field Advisor (TFA) site inspections help anticipate challenges and avoid downtime
- Comprehensive product warranty protection
- Extensive range of replacement filters, parts and accessories



Local Support on a Global Scale

With over 14,000 employees in 140 locations throughout the world, Donaldson operates globally to deliver customized solutions and localized support where you need it, when you need it.

- Fast delivery, service, and time-to-market
- Localized support and consistent customer experiences



FILTRATION FOR EVERY ENVIRONMENT



URBAN/INDUSTRIAL
various contaminants,
including hydrocarbons



ARID/SEMI-ARID with
frequent seasonal
ground fog



ARCTIC very cold, dry air
with frequent snow and
frost build up



DESERT/ARID
frequently heavy wind,
dust concentration



**MARINE/COASTAL/
TROPICAL/SEMI-TROPICAL**
hot, humid, moisture-laden

Simplifying the Specification Process for Operators

The environment in which gas turbine systems operate should define the right filtration mix. Through decades of serving gas turbine customers in all climates and conditions Donaldson has identified three key pillars that determine the ideal filtration solution for an operator's specific situation: **efficiency**, **water tightness** and **pulse recovery** rate.

To help equipment operators optimize productivity and minimize operating costs, Donaldson has developed a 0-5 point rating scale for each pillar. Each Donaldson filter incorporates this rating system in its naming, simplifying the specification process for operators.

Efficiency

The most widely recognized performance metric for efficiency is the proportion of inlet air particulates captured by the filter. Because higher-efficiency filters have associated costs, operators need to determine an efficiency rating that delivers a return on investment for their facility.



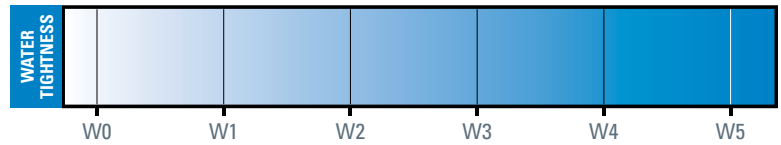
Higher levels of filtration efficiency indicate increased particulate filtration

By using established standard test methodology, such as ASHRAE52.2, EN779, EN1822 and ISO 16890, Donaldson has worked to simplify how customers classify their filtration application. In this case, an Er5 rating is (H)EPA level filtration and Er0 represents coarse pre-filtration.

Watertightness

In certain applications watertightness becomes a high priority. Salts and other dissolved solids carried by water can be highly corrosive and often more detrimental than airborne contaminants.

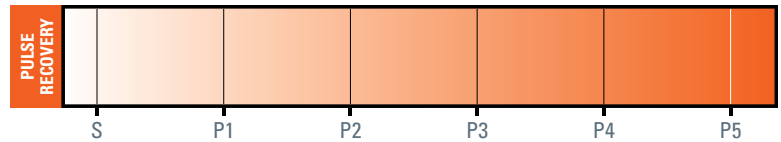
Donaldson rates its gas turbine filters on a scale of W0 to W5, with higher values indicating greater watertightness. A filter rated at W0 would not withstand moisture, while a W5 filter could pass the test with at least 99.5 percent water resistance and no more than a 1.5 inch water-gauge (WG) increase in pressure drop.



Higher levels of watertightness indicate the ability to resist ingress and provide a more stable pressure drop when challenged with water

Pulse Recovery

High pulse recovery can be a priority in applications where high dust concentrations, heavy dirt loading or freezing can cause premature fouling of the filter elements.



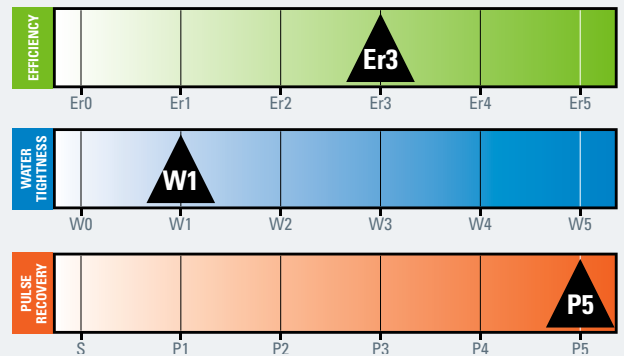
Higher levels of pulse recovery indicate pressure drop performance even when faced with challenging dust conditions

On Donaldson's scale, a static (S) filter would be considered unable to be pulse-cleaned without damage, while the remainder of the P ratings indicate the level of pulse recovery. Note: If your filter housing does not have a pulse system, static filtration solutions are most appropriate.

Converting to a Better Filter Profile: A Case Example

Donaldson's inlet air filter rating scale helps plants convert to the right filtration solution for their unique operating and environmental conditions. If a plant's environment or operating conditions change, Donaldson can help the plant choose the appropriate filtration based on efficiency (Er), watertightness (W) and pulse recovery (P) — the three attributes that differ most from one filter to another and, in combination, also drive operating costs.

Using a baseline profile of the current filter, the owner can select replacement filters with stronger ratings on the properties that matter most under the new conditions. An Er|W|P profile provides an apples-to-apples comparison and enables a better match. Donaldson uses standardized testing to determine the Er|W|P on a 0 to 5-point scale for both the current filter as well as the proposed solution.



Environmental Issue

A plant in an agricultural region is coping with a dusty harvest season by using a pre-filter wrap on a depth-loading filter. The pre-filter and filter begin to quickly load and require frequent replacement. The owner discovers a rock quarry has reopened to the West, compounding a dust problem. Donaldson removes and tests the plant's current filter, discovering it has medium-high capture efficiency (Er3); moderate watertightness (W2); and weak pulsability. (P1). The trouble becomes apparent: The existing filter's limited pulse recovery rate (P1) cannot keep pace with the high dust load. Using this comparative information, Donaldson recommends an Er3|W1|P5 replacement. No watertightness is required in the filter, but it has to deliver the highest possible pulse recovery rate (P5) to shed the heavy dust load. With this change, the plant runs continuously through high dust occurrences and projects a short return-on-investment.

THE FIRST NAME IN FIRST FIT

Donaldson was the first to manufacture engineered air intake and pulse system components for gas turbines and industrial compressors. We have filtration systems to protect large turbines (up to 1.2 million cfm/2 million m³/h), small turbines, compressors, micro turbines, and everything in between. You will find our equipment in virtually every gas turbine application, including:



Power Plants



Oil and Gas
Delivery Systems



Air Separation
Plants



Refining and
Processing Machinery

When combined with our proprietary filter media, there is no better protection for your critical equipment, or your bottom line.



Aftermarket Replacement Filters and Components

We supply high-quality filters and parts that meet or exceed original manufacturer performance and offer superior cost-to-quality ratios, including:

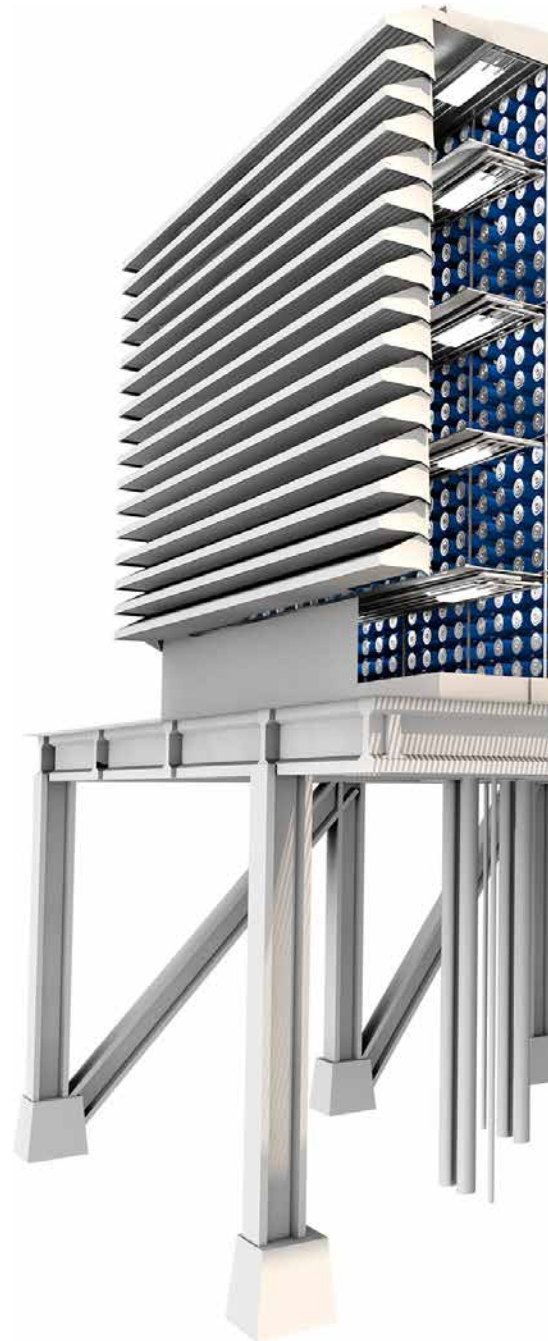
Cartridge Filters powered by our high-efficiency filter media

Panel and Compact Filters in a wide variety of shapes, sizes, and efficiencies to fit your space requirements. Leak-free, rigid, and non-metal parts

Pulse System valves, solenoids, and controllers

Inlet Hood Components bird screens, moisture separators, control panel upgrades, coalescing media and acoustic weather hoods

Filter Retention Hardware standard yokes, Quick Lock Yokes, and filter clips



Retrofit

Having performed hundreds of upgrades and modifications globally, we have the experience you can rely on to enhance your inlet system. Our team of qualified engineers repair and modify inlet systems to optimize performance and deliver more power to you. We offer standard replacement and upgrade kits as well as custom modifications for:

- Higher filtration efficiency
- Lower operating intake pressure drop
- Greater moisture control
- Reduced maintenance
- Enhanced noise attenuation and access doors
- Power augmentation with evaporative coolers and chiller coils



Field Services

We provide maintenance on inlet systems regardless of manufacturer. Our certified crews have the products, tools, and training to help keep your system running at peak efficiency with minimal downtime. We offer:

- Filter/pre-filter changeout
- Evaporative cooler media changeout
- Component replacement
- Air intake and evaporative cooler system maintenance
- System inspection and check-up
- Coatings and corrections



DONALDSON. MORE POWER TO YOU.

Comprehensive Technical Capabilities

- Extensive product and service portfolio
- Advanced filter media technology for optimal performance
- Engineering and design support
- Customization capabilities

Unrivaled Operations and Maintenance Support

- Filter testing and reporting
- Technical Field Advisor site inspections
- Dedicated service crews
- Comprehensive warranty
- Wide breadth of aftermarket filters, parts, and accessories

Extensive Global Reach

- 140 sales, manufacturing, and distribution locations globally
- Localized support for faster service and delivery
- Logistical and regulatory expertise

Important Notice

Many factors beyond the control of Donaldson can affect the use and performance of Donaldson products in a particular application, including the conditions under which the product is used. Since these factors are uniquely within the user's knowledge and control, it is essential the user evaluate the products to determine whether the product is fit for the particular purpose and suitable for the user's application. All products, product specifications, availability and data are subject to change without notice, and may vary by region or country.

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