



aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding



Image courtesy of APR Energy PLC



CLEAN*Diesel*®

Solutions for Diesel Fuel Cleanliness



ENGINEERING YOUR SUCCESS.

CLEAN Diesel®

Diesel and Biodiesel fuels may leave a refinery clean, but fuel quality can vary at the time it is dispensed due to contamination accumulated during transport and storage. Operators and engine manufacturers report that the majority of engine issues are due to dirt and/or water in the fuel. As diesel engines

adopt more efficient High Pressure Common Rail (HPCR) systems, demands for removal of abrasive particles smaller than 6 microns are rapidly becoming a standard. Clean diesel fuel plays an important role in reducing maintenance and overall operating cost.

For over 60 years, Velcon has supplied filters for fuel conditioning for applications from 5 gpm to more than 5,000 gpm. Our proven bulk fuel handling experience in combination with the world's largest indoor fuel lab have allowed us to develop a range of high quality products to meet the most stringent diesel and biodiesel fuel market needs.

Primary Markets

Mining

Today's electronically controlled diesel engines utilize the latest high pressure common rail systems that require pressures up to 30,000 psi with injection nozzle sizes down to 6 microns.

Given the mining environment, meeting downstream ISO 4406 Cleanliness Standards for bulk fuel storage, dispensing, and during transfer can be challenging. Velcon offers the filtration and process fuel monitoring technology that extend equipment up-time and assures clean dry fuel.



ISO 4406 Cleanliness Standards required for use in today's diesel engines. Our filtration and separation solutions are designed to remove contaminants so that the fuel supplied to customers at distribution meet or exceed original manufacturer specifications.

Power Generation

Diesel powered plants require large fuel storage reservoirs and tank farms that must be available on demand. Velcon's fuel monitoring products can help ensure that fuel is monitored for contaminants. Our filtration and separation products are used to remove particulate and water and to ensure that fuel quality meets engine ISO Cleanliness Standards in order to assure reliability.



Refinery/Terminals

In the process of refining, storing in terminals and distributing bulk diesel fuel, contaminants such as abrasive silica, pipe scale and water are commonly introduced. As fuel is transported, it can quickly deteriorate fuel quality below



Transportation

Fuel is the number one operating cost for transportation



fleets. The trucking and transportation industry depend upon the reliability of the diesel engines and the diesel fuel. Poor fuel quality directly affects maintenance cost, fuel expenditure, fuel efficiency and overall operating costs. From monitoring the quality of the fuel source to ensuring that engines utilize fuels that meet ISO 4406 Cleanliness Standards, Velcon provides solutions to help manage and meet your diesel fuel needs.

Retail

Retailers rely on their fuel suppliers to provide quality fuels that meet regulatory requirements and consumer demands. Nevertheless, fuel stored and transported can acquire particulate and water contaminants that lower the quality below required specifications. Velcon's filtration and separation solutions are designed to remove these contaminants and return fuel quality to desired levels.



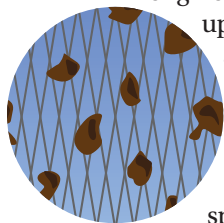
Filtration Solutions

Micronic Filtration

Removing fine and abrasive silica and pipe scale particles reduces engine wear, increases up-time and allows our customers to meet equipment warranty specifications.

From 5 to 5,000 gpm, Velcon's DFO Series filters can meet critical downstream ISO 4406 Cleanliness Standards in both bulk and dispensing (Point-of-Use) applications.

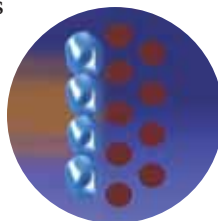
- Reduced operating costs due to fewer repair and replacement of equipment
- Reliable engine performance with ISO 4406 Cleanliness Standards compliant fuel
- Extended equipment uptime as less maintenance is required
- More efficient fuel consumption with fewer contaminants



Protection from particulate and Water (Absorption)

Velcon has been the leader in providing products that can absorb (chemically bind) free water, while filtering particulate from diesel fuel. Our Aquacon® AD Series products have over a 30 year history of proven application success and is ideal for use in fuel polishing.

- Removes both particulate and water contaminants in fuels to meet stringent downstream ISO 4406, ASTM D975 and EN 590:2009 cleanliness standards for both diesel or biodiesel fuels
- Filtration prevents damage to injectors
- Constricts flow when media reaches capacity
- For applications up to 5000 gpm



Particle & Water Removal (Coalescing)

Water is the primary cause of pump and injector failures in diesel engines and can displace diesel fuel's lubricant coating on high precision injector components. Water can be introduced throughout the fuel delivery process. Velcon's DI Series coalescer and DSO Series separator work together to separate water and aid in removing water from diesel fuel.



- Removes water from bulk diesel fuel
- Meets stringent ASTM D975 and ISO 4406 fuel cleanliness standards
- Flow rates from 100 to 5000 gpm

Fuel Condition Monitoring

Velcon offers various unique tools that will allow monitoring of diesel fuel quality throughout the distribution process, and through custody transfers with the correct blend of products, from disposable test kits to real-time precision instrumentation that measures particulate and water contamination simultaneously.



- Velcon Contaminant Analyzer for Diesel (VCA®-D): military grade in-line full flow sensor system that simultaneously detects and differentiates between particulate and water contaminants in real time. Can detect pipe scales, particulate and water from truck pipelines, dirt and water from storage
- icountACM20, icountBSplus, icountFS and IPM™ (Integrated Particulate Monitor): portable and online particle counters with proven laser detection technology
- Hydrokit® Diesel (HKD): portable test kit to help determine concentration of water in diesel fuel

DFO - Micronic Filtration

High Quality Filtration for Diesel and Biodiesel Applications

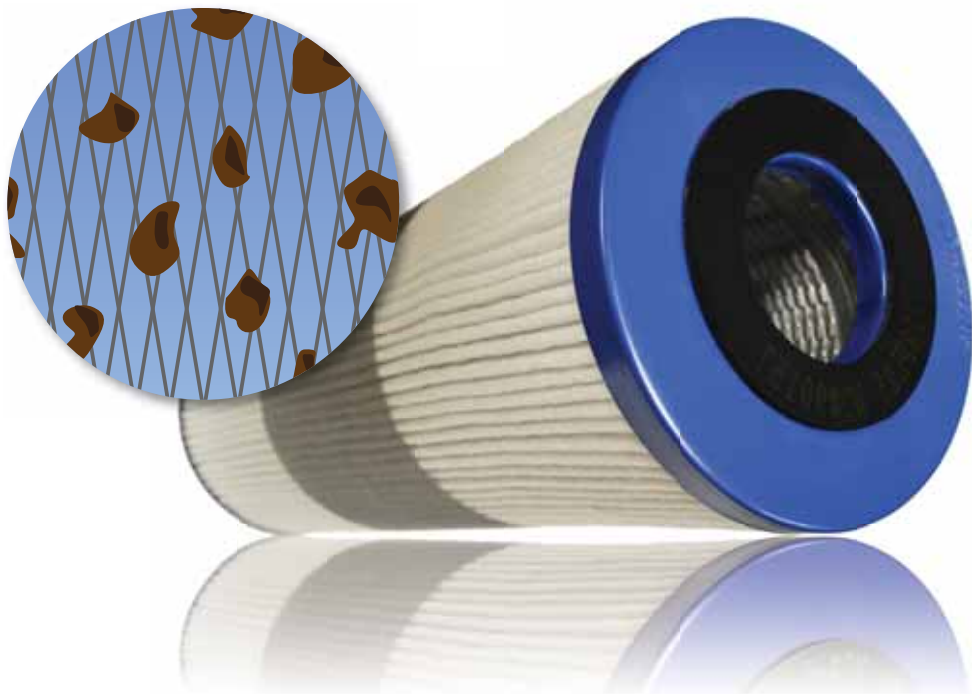
Diesel fuel is stored and transferred multiple times from refining to dispensing. Preventative action does not always eliminate contamination. Common contaminants introduced during transportation include both extremely fine and abrasive silica as well as pipe scale. These contaminants can quickly deteriorate fuel quality below engine manufacturer standards, reducing the durability and performance of the engine.

Velcon's DFO filters transform contaminated fuels to meet stringent downstream ISO 4406 cleanliness standards for the demanding limits placed on diesel and biodiesel fuels. The DFO design balances high surface area and depth filtration to maximize filter life which reduces filtration costs.

Tiered Ratings

To meet industry fuel quality standards, Velcon developed pleated media filters for diesel and biodiesel fuels. In accordance with ISO standards, the DFO filters were designed with tiered media classification using absolute rated media. Each media tier provides a unique solution from managing fuel contamination to final fuel conditioning.

- DFO filters with ratings of 2 and 4 micron are the ultimate solution to condition fuel for dispensing while assuring ISO 4406 Cleanliness Standards are consistently met. Each progressively tighter DFO filter rating delivers additional particle removal and fuel cleanliness; therefore progressively lower ISO 4406 particle counts.
- The mid-range DFO filters of 6 and 10 micron extend filter life following secondary conditioning by removing particulate contaminants and allowing Velcon's downstream coalescing products to focus on water removal rather than particle removal.
- The DFO filters rated at 25 and 40 micron are the ideal solution to manage contaminated fuel entering and leaving terminal storage tanks throughout the fuel transferring process.



Benefits

- Reduced operating costs by removing particulates that can cause engine damage
- Reliable fuel injector performance when particulate contaminants are removed to meet ISO 4406 Cleanliness Standards
- Improved equipment uptime, reduces equipment failures, repairs, and/or replacements

Product Specifications

- All filter components compatible with diesel and biodiesel blends
- Recommended change out pressure: 25 psid (1.7 bar)
- Buna-N sealing materials are standard
- Maximum Operating Temperature: 225°F (107°C)

Recommended Housings (See Pages 16-23 for details)



VF-61 & VF-62 (for DFO-5)



DVX (for DFO-6)



DVF Series (for DFO-6)

DFO Part Numbering

Velcon recommends use of threaded base endcaps for ease of installation and to minimize components.

		O.D. in. (mm)	Length in. (mm)		Micron Rating (µm)	Endcap Options
DFO	—	5 5 5/8 (143)	12 – 12 (305) 24 – 24 (610)	PLF	2, 4, 6, 10, 25, 40	
DFO	—	6 6 (152)	14 – 14 5/8 (371) 29 – 29 1/8 (740) 36 – 36 (915) 44 – 44 1/8 (1121) 56 – 56 1/8 (1426)	PLF	2, 4, 6, 10, 25, 40	TB (Threaded base)

Example:

DFO-614PLF25

Variables that often change for the DFO part numbers when placing an order are the length and the µm ratings; as seen in the case of the above example with number 14 (length) and number 25 (µm rating)

NOTE: Other lengths and end fittings available. Please contact Velcon for further assistance.

High Flow Particulate Filter for Diesel Fuel

DFI Series

Description

Diesel fuel is stored and transferred multiple times from refining to dispensing. Preventative action does not always eliminate contamination. Common contaminants introduced during transportation include both extremely fine and abrasive silica as well as pipe scale. These contaminants can quickly deteriorate fuel quality below engine manufacturer standards, reducing the durability and performance of the engine.

Velcon's DFI filters transform contaminated fuels to meet stringent downstream ISO 4406 cleanliness standards for the demanding limits placed on diesel. The DFI design balances high surface area and depth filtration to maximize filter life which reduces filtration costs.

Benefits

- Reduced operating costs by removing particulates that can cause engine damage
- Reliable fuel injector performance when particulate contaminants are removed to meet ISO 4406 Cleanliness Standards
- Improved equipment uptime, reduces equipment failures, repairs, and/or replacements



Tiered Ratings

To meet industry fuel quality standards, Velcon developed pleated media filters for diesel and biodiesel fuels. In accordance with ISO standards, the DFI filters were designed with tiered media classification. Each media tier provides a unique solution from managing fuel contamination to final fuel conditioning.

- DFI filters with ratings of 2 and 4 micron are the ultimate solution to condition fuel for dispensing while assuring ISO 4406 Cleanliness Standards are consistently met. Each progressively tighter DFI filter rating delivers additional particle removal

and fuel cleanliness; therefore progressively lower ISO 4406 particle counts.

- The mid-range DFI filters of 6 and 10 micron extend filter life following secondary conditioning by removing particulate contaminants and allowing Velcon's downstream coalescing products to focus on water separation rather than particle removal.
- The DFI filters rated at 25 and 40 micron are the ideal solution to manage contaminated fuel entering and leaving terminal storage tanks throughout the fuel transferring process.

Product Specifications

- All filter components compatible with diesel and biodiesel blends
- Recommended change out pressure: 25 psid (1.7 bar)
- Buna-N sealing materials are standard
- Max. Operating Temperature.: 225°F (107°C)

DFI Part Numbering

Velcon recommends use of threaded base endcaps for ease of installation and to minimize components.

		O.D. in. (mm)	Length in. (mm)		Micron Rating (µm)	
DFI	—	6 6 (152)	40 – 40.9 (1039) 60 – 60.9 (1547)	PLF	2, 4, 6, 10, 25, 40	HF

NOTE: Other lengths and end fittings available. Please contact Velcon for further assistance.

Examples:

DFI-640PLF25HF

Variables that often change for the DFI part numbers when placing an order are the length and the µm ratings; as seen in the case of the above example with number 40 (length) and number 25 (µm rating).

Aquacon[®] - AD

Diesel and Biodiesel (FAME) Protection from Particulate and Water Contaminants

Even when the utmost care is taken, contaminants will be introduced as fuel is transported from the refinery to its point-of-use. Common contaminants, including pipe scale, silica, metal debris and water, can quickly deteriorate fuel cleanliness far beyond engine manufacturer's minimum requirements for fuel cleanliness.

Velcon's Aquacon Diesel (AD) filters can remove both particulate and water contaminants in fuels to meet stringent downstream ISO 4406 and ASTM D975 cleanliness standards for both diesel or biodiesel fuels. The AD design incorporates multiple layers of both high efficiency long-life particulate retention and water absorbing media.

Tiered Ratings

- Velcon's 2, 4 or 6 micron rated AD filters are excellent solutions for delivering fuel ready for dispensing while assuring both ISO 4406 and ASTM D975 cleanliness levels are consistently met. Each progressively tighter AD filter rating adds additional particle removal capability and lowers ISO 4406 particle counts

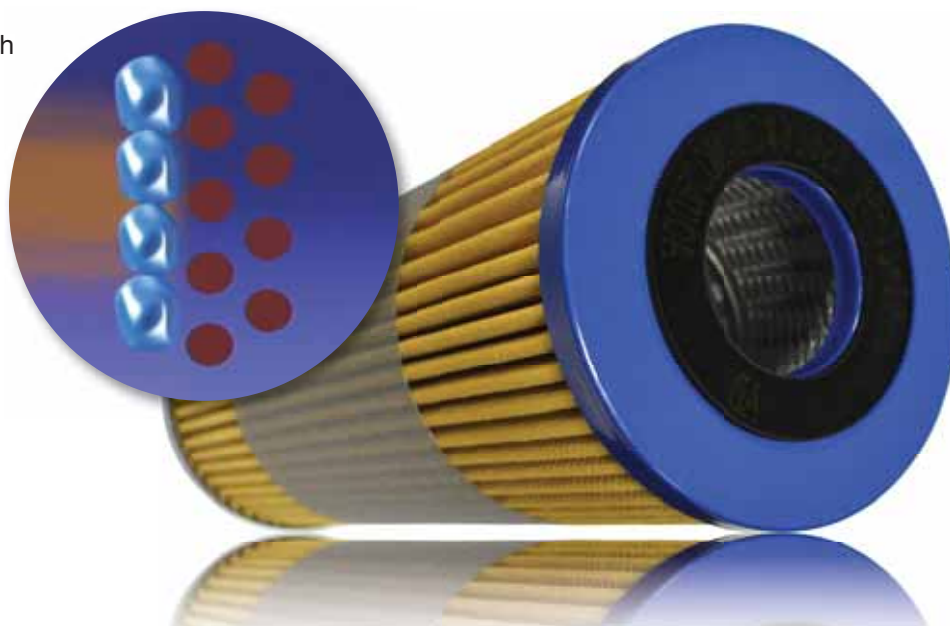
- The 10, 25 and 40 micron rated filters are ideal for managing fuel contamination entering and leaving terminal storage tanks throughout the fuel transfer process

Benefits

- More reliable fuel injector performance by reducing particulate which can cause cascading damages
- Reduced operating costs due to repair of equipment damaged by particulate and water contaminants
- Reduced engine maintenance due to fewer components being damaged by contaminants
- More efficient fuel consumption due to fewer inhibiting particulate and water contaminants
- Removes free aqueous contaminants from fuel

Water Absorbance Versus Water Coalescing

AD filters are designed to remove both water and particulates from either diesel or biodiesel fuels. AD filters are ideal for use in biodiesel and blended fuels where high levels of surfactants (glycerin) could disrupt water coalescing. When continual removal of water from petroleum based fuel is required, the application of coalescing technology is optimal or preferred.



Product Specifications

- All filter components are compatible with diesel and biodiesel blends
- Recommended change out pressure: 25 psid (1.7 bar)
- Water absorbance and particulate retention will increase differential pressure to the change out pressure
- Buna-N sealing materials are standard
- Maximum Operating Temperature: 150°F (65°C)
- All AD products will remove free and emulsified water from both diesel and biodiesel fuels to levels below 50 ppm
- The water absorbing technology used in AD filters is not effective in the presence of fuels containing high concentrations of alcohol

Recommended Housings (See Pages 16-23 for details)



VF-61 & VF-62 (for AD-5)



DVX (for AD-6)



DVF Series (for AD-6)

AD Part Numbering

Velcon recommends use of threaded base endcaps for ease of installation and to minimize components.

		O.D. in (mm)	Length in. (mm)	Micron Rating (µm)	Endcap Options
AD	—	5 5.5 (143)	12 – 12 (305) 24 – 24 (610)	2, 4, 6, 10, 25, 40	
AD	—	6 6 (152)	14 – 14 5/8 (371) 29 – 29 1/8 (740) 36 – 36 (914) 44 – 44 1/8 (1121) 56 – 56 1/8 (1426)	2, 4, 6, 10, 25, 40	TB (Threaded base)

Example:

AD-5122

Variables that often change for the AD part numbers when placing an order are the length and the µm ratings; as seen in the case of the above example with number 12 (length) and number 2 (µm rating).

NOTE: Other lengths and end fittings available. Please contact Velcon for further assistance.

DI & DSO

Particulate and Water Removal from Diesel Fuel

As fuel is transported from the refinery to its point-of-use, it can quickly become contaminated from silica, pipe scale, and water condensate. These contaminants rapidly deteriorate fuel cleanliness far below engine manufacturers minimum for fuel cleanliness.

Velcon's DI coalescers in combination with DSO separators, contaminated fuels are cleaned to a level that meets stringent downstream fuel cleanliness standards for petroleum based diesel fuels.

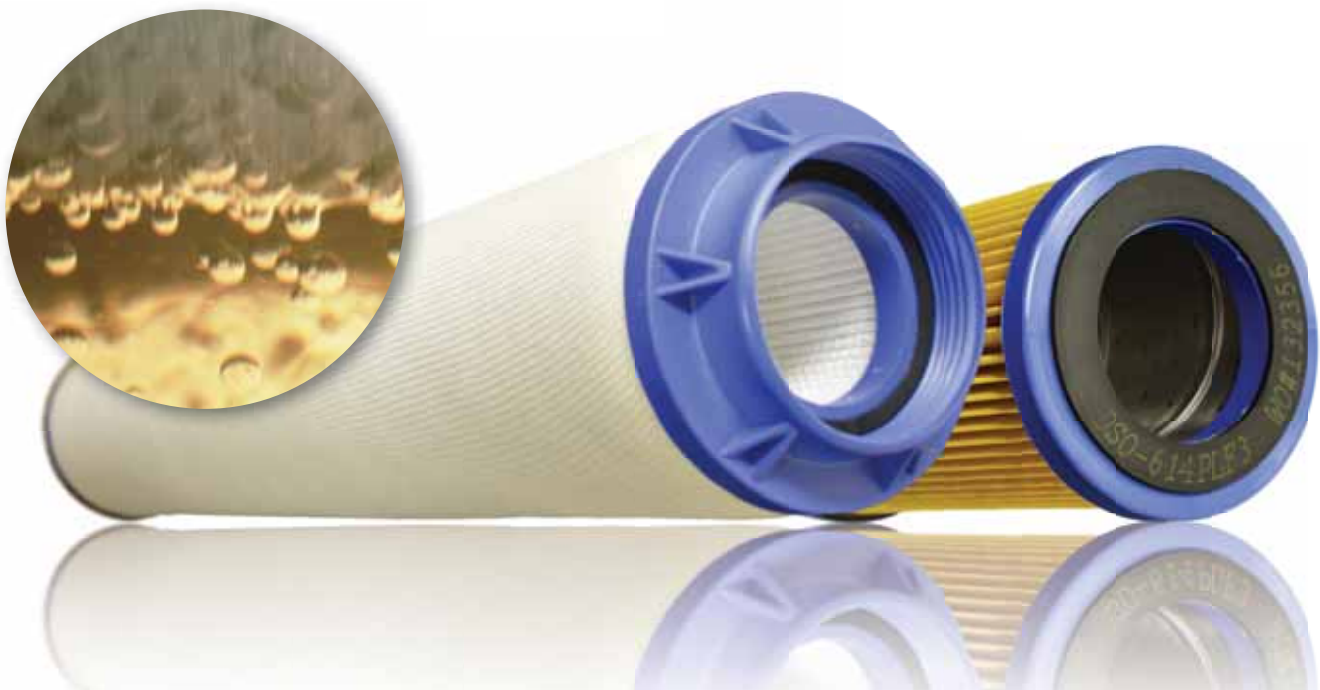
The first stage in the DI coalescer removes particles through an inside-out flow and coalesces emulsified water into large droplets, which then fall to the housing sump. In the second stage, an outside-in process, the DSO separator creates a hydrophobic barrier to block the coalesced water droplets from flowing downstream of the housing. This multi-stage design assures the fuel is conditioned to a clean and dry state, ready for use.

Tiered Ratings

- Velcon's 4 micron coalescer combines leading-edge particle removal with world-class coalescing technology to provide optimal fuel cleanliness
- The 10 and 25 micron rated filter coalescer provides effective particle removal with industry proven coalescing technology.

Benefits

- Extended equipment up-time
- Reduced operating costs
- Reliable fuel injector performance
- Improved equipment up-time
- Reduced fuel system maintenance



Product Specifications

- All filter components compatible with petroleum based diesel fuels
- Downstream free-water level typically below 50 ppm
- Recommended change out pressure: 25 psid (1.7 bar)
- Buna-N sealing materials standard
- Maximum operating temperature: 150°F (65°C)
- 6" (15.2 cm) outer diameter
- DI - coalescer flow direction - inside to outside
- DSO - separator flow direction - outside to inside

Surfactants

- Water coalescing is not effective in the presence of fuels containing high levels of surfactants/alcohols or unrefined biofuels
- Detergents and additives inhibits the ability of coalescers to effectively remove water by reducing Interfacial Tension (IFT) and can eventually disarm coalescers
- Contact Velcon Laboratories for further analysis of your fuel for presence of surfactants

Recommended Housing (See Pages 24-25 for details)



DV Series
Filter-Coalescer/Separator

DI, DO Part Numbering

Velcon recommends use of threaded base endcaps for ease of installation and to minimize components.

		O.D. in. (mm)	Length in. (mm)		Micron Rating (µm)	Endcap Options
DI	-	6 (152)	14 – 14 5/8 (371) 22 – 22 (559) 28 – 27 7/8 (709) 33 – 33 (838) 38 – 38 (965) 44 – 44 (1118) 56 – 56 (1422)	D	4, 10, 25	TB (Threaded base)
DO	-	8 7 5/8 (194)	15 – 15 (381) 30 – 30 (762) 44 – 44 (1118)	D	2, 3, 5, 25	

Example:

DI-628D25TB

Variables that often change for the DI part numbers when placing an order are the length and the µm ratings; as seen in the case of the above example with the number 28 (length) and the number 25 (µm rating).

Note: Other lengths and end fittings available. Please contact Velcon for further assistance.

DSO Part Numbering

		O.D. in. (mm)	Length in. (mm)	
DSO	-	6 (152)	14 – 14 5/8 (371) 22 – 22 (559) 29 – 29 1/8 (737) 33 – 33 1/4 (914) 44 – 44 (1118)	PLF3 (paper) C (screen)
DSO	-	4	15 – 15 (381) 30 – 30 (762) 44 – 44 (1118)	PLF3 (paper) C (screen)

Example:

DSO-614PLF3

Variables that often change for the DSO part numbers when placing an order are the length and the hydrophobic material. In the case of the above example with the number 14 (length) and the PLF3 (hydrophobic material) change.

Note: Other lengths and end fittings available. Please contact Velcon for further assistance.

Fuel Condition Monitoring

Providing critical real-time data of contaminants in your fuel

Velcon Contaminant Analyzer (VCA®)

Simultaneous Detection of Solid and Water Contaminants at Full-flow

Product Features

- Fuel quality accountability upon receipt
- Record of fuel quality at dispensing point
- System alarm or shutdown when fuel contaminant levels exceeded
- Vehicle Warranty Conformance by assuring fuel meets ISO 4406 and ASTM D975 Cleanliness Standards
- Fuel system peace of mind with real-time constant monitoring of your fuel condition
- Flange Sizes: 3 or 4 in. Other sizes available.
- Contamination Measurement/Standard:
 - Particulates in Milligrams Per Liter and ISO 4406 Reference Codes
 - Water in Parts Per Million
- Data Output
 - PC-Based Interface (GUI)
 - Local Data Storage: downloadable to USB storage device
- Additional SCADA Integration (optional)
- Cellular Telemetry (optional)
 - E-mail Reports
 - Global Reach



icountACM20

State-of-the-Art Fuel Contamination Monitoring

The first fully functional particle counter approved for use on fuels.

- Two minute test procedure
- Fully manufactured by Parker with 20 years experience in the Particle Counter Measuring market
- Laser optical scanning analysis
- Multi-standard ISO cleanliness reporting
- On-board, rear-mounted pump enables monitoring possibilities. For example: Fuel storage/vehicle tanks and fuel storage drums
- Latest averaging software as standard
- Downloader software



icountFS

Portable Condition Monitoring for Fuel Systems

- Fluid viscosity as high as 300cSt (usable range) will be able to pass through the detector at the proper flow rate
- Quick connections for testing online and offline
- Reporting Standards ISO4406:1999, NAS1638 and RH% moisture sensor display in high intensity OLED format
- Data Storage up to 250,000 test points of information
- Compact, lightweight and robust, truly portable iFS makes field analysis simple, quick and easy
- Able to sample directly from a hydraulic reservoir, barrel and vehicle fuel tank or from a high pressure, online hydraulic system with the addition of a pressure reducing adaptor
- Completely self contained, with laser detection particle counter (icountPD), rechargeable battery and flow management pump
- No special software needed
- Embedded web page generator for data downloading. Connect via Ethernet (universal RJ45) or WiFi to PC, laptop, or smartphone.
- Fast detection of the presence of contamination with a sampling period from 5 seconds to 999 seconds



icountBSplus

The benchtop solution to fluid contamination bottle sampling

- Quick sample bottle analysis with variable test time options from 15 seconds and volume capacities from 25ml
- Repeatable and re-producible result performance to ISO4406:1999, NAS1638 AS4509E and GOST 17216:2001 (Differential and Cumulative) particle count distributions
- On-board compressor and 'shop' air capability
- Environmentally controlled frontloading bottle chamber
- Selectable 12-language instruction manual menu
- Analysis of fluid moisture and temperature capability
- icounBSplus has the capability for on-line fluid measurement configuration as well as off-line fluid sampling
- Design concept allowing for portability. DC and rechargeable battery pack power option built in
- CE compliant
- Fluid resistant touch type screen panel
- On-board thermal printer
- 500 test memory (fully downloadable)



Integrated Particulate Monitor

IPM™ Series

Description

Parker Velcon's IPM Series represents the most up-to-date technology in solid particle contamination analysis. The IPM is a compact, permanently-mounted laser-based particle detector module that provides a cost-effective solution to fluid management and contamination control.

The IPM measures particle contamination continuously utilizing the Parker IcountPD (IPD), updates the display, and outputs ISO code values to an RS-232, CAN bus or Cellular (GSM) Data Acquisition Module.

The laser based, leading-edge technology is a cost effective market solution to fluid management and contamination control.

Benefits

- Independent online monitoring of system contamination trends
- Cost effective solution in monitoring fuel cleanliness and reducing machine downtime
- LCD display with alarm output warnings
- Continuous performance for dependable analysis
- Diesel, kerosene fuel compatible construction
- Self-diagnostic software
- PC/PLC integration technology using Data Acquisition RS-232 or CAN bus output
- Reporting interval through visual display, RS-232, CAN bus or Cellular data acquisition module



Principle of operation

The IPM measures particle contamination continuously updates the display, output options and limit relay every second, and does not perform a “one-off” test. This means that even if the Measurement Period is set to 60 seconds, the display, output and limit relay all report the presence of dirt in the oil in just a few seconds—it does not wait until the end of the Measurement Period before reporting the result.

The IPM has just one setting to control the accuracy, stability and sensitivity of the measurements and that is the “Measurement Period.” This can be set from

five seconds to 180 seconds.

The longer the Measurement Period, the more contaminant is measured, averaging out any spikes seen on a smaller sample. The shorter the Measurement Period the more sensitive the IPM is to variation of contaminant level, but also the performance on clean systems can be reduced. Thus, the user can select how sensitive the IPM is to spikes of contaminant, and how quickly it responds to contamination levels above the set point (“limits”).

The Measurement Period is factory set to 60 seconds, updated on a second by second basis, giving an effectively continuous readout of the level of contamination.

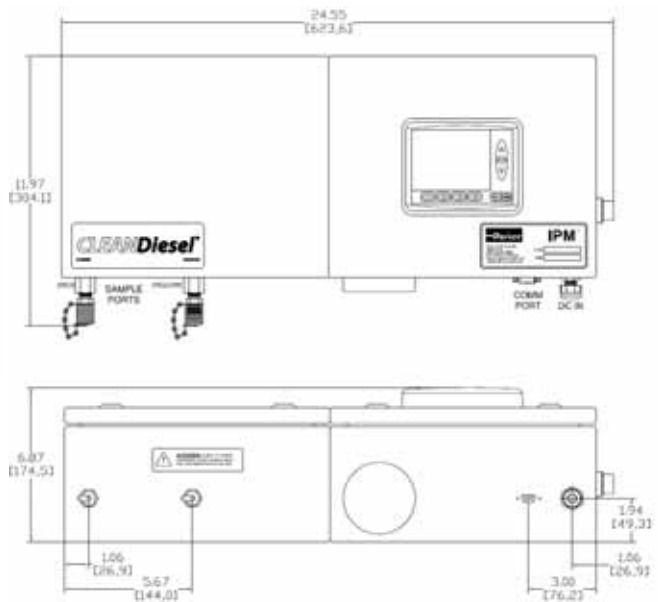
Models Available

IPM-110	CAN bus or RS-232 to Customer Control System, No LCD Display
IPM-210	CAN bus or RS-232 Output
IPM-230	Cellular Telemetry Output

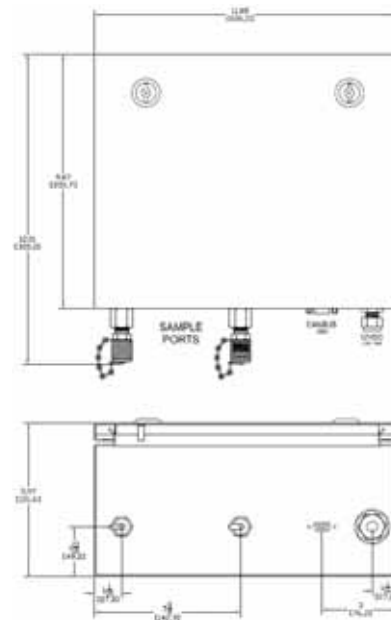
Dimensions



IPM-230
with MD3 Display and
Telemetry Module



IPM-110
For Integration with
Existing System



Standard Components

Quantity	Description
1	IPM Unit Enclosures
1	Installation and Operation Manual
1	Software, OEM, CD's
1	Sampling Hose Set, 5 m long, P/N ACC6NN005
1	Probe, Twin Sample Port, P/N ACC6NN046
1	Mounting Hardware
1	Enclosure Lid Key



Diesel Filtration Skid

DFS™ Series

Combining Particulate Filtration with Water Coalescing

Providing high quality fuel to the modern high pressure common rail fuel injection systems is imperative to avoid costly downtime and engine repair.

The Velcon Diesel Filtration Skid (DFS) plays an important role in a comprehensive fuel contaminant control program as it provides fuel conditioning to assure the consistent removal of abrasive particles and damaging water.

The DFS offers a complete fuel filtration solutions which incorporates both particulate and water contaminant removal technologies mounted on a skid base that can be quickly installed and put into operation.

Key components of the DFS includes filter (DVF) and coalescing (DV) housings which have proven to withstand years of service in the most challenging environments. Velcon DFO particulate filters and DI and DSO coalescer and separator cartridges are used for conditioning contaminated fuels to meet the most stringent ISO 4406 and ASTM D975 standards for emulsified and free water as well as abrasive particulate. All filtration cartridges are available with threaded base endcap option for quick filter removal and ease of installation.

Standard Features

- ASME code epoxy painted carbon steel vessels
- Swing bolt housing closures
- Independent differential pressure gauges
- Air eliminators
- Walkway
- Inlet/Outlet sample ports
- Hydraulic or mechanical housing lid lifting
- Isolation valves
- Pressure relief valve

- Threaded base coalescer
 - One package
 - Quick installation
 - Maximize Second Stage Water Removal

Optional Features

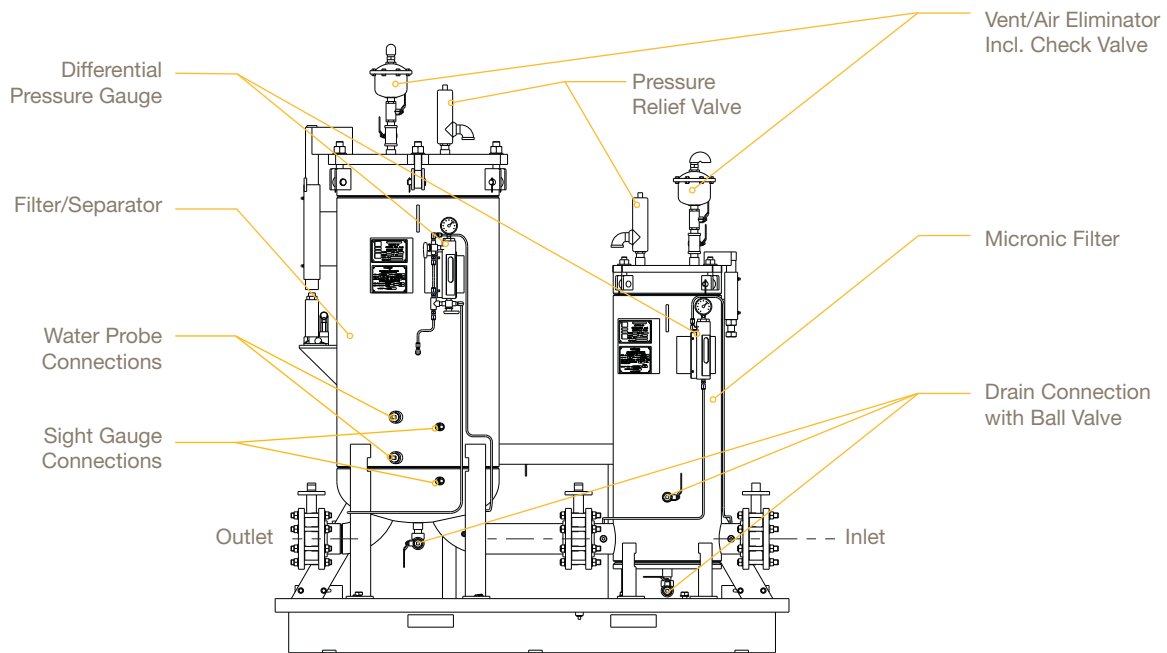
- Support hand rail
- Electronic water sensing
- Automatic vessel drain
- Water sight glass
- Fuel Condition Monitoring



DFS3
(with Optional Support
Hand Rail)



Features



DFS Part Number & Dimensions

Velcon recommends use of threaded base endcaps for ease of installation and to minimize components.

Series	Flow Rate*		Filter Housing	Filters		Coalescer Housing	Coalescers		Separators		Approx. Footprint mm (in)	Approx. DryWeight (w/o Elements, Tie Rods, Spider Plate) kg (lb)	I/O Flange mm (in)
	Range lpm (gpm)	Target lpm (gpm)		Qty.	Cartridge Part Number		Qty.	Cartridge Part Number	Qty.	Cartridge Part Number			
DFS1	500 - 1250 (135 - 330)	750 (200)	DVF1629	4	DFO-629	DV2233	4	DI-633	3	DSO-629	1778 x 1524 (70 x 60)	900 (1985)	102 (4)
DFS2	865 - 2160 (230 - 570)	1300 (345)	DVF1644	4	DFO-644	DV2838	6	DI-638	5	DSO-629	2032 x 1524 (80 x 60)	1021 (2250)	102 (4)
DFS3	1585 - 3955 (420 - 1045)	2380 (630)	DVF2044	6	DFO-644	DV3638	11	DI-638	9	DSO-629	2794 x 2032 (110 x 80)	1542 (3400)	152 (6)

Dimensions shown are for estimating purposes only. For exact dimensional detail, obtain certified copy of drawings.

*Flow rates provided are for illustrative purposes. Actual flow rates may vary based on field conditions.

VF-61, VF-62

Product Specifications

- Flow Rates:
 - VF-61 w/ Aquacon AD: 1-50GPM, 25GPM Recommended
 - VF-62 w/ Aquacon AD: 30-100GPM, 50GPM Recommended
- Max. Operating Pressure: 150 psi
- Inlet/Outlet connection: 1-1/2" NPT
- Closure Seal: Buna-N O-ring (P/N G-0986)
- 1/8" brass petcock vent valve and 1/2" drain valve
- Material: Die cast aluminum head and closure clamp assembly; carbon steel shell with epoxy coated exterior and interior
- Weight:
 - VF-61: 4.54 kg (10 lbs), Shipping weight: 5.44 kg (12 lbs)
 - VF-62: 7.26 kg (16 lbs), Shipping weight: 8.17 kg (18 lbs)

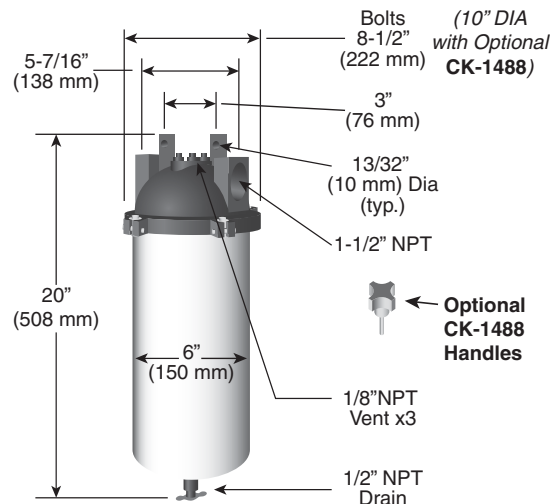
Optional Features

- dP Gauge



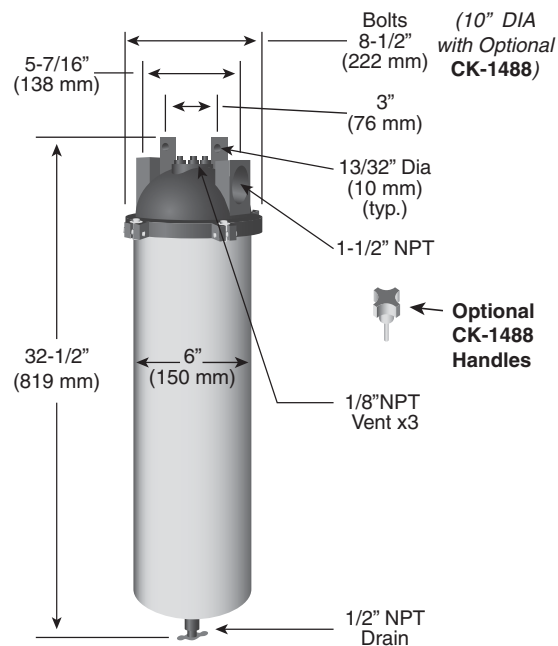
VF-61

(For use with AD-512 and DFO-512 Cartridges)



VF-62

(For use with AD-524 and DFO-524 Cartridges)



Dimensions shown are for estimating purposes only. For exact dimensional detail, obtain certified copy of vessel drawing.

Small Housings for Diesel Fuel Filtration

VF-64/65, Filter/Separator Housing for Diesel Fuel Filtration

Description

The versatile housings are designed to meet various requirements: a fuel filter/water separator and a micronics filter. Ideal for fuel dispensing applications

The VF-64 and VF-65 housings are designed to meet the toughest hydrocarbon refueling conditions and designed for easy cartridge changeouts. The VF-64 and VF-65 can be used on mobile refuelers or installed in refueling cabinets. The unit can also be used for diesel fuel dispensing pumps, as a primary fuel filter/water separator for large diesel engines, or as bulk fuel handling, fuel transfer, and other higher flow applications.

Product Features:

- Die-cast aluminum head
- Steel filter bowl assembly
- Powder coated components
- Locking ring collar “no V-clamps”
- 1.5” NPT inlet and outlet
- Viton® seals for compatibility to various fuels
- Field proven performance
- Designed to withstand a max. pressure of 150 PSI (10 bar) and a maximum temperature of 240°F (115°C)
- Manual drain valve (½” NPT)
- Manual vent valve
- Sight glass (½” NPT)
- Wide variety of accessories, filters and applications available



Replacement Filters

Water separator filters remove water and contaminants from hydrocarbon fuel streams and are the most popular filters.

Specification	Micron (µm)	Flow Rate recommended min-max GPM (LPM)	Clean ΔP	Change ΔP
VF-64		Diesel		
DOS-609D10	10	15 (56.8)	2.5 PSID	15 PSID
DOS-609D25	25	1 - 20 (3.8 - 75.7)		
VF-65		Diesel		
DOS-612D10	10	20 (75.7)	2.5 PSID	15 PSID
DSO-612D25	25	15 - 25 (56.8 - 95)		

Housings for Diesel Fuel Filtration

DVX Series

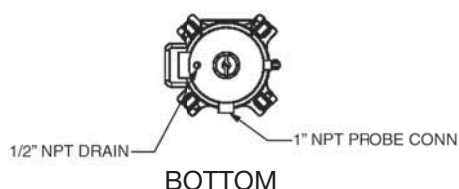
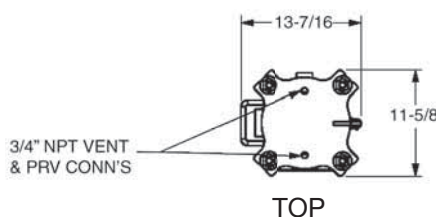
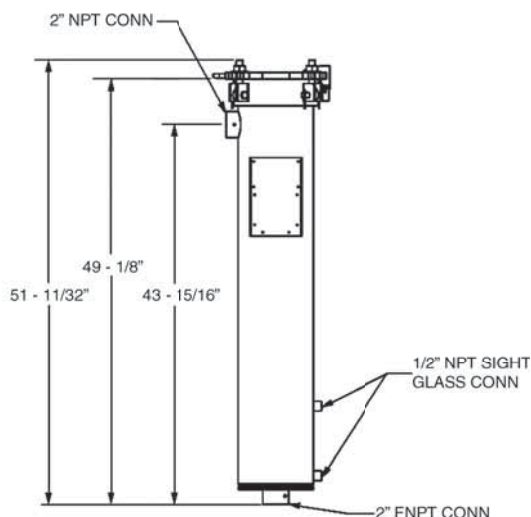
For use with AD-6, DFO-6, DO-8/DSO-4 Cartridges

Standard Features

- Carbon steel construction
- 250 psi design pressure
- Epoxy powder coated interior and exterior
- 2" NPT female inlet/outlet
- 1/2" NPT drain connection
- 3/4" NPT vent and relief connection
- 1/2" NPT sight glass connections
- 1" NPT water probe connection
- 1/8" NPT differential pressure gauge connections
- Lid gasket: G-2052 (Buna N)
- Leg Assembly
- Differential pressure gauge assembly

Optionals

- Air eliminator
- Drain valve
- Pressure relief valve
- Water probe
- Sight gauge
- ASME Code Stamp
- CE Mark
- Lid Gasket: G-2052V (Viton®)
- Duplex Configuration

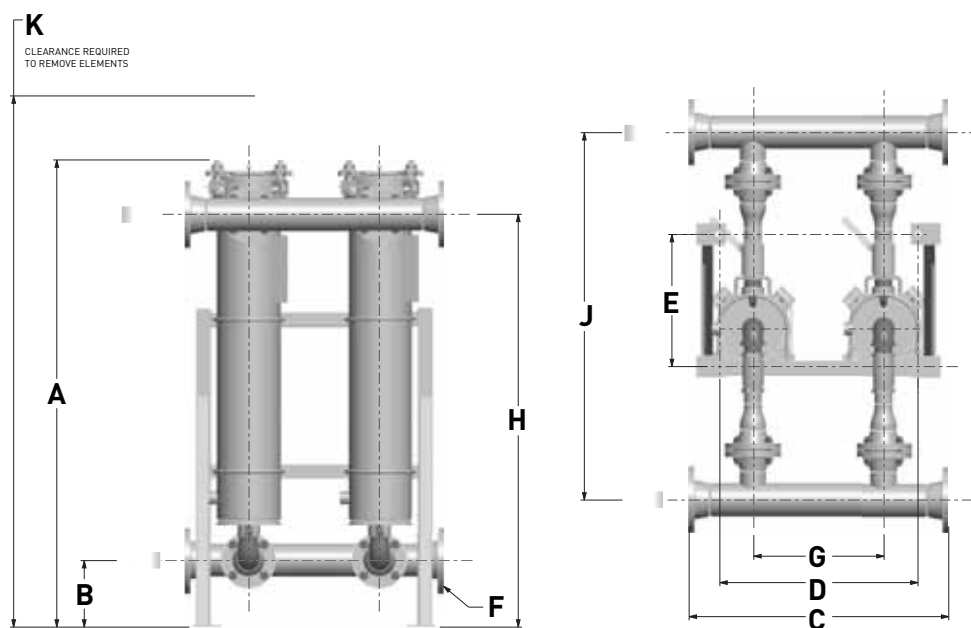
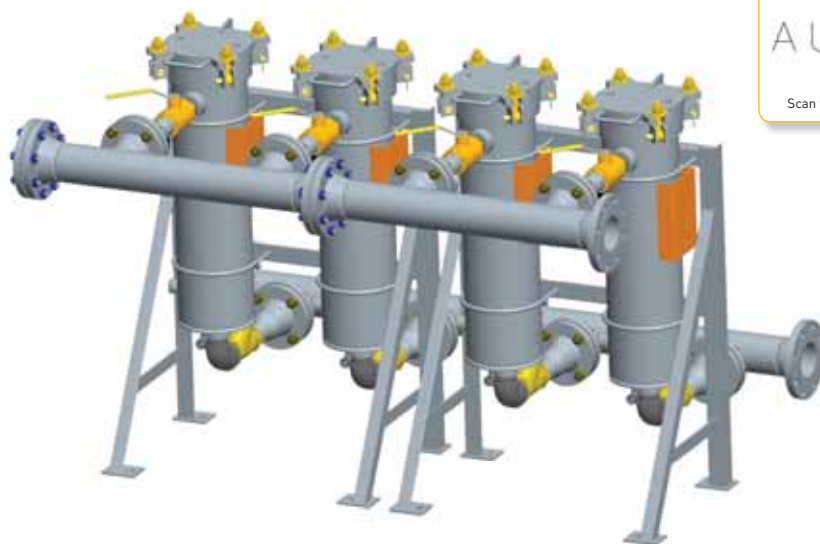


DVX-2 shown with optional differential pressure gauge, sight glass assembly, and air eliminator

Model	Cartridge	Flow Rates gpm (lpm)			Height	Cover Width	Cover Length	Dry Weight	
		Min	Max	Target	mm(in.)	mm(in.)	mm(in.)	lbs.	kgs
DVX-1	DO-815/DSO-415	1(3.8)	25(94.6)	15(56.8)	914 (36)	341 (13 7/16)	295 (11 5/8)	110	50
	DFO-614/AD-614	1(3.8)	50(189.3)	25(94.6)					
DVX-2	DO-830/DSO-430	25(94.6)	50(189.3)	40(151.4)	1295 (51)			125	57
	DFO-629/AD-629	50(189.3)	75(283.9)	75(283.9)					
DVX-3	DO-844/DSO-444	50(189.3)	100(387.5)	75(283.9)	1676 (66)			150	68
	DFO-644/AD-644	75(283.9)	150(567.8)	100(387.5)					

Dimensions shown are for estimating purposes only. For exact dimensional detail, obtain certified copy of vessel drawing.

Duplex Option



Model (Flow Rate, US- GPM)	Dimensions mm (in)									
	A	B	C	D	E	F	G	H	J	K
DVX-1 DPL (100)	1235 (45 5/8)	230 (9 1/16)	898 (35 3/8)	685 (27)	482 (19)	101 (4)	450 (17 3/4)	1047 (41 1/4)	1271 (50 1/16)	1651 (65)
DVX-2 DPL (200)	1617 (63 11/16)		295 (11 5/8)	57 (125)	457 (18)			1428 (56 1/4)	1271 (50 1/16)	2362 (93)
DVX-3 DPL (300)	1998 (78 11/16)		295 (11 5/8)	68 (150)	508 (20)			1809 (71 1/4)	1271 (50 1/16)	3073 (121)

Dimensions shown are for estimating purposes only. For exact dimensional detail, obtain certified copy of vessel drawing.

DVF Series

Vertical Filter Housings

For Use with DFO-6 & AD-6 Cartridges

Standard Design Features

- 150 psi welded steel ASME Code construction.
- Choice of micron rating from 0.5 to 75 microns.
- Choice of pleated or depth type media.
- Epoxy coated interior, primed exterior.
- Buna-N O-ring cover seals.

DVF1644 and larger vessels, such as the DVF2044 shown on the right, are provided with swing bolt closure, RF flange connections and fittings for pressure gauge, air eliminator, pressure relief valve and drain valve.

Note: In applications where increased dirt contamination is present, it may be desirable to oversize filtration equipment. Contact Velcon for oversizing recommendations

Recommended Optional Accessories

- Automatic Air Eliminator
- Pressure Relief Valve
- Differential Pressure Gauge
- Drain Valve(s)
- Sampling Probes
- ASME Code Stamp



DVF2044

Model	Flow Rate Range lpm (gpm)		Length mm (in.)	Qty.	Fig. No.	Dimensions mm (in.)		
	Min	Max				A	B	C
DVF829	110 (29)	496 (131)	737 (29)	1	2	219 (8 5/8)	76 (3)	991 (57 1/16)
DVF844	167 (44)	750 (198)	1118 (44)	1	2	219 (8 5/8)	76 (3)	1449 (57 1/16)
DVF1629	439 (116)	1976 (522)	737 (29)	4	2	406 (16)	381 (15)	1341 (52 13/16)
DVF1644	666 (176)	2998 (792)	1118 (44)	4	2	406 (16)	381 (15)	1695 (66 3/4)
DVF2044	999 (264)	4497 (1188)	1118 (44)	6	2	508 (20)	495 (19 1/2)	1895 (74 5/8)
DVF2444	1332 (352)	5996 (1584)	1118 (44)	8	1	610 (24)	533 (21)	1651 (65)
DVF2456	1696 (448)	7631 (2016)	1422 (56)	8	1	610 (24)	533 (21)	1956 (77)
DVF2844	1999 (528)	9005 (2379)	1118 (44)	12	1	711 (28)	610 (24)	1635 (64 3/8)
DVF2856	2544 (672)	11447 (3024)	1422 (56)	12	1	711 (28)	610 (24)	1940 (76 3/8)
DVF3644	2998 (792)	13491 (3564)	1118 (44)	18	1	930 (36 5/8)	660 (26)	1635 (64 3/8)
DVF3656	3816 (1008)	17171 (4536)	1422 (56)	18	1	930 (36 5/8)	660 (26)	1940 (76 3/8)
DVF4244	4497 (1188)	20237 (5346)	1118 (44)	27	1	1086 (42 3/4)	711 (28)	1676 (66)
DVF4256	5724 (1512)	25756 (6804)	1422 (56)	27	1	1086 (42 3/4)	711 (28)	1981 (78)
DVF4856	6995 (1848)	31479 (8316)	1422 (56)	33	1	1219 (48)	737 (29)	2032 (80)
DVF5456	8903 (2352)	40065 (10584)	1422 (56)	42	1	1397 (55)	787 (31)	2083 (82)
DVF6056	10599 (2800)	47696 (12600)	1422 (56)	50	1	1549 (61)	914 (36)	2235 (88)

1. For higher viscosity fluids or operating in highly variable temperature conditions, consult your Velcon Representative.

2. DVF Series are designed to accommodate our standard 6 in. O.D., 3 1/2 in. I.D. cartridges including Velcon's DFO, DI, DSO, and Aquacon® AD.

3. Threaded base filter cartridges are available, which allow for easier cartridge change out and removal of particulate matter from the deckplates. The threaded base cartridges mount on the optional 6000T adapters.

4. DVF16 and DVF20 Series vessels have flat covers. DVF16 Series vessels do not have hydraulic lift jacks.

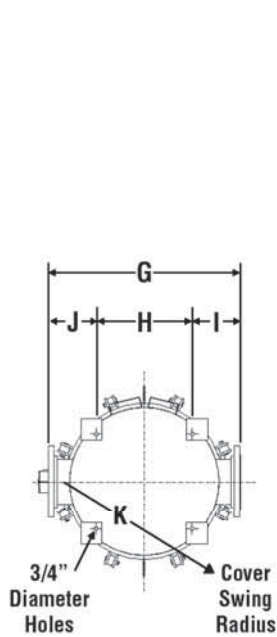


Figure 1

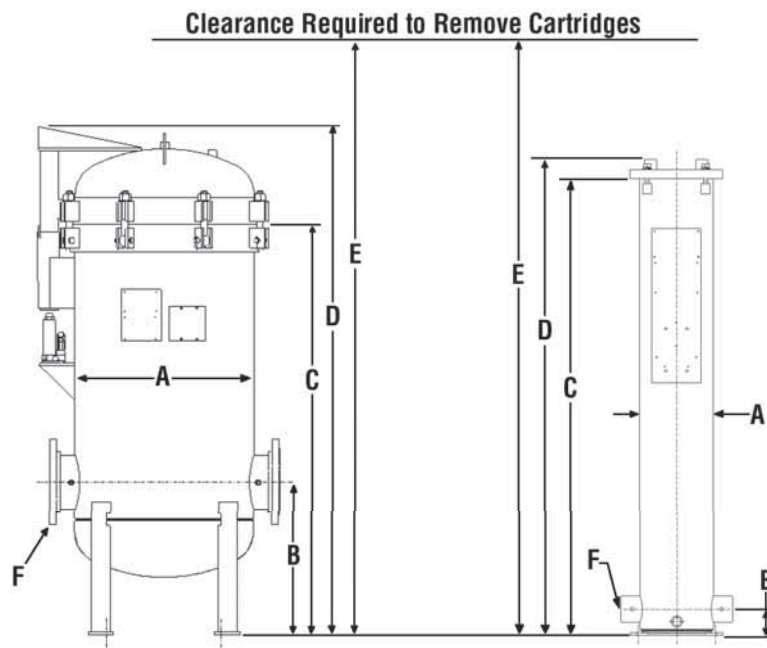
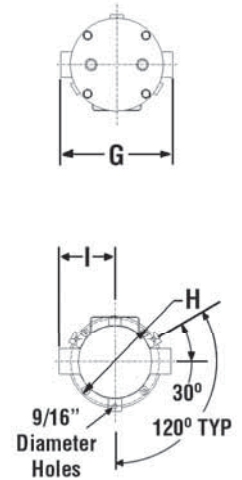


Figure 2



Dimensions mm (in.)							Wt. w/Skid kgs (lbs)	Volume litr. (U.S. gal)
E	F	G	H	I	J	K		
1727 (68)	51 (2)	330 (13)	264 (10 3/8)	165 (6 1/2)			120 (65)	30 (8)
2565 (101)	51 (2)	330 (13)	264 (10 3/8)	165 (6 1/2)			138 (305)	42 (11)
2083 (82)	102 (4)	616 (24 1/4)	229 (9)	194 (7 5/8)	194 (7 5/8)	468 (18 7/16)	254 (560)	132 (35)
2794 (110)	102 (4)	616 (24 1/4)	229 (9)	194 (7 5/8)	194 (7 5/8)	468 (18 7/16)	281 (620)	189 (50)
2997 (118)	152 (6)	711 (28)	330 (13)	191 (7 1/2)	191 (7 1/2)	660 (26)	499 (1100)	341 (90)
2845 (112)	152 (6)	813 (32)	381 (15)	203 (8)	203 (8)	813 (32)	590 (1300)	454 (120)
3099 (122)	152 (6)	813 (32)	381 (15)	203 (8)	203 (8)	813 (32)	612 (1350)	568 (150)
2743 (108)	203 (8)	914 (36)	457 (18)	229 (9)	229 (9)	889 (35)	726 (1600)	625 (165)
3048 (120)	203 (8)	914 (36)	457 (18)	229 (9)	229 (9)	889 (35)	794 (1750)	757 (200)
2769 (109)	254 (10)	1219 (48)	584 (23)	318 (12 1/2)	318 (12 1/2)	1118 (44)	1021 (2250)	1098 (290)
3073 (121)	254 (10)	1219 (48)	584 (23)	318 (12 1/2)	318 (12 1/2)	1118 (44)	1089 (2400)	1325 (350)
2794 (110)	305 (12)	1372 (54)	711 (28)	330 (13)	330 (13)	1327 (52 1/4)	1724 (3800)	1514 (400)
3099 (122)	305 (12)	1372 (54)	711 (28)	330 (13)	330 (13)	1327 (52 1/4)	1814 (4000)	1798 (475)
4191 (165)	356 (14)	1676 (66)	927 (36 1/2)	375 (14 3/4)	375 (14 3/4)	1651 (65)	1996 (4400)	2385 (630)
4216 (166)	406 (16)	1829 (72)	1041 (41)	394 (15 1/2)	394 (15 1/2)	1829 (72)	2268 (5000)	3975 (1050)
4445 (175)	457 (18)	1981 (78)	1156 (45 1/2)	413 (16 1/4)	413 (16 1/4)	1905 (75)	3084 (6800)	4845 (1280)

DV Series

Vertical Filter-Coalescer/Separator Housings For Use with DI-6/DSO-6 Cartridges

Standard Design Features

- Pleated paper separator cartridges
- 150 psi ASME Code construction
- RF flanged connections
- Swing bolt closure with O-ring seal
- Epoxy-coated interior, primed exterior
- Threaded base coalescer
- Carbon Steel Construct

Optional Accessories

- Automatic air vent (R)
- Water slug valve (R)
- Sump heater
- Pressure relief valve (R)
- Water interface control (R)
- Sump sight glass
- Differential pressure gauge (R)
- Sampling probes (R)
- Manual drain valve (R)

The accessory items marked with an (R) are recommended for safe, effective operation of all installations.

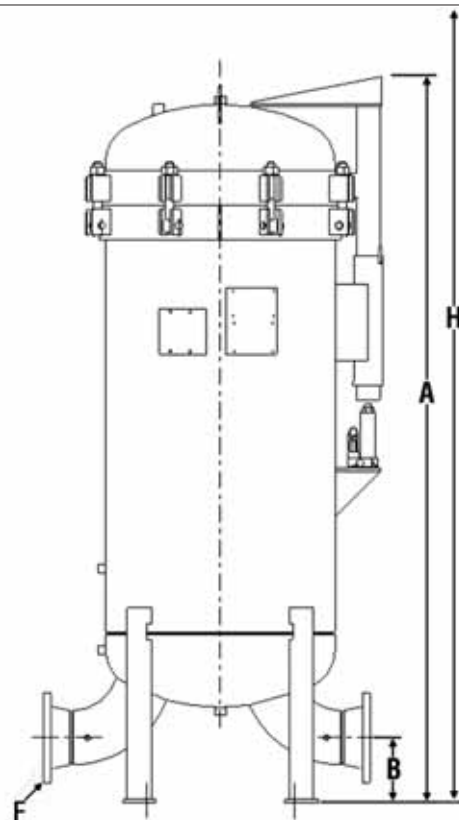
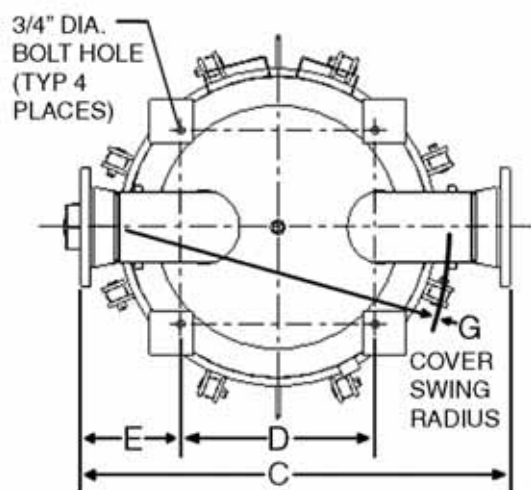


Model Number	Flow Rate Range lpm (gpm)		Cartridges		Dimensions mm (in.)	
	Min - Max	Target	DI/DSO	Qty. (C/S)	A	B
DV2222	335 - 835 (90 - 220)	500 (130)	DI-622 DSO-622	4/3	1575 (62)	203 (8)
DV2233	500 - 1250 (135 - 330)	750 (200)	DI-633 DSO-629	4/3	1753 (69)	203 (8)
DV2833	750 - 1875 (200 - 495)	1125 (300)	DI-633 DSO-629	6/5	2108 (83)	203 (8)
DV2844	1000 - 2500 (265 - 660)	1500 (400)	DI-644 DSO-633	6/5	2261 (89)	203 (8)
DV3638	1585 - 3955 (420 - 1045)	2380 (630)	DI-638 DSO-629	11/9	2326 (91 ⁹ / ₁₆)	203 (8)
DV3644	1835 - 4580 (485 - 1210)	2750 (730)	DI-644 DSO-633	11/9	2448 (96 ³ / ₈)	229 (9)
DV3656	2335 - 5830 (620 - 1540)	3500 (930)	DI-656 DSO-644	11/9	2786 (109 ¹¹ / ₁₆)	229 (9)
DV4244	2500 - 6245 (660 - 1650)	3750 (995)	DI-644 DSO-633	15/12	2626 (103 ³ / ₈)	229 (9)
DV4256	3180 - 7950 (840 - 2100)	4770 (1260)	DI-656 DSO-644	15/12	2931 (115 ³ / ₈)	229 (9)

Dimensions shown are for estimating purposes only. For exact dimensional detail, obtain certified copy of vessel drawing.

**Flow rates provided are for illustrative purposes. Actual flow rates may vary based on field conditions.*

Clearance Required to Remove Cartridges



Dimensions mm (in.)						Wt. w/ Skid kgs (lbs)	Volume ltr (U.S. gal)
C	D	E	F	G	H		
689 (27 1/8)	394 (15 1/2)	159 (6 1/4)	102 (4)	762 (30)	2184 (86)	503 (1110)	242 (64)
689 (27 1/8)	394 (15 1/2)	159 (6 1/4)	102 (4)	762 (30)	2591 (102)	513 (1130)	273 (72)
1016 (40)	457 (18)	321 (12 5/8)	152 (6)	889 (35)	2997 (118)	748 (1650)	644 (170)
1016 (40)	457 (18)	321 (12 5/8)	152 (6)	889 (35)	3378 (133)	767 (1690)	700 (185)
1607 (63 1/4)	584 (23)	511 (20 1/8)	152 (6)	1118 (44)	3277 (129)	943 (2080)	1060 (280)
1324 (52 1/8)	584 (23)	371 (14 5/8)	203 (8)	1118 (44)	3556 (140)	975 (2150)	1155 (305)
1324 (52 1/8)	584 (23)	371 (14 5/8)	203 (8)	1118 (44)	4064 (160)	1043 (2300)	1344 (355)
1405 (55 5/16)	711 (28)	381 (15)	203 (8)	1270 (50)	3810 (150)	1520 (3350)	1703 (450)
1405 (55 5/16)	711 (28)	381 (15)	203 (8)	1270 (50)	4191 (165)	1588 (3500)	1968 (520)

Laboratories



Diesel Fuel Laboratory

Velcon is committed to supplying the highest quality filtration technology available. Our state-of-the-art Diesel Fuel Laboratories are uniquely capable of performing full-flow single-pass efficiency testing similar to real world

conditions. We also structurally challenge our products to assure consistent performance in the most extreme conditions. At Velcon, we stand behind our products, as we continue to seek solutions to ensure quality fuel whenever and wherever needed.

Analytical Laboratory

The Velcon Analytical Laboratory houses a wide range of capabilities to support the development of filtration products. These capabilities include the testing of filters, in-house quality control testing, and the analysis of customer-provided samples. Using our broad range of cutting edge technology and diagnostic equipment for conducting both quantitative and qualitative testing, Velcon is committed to providing

quality solutions and industry leading technology. All equipment and testing are performed within the guidelines of ASTM, ISO, SAE, and ANSI standards.

Laboratory Services

- Custom product testing available for specialty application needs
- Fluid filtration analysis to determine optimal product application
- Post use contamination analysis to determine level and composition of contaminants
- Customized laboratory reports for informed decision making

System Sizing



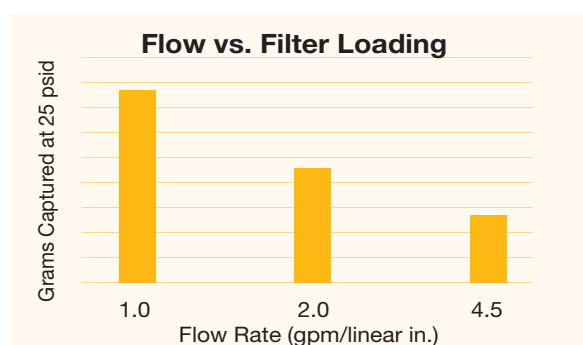
Velcon's extensive bulk fuel handling experience and our state-of-the-art fuel testing laboratory have quantitatively proven that increased system/housing will allow for lower flow

rates per filter while dramatically extending the service life of the elements. Systems "sized for life" commonly see a full repayment of the additional system cost through operating savings. Using Velcon's proprietary calculator in **SizeRight**, for system sizing, we can help you select the right housing and elements for your application based on your ISO 4406 cleanliness requirements

and specified change-out interval. This invaluable tool can also help us in estimating your annual operating cost in maintaining your filtration system.

For additional information on this powerful tool, please contact Velcon or our local representative to have your filtration system **SizeRight** for your specific needs.

ISO Code vs Mass	
ISO Code	lbs/yr (kg/yr)
24/22/20	1609 (730)
22/20/18	564 (256)
17/15/13	20 (9.1)
12/9/7	4 (1.8)
<i>Notes:</i> Values are based on usage of +3.5M Liter of fuel per year. Field results may vary.	



ISO 4406 Codes

Specifying proper filtration has become more difficult since the days of “nominal” rated filters. Rather than guessing on nominal, absolute, or Beta ratings, it makes more sense instead to specify how clean you want the fuel to be and let the filter manufacturer provide the proper cartridge to attain that cleanliness. The International Standards Organization (ISO) has developed a method of describing fluid cleanliness called ISO 4406 Solid Contamination Level Code, commonly referred to as the ISO Cleanliness Code. This method is based on particle counting and is expressed by a set of 3 code numbers, each ranging from 1 to 28. Each code number represents particle counts from .01 particles per milliliter of fluid to 2,500,000

particles per milliliter. The three code numbers are separated by a slash and are written as shown in the following example:

14/11/8. The first code number represents the particle count range of all particles greater than 4 microns in size, the second number represents the count range of particles greater than 6 microns, and the third number represents that of all particles greater than 14 microns. The table below shows the ISO 4406 code levels.

Prior to 1999, ISO Codes were expressed as only two numbers, such as “14/11”, which represented the number of particles greater than 5 microns and greater than 15 microns. Due to differences in test

methods and test contaminants, the 6 and 14 micron sizes of the new revision correspond to the 5 and 15 micron sizes of the original standard.

Equipment manufacturers can provide the level of fluid cleanliness required for proper operation of their equipment. More and more, diesel engine manufacturers are beginning to specify the level of fuel cleanliness required for modern diesel engines.

Once the application conditions such as fuel type, flow rate, operating temperature, reservoir size, etc. are provided, the proper filter housing and cartridge can be selected to meet a desired fluid cleanliness requirement.

ISO 4406:1999 Code Chart		
Range Code	Particles per milliliter	
	More Than	Up To/Including
24	80,000	160,000
23	40,000	80,000
22	20,000	40,000
21	10,000	20,000
20	5,000	10,000
19	2,500	5,000
18	1,300	2,500
17	640	1,300
16	320	640
15	160	320
14	80	160
13	40	80
12	20	40
11	10	20
10	5	10
9	2.5	5
8	1.3	2.5
7	0.64	1.3
6	0.32	0.64

Particle Size μm	Particle per mL	ISO Code 4406 Range	ISO Code
4	151700	80000 - 160000	24
6	57233	40000 - 80000	23
14	27562	20000 - 40000	22
30	2965	2500 - 5000	19

Particle Size μm	Particle per mL	ISO Code 4406 Range	ISO Code
4	520	320 - 640	16
6	173	160 - 320	15
14	37	20 - 40	12
30	11	10 - 20	11

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VEL2154R5 0415



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