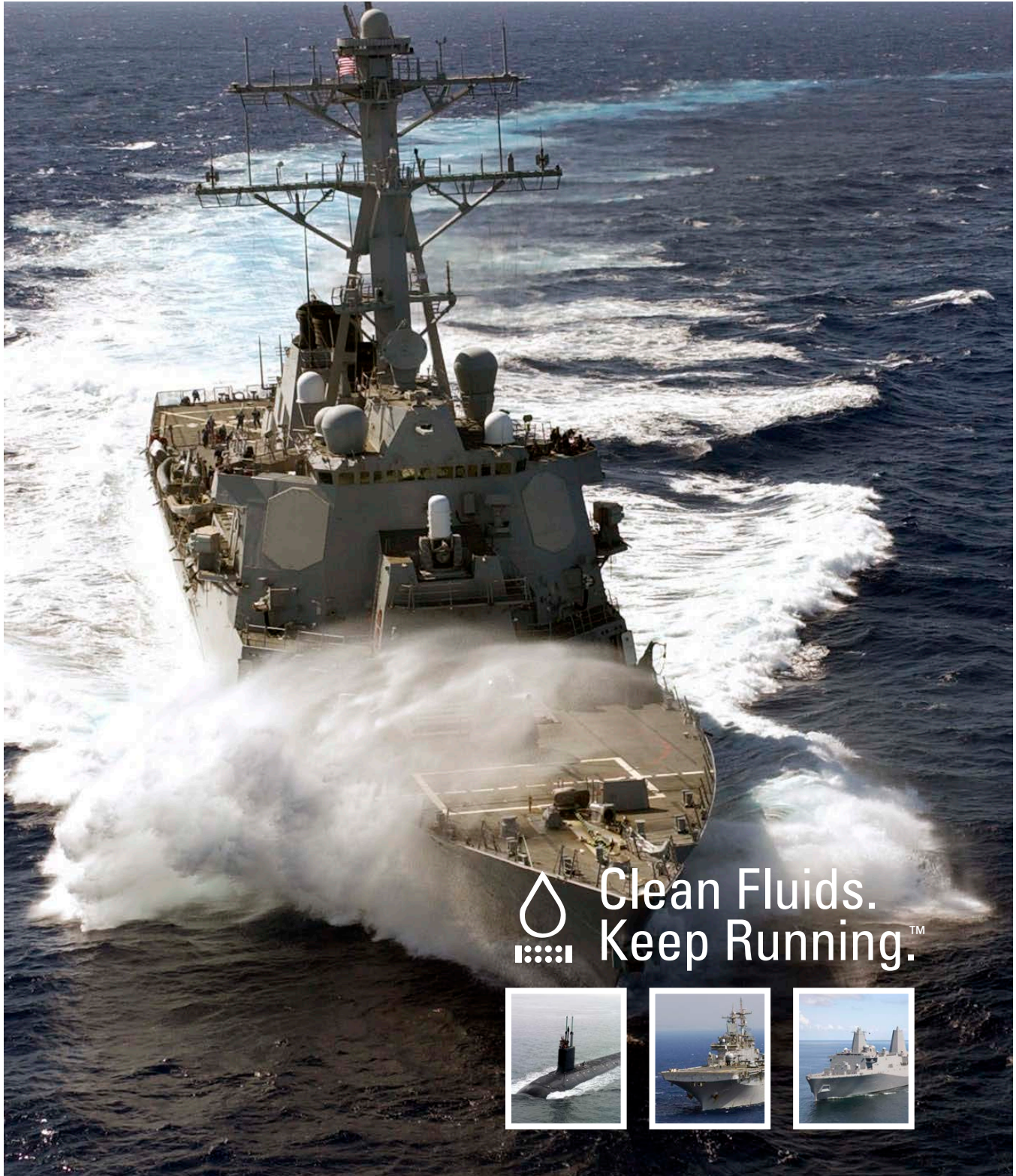




Donaldson
FILTRATION SOLUTIONS
AEROSPACE & DEFENSE

Filtration Solutions

In Naval Applications



Clean Fluids.
Keep Running.™





Proven Solutions for Protecting Critical Shipboard Systems

At Donaldson we are the acknowledged industry leader in the design, development and production of high performance filtration systems. In 1915, Frank Donaldson fielded a pioneering system to filter dirt and dust from tractor engines, keeping those critical machines running on farms. Since then, the Donaldson Company has developed filtration solutions to ensure the safe, reliable performance of critical military platforms in the most demanding environments. Today, our solutions protect onboard hydraulic, lubrication, pneumatic, transmission, fuel, air, exhaust, and environmental control systems on military equipment deployed throughout the world.

Our defense customers tell us we're innovators. To meet their requirements, we apply that century of experience and expertise in technological advances, choosing from an assortment of systems and media materials (cellulose, polymeric, glass, fire-retardant and electrostatically-charged). At our unique prototype filter media manufacturing facility, we develop and test media formulations that address most filtration problems. Through our global design and logistics network, we support the development, procurement, production, deployment and sustainment of operational filtration systems to the highest military standards.



There is no margin for error at any latitude, depth, altitude or operating environment. Donaldson's in-house test facilities fully support the broad range of testing requirements needed to analyze filtration needs and verify product performance. From environmental and flow-bench to structural integrity, multi-pass efficiency and capacity testing, we work with customers to ensure the performance and reliability of our advanced filtration solutions. Our analytical labs include a full complement of chemical test equipment, optical and scanning electron microscopes, laser particle counters and gas chromatography equipment.

Donaldson leads the way in high performing, efficient filtration solutions for your needs and requirements.

Industry Shaping Technology

Advanced Media Technology for Optimal Filtration Performance

Donaldson offers extensive filter media technology choices for hydraulic filters – over 35 different formulations. These multiple formulations enable our engineers to develop filtration systems that meet or exceed a wide variety of customer specifications.

Synthetic media captures more and smaller contaminants than cellulose media. When an application requires higher efficiency filtration than what cellulose filter media can deliver, Donaldson uses Synteq™ synthetic media technology.

We use a variety of techniques to enhance filter media so it can withstand the high differential pressures found in typical hydraulic systems. Oven-curing, wire backing and multiple layers all contribute to our media integrity.

Synteq XP™ Synthetic Media



Synteq XP.

Synteq XP™ is a breakthrough in synthetic filter media technology that takes hydraulic filtration to the next level. It is the next generation of Donaldson Synteq media, designed to increase filter dirt holding capacity and reduce pressure drop.

Synteq XP media technology uses a resin-free bonding technique to provide improved filtration characteristics, including:

- Enhanced hydraulic system component protection
- Lower operating pressure drop
- Longer filter life – 2 to 3 times that of traditional cellulose filter media
- Higher filtration efficiency
- Versatile packaging

DT Synteq™ Synthetic Media (High-Performance)

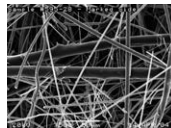


DT Synteq™

DT grades of Synteq media utilize a blend of borosilicate glass fiber whose matrix is bonded together with an epoxy-based resin system. Donaldson filter media scientists found this to provide the best available chemical resistance for the broadest array of hydraulic applications. DT Synteq is ideal for use with phosphate ester and water glycol fluids.

Synteq™ Synthetic Media

This media's uniform synthetic fiber structure delivers higher filtration efficiency and longer filter life. Synteq filter media technology is ideal for synthetic fluids, water glycols, water/oil emulsions, HWCF (high water content fluids) and petroleum-based fluids. The smooth rounded fibers provide low resistance to fluid flow.



Cellulose Media

This media often has lower beta ratings, providing effective filtration for a wide variety of petroleum-based fluids. The smaller pores result in greater flow resistance, in turn causing higher pressure drop.

Water Absorbing Media

This media is formulated with absorbents and resins to remove moisture and condensation from petroleum-based fluids.

Wire Mesh Media

Stainless steel wire mesh is used to catch very large, harsh particulate that would rip up a normal filter. This media is also useful as a coarse filter in viscous fluid applications.

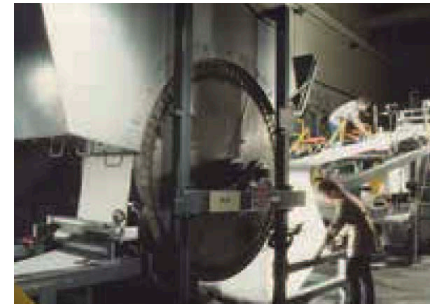


Filter Media Design & Development

From traditional cellulose to synthetic – the development of proprietary filtration substrates is at the heart of every Donaldson filtration system. If one of our existing media formulations does not meet your specifications, our scientists use our in-house media development laboratory to develop new formulations that meet or exceed your requirements.

Media Characterization Testing

- Permeability
- Tensile strength
- Mullen burst
- Basis weight
- Pore size
- Thickness
- Gurley stiffness
- LEFS bench
- 3-Point bend



In-House Media Mill

- For application development
- Trial media production runs
- Development of proprietary formulations

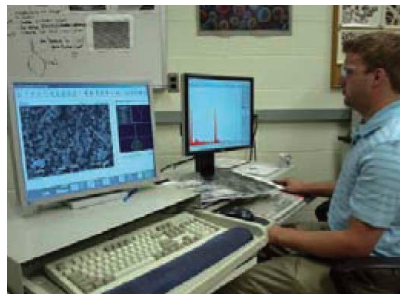
Filtration Performance Testing

- Particle counting
- Multi-pass testing
- Water removal efficiency

Enhancing filtration capabilities through advanced technology



Donaldson has pioneered the use of a wide range of engineering, design and testing tools used during the product development and validation process.



Engineering capabilities

- Design centers in key locations – Valencia, CA; Bloomington, MN; St Louis, MO; Paris, France

Prediction and simulation

- CAD
- Media modeling
- Fluid mechanics
- Structural analysis
- Thermal analysis

Quality assurance

- All facilities are ISO/TS certified
- AS9100 Rev C
- NADCAP
- On-site verification test units and equipment
- Manufacturing dates for tracking and warranty
- Full traceability of all materials

Development and validation

Filter performance testing

- Particle counting
- Multi-pass testing
- Water removal efficiency
- Flow fatigue
- Media migration
- Differential versus flow pressure

Filter assembly durability

- Filtration performance testing per applicable MIL, SAE and ISO standards
- Environmental conditions
- Flow fatigue
- Flow benches
- Gravimetric analysis

Test and evaluation

Structural Analysis

- Per SAE, ISO and NFPA standards
- Pressure fatigue
- Hydrostatic burst
- Vibration
- Collapse
- Impulse testing

Environmental testing

- Extreme temperature
- Salt spray
- Thermal cycling

Rapid prototyping

- SLA, SLS
- Investment casting
- RTV molding

Donaldson Valencia Capabilities

Leader in designing and manufacturing liquid filters

Donaldson's facility in Valencia, California is one of a select few fluid filtration component and system manufacturers that hold approvals from the U.S. Navy to produce the full-line of low-and high-pressure hydraulic, pneumatic, fuel and environmental system fluid filters.

Donaldson Valencia is also the primary supplier of unique, custom filtration solutions for the Navy. Our engineers routinely work with Naval representatives and architects. We modify existing systems and create clean-sheet filtration solutions for special fluid cleaning applications aboard surface vessels and submarines.

While other companies have attempted to "reverse-engineer" filters that equal what we have been providing to the U.S. Navy, the truth is no other product can match the unsurpassed fluid-cleaning capabilities found in Donaldson filters.



Donaldson Valencia's state-of-the-art manufacturing and testing facility enables us to consistently produce an array of high-quality hydraulic fluid filtering components for use onboard a variety of U.S. Navy surface vessels, as well as Los Angeles, Seawolf, and Virginia Class submarines.

Simplex

- Single bowl, single element
- Rated Flow: 50 gpm
- Operating Pressure: 3000 psig
- Proof Pressure: 4500 psig
- Rated Fatigue Pressure: 3000 psi
- Material: Aluminum and Stainless Steel
- Fluid: MIL-PRF-17331
- Filter Element (1): B-size per MIL-DTL-24402 or SAE J2321
- Options: Indicator; Bypass Valve



Triplex

- Three elements
- Removable lid enables easy element replacement
- Rated Flow: 150 gpm
- Operating Pressure: 400 psig
- Proof Pressure: 900 psig
- Material: Stainless Steel
- Fluid: MIL-PRF-17331
- Filter Elements (3): B-size per MIL-DTL-24402 or SAE J2321
- Options: DP Gauge; Bypass Valve



Duplex

- Dual bowl, dual element
- Rated Flow: 100 gpm
- Operating Pressure: 3000 psig
- Proof Pressure: 4500 psig
- Rated Fatigue Pressure: 3000 psi
- Material: Aluminum and Stainless Steel
- Fluid: MIL-PRF-17331
- Filter Element (2): B-size per MIL-DTL-24402 or SAE J2321
- Options: DP Indicators or DP Gauges; Bypass Valve



Quad

- Four bowls, four elements
- Rated Flow: 190 gpm
- Operating Pressure: 1000 psig
- Proof Pressure: 2000 psig
- Material: Aluminum
- Fluid: MIL-PRF-17331
- Filter Elements (4): B-size per MIL-DTL-24402 or SAE J2321
- Options: DP Indicator; Bypass Valve



The leading shipboard fluid filtration supplier to the U.S. Navy.

The middle of the ocean is no place to have foreign object and contaminant buildup shut down critical shipboard systems. That's why the U.S. Navy puts its trust in Donaldson filters and filtration systems. Our products have been keeping lubrication, hydraulic, pneumatic, transmission, fuel, air, exhaust, and environmental control fluid systems aboard Naval surface vessels and submarines clean and contaminant free for decades.



Performance Under Any Pressure

- 100-years of fluid filtration experience
- Low-, medium- and high-pressure fluid filtration systems
- Spin-on, cartridge and in-tank style filters
- Meets stringent MIL Spec qualification standards
- Customizable to meet all shipboard fluid filtration requirements
- Supported by a global network of service providers



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Donaldson Company, Inc.
Aerospace & Defense Group

www.DonaldsonAerospace-Defense.com
www.donaldson.com

Donaldson Defense +1-877-314-9637
defense.americas@donaldson.com
Europe +33-1-30866698
aerospace.amea@donaldson.com

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