

Filtration Technology *for the* Wind Power Industry

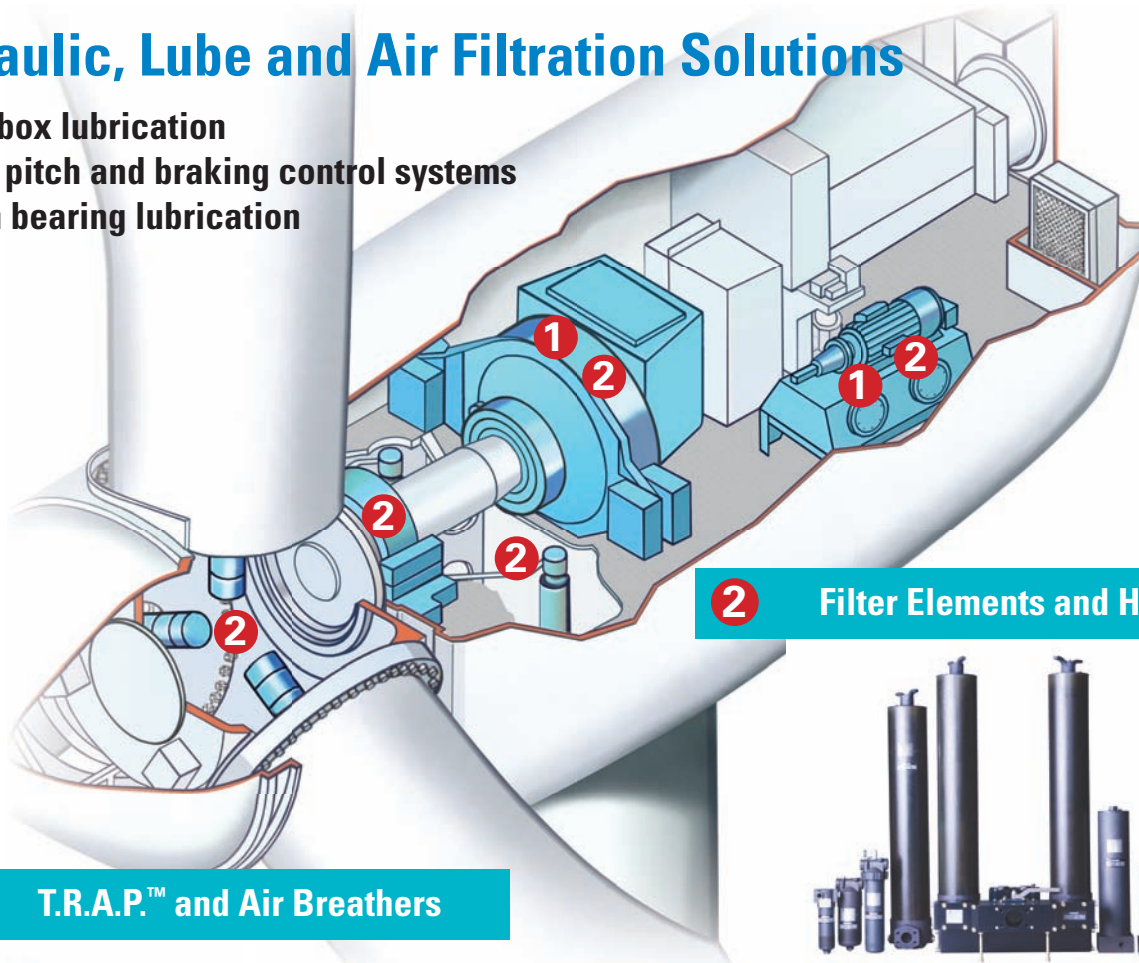


Turbine Reliability Through Maximum
Filtration Performance.



Hydraulic, Lube and Air Filtration Solutions

- Gearbox lubrication
- Yaw, pitch and braking control systems
- Main bearing lubrication



1 T.R.A.P.™ and Air Breathers



T.R.A.P. Breathers

Water contamination causes major problems in hydraulic systems and oil-wetted machinery. The patented, innovative technology used in Donaldson's T.R.A.P. breathers utilizes a new and superior method to eliminate moisture from hydraulic reservoirs. Donaldson's T.R.A.P. breather begins removing atmospheric moisture at only 15% relative humidity. Traditional desiccant breathers are limited by fixed water holding capacity and require frequent change-outs. The T.R.A.P. breather exhales moisture with every flow cycle, regenerating its water holding capacity, resulting in longer breather life.

Air Breathers

Air breathers are placed on hydraulic reservoirs and gearboxes to prevent atmospheric contamination from entering and to allow for sufficient air movement and pressure equalization inside the chamber. Donaldson breathers prevent particles larger than 3 microns from entering the system. This is a sensible, affordable solution for any hydraulic system and gearbox.

2 Filter Elements and Housings



Donaldson Triboguard™ and Duramax® Filter Elements

The Donaldson Triboguard line of high performance hydraulic filter elements provides 73% higher dirt-holding capacity and 47% lower initial pressure drop than traditional filters. Donaldson's Duramax filters are the highest-rated medium pressure filters available in a spin-on configuration. Using Donaldson's proprietary Synteq® filter media, these filters allow initial lower clean pressure drop and provide superior system protection. The five-layer media is available in a variety of media grades down to 4µm(c). A cost effective solution – Donaldson Triboguard filters reduce maintenance cost by extending filter life resulting in longer change intervals. This family of high performance hydraulic filters is ideally suited for demanding wind power applications and designed to fit flawlessly in many different types of housings.

Donaldson Triboguard Filter Housings

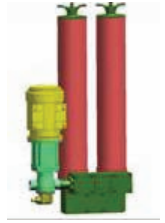
Donaldson Triboguard high performance hydraulic filter housings deliver higher efficiency filtration with greatly enhanced dirt holding and low element pressure drops. The product line includes medium and high pressure cartridge style housings with a variety of mounting configurations, advanced indicator and duplex options. These options and the Donaldson Triboguard breadth of specifications further differentiate the Donaldson family of filtration products.



The Donaldson Solution

Custom Configurations

Donaldson has the capability to optimize filtration solutions for wind power system manufacturers, including gearbox and hydraulic power unit systems. Our product line spans a range of styles, materials, pressure ratings, and flow rates, enabling us to optimize the contamination control components for your wind power applications. We have a broad variety of both cartridge and spin-on filter assemblies with world class filtration performance. We also have an extensive range of accessories to fill your needs. As space and weight are both critical to these applications, our technical engineering staff can help you select the optimum solutions for your contamination control needs. Since maintenance and service life are key, we can also recommend solutions that provide the lowest cost of operation. Let us know how we can help you solve your wind power contamination control requirements today.



Donaldson HIAC Portable Oil Diagnostic System (PODS)

The Donaldson HIAC Portable Oil Diagnostic System measures, stores and reports oil condition parameters essential for reliable hydraulic systems operation. Unlike traditional laboratory analysis that can take up to a week to complete, the Donaldson HIAC PODS analyzes fluids and lubricants to determine a machine's operating condition instantly. The superior optics and design of this real-time assessment product provides eight channels for particle counting, as well as, measuring viscosity and temperature to assess fluid conditions. Donaldson HIAC PODS control analysis software provides real-time data download and visualization, data analysis, formatting and reporting.



Fluid Analysis Service

Donaldson's new Fluid Analysis Service provides a complete snapshot of the condition of the lubricant and identifies component wear and fluid contamination in virtually any industrial hydraulics equipment application. The easy-to-read Donaldson test report color codes individual results by severity, provides graphical representation of fluid cleanliness levels with a target ISO chart, and includes an image of the photomicropatch performed on each sample. Results are posted on-line and ready to view quickly after the test is performed.

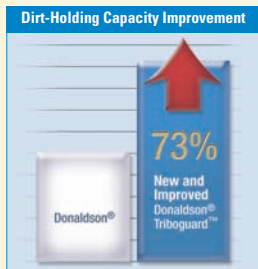


Filter Panels

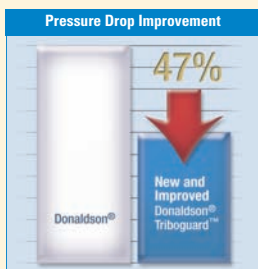
The Donaldson filter panel is a permanent-mount off-line filtration system designed to provide an economical and effective way to supplement current filtration. High efficiency media grades provide cost-effective filtration to achieve and maintain desired ISO cleanliness levels. Its dual-stage filtration offers coarse/fine particle removal or install a water absorbing element to obtain particulate and water removal. The filter panel can be customized to fit your specific needs.



When you install Donaldson Triboguard™, you're really installing uptime.

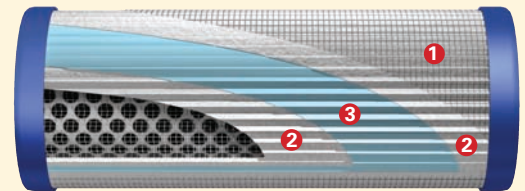


You asked for better filtration. You got it again. Our engineers redesigned our pleat pack to give you up to **73% more dirt-holding capacity** than previous Donaldson® Triboguard™ filters AND up to a **47% lower initial pressure drop**.



How Uptime Protection Works

New and improved Donaldson® Triboguard™ filters feature an advanced pleat pack design that provides premium protection for your system:



1 Epoxy-Coated Steel Support Mesh (Upstream and Downstream)

- Excellent pleat support/spacing
- Protects against media damage during handling/installation
- Excellent compatibility
- Allows for maximum effective media area

2 Media Support Layers (Upstream and Downstream)

- Optimizes media support
- Protects media during pressure surges

3 Synteq® Media

Donaldson-developed *Synteq*® synthetic filter media has smooth, rounded fibers for low resistance to fluid flow. *Synteq*® media is ideal for filtering synthetic fluids, water glycols, water/oil emulsions, HWCF and petroleum-based fluids.

- Donaldson's synthetic filter media is specially developed for fluid filtration
- High-efficiency media grades with performance to $\beta < 4(c) = 1000$ (per ISO 16889)
- Exceptionally low flow resistance
- Consistent performance throughout the life of the filter
- Excellent compatibility



Why You Should Choose Donaldson

All wind turbine manufacturers require the assurance of a high performing product for demanding wind power applications. Donaldson is committed to providing the absolute best products in the market today. Rest assured that the world's largest manufacturer of industrial filter products is prepared to support you; everyday, everywhere. Ask us how we can help you with all your filtration needs.

Donaldson is the recognized leader in quality replacement filters, offering the largest selection of **in-stock, ready-to-ship** replacements for:

Hydac	Eppensteiner
Parker	Internormen
Mahle	MP Filtri
Pall	PTI
Schroeder	Argo Hytos

Donaldson products are engineered to fit many applications, including those used in the most common wind turbine manufacturers such as: Vestas, Gamesa, GE, Enercon, Siemens, Suzlon, Mitsubishi, Clipper, and others.

About Donaldson Company

For more than 90 years, Donaldson Company has had a single focus – providing the most effective filtration solutions on the market. In critical applications like military equipment, construction equipment, passenger airliners and power generation, it's Donaldson filters protecting equipment that must run every time!

Exceptional customer service is a hallmark of Donaldson. When you call us, a person in our headquarters answers the phone. Not a distant

call center, not an automated system. A real person, who can really find the answers you need – right now!

Donaldson sees every customer as a partner – a company counting on us to provide the best filtration solution available. It's why we provide the highest quality filter products on the market, why we offer world-class service and why you can relax knowing that Donaldson is helping protect your critical equipment.



Donaldson
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