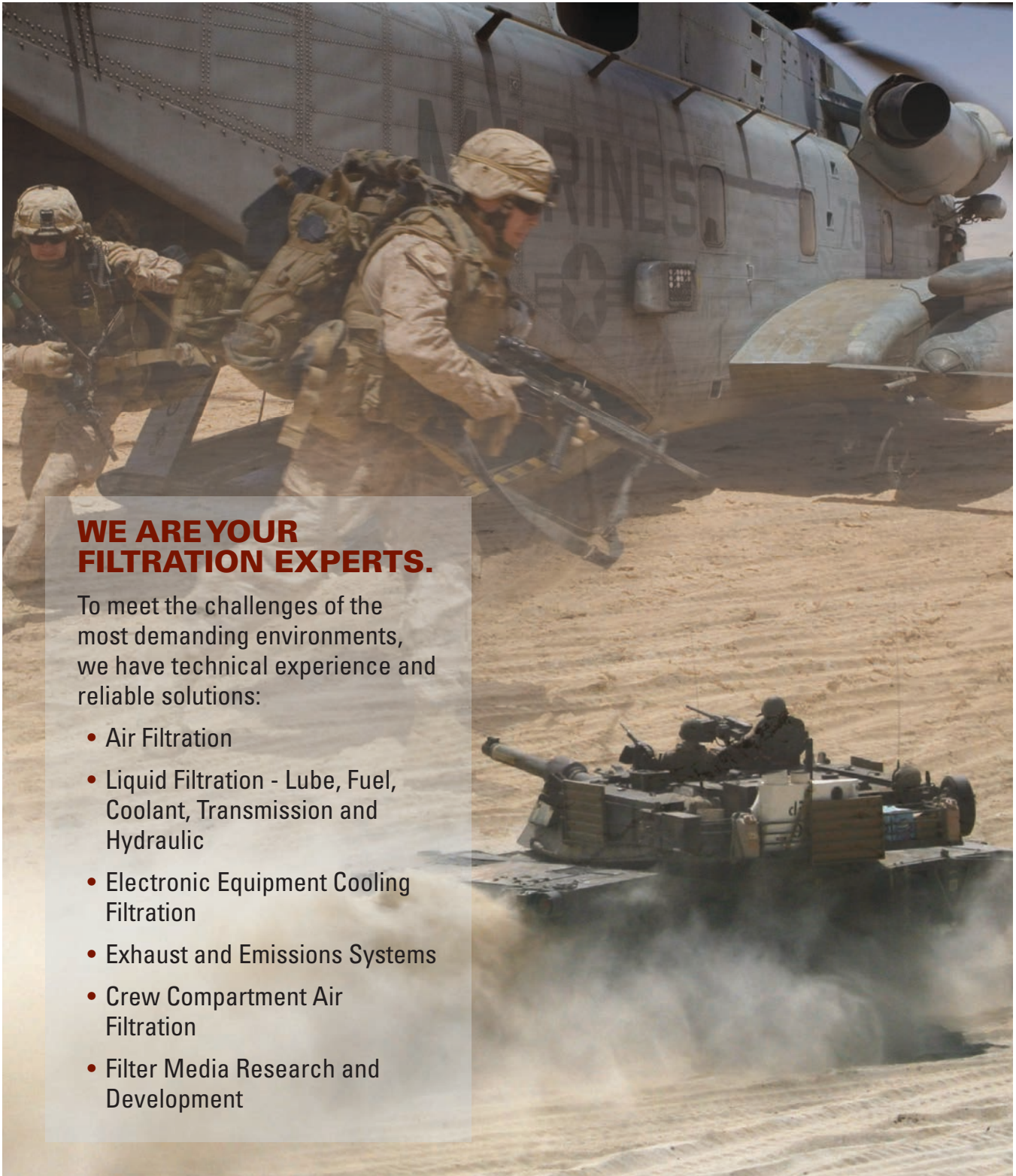




WE'RE THERE WHEN THEY NEED US

Filtration Solutions For The Defense Industry



WE ARE YOUR FILTRATION EXPERTS.

To meet the challenges of the most demanding environments, we have technical experience and reliable solutions:

- Air Filtration
- Liquid Filtration - Lube, Fuel, Coolant, Transmission and Hydraulic
- Electronic Equipment Cooling Filtration
- Exhaust and Emissions Systems
- Crew Compartment Air Filtration
- Filter Media Research and Development

About Donaldson

Donaldson Company, Inc. is a leading worldwide manufacturer of filtration systems and replacement parts. Our product mix includes air and liquid filters and exhaust and emission control products for mobile equipment; in-plant air cleaning systems; air intake systems for industrial gas turbines; and specialized filters for such diverse applications as computer disk drives, aircraft passenger cabins and semiconductor processing. Products are manufactured at more than three dozen manufacturing facilities around the world.

The UH-60 Black Hawk performs a wide range of missions, including the tactical transport of troops and aeromedical evacuation around the world. Donaldson products are key to their successful operation.



Donaldson Defense

As part of Donaldson, the Aerospace & Defense group offers a wide-ranging product line designed to protect critical military equipment and vehicles. Donaldson began manufacturing filtration products for the military during World War I. We have established a dedicated team to provide the special expertise required for defense and military applications. Over the past 10 decades, Donaldson's reputation for precision engineering, innovative design, on-site quality testing and for aggressively meeting military requirements, has continued to win our company a position as the premier filtration supplier for defense industries worldwide.

What Makes Donaldson Defense Products Superior?

We have a dedicated applications team that provides special expertise to help keep critical military equipment running efficiently and reliably in the most demanding environments. We design technically superior products that best suit your applications and requirements. Our research and product development facilities are some of the best in the industry. Look to us for thoroughness and reliability in testing and quality control facilities.

In-House Test Facilities

We're your partner in ensuring that our filtration solutions are right on target. That's why our testing labs fully support the broad range of testing requirements we need to analyze filtration needs and verify product performance. Here are highlights of our testing capabilities:

- Environmental test laboratory: tests shock vibration, tensile compression strength, temperature, humidity and salt spray to MIL-STD-810 requirements
- Flow bench test laboratory: a climate controlled custom airflow bench laboratory specifically built for military and defense products that includes seven flow test stations, ensuring maximum data accuracy under a variety of conditions and military specifications
- Fluid filter laboratory: this special lab is used to test for structural integrity, multi-pass efficiency and capacity
- High flow test bench laboratory: a large, single-source test area that is used for full-scale qualification testing of high-flow products (up to 20,000 cfm)
- Dynamometer and anechoic chambers

Analytical Test Systems

Our analytical labs include a full complement of chemical test equipment, optical and scanning electron microscopes, laser particle counters and gas chromatography equipment.

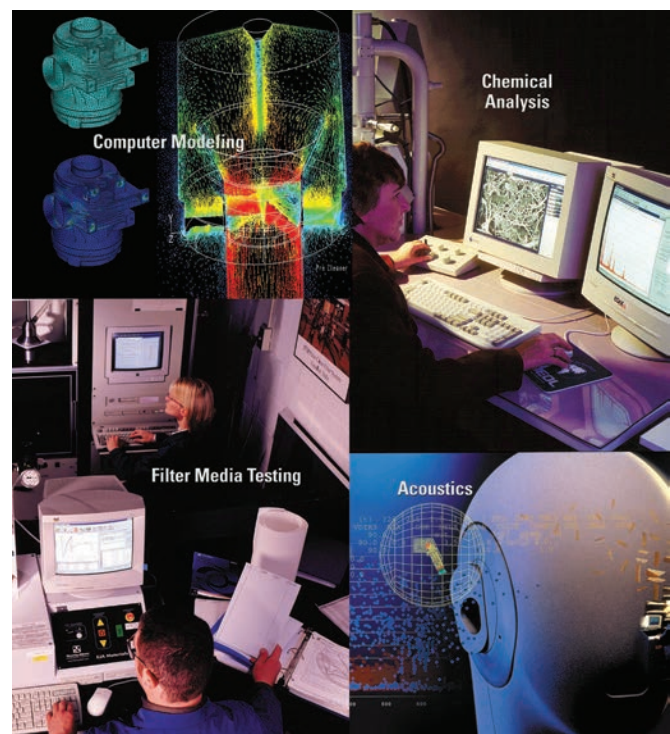
Donaldson has extensive research and product development facilities – some of the best in the industry.

Prototype Filter Media Manufacturing Facility

Unique to the industry, our prototype filter media manufacturing facility offers us capability to develop and test numerous media formulations. That's how we develop our proprietary media grades for advanced applications.

Structural, Acoustic and Flow Modeling Capabilities

Using advanced computer systems, Donaldson technical staff analyze and optimize filter designs and exhaust system solutions.



Donaldson continues to support the defense

1910s

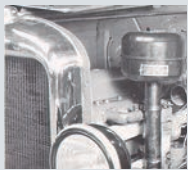


World's first air cleaner invented by Frank Donaldson

1920s

Leon Le Bozec and Georges Gautier collaborated on their patents in the field of fuel and fluids controls. Their collaboration led to the creation of a large number of products for the automotive and aviation industry.

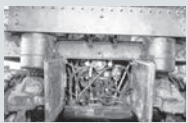
1930s



Donaldson issued patent for oil-washed air cleaners



Exhaust systems and air cleaners appeared on 5-ton military trucks and artillery tractors



Air cleaner installed on M3 tank

1940s



Donaldson product line diversified to include bayonet holders, Bomber gun sights, crankcase valves and ammunition box liners; workers in their welding gear shown

1950s

Developed innovative dry-type air cleaners and filters



Catalytic air cleaner on B-52 Bomber



Donaclone® particle separator on the M60 Tank



Air cleaner with Donaclone on M109 Self-Propelled Howitzer



Donaclone "fender" installation on M48 Tank

1960s

WESTERN FILTER

Western Filter was founded, developed their first liquid filter



EAPS on OH-6A army helicopter



Introduced Strata™ Tubes on CH-53 helicopter



Air cleaner and muffler on the M113 Personnel Carrier family of vehicles

1970s



Air cleaner and muffler on M113A2 Armored Personnel Carrier



Air Cleaner and muffler on M88A1 Recovery Vehicle

1980s



Synteq™ filter media developed for lube and hydraulic filters



Donaldson developed line of engine liquid filters



Oil conditioning system for the tilt-rotor V-22



Developed main hydraulic filter assembly for M1A1 tank



Air cleaner and muffler on AAV7A1 Amphibious Assault Vehicle



Air cleaner and muffler on Bradley M2/A3 Fighting Vehicle

industry with high performance solutions.

1980s continued



Air cleaner and muffler for LAV (Light Armored Vehicle) Family of Vehicles

Strata panel filters on the LCAC Hovercraft



Air cleaner and muffler on MLRS (Multiple Launch Rocket System)



Donaldson developed Nuclear, Biological and Chemical (NBC) Shelter air filtration

Supplier for main fuel filter on LeClerc Tank (Nexter)

1990s



Aerospace Filtration Systems started developing helicopter engine barrier filters



Le Bozec Filtration & Systems became an independent company



Provided cabin air filters and environmental control systems (ECS) filtration on C17 Globemaster Transport

1990s continued



Developed Donaldson PowerCore® Filtration Technology



Exhaust system and 200-hour air cleaner on the FMTV



RadialSeal® air filters for Gen Sets



Donaldson pioneered nanofiber filtration with Ultra-Web®

Nanofiber Filtration, used in Pulse Jet Air Cleaner (PJAC™) on M1 Abrams tank

2000s



Acquired Le Bozec Filtration & Systems, Aerospace Filtration Systems, Inc. and Western Filter



Inlet Barrier Filter - First fully-integrated inlet barrier filter qualified by the US Army

Donaldson provided first dry media barrier filter for the V-22 Shaft-Driven Compressor



Warrior and CVRT vehicles retrofitted with Donaldson Ultra-Web® filters



2000s continued

Developed self-cleaning PJAC™ Ultra® for military vehicles; initially installed on the Freightliner M915A5



Donaldson launched first PJAC in Europe on the Terrier vehicle



Donaldson provided air cleaners for the Missile Resistance Ambush Protected (MRAP) family of vehicles

Introduced RadialSeal™ and Ultra-Web® Technology to the UK MOD on the Land Rover Snatch



Auxiliary Power Unit Inlet Barrier Filter developed for Army UH-60 Black Hawk, CH-47 Chinook and AH-64 Apache helicopters; developed main engine barrier filter for UH-60 Black Hawk

FMTV gets an upgrade with Catalytic Converter Mufflers (CCM) or Diesel Oxidation Catalysts (DOC)



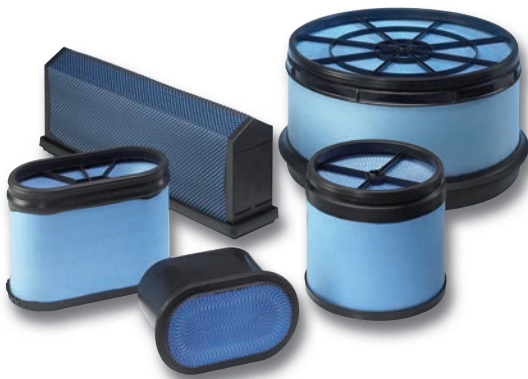
Selected to provide Sikorsky with integrated engine particle separators on the CH-53K



Donaldson Strata™ Tubes protect critical electronics in TPQ-36 radar

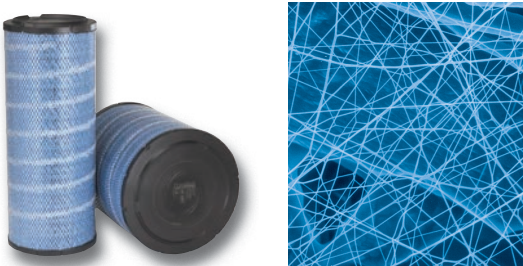
Demand Donaldson for Meeting the Most Rigid Filtration Specifications

Our defense customers tell us we're innovators, capably and reliably providing them with the filtration systems they require. We are specialists in custom design. For example, our prototype filter media manufacturing facility is unique, allowing us to develop and test media formulations that suit every filtration problem. Depending on each application's requirements we can choose from a wide assortment of media materials – including cellulose, polymeric, glass, fire retardant and electrostatically-charged media. Below are highlights of our leading filtration products.



PowerCore® Filtration Technology

With more streamlined designs, stricter exhaust emissions regulations and increased horsepower, today's heavy equipment and vehicles are running hotter in a more confined amount of space. To meet demands for a compact, high-performance air filtration solution, consider PowerCore Filtration Technology. As an alternative to larger-sized conventional filters, it's straight-through airflow configuration and high-density filtration system reduces system restriction and extends filter life, reducing overall maintenance costs.



Ultra-Web® Nanofiber Filtration

Nanofiber filtration causes sub-micron contaminant to load on the surface of a filter rather than dispersing throughout the depth of the filter media where there is less area for the air to flow. The smaller, interfiber spaces of Ultra-Web have higher filter efficiency and can hold up to five times more contaminants than cellulose filters. Ultra-Web filtration provides superior engine protection and is ideal for extending filter service intervals.



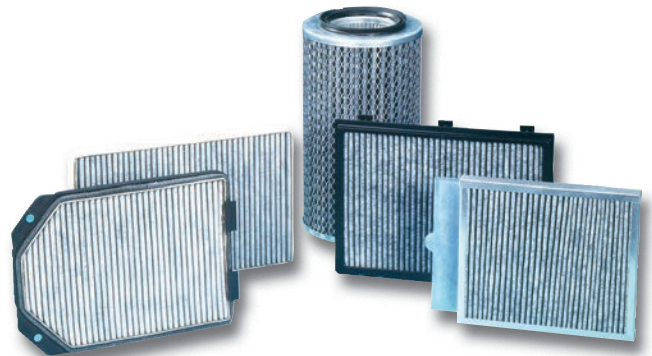
Pulse Jet Air Cleaner (PJAC™)

PJAC is a self-cleaning filtration system for the most demanding environmental conditions giving you optimal reliability and reduced fuel consumption.



Inertial Particle Separator Systems with Strata® Tubes

Air particle separators with Donaldson's specially designed Strata Tubes spin contaminants out of incoming air, providing reliable, low maintenance air filtration for every space requirement and performance level. Easily combined with other filtration methods, Strata Tubes help make highly effective, low cost filter systems that remove up to 99% of contaminants from the air stream.



Barrier Filters and Air Cleaners

Barrier filters like Vee-Pac™, round, Konepac™ conical and panel filters meet stringent efficiency, weight and space requirements. We have more than 50 years of experience designing and supplying barrier filters and air cleaners for military aircraft and vehicles requiring high performance filtration. Our filters can be designed in a variety of sizes and filter media choices to meet your system specifications.



Liquid Filters – Lube Oil, Coolant, Fuel, Transmission and Hydraulic

Heavy-duty engines are built to last longer and to withstand more severe operating conditions. These improvements demand liquid filtration with design characteristics that optimize performance. Donaldson provides an extensive line of liquid filtration for main engine, APU and hydraulic systems. Our filtration ranges from filters to complex manifolds with indicators, valves and sampling ports.



Emission and Exhaust Systems

We're focused on developing integrated solutions to meet current and future regulatory emission standards around the world with products like Catalytic Converter Mufflers (CCM) and Diesel Oxidation Catalysts (DOC). Our mufflers, silencers and exhaust systems reduce noise and back pressure, increase fuel economy and extend service life. Whether you need a replacement muffler, total emission system design assistance, or are looking for ways to improve product performance and durability – we're ready today!

We can custom design to achieve:

- the **RIGHT** filter media choice
- the **RIGHT** combination of efficiency, pressure drop and loading
- the **RIGHT** performance, reliability and durability
- the **RIGHT** configuration

Donaldson...
The RIGHT choice!

The Specialized Filtration Expertise You Expect

We design filters and exhaust systems for extreme environments – anything the world can throw at us. Our products have been used worldwide in the roughest military applications, proficiently filtering air, lube oil, fuel, transmission fluid and hydraulic fluid, as well as reducing noise, exhaust and emissions.

A critical job of the military and its equipment is to deliver tactical supplies, equipment and troops in any weather, environmental and operating condition. Donaldson filtration products can help.

Demand Donaldson.



Photos in the timeline can be credited to the Department of Defense, General Dynamics Land Systems and Sikorsky. Some photos included in this brochure have been digitally altered.



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