Donaldson®
Facet™

DIESEL FILTRATION
SOLUTIONS

Advancing Filtration for a Cleaner World



Precision Protection for the World's Most Critical Fluids

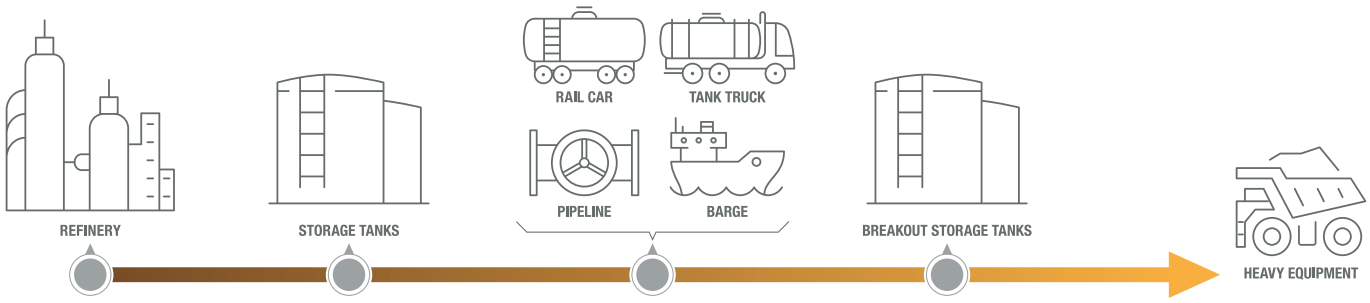
For more than 80 years, Facet has designed filtration and separation solutions to keep mission-critical fuels clean in the world's most demanding operating environments. Trusted by global airlines, naval fleets, and leading OEMs, Facet solutions are engineered to meet rigorous industry requirements, protect critical equipment, and perform reliably when failure is not an option.

From bulk terminals and fleet fueling to power generation and heavy equipment, Facet diesel solutions remove water and particulate throughout the fuel supply chain, protecting high-pressure fuel systems and helping keep essential operations moving.

THE IMPORTANCE OF CLEAN DIESEL

Diesel is transferred and stored many times before it reaches the equipment that depends on it. Water and particulate can enter during each transfer and accumulate during storage. Left unaddressed, contamination can interrupt operations, accelerate component wear, and degrade stored fuel.

CONTAMINATION ENTERS AT EVERY STAGE



Contamination introduced at one stage can be carried downstream to every stage that follows.

THE IMPACTS ARE SIGNIFICANT:

EQUIPMENT DAMAGE
- System corrosion
- Pump and injector wear
- Power loss

MICROBIAL GROWTH
- Component fouling
- Filter plugging
- Premature fuel spoilage

DOWNTIME & COST
- Unplanned downtime
- Emergency repairs
- Lost productivity

CONTAMINATION IS INEVITABLE. PROTECTING FUEL QUALITY IS ESSENTIAL.

FROM THE REFINERY TO THE ENGINE

The conditions that threaten fuel quality change across the diesel value chain. High-volume transfer, long-term storage, humid marine environments, and airborne dust each create unique contamination challenges. Effective fuel protection begins with understanding the conditions specific to each application.

UPSTREAM

Refining & Pipeline



Large volumes of diesel move through pipelines, storage facilities, and transfer points before reaching the end user. Water and particulate introduced during handling can be carried downstream, affecting product quality throughout the distribution system.

Terminals & Bulk Storage



As diesel is stored at terminals or in bulk onsite tanks, water accumulates, sediment settles, and microbial growth can develop wherever water and fuel meet. Without proper management, these contaminants are transferred downstream with the fuel.

POINT OF USE

Rail



Modern locomotives rely on high-pressure fuel systems with extremely small internal clearances. Fine particulate damages injectors, while water contributes to corrosion and fuel degradation. Effective filtration helps prevent contamination-related failures that take locomotives out of service.

Mining & Heavy Equipment



Mining and construction sites expose stored and dispensed fuel to heavy airborne dust, often in remote operating areas. Contamination plugs filters, damage fuel systems, and take production equipment out of service, directly reducing output.

Marine



Humid marine conditions contribute to condensation in tanks, while vessel motion redistributes water and sediment through the fuel. Controlling these contaminants helps protect fuel systems and supports reliable operation at sea.

Backup Power



Standby fuel may remain unused for months or years, allowing water and sediment to accumulate over time. Without preventive fuel management, contamination will restrict fuel flow and jeopardize generator startup when emergency power is needed.

While operating environments differ, the need for protection against water and particulate does not. Effective filtration helps preserve fuel quality, protect critical equipment, and support reliable operation throughout the diesel value chain.

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PROTECTING AGAINST PARTICULATE

AS LITTLE AS **ONE SPOONFUL OF DIRT** IN A FUEL TANK WILL RUIN A FUEL INJECTOR IN ONLY **8 HOURS**

WHY PARTICULATE FILTRATION MATTERS

Modern fuel systems demand microscopic cleanliness.

Common rail injector clearances are measured in single-digit microns, below the threshold of visible inspection.

Particulate causes multiple failure modes.

Abrasive wear, scoring, distorted spray pattern, and restricted flow all trace to the same cause.

On-engine filters should not be the first line of defense against contamination.

Without effective upstream filtration, excessive particulate loading can shorten on-engine filter life and require frequent changeouts.

Pre-filtration is essential for efficient water separation.

Dust and dirt loading degrades coalescer performance, leaving you susceptible to damage caused by both particulate and water contamination.

UNDERSTANDING DIESEL FILTER PERFORMANCE

MICRON RATINGS:

Micron ratings are common but misleading because manufacturers may publish either nominal or absolute ratings.

A **nominal rating** indicates that a filter retains a specified percentage of particles at or above the stated size, but that percentage can vary by manufacturer. One 10-micron nominal filter may retain 50% of particles 10 microns and larger, while another retains 90%.

Other filters have **absolute ratings**, which are commonly associated with at least 98.7% efficiency at the rated size.

Because these conventions are not applied uniformly, the micron number alone is not enough to compare filters. Without context, micron ratings tell you almost nothing about real-world performance.

BETA RATIOS:

Beta ratios provide objective, measurable filter performance data. Here's how to interpret them:

$ß_4 = 200$

For every 200 particles ≥ 4 microns entering the filter, only 1 passes through (99.5% efficiency)

$ß_4 = 1000$

For every 1,000 particles ≥ 4 microns entering the filter, only 1 passes through (99.9% efficiency)

While beta ratios tell you element efficiency, they don't quantify how much particulate actually remains in the fuel after it's been filtered.

To know that, you must use the ISO 4406 Code.

ISO 4406 CLEANLINESS CODES:

While micron ratings and beta ratios describe filter performance, ISO 4406 cleanliness codes measure the actual contamination level in fuel after filtration. ISO 4406 codes (like 18/16/13) report particle-count ranges per milliliter at 4, 6, and 14 microns. Lower numbers mean cleaner fuel. Each step down in the code cuts contamination in half – i.e. moving from 18/16/13 to 16/14/11 means **75% fewer particles** and a significant improvement in equipment protection.

The Worldwide Fuel Charter, published by a global committee of OEMs, recommends 18/16/13 or cleaner. Some high-pressure fuel systems specify even lower ISO codes to protect sensitive components and support long-term reliability.



FILTER ELEMENTS

Facet high-efficiency filter elements remove fine particulate throughout fuel storage, handling, and transfer, from refineries and bulk terminals to point-of-use dispensing.

We offer three element options designed around cleanliness targets, contaminant loading, and desired service interval.

Model	Media	Efficiency	Best for
DFI	Cellulose	$ß_x \geq 200$	General storage and transfer where dependable particulate removal is the goal
DFIX	Cellulose with extended area	$ß_x \geq 200$	Higher dirt loads, providing up to 20% longer service intervals than standard cellulose medias
DMG	Microglass	$ß_x \geq 1000$	Engine and injector OEM cleanliness targets, providing 2x the element life compared to standard cellulose medias

Specifications	
Standard Lengths	14" (356 mm), 18" (457 mm), 29" (737 mm), 36" (914 mm), 44" (1118 mm), 56" (1422 mm)
Micron Ratings	1, 5, 10, 25
Available Configurations	Double Open-Ended or Screw Base
Outside Diameter	6" (152 mm)
Inside Diameter	3.5" or 2.63" Options

TO SELECT THE BEST FILTER FOR YOUR APPLICATION:

1. Start with the ISO Cleanliness Code your equipment requires
2. Select the Beta Ratio that achieves that cleanliness level
3. Consider total cost of ownership, including service life and potential damage from contaminated fuel

REMEMBER:

The best filter isn't the one with the highest beta ratio or lowest micron rating – it's the one that consistently delivers the cleanliness your equipment needs to run reliably.

Cleaner fuel reduces injector wear, minimizes downtime, and helps maintain system performance. Measuring ISO cleanliness after filtration is essential to verifying fuel quality and filter performance.

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DEFENDING AGAINST WATER

PURE BIODIESEL CAN HOLD UP TO **10X MORE WATER** THAN 100% PETROLEUM DIESEL

ASTM D975 allows blends up to 5%, significantly increasing risk of contamination

UNDERSTANDING WATER CONTAMINATION

Free water levels change throughout the storage life of diesel.
Temperature swings cause condensation in tanks and fuel lines, even when fuel is delivered dry.

Microbial growth occurs at the fuel/water interface.
Microorganisms consume hydrocarbons and produce by-products that further degrade fuel and shorten shelf life.

Biofilms and sludge foul systems.
Deposits settle in tanks, plug fuel lines, and foul filtration equipment.

Facet offers two technologies for water removal: absorption or coalescing & separation. While both technologies remove water, it is important to understand their differences in order to select the best technology for your application:

ABSORPTION

As water and particulate load increases, the media swells and gradually restricts flow, ultimately shutting down the system and preventing contaminated fuel from passing downstream.

A rising differential pressure or decreasing flow rate indicates that the element has reached its capacity for solids, water, or both and must be replaced.

COALESCING & SEPARATION

The coalescing media combines small water droplets into larger ones. As the droplets grow, gravity pulls them out of the fuel and into the vessel sump, where the separated water collects until it is drained.

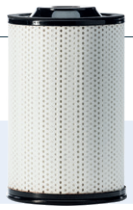
The fuel then passes through a hydrophobic separator, which blocks remaining water droplets while allowing fuel to continue downstream.

	ABSORPTION	COALESCING & SEPARATION
Response to Water	Media absorbs and retains water	Separates water to the sump
Consumable Cost	Typically higher	Typically lower
Changeout Interval	Typically shorter	Typically longer
OpEx Impact	Flow restricts and eventually shuts off, interrupting service and requiring manual intervention	Flow continues even in the presence of water, allowing for predictable changeout intervals
Best for	Fuels that resist coalescing or protecting against water slugs	Continuous, low-maintenance operation, even with high levels of water

Absorption retains water within the element. Coalescing separates water from the fuel and collects it in the vessel sump.

Water absorption requires rapid response.
Separation is better suited for continuous, low-maintenance operations.





ABSORPTION ELEMENTS

Our absorption elements remove particulate and water, with positive shutoff at capacity. They remain effective in fuels containing surfactants that can reduce coalescing performance.

Model	Standard Lengths	Outside Diameter	For use with
DAB	14" (356 mm), 18" (457 mm), 29" (737 mm), 36" (914 mm), 43" (1092 mm), 56" (1422 mm)	6" (152 mm)	DMV Series Vessels
DCA	9" (229 mm), 12" (305 mm)	6" (152 mm)	DMH Series Housings



COALESCER/SEPARATOR ELEMENTS

Built on more than 80 years of coalescing expertise, our coalescer/separator elements efficiently separate water from diesel through a two-stage process engineered for continuous operation in demanding applications.

NESTED ELEMENT DESIGN

Coalescing and separation occur within a single nested element.



Model	Standard Lengths	Outside Diameter	For use with
DCC	9" (229 mm), 12" (305 mm)	6" (152 mm)	DMH Series Vessels
DCI/DSI	20" (508 mm)	4" (102 mm)	DCV Series Coalescer/Separator Vessels and DRS Series Recirculation Systems
DCN/DSN	14" (356 mm) - 44" (1118 mm)	8" (203 mm)	DMV Series vessels and DIS Series In-Line Fueling Systems

PAIRED-ELEMENT DESIGN

A DCS coalescer pairs with a compatible separator. Choose from three separator options to match application requirements.



Stage 1: DCS Coalescer

Specifications	
Standard Lengths	14" (356 mm) 22" (559 mm) 33" (838 mm) 43" (1092 mm) 56" (1422 mm)
Micron Ratings	1, 5, 10, 25
Outside Diameter	6" (152 mm)

Stage 2: Separator Options



Model	Media
DSS	Synthetic Hydrophobic Mesh
DSP	Silicone-Treated, Pleated Paper
DST	Teflon® Coated Screen

Specifications	
Standard Lengths	14" (356 mm), 18" (457 mm), 29" (737 mm), 36" (914 mm), 43" (1092 mm), 56" (1422 mm)
Micron Ratings	1, 5, 10, 25
Outside Diameter	6" (152 mm)

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VESSELS

Facet vessels house the particulate and water-removal elements shown on the previous pages. Multi-purpose and dedicated designs, available in code and non-code configurations, allow the vessel and element to be matched to the application's contaminant, flow, installation, and certification requirements.

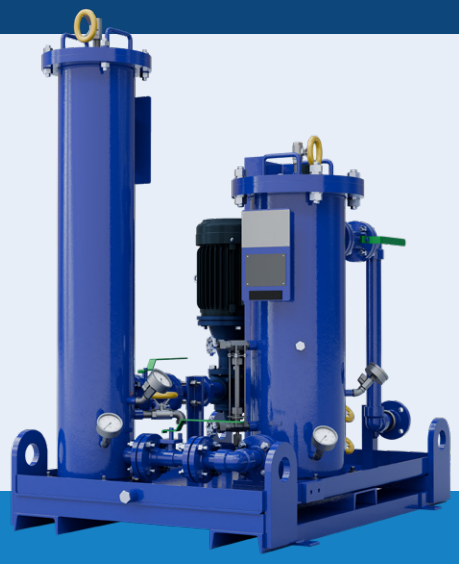
	Model	Function	Approx. Dimensions	Flow Range	Application Fit
	**DMH** MULTI-PURPOSE NON-CODE	Particulate Removal and/or Water Removal	Length: 8" (203 mm) Width: 8" (203 mm) Height: 16 - 20" (406 - 508 mm)	Less than 30 gpm (114 lpm)	Installations where space is limited or mounting is required. Easily integrated into larger systems.
	**DMV** MULTI-PURPOSE ASME CODE	Particulate Removal and/or Water Removal	Length: 12" (305 mm) Width: 12" (305 mm) Height: 35 - 65" (889 - 1651 mm)	30 - 200 gpm (114 - 757 lpm)	Applications requiring higher flow than the DMH in a compact ASME vessel. Reconfigures for particulate filtration, coalescing and separation, or absorption.
	**DCV** SINGLE PURPOSE ASME CODE	Water Removal	Length: 12-22" (305 - 559 mm) Width: 12-22" (305 - 559 mm) Height: 38 - 52" (965 - 1321 mm)	10 - 50 gpm (38 - 379 lpm)	Water-only applications or installations where particulate filtration is handled by a dedicated vessel upstream. Performs coalescing and separation in a single vessel.
	**DFV** SINGLE PURPOSE ASME CODE	Particulate Removal	Length: 9 - 36" (229 - 914 mm) Width: 9 - 36" (229 - 914 mm) Height: 62" (838 - 1575 mm)	50 - 800 gpm (189 - 3024 lpm)	Particulate filtration where water removal is not required or is handled separately. ASME-code construction for regulated environments.
	**DFV-N** SINGLE PURPOSE NON-CODE	Particulate Removal	Length: 9 - 36" (229 - 914 mm) Width: 9 - 36" (229 - 914 mm) Height: 62" (838 - 1575 mm)	50 - 100 gpm (189 - 379 lpm)	The same dependable particulate filtration where ASME certification is not required. Streamlined design stocked for quick delivery.

SYSTEMS

Facet integrated systems combine high-efficiency particulate filtration and coalescing/separation in a turnkey, skid-mounted design. Engineered for storage tank recirculation or in-line polishing during transfer, each package simplifies installation while providing comprehensive control of diesel contamination.

Storage Tank Conditioning

DRS SERIES RECIRCULATION SYSTEMS



Contamination continues to accumulate while diesel remains in storage. DRS systems provide ongoing protection by continuously circulating stored fuel through particulate-filtration and water-removal stages, returning conditioned fuel to the tank with every pass. Unlike periodic cleaning, continuous recirculation addresses contamination as it develops, helping keep stored fuel ready for immediate use even after extended storage.

Specifications

Models & Flow Rates	DRS-10: 10 gpm (38 lpm) DRS-30: 30 gpm (114 lpm)
Performance (Single Pass)	ISO Cleanliness: 13/11/9 Water Removal: <100 ppm total water
Pump	Integrated; 1.5 or 5 HP
Configurations	Skid or cart; permanent or portable
Dimensions	Length: 48" (1219 mm) Width: 35" (889 mm) Height: 55" (1397 mm)

In-Line Fuel Transfer

DIS SERIES IN-LINE FUELING SYSTEMS



DIS systems remove particulate and water as fuel passes through the skid during transfer. Depending on its location, the system can treat incoming fuel before it enters storage or condition stored fuel before downstream delivery. It operates on existing transfer pressure, with a duplex configuration available when uninterrupted fueling is required.

Specifications

Models & Flow Rates	DIS-50: 50 gpm (189 lpm) DIS-100: 100 gpm (379 lpm) DIS-200: 200 gpm (757 lpm) DIS-300: 300 gpm (1136 lpm)
Performance	ISO Cleanliness: 13/11/9 Water Removal: <100 ppm total water
Configurations	Single or duplex skid
Dimensions	Length: 84 - 102" (2134 - 2591 mm) Width: 26 - 48" (660 - 1219 mm) Height: 80" (2032 mm)

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VARIABLES TO CONSIDER

Effective diesel contamination control starts with understanding the application, the fuel, and the operating environment. Evaluating these variables together guides the selection, sizing, and placement of the technologies needed to protect your fuel and support reliable operations.

APPLICATION REQUIREMENTS



Contaminant Types

Determine whether protection is needed against particulate, water, or both. The contaminants present dictate whether the application requires filtration, water removal, or a combination of treatment stages. Water also supports microbial growth, which can generate additional solids and increase filter loading.



Target Cleanliness

The target should be based on the requirements of the equipment being fueled. Engine and injector manufacturers may specify an ISO cleanliness code and maximum allowable water content. Modern fuel systems operate at extremely tight clearances and high injection pressures, making clean, dry fuel essential to reliable performance.



Flow Rate

Flow rate is critical to correctly sizing both the vessel and its elements. The system must accommodate peak flow while maintaining the pressure drop and flow velocity required by each treatment stage. Improper sizing can restrict flow, shorten element life, or reduce the effectiveness of coalescing and separation.



Location

Effective contamination control often requires treatment at multiple points as fuel moves from delivery through storage to the point of use. Treatment farther upstream removes bulk contamination and reduces the load on downstream equipment, while finer filtration closer to the equipment achieves the required cleanliness.

FUEL AND SITE CONDITIONS



Fuel Turnover

How long fuel remains in storage influences the fuel management strategy. Low-turnover tanks give water and sediment more time to accumulate, which may increase the need for ongoing recirculation. Storage conditioning and treatment during transfer address contamination at different points and may be used independently or together.



Fuel Blend

The diesel supply is changing, and each fuel brings its own variables. As biodiesel content increases, the fuel can hold more dissolved water and water separation can become more difficult. Because fuels sold under similar labels can differ, the actual fuel and blend in use should be confirmed before specifying treatment.



Fuel Additives

Additive chemistry can affect how readily water coalesces and separates from fuel. Detergents, corrosion inhibitors, lubricity improvers, and other treatments may stabilize small water droplets or interfere with coalescer performance. Element selection should therefore account for both the base fuel and its additive package.



Temperature

Cold fuel holds less dissolved water, so fuel that tests dry in summer can release free water as temperatures fall. Low temperatures can also thicken diesel and cause wax to form, increasing pressure drop across the filter. The system should be sized for the coldest expected operating conditions, not the seasonal average.

PARTNERING WITH FACET

More than 80 years of specialized fuel cleanliness expertise informs every Facet solution.



Application Expertise

Our dedicated applications engineers work as an extension of your team, bringing specialized knowledge to complex fuel protection challenges. We translate operating conditions and performance goals into a clear technical recommendation.



Flexibility to Meet Your Requirements

From individual elements and vessels to integrated systems, Facet offers a broad range of sizes and configurations for applications across the diesel value chain. That breadth allows us to tailor the solution to your application and operating environment.



Support That Keeps Operations Moving

Our industry-leading lead times help keep projects and planned maintenance on schedule. If issues arise in the field, we inspect and test used elements and evaluate contamination sources, system conditions, and operational factors to identify the cause and help restore reliable performance.

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FILTRATION SOLUTIONS

Backed by Donaldson

Facet's expertise is supported by Donaldson's global technical, manufacturing, and research resources.

- 150+ facilities globally
- 100+ technical laboratories
- $76M invested in research and development in 2026

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