



# 4x Cleaner Fuel

## THAN THE BEST COMPETITIVE FILTER



**Clean fuel minimizes expensive repairs and unplanned downtime** – it's better for high pressure common rail (HPCR) fuel systems, including injectors, pumps, and engines.

Donaldson  
**BLUE**



## SELECT™ OEM Filtration Technology

### Protect your Investment with Donaldson's Most Advanced Filtration Technology

Donaldson SELECT filtration technology provides the latest fuel filtration advancements and industry-leading protection for Original Equipment Manufacturers. The modular SELECT product line offers highly configurable components that can be packaged with our advanced Synteq XP™ Media Technology – or with other Donaldson media offerings – to address today's most complex fuel challenges.

### Better Fuel Filtration is Key for Modern Fuel Systems

Today's diesel engines need to maintain high performance levels to remain compliant with stringent Tier 4 Final and Euro 5/6 emissions regulations. Fuel filtration plays a key role, with modern high pressure common rail (HPCR) fuel injectors operating at pressures up to 30,000 - 45,000 psi (2,000 - 3,100 bar). This means it's important to deliver clean and dry fuel to today's highly engineered fuel system pumps and injectors to maintain performance.

Modern HPCR fuel systems require extremely clean fuel delivered under the most severe operating conditions. Advanced media technologies are required to protect highly pressurized and sensitive fuel systems from water and contaminants, particularly under dynamic, real-world operating conditions.

As your filtration partner, Donaldson has the expertise and technical capabilities to navigate the challenges of today's fuels and fuel systems. Our modular SELECT product line gives you access to our most advanced filtration technology designed for specific equipment and applications, with your customers' geographic location in mind.

## Synteq XP™ Media Technology

Donaldson proprietary Synteq XP filter media for Tier 4 engines takes fuel filtration performance to a whole new level by providing enhanced engine and system component protection.

### Primary Filtration

#### Multi-Stage Coalescing Synteq XP Media

Water in fuel is a complex challenge for modern HPCR fuel systems. Water damage can result in corrosion, rust and pitting.

Donaldson Synteq XP coalescing technology offers:

- Remove more water – both coarse and emulsified
- Perform consistently over the life of the filter

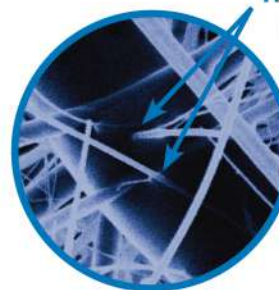
### Secondary Filtration

#### High-Efficiency Synteq XP Media

Synteq XP offers industry-leading contaminant removal and retention for secondary filtration – all under the dynamic operating conditions that your engines and equipment experience every day.

Donaldson Synteq XP technology offers:

- Higher efficiency for optimal engine protection, or
- Extended filter life
- Versatile and smaller filter configuration options



### Resin-free, thermally bonded fibers

*Synteq XP media creates small, consistent inter-fiber spacing – increasing filter capacity. These unobstructed pores result in reduced pressure drop and increased surface area for capturing and retaining smaller particles.*





## Diesel Engine Fuel Filtration Systems

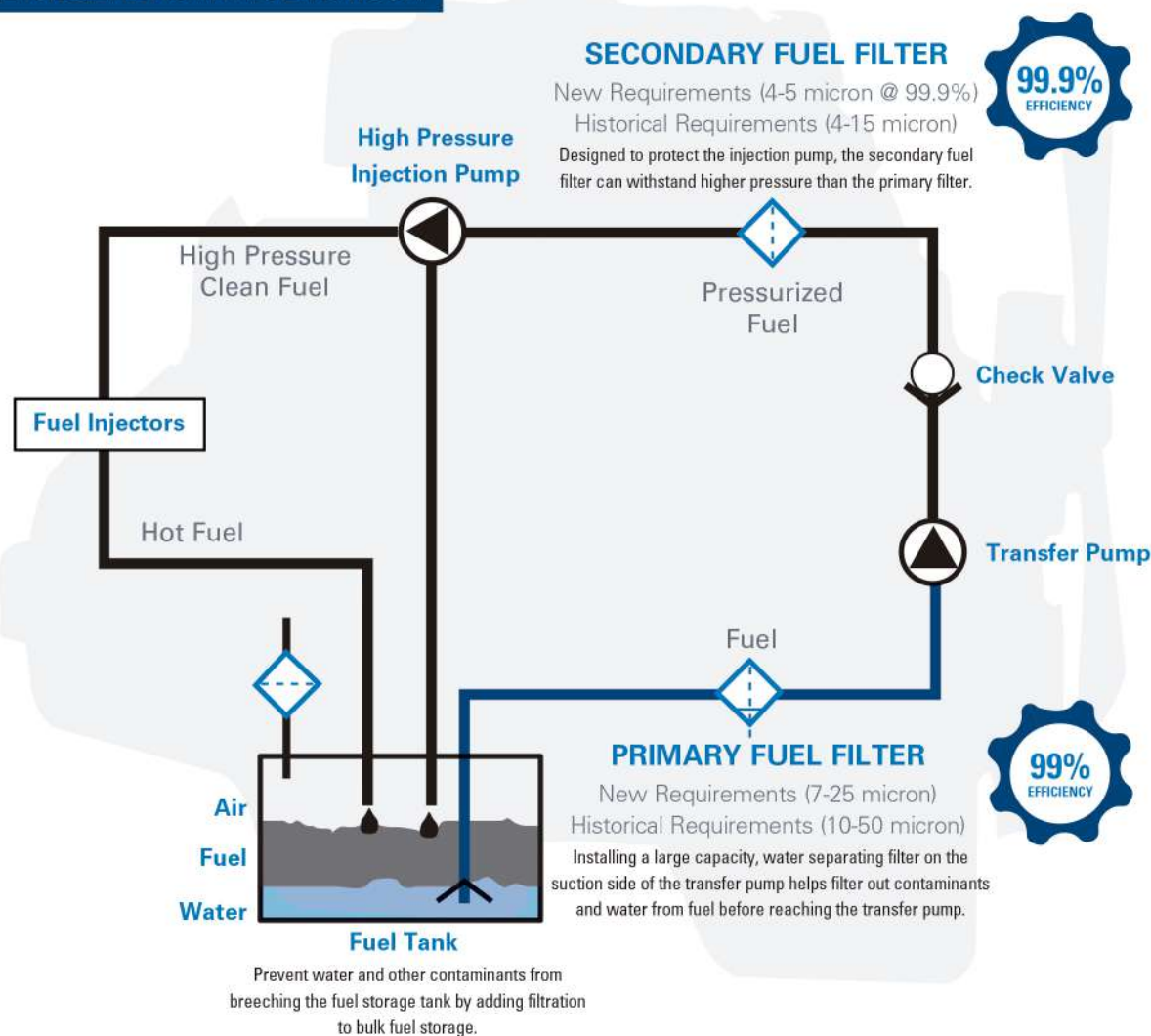
Diesel fuel and diesel fuel systems are ever-changing technologies. Over the past decade, numerous emission standards and engineering achievements provided some of the most advanced, clean, and flexible engine designs, yet the advancements have also included the acceptance of alternative forms of fuels such as biodiesel.

Fuel filter performance and technology have also been challenged by these rapid changes. Today secondary filtration demands 4-5  $\mu\text{m}$  absolute efficiency at 99.9%, while matching with an upstream primary filter of 7-25  $\mu\text{m}$  at 99% efficiency (per ISO 19438). These changes come with the expectation that water separation, filter efficiency and life remain constant or are improved upon. Donaldson engineers have proven to be up to this challenge through the advancement of media technologies.

Fuel filtration today is an integral part of the complete fuel system. A well designed fuel system takes contamination control into account from the beginning. Water separation, particulate and non-traditional contaminants need to be controlled. Engineers must be conscious of the relationship between the fuel circuit design and overall system cleanliness.

Global fuel quality concerns are critical and end user needs need to be understood. Documentation such as the World Wide Fuel Charter exists to promote convergence of various regional practices. Fuel system design type, preferred alternate fuels and maintenance practices must be taken into account during the design process. Providing lasting, high quality fuel filtration solutions to our customers is our goal at Donaldson.

### TYPICAL DIESEL ENGINE FUEL CIRCUIT





## Filter Media

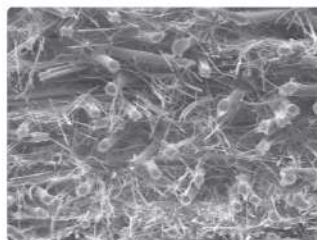
Filtration media represents the foundation of any filter design. Mastering the science of media creation is a key focus at Donaldson. The media representations below highlight some of the more commonly used media types in this evolving industry.

Today's engines are built with more stringent specifications and finer tolerances. Fuel systems, pumps and injectors require cleaner fuel to achieve better combustion and lower emissions. That's why the latest advances in filter media can make the difference between engine power and engine problems.

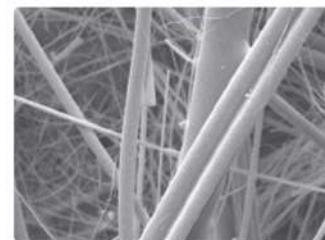
### PRIMARY FILTRATION

#### Synteq™ Synthetic Media

Donaldson's Synteq fuel filter water separator media uses both cellulose and a melt-blown synthetic layer to achieve the highest levels of fuel filtration performance. This double-layered media increases particulate holding capacity and is a high performance water separator. It has the ability for high efficiency emulsified water separation and can be used in both suction and pressure sides of fuel systems.



SEM 100x

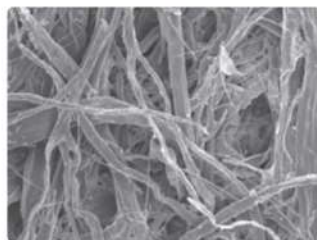


SEM 600x

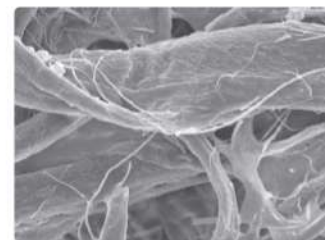
The polyester layer improves water separation and dirt holding capacity performance. This media is ideal for critical applications or extended service intervals.

#### Cellulose Media

This fuel filter water separator media is a treated cellulose base material. Treating a cellulose media with a silicone based treatment allows for effective water separation. Typically, this media is used on the suction side of the fuel system to remove harmful water and coarse particulate contaminant.

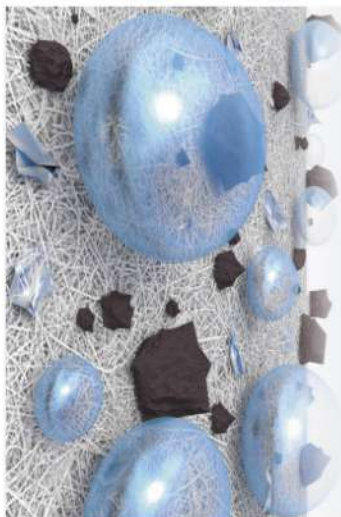


SEM 100x



SEM 600x

Water coalesces on the media and drains to the bottom of the can or water collection bowl. Particulate is then trapped and held in media.



#### Why remove water in fuel?

Water, both coarse and emulsified, must be removed from the fuel to maximize fuel system performance and service life.

Water in fuel can prematurely wear and oxidize the components within the fuel injectors, leading to:

- Rusting and corrosion of components
- Governor/metering component failure
- Sticky metering components (both pump and nozzle)
- Injection component wear and seizure
- Reduced lubrication



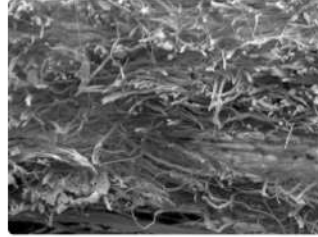


## SECONDARY FILTRATION

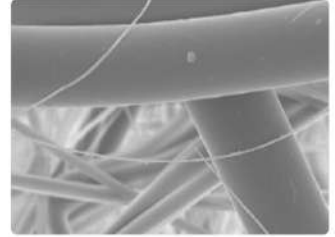
### Synteq XP™ Synthetic Media

Donaldson's high-performance Synteq XP media was developed specifically to overcome the evolving challenges of today's fuels. This ground-breaking filter media takes fuel filtration performance to a whole new level by providing higher efficiency for optimal engine and system component protection.

The Donaldson Blue® line of fuel filters utilizes this advanced media formulation and is your best option for the cleanest fuel for secondary filtration.



SEM 100x

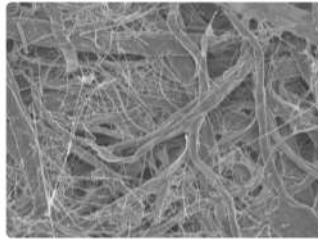


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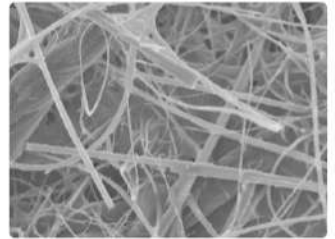
### Cellulose Media

This traditional fuel filter media is most commonly a pleated cellulose base material. This media is tested for compatibility with a variety of diesel fuels, including biodiesel and ULSD.

Larger particulates are trapped on outer layer, while finer particles are captured deeper in the media.



SEM 100x



SEM 600x