

Products for the Industrial Market

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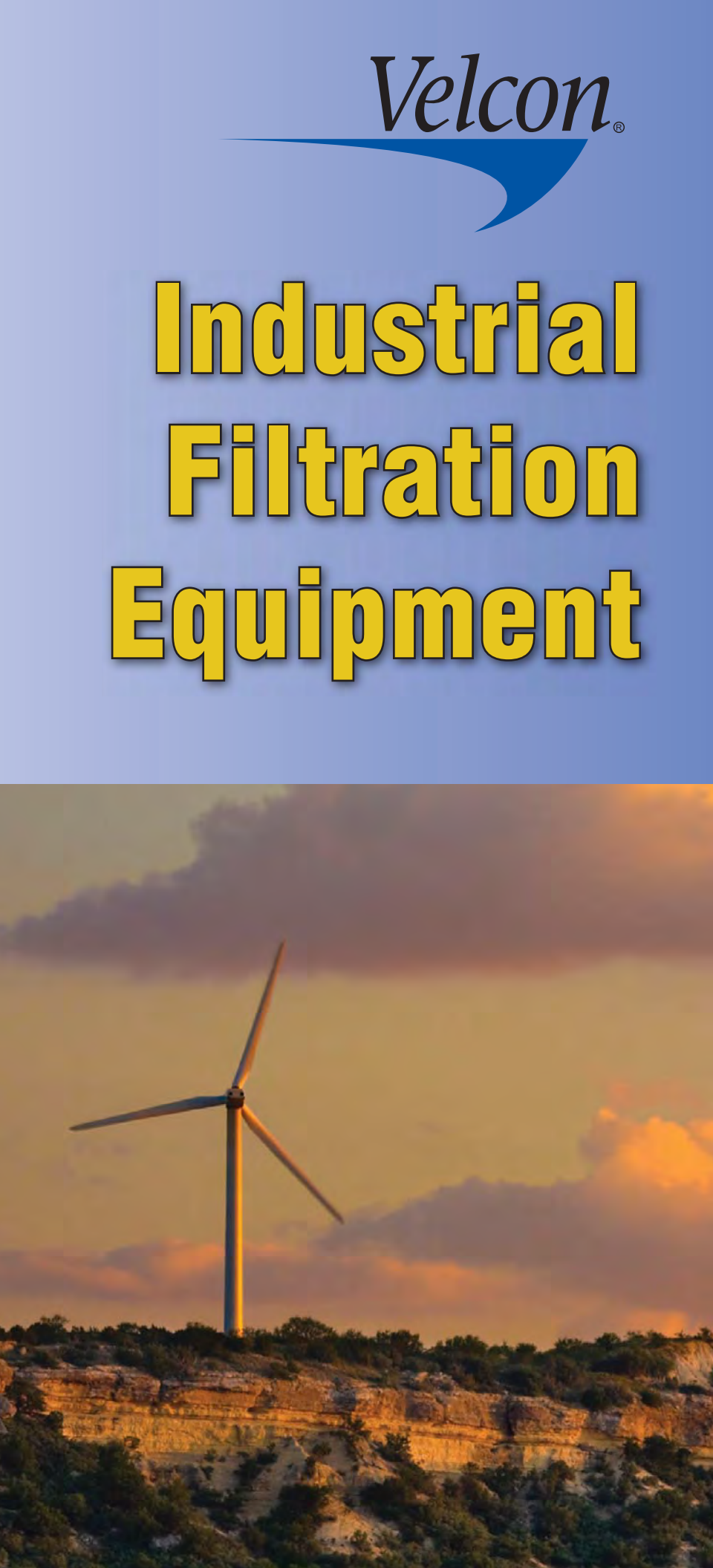
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Velcon®

Industrial Filtration Equipment

Filter Selection Table



Portable Filter Pumps



MP5
(#1535)
MP1EG
(#1721)
MP5E
(#1661)



MCP5E/MDP5E
(#1691)
AVF
(#2023)
HP10/HP30
(#1604)

Stationary Housings



VF-62
(#2076)
VF-61
(#1997)
VF-609
(#1997)
VF-31E
(#1997)



Vel-Max®
(#1961)
VF-71E
(#1654)
VF-166C/VF-2012C
(#1588)
VF82B
(#1708)

Filter Systems



TOC30 (#1751)
TOC5 (#1857)
HCP/HDP (#1693)

Typical Solutions for Industrial Applications Equipment/Cartridge Combinations

For more detailed information, please refer to individual data sheets as indicated by the form # listed below photos or in parenthesis in the table.

Problem	Type of Fluid/Applications	Solution
1. Water and Dirt in Oils	Lube Oil Gear Oil Hydraulic Oil Turbine Oil	1a. Portable Filter Pumps The MP5, 5 GPM Portable Filter Pump is typical and widely used in industry. Use with Aquacon® cartridge (#1582) or FO-718PL pleated media (#1549)
		1b. Stationary Filter Housings and Aquacon® Cartridges Note that Aquacon® super-absorbent filters have become the industry standard for dirt and water removal. See #1770 for more info.
		1c. Turbine Oil Coalescing System (#1751, 1857) Use TOC30 System at 30GPM flow rate.
2. Water and Carbon in Insulating Oils	Transformer Oil Circuit Breaker Oil Switch Gear Oil Tap Changer Oil	2a. Aquacon® Cartridges in Portable Filter Pumps MP-5 at 5 GPM and HP-30 at 30GPM flow rate.
		2b. Insulating Oil Filter Systems Use Aquacon® Cartridges in HCP-30 and TO-30 Systems at 30GPM flow rates.
		2c. Aquacon® 1, 2, 3, and 4-Hi Cartridges (#1684) Replacements for Alsop and Cuno disk type cartridges and Hilco blotter paper filters in existing housings.
3. Water and Dirt in Fuels	Gasoline Diesel Kerosene	3a. Aquacon® Cartridges in VF-61, VF-62 or VF-31E Housings (#1655) Positive Shut-Off features prevents pumping of contaminated fuel. Use Coalescer Cartridges in high volume applications.
		3b. Spin-On Aquacon® Cartridges (#1717) Use on gasoline and diesel fuel dispensers.
		4. High Surface Area Pleated Media and Fiberglass Depth Media Cartridges (#1550) Use in Stationary Housings at 1 to 600 GPM or Portable Filter Pumps at 1 to 30 GPM.
4. Dirt (Particulates) In Oils and Fuels	All Oils All Fuels	5. Adsorbent Cartridges: Fullers Earth or Activated Alumina (#1667) Use in Stationary Housings or Portable Filter Pumps.
5. Acid in Oils	Vacuum Pump Oil	6. Air Aquacon® Filter Cartridge in VF-31E Housing (#1689) "Foolproof" 99.9+% water removal with positive lock-in and positive shut-down. Gross water removal via petcock.
6. Water and Dirt in Compressed Air	Industrial Compressed Air Instrument Air	7. Solvent Aquacon® Cartridges (#1692) Use in Stationary Housings. Typical: 1 to 80 GPM, down to 10 ppm water in effluent with 1 micrometer particulate rating.
7. Water and Dirt in Solvents	Hexane Toluene 1,1,1 -Trichlorene	

Aquacon® Cartridges



Aquacon® - Industrial
(#1582)



Air Aquacon® ACA-210
(#1689)



Aquacon® Spin-on Industrial
(#1717)

Other Filter Cartridges



Synthetic FOS
(#1734)



Fiberglass FO-xxxFG
(#1550)



Pleated Filters
(#1549)



Coalescers
(#1561)



Adsorbent LA-6xx
(#1667)

Velcon Filters, LLC Divisions

Aviation

Aviation Division provides filtration and fueling solutions for jet fuels and avgas.



Industrial

Industrial Division provides filtration and fueling solutions for hydraulic & lube oils, diesel, and biodiesel fuels.



Systems

Velcon Systems provides filtration solutions for insulating oil in transformers, circuit breakers, and load tap changers.



Process

Velcon Process provides filtration for the process industry, including food & beverage, refining, chemicals, gas, pipelines and process water.



Velcon Filters manufactures hundreds of different filter cartridges, with a range of filtration efficiencies in a variety of configurations, to meet specific industry filtration requirements.

In order to support the development and testing of these products, Velcon maintains one of the world's largest laboratories used exclusively for fluid clarification research and testing. Filtration tests can be conducted in jet fuel, diesel/biodiesel fuels, insulating oil, and hydraulic oil. Analytical equipment includes instruments for determination of beta ratio, ISO cleanliness, water in oil content, fluid dielectric strength, interfacial tension, and contaminant identification by FT-IR.

For more information, and to discuss your specific requirements, please contact your local Velcon Representative.



Velcon products are sold and serviced by a world-wide representative network. To order, contact Headquarters or your **LOCAL REPRESENTATIVE**:

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e-mail: vfsales@velcon.com
www.velcon.com

MANUFACTURING PLANTS LOCATED AT:
Colorado Springs, Colorado
Sylacauga, Alabama
Henryetta, Oklahoma

OFFICES AND AFFILIATES IN:
Canada, Germany, Singapore, & Spain



**Liquid Filtration
and Separation
Specialists**



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



CLEANDiesel®

Solutions for Diesel Fuel Filtration



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 systems (HPCR), 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.



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 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.

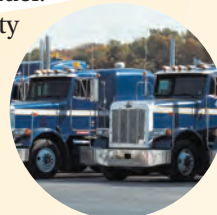
Power Generation

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.



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.

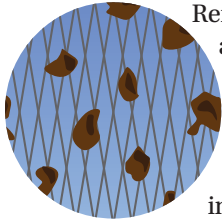
Retail

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



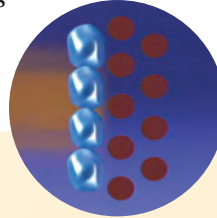
Removing fine and abrasive silica and pipe scale particles reduces engine wear, increases up-time and allows

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)

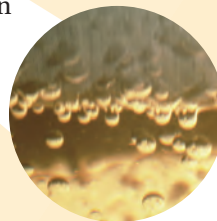
Velcon has been the leader in providing products that can absorb (chemically bind) free water, while filtering particulate from diesel fuel. Our Aquacon[®] AD Series products have over a 30 year history of proven application success and is ideal for use in fuel polishing.



- 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.

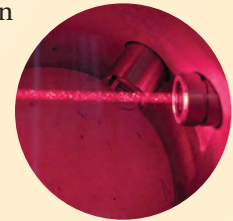


- Removes water from bulk diesel fuel
- Meets stringent ASTM D975 and ISO 4406 fuel cleanliness standards
- Flow rates from 100 to 5000 gpm

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.



- VCA[®]-D (Velcon Contaminant Analyzer for Diesel): 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, icountOS: portable and online particle counters with proven laser detection technology
- HKD (Hydrokit[®] Diesel): 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.

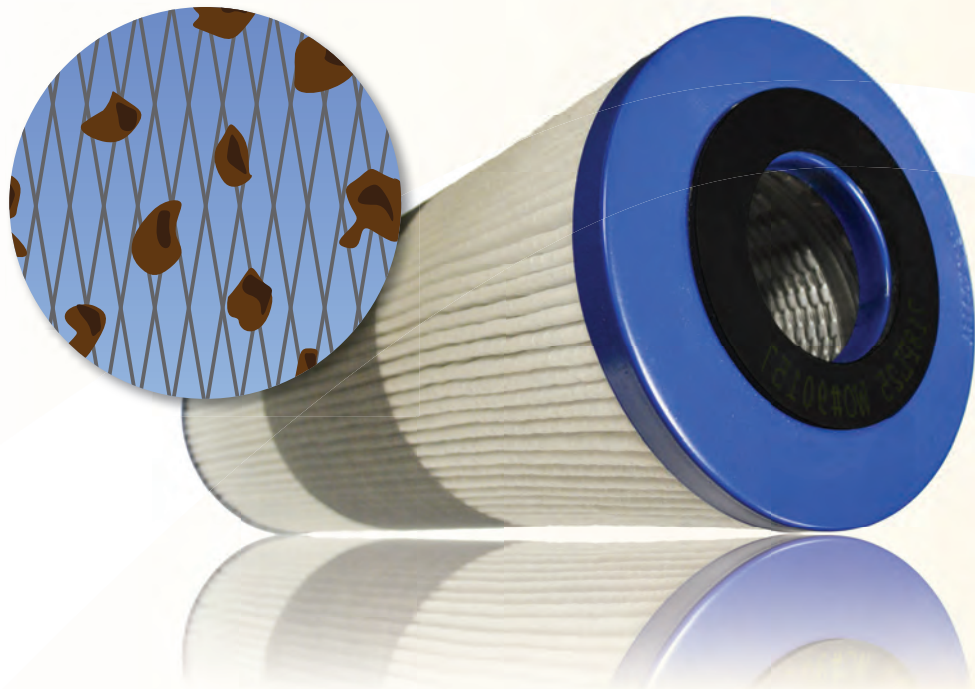
Velcon's DFO filters transform contaminated fuels to meet stringent downstream ISO 4406 cleanliness standards for the demanding limits placed on diesel and biodiesel fuels. The DFO design balances high surface area and depth filtration to maximize filter life which reduces filtration costs.

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 13-16 for details)



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

Vel-Max® (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	<p>Example:</p> <p>DFO-614PLF25</p> <p>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)</p>
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)	

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

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

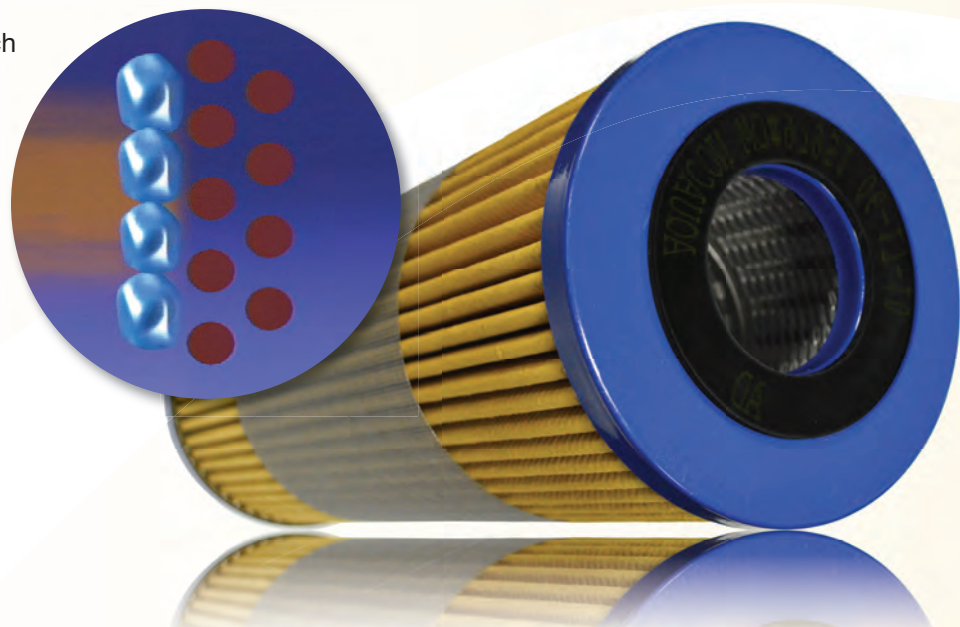
- The 10, 25 and 40 micron rated filters are ideal for managing fuel contamination entering and leaving terminal storage tanks throughout the fuel transfer process

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 13-16 for details)



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	<i>Example:</i> 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).
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 (112) 56 – 56 1/8 (143)	2, 4, 6, 10, 25, 40	TB (Threaded base)	

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.

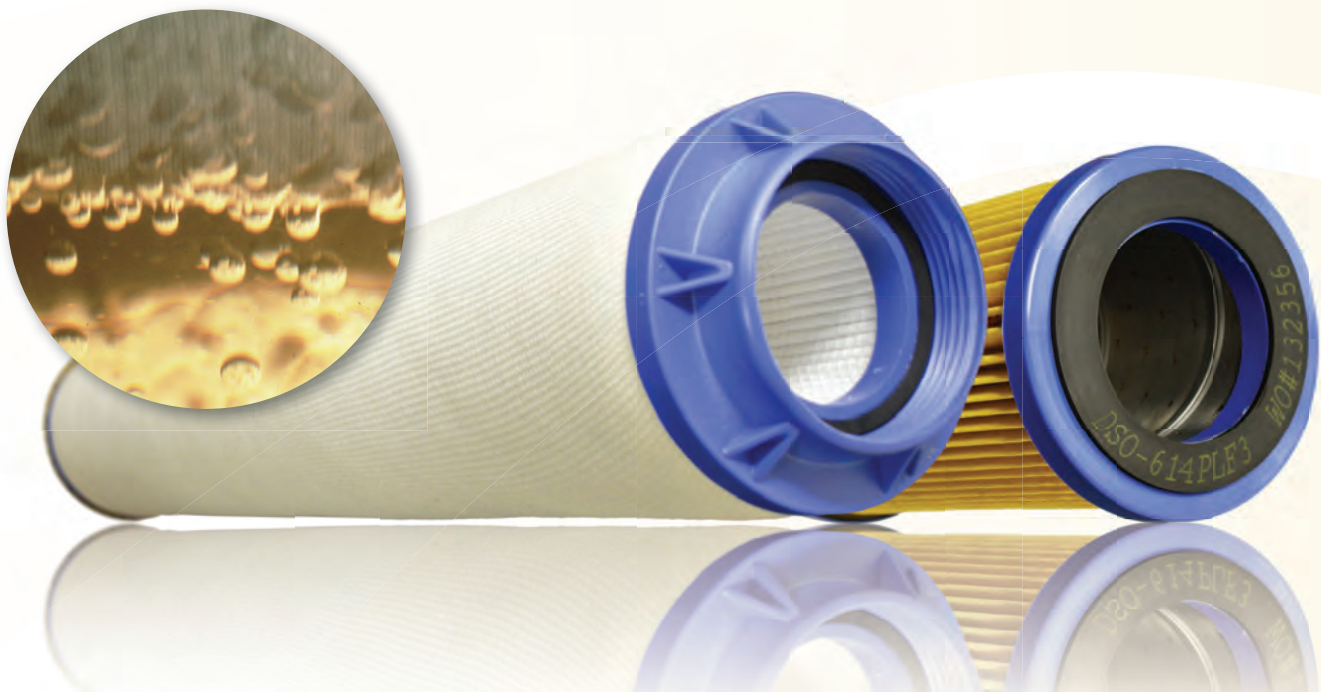
The first stage in the DI coalescer removes particles through an inside-out flow and coalesces emulsified water into large droplets, which then fall to the housing sump. In the second stage, an outside-in process, the DSO separator creates a hydrophobic barrier to block the coalesced water droplets from 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 Page 17 for details)



DV Series
Filter-Coalescer/Separator

DI 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 6 (152)	14 – 14 5/8 (371) 28 – 27 7/8 (709) 33 – 33 (838) 38 – 38 (965) 44 – 44 (1118) 56 – 56 (1422)	D	4, 10, 25	TB (Threaded base)

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 6 (152)	14 – 14 5/8 (371) 29 – 29 1/8 (737) 33 – 33 1/4 (914) 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, 4, or 6 in.
- 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



icountOS

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 hydraulic fluid 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 IOS 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 download onto any PC or laptop via a universal RJ45 connection interface
- 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
- Repeatability 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
- icountBSplus 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)



DFS - Diesel Filtration Skid

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
- Water slug valve
- Automatic vessel drain
- Water sight glass
- Fuel Condition Monitoring



DFS3
(with Optional Support Hand Rail)

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)	I/O Flange mm (in)
	Range lpm (gpm)	Target lpm (gpm)		Qty.	Length mm (in)		Qty.	Length mm (in)	Qty.	Length mm (in)		
DFS1	500 - 1250 (135 - 330)	750 (200)	DVF1629	4	737 (29)	V2233	4	838 (33)	3	838 (33)	1778 x 1524 (70 x 60)	102 (4)
DFS2	865 - 2160 (230 - 570)	1300 (345)	DVF1644	4	1118 (44)	V2838	6	965 (38)	5	838 (33)	2032 x 1524 (80 x 60)	102 (4)
DFS3	1585 - 3955 (420 - 1045)	2380 (630)	DVF2044	6	1118 (44)	V3638	11	965 (38)	9	838 (33)	2794 x 2032 (110 x 80)	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

Small Housings for Diesel Fuel Filtration

Product Specifications

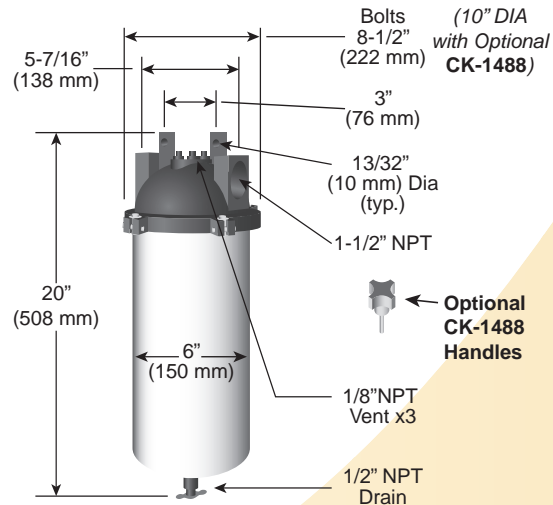
- Max. Operating Pressure: 150 psi
- Inlet/Outlet connection: 1-1/2" NPT
- Closure Seal: Buna-N O-ring (P/N G-0986)
- 1/8" brass petcock vent valve and 1/2" drain valve
- Material: Die cast aluminum head and closure clamp assembly; carbon steel shell with epoxy coated exterior and interior
- Weight:
 - 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

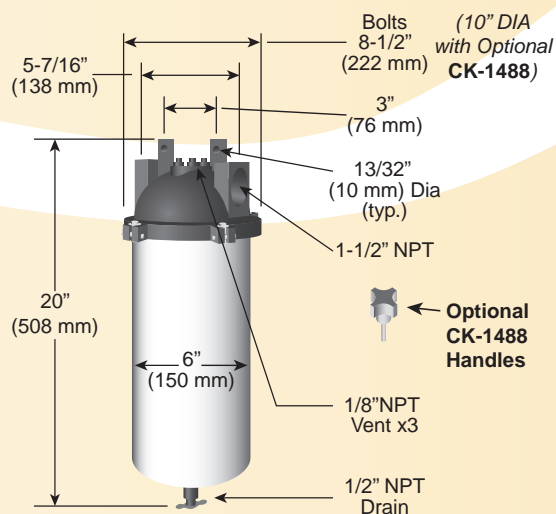
- dP Gauge



VF-61 (For use with AD-5 and DFO-5 Cartridges)



VF-62 (For use with AD-5 and DFO-5 Cartridges)



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

Vel-Max[®] Housings

Housings for Diesel Fuel Filtration

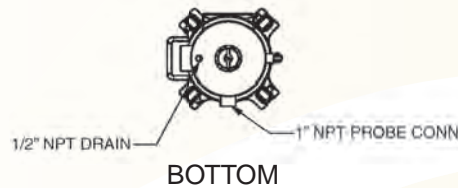
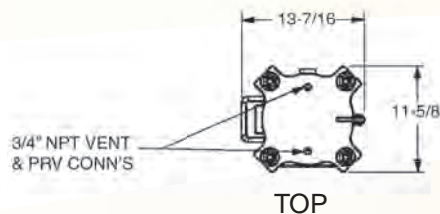
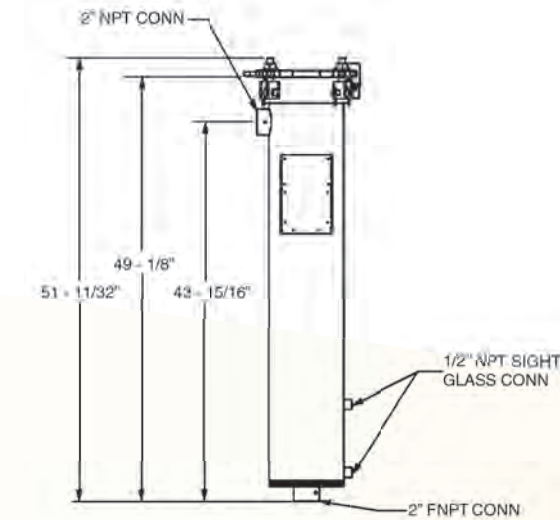
For use with AD-6 and DFO-6 Cartridges

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)

Optional Features

- Air eliminator
- Drain valve
- Pressure relief valve
- Water probe
- Sight gauge
- Leg assembly with adjustable height
- ASME Code Stamp
- CE Mark
- Differential pressure gauge assembly
- Lid Gasket: G-2052V (Viton[®])
- Duplex Configuration

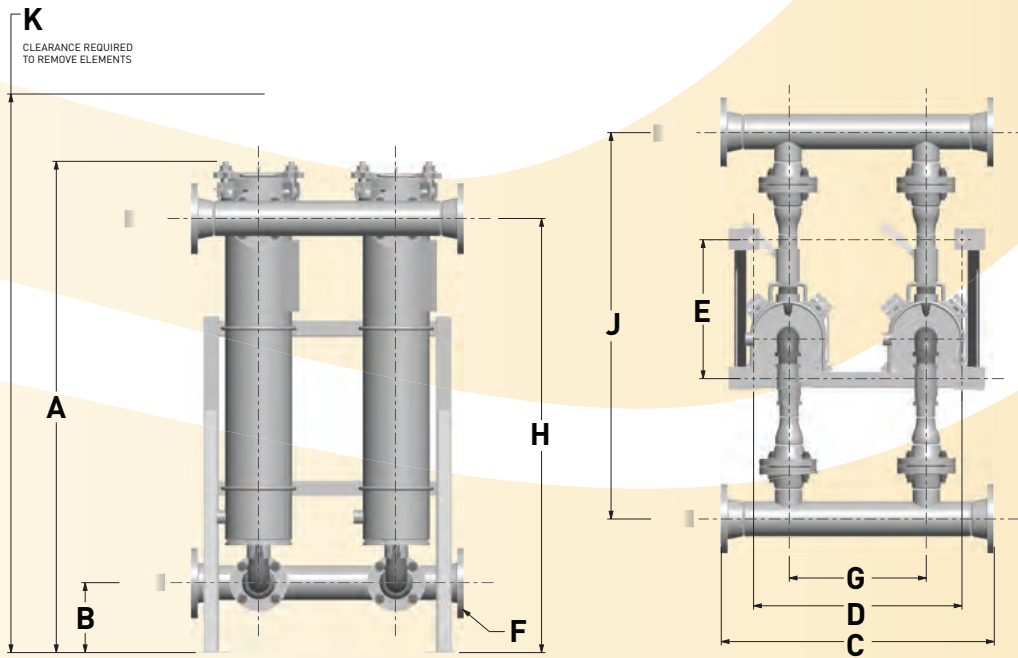
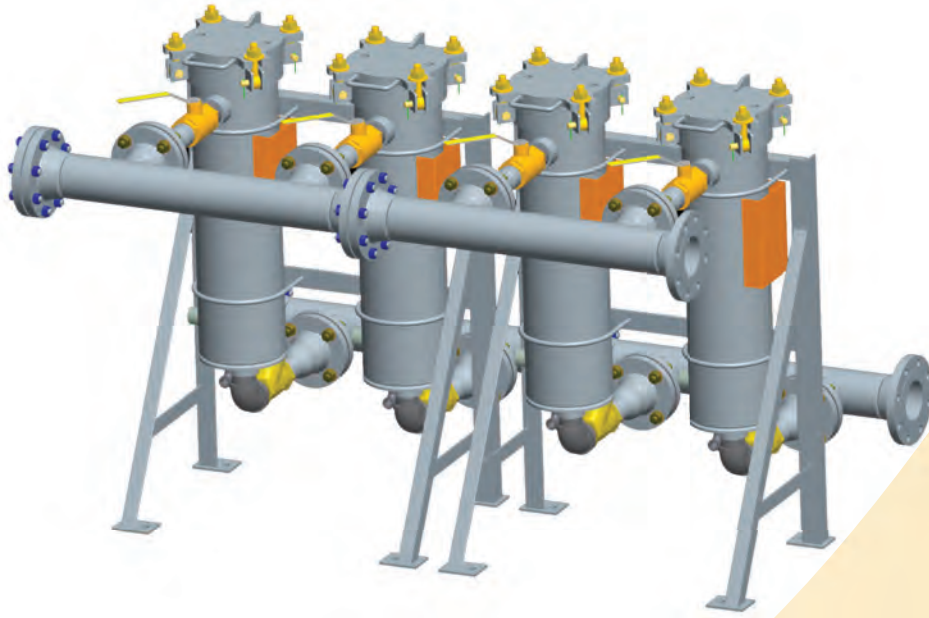


Vel-Max
(VX-2 shown
with optional leg
assembly)

Model	Height		Cover Width		Cover Length		Dry Weight	
	in.	mm	in.	mm	in.	mm	lbs.	kgs
VX-1	36	914	13 7/16	341	11 5/8	295	110	50
VX-2	51	1295	13 7/16	341	11 5/8	295	125	57
VX-3	66	1676	13 7/16	341	11 5/8	295	150	68

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

Duplex Option



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

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

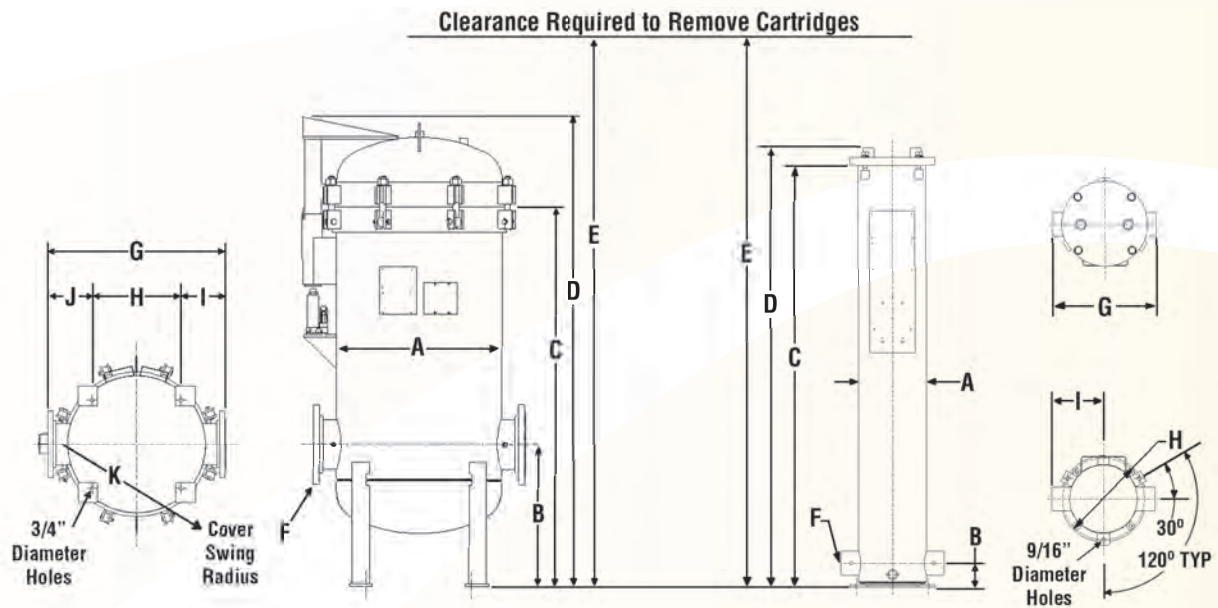


Figure 1

Figure 2

Model	Flow Rate Range lpm (gpm)		Length mm (in.)	Fig. No.	Qty.	Dimensions mm (in.)													Wt. w/Skid kgs (lbs)	Volume ltr. (U.S. gal)
	Min	Max				A	B	C	D	E	F	G	H	I	J	K				
DVF829	110 (29)	496 (131)	737 (29)	2	1	219 (8 5/8)	76 (3)	991 (57 1/16)	1045 (41 1/8)	1727 (68)	330 (13)	264 (10 3/8)	165 (6 1/2)			120 (65)	30 (8)			
DVF844	167 (44)	750 (198)	1118 (44)	2	1	219 (8 5/8)	76 (3)	1449 (57 1/16)	1510 (59 7/16)	2565 (101)	330 (13)	264 (10 3/8)	165 (6 1/2)			138 (305)	42 (11)			
DVF1629	439 (116)	1976 (522)	737 (29)	2	4	406 (16)	381 (15)	1341 (52 13/16)	1418 (55 13/16)	2083 (82)	102 (4)	229 (9)	194 (7 5/8)	194 (7 5/8)	468 (18 7/16)	254 (560)	132 (35)			
DVF1644	666 (176)	2998 (792)	1118 (44)	2	4	406 (16)	381 (15)	1695 (66 3/4)	1772 (69 3/4)	2794 (110)	102 (4)	229 (9)	194 (7 5/8)	194 (7 5/8)	468 (18 7/16)	281 (620)	189 (50)			
DVF2044	999 (264)	4497 (1188)	1118 (44)	2	6	508 (20)	495 (19 1/2)	1895 (74 3/8)	2043 (80 7/16)	2997 (118)	152 (6)	330 (13)	191 (7 1/2)	191 (7 1/2)	660 (26)	499 (1100)	341 (90)			
DVF2444	1332 (352)	5996 (1584)	1118 (44)	1	8	610 (24)	533 (21)	1651 (65)	1829 (72)	2845 (112)	152 (6)	381 (15)	203 (8)	203 (8)	813 (32)	590 (1300)	454 (120)			
DVF2456	1696 (448)	7631 (2016)	1422 (56)	1	8	610 (24)	533 (21)	1956 (77)	2134 (84)	3099 (122)	152 (6)	381 (15)	203 (8)	203 (8)	813 (32)	612 (1350)	568 (150)			
DVF2844	1999 (528)	9006 (2379)	1118 (44)	1	12	711 (28)	610 (24)	1635 (64 3/8)	2026 (79 3/4)	2743 (108)	203 (8)	457 (18)	229 (9)	229 (9)	889 (35)	726 (1600)	625 (165)			
DVF2856	2544 (672)	11447 (3024)	1422 (56)	1	12	711 (28)	610 (24)	1940 (76 3/8)	2330 (91 3/4)	3048 (120)	203 (8)	457 (18)	229 (9)	229 (9)	889 (35)	794 (1750)	757 (200)			
DVF3644	2998 (792)	13491 (3564)	1118 (44)	1	18	930 (36 3/8)	660 (26)	1635 (64 3/8)	2134 (84)	2769 (109)	254 (10)	584 (23)	318 (12 1/2)	318 (12 1/2)	1118 (44)	1021 (2250)	1088 (290)			
DVF3656	3816 (1008)	17171 (4536)	1422 (56)	1	18	930 (36 3/8)	660 (26)	1940 (76 3/8)	2438 (96)	3073 (121)	254 (10)	584 (23)	318 (12 1/2)	318 (12 1/2)	1118 (44)	1089 (2400)	1325 (350)			
DVF4244	4497 (1188)	20237 (5346)	1118 (44)	1	27	1086 (42 3/4)	711 (28)	1676 (66)	2219 (87 3/8)	2794 (110)	305 (12)	711 (28)	330 (13)	330 (13)	1327 (52 1/4)	1724 (3800)	1514 (400)			
DVF4256	5724 (1512)	25756 (6804)	1422 (56)	1	27	1086 (42 3/4)	711 (28)	1981 (78)	2499 (98 3/8)	3099 (122)	305 (12)	711 (28)	330 (13)	330 (13)	1327 (52 1/4)	1814 (4000)	1788 (475)			
DVF4856	6995 (1848)	31479 (8316)	1422 (56)	1	33	1219 (48)	737 (29)	2032 (80)	2743 (108)	4191 (165)	356 (14)	927 (36 1/2)	375 (14 3/4)	375 (14 3/4)	1651 (65)	1996 (4400)	2385 (630)			
DVF5456	8903 (2352)	40065 (10584)	1422 (56)	1	42	1397 (55)	787 (31)	2083 (82)	2870 (113)	4216 (166)	406 (16)	1041 (41)	394 (15 1/2)	394 (15 1/2)	1829 (72)	2268 (5000)	3975 (1050)			
DVF6056	10599 (2800)	47696 (12600)	1422 (56)	1	50	1549 (61)	914 (36)	2235 (88)	3023 (119)	4445 (175)	457 (18)	1156 (45 1/2)	413 (16 1/4)	413 (16 1/4)	1905 (75)	3084 (6800)	4845 (1280)			

1. For higher viscosity fluids or operating in highly variable temperature conditions, consult your Valcon Representative.
2. VFD Series are designed to accommodate our standard 6 in. O.D., 3 1/2 in. I.D. cartridges including Valcon's DFO, DI, DSO, and Aquacore® AD.
3. Three dead 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. VFD16 and VFD20 Series vessels have flat covers. VFD16 Series vessels do not have hydraulic lift jacks.

DV Series

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

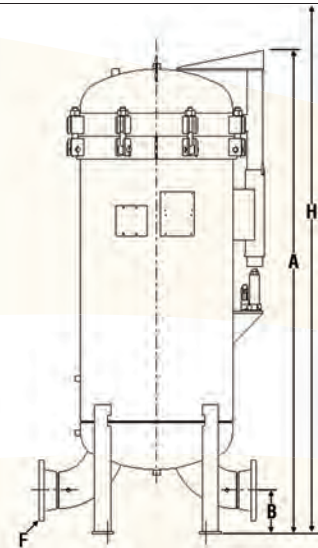
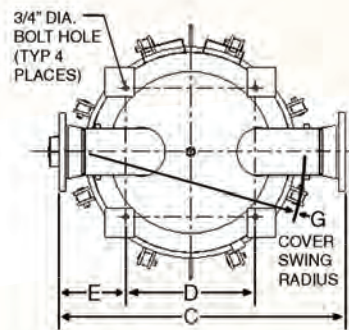
Optional Accessories

- 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.



Clearance Required to Remove Cartridges



Vessel Model Number	Flow Rate Range lpm (gpm)		DI/DSO		Dimensions mm (in.)								Wt. w/ Skid kgs (lbs)	Volume ltr (U.S. gal)
	Min - Max	Target	Length mm (in.)	Qty. (C/S)	A	B	C	D	E	F	G	H		
V2222	335 - 835 (90 - 220)	500 (130)	559 (22)	4/3	1575 (62)	203 (8)	689 (27 1/4)	394 (15 1/2)	159 (6 1/4)	102 (4)	762 (30)	2184 (86)	503 (1110)	242 (64)
V2233	500 - 1250 (135 - 330)	750 (200)	838 (33)	4/3	1753 (69)	203 (8)	689 (27 1/4)	394 (15 1/2)	159 (6 1/4)	102 (4)	762 (30)	2591 (102)	513 (1130)	273 (72)
V2833	750 - 1875 (200 - 495)	1125 (300)	838 (33)	6/5	2108 (83)	203 (8)	1016 (40)	457 (18)	321 (12 5/8)	152 (6)	889 (35)	2997 (118)	748 (1650)	644 (170)
V2844	1000 - 2500 (265 - 660)	1500 (400)	1118 (44)	6/5	2261 (89)	203 (8)	1016 (40)	457 (18)	321 (12 5/8)	152 (6)	889 (35)	3378 (133)	767 (1690)	700 (185)
V3638	1585 - 3955 (420 - 1045)	2380 (630)	965 (38)	11/9	2326 (91 5/8)	203 (8)	1607 (63 1/4)	584 (23)	511 (20 1/2)	152 (6)	1118 (44)	3277 (129)	943 (2080)	1060 (280)
V3644	1835 - 4580 (485 - 1210)	2750 (730)	1118 (44)	11/9	2448 (96 3/4)	229 (9)	1324 (52 1/2)	584 (23)	371 (14 5/8)	203 (8)	1118 (44)	3556 (140)	975 (2150)	1155 (305)
V3656	2335 - 5830 (620 - 1540)	3500 (930)	1422 (56)	11/9	2786 (109 1/8)	229 (9)	1324 (52 1/2)	584 (23)	371 (14 5/8)	203 (8)	1118 (44)	4064 (160)	1043 (2300)	1344 (355)
V4244	2500 - 6245 (660 - 1650)	3750 (995)	1118 (44)	15/12	2626 (103 3/8)	229 (9)	1405 (55 1/8)	711 (28)	381 (15)	203 (8)	1270 (50)	3810 (150)	1520 (3350)	1703 (450)
V4256	3180 - 7950 (840 - 2100)	4770 (1260)	1422 (56)	15/12	2931 (115 3/8)	229 (9)	1405 (55 1/8)	711 (28)	381 (15)	203 (8)	1270 (50)	4191 (165)	1588 (3500)	1968 (520)

*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.

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

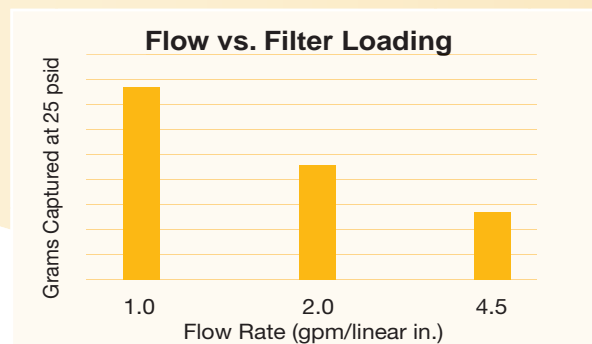
invaluable tool can also help us in estimating your annual operating cost in maintaining your filtration system.

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)

Notes:

Values are based on usage of +3.5M Liter of fuel per year. Field results may vary.



Worldwide Filtration Manufacturing Locations

North America

Compressed Air Treatment Filtration & Separation/Balston

Haverhill, MA
978 858 0505
www.parker.com/balston

Finite Airtek Filtration Airtek/domnick hunter/Zander

Lancaster, NY
716 686 6400
www.parker.com/faf

Finite Airtek Filtration/Finite

Oxford, MI
248 628 6400
www.parker.com/finitefilter

Engine Filtration & Water Purification Racor

Modesto, CA
209 521 7860
www.parker.com/racor

Holly Springs, MS
662 252 2656
www.parker.com/racor

Beaufort, SC
843 846 3200
www.parker.com/racor

Racor – Village Marine Tec.

Gardena, CA
310 516 9911
desalination.parker.com

Parker Sea Recovery

Carson, CA
310 637 3400
www.searecovery.com

Hydraulic Filtration Hydraulic Filter

Metamora, OH
419 644 4311
www.parker.com/hydraulicfilter

Laval, QC Canada
450 629 9594
www.parkerfarr.com

Process Filtration domnick hunter Process Filtration

Oxnard, CA
805 604 3400
www.parker.com/processfiltration

Madison, WI
608 824 0500
www.scilog.com

Phoenixville, PA
610 933 1600
www.parker.com/processfiltration

Aerospace Filtration

Velcon Filtration
Colorado Springs, CO
719 531 5855
www.velcon.com

Europe

Compressed Air Treatment domnick hunter Filtration & Separation

Gateshead, England
+44 (0) 191 402 9000
www.parker.com/dhfn

Parker Gas Separations

Etten-Leur, Netherlands
+31 76 508 5300
www.parker.com/dhfn

Hiross Zander

Padova Business Unit
Padova, Italy
+39 049 9712 111
www.parker.com/hzd

Hiross Zander

Essen Business Unit
Essen, Germany
+49 2054 9340
www.parker.com/hzd

Engine Filtration & Water Purification Racor

Dewsbury, England
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www.parker.com/rfde

Racor Research & Development

Stuttgart, Germany
+49 (0)711 7071 290-10
www.parker.com/rfde

Hydraulic Filtration Hydraulic Filter

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+31 26 3760376
www.parker.com/hfde

Ujala Operation

Ujala, Finland
+358 20 753 2500
www.parker.com/hfde

Condition Monitoring Centre

Norfolk, England
+44 (0) 1842 763 299
www.parker.com/hfde

Parker Kittiwake

West Sussex, England
+44 (0) 1903 731 470
www.kittiwake.com

Parker Procal

Peterborough, England
+44 (0) 1733 232 495
www.kittiwake.com

Process Filtration domnick hunter Process Filtration

Birtley, England
+44 (0) 191 410 5121
www.parker.com/processfiltration

Parker Twin Filter BV

Zaandam, Netherlands
+31(0)75 655 50 00
www.twinfilter.com

Asia Pacific

Australia

Castle Hill, Australia
+61 2 9634 7777
www.parker.com/australia

China

Shanghai, China
+86 21 5031 2525
www.parker.com/china

India

Navi Mumbai, India
+91 22 651 370 8185
www.parker.com/india

Parker Fowler

Bangalore, India
+91 80 2783 6794
www.johnfowlerindia.com

Japan

Tokyo, Japan
+81 45 870 1522
www.parker.com/japan

Parker Techno

Osaka, Japan
+81 66 340 1600
www.techno.taiyo-ltd.co.jp

Korea

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+82 31 359 0852
www.parker.com/korea

Singapore

Jurong Town, Singapore
+65 6887 6300
www.parker.com/singapore

Thailand

Bangkok, Thailand
+66 2186 7000
www.parker.com/thailand

Latin America

Parker Comercio Ltda. Filtration Division

Sao Paulo, Brazil
+55 12 4009 3500
www.parker.com/br

Pan American Division

Miami, FL
305 470 8800
www.parker.com/panam

Africa

Aeroporto Kempton Park, South Africa
+27 11 9610700
www.parker.com/africa



FACILITIES OVERVIEW & MISSION

The Velcon Laboratories Analytical Lab 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 fluid samples. Using our broad range of cutting edge technology and diagnostic equipment, Velcon is committed to manufacturing quality products and providing industry leading filtration. Equipment and testing is performed within the guidelines of ASTM, ISO, SAE, and ANSI standards. At Velcon, we stand behind our products, as we continue to seek solutions to ensure quality fuel whenever, and wherever, it's needed.



LABORATORY CAPABILITIES AND EQUIPMENT

30 keV SEM Scanning Electron Microscope (SEM) with Energy Dispersive X-Ray Spectroscopy (EDS)

- Analyze both liquid and solid samples up to 120,000X magnification using a high energy beam of electrons in a raster scan pattern in order to determine topography, composition, and electrical conductivity.
- Determines the elemental composition or chemical characterization of a sample, or discriminate particulate.
- Particularly useful in assessing the composition of individual particles, or granules, from various sources for quality control and failure analysis. Returned cartridge contamination can be isolated on the scale of micrometers and individually analyzed. Root cause analysis of the contamination source can then be performed.



Fourier Transform Infrared (FT-IR) Spectrometer

- Analyzes both liquid and solid materials, using infrared light to determine molecular composition.
- Measures the amount of absorbance and reflectance through a material sample across the infrared spectrum.
- Results of the spectral analysis are compared against a database of patterns in order to determine particulate contamination of organic compounds on filter media.
- The FT-IR analysis is helpful in determining particulate contamination on various filter media, as well as additional sources. Once a contaminant is identified, possible sources can be traced to alleviate the downstream filtration issues.





Porometer

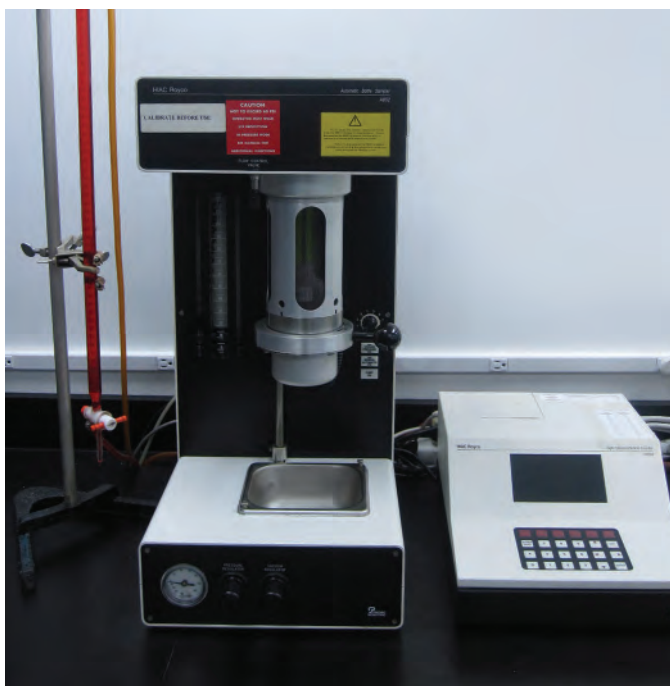
- Determines the following characteristics of flow porometry for media and filter samples:
 - » Pore Size Distribution
 - » Bubble Point Measurement
 - » Air Permeability
- Accurately measures the characteristics of filter media for new product development.
- Allows for benchmark testing of Velcon media against competitor cartridges.

Particle Counter and Automatic Bottle Sampler

- Determine both the particle sizing characteristics and the particle distribution of a liquid sample with the single and multi-pass filter method within the guidelines of ASTM and ISO standards.
- Uses hydraulic fluid as a baseline for bottle sampling.
- 8 Channel Particle Counter reports results down to 1 μ m levels.
- Results of an analysis are characterized as ISO Codes, Beta Ratios, and Efficiency Ratings.
- Particle size distribution analyses are helpful in determining the most efficient and effective filtration cartridges for use in various applications. A large accumulation of 1 μ m particulate in a sample will require specific filtration, as opposed to an accumulation of 25 μ m $>$ particles.

Karl Fischer Titration

- A coulometric titration of a liquid sample in order to determine trace amounts of water.
- Results are reported at PPM levels and percentage of total water is established.
- KF Titration measures the amount of total water within a sample, including both free water and saturated water. Free water content is calculated based on fuel saturation curves.
- Establishing the amount of free water present in fluid samples is helpful in determining the best possible filtration solution.
- Before and after filtration tests of free water present in a sample provide immediate feedback for quality control and verification of the filtration process.



Microscope Station

- General spectroscopy and close-up imaging of particulate contamination for analysis.
- Allows for in-depth analysis of returned cartridges, or “filter autopsies”.
- Magnified image capturing can facilitate in particulate contamination sources.

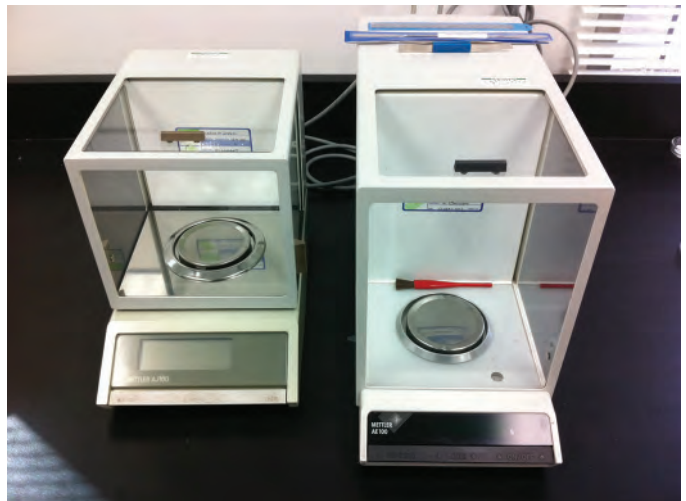


Viscosity & pH Balance Station

- The viscosity of a liquid sample can be determined.
- The pH levels of a liquid sample can be determined.

Analytical Balances

- Measures the amount of gravimetric contamination.
- Allows for accurate, and efficient results of particulate analysis.
- Helpful in determining the amount of total suspended solids within a fluid sample for filter life estimation, as well as effective filtration methods.



Products are sold and serviced by a worldwide network of representatives.
To order, contact the Velcon Filtration Division headquarters or a local Velcon representative:

Division Headquarters

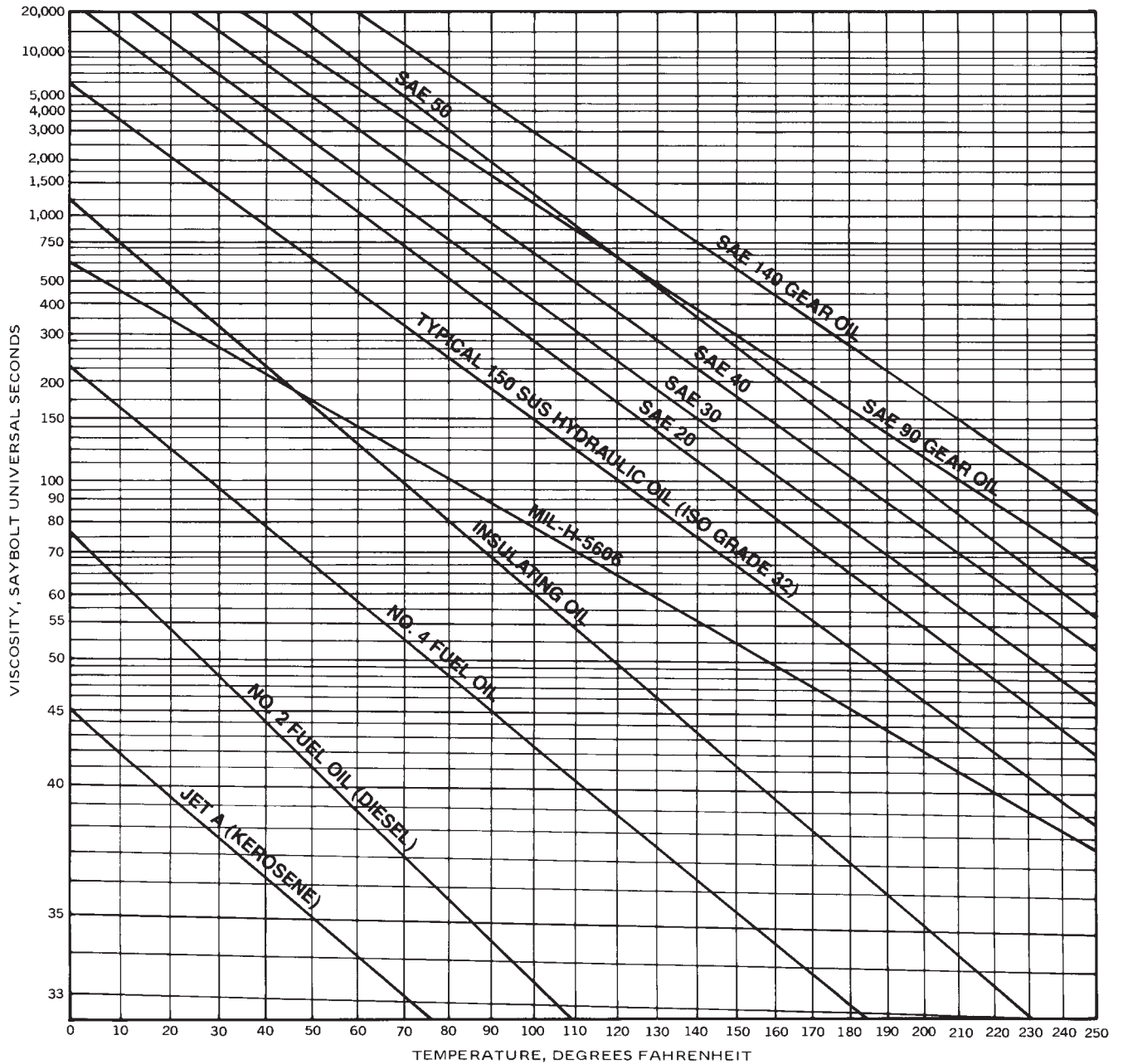
Parker Hannifin Corporation | Filtration Group | Velcon Filtration Division
1210 Garden of the Gods Road, Colorado Springs, CO 80907-3410
+1 800 531 0180 | +1 719 531 5855 | +1 719 531 5690 Fax
vfsales@parker.com | www.velcon.com

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Centistokes to Saybolt Universal Seconds Conversion

To convert centistokes to Saybolt Universal Seconds, find the centistoke value on the table at left and then read across to find the equivalent value in Saybolt Universal Seconds.

EXAMPLE:

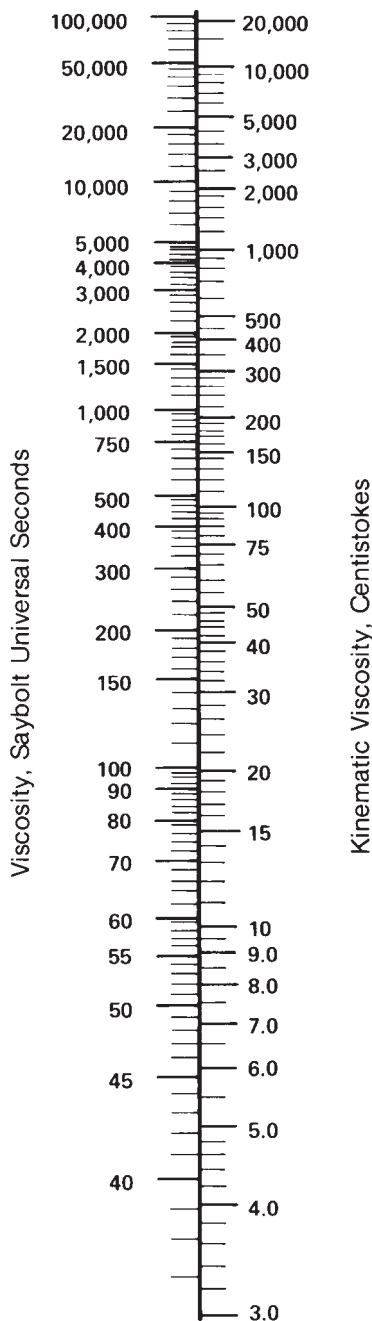
A viscosity of 30 centistokes is equivalent to 140 Saybolt Universal Seconds.

NOTES:

- a) If the viscosity is given in centipoise (cp), it can be readily converted to centistokes (cs) by the formula:

$$\text{centistokes} = \frac{\text{centipoise}}{\text{specific gravity}}$$

- b) Centistokes are often designated by cSt.
 c) Saybolt Universal Seconds are designated by either SUS or SSU



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3. **Delivery Dates; Title and Risk; Shipment.** All delivery dates are approximate and Seller shall not be responsible for any damages resulting from any delay. Regardless of the manner of shipment, title to any products and risk of loss or damage shall pass to Buyer upon placement of the products with the shipment carrier at Seller's facility. Unless otherwise stated, Seller may exercise its judgment in choosing the carrier and means of delivery. No deferment of shipment at Buyers' request beyond the respective dates indicated will be made except on terms that will indemnify, defend and hold Seller harmless against all loss and additional expense. Buyer shall be responsible for any additional shipping charges incurred by Seller due to Buyer's acts or omissions.

4. **Warranty.** Seller warrants that the Products sold hereunder shall be free from defects in material or workmanship for a period of twelve (12) months from the date of delivery to Buyer. The prices charged for Seller's products are based upon the exclusive limited warranty stated above, and upon the following disclaimer: **DISCLAIMER OF WARRANTY: THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO PRODUCTS PROVIDED HEREUNDER. SELLER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS AND IMPLIED, INCLUDING DESIGN, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**

5. **Claims; Commencement of Actions.** Buyer shall promptly inspect all Products upon delivery. No claims for shortages will be allowed unless reported to the Seller within 10 days of delivery. No other claims against Seller will be allowed unless asserted in writing within 30 days after delivery. Buyer shall notify Seller of any alleged breach of warranty within 30 days after the date the defect is or should have been discovered by Buyer. Any action based upon breach of this agreement or upon any other claim arising out of this sale (other than an action by Seller for an amount due on any invoice) must be commenced within 12 months from the date of the breach without regard to the date breach is discovered.

6. **LIMITATION OF LIABILITY.** UPON NOTIFICATION, SELLER WILL, AT ITS OPTION, REPAIR OR REPLACE A DEFECTIVE PRODUCT, OR REFUND THE PURCHASE PRICE. **IN NO EVENT SHALL SELLER BE LIABLE TO BUYER FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR AS THE RESULT OF, THE SALE, DELIVERY, NON-DELIVERY, SERVICING, USE OR LOSS OF USE OF THE PRODUCTS OR ANY PART THEREOF, OR FOR ANY CHARGES OR EXPENSES OF ANY NATURE INCURRED WITHOUT SELLER'S WRITTEN CONSENT, EVEN IF SELLER HAS BEEN NEGLIGENT, WHETHER IN CONTRACT, TORT OR OTHER LEGAL THEORY. IN NO EVENT SHALL SELLER'S LIABILITY UNDER ANY CLAIM MADE BY BUYER EXCEED THE PURCHASE PRICE OF THE PRODUCTS.**

7. **User Responsibility.** The user, through its own analysis and testing, is solely responsible for making the final selection of the system and Product and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application and follow applicable industry standards and Product information. If Seller provides Product or system options, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the Products or systems.

8. **Loss to Buyer's Property.** Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which become Buyer's property, will be considered obsolete and may be destroyed by Seller after two consecutive years have elapsed without Buyer ordering the items manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

9. **Special Tooling.** A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture Products. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the Products, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

10. **Buyer's Obligation; Rights of Seller.** To secure payment of all sums due or otherwise, Seller shall retain a security interest in the goods delivered and this agreement shall be deemed a Security Agreement under the Uniform Commercial Code. Buyer authorizes Seller as its attorney to execute and file on Buyer's behalf all documents Seller deems necessary to perfect its security interest.

11. **Improper use and Indemnity.** Buyer shall indemnify, defend, and hold Seller harmless from any claim, liability, damages, lawsuits, and costs (including

attorney fees), whether for personal injury, property damage, patent, trademark or copyright infringement or any other claim, brought by or incurred by Buyer, Buyer's employees, or any other person, arising out of: (a) improper selection, improper application or other misuse of Products purchased by Buyer from Seller; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, plans, drawings, or specifications furnished by Buyer to manufacture Product; or (d) Buyer's failure to comply with these terms and conditions. Seller shall not indemnify Buyer under any circumstance except as otherwise provided.

12. **Cancellations and Changes.** Orders shall not be subject to cancellation or change by Buyer for any reason, except with Seller's written consent and upon terms that will indemnify, defend and hold Seller harmless against all direct, incidental and consequential loss or damage. Seller may change product features, specifications, designs and availability with notice to Buyer.

13. **Limitation on Assignment.** Buyer may not assign its rights or obligations under this agreement without the prior written consent of Seller.

14. **Force Majeure.** Seller does not assume the risk and shall not be liable for delay or failure to perform any of Seller's obligations by reason of circumstances beyond the reasonable control of Seller (hereinafter "Events of Force Majeure"). Events of Force Majeure shall include without limitation: accidents, strikes or labor disputes, acts of any government or government agency, acts of nature, delays or failures in delivery from carriers or suppliers, shortages of materials, or any other cause beyond Seller's reasonable control.

15. **Waiver and Severability.** Failure to enforce any provision of this agreement will not waive that provision nor will any such failure prejudice Seller's right to enforce that provision in the future. Invalidation of any provision of this agreement by legislation or other rule of law shall not invalidate any other provision herein. The remaining provisions of this agreement will remain in full force and effect.

16. **Termination.** Seller may terminate this agreement for any reason and at any time by giving Buyer thirty (30) days written notice of termination. Seller may immediately terminate this agreement, in writing, if Buyer: (a) commits a breach of any provision of this agreement (b) appoints a trustee, receiver or custodian for all or any part of Buyer's property (c) files a petition for relief in bankruptcy on its own behalf, or by a third party (d) makes an assignment for the benefit of creditors, or (e) dissolves or liquidates all or a majority of its assets.

17. **Governing Law.** This agreement and the sale and delivery of all Products hereunder shall be deemed to have taken place in and shall be governed and construed in accordance with the laws of the State of Ohio, as applicable to contracts executed and wholly performed therein and without regard to conflicts of laws principles. Buyer irrevocably agrees and consents to the exclusive jurisdiction and venue of the courts of Cuyahoga County, Ohio with respect to any dispute, controversy or claim arising out of or relating to this agreement.

18. **Indemnity for Infringement of Intellectual Property Rights.** Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Section. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets ("Intellectual Property Rights"). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that a Product sold pursuant to this Agreement infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If a Product is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Product, replace or modify the Product so as to make it noninfringing, or offer to accept return of the Product and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to Products delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any Product sold hereunder. The foregoing provisions of this Section shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

19. **Entire Agreement.** This agreement contains the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of sale. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter are herein merged.

20. **Compliance with Law, U. K. Bribery Act and U.S. Foreign Corrupt Practices Act.** Buyer agrees to comply with all applicable laws and regulations, including both those of the United Kingdom and the United States of America, and of the country or countries of the Territory in which Buyer may operate, including without limitation the U. K. Bribery Act, the U.S. Foreign Corrupt Practices Act ("FCPA") and the U.S. Anti-Kickback Act (the "Anti-Kickback Act"), and agrees to indemnify and hold harmless Seller from the consequences of any violation of such provisions by Buyer, its employees or agents. Buyer acknowledges that they are familiar with the provisions of the U. K. Bribery Act, the FCPA and the Anti-Kickback Act, and certifies that Buyer will adhere to the requirements thereof. In particular, Buyer represents and agrees that Buyer shall not make any payment or give anything of value, directly or indirectly to any governmental official, any foreign political party or official thereof, any candidate for foreign political office, or any commercial entity or person, for the purpose of influencing such person to purchase products or otherwise benefit the business of Seller.

Section 1

Cartridges

Aquacon® , the super-absorbent filter cartridge for purifying oils, fuels and gases

Not only does **Aquacon**'s inner media hold twenty-five times its own weight of water, it's chemically "locked-in".

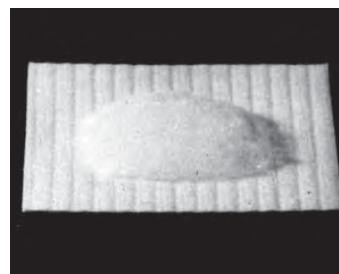
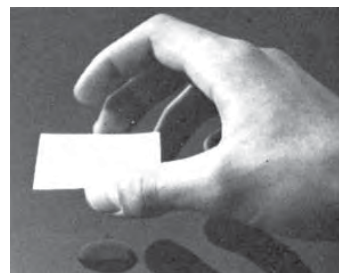
You can't squeeze it out!

When a cartridge reaches its water holding limit, the accordion pleats swell shut and prevent additional water and dirt from escaping downstream.

That's Positive Shutoff.

Prove it to yourself. Try the Squeeze Test.

1. Carefully pour twenty to twenty-five drops of water onto a smooth surface. This makes a small pool about the size of a quarter.
2. Place one of the media samples directly on top of the water.
3. Note how the media swells as it totally absorbs and "locks-in" the water.
4. Place the media sample between thumb and forefinger and squeeze – as hard as you wish. No free water is liberated.



Cutaway of a typical Aquacon® Cartridge showing its unique, patented construction. Note the inner super-absorbent water media, migration barrier, and outer media layer for particulate matter.

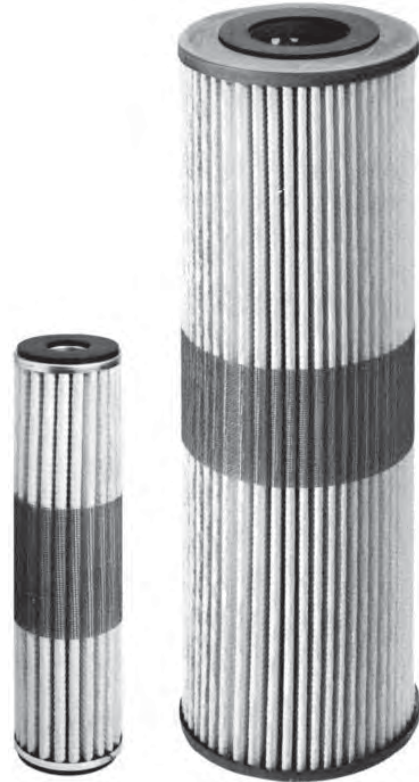
Samples are available on request.

Remove Water and Dirt from Oils, Fuels and Gases

- Removes free and emulsified water to less than 2 ppm
- Differential pressure increase alerts operator to change cartridges
- Effectively filters silt and other particulates
- No media migration or “linting”
- Easy to install and remove
- Does not affect oil additives
- Fits standard filter housings

Aquacon® Cartridges have a patented* construction for removing dirt and water from hydrocarbon and other oils as well as gases. The outer media layer filters out silt, rust and other particulate contaminants. The inner layers absorb water and chemically bond it so that no water will release downstream.

When the **Aquacon** Cartridge reaches its water holding limit, the media swells shut and the differential pressure rapidly increases. This signals the operator that the cartridge must be changed.



APPLICATIONS

Gasoline	Hydraulic Oil
Kerosene	Turbine Lube Oil
Diesel Fuel	Quench Oil
Insulating Oil	Synthetic Oil
Biodiesel	Phosphate Ester Oil

TECHNICAL INFORMATION

1. Maximum operating temperature is 250°F.
2. **Aquacon** Cartridges will shut off flow when loaded with water or dirt. Appropriate precautions should be taken in critical applications where oil flow must be maintained.
3. With some lube and hydraulic oils all of the water may not be removed in one pass, and extra passes will be required for total removal.
4. Water capacity for the AC-718 cartridges ranges from 2 to 4 quarts.

WARNING: Absorbent-type monitor cartridges will not remove water from fuel containing alcohol-blending agents (commonly called gasohol). For removal of solids, please use Velcon particle removal filters specifically made for gasohol. Consult your Velcon representative.

CARTRIDGE INFORMATION

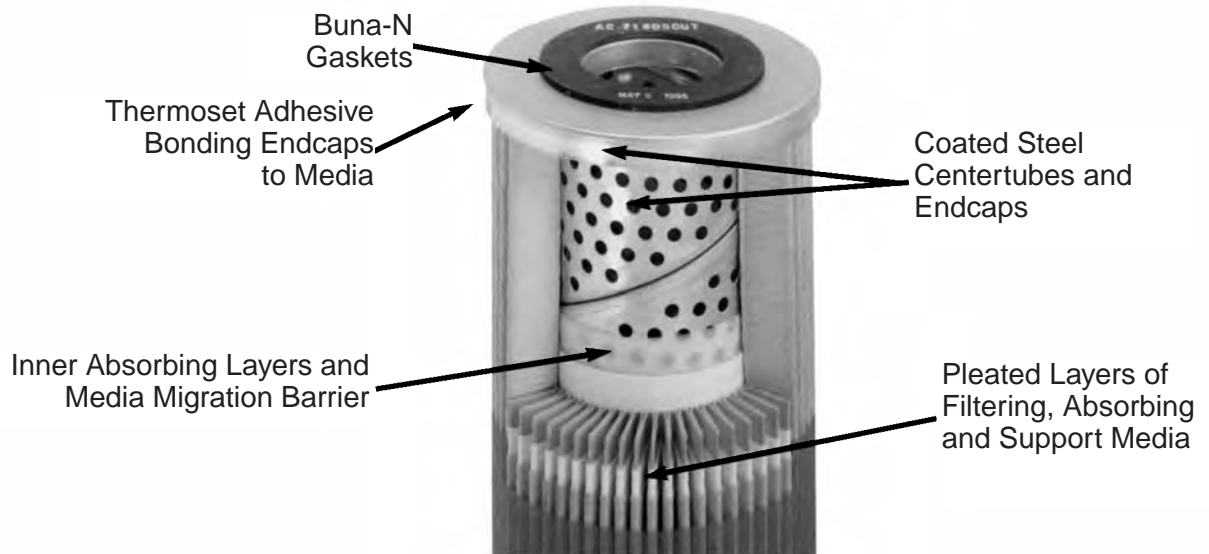
New types of **Aquacon**® Cartridges are being introduced continually. Contact your local Velcon Representative for up-to-date information.

Model Number	Micrometer Reading		I.D. Inches	O.D. Inches	Length Inches	Collapse Pressure, psi	Interchange Information
	Normal	Beta _x = 75					
AC-21005 ⁽¹⁾	5	40	1	2 5/8	9 3/4	75	Fits Velcon VF-31 Housings
AC-5121/2E ⁽²⁾	0.5	3	1 7/8	5 5/8	12 1/8	75	Fits Velcon VF-61 Housings
AC-51205	5	40	1 7/8	5 5/8	12 1/8	75	
AC-61405	5	40	3 1/2	6	14 1/2	100	Interchanges with Velcon FO-614PLF, FO-629PLF, and FO-644PLF Series Cartridges
AC-62905	5	40	3 1/2	6	29 1/2	100	
AC-64405	5	40	3 1/2	6	44	100	
AC-718P3 ⁽²⁾	0.3	2	2 9/16	6 1/4	18	75	Fits Velcon industrial housings and portable filters, interchangeable with Velcon FO-718PL and FO-736PL Series Cartridges
AC-718P4D	0.4	2.5	2 9/16	6 1/4	18	75	
AC-7181/2 ⁽²⁾	0.5	3	2 9/16	6 1/4	18	75	
AC-71801	1	6	2 9/16	6 1/4	18	75	
AC-71805	5	40	2 9/16	6 1/4	18	75	
AC-7361/2 ⁽²⁾	0.5	3	2 9/16	6 1/4	36	75	
AC-73601	1	6	2 9/16	6 1/4	36	75	
AC-73605	5	40	2 9/16	6 1/4	36	75	

Notes: (1) The AC-21005 will fit into many existing housings that take "string-wound" cartridges. Check to confirm that the 9 3/4" length will seat properly in the housing.

(2) The AC-5121/2E, AC-718P3, AC-7181/2 and AC-7361/2 are increased surface area/reduced water capacity cartridges specifically designed for circuit breaker oil.

TYPICAL **Aquacon**® CARTRIDGE CONSTRUCTION



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**Liquid Filtration
 and Separation
 Specialists**



Aquacon® Filter Cartridges

AD Series

Eliminate Diesel Fuel Contamination Problems at the Pump

- Positive shut-off prevents pumping harmful amounts of water
- Removes silt and rust
- Effective protection combined with economical life

DESCRIPTION

AD Series **Aquacon** cartridges were developed in cooperation with a major oil company for diesel fuel applications. Balancing effective water and dirt removal with economical life, AD cartridges have become standard for most diesel users and can also be used with biodiesel.

Nominal filtration efficiency is 25 microns. Effluent water levels are typically below 50 parts per million. The AD design retains the water shut-off feature and the high water holding capacity of similar size AC Series cartridges.

Motor gasoline, hydraulic and lube oils can also be filtered with AD cartridges. Aviation fuels, however, must be filtered with the more efficient series design.



CARTRIDGE INFORMATION:

Model Number	Dimensions (inches)	Max. Diesel Flow Rate per cartridge (GPM)	Use
AD-21025	2 ⁵ / ₈ x 9 ³ / ₄	15	Velcon VF-31E Housing
AD-51225	5 ⁵ / ₈ x 12 ¹ / ₄	50	Velcon VF-61 Housing
AD-60925	6 x 9 ¹³ / ₁₆	35	Velcon VF-609/Facet VFCS-21 Housings
AD-61225	6 x 13 ¹¹ / ₁₆	46	Facet VFCS-22/FBO-14 Housings
AD-61425	6 x 14 ¹ / ₂	50	Velcon Aviation Housings
AD-71825	6 ¹ / ₄ x 18	60	Velcon Industrial Housings

WARNING: Absorbent-type monitor cartridges will not remove water from fuel containing alcohol-blending agents (commonly called gasohol). For removal of solids, please use Velcon particle removal filters specifically made for gasohol. Consult your Velcon representative.

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**Liquid Filtration
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 Specialists**

Due to Velcon Filters' continuing product improvement, drawings, specifications and pictures are subject to change without notice.

Water and Dirt Removal from Solvents

FEATURES

- Removes all free and emulsified water to < 10 ppm
- Positive shutdown:
 - Signals cartridge change
 - No unfiltered solvent gets downstream
- Effective silt and particle removal
- Solvent resistant cartridge components
- Not affected by surface active agents

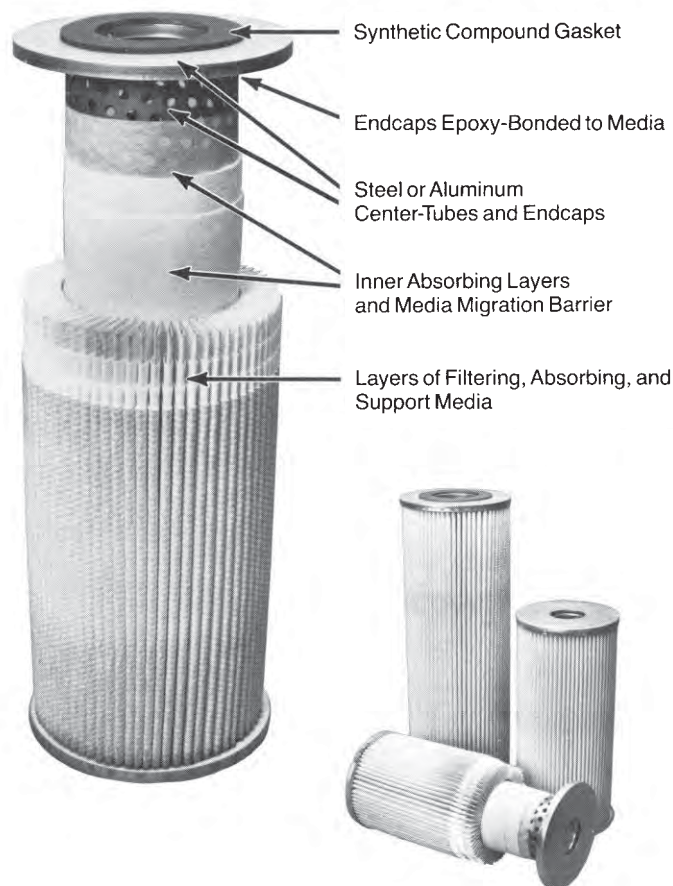
DESCRIPTION

Originally developed for the demanding requirements of aviation jet fuel filtration, **Aquacon**[®] Cartridges have been modified for use with a variety of solvents. In addition to filtering particles, these high performance cartridges remove all free and emulsified water down to less than 10 parts per million.

Filtered water is locked into the cartridge's inner super-absorbent media and can not be squeezed out. When a cartridge reaches its water holding limit, this media expands and shuts off the flow of unfiltered solvent until the cartridge is replaced. A rapid increase in differential pressure signals the operator to change the cartridge.

Aquacon Cartridges are also excellent dirt filters. Silt, rust, and other particles are removed by the cartridge's outer filter media. The pleated accordion style design provides a high capacity surface.

Special epoxy bonding materials enable **Aquacon** Cartridges to function in difficult solvent environments. They hold the filter media together, bond the end caps to the media, and bond the gaskets to the end caps. Viton-A[®] is used as a gasket material on ASL-51201 Cartridges while the ASL-71801 Models employ a special synthetic material for that purpose.



APPLICATIONS

Fluorocarbons:

Freon[®] 11, 12, 13, 13B1, 112, 113, 114, 115, 218, C-318, 114B2 and TF

Aliphatic Hydrocarbons:

Cyclohexane, Pentane, Hexane, Stoddard, Heptane

Aromatic Hydrocarbons:

Benzene, Toluene, Xylene

Chlorinated Hydrocarbons:

Perchloroethylene, 1,1,1-Trichlorethane, Carbon Tetrachloride

Contact factory regarding other solvents not listed above.

Model Number	Micrometer Rating	O. D. Inches	Length Inches	Collapse Pressure PSID	Water Capacity Quarts	Max. Flow GPM	Metal Components
ASL-51201	1	5 ⁵ / ₈	12 ¹ / ₄	75	1	50	Aluminum
ASL-71801	1	6 ¹ / ₄	18	75	2	80	Coated Steel
ASL-71801D (baked & dried media)	1	6 ¹ / ₄	18	75	2	80	Coated Steel

CARTRIDGE TECHNICAL INFORMATION

1. Maximum operating temperature is 200° F.
2. Micrometer ratings are nominal at 98% + efficiency.
3. Cartridges do not remove soluble water.

CARTRIDGE HOUSINGS

ASL-51201 Cartridge – Use VF-61 Housing with die-cast aluminum head and epoxy coated carbon steel body.

ASL-71801, ASL-71801D Cartridges – Use VF-81 Series Housing; all carbon steel with epoxy coating.

Note: Housings are supplied with Buna-N Lid Gaskets. Viton A Lid Gaskets, required for solvent filtering applications, must be ordered separately.



LID GASKETS ORDERING INFORMATION (Specify)

HOUSING	VITON LID GASKET PART NUMBER
VF-81E	G-1016A
VF81B, C, SYS	G-1045A
VF-61	G-0986A



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**Liquid Filtration
and Separation
Specialists**

Remove Dirt and Water from Fuels and Oils

FEATURES

- Convenient Spin-On Design
- Removes free and emulsified water to 5 ppm, typical
- Filters out dirt and other particulates to a 5 micron nominal rating
- Choice of five mounting head styles



AC-405SP
mounted to
SPH-2 Head



AC-409SP
mounted to
SPH-4 Head



Two AC-409SP Cartridges
mounted to SPH-5
Parallel Flow Head

DESCRIPTION

AC-405SP is the popular 3³/₄" diameter x 5¹/₂" long size. The AC-409SP is 3³/₄" diameter x 8¹/₂" long. Five mounting head styles are offered for use with these two cartridges. Refer to the back side of this sheet for details.

Aquacon Cartridges filter out water by chemically locking it into layers of super-absorbent media. Water removal efficiency is not affected by surfactants or additives, and once captured, the water cannot be squeezed out. These

cartridges also effectively filter out dirt, rust, and other particulates.

As a cartridge reaches its water-holding limit, the media expands very rapidly and restricts the flow. For fuels, the flow may completely stop. For oils and other high viscosity liquids, the pressure drop will rapidly increase, signaling the need to change cartridges.

WARNING: Absorbent-type monitor cartridges will not remove water from fuel containing alcohol-blending agents (commonly called gasohol). For removal of solids, please use Velcon particle removal filters specifically made for gasohol. Consult your Velcon representative.

Aquacon® AC-405SP and AC-409SP Spin-On Filters

CARTRIDGE TECHNICAL INFORMATION

Maximum Operating Pressure 50 psi
 Maximum Operating Temperature 200°F
 5 Micron nominal filtration rating at 98+% efficiency.
 Cartridges do not remove soluble (dissolved) water.
 Gaskets are Buna-N.

	AC-405SP	AC-409SP
Diameter:	3 ³ / ₄ "	3 ³ / ₄ "
Length:	5 ¹ / ₂ "	8 ¹ / ₂ "
Weight:	1 ¹ / ₄ lbs.	1 ¹ / ₂ lbs.
Thread:	1" - 12 NF	1 ³ / ₈ " - 12 NF




HEAD STYLES AND FLOW RATES



Head Part Number	Use with Aquacon Cartridge(s)	Inlet/Outlet Size	Inlet/Outlet Face-to-Face	Head Weight Lbs	Fuel Max Flow gpm	150 SUS Oil Max Flow gpm
SPH-1	1 ea. AC-409SP	1" NPT	4"	2 ¹ / ₄	20	5
SPH-2	1 ea. AC-405SP	3 ³ / ₄ " NPT	3 ³ / ₄ "	1	13	2.5
SPH-3	1 ea. AC-409SP	3 ³ / ₄ " NPT	3 ³ / ₄ "	1	15	5
SPH-4	1 ea. AC-409SP	1 ¹ / ₂ " NPT	2 ³ / ₄ "	1	7	4
SPH-5	2 ea. AC-409SP	1 ¹ / ₂ " NPT	7"	1 ³ / ₄	15	10

NOTES

- Differential pressure across head and cartridge at recommended maximum flow is 5 psi or less.
- SPH-1 is cast iron. SPH-2, -3, -4, and -5 are die cast aluminum 380 alloy.
- SPH-4 and -5 have dual inlets/outlets for plumbing flexibility.
- SPH-5 allows parallel flow through two cartridges.
- Heads have no internal bypass. Flow will stop if cartridges plug-up.
- Mounting holes on SPH-4 and -5 are 5/16".
- SPH-3, -4, and -5 have steel bushings or nipples for adapting to AC-409SP. They are permanently fastened with Loctite® 271.



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Due to Velcon Filters' continuing product improvement, drawings, specifications and pictures are subject to change without notice.

Combined Water and Particle Removal with a Single Cartridge

FEATURES

- Available in popular "K-Series" size and spin-on style
- Lower pressure drop with higher particle and water removal efficiency
- Cleaner oil and reduced maintenance with existing filtration equipment

DESCRIPTION

AH Series Cartridges remove free and emulsified water and particulate contamination from hydraulic oil in recirculating systems. Super-absorbent polymers capable of holding over 100 times their weight in water are combined with particle filtering media. The polymers chemically lock in water and swell when saturated. This increases the pressure drop and signals that the cartridge must be changed.

Velcon Filters pioneered the development of **Aquacon** super-absorbent filters for the demanding requirements of aviation jet fuel filtration. However, when the aviation cartridges were used with heavier oils, it was found that they were subject to high pressure drops. To overcome this limitation, AH Series Cartridges were developed specifically for hydraulic oil filtration. They offer the same extraordinary **Aquacon** water absorbing and particle removing capability as the aviation elements but with minimum pressure drop and high flow rates. Three hydraulic oil cartridges are offered:

AH-40905S is a good "chip removal" filter rated at 5 microns nominal as well as an effective water remover.

AH-409P8S combines water removal with excellent "silt control" characteristics for removing fine particles. The pure microglass fiber filter medium has a nominal 0.8 micron rating.

AH-511P8SP is the 0.8 micron design packaged in the popular 5 inch spin-on configuration. This design offers significant performance advantages over the several 5 inch water/particle removing spin-ons from other manufacturers which utilize fiberglass/cornstarch polymer technology and have a nominal rating of about 3 microns.

Advantages include:

1. More than double the fine particle removal efficiency.
2. Lower pressure drop and higher flow rate.
3. Greater water capacity.

AH-511P8SP Spin-On Style is shown at right. AH-40905S and AH-409P8S are shown below.



APPLICATIONS

Water in hydraulic oil leads to corrosion, accelerated wear, additive breakdown, acid formation and microbial growth. Filtering with AH **Aquacon** Cartridges will remove virtually all free and emulsified water and minimize these problems.

AH-409 Cartridges were developed to add water removing capabilities to Schroeder HFB Series portable filters. These 4 in. x 9 in. "K" size filters will also fit many other housings already in the field.

The AH-511P8SP will improve filtration performance in existing systems by replacing 3 micron water removing filters already in place. For new installations, the SPH-6 spin-on filter head, which has an internal bypass set at 25 PSID, is available.

Aquacon Hydraulic Oil Filters

CARTRIDGE SPECIFICATIONS

CARTRIDGE:	AH-40905S	AH-409P8S	AH-511P8SP
Thread	N/A	N/A	1½"-16
O.D. – Inches	3.9	3.9	5.1
I.D. – Inches	1.62	1.62	N/A
O.A.L. – Inches	9.2	9.2	10.9
Gaskets	Buna-N	Buna-N	Buna-N
Max Operating Temp. – ° F	250	250	250
Max Cartridge ΔP – psid	100	100	100
Nominal Gravimetric			
Filter Rating – microns	5	0.8	0.8
Surface Area – In ²	480	450	780
Beta ₁₀	10	120	120
Particle Size (Micrometers)			
Where Beta = 75	25	6	6
ACFTD Capacity – gm	40	27	36
Water Capacity – ml	310	340	460

SPH-6 SPIN-ON HEAD SPECIFICATIONS

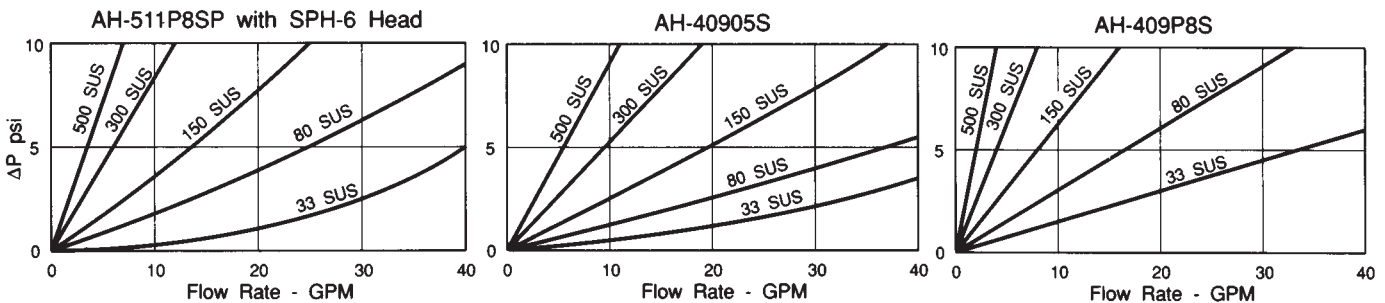
- Die cast aluminum
- 1 inch NPT inlet/outlet
- Face-to-face 5.4 inches
- Internal By-Pass valve set at 25 psid
- Mounting holes (Two)
5/16 - 18 UNC-2B



Notes:

1. Maximum system operating pressure for AH-511P8SP Spin-On is 100 psi.
2. **Aquacon** Cartridges will remove free and emulsified water to levels of 5 ppm or less. Multiple passes through the filter may be required to reach this level.
3. High water concentrations will cause the differential pressure to increase rapidly. If the pressure can exceed 100 psi, a bypass, pressure relief valve, or other means of protection should be installed.
4. AH cartridges have a higher initial pressure drop than equivalent size filters that only remove particles. Refer to the flow curves below before replacing an existing particle filter.
5. Cartridges should be changed when differential pressure reaches 25 psi, if there is a reduction in flow or after one year service, whichever occurs first.

CARTRIDGE FLOW CURVES



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Filter Sizing Information

AC and AD Series Aquacon® Cartridges

CARTRIDGE FLOW RATE (USGPM) VS. VISCOSITY DATA FOR 2 PSI AND 5 PSI INITIAL PRESSURE DROPS

CARTRIDGE	33 SUS			39 SUS		46 SUS		59 SUS		98 SUS		142 SUS		187 SUS	
	2 CS			4 CS		6 CS		10 CS		20 CS		30 CS		40 CS	
	CAP	2 PSI	5 PSI	2 PSI	5 PSI	2 PSI	5 PSI	2 PSI	5 PSI	2 PSI	5 PSI	2 PSI	5 PSI	2 PSI	5 PSI
AC-21005	240	20	20	11	20	7	18	4	11	2	5	1	4	1	3
AC-405SP	150	13	13	6	13	4	11	3	7	1	3	1	2	1	2
AC-409SP	240	20	20	11	20	7	18	4	11	2	5	1	4	1	3
AC-51205	980	50	50	45	50	31	50	18	46	9	23	6	15	5	12
AC-52405	1960	100	100	90	100	62	100	36	92	18	46	12	30	10	24
AC-61405	1270	50	50	50	50	37	50	22	50	11	28	7	18	6	14
AC-718P3	670	50	50	33	50	22	50	13	32	7	17	4	10	3	8
AC-7181/2	670	50	50	36	50	24	50	15	36	7	18	5	12	4	9
AC-71801	1850	50	50	36	50	24	50	15	36	7	18	5	12	4	9
AC-71805	1850	50	50	50	50	50	50	33	50	17	42	11	28	8	21
AD-21025	240	20	20	20	20	14	20	9	20	4	11	3	7	2	5
AD-51225	980	50	50	50	50	50	50	44	50	22	50	15	36	11	28
AD-52425	1960	100	100	100	100	100	100	88	100	44	100	30	72	22	56
AD-61425	1270	50	50	50	50	50	50	50	50	27	50	18	45	14	35
AD-71825	1850	50	50	50	50	50	50	50	50	41	50	27	50	20	50

CARTRIDGE	233 SUS		348 SUS		463 SUS		927 SUS		1390 SUS		1853 SUS		2316 SUS	
	50 CS		75 CS		100 CS		200 CS		300 CS		400 CS		500 CS	
	2 PSI	5 PSI	2 PSI	5 PSI	2 PSI	5 PSI	2 PSI	5 PSI	2 PSI	5 PSI	2 PSI	5 PSI	2 PSI	5 PSI
AC-21005	1	2	-	1	-	1	-	-	-	-	-	-	-	-
AC-405SP	-	1	-	1	-	-	-	-	-	-	-	-	-	-
AC-409SP	1	2	-	1	-	1	-	-	-	-	-	-	-	-
AC-51205	4	9	2	6	2	5	1	2	1	2	-	1	-	1
AC-52405	8	18	4	12	4	10	2	4	2	4	1	2	1	2
AC-61405	5	11	3	7	2	6	1	3	1	2	-	1	-	1
AC-718P3	3	7	2	5	1	3	-	1	-	1	-	-	-	-
AC-7181/2	3	7	2	5	1	4	1	2	-	1	-	1	-	-
AC-71801	3	7	2	5	1	4	1	2	-	1	-	1	-	-
AC-71805	7	17	4	11	3	8	2	4	1	3	1	2	1	2
AD-21025	2	4	1	3	1	2	-	1	-	1	-	-	-	-
AD-51225	9	22	6	15	4	11	2	5	1	4	1	3	1	2
AD-52425	18	44	12	30	8	22	4	10	2	8	2	6	2	4
AD-61425	11	27	7	18	5	13	3	7	2	5	1	3	1	2
AD-71825	16	40	11	27	8	20	4	10	3	7	2	5	2	4

- NOTES:** 1. Figures in table are flow rates (USGPM) that will cause a pressure drop of 2 or 5 psi across the cartridge.
 2. "CAP" is the water holding capacity in milliliters for 33 SUS (2 CS) fuel at the flow rates shown. These flow rates are the generally recommended maximum values for the specific cartridges.

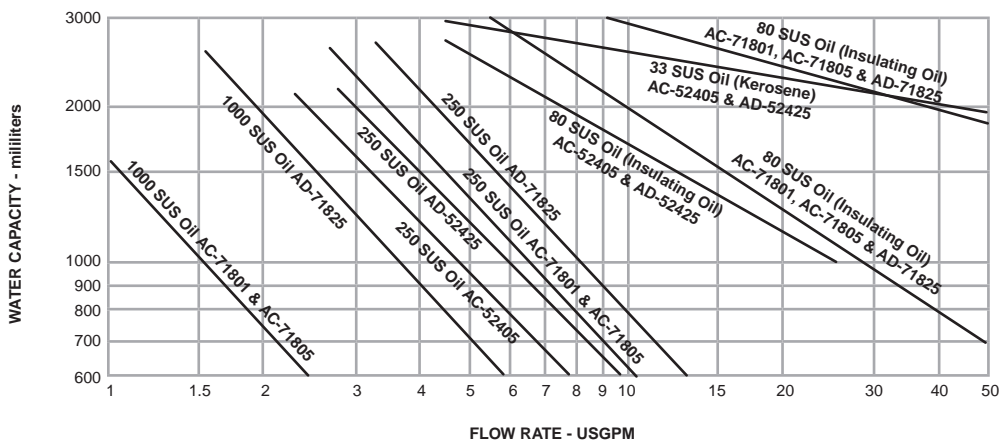
FILTER SIZING INFORMATION

1. Select the desired filter cartridge type and micron rating.
2. Determine the viscosity at the operating temperature for the fluid being filtered. See Bulletin 1533.
3. From the cartridge flow rate data, estimate the flow rate that will result in a 2 psi differential pressure.
4. Divide the total desired flow rate by the flow rate determined in 3, above. This will give the required number of cartridges.
5. Select a filter housing that will hold the required number of cartridges.

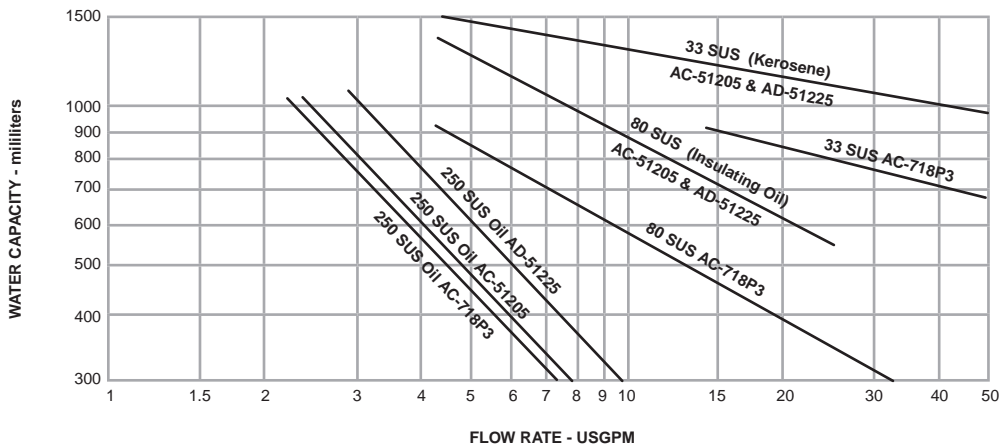
- NOTES:**
- a) The recommended maximum flow rate can be exceeded by as much as 50% for "fuse-monitor" type applications with fuels and other low viscosity fluids. However, water holding capacity will be reduced and pressure losses from the filter housing itself may become excessive.
 - b) For higher viscosity fluids, a 5 psi differential pressure is frequently used for cartridge selection. This is acceptable, but you should consider the resulting loss in water capacity.

WATER HOLDING CAPACITY


Water capacity decreases when viscosity or flow rate increases. The graphs below show typical characteristics. For any specific application you must trade off between capacity (how much water the cartridge will hold before it must be changed) and flow rate (size of filter housing and initial cost). For long term operating cost benefits, it is always best to use a larger housing (reduce the flow rate per cartridge).



WATER CAPACITY AS A FUNCTION OF VISCOSITY AND FLOW RATE
AC-52405, AD-52425, AC-71801, AC-71805, and AD-71825 CARTRIDGES



WATER CAPACITY AS A FUNCTION OF VISCOSITY AND FLOW RATE
AC-51205, AD-51225, AC-718P3, and AC-7181/2 CARTRIDGES



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High Efficiency, Long Life Cartridges for Industrial Fluids



FO-424PLxx



FO-718PLxx



FO-614PLFxx



FO-512PLxx



FO-644PLFxxTB

- **Large Surface Area** – Allows high flow rate with low initial pressure drop and maximum contaminant holding capacity.
- **Resin Impregnated Media** – Maintains strength, resists effects of water and heat.
- **75 psi Collapse Strength** – Heavy gauge carbon steel endcaps and center tube give safety margin against pressure surges.
- **Coated Steel Components** – Resist corrosion from most industrial fluids.
- **Corrugated Media** – Prevents pleat pinch-off, assuring all filtration media is utilized.
- **Buna-N Gaskets** – The best general gasket material available assures positive seal in most fluids.
- **Thermoset Bonding Material** – Durable endcap-to-media bond prevents internal bypassing.
- **Threaded base filter cartridges** – Available for easier installation.

APPLICATIONS

Velcon Pleated Media Cartridges are suitable for a broad range of polar and non-polar fluids. Recommended for applications where the contaminant is granular (non-colloidal), allowing maximum utilization of the high surface area.

Suitable for:

All Hydrocarbon Fuels	Cutting Oils	Insulating Oils	Glycols	Toluol	Naphtha
Diesel Fuel	Lube Oils	Hydraulic Oils	Water Emulsion	Coolants	
Biodiesel Fuel	Synthetic Oils	Ethyl Alcohol	Degreasing Fluids		

SPECIFICATIONS

75 psi Collapse strength	250°F Maximum operating temperature
5 - 9 Operating pH range	Recommended changeout differential pressure - 25 psid
Micron ratings from 1/4 to 75	Multi-pass (Beta Ratio) data available on request
98%+ Nominal filtration efficiency	

For information about Flow Ratings with various viscosity fluids, refer to Form #1532

Photos - please note: The outer wrap of a cartridge can be either nylon jacket, beaming paper, or PVC-coated screen wrap. Actual cartridges may not look exactly like those shown in photo. In the part numbers above, "xx" represents micron rating of the cartridge.

CARTRIDGE INFORMATION

The following table lists a few of the broad range of available Velcon cartridges. Your local Velcon Representative can provide more complete information.

Dimensions	Model	Nominal Micron Rating	Protective Outer Wrap
4" x 12¼" x 1¾" ID	FO-412PL2	2	No
	FO-412PL5	5	No
4" x 18" x 1¾" ID	FO-418PL5	5	No
	FO-418PL15	15	No
For VF-61 Housing	FO-512PL1/2	½	No
	FO-512PL05	5	No
	FO-512PL25	25	No
6" x 14½" x 3½" ID	FO-614PLF½	½	No
	FO-614PLF1	1	No
	FO-614PLF2	2	No
	FO-614PLF5	5	No
	FO-614PLF5M	5	Yes
	FO-614PLF10	10	No
	FO-614PLF15	15	No
	FO-614PLF15M	15	Yes
	FO-614PLF25	25	No
	FO-614PLF25M	25	Yes
	FO-614PLF75	75	No
6" x 29" x 3½" ID	FO-629PLF1/4	¼	Yes
	FO-629PLF1/2	½	Yes
	FO-629PLF1	1	Yes
	FO-629PLF2	2	Yes
	FO-629PLF5	5	Yes
	FO-629PLF10	10	Yes
	FO-629PLF20	20	Yes
	FO-629PLF25	25	Yes
6" x 29" Threaded Base	FO-629PLF1/2TB	½	Yes
	FO-629PLF1TB	1	Yes
	FO-629PLF2TB	2	Yes
	FO-629PLF5TB	5	Yes
	FO-629PLF25TB	25	Yes

Dimensions	Model	Nominal Micron Rating	Protective Outer Wrap
6" x 44" x 3½" ID	FO-644PLF1/2	½	No
	FO-644PLF1M	1	Yes
	FO-644PLF2M	2	Yes
	FO-644PLF5M	5	Yes
	FO-644PLF10M	10	Yes
	FO-644PLF15M	15	Yes
	FO-644PLF25M	25	Yes
6" x 44" Threaded Base	FO-644PLF1/4TB	¼	Yes
	FO-644PLF1/2TB	½	Yes
	FO-644PLF1TB	1	Yes
	FO-644PLF2TB	2	Yes
	FO-644PLF5TB	5	Yes
	FO-644PLF10TB	10	Yes
	FO-644PLF25TB	25	Yes
6" x 56" x 3½" ID	FO-656PLF1M	1	Yes
6" x 56" Threaded Base	FO-656PLF1/2TB	½	Yes
	FO-656PLF1TB	1	Yes
	FO-656PLF2TB	2	Yes
	FO-656PLF5TB	5	Yes
	FO-656PLF25TB	25	Yes
6¼" x 18" x 2 ⁹ / ₁₆ " ID	FO-718PLP3	0.3	No
	FO-718PL1/2	½	No
	FO-718PL01	1	Yes
	FO-718PL02	2	Yes
	FO-718PL05	5	Yes
	FO-718PL10	10	Yes
	FO-718PL15	15	Yes
	FO-718PL25	25	Yes
	FO-718PL50	50	Yes
	6¼" x 36" x 2 ⁹ / ₁₆ " ID	FO-736PLP3	0.3
FO-736PL1/2		½	No
FO-736PL05		5	Yes
FO-736PL15		15	Yes
8" x 22 ¹ / ₈ " x 2" ID	FO-822PLP3	0.3	No
	FO-822PL1/2	½	No
	FO-822PL05	5	No
8" x 29½" x 2" ID	FO-829PL05	5	No



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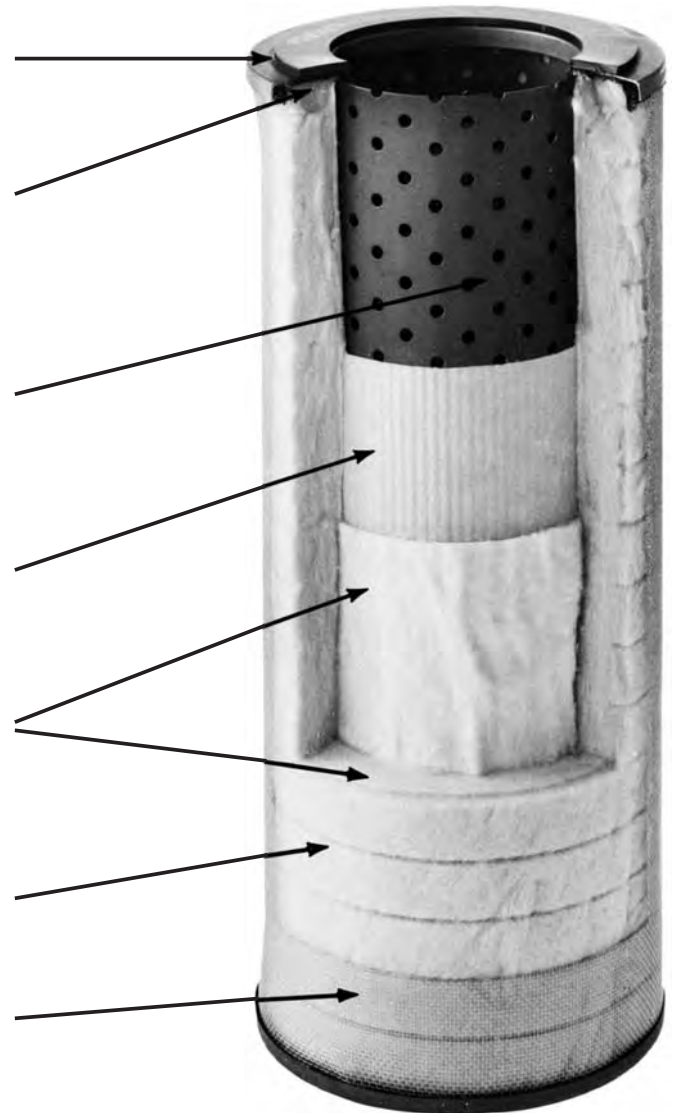
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Fiberglass Filter Cartridges

High Efficiency, Long Life Cartridges for Oils and Fuels

- Buna-N gaskets bonded to endcaps form a positive, durable seal.
- Specially formulated thermoset resin bonds endcaps to centertube and media, preventing fluid bypass.
- Aluminized heavy-gauge steel centertube and endcaps resist corrosion and insure 100 psi collapse strength.
- Migration barrier guarantees that no fibers will pass downstream.
- Resin-impregnated fiberglass media, arranged in progressively finer layers, provides superior depth filtration with no channeling.
- Surface grooves increase dirt holding capacity.
- Screen outerwrap prevents handling damage.



FO-614FG Cutaway

Velcon Fiberglass Depth Cartridges have proven superior in filtering colloidal or slimy contaminants. Lube oil and EDM coolant filtration are this type of application where fiberglass elements consistently filter better with dramatically longer life than other types of media.

APPLICATIONS

Hydraulic Oils
Water Emulsion Coolants
Boiler Feed Water

Cutting Oils
Naphtha
Fuels

Glycols
Lube Oils
Synthetic Oils

Degreasing Fluids
Ethyl Alcohol
Biodiesel

CARTRIDGE INFORMATION

FG SERIES

Velcon Model Number	O.D.	I.D.	Length	Micron Rating
FO-336FG10	3 ¹ / ₁₆ "	1 ⁵ / ₁₆ "	36 ¹ / ₁₆ "	10
FO-614FG10	6"	3 ¹ / ₂ "	14 ¹ / ₂ "	10
FO-614FG25	6"	3 ¹ / ₂ "	14 ¹ / ₂ "	25
FO-618FG10P	6"	3 ¹ / ₂ "	18"	10
FO-618FG25	6"	3 ¹ / ₂ "	18"	25
FO-622FG10	6"	3 ¹ / ₂ "	22"	10
FO-622FG25	6"	3 ¹ / ₂ "	22"	25
FO-629FG2	6"	3 ¹ / ₂ "	29 ¹ / ₂ "	2
FO-629FG10	6"	3 ¹ / ₂ "	29 ¹ / ₂ "	10
FO-629FG25	6"	3 ¹ / ₂ "	29 ¹ / ₂ "	25
FO-636FG5	6"	3 ¹ / ₂ "	35 ⁷ / ₈ "	5
FO-636FG10	6"	3 ¹ / ₂ "	35 ⁷ / ₈ "	10
FO-636FG25	6"	3 ¹ / ₂ "	35 ⁷ / ₈ "	25
FO-644FG2	6"	3 ¹ / ₂ "	44"	2
FO-644FG5	6"	3 ¹ / ₂ "	44"	5
FO-644FG25	6"	3 ¹ / ₂ "	44"	25
FO-644FG40P	6"	3 ¹ / ₂ "	44"	40


FGA SERIES

FO-618FGA5	6"	2 ⁹ / ₁₆ "	18"	5
FO-618FGA10	6"	2 ⁹ / ₁₆ "	18"	10
FO-618FGA25	6"	2 ⁹ / ₁₆ "	18"	25
FO-629FGA10	6"	2 ⁹ / ₁₆ "	29 ¹ / ₂ "	10
FO-632FGA10	6"	2 ⁹ / ₁₆ "	32"	10
FO-636FGA5	6"	2 ⁹ / ₁₆ "	35 ⁷ / ₈ "	5
FO-636FGA10	6"	2 ⁹ / ₁₆ "	35 ⁷ / ₈ "	10

SPECIFICATIONS

100 psi collapse strength
98% + filtration efficiency

5 - 9 operating pH range
250°F maximum operating temperature
Recommended changeout : 25 psid



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Filter Sizing Information

FO Series Filter Cartridges

CARTRIDGE FLOW RATE (USGPM) VS. VISCOSITY DATA FOR 2 PSI AND 5 PSI INITIAL PRESSURE DROPS

CARTRIDGE	33 SUS 2 CS		39 SUS 4 CS		46 SUS 6 CS		59 SUS 10 CS		98 SUS 20 CS		142 SUS 30 CS		187 SUS 40 CS	
	2 PSI	5 PSI	2 PSI	5 PSI	2 PSI	5 PSI	2 PSI	5 PSI	2 PSI	5 PSI	2 PSI	5 PSI	2 PSI	5 PSI
FO-614PLF1/2	68	68	50	66	33	65	20	50	10	25	7	17	5	12
FO-614PLF1	68	68	50	66	33	65	20	50	10	25	7	17	5	12
FO-614PLF2	68	68	66	66	65	65	52	64	26	63	18	44	13	33
FO-614PLF5	68	68	66	66	65	65	64	64	63	63	53	62	40	61
FO-614PLF25	68	68	66	66	65	65	64	64	63	63	62	62	61	61
FO-614PLF75	68	68	66	66	65	65	64	64	63	63	62	62	61	61
FO-718PL1/2	50	50	50	50	38	50	23	50	12	29	8	19	6	15
FO-718PL01	50	50	50	50	38	50	23	50	12	29	8	19	6	15
FO-718PL02	50	50	50	50	50	50	50	50	31	50	21	50	16	39
FO-718PL05	50	50	50	50	50	50	50	50	50	50	50	50	50	50
FO-718PL15	50	50	50	50	50	50	50	50	50	50	50	50	50	50
FO-718PL50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
FO-618FGA5	68	68	66	66	42	65	25	60	13	31	8	21	6	16
FO-618FGA10	68	68	66	66	50	65	30	64	15	38	10	25	8	19
FO-618FGA25	68	68	66	66	50	65	30	64	15	38	10	25	8	19

CARTRIDGE	233 SUS 50 CS		348 SUS 75 CS		463 SUS 100 CS		927 SUS 200 CS		1390 SUS 300 CS		1853 SUS 400 CS		2316 SUS 500 CS	
	2 PSI	5 PSI	2 PSI	5 PSI	2 PSI	5 PSI	2 PSI	5 PSI	2 PSI	5 PSI	2 PSI	5 PSI	2 PSI	5 PSI
FO-614PLF1/2	4	10	3	7	2	5	1	3	1	2	-	1	-	1
FO-614PLF1	4	10	3	7	2	5	1	3	1	2	-	1	-	1
FO-614PLF2	10	26	7	18	5	13	3	7	2	4	1	3	1	3
FO-614PLF5	32	60	22	55	16	40	8	20	5	13	4	10	3	8
FO-614PLF25	60	60	59	59	45	58	22	55	15	50	11	28	9	23
FO-614PLF75	60	60	59	59	58	58	45	57	30	56	22	55	18	45
FO-718PL1/2	5	12	3	8	2	6	1	3	1	2	1	2	-	1
FO-718PL01	5	12	3	8	2	6	1	3	1	2	1	2	-	1
FO-718PL02	12	31	8	21	6	16	3	8	2	5	2	4	1	3
FO-718PL05	41	50	27	50	20	50	10	25	7	17	5	13	4	10
FO-718PL15	50	50	50	50	42	50	21	50	14	35	10	26	8	21
FO-718PL50	50	50	50	50	50	50	30	50	20	50	15	38	12	30
FO-618FGA5	5	13	3	8	2	6	1	3	1	2	1	2	1	1
FO-618FGA10	6	15	4	10	3	8	1	4	1	3	1	2	1	2
FO-618FGA25	6	15	4	10	3	8	1	4	1	3	1	2	1	2

NOTE: Figures in table are flow rates (US GPM) that will cause a pressure drop of 2 or 5 psi across the cartridge.

Housing Selection Guidelines

FILTER SIZING

1. Select the desired filter cartridge type and micrometer (micron) rating.
2. Determine the viscosity at the operating temperature for the fluid being filtered. See Bulletin 1533.
3. From the cartridge flow rate data estimate the flow rate that will result in a 2 psi differential pressure.
4. Divide the total desired flow rate by the flow rate determined in 3, above. This will give the required number of cartridges.
5. Select a filter housing that will hold the required number of cartridges.

NOTES: a) For double and triple length cartridges find the flow rate for the equivalent single length cartridge and multiply by 2 or 3, as appropriate. For example, the triple length five micron rated FO-644PLF5M would have 3 times the flow rate of the single length five micron rated FO-614PLF5.

b) For recirculating lube and hydraulic oil systems where contaminant generation will be slight, it is common practice to size for a 5 psi initial pressure drop.

CONTAMINANT CAPACITY

Velcon recommends filter cartridges be changed when they reach 25 psi differential or in accordance with your company's fuel handling procedures. The amount of contaminant a cartridge will hold before that point depends on many factors, the key one being the nature of the contaminant itself. A hard, particulate contaminant has very different filtration characteristics than a soft, gel-like contaminant.

Accurately estimating the life of a cartridge in a given application, therefore, is extremely difficult. However, when a cartridge has been sized for an initial pressure drop of 2 psi, the following rule of thumb is often employed for particulate contaminants: A 1 or 2 micrometer cartridge will hold up to 3 pounds of contaminant, and a 5 micrometer or greater cartridge will hold up to 5 pounds.

REDUCED FLOW RATE EFFECTS

The filter sizing above is based on a 2 psi initial pressure differential which is a widely accepted industry standard. However, where heavy contaminant loads are anticipated, a substantial savings in operating costs for cartridges and filter change labor can be achieved by over-sizing the filter. **Reducing the flow rate per cartridge in half will increase the contaminant capacity of each cartridge by 30 to 50 percent. This means that doubling the size of the filter will increase the total throughput between cartridge changeouts by as much as three times.**



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**Liquid Filtration
and Separation
Specialists**

High Performance Replacements for Pleated Paper Cartridges Upgrade Your Oil Filtration Using Existing Housings

FEATURES

- Superior Filtration Efficiency
- Long-Life Durability
- Low Pressure Drop
- High Flow Rates
- No New Hardware Required

DESCRIPTION

FOS Series synthetic media cartridges provide excellent filtration performance for a wide variety of industrial applications. They excel in applications where water or chemicals cause softening or degradation of conventional resin impregnated cellulose (pleated paper) filter media. Due to the finer synthetic fibers used, FOS cartridges have a low pressure drop. Replacing an equivalent size paper filter will, in many cases, result in improved filtration efficiency, higher flow rates, longer service life, and significant cost savings.

APPLICATIONS

- Turbine Lube Oil
- Water Soluble Oils
- Paper Machine Lube Oil
- Synthetic Base Oils
- Compressor Lube Oil

A selection of FOS Series cartridges, suitable for a wide variety of applications, is offered:

FOS-512PL25 and FOS-718PL25 have a nominal 25 micron filtration rating. They are especially effective with cutting oils, and in some cases have had five times the life of equivalent size paper filters.

FOS-618PL05 and FOS-636PL05 have a nominal 5 micron filtration rating. They provide improved filtration for synthetic-based compressor lube oil applications.



FOS-618PL1/2 FOS-512PL25 FOS-618PL1/2
FOS-636PLP8 lying on side

The 0.8 micron rated FOS-618PLP8 and FOS-636PLP8 are excellent "fine particle removal" filters and frequently are installed in existing lube oil filtration systems to upgrade system cleanliness.

FOS-618PL1/2 and FOS-636PL1/2 have a nominal 0.5 micron filtration rating. These models provide efficient removal of extremely fine particles without sacrificing cartridge life. They are used where tough ISO code oil cleanliness is needed.

GENERAL SPECIFICATIONS

- Collapse strength 75 psi
- Max. Operating temperature 250°F
- pH operating range 3 - 9
- Recommended change-out at 25 psid differential pressure or after one year, whichever occurs first
- Buna-N gasket material
- Filter media are glass micro-fibers backed by spun-bonded polyester and metal screen. Twenty-five micron designs are spun-bonded polyester only.
- Metal components are aluminiumized steel. FOS-512PL25 end caps are aluminum.
- End cap bonding material is epoxy. Twenty-five micron designs use plastisol.

CARTRIDGE SELECTION TABLE

Cartridge Model	O.D. (Inches)	I.D. (Inches)	Length (Inches)	Surface Area (In. ²)	Nominal ⁽¹⁾ Rating (Microns)	Beta ₅	Size ⁽²⁾ where Beta=75	ACFTD Capacity (GMS)
FOS-512PL25	5 ⁵ / ₈	n.a.	12 ¹ / ₄	2390	25	n.a.	60	210
FOS-718PL25	6 ¹ / ₄	2 ⁹ / ₁₆	18	3970	25	n.a.	60	360
FOS-618PL05	6	2 ⁹ / ₁₆	18	2000	5	3.5	37	172
FOS-618PLP8	6	2 ⁹ / ₁₆	18	2000	0.8	90	8	87
FOS-618PL1/2	6	2 ⁹ / ₁₆	18	2000	1/2	250	4	71
FOS-636PL05	6	2 ⁹ / ₁₆	36	4160	5	3.5	37	358
FOS-636PLP8	6	2 ⁹ / ₁₆	36	4160	0.8	90	8	180
FOS-636PL1/2	6	2 ⁹ / ₁₆	36	4160	1/2	250	4	148

NOTES: ⁽¹⁾Nominal gravimetric filter micron rating.

⁽²⁾Particle size (microns) where Beta equals 75. Often referred to as the "absolute" rating of the cartridge.



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Filter Sizing Information

FOS Series Synthetic Media Cartridges

Cartridge Flow Rate (US GPM) vs. Viscosity Data for 2 PSI and 5 PSI Initial Pressure Drops

CARTRIDGE	33 SUS 2 CS		46 SUS 6 CS		59 SUS 10 CS		98 SUS 20 CS		142 SUS 30 CS		187 SUS 40 CS		233 SUS 50 CS	
	2 psi	5 psi	2 psi	5 psi	2 psi	5 psi	2 psi	5 psi	2 psi	5 psi	2 psi	5 psi	2 psi	5 psi
FOS-512PL25	80	80	80	80	80	80	80	80	80	80	69	80	55	80
FOS-718PL25	100	100	100	100	100	100	100	100	100	100	100	100	92	100
FOS-614PL05	95	100	91	100	87	100	75	100	62	100	49	100	36	90
FOS-618PL05	100	100	100	100	100	100	100	100	100	100	80	100	64	100
FOS-618PLP8	100	100	100	100	100	100	52	100	34	85	26	65	20	51
FOS-618PL1/2	100	100	100	100	68	100	34	185	22	55	17	43	13	34
FOS-636PL05	200	200	200	200	200	200	200	200	200	200	184	200	160	200
FOS-636PLP8	200	200	200	200	200	200	104	200	68	170	52	130	41	102
FOS-636PL1/2	200	200	200	200	136	200	68	170	44	110	34	86	27	68

CARTRIDGE	348 SUS 75 CS		463 SUS 100 CS		927 SUS 200 CS		1390 SUS 300 CS		1853 SUS 400 CS		2316 SUS 500 CS		4632 SUS 1000 CS	
	2 psi	5 psi	2 psi	5 psi	2 psi	5 psi	2 psi	5 psi	2 psi	5 psi	2 psi	5 psi	2 psi	5 psi
FOS-512PL25	36	80	27	68	13	33	9	23	6	16	5	13	3	7
FOS-718PL25	62	100	46	100	23	58	15	38	11	29	9	23	5	11
FOS-614PL05	30	70	23	56	11	28	7	17	6	14	4	11	2	6
FOS-618PL05	42	100	32	80	16	40	10	25	8	20	6	15	3	8
FOS-618PLP8	14	35	10	25	5	13	3	8	3	8	2	5	1	3
FOS-618PL1/2	9	23	7	18	3	8	2	5	2	5	1	3	1	2
FOS-636PL05	84	200	64	160	32	80	21	53	16	40	12	30	6	15
FOS-636PLP8	28	70	21	53	10	25	7	18	5	13	4	10	2	5
FOS-636PL1/2	18	45	14	35	7	18	4	10	3	8	3	8	1	3

Notes: 1. Figures in table are flow rates (US GPM) that will cause a pressure drop of 2 or 5 psi across the cartridge.
 2. These flow curves are for the cartridges only. To determine additional pressure losses caused by vessel components, see Velcon Form #1711

Housing Selection Guidelines

FILTER SIZING

1. Select the desired filter cartridge type and micrometer (micron) rating.
2. Determine the viscosity at the operating temperature for the fluid being filtered. See Bulletin 1533.
3. From the cartridge flow rate data estimate the flow rate that will result in a 2 psi differential pressure.
4. Divide the total desired flow rate by the flow rate determined in 3, above. This will give the required number of cartridges.
5. Select a filter housing that will hold the required number of cartridges.

NOTE: For recirculating lube and hydraulic oil systems where contaminant generation will be slight, it is common practice to size for a 5 psi initial pressure drop.

CONTAMINANT CAPACITY

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REDUCED FLOW RATE EFFECTS

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**Liquid Filtration
and Separation
Specialists**

Adsorbent Media Cartridges – Fuller’s Earth and Activated Alumina

**Field proven in corrosive vacuum
pump oil applications**

DESCRIPTION

Velcon adsorbent media cartridges combine the highest grade sorbing materials with specially selected structural components. Field proven at major semiconductor companies, these cartridges maintain oil quality in the most corrosive environments.

Models **LA-61801B** and **LA-71801B** contain a special grade of fuller’s earth mined in Florida and Georgia. This clay is heat refined to increase sorbing capacity and water resistance.

Models **LB-71801** and **LB-1107B** contain a granular form of activated alumina that has proven most effective for oil purification.

APPLICATIONS

Adsorbent media cartridges remove acids, gums, surfactants, varnishes, soaps, color bodies, corrosive gases, polar compounds and oxidation products from hydrocarbon and synthetic oils. They also remove moisture and filter particulates to a nominal 10 micrometer level. Routine filtering will return oil to a clear and bright condition, extending oil life and protecting machinery.

Filtering mechanical **vacuum pump oil** with adsorbent cartridges is a standard process in the semiconductor industry for LPCVD, Ion Implantation and Plasma Etching equipment.



Velcon Adsorbent Media cartridges effectively process:

Insulating Oil	Vacuum Pump Oils
Quench Oil	Hydrocarbon base
Mineral Oil	Perfluoropolyethers
Heat Transfer Fluids	Phosphate Ester Oils
Transformer Oil	Synthetic Oils

CONSTRUCTION

Model Number	Adsorbent Media	Media Mesh	Media Quantity	Dimensions
LA-61801B	Fuller's Earth	50 - 80	10 lbs.	2 ⁹ / ₁₆ " I.D. x 6 ¹ / ₄ " O.D. x 18" length
LA-71801B	Fuller's Earth	50 - 80	13 lbs.	2 ³ / ₁₆ " I.D. x 7" O.D. x 18" length
LB-71801	Activated Alumina	48 - 100	15 lbs.	2 ³ / ₁₆ " I.D. x 7" O.D. x 18" length
LB-1107B	Activated Alumina	48 - 100	14 lbs.	2" I.D. x 11" O.D. x 7 ¹ / ₄ " length

Buna-N gaskets bonded to end caps

Phosphate coated heavy gauge steel centertube and end caps

Internal migration barrier

Phenolic resin impregnated polyester/rayon outer jacket

100 psi collapse strength

300°F maximum operating temperature

APPLICATION NOTES

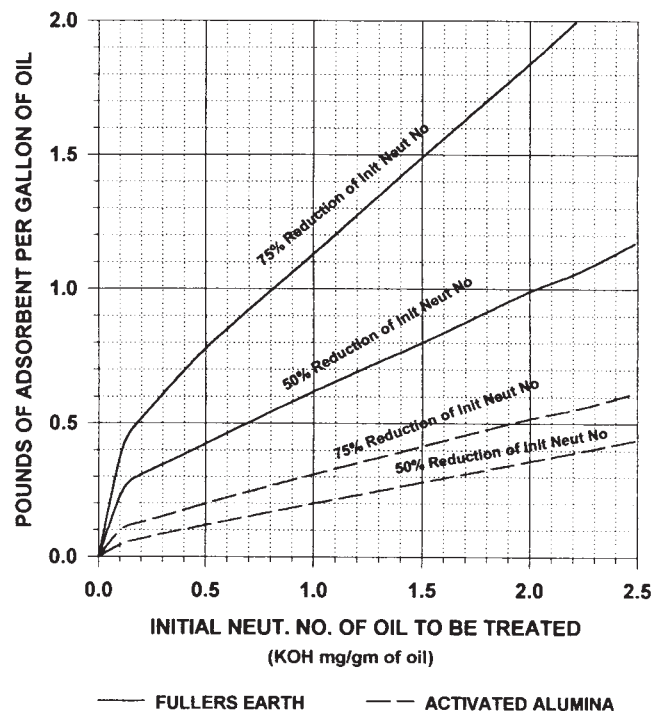
- Flow rates should be kept below 1 gpm per cartridge for optimum performance. Initial pressure drop is typically below 5 psi. Changeout differential pressure is 25 psi.
- If water or solid contamination is heavy a prefilter should be installed. FO-718PL Cartridges remove solids and AC-718 **Aquacon**® Cartridges remove solids, water and hydrolyzed acids.
- Activated alumina has a higher specific surface area than fuller's earth. It is also more efficient at removing Lewis acids and halogens, and has higher water resistance. It typically has 3 to 5 times the acid adsorbing capacity of fuller's earth.
- An LB-71801 activated alumina cartridge will adsorb up to 2350 ml of reagent grade HCl.
- Easy-to-use field test kits are available to determine when the acid level in oil is above acceptable limits. We recommend using these kits to determine when cartridges should be changed and also to compare the cost effectiveness of activated alumina vs. fuller's earth in a given application.

ORDERING INFORMATION

LB-1107B LA-61801B LB-71801

LA-1107B LA-71801B

Specify model number as shown above. LA-71801B, LB-71801 and LB-1107B are packaged two per carton. LA-61801B is packaged four per carton.



Approximate quantities of adsorbent material required for desired reduction in neutralization number of oil when using batch method of reclamation.



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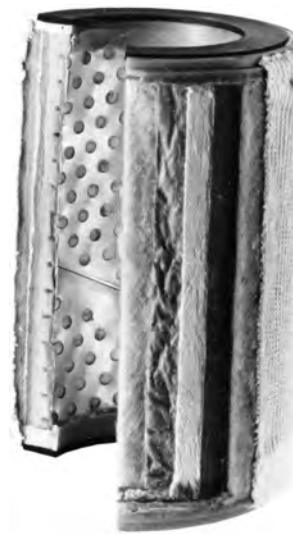
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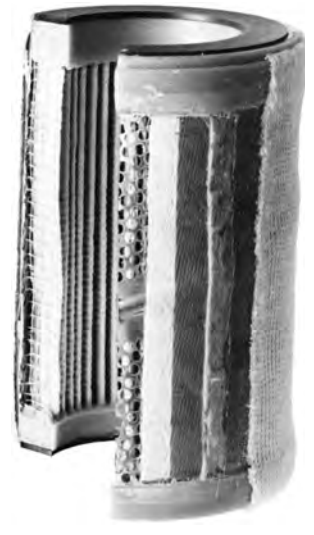
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Industry's Broadest Selection of Coalescer Cartridges Used for Separating Immiscible Liquids with Different Densities

- **Proven field performance** – billions of gallons of hydrocarbons processed to exacting requirements.
- **Wide selection** – interchanges available for most other manufacturers' models.
- **Optimum use of filter area** – gives high flow capacity and long life.
- **Rugged construction** – assures performance in the toughest environment.
- **Choice of various media** – allows best selection for individual applications.
- **Custom design available** – provides special cartridges for unique water removal problems.



All fiberglass
coalescer



Pleated/fiberglass
coalescer

GENERAL DESCRIPTION

Standard Velcon construction features include aluminum tubes to prevent corrosion, aluminum or glass filled nylon endcaps with epoxy adhesive to assure a thorough bond to the media, and Buna-N gaskets to give positive sealing. For special applications, different materials can be used for the tubes, endcaps and gaskets. A knitted sock is also put on each cartridge to enhance the drop size.

Media come in two basic types – all fiberglass and pleated media/fiberglass. By combining various grades of media materials, the optimum balance can be achieved for each application.

In addition to removing liquids, the coalescer cartridge acts as a high efficiency filter. This gives both a dry and dirt-free effluent

APPLICATIONS

- Diesel Fuel
- Biodiesel
- Turbine Lube Oil
- Gasoline
- Insulating Oil

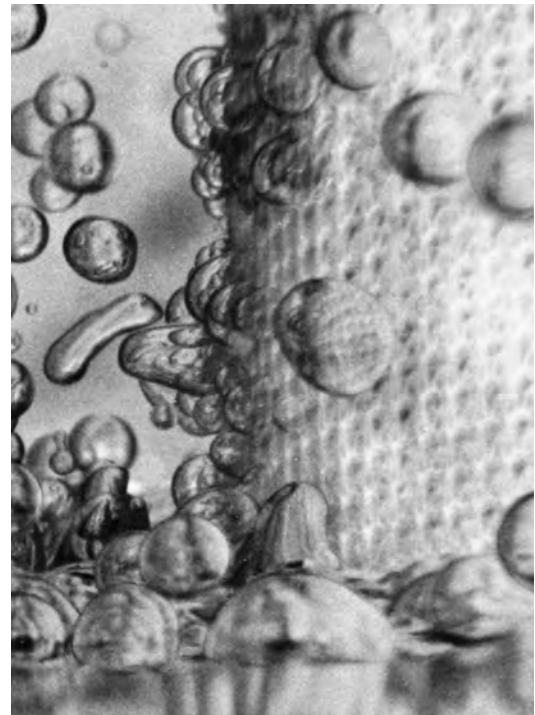
SPECIFICATIONS

- 75 psi burst strength
- 5 - 9 pH range
- 160° maximum operating temperature

The table below lists some of the coalescers commonly used in industrial applications. Your local Velcon representative can provide complete information on other sizes and types.

Model Number	Diameter (inches)	Length (inches)	Media	End	Use/Interchange
CA-62202	6	22.25	Fiberglass	Open	Petroclar (10 micron)
CA-62206	6	22.25	Fiberglass	Open	Petroclar (2 micron)
CA-64485	6	44	Pleated/ Fiberglass	Open	Keene K2000
CC-62283	6	22.25	Pleated/ Fiberglass	Threaded	TO-30 Insulating Oil System
CC-62285	6	22	Pleated/ Fiberglass	Threaded	TOC-10 Turbine Oil System
CC-63385	6	33	Pleated/ Fiberglass	Threaded	TOC-30 Turbine Oil System
I-4126	3.56	12	Fiberglass	Open	Keene A-840, A-840A, CI-3512-F2-1
I-4152	3.5	15.75	Fiberglass	Open	Keene A-1525, CI-3416-F2-0
I-4184	3.5	17.63	Fiberglass	Open	Keene A-870, A-870A, CI-3518-F2-1
I-4204	3.63	20	Fiberglass	O-Ring	Keene CI-3520-02-2
I-4310	3.5	30.81	Fiberglass	O-Ring	Keene A-3057, CI-3431-02-0
I-6086A	6	8.64	Fiberglass	Open	Interdyne Solvent System

AT RIGHT: A Velcon coalescer cartridge removing water from kerosene. Large (coalesced) waterdrops break away from the cartridge surface and sink into the sump area. Visible at the bottom is the interface between the kerosene and the settled water.



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**Liquid Filtration
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Due to Velcon Filters' continuing product improvement, drawings, specifications and pictures are subject to change without notice.



Coalescer Cartridges for Aviation Fuel and Industrial Use

FEATURES

- Cost effective particle and emulsified water removal from hydrocarbon fluids
- Easy installation and replacement with one-piece design
- Choice of Threaded Base or Open End cartridges
- Choice of All-Fiberglass Media or Combination Fiberglass and Pleated Media
- Field proven performance
- Ongoing qualification testing to meet changing commercial and military requirements

GENERAL

Coalescer cartridges are employed as the first stage in filter/separator vessels for hydrocarbon fluids. They perform two functions: (1) coalesce (combine) highly dispersed, emulsified water particles into larger water drops and (2) filter-out particulate contaminants.

HOW COALESCER CARTRIDGES WORK

The top photo shows a highly magnified view of the coalescing process. Tiny droplets of water contact and adhere to strands of fiberglass. Flow pushes the droplets along the strand until they reach an intersection of strands where they combine with other droplets (coalesce) into large drops.

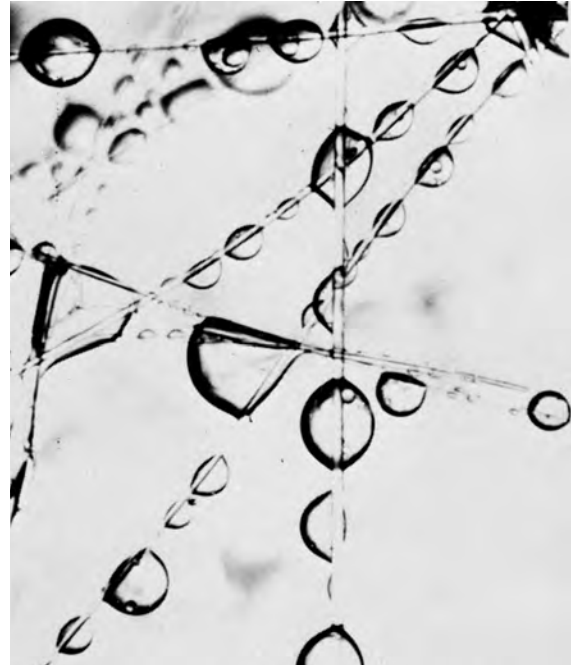
These large drops are then carried to the outside surface of the cartridge. Having a higher specific gravity than the hydrocarbon fluid, they release and settle to the bottom of the vessel. The larger the drops, the faster and more efficiently they fall out. (See bottom photo.) In general, particle removal efficiency increases with coalescing efficiency. This is accomplished by employing a tighter, finer filtration media.

Flow direction is from inside to outside of the cartridge. This minimizes surface velocity and helps prevent the water drops from breaking up and being carried downstream.

APPLICATIONS

Coalescer cartridges are used primarily to coalesce emulsified water and remove particles from hydrocarbon fluids. The largest single application is the filtration of aviation jet fuel. They are also used with other types of fuels, process streams in refineries and petrochemical plants, and condensate streams where natural gas is produced.

Other liquids can be separated if they are immiscible, the specific gravities differ, and high concentrations of surface active agents are not present. As a rule of thumb, if a sample of the mixture readily separates in an hour or two, a coalescer can probably be used. If the mixture hasn't separated after 24 hours, coalescing probably won't work.



Photomicrograph of coalescing process inside fiberglass media.



Coalesced water drops releasing from the knitted sock at the outside surface of the cartridge.

Coalescer Cartridges

CONSTRUCTION

Velcon single-unit coalescer elements are offered with Threaded Base or Open Ends and with Fiberglass Media or Fiberglass and Pleated Media combinations.

Threaded Base Coalescers are recommended for use in most applications. They simplify installation and replacement by eliminating the need for cover plates, center plates, nuts, washers, and gaskets. They are for use in Velcon and other make filter/separators. Threaded base adapters are available to convert vessels presently using open end elements.

Open End Coalescers are offered with single unit construction which reduces the number of gasket seals and improves overall reliability.

All-fiberglass Media Coalescers combine depth particulate filtration with a deep coalescing structure. All-fiberglass designs have successively finer media layers to achieve depth-type filtration of particles.

Combination Fiberglass and Pleated Media Coalescers remove particles primarily in the high surface area pleated core. They have one or more layers of pleated media inside a cylinder of molded fiberglass laminations to provide an extended surface area for particulate filtration. Pleat corrugation and separation materials are used to keep pleats open for full utilization.

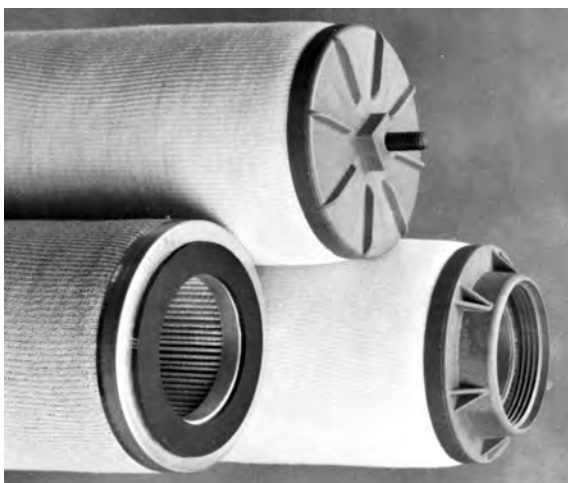
Coalescing and filtration performance depends largely on the fiber diameter and bulk density of the fiberglass media. Both the All-Fiberglass and the Combination coalescer cartridge designs incorporate phenolic resin impregnated fiberglass media. Several grades with fiber diameters ranging from 1 to 10 micrometers are used in various combinations to achieve desired results. Velcon's latest coalescer designs (85, 87 and C5 series cartridges) achieve even higher filtration and coalescing efficiency by incorporating pure micro-glass fibers with diameters of less than 1 micrometer in the pleated media.



All-Fiberglass "6" Series Coalescer



Fiberglass and Pleated Media
"87" Series Coalescer



6" Diameter
Threaded Base
and Open End
Coalescer
End Caps



6000T Threaded Base Adapter

COALESCER CARTRIDGE SERIES DESCRIPTION

Model Number System. Refer to the box at right. The one or two digit Series Designator relates to the approximate micron rating of each model coalescer cartridge. Note that this is a nominal rating and should be used for reference only.

The “0”, “2”, and “4” Series all-fiberglass cartridges are rated at 25, 5, and 3 microns respectively. The “2” and “4” Series are commonly used with diesel and other fuel oils, and are a compromise between filtration efficiency (cartridge life) and water removing capability. They coalesce gross water, but normally do not remove fine water haze.

The all-fiberglass “6” Series was originally developed for jet fuel service (the original MIL-F-8901 specification). With a 2-micron rating, it has proven to be the most cost effective design in some jet fuel applications. “6” Series cartridges are also used in gasoline filtration service. However, it should be noted that the powerful detergent additives in most automotive gasolines reduce the coalescing capability of this and other cartridge designs.

“83” Series Cartridges. The 1-micron rated “83” Series is a pleated media/fiberglass cartridge. The very practical “83” Series cartridges have become the most widely used design in applications including gasoline, condensate, and insulating oil filtration.

“85” and “87” Series Cartridges. The “85” Series is rated at 0.5-micron while the “87” Series is rated at 0.3 micron. Both incorporate multi-layered pleated media. The “85” Series has consistently shown superior dirt holding capacity in the field.

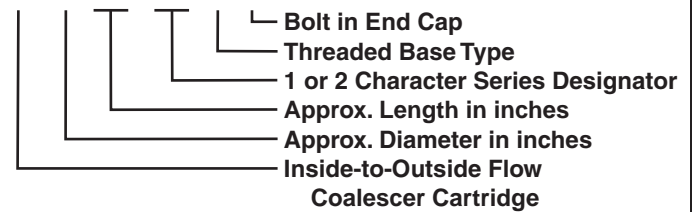
EI* 1581 Fifth Edition Cartridges. I-6xxC5 (TB), I-6xxMM, and I-6xxA4 Series of coalescers incorporate a multi-layered pleated media designed to provide superior dirt holding capacity in the field, combined with 0.4 micron efficiency. The I-6xxC5 (TB) replaces both the I-6xx85 (TB) and I-6xx87 (TB) cartridges. These cartridges are available in either threaded base or open-end configuration. See data sheets 1923 and 1934 for more specific information on EI 1581 Fifth Edition.

Cartridge Dimensions. 6” diameter cartridges are the current industry standard. They are offered in lengths of 11”, 14”, 22”, 28”, 33”, 38”, 44”, and 56”. However, not all series are available in all lengths or in both end cap designs. Contact your Velcon Distributor for details.

4” diameter cartridges are also offered for use with older equipment. They are available in a variety of lengths ranging from 8 to 40 inches.

Velcon Model Numbers include significant product information. **Example:**

I - 6 2 8 C 5 T B



Note that **I-628C5** would designate the open end version of this cartridge.



GENERAL SPECIFICATIONS

- 75 psi maximum pressure differential rating
- 5 to 9 pH range
- 150°–160°F maximum operating temperature
- Aluminum center tube
- Buna-N gaskets
- Injection molded end caps are standard on 6” diameter threaded base coalescers;
- Aluminum end caps are standard on 6” diameter open end cartridges
- All 6” diameter cartridge end caps are bonded directly to the media with high strength epoxy or urethane
- 4” diameter cartridge have molded polyester resin or injection molded end caps

*EI (Energy Institute) is the new specification authority. API (American Petroleum Institute) is no longer involved in aviation fuel filtration specifications.

Coalescer Cartridge and Filter/Separator Vessel Selection Guidelines

Aviation Fuel Filtration in commercial applications is governed by the complex, stringent requirements of EI 1581, 5th Edition. Refer to the appropriate Velcon literature or contact your Velcon Representative for assistance. For non-aviation applications the following guidelines have proven to be useful. Note, however, that these guidelines are general in nature and should be used for guidance only.

1 Determine total length (inches) of 6" diameter cartridge required:

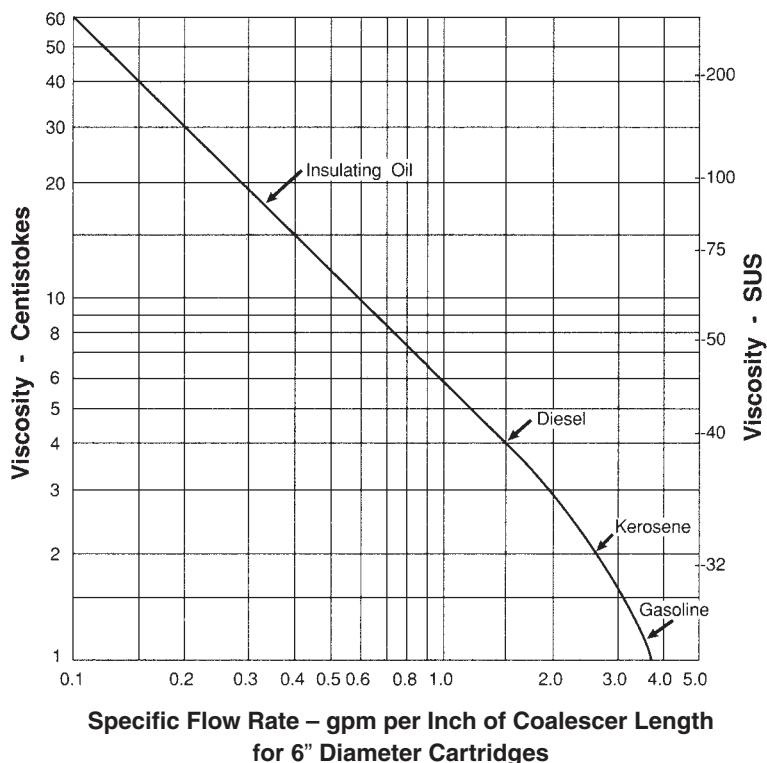
- Find the approximate viscosity of your hydrocarbon fluid on the Chart Y-axis.
- Find the corresponding Specific Flow Rate (gpm/inch) on the X-axis.
- Divide Total Flow Rate (gpm) of your application by this Specific Flow Rate to calculate total inches of coalescer required.

2 Select cartridge model and calculate quantity required:

- Choose model (type and length) cartridge to use. **83 Series Coalescers** are recommended for most applications. Other types and sizes are offered for special applications.
- Calculate minimum number of cartridges required by dividing total inches (from Step 1) by length of cartridge selected.

3 Select the Filter/Separator Vessel for your application:

- Refer to the Velcon literature for **HV** (horizontal) or **VV** (vertical) Filter/Separators.
- Find the appropriate vessel for the model and quantity Coalescer Cartridge selected in Step 2.



NOTES

- These guidelines assume a specific gravity of 0.92 or less, and an influent water concentration of 3% or less. In general, if the Interfacial Tension (IFT) of the hydrocarbon over water is 36 dynes per centimeter or greater, effluent water levels of 15 ppm or less can be achieved.

- Surfactants will significantly lower IFT with a corresponding decrease in coalescing performance. Surfactants can occur naturally (diesel fuel) or they can be intentionally added as corrosion inhibitors (pipelines, lube and hydraulic oils) and detergent dispersants (automotive gasoline).

- As previously discussed, diesel and fuel oils are a special category. **2 or 4 Series Coalescer Cartridges** are commonly used. Pleated paper separator cartridges are typically specified since diesel often contains materials that adhere to TCS separators and cannot be cleaned off – nullifying their cost effectiveness. Refer to Velcon **V Series Filter/Separator Vessels** literature.

- Oversizing filtration equipment improves performance and extends cartridge life.

- Strong bases (high pH fluids) attack glass microfibers and break down the coalescing media. Caustic washing or applications with high concentrations of MEA or DEA should be avoided.

- Initial differential pressure (with clean coalescer cartridges) will be less than 5 psi. Cartridges should be changed when the differential pressure reaches 15 psi or after one year – whichever occurs first.



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**Liquid Filtration
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 Specialists**



Disposable Cartridges

DC Series

& Permanent Filter Core Kits

CK-1479, CK-1480, CK-1481, CK-1482

High Efficiency, Long Life Cartridges for Fuels, Fluids and Oils

BENEFITS

- Disposable, Crushable and Incinerable
- Provides a convenient, cost-efficient method to recycle
- Lightweight, easy handling during installation and change-outs
- No More Land Fill – Velcon Disposable Cartridges offer a convenient, legal, cost-effective and environmentally responsible method for disposing of your used filter cartridges

FEATURES

- Large Surface Area – allows high flow rate with low initial pressure drop and maximum contaminant holding capacity
- Resin Impregnated Media – maintains strength, resists effects of water and heat
- Aluminum Components – resists corrosion from most fluids
- Corrugated Media – prevents pleat pinch-off, assuring all filtration media is utilized
- Buna-N Gaskets – the best general gasket material available assures positive seal in most fluids
- Thermoset Adhesive Bonding Material – durable endcap-to-media bond prevents internal bypassing
- 98% Filtration Efficiency with Micron Ratings 1 and 5 microns



CK-1480 with DC Series cartridge and cover plate

LOWER COSTS

Savings are realized by reducing the volume of material you send to hazardous waste disposal facilities and by minimizing the time you spend on regulatory compliance record keeping, reporting and tracking.

APPLICATIONS

Velcon pleated paper media cartridges are suitable for a broad range of polar and non-polar fluids. Recommended for applications where the contaminant is granular (non-colloidal), allowing maximum utilization of the high surface area.

Suitable for:

All hydro-carbon fuels
Cutting oils
Glycols
Degreasing fluids
Insulating oils
Water emulsion coolants

Toluol
Lube oils
Synthetic oils
Ethyl alcohol
Hydraulic oils
Naptha

CARTRIDGES

All DC Series cartridges are 6" outside diameter and are offered in four lengths: 14", 29", 44" and 58".

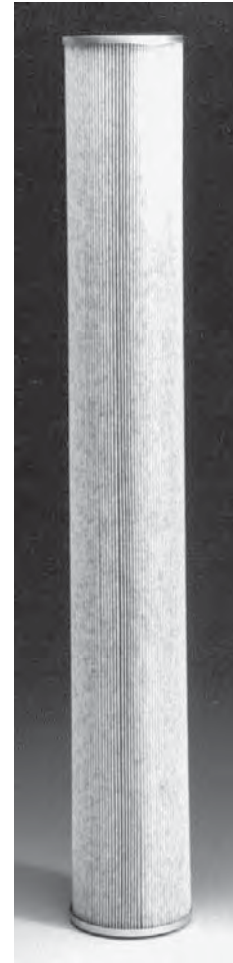
SPECIFICATIONS

- Micron Ratings 1 and 5 microns
- 98% + Nominal Filtration Efficiency
- 5 - 9 Operating pH range
- 200° F Maximum Operating Temp

Interchangeable with Facet – to use the Velcon Disposable Cartridges, DC-Series, you must first have an Installation Kit installed.

FILTER CROSS-REFERENCE TABLE

Velcon P/N	Facet P/N	Length	Micron Rating	Velcon Kit	replaces Facet Kit
DC-614PLF1	CIF1	14	1	CK-1479	CIF1KIT (14" KIT)
DC-629PLF1	CIF1X2	29	1	CK-1480	CIF2KIT (29" KIT)
DC-644PLF1	CIF1X3	44	1	CK-1481	CIF3KIT (44" KIT)
DC-658PLF1	CIF1X4	58	1	CK-1482	CIF4KIT (58" KIT)
DC-614PLF5	CIF5	14	5	CK-1479	CIF1KIT (14" KIT)
DC-629PLF5	CIF5X2	29	5	CK-1480	CIF2KIT (29" KIT)
DC-644PLF5	CIF5X3	44	5	CK-1481	CIF3KIT (44" KIT)
DC-658PLF5	CIF5X4	58	5	CK-1482	CIF4KIT (58" KIT)



PERMANENT FILTER CORE KITS - CK-1479, CK-1480, CK-1481, & CK-1482


Velcon's permanent filter core kits mount easily into filter vessels to provide support for DC Series disposable cartridges. The core is a simple one-piece design that can be installed directly into the vessel, unlike the complicated multi-piece plastic designs. Velcon's permanent cores have high quality, all aluminum construction and achieve 175 psi collapse strength. The one-piece design and smooth outer surface allow for easy installation and removal of the DC Series cartridges. Kits are available in 14", 29", 44" and 58" lengths.

Each kit includes the tube assembly, nuts and washers. Filters and additional hardware should be ordered separately.

NOTE: The Velcon Permanent Support Tube Kits are designed for use only with standard 3½" filter mounting adapters and appropriate length tie rods. The kit will not work with threaded base adapters.

The Velcon Permanent Support Tube Kits are designed for use with either the Velcon "DC" disposable cartridges or Facet CIF Series cartridges of appropriate length.

The Velcon Permanent Support Tube Kits are designed to replace the Facet CIF Series Center Tube Kits.



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Natural Gas Filter Cartridges

Improved Natural Gas Filter/Separator Performance

Velcon Model FO-436G and FO-472G gas filter cartridges have been designed to remove particulate and liquid contaminant from natural gas. Both sizes offer:

- **Finer Filtration**
- **More Complete Liquid Removal**
- **Proven Performance**

The FO-436G and FO-472G have been designed for installations where superior performance features are desired over those offered by standard cartridges.

- **High Collapse Strength** – In lab tests, the FO-472G averaged > 100 psid collapse strength vs. 34 psid for a leading competitive cartridge.
- **Improved Filtration/Separation Efficiency** – Multiple layers of fiberglass in graduated fiber diameters assure maximum efficiency by distributing collected particles evenly throughout the filter body. The fine fiberglass inner wrap assures finer moisture separation compared to standard models.
- **Positive Media Migration Barrier** – An inner wrap of cellulose filtration material provides a positive media migration barrier.
- **Improved Handling Characteristics** – An outer wrap of resin coated fiberglass screen retains cartridge shape and density through its useful life, protects against handling damage, and reduces the exterior dirt accumulation typical of fuzzy cotton or dacron stockinette coverings.
- **Steel End Caps** – Aluminized steel provides corrosion resistance while plastisol adhesive assures complete bonding of filter media to end caps.
- **Buna Gaskets** – Seal tightly to mounting stool and top seal plate.

Both the 36" FO-436G and the 72" FO-472G cartridges are dimensionally interchangeable with many cartridges in field use. They include:

Peco Model FG-372

Filter Shield Model FS-FG-472-6

KingTool Model KTVSWN

Flo-Line Model Q-FG-372



SPECIFICATIONS

- Heavy gauge aluminized steel center tube resists corrosion and gives 100 psi collapse strength. Louvered openings provide maximum flow distribution.
- Resin-impregnated cellulose barrier to stop fibers from migrating downstream.
- Resin-impregnated fiberglass media, arranged in progressively finer layers, to provide efficient, no channeling depth filtration.
- 200° maximum operating temperature.
- Outside-to-inside flow direction.
- 4-1/2" outside diameter, 3-3/8" inside diameter, 36" and 72" overall lengths.

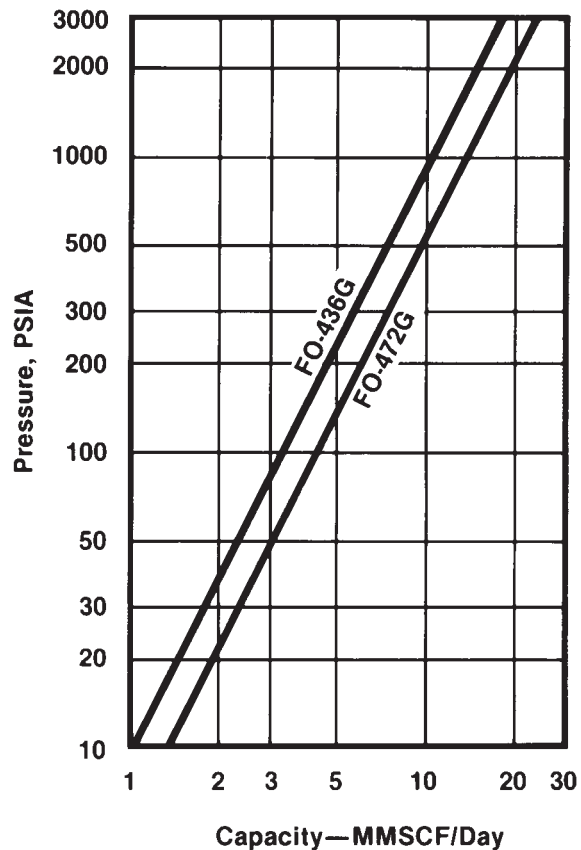


MODELS AVAILABLE:

Model	OAL (Inches)	Rating @ 99% Gravimetric Efficiency
FO-436G	35.75	1/2 micron
FO-436G5	35.75	1 micron
FO-436GA	35.75	2 micron
FO-436GC	35.75	5 micron
FO-472G	71.875	1/2 micron
FO-472GC	71.875	5 micron

CAPACITY VS. OPERATING PRESSURE

- Sized for 1 psi Differential Pressure across filter and centerpipe
- Specific gravity = 0.65
- Temperature = 60°F



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**Liquid Filtration
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OS Series Coalescer/ Separator Cartridges

for Diesel Fuels

Designed for superior performance in VF-61 & VF-609 Housings

FEATURES

- One piece replacement combination coalescer and separator cartridge
- Teflon[®] coated screen separator
- Reliable radial sump seal design
- Nominal 5 micron for diesel fuel
- Minimum 75 psid collapse strength
- Flow direction – outside to inside
- Operating temperatures up to 240°F (115°C)
- 5 - 9 operating pH range

The OS Series combination coalescer/separator cartridges filter dirt and remove water from diesel fuel. They are designed to fit into VF-61 and VF-609 housings. Performance is improved due to Teflon[®] coated screen separators and reliable radial sump seals.



OS-51286 Cartridge

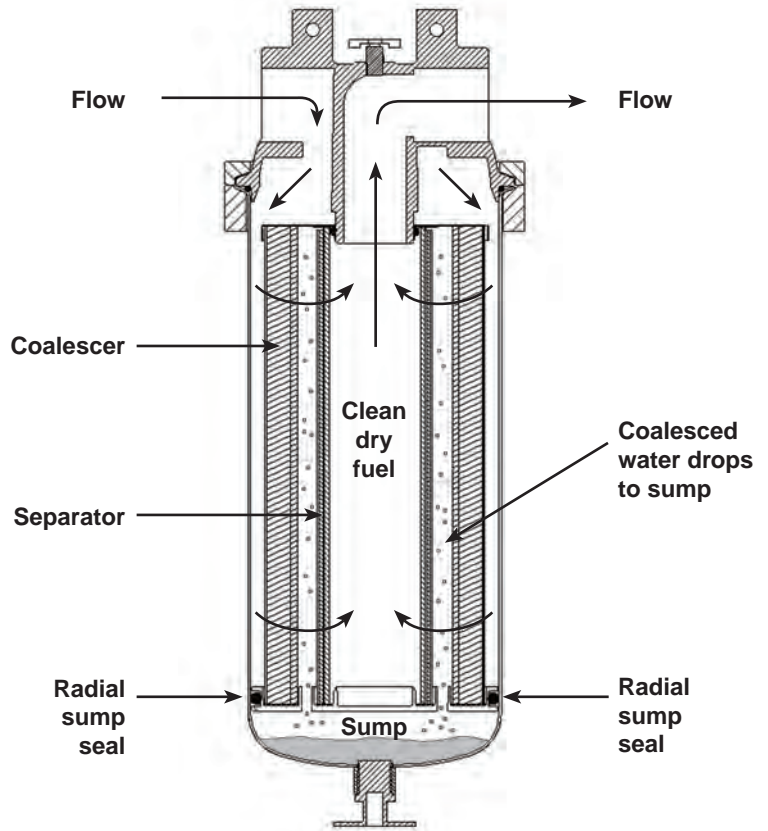


OS-60986 Cartridge

[®] Teflon is a registered trademark of E.I. du Pont de Nemours & Co., Inc.

DESCRIPTION

Flow is from outside to inside through the cartridge. Coalesced water is repelled by the separator and drops to the sump for daily draining. Clean, dry fuel exits the cartridge through the nozzle at the top.




CARTRIDGE SELECTION TABLE

MODEL NUMBER	VESSEL MODEL NUMBER	FOR PRODUCT	FLOW RATE USGPM (maximum)	MICRON RATING	DIMENSIONS			
					OD		LENGTH	
					inches	mm	inches	mm
OS-51286	VF-61	Diesel Fuel	18	5	6	152	11 ³ / ₄	298
OS-60986	VF-609	Diesel Fuel	18	5	6	152	9	229

Replace the cartridge when the differential pressure exceeds 15 psi or after 1 year of service, whichever occurs first.

*Because of the limited sump space in these vessels, IT IS IMPERATIVE to drain the sump at EVERY FUELING. It is also important to recognize that these OS cartridges by themselves do not provide a water defense system. Velcon recommends the use of a water defense system to alert the user to the presence of water in the sump.



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Replacement Cartridges for Vel-Max® Housings

O Series Coalescer and SO Separator Remove Water and Dirt from Diesel, Jet Fuel and Avgas

- Reduces free and emulsified water to less than 50 ppm in diesel, and less than 15 ppm in jet fuel/avgas.
- Used in place of **Aquacon**® cartridges for continuous removal of free water
- For use in the Velcon Vel-Max® housings

DESCRIPTION

The Velcon coalescer and separator are installed together in the Vel-Max® housing to remove water and dirt from fuel. The fuel passes from the outside to the inside through the coalescer. Dirt is filtered out of the fuel and free/emulsified water in fuel is coalesced. The coalesced water droplets, which form on the inside of the coalescer, are repelled from going further down-stream by the separator. The water settles down to the sump where it is manually drained.



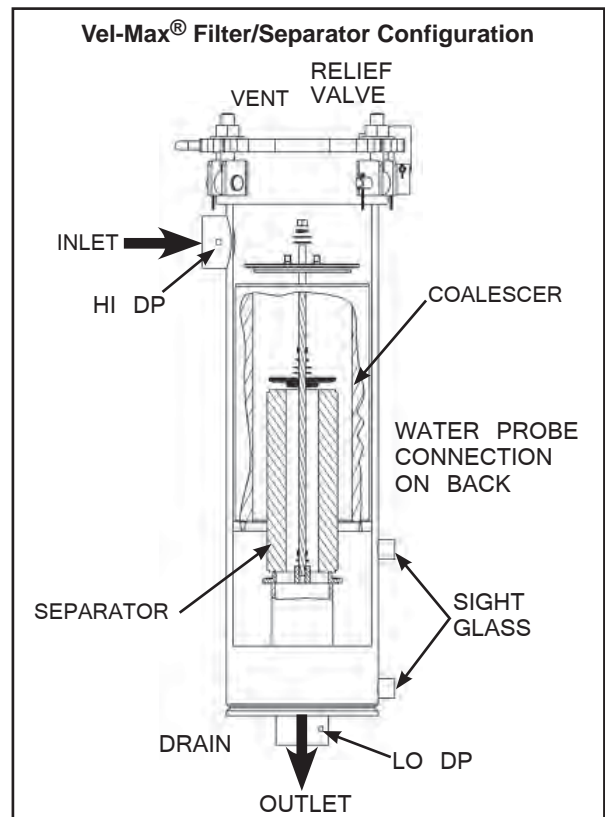
O-81588 and SO-415VX5 Separator

SPECIFICATIONS

- Maximum Operating Temperature is 160°F / 71°C
- Flow direction: outside to inside
- pH range: 5 to 9
- Coalescer Changeout at 15 psid

MAXIMUM RECOMMENDED FLOW RATES

Housing with Cartridges	Jet		Avgas		Diesel	
	gpm	lpm	gpm	lpm	gpm	lpm
VX-1	37	140	55	208	25	95
VX-2	75	284	100	378	50	189
VX-3	112	424	168	636	75	284



For more information on the Vel-Max® Filter Vessel please refer to data sheet #1961.

Cartridge Selection Tables for Vel-Max® Housings

Jet & Avgas Applications

Housing	Cartridge	Model #	Micron Rating	Dimensions (Inches)		
				OAL	ID	OD
VX-1	Coalescer	O-81588	0.5	15.0	5.625	7.625
	Separator	SO-415VX5	N/A	15.0	1.875	4.0
VX-2	Coalescer	O-83088	0.5	30.0	5.625	7.625
	Separator	SO-430VX5	N/A	30.0	1.875	4.0
VX-3	Coalescer	O-84488	0.5	44.0	5.625	7.625
	Separator	SO-444C	N/A	44.0	1.875	4.0

Diesel Applications

Housing	Cartridge	Model #	Micron Rating	Dimensions (Inches)		
				OAL	ID	OD
VX-1	Coalescer	O-8150	25	15.0	5.625	7.625
	Coalescer	O-8152	5			
	Coalescer	O-8154	3			
	Coalescer	O-8156	2			
	Separator	SO-415PL	N/A	15.0	1.875	4.0
VX-2	Coalescer	O-8300	25	30.0	5.625	7.625
	Coalescer	O-8302	5			
	Coalescer	O-8304	3			
	Coalescer	O-8306	2			
	Separator	SO-430PL	N/A	30.0	1.875	4.0
VX-3	Coalescer	O-8440	25	44.0	5.625	7.625
	Coalescer	O-8442	5			
	Coalescer	O-8444	3			
	Coalescer	O-8446	2			
	Separator	SO-444PL	N/A	44.0	1.875	4.0

NOTES:


1. If converting from Velcon's **Aquacon**® water absorbing cartridges to coalescer/separator cartridges, please order **Part Number EA35** end seal plate.
2. Separators used for jet fuel and avgas applications (SO-4xxVX5) are Teflon®-coated and can be cleaned and re-used. See data sheet #1242 for cleaning and maintenance instructions.
3. Separators used for diesel applications (SO-4xxPL) are made with pleated media. Changeout at 15 psid.

For information on other types of Velcon filter cartridges that can be used in the Vel-Max® Housing, see below and corresponding data sheet as marked.

Type		1-High	2-High	3-High	Data Sheet #
Micronic Filter Cartridges	Pleated Paper	FO-614PLFxx*	FO-629PLFxx	FO-644PLFxx	1549
	Fiberglass Depth	FO-614FGxx	FO-629FGxx	FO-644FGxx	1550
Aquacon ® Cartridges	Jet Fuel/Avgas	ACO-61401L	ACO-62901L	ACO-64401L	1681
	Gasoline	AC-61405	AC-62905	AC-64405	1582
	Diesel	AD-61425	AD-62925	AD-64425	1655
CDF®	Jet Fuel	CDF-215N	CDF-230N	N/A	1962

*The suffix "x" or "xx" on the part number denotes the micron rating of the cartridge.

Example: FO-614PLF5 is a 5 micron filter.



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High Capacity Synthetic Filter Cartridges

FSH Series

Long-lasting, High Capacity, & Efficient Performance Up To Three Times Greater Solids Capacity

BENEFITS

- Polyester meltblown media - excellent water and hydrocarbon resistance
- Up to three times greater solids capacity than our regular pleated paper cartridges
- Coated Steel Components - resists corrosion from most fluids
- Buna-N Gaskets - the best general gasket material available assumes positive seal in most fluids
- Thermoset Bonding Material - durable endcap-to-media bond prevents internal bypassing 98%+ Filtration Efficiency for various micron ratings
- Available with threaded base
- Can be supplied with metal outer jacket
- Out-to-In Flow

APPLICATIONS

Velcon synthetic media cartridges are suitable for a broad range of polar and non-polar fluids.

- Recommended in applications where the contaminant is granular (non-colloidal), allowing maximum utilization of the high surface area.
- Recommended in applications where water or chemicals cause softening or degradation of conventional resin impregnated cellulose filter media.

Suitable for:

- All hydrocarbon fuels
- Cutting Oils
- Glycols
- Degreasing fluids
- Insulating oils
- Water emulsion coolants
- Hydraulic oils
- Ethyl alcohol
- Synthetic oils
- Lube oils
- Naptha



FSH-5436PL5



FSH-644PLF10M

Please note – The outer wrap of a cartridge can be either nylon jacket, beaming paper, or PVC-coated screen wrap. Cartridges may not look exactly like those shown in photo.

SPECIFICATIONS

75 psi Collapse strength
5 - 9 Operating pH range
250°F Maximum operating temperature

CARTRIDGE SELECTION TABLE

Velcon Model Number	Micron Rating	Dimensions			Maximum Flow Rate
		ID (Inches)	OD (Inches)	Length (Inches)	
FSH-5436PL1/2	0.5	N/A	4	36.31	75
FSH-5436PL2	2	N/A	4	36.31	75
FSH-5436PL5	5	N/A	4	36.31	75
FSH-614PLF10M	10	3.5625	6	14	50
FSH-629PLF10M	10	3.5625	6	29	108
FSH-636PLF2M	2	3.5625	6	36	135
FSH-644PLF2M	2	3.5625	6	44	166
FSH-644PLF5M	5	3.5625	6	44	166
FSH-644PLF5MTB	5	N/A	6	44	166
FSH-64410M	10	3.5625	6	44	166



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**Liquid Filtration
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Dual Media Cartridges Two-Layer Filtration Through a Single Filter Cartridge

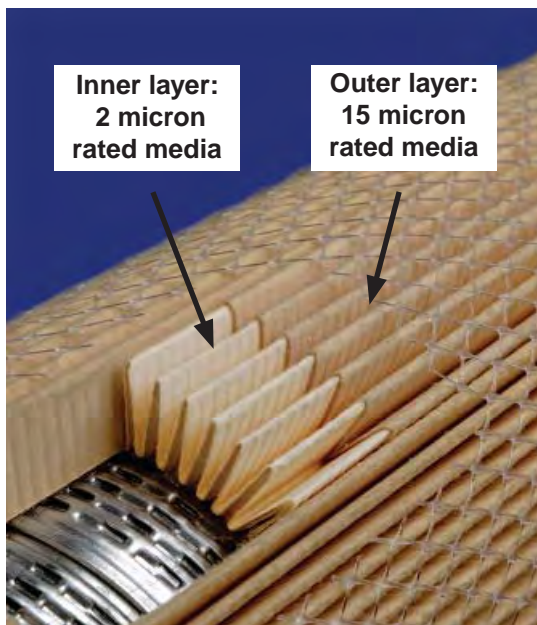
Bulk fuel suppliers are increasingly being called upon to supply cleaner fuels to accommodate new engine technology, more stringent emissions standards, and ever-increasing environmental concerns. Velcon's Dual Media Cartridges provide a cost effective solution to meet these needs.

DESCRIPTION

Velcon Dual Media Cartridges are designed for bulk fuel filtration applications that would benefit from two layers of filter media in a single filter cartridge. These cartridges are desirable in applications where a large variance of contaminant particle size occurs such as at terminals, refineries and pipelines.

APPLICATIONS

- Diesel fuel
- Gasoline
- Naphtha
- Biodiesel fuel
- Kerosene
- Jet fuel
- All hydrocarbon fuels



BENEFITS

- Coarse and fine contaminants are cleaned in a single pass
 - * Larger particles captured in first layer
 - * Second layer acts as a polishing filter for finer particles
- Money saving alternative to several different filter vessels to handle different sized particles
- Users of dual layer filtration have experienced fewer mechanical equipment problems at the load rack downstream of filtration
- New and innovative way to meet previously unattainable fuel cleanliness levels as tested per ISO 11171.

CARTRIDGE INFORMATION

MODEL NUMBER	DIMENSIONS	NOMINAL MICRON EFFICIENCY	
		UPSTREAM	DOWNSTREAM
FO-629PLF5/1M	6" OD x 29" OAL x 3-1/2" ID	5	1
FO-629PLF15/2M		15	2
FO-629PLF25/5M		25	5
FO-644PLF5/1M	6" OD x 44" OAL x 3-1/2" ID	5	1
FO-644PLF15/2M		15	2
FO-644PLF25/5M		25	5
FO-656PLF5/1M	6" OD x 56" OAL x 3-1/2" ID	5	1
FO-656PLF15/2M		15	2
FO-656PLF25/5M		25	5

NOTE:

1. All cartridges have nylon mesh protective outer jacket.
2. For Centertubeless configuration, substitute "DC" for "FO" in model number (Example: DC-629PLF15/2M).
3. For Threaded Base configuration, add "TB" suffix to model number (Example: FO-644PLF5/1MTB).
4. Centertubeless & Threaded Base configurations subject to minimum order requirements.

SPECIFICATIONS

- 75 psi Collapse strength
- 5 - 9 Operating pH range
- 98%+ Nominal filtration efficiency
- 250°F Maximum operating temperature
- Recommended changeout differential pressure - 25 psid

The photos below show contaminant that was removed from a two-inch square block of filter media on a cartridge that had been filtering diesel fuel. The photo on the left shows the coarse contaminant that was removed by the fifteen micron layer of filter media. The photo on the right shows the finer particles that were removed by the two micron filter layer. This filter cartridge (FO-644PLF15/2M) held over ten pounds of contamination before it was changed out!



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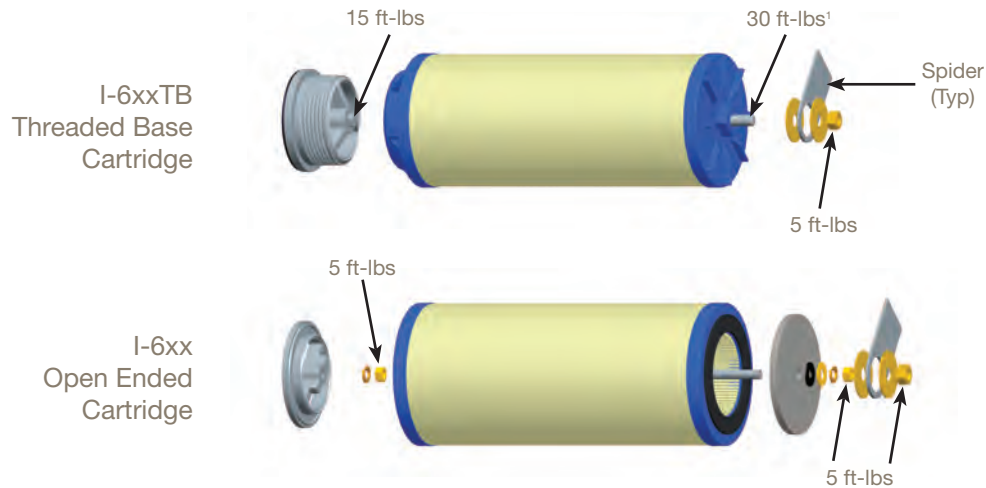


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Assembly Torque Recommendations

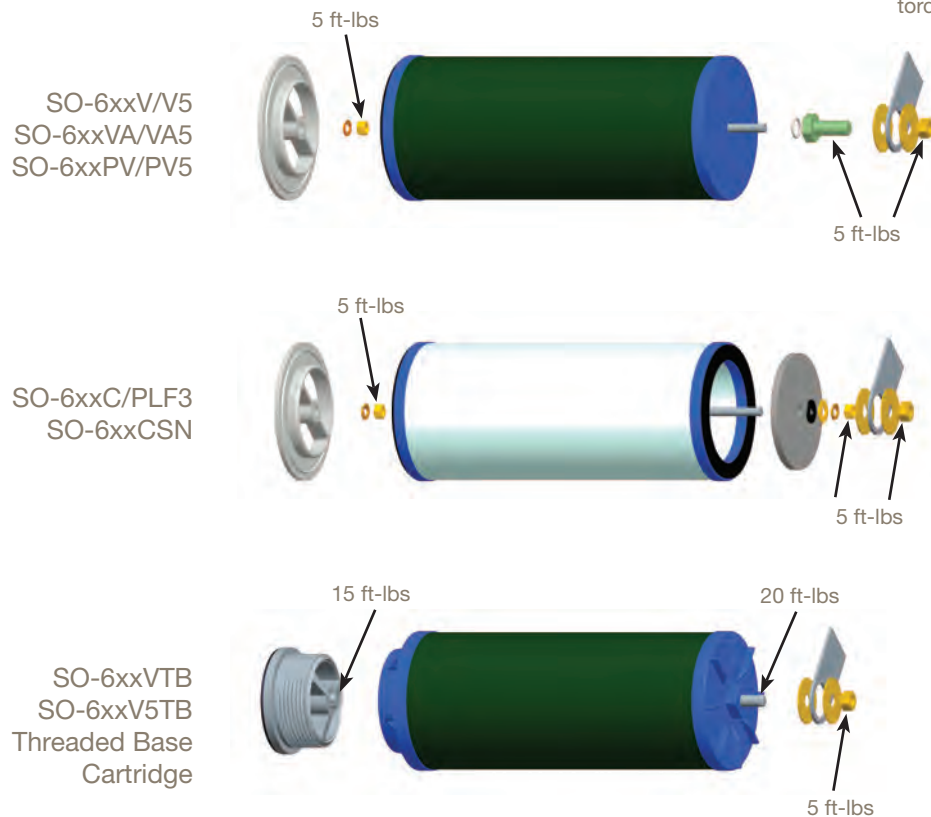
COALESCER CARTRIDGES

¹10 ft-lbs for I-4xxT coalescers



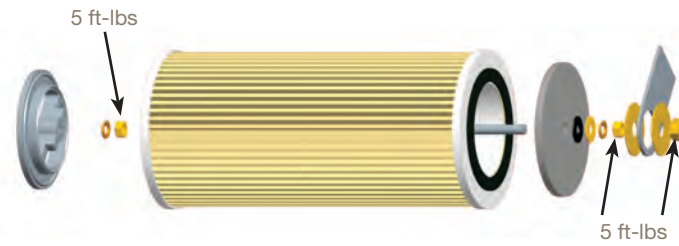
SEPARATOR CARTRIDGES²

²All 3" and 4" separators should be torqued to 5 ft-lb on both ends.

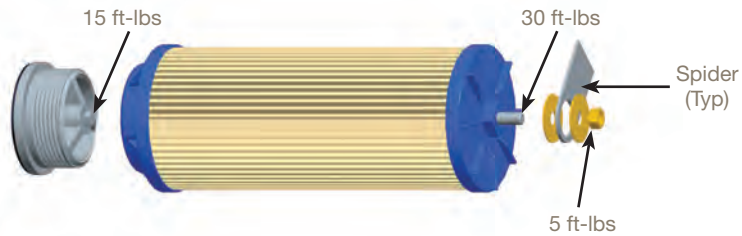


FILTER CARTRIDGES

FO-6xxPLF
FO-6xxFG
FO-6xxA3

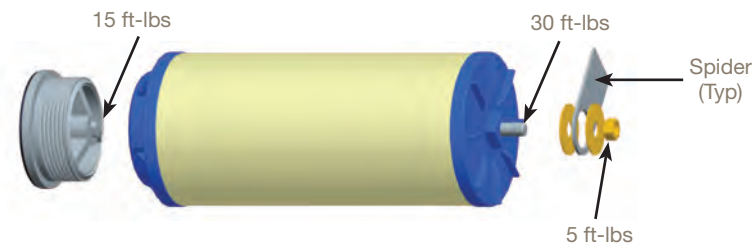


FO-6xxPLFTB
Threaded Base
Cartridge

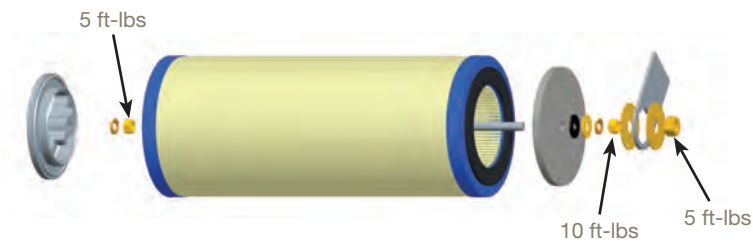


Aquacon® CARTRIDGES

ACI-6xxTB
ACO-6xxTB
Threaded Base
Cartridge



AC, ACI, ACO,
ASL, AD
Open Ended
Cartridge



TORQUE CONVERSION TABLE

ft-lbs	inch-lbs	kg-m	N-m
5	60	0.69	6.78
10	120	1.38	13.56
15	180	2.07	20.34
20	240	2.77	27.12
30	360	4.15	40.67

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VEL1801R6 10/13



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Section 2

Filter Vessels

- **Compact**
- **Flexible Filtration**
- **Multipurpose Design**
- **Simplified Maintenance**

DESCRIPTION

The compact Vel-Max® Filter Vessel is suitable for flowrates up to 204 USGPM with micronic cartridges, up to 198 USGPM as a filter/separator, and up to 150 USGPM with CDF® monitor cartridges. The Vel-Max® can be used on mobile refueling equipment, fueling cabinets and for fixed fueling installations. Vel-Max® is designed for easy maintenance and easy conversion to a prefilter, filter/separator, or monitor.

APPLICATIONS

- Jet Fuel
- Avgas
- Diesel Fuel
- Biodiesel Blends
- Motor Gasoline
- Kerosene
- Turbine Lube Oil
- Insulating Oil

STANDARD FEATURES

- Carbon steel construction
- 250 psi design pressure
- Epoxy powder coated interior & 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)



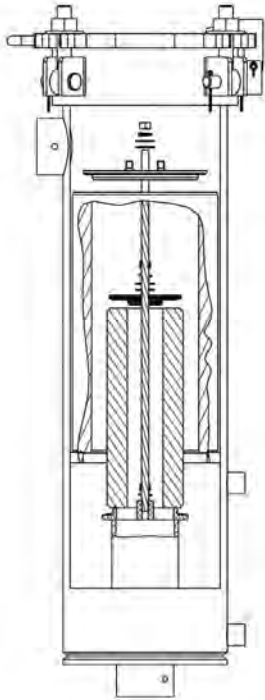
Vel-Max® Filter Vessel, VX-2, showing optional leg assembly, differential pressure gauge, sight glass assembly, and air eliminator.

OPTIONAL FEATURES

- Air eliminator
- Drain valve
- Pressure relief valve
- Water probe
- Sight gauge
- Leg assembly with adjustable height
- ASME Code Stamp
- CE Mark
- Differential pressure gauge assembly
- Lid Gasket: G-2052V (Viton)

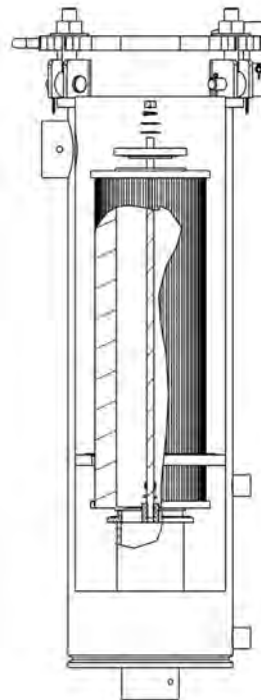
Vel-Max® Filter Vessel Configurations/Applications

Filter/Separator Configuration



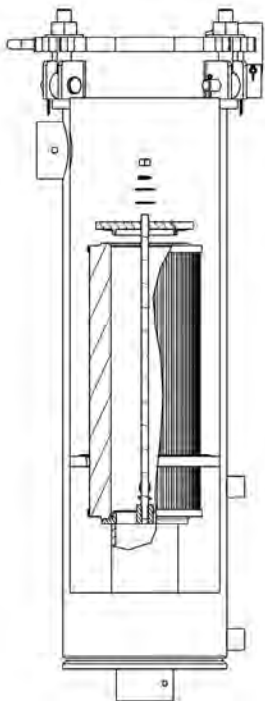
Vel-Max® Series for liquid/liquid separation uses a 2-stage coalescer separator cartridge combination to remove free and emulsified water from a liquid product stream. The first stage coalescing cartridge provides filtration as well as coalescing of free and emulsified water. The second stage separator is a hydrophobic barrier designed to repel the coalesced water droplets. The water droplets will fall and collect in the sump for removal through the manual drain.

6" or 6.25" OD x 2.625" ID Configuration



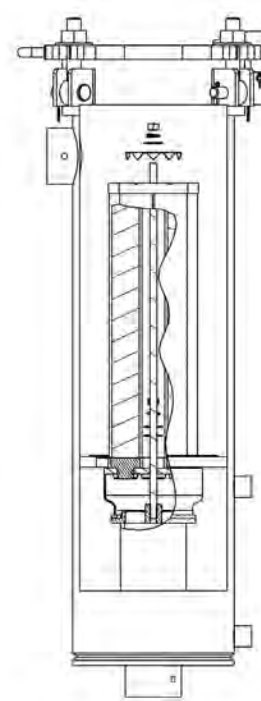
Vel-Max® Series for 6" or 6.25" OD x 2.625" ID cartridges can be used in several ways. To remove solid contaminants from a flow stream, use the vessel with a pleated media filter. When used with Aquacon® cartridges the Vel-Max® will remove solids and free water by absorption from a fuel or industrial oil flow stream. Using Vel-Max® with clay cartridges will remove surfactants, color and other impurities by adsorption from a fuel or industrial oil system.

6" OD x 3.5" ID Configuration



Vel-Max® Series with 6" OD x 3.5" ID cartridges can be used in two ways. To remove solid contaminants from a flow stream, use the vessel with a pleated media filter. When used with Aquacon® cartridges* the Vel-Max® will remove solid contaminants and free water by absorption from a jet fuel or aviation gasoline flow stream.

CDF® Monitor Configuration



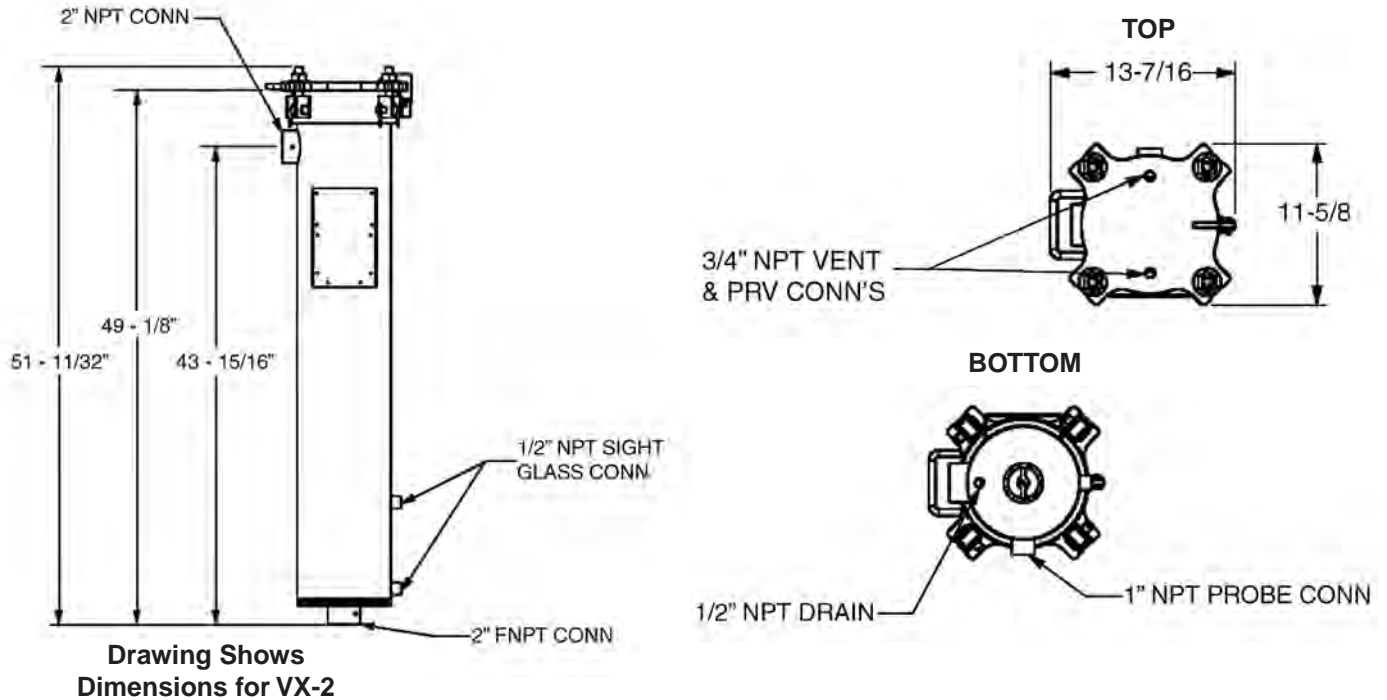
Vel-Max® Series can be adapted to use 2" diameter CDF® type monitor cartridges* for removing solid contaminants and free water by absorption from jet fuel or aviation gasoline flow streams.

***CAUTION: Do not use Aquacon® or CDF® water absorbing monitor cartridges in pre-mixed jet fuel containing anti-icing additives (DiEGME, FIZZY®, Prist®, FSII)**

Vel-Max® Filter Vessel Specifications

DIMENSIONS

Model	Height		Cover Width		Cover Length		Dry Weight	
	Inches	mm	Inches	mm	Inches	mm	lbs	kgs
VX-1	36	914	13 7/16	341	11 5/8	295	110	50
VX-2	51	1295	13 7/16	341	11 5/8	295	125	57
VX-3	66	1676	13 7/16	341	11 5/8	295	150	68



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

FLOW RATES (USGPM)

CONFIGURATION	APPLICATIONS	VX-1	VX-2	VX-3
FILTER / SEPARATOR	TURBINE LUBE OIL (ISO 32, 100°F)	3.5	7.5	11.5
	INSULATING OIL (80°F)	6.1	13.5	20.0
	DIESEL FUEL	25	50	75
	GASOLINE / AVIATION GASOLINE	66	132	198
	JET FUEL / KEROSENE	50	100	150
MICRONIC CARTRIDGES 6" OD x 3.5" ID	OILS	CONTACT FACTORY		
	DIESEL FUEL	50	100	150
	GASOLINE / AVIATION GASOLINE	68	136	204
	JET FUEL / KEROSENE	66	132	198
AVIATION <i>Aquacon</i> ® CARTRIDGES 6" OD x 3.5" ID	JET FUEL / KEROSENE	58	115	176
INDUSTRIAL MICRONIC & <i>Aquacon</i> ® CARTRIDGES 6" or 6.25" OD x 2.625" ID	OILS	CONTACT FACTORY		
	DIESEL / GASOLINE / AV GAS / JET FUEL / KEROSENE	50	100	150
CLAY CARTRIDGES (LA-61801B)	INSULATING OIL	1	N/A	2
	JET FUEL / KEROSENE / GASOLINE	7.5		15
CDF® MONITOR CARTRIDGES	JET FUEL / KEROSENE / GASOLINE	75	150	N/A

Vel-Max® Cartridge Selection Table

CARTRIDGES


FILTER/SEPARATOR CONFIGURATION				
FIRST STAGE COALESCERS FOR:	MICRON RATING	VX-1	VX-2	VX-3
DIESEL FUEL	25	O-8150	O-8300	O-8440
	3	O-8154	O-8304	O-8444
DIESEL FUEL / GASOLINE	2	O-8156	O-8306	O-8446
JET FUEL / KEROSENE / DIESEL FUEL / TURBINE LUBE OIL / INSULATING OIL	0.5	O-81588	O-83088	O-84488
SECOND STAGE SEPARATORS FOR:	TYPE	VX-1	VX-2	VX-3
DIESEL	PAPER	SO-415PL	SO-430PL	SO-444PL
JET / KERO / GAS / OILS	TCS	SO-415VX5	SO-430VX5	SO-444C
6" OD X 3.5" ID CONFIGURATION	TYPE	VX-1	VX-2	VX-3
MICRONIC CARTRIDGES	PLEATED PAPER	FO-614PLFxx	FO-614PLFxx (STACK OF 2)	FO-614PLFxx (STACK OF 3)
			FO-629PLFxx	FO-644PLFxx
	FIBERGLASS DEPTH	FO-614FGxx	FO-614FGxx (STACK OF 2)	FO-614FGxx (STACK OF 3)
			FO-629FGxx	FO-644FGxx
AVIATION <i>Aquacon</i> ® CARTRIDGES*		ACO-61401L	ACO-61401L (STACK OF 2)	ACO-61405 (STACK OF 3)
INDUSTRIAL <i>Aquacon</i> ® CARTRIDGES		AC-61405	A(C/D)-614xx (STACK OF 2)	A(C/D)-614xx (STACK OF 3)
		AD-61410		
		AD-61425	AC-62905	AC-64405
6" OR 6.25" OD X 2.5625" ID CONFIGURATION		VX-1	VX-2	VX-3
MICRONIC CARTRIDGES	PLEATED PAPER (FO) & PLEATED SYNTHETIC (FOS)	FO-718PLxx	N/A	(FO/FOS)-718xx (STACK OF 2)
		FOS-618PLxx		FO-736PLxx
		FOS-718PLxx		FOS-636PLxx
	FIBERGLASS DEPTH	FO-618FGAxx		FO-618FGAxx (STACK OF 2)
FO-636FGAxx				
INDUSTRIAL <i>Aquacon</i> ® CARTRIDGES		AC-718xx		AC-718xx (STACK OF 2)
CLAY (FULLER'S EARTH) CARTRIDGES		LA-61801B	LA-61801B (STACK OF 2)	
CDF® MONITOR CONFIGURATION		VX-1	VX-2	VX-3
CDF® CARTRIDGES*		CDF-215N	CDF-230N	N/A

The suffix "xx" on the part number of cartridges denotes the micron rating of the cartridge.
Contact Velcon Filters, LLC for available micron ratings.

HARDWARE KITS

CONFIGURATION	VX-1	VX-2	VX-3
FILTER / SEPARATOR (COALESCER + SEPARATOR)	VX1-FSKIT	VX2-FSKIT	VX3-FSKIT
6" OD X 3.5" ID CARTRIDGE(S)	VX1-AVKIT	VX2-AVKIT	VX3-AVKIT
6" OR 6.25" OD X 2.5625" ID CARTRIDGE(S)	VX1-INKIT	N/A	VX3-INKIT
CDF® MONITOR CARTRIDGES	VX1-CDKIT	VX2-CDKIT	N/A

***CAUTION: Do not use *Aquacon*® or CDF® water absorbing monitor cartridges in pre-mixed jet fuel containing anti-icing additives (DiEGME, FIZZY®, Prist®, FSII)**



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Oil Dispenser Filter

VF-21, ACB-20501

Dispense Only Clean Dry Oil

FEATURES

- Designed to filter turbine lube oil and other similar oils
- 600 psi maximum operating pressure
- Filters out dirt and other particulate contaminants with 0.8 micron nominal efficiency
- Removes free and emulsified water to less than 5 ppm
- Internal check valve prevents operation without cartridge installed
- Positive shut-off prevents pumping contaminated oil



DESCRIPTION

The VF-21 Housing was developed in conjunction with a major airline for use on turbine lube oil dispensers. When an ACB-20501 Cartridge is installed, only clean oil will be pumped.

The ACB-20501 **Aquacon**[®] Cartridge absorbs free and emulsified water. When fully saturated, the absorbent media swells shut and blocks the flow of contaminated oil. Glass microfiber material removes particulate contamination with a nominal gravimetric filtration efficiency of 0.8 micron. The ACB-20501 **Aquacon** Cartridge is designed to withstand the pulsating flow and high pressures generated by a hydraulic hand pump.

The VF-21 Housing has a spring valve that will only open if a cartridge is installed. Fluid will not flow through the VF-21 without a cartridge in place. Kits are available to retrofit stainless steel 2 gallon and 5 gallon dispensers manufactured by Malabar International.

APPLICATIONS

- All hydrocarbon-based fuels and oils
- MIL-PRF-5606 hydraulic oil
- MIL-PRF-83282 hydraulic oil
- MIL-PRF-7808 and MIL-PRF-23699 turbine lube oil.
Includes Exxon Turbo Oil 2380 and 2389, and Mobil Jet Oil II (Type II)
- Stauffer Fyrquel, Houghto-Safe 1000 Series, Exxon Imol S 220, Mobil Pyrogard 51, 53, & 55
- Mobil SHC 824, Mobilube SHC, Exxon Synesstic

Note: VF-21 and ACB-20501 can also be used with Skydrol and HI Jet IV. Order Ethylene Propylene Seal Kit CK-1478I.

For complete operating procedures see PN 09-115, Operating Instructions for ACB's.

ORDERING INFORMATION

- For housing alone specify Model **VF-21**
- For housing plus 2 gallon Malabar Kit specify **VF-21/2**
- For housing plus 5 gallon Malabar Kit specify **VF-21/5**
- Cartridges must be ordered separately. Specify Model **ACB-20501**. Cartridges are packed in sealed polybags, 20 per carton.

VF-21

- Aluminum construction
- Viton A O-ring seals
- Inlet/Outlet: Female 1/2-20 SAE O-ring
- Length: 8^{1/2}"
- Diameter: 3^{1/2}"
- Weight: 2 lbs
- Shipping Weight: 3 lbs
- Maximum Pressure: 1000 psi

ACB-20501

- Length: 5^{7/8}" OAL
- Diameter: 1^{3/4}" OD
- Weight: 120 grams
- Nominal Gravimetric Filtration Efficiency: 0.8 micron
- Beta 10: 90
- Absolute Beta Rating (Beta=75): 8 micrometers
- Water Capacity: 50 cc
- Particulate Solids Capacity: 1.5 grams
- Maximum Flow Rate (Turbine Oil): 0.5 GPM
- Collapse Pressure: 600 psi
- Maximum Operating Temperature: 200°F
- Buna-N O-ring



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Clean Dry • Fuels • Oils • Gasses with High Performance *Aquacon*® Filter Cartridges

FEATURING

- Free and emulsified water to less than 5 ppm
- 1/2 micrometer particulate removal
- Provides protection against “slugs” of water
- Pressure increase signals cartridge change
- Use with existing filter housings

DESCRIPTION

The VF-31E is a versatile filter housing designed for use with several different high performance *Aquacon* filter cartridges. Cartridges are offered for the optimum filtration of aviation fuel (see caution on reverse side), gasoline, diesel fuel, oils, compressed air, and other gasses. Refer to the Cartridge Selection Table on the reverse side of this sheet for details.

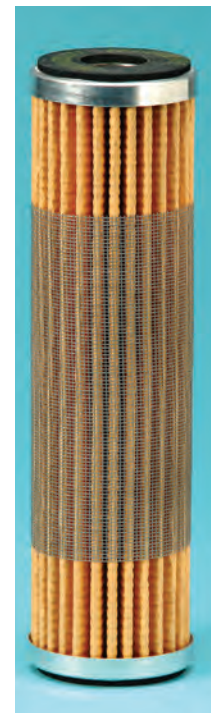
Aquacon filters eliminate water contamination problems by removing water from fuels, oils, and gasses. Filtered water is chemically locked into the cartridge’s inner super-absorbent media.

As a cartridge reaches its water holding limit, the media expands very rapidly and restricts the flow of unfiltered material. This causes an increase in the differential pressure which signals the operator to replace the cartridge. When filtering fuels or compressed air, a saturated *Aquacon* cartridge will completely block the flow until it is replaced.

Aquacon Cartridges are also excellent dirt filters. Silt, rust, and other particulates are removed by the cartridge’s outer filter media. One-half, five, and 25 micron rated cartridges are available for use with fuels and oils. The ACA-210 cartridge, for use with compressed air and other gasses, has a 1 micron rating.



VF-31E
Filter Housing



AC-21005
Filter Cartridge



ACA-210
Filter Cartridge

APPLICATIONS

Fuels:	Oils:
Kerosene	Insulating
Diesel	Hydraulic
Biodiesel	Lubricating
Gasoline	

Compressed Air and Other Gasses

FILTER CARTRIDGE SELECTION TABLE

Product being filtered	Application	Cartridge P/N	Data Sheet	Type	Micron	Flow Rate (GPM)
Jet Fuel & Avgas ⁽¹⁾	Dirt & Free water	ACO-21001L	1681	Aquacon [®] (Absorbent)	0.5	1-15
Motor Gasoline		AC-21005	1582		5	
Gasohol	Dirt	FOG-21005	N/A	Paper filter	5	1-15
Diesel/ Biodiesel ⁽¹⁾	Dirt & Free water	AD-21025	1655	Aquacon [®] (Absorbent)	25	1-15
Oils		AC-21005	1582		5	
		AD-21025	1655		25	
Air/Gas		ACA-210	1689		1	100 SCFM @ 100 psig
	Dirt	FOS-210PLP5	N/A	Synthetic Filter	0.5	

(1) For Aviation and Diesel Fuel Systems, if system pressure can exceed 25 psi, **always** install pressure gauge or other means of determining differential pressure.

(2) See Data Sheet #1709 for absorbent cartridge (AC, AD) flow rates.

SPECIFICATIONS

Filter Housing VF-31E

- Recommended maximum flow rate: see table below
- Maximum operating pressure: 150 psi
- Material: cast aluminum head, carbon steel bowl with epoxy painted interior and exterior
- Inlet/Outlet Connection: 1" NPT
- Inlet/Outlet face-to-face: 4"
- Mounting holes in head: four 1/4-20 NC
- Seal: Buna-N gasket
- Height: 13.50" without Petcock, 14.50" with Petcock
- Weight: 3 lbs., 15 oz.
- Shipping Weight: 4 lbs., 15 oz.
- Hardware included: 1 ea. Buna-N Lid Gasket, Mounting Brackets, 1 ea. Plug (for fuel and oil applications), and 1 ea. 1/8" Petcock Drain (for air, gas and aviation fuel applications).

RECOMMENDED SPARES

- 1 ea. Model G-0995 Buna-N Lid Gasket
- 4 ea. filter cartridges (Specify from table.)

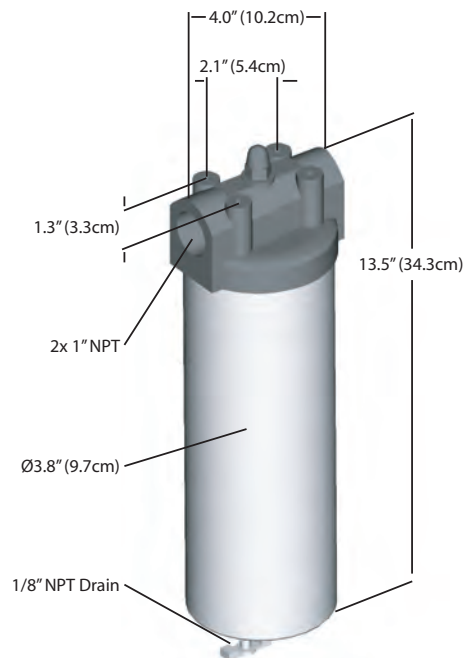
CAUTION

Do not use **Aquacon**[®] absorbent cartridges (AC, ACO or AD Series) with pre-mixed jet fuel containing anti-icing additives, or with gasoline/alcohol blends.


ORDERING INFORMATION

• Model VF-31E Filter Housing

- Supplied without cartridge
- Supplied with 1 ea. Model G-0995 Buna-N Lid Gasket, Mounting Brackets, 1 ea. Plug, and 1 ea. 1/8" Drain Petcock



Dimensions are for estimating purposes only.



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Small Filter Housings

VF-31E, VF-61, VF-609

Clean Dry Fuels and Oils with High Performance

FEATURES

- Wide variety of applications
- Free and emulsified water to less than 5 ppm
- 1/2 micron particulate removal
- Provides protection against “slugs” of water
- Pressure increase signals cartridge change

These filter housings are versatile housings designed for use with several different high performance **Aquacon**® and other filter cartridges. Refer to the cartridge selection table on page 3 for application and other details.

Aquacon® cartridges filter out water by chemically locking it into layers of super-absorbent media. Water capacity is as much as 1½ quarts, depending on the specific vessel and cartridge. These cartridges also effectively filter out dirt, rust and other particulates. (See caution, back cover.)

As an **Aquacon**® cartridge reaches its water-holding limit, the media expands very rapidly and restricts the flow. The pressure drop will rapidly increase, signaling the need to change cartridges.

The VF-61, with **Aquacon**® ACO series cartridges installed, has become the standard for low flow rate full flow aviation fuel monitor applications.

APPLICATIONS

- | | |
|---------------------|--------------------|
| • Jet Fuel | • Oils: Insulating |
| • Avgas | Hydraulic |
| • Motor Gasoline | Lubricating |
| • Diesel Fuel | • Compressed Air |
| • Biodiesel | • Other Gasses |
| • Selected Solvents | |



VF-31E



VF-61*



VF-609



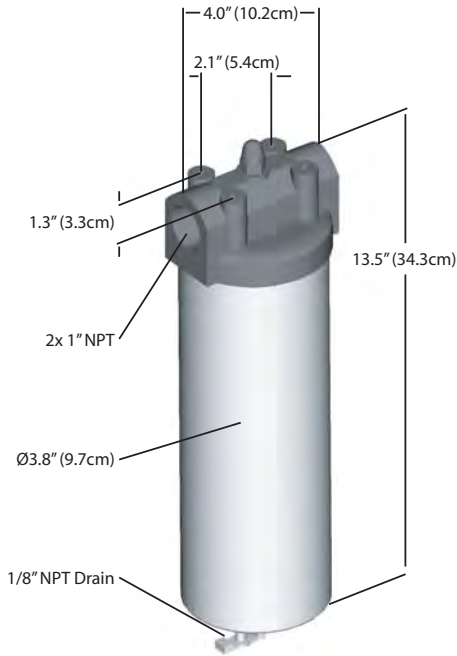
VF-61 connected to a diesel fuel dispenser

***Also available: VF-61UL Filter Housing, for diesel fuels. Recognized under the Component Recognition Program of Underwriters Laboratories Inc.**

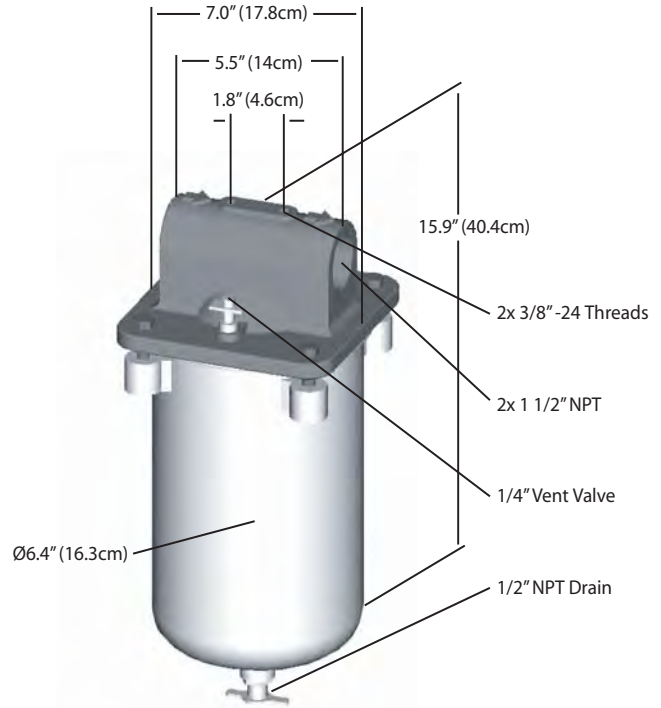
DIMENSIONAL DRAWINGS

Please note: Drawings are not to scale. Dimensions are shown for estimating purposes only.

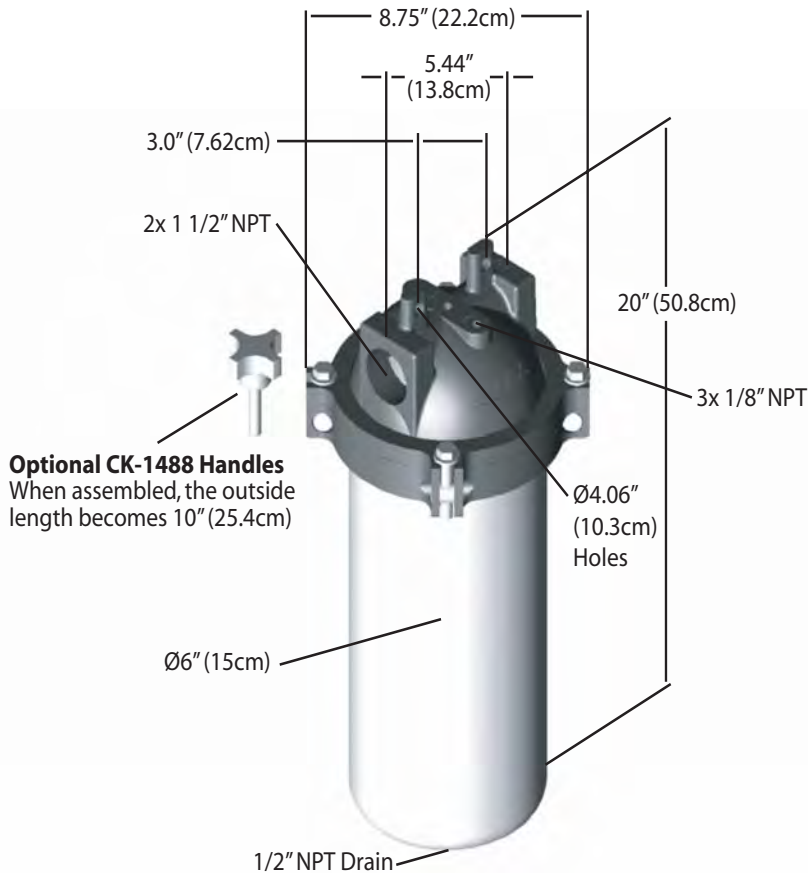
VF-31E



VF-609



VF-61



OPTIONAL ACCESSORIES - DIFFERENTIAL PRESSURE GAUGES

See page 4 for ordering information



**P/N 10678
for VF-61**



**P/N 07-224
for VF-609**

Optional mounting block for gauge, P/N 07-224AMB, not shown

FILTER CARTRIDGE SELECTION TABLE

Housing P/N	Product being filtered	Application	Cartridge P/N	Data Sheet	Type	Micron	Flow Rate (GPM)
VF-31E	Jet Fuel & Avgas ⁽¹⁾	Dirt & Free water	ACO-21001L	1681	Aquacon [®] (Absorbent)	0.5	1-15
	Mo-gas		AC-21005	1582		5	
	Gasohol	Dirt	FOG-21005	N/A	Paper filter	5	1-15
	Diesel ⁽¹⁾	Dirt & Free water	AD-21025	1655	Aquacon [®] (Absorbent)	25	1-15
	Oils		AC-21005	1582		5	Varies with oil viscosity ⁽²⁾
			AD-21025	1655		25	
	Air/Gas		ACA-210	1689		1	100 SCFM @ 100 psig
	Dirt	FOS-210PLP5	N/A	Synthetic Filter	0.5		
VF-61	Jet Fuel & Avgas ⁽¹⁾	Dirt & Free water	ACO-512P3L	1681	Aquacon [®] (Absorbent)	0.3	5-50
			ACO-51201L			0.5	5-50
			OS-51288	1858	Coalescer/ Separator	0.5	Jet: 5-35 Avgas: 5-45
	Mo-gas		AC-51205	1582	Aquacon [®] (Absorbent)	5	5-50
	Diesel ⁽¹⁾		AD-51225	1655		25	15-50
				OS-51286	1858	Coalescer/ Separator	5
	Oils		AC-51205	1582	Aquacon [®] (Absorbent)	5	Varies with oil viscosity ⁽²⁾
			AD-51225	1655		25	
	Solvents		ASL-51201	1692		1	5-50
	ALL		Dirt	FO-512PL1/2	1549	Paper Filter	0.5
		FO-512PL05		5			
		FO-512PL25		25			
		FOS-512PL25		1734	Synthetic Filter	25	
VF-609	Jet Fuel & Avgas ⁽¹⁾	Dirt & Free water	ACO-609P3L	1681	Aquacon [®] (Absorbent)	0.3	15-36
			ACO-60901L			0.5	
			ACO-60905L			5	
			OS-60988	1858	Coalescer/ Separator	0.5	Jet: 5-35 Avgas: 5-45
	Diesel ⁽¹⁾		AD-60925	1655	Aquacon [®] (Absorbent)	25	15-30
			OS-60986	1858	Coalescer/ Separator	5	5-18

NOTES:

(1) For aviation and diesel fuel applications, always install a differential pressure gauge or other means of determining differential pressure.

(2) See Data Sheet #1709 for absorbent cartridge (AC, AD) flow rates.

(3) See Data Sheet # 1532 for paper filter (FO) flow rates, see Data Sheet # 1747 for synthetic filter (FOS) flow rates. For Biodiesel applications, please contact Velcon.

Please consult installation instructions and operating procedures that accompany products for more detailed information.

ORDERING INFORMATION

(Please note: Cartridges are NOT supplied. They must be ordered separately)

HOUSING P/N:	VF-31E	VF-61	VF-609
SUPPLIED WITH:	<ul style="list-style-type: none"> 1 ea P/N G-0995 Buna-N O-ring Mounting holes in head - 4 ea 1/4-20 NC 1 ea plug (for fuel & oil applications) 1 ea 1/8" petcock drain (for air, gas, & aviation fuel applications) 	<ul style="list-style-type: none"> 1 ea P/N G-0986 Buna-N O-ring 1/8" brass petcock vent valve, installed 1/2" drain plug, installed 1 ea 1/2" petcock drain, shipped loose 	<ul style="list-style-type: none"> 1 ea P/N G-0565 Buna-N O-ring 1/4" brass petcock vent valve 1/2" drain valve
RECOMMENDED SPARES	<ul style="list-style-type: none"> 1 ea P/N G-0995 Buna-N O-ring 4 ea replacement filter cartridges 	<ul style="list-style-type: none"> 1 ea P/N G-0986 Buna-N O-ring 6 ea replacement filter cartridges 	<ul style="list-style-type: none"> 1 ea P/N G-0565 Buna-N O-ring 6 ea replacement filter cartridges
If using with gasoline/solvent applications:		<ul style="list-style-type: none"> 2 ea P/N G-0986A Viton O-rings 	<ul style="list-style-type: none"> 2 ea P/N G-0565A Viton O-rings
OPTIONS	N/A	<ul style="list-style-type: none"> P/N 554Y020 - (carbon steel 1/2" NPT ball valve, with mounting nipple) P/N 10678 - (differential pressure gauge assembly) P/N CK-1488 (quick release hand bolts) 	<ul style="list-style-type: none"> P/N 554Y020 - (carbon steel 1/2" NPT ball valve, with mounting nipple) P/N 07-224 - (differential pressure gauge assembly) PN 07-224AMB (mounting block)
SPECIFICATIONS			
Weight	3 lbs, 15 oz	8 lbs	8 lbs
Shipping Weight	4 lbs, 15 oz	10 lbs	10 lbs
Inlet/Outlet Connection	1" NPT	1 1/2" NPT	1 1/2" NPT
Cover	Bolted	Bolted, 4 bolts	Bolted, 4 bolts
Maximum Operating Pressure: 150 psi			
Material: Cast aluminum head, carbon steel shell with epoxy powder coated exterior & interior			

OVER PRESSURE PROTECTION


When exposed to a high concentration of water, the differential pressure across an absorbent cartridge (AC, ACO, AD, or ASL Series cartridges) will immediately increase. Pressure bypasses or other means to limit the inlet pressure to 75 psi (5 bar) should be installed to prevent cartridge from collapsing.

CAUTION

To protect the fuel system, including the VF-609 & other components, be sure to install pressure relief valve(s).

CAUTION

Do not use **Aquacon**[®] absorbent cartridges (AC, ACO, AD or ASL Series) with pre-mixed jet fuel containing anti-icing additives, or with gasoline/alcohol blends.



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VF-61 Differential Pressure Gauge

Assembly Part Number 10678
For Use with VF-61, VF-61E, VF-62

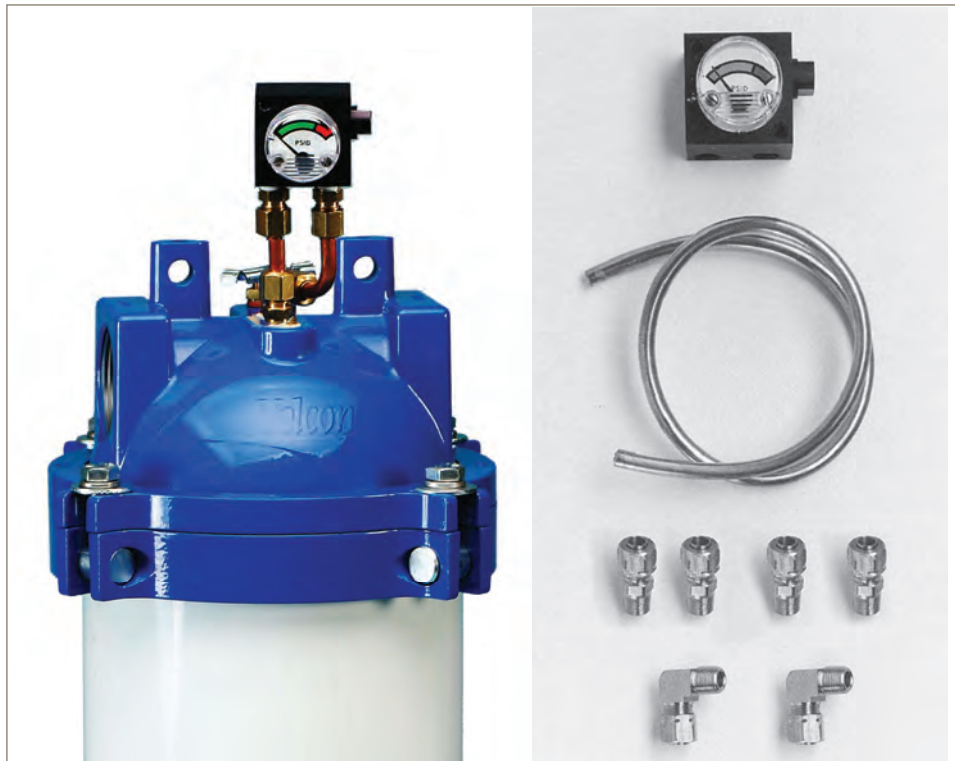


Description

This unit measures pressure difference between two points. The gauge allows for a simple reading on an easy-to-read scale. A red/green dial with a breakpoint located at 15 psid alerts the user of the condition of the process.

This kit consists of the following components:

- Differential Pressure Gauge: aluminum body, 1/8" NPT bottom, 1" molded lens & 0-20 psid scale,
- Compression Fittings: 4 straight, 2 90° elbow
- 1/4 O.D. Copper Tubing



Contact Information: Operation:

Parker Hannifin Corporation
Velcon Filtration Division
1210 Garden of the Gods Road
Colorado Springs, CO 80907

tel +1 719 531 5855
fax +1 719 531 5690
vfsales@parker.com

www.velcon.com

When the needle is in the green zone of the gauge during normal flow, the differential pressure is less than 15 psid across the installed element, and the element does not need to be changed out.

When the needle is in the red zone, the differential pressure is more than 15 psid and the element should be changed out. It has reached its recommended maximum pressure differential.

CAUTION:

Do not mount the P/N 10678 differential pressure gauge assembly any closer than 2" from a steel bracket or pipe. The gauge has a magnetic piston, and mounting too close to steel may affect the accuracy.

Aquacon[®] Air Filter

Cartridge Model ACA-210

Housing Model VF-31E

Water Removal from Compressed Air

FEATURES

- Minimal routine maintenance
- 99.9+% Water-Free Air
- Efficient particulate removal
- Residual oil mist removal

APPLICATIONS

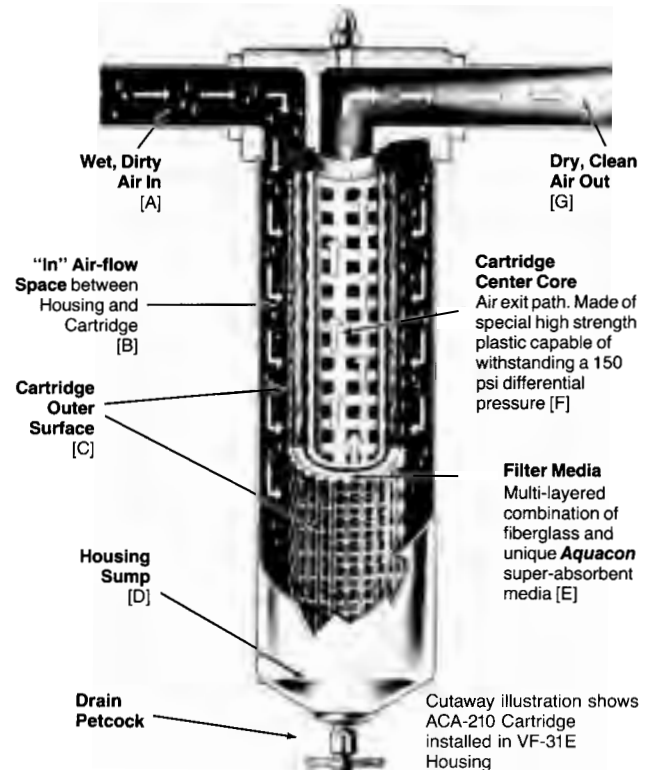
- Spray Painting
- Instrument Air
- Air Bearings
- Fluidic Controls
- Gas Chromatography
- Gas Sampling Equipment
- Machine Tools
- Air Driven Hand Tools
- Etching Tools
- Servo Pneumatic Control Systems
- Sand Blasting Equipment
- Compressed Air Cleaning

GENERAL DESCRIPTION

Aquacon super-absorbent cartridges remove 99.9+% of liquid water from compressed air. This is considered to be “total” water removal for many industrial and scientific applications. Note that water vapor is not removed.

Filtered water is locked into the super-absorbent media and cannot be squeezed out. When a cartridge reaches its water holding limit, the media expands and restricts the flow of unfiltered air until the cartridge is replaced. Periodic draining of the sump will extend cartridge life by keeping accumulated water away from the super-absorbent media.

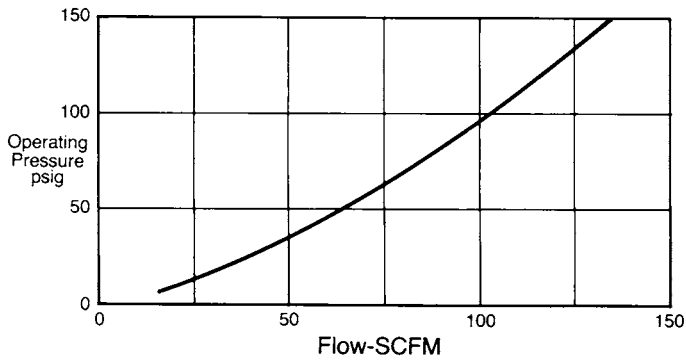
Aquacon Cartridges are also excellent dirt filters. They are rated at 99.9+% for particles down to 1 micrometer. In addition, the cartridges remove residual oil mist that may have gotten past a primary filter.



HOW IT WORKS

- (1) **Wet, Dirty Air** [A] flows into housing and down into space between housing and cartridge [B].
- (2) **Gross Water** coalesces in large drops on the cartridge's outer surface [C] and drips down into the housing sump [D].
- (3) **Finely Dispersed Water Mist** penetrates into the cartridge's multi-layered filter media [E] where it is absorbed and “locked-in” to the super-absorbent water media layers. When saturated, this media swells up and restricts airflow.
- (4) **Dirt Particles** are filtered by the fiberglass layers of the multi-layered filter media [E]. When fully loaded with dirt, the cartridge plugs up like any conventional filter.
- (5) **Residual Oil Mist** – Oil drops coalesce on the cartridge surface [C] and fall into the vessel sump [D]. Some oil mist penetrates into the cartridge and is trapped in voids in the fiberglass media layers [E]. Oil removal capacity is limited.
- (6) **Dry, Clean Air** passes up through Center Core [F] and out [G].

FLOW CHARACTERISTICS



Note: Assumes 2 psi differential with clean cartridge installed.

APPLICATION NOTES

- Aquacon®** Filters function best at the end of an air line close to the point of use. They should not be installed immediately downstream from a compressor.
- A large "slug" of water in the line may cause **Aquacon** Filters to completely block the air flow within seconds. If maintaining air flow is critical, a duplex filter arrangement with automatic valves should be considered.

SPECIFICATIONS

VF-31E Filter Housing

Cast aluminum head. Carbon steel shell with corrosion resistant phosphate coated interior and epoxy painted exterior.

Maximum operating pressure:	150 psi (10 bar)
Height:	14½" (37 cm)
Inlet/Outlet Connection:	1" NPT
Inlet/Outlet face-to-face:	4" (10 cm)
Bottom Drain:	⅛" Petcock
Lid Gasket, Buna-N, Model:	G-0995
Cartridge, (one required) Model:	ACA-210

ACA-210 Aquacon Filter Cartridge

I.D.	1" (2.5 cm)
O.D.	2" (5.1 cm)
Length:	9¾" (25 cm)
Minimum collapse pressure:	150 psi (10 bar)
Maximum operating temperature:	250°F (121°C)
Water removal efficiency:	99.9 +% of liquid water
Particulate removal efficiency:	99.9 +% of 1 micrometer and larger particles
Water holding capacity:	100 ml



ORDERING INFORMATION (SPECIFY)

- The VF-31E Housing is shipped without an element installed. Specify cartridge model number ACA-210. Includes Buna-N Lid Gasket, Petcock Drain, and Mounting Brackets.

RECOMMENDED SPARES

- 4 each Model ACA-210 Cartridges
- 1 each Model G-0995 Buna-N Lid Gasket



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Dispense Only Clean Dry Oil

FEATURES

- Designed to filter turbine lube oil and other similar oils
- 600 psi maximum operating pressure
- Filters out dirt and other particulate contaminants with 0.8 micron nominal efficiency
- Removes free and emulsified water to less than 5 ppm
- Internal check valve prevents operation without cartridge installed
- Positive shut-off prevents pumping contaminated oil

DESCRIPTION

The VF-21 Housing was developed in conjunction with a major airline for use on turbine lube oil dispensers. When an ACB-20501 Cartridge is installed, only clean oil will be pumped.

The ACB-20501 **Aquacon**[®] Cartridge absorbs free and emulsified water. When fully saturated, the absorbent media swells shut and blocks the flow of contaminated oil. Glass microfiber material removes particulate contamination with a nominal gravimetric filtration efficiency of 0.8 micron. The ACB-20501 **Aquacon** Cartridge is designed to withstand the pulsating flow and high pressures generated by a hydraulic hand pump.

The VF-21 Housing has a spring valve that will only open if a cartridge is installed. Fluid will not flow through the VF-21 without a cartridge in place. Kits are available to retrofit stainless steel 2 gallon and 5 gallon dispensers manufactured by Malabar International.



APPLICATIONS

- All hydrocarbon-based fuels and oils
- MIL-PRF-5606 hydraulic oil
- MIL-PRF-83282 hydraulic oil
- MIL-PRF-7808 and MIL-PRF-23699 turbine lube oil.
Includes Exxon Turbo Oil 2380 and 2389, and Mobil Jet Oil II (Type II)
- Stauffer Fyrquel, Houghto-Safe 1000 Series, Exxon Imol S 220, Mobil Pyrogard 51, 53, & 55
- Mobil SHC 824, Mobilube SHC, Exxon Synesstic

Note: VF-21 and ACB-20501 can also be used with Skydrol and HI Jet IV. Order Ethylene Propylene Seal Kit CK-1478I.

For complete operating procedures see PN 09-115, Operating Instructions for ACB's.

VF-21

- Aluminum construction
- Viton A O-ring seals
- Inlet/Outlet: Female 1/2-20 SAE O-ring
- Length: 8 1/2"
- Diameter: 3 1/2"
- Weight: 2 lbs
- Shipping Weight: 3 lbs
- Maximum Pressure: 1000 psi

ACB-20501

- Length: 5 7/8" OAL
- Diameter: 1 3/4" OD
- Weight: 120 grams
- Nominal Gravimetric Filtration Efficiency: 0.8 micron
- Beta 10: 90
- Absolute Beta Rating (Beta=75): 8 micrometers
- Water Capacity: 50 cc
- Particulate Solids Capacity: 1.5 grams
- Maximum Flow Rate (Turbine Oil): 0.5 GPM
- Collapse Pressure: 600 psi
- Maximum Operating Temperature: 200°F
- Buna-N O-ring on snout



ORDERING INFORMATION

- For housing alone specify Model **VF-21**
- For housing plus 2 gallon Malabar Kit specify **VF-21/2**
- For housing plus 5 gallon Malabar Kit specify **VF-21/5**
- Cartridges must be ordered separately. Specify Model **ACB-20501**. Cartridges are packed in sealed polybags, 20 per carton.



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Filter Housing

VF-62

Clean Dry Fuels and Oils with High Performance *Aquacon*® Filter Cartridges

FEATURES

- Free and emulsified water to less than 5 ppm
- 1/2 micrometer particle removal
- Provides protection against “slugs” of water
- Pressure increase signals cartridge change

DESCRIPTION

The VF-62 is a versatile filter housing designed for use with several different high performance *Aquacon* filter cartridges. Refer to the cartridge selection table on the reverse side.

Aquacon cartridges filter out water by chemically locking it into layers of super-absorbent media. Water removal efficiency is not affected by common surfactants or additives. Water capacity is as much as 3 quarts, depending on the flow rate. These cartridges also effectively filter out dirt, rust and other particles. (See caution below, right.)

As a cartridge reaches its water-holding limit, the media expands very rapidly and restricts the flow. The pressure drop will rapidly increase, signaling the need to change cartridges.

The VF-62, with ACO series cartridges installed, will soon become the standard for low flow rate full flow aviation fuel monitor applications.

APPLICATIONS

- | | |
|----------------|-------------------|
| Jet Fuel | Insulating Oil |
| Avgas | Hydraulic Oil |
| Motor Gasoline | Lubricating Oil |
| Diesel Fuel | Selected Solvents |
| Biodiesel Fuel | |



VF-62 shown with optional quick release hand bolts.

*****CAUTION*****

DO NOT USE WITH PRE-MIXED JET FUEL CONTAINING ANTI-ICING ADDITIVES.

WARNING: Absorbent-type monitor cartridges will not remove water from fuel containing alcohol-blending agents (commonly called gasohol). For removal of solids, please use Velcon particle removal filters specifically made for gasohol. Consult your Velcon representative.

SPECIFICATIONS

Filter Housing VF-62

- Maximum Operating Pressure: 150 psi
- Material: die cast aluminum head and closure clamp assembly; carbon steel shell with epoxy coated exterior and interior.
- Inlet/Outlet Connection: 1 1/2" NPT
- Closure Seal: Buna-N O-Ring (P/N G-0986)
- Weight: 16 lbs., Shipping Weight: 18 lbs.
- 1/8" brass petcock vent valve and 1/2" drain valve

Cartridges

- Maximum Operating Temperature: 200°F
- Collapse Strength: 75 psi (5 bar)
- pH Range: 5 - 9
- Nominal Filtration Efficiency: 98%

Over Pressure Protection

- When exposed to a high concentration of water, the differential pressure across an **Aquacon**® cartridge will immediately increase. Pressure bypasses or other means to limit the inlet pressure to 75 psi (5 bar) should be installed to prevent the cartridge from collapsing.

FILTER CARTRIDGE SELECTION TABLE

Application	Cartridge	Rating	Typical Free Water in Effluent (Maximum)	Recommended Flow Rates
Jet Fuel (1) Avgas (1)	ACO-52401L	1/2	2 ppm	10-100 USGPM (2)
Motor Gasoline	AC-52405	5	5 ppm	10-100 USGPM
Diesel Fuel	AD-52425	25	50 ppm	30-100 USGPM
Oils	AC-52405	5	See Note (3)	Varies with viscosity See Form #1709
	AD-52425	25		
Solvents	ASL-52401	1	5 ppm	10-100 USGPM
Dirt Removal Only	FO-524PL05	5	N/A	2-100 USGPM
	FO-524PL1/2	1/2		
	FO-524PL25	25		

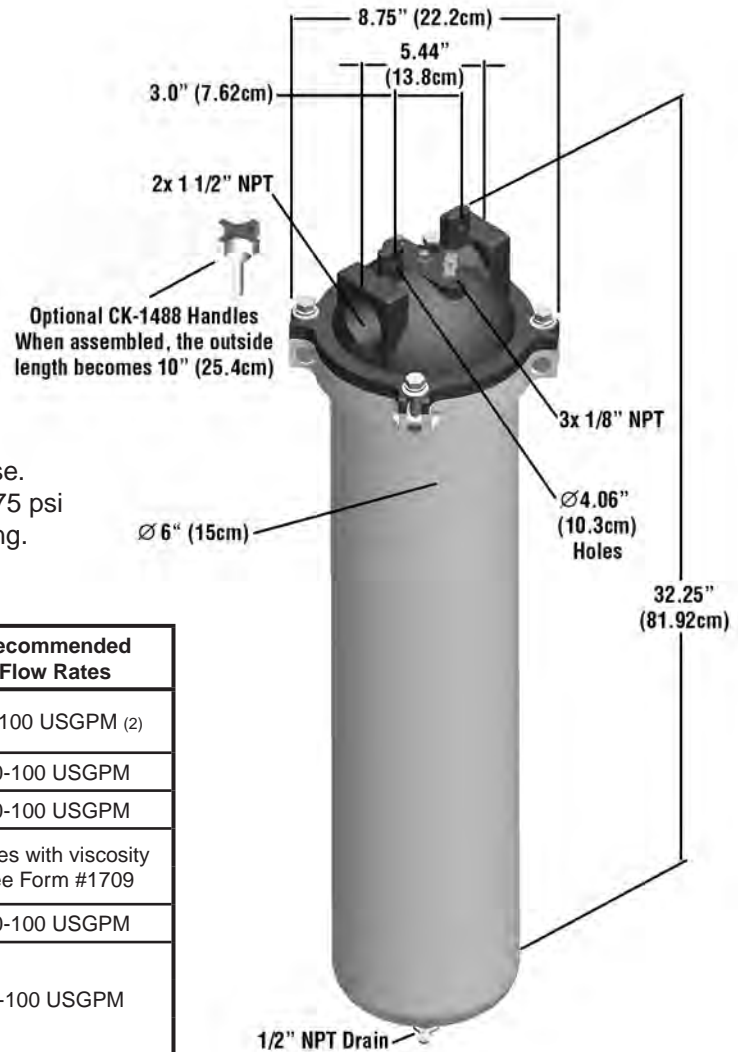
NOTES:

- (1) For Aviation Fuels, if system pressure can exceed 25 psi, and for Diesel Fuel Systems, always install pressure gauge or other means of determining differential pressure.
- (2) For Full Flow Fuel Monitor applications, the flow rate can be increased to 100 USGPM. This will result in a somewhat reduced cartridge life and higher initial pressure drop. In jet fuel with an ACO-52401L installed, the initial pressure drop is 6 psi at 50 USGPM, 10 psi at 75 USGPM.
- (3) For oils and other liquids with viscosity above 100 SUS, more than one pass is typically required through the cartridge. After multiple passes, water levels of 5 ppm can be achieved.

ORDERING INFORMATION

- Specify Model VF-62 Filter Housing
- Unit is supplied with G-0986 Buna-N O-Ring and 1/8" valve and 1/2" drain plug installed. 1/2" petcock drain valve is shipped loose.
- Cartridges are not supplied and must be ordered separately.
- Viton O-Rings (P/N G-0986A) are available but must be ordered separately. They are recommended for gasoline and solvent applications.
- Optional Differential Pressure Gauge Assembly is Part Number 10678 (See Form #1959)

VESSEL DIMENSIONS




RECOMMENDED SPARES

- 1 each G-0986 Buna-N O-Ring
- 6 each Cartridges
- If Viton O-Rings are desired, 2 each G-0986A

OPTIONS

- Part Number 554Y020 is a Carbon Steel 1/2" NPT Ball Valve, with Mounting Nipple
- Part Number CK-1488 quick release hand bolts (set of 4) to replace closure bolts (as shown on page 1)



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**Liquid Filtration
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Remove Dirt, Water and Acids From Oils and Fuels

FEATURES

- No tools required for changeout
- 150 psi design pressure
- Epoxy coated interior and exterior
- Positive O-ring closure

CARTRIDGE SELECTION

Water and Dirt Removal – AC-718 Series *Aquacon*® Cartridges remove both water and dirt from all oils and fuels. SD-718 *Superdri*® Cartridges remove dissolved water from insulating oils.

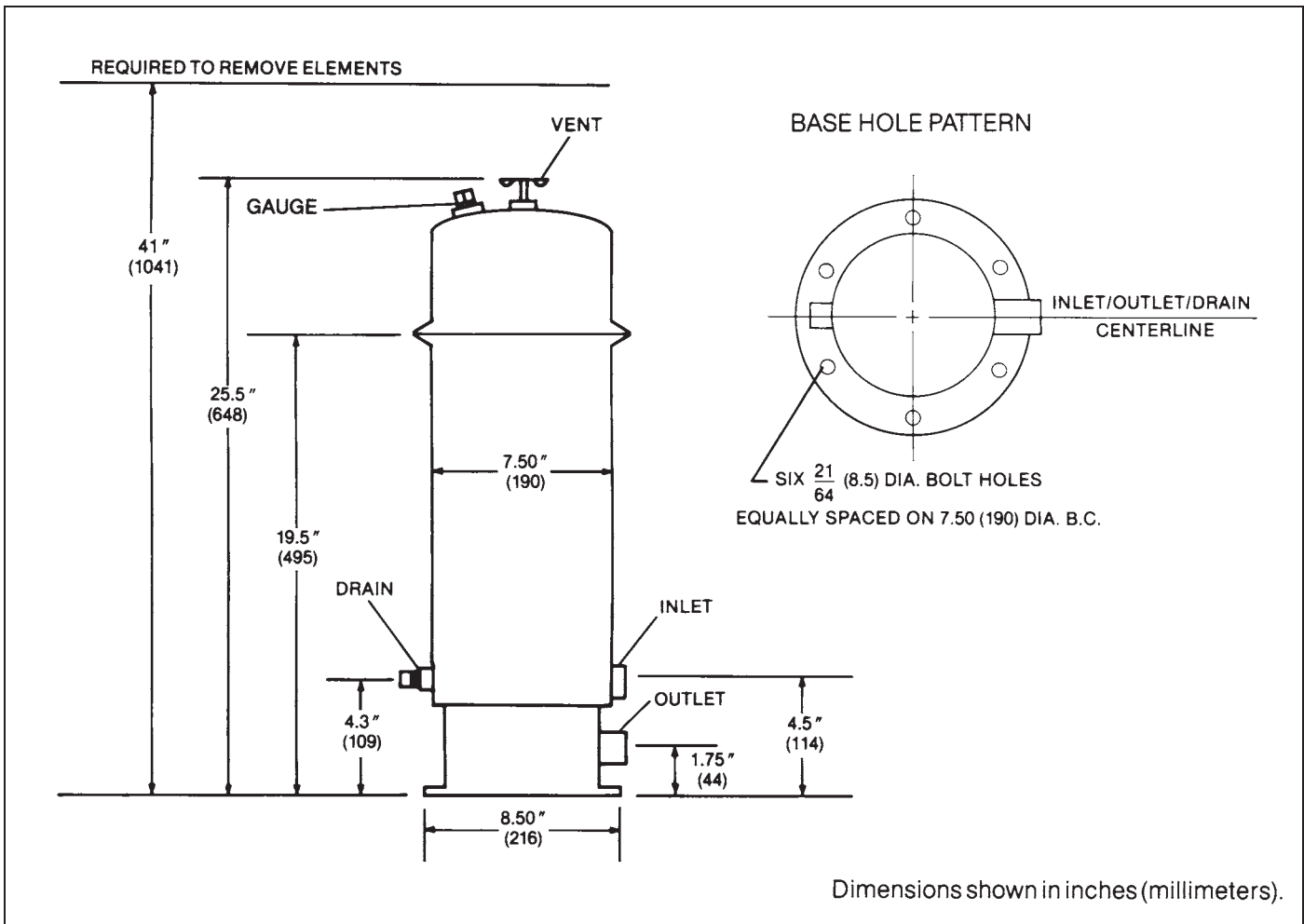
Acid Removal – LA-71801B Cartridges contain the most effective form of fuller's earth available. LB-71801 Cartridges contain activated alumina. Field proven in vacuum pump oil applications.

Solids Removal – FO-718PL Series high surface area pleated cartridges are the most cost effective for particulate contaminant removal. FOS-618/718PL Series all synthetic media cartridges are also available for particle removal. For removing amorphous, soft contaminants, FO-618FGA Series Cartridges with fiberglass depth media are often the most cost effective.

APPLICATIONS

- | | | |
|------------------|-----------------|-------------------|
| • Insulating Oil | • Kerosene | • Turbine Oil |
| • Hydraulic Oil | • Gasoline | • Lube Oil |
| • Cutting Oil | • Synthetic Oil | • Water/Glycol |
| • Diesel Fuel | • Biodiesel | • Vacuum Pump Oil |





SPECIFICATIONS

14 GA. (2 mm) carbon steel shell
 150 psi (1034 k Pa) max operating pressure
 250°F (121°C) design temperature
 Buna-N O-ring lid gasket
 Epoxy coated interior and exterior
 Holds one cartridge

Inlet and outlet – $\frac{3}{4}$ " NPT
 Drain – $\frac{3}{4}$ " NPT
 Vent and gauge fittings – $\frac{1}{4}$ " NPT
 Volume without cartridge – 3.8 U.S. gallons (14.4 l)
 Dry weight without cartridge – 17 lbs. (7.7 kg)
 Shipping weight – 19 lbs. (8.6 kg)

ORDERING INFORMATION

Specify Model VF-71E Filter Vessel. Unit is shipped as shown above with Buna-N Lid Gasket installed but without filter cartridge installed. Desired filter cartridges to be specified separately.

RECOMMENDED SPARES

6 filter cartridges
 1 G-1016 Buna-N Lid Gasket

Note: If Viton-A lid Gasket is desired, order G-1016A Gasket and replace Buna-N gasket that is installed.



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**Liquid Filtration
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Single and Double Element Housings

FEATURES

- 150 psi maximum operating pressure
- Carbon steel construction
- Positive seal tie-rod cartridge mounting
- Six types of cartridge media available
- 2" NPT connections
- Painted exterior; oil-coated interior

DESCRIPTION

- VF81C – a single element housing designed in accordance with the ASME code
- VF82C – a double element housing designed in accordance with the ASME code.
- VF82B – a non-code design that holds two cartridges.

VF8 Series vessels accommodate **Aquacon**[®] super absorbent or other special purpose filter cartridges. Refer to "Cartridge Types" listed on the reverse side of this sheet.

APPLICATIONS

Hydraulic Oil	Kerosene
Insulating Oil	Gear Oil
Diesel Fuel	Quench Oil
Lube Oil	Vacuum Pump Oil
Coolant	Turbine Oil
Cutting Oil	Cooling Water
Synthetic Oil	Transformer Oil
Gasoline	Biodiesel



VF81C

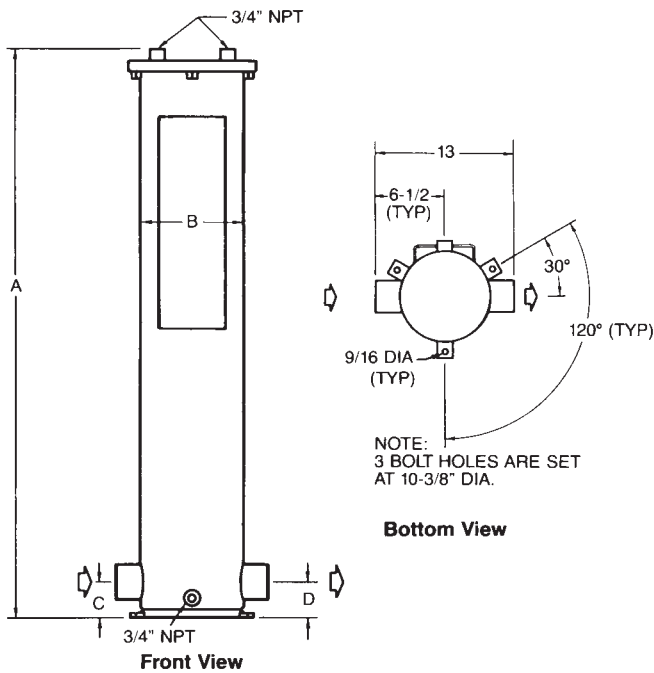
VF82B

VF82C

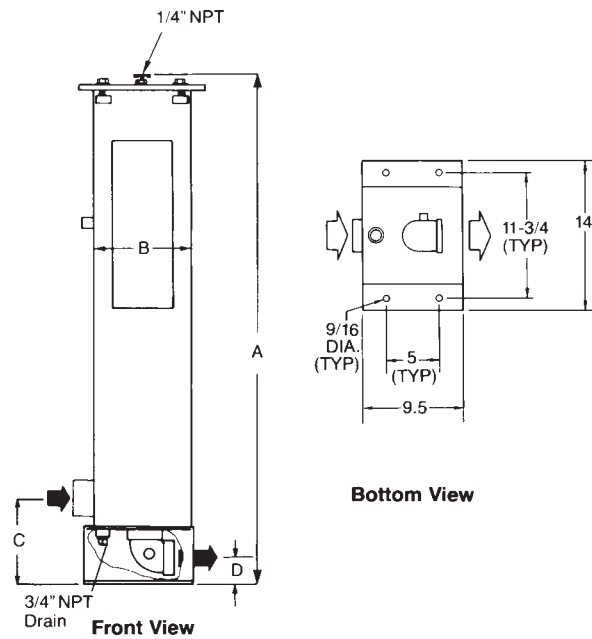
DIMENSIONS

Housing	VF81C	VF82C	VF82B
Inlet/Outlet	2" NPT	2" NPT	2" NPT
A	31.5" (80 cm)	48.5" (123.1 cm)	44" (111.8 cm)
B	8.6" (21.9 cm)	8.6" (21.9 cm)	8.6" (21.9 cm)
C	3" (7.6 cm)	3" (7.6 cm)	7.5" (19 cm)
D	3" (7.6 cm)	3" (7.6 cm)	2.5" (6.3 cm)
Volume	6 gal (22.7 l)	10 gal (37.9 l)	9 gal (34 l)
Vessel Weight – Empty	90 lbs (40.8 kg)	118 lbs (53.5 kg)	86 lbs (39 kg)
Shipping Weight	110 lbs (49.9 kg)	138 lbs (62.6 kg)	106 lbs (48 kg)
Number of Standard Cartridges	1	2	2
Lid Gasket – Buna-N	G-1045	G-1045	G-1045

VF81C and VF82C



VF82B



ORDERING INFORMATION (Specify)

Housing (Add -EPX for Internal Epoxy Coating)	VF81C150 (ASME Code Design)	Recommended Spares	6 Spare Filter Cartridges
	VF82C150 (ASME Code Design)		1 Lid Gasket
	VF82B150 (Non-ASME Code Design)		#120-A Direct Reading Gammon Gauge, piston type
	ASME Code Stamp – Specify if Required		#120-F Differential Pressure Gauge
Cartridge Types (not included with housing)	FO-718PL Series Pleated Synthetic Media	Accessories	G-1045A Viton Lid Gasket
	FOS-618PL Series Pleated Media		
	FO-618FGA Series Fiberglass Depth Media		
	LA-61801B Fuller's Earth Media		
	AC-718 Series Aquacon ® Free Water-Absorbing Media		
SD-718 Superdri ® Dissolved Water Removal Media			



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Liquid Filtration and Separation Specialists



Filter Housings

VF81SYS150

VF82SYS150

Single and Double Element Housings 1½” Inlet/Outlet

STANDARD FEATURES

- Carbon steel construction
- 150 psi design pressure
- 195 psi hydro-test pressure
- Polyurethane almond powder coated interior & exterior
- 1½” NPT female inlet/outlet
- ¾” NPT drain couplings (qty 2)

APPLICATION INFORMATION

50 or 100 gpm maximum flow rates for fuels.
For oils, determine viscosity, then rate based on cartridge flow capacities.

- | | |
|----------------|-----------------|
| Hydraulic Oil | Gasoline |
| Insulating Oil | Transformer Oil |
| Diesel Fuel | Coolant |
| Lube Oil | Cutting Oil |
| Kerosene | Synthetic Oil |
| Gear Oil | Quench Oil |
| Biodiesel | |



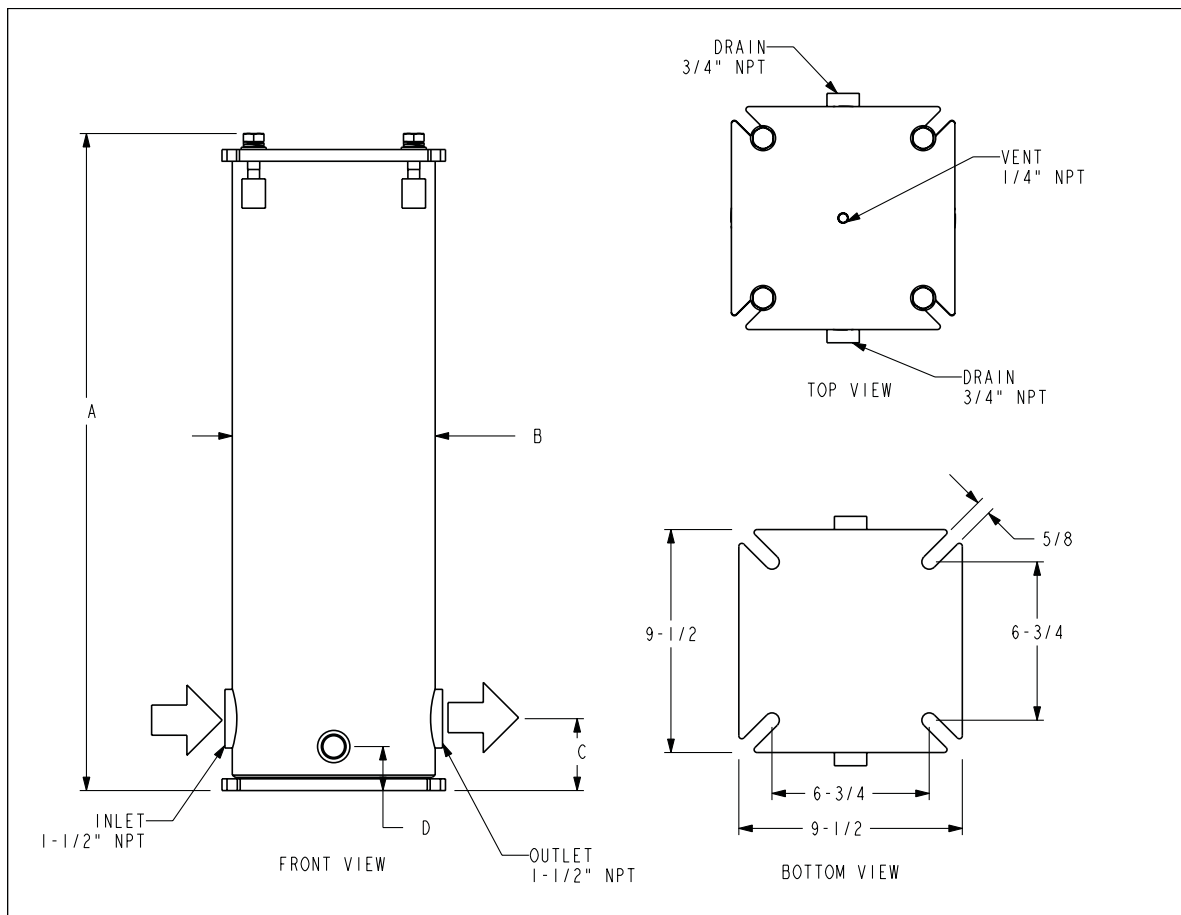
VF81SYS150 (left) and VF82SYS150 (right) Filter Housings

ORDERING INFORMATION

Cartridge Types (not included with housings)	FO-718PL Series Pleated Media FO-618FGA Series Fiberglass Depth Media FOS-618 Series Pleated Synthetic Media LA-61801B Fuller's Earth Media AC-718 Series Aquacon ® Water Absorbing Cartridge
Recommended Spares	1 Set of Spare Filter Cartridges 1 Lid Gasket
Accessories	G-1045A Viton Lid Gasket

SPECIFICATIONS

Housing	VF81SYS150	VF82SYS150
Inlet/Outlet	1½" NPT	1½" NPT
A	27 ⁷ / ₈ " (70.8 cm)	46 ¹ / ₈ " (117.2 cm)
B	8 ⁵ / ₈ " (21.9 cm)	8 ⁵ / ₈ " (21.9 cm)
C	3" (7.6 cm)	3" (7.6 cm)
D	1¼" (3.2 cm)	1¼" (3.2 cm)
Vessel Weight – Empty	60 lbs	90 lbs
Shipping Weight	70 lbs	110 lbs
Number of Standard Cartridges	1	2
Lid Gasket – Buna-N	G-1045	G-1045
Lid Gasket – Viton (Optional)	G-1045A	G-1045A



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Filter Housings

VF166C

VF2012C

Six and Twelve Cartridge Housings

STANDARD FEATURES

- ASME Code Design
- Carbon Steel Construction
- 150 psi operating pressure, 225 psi test
- O-Ring closure
- Primed exterior, oil coated interior
- Positive seal tie-rod cartridge mounting
- Swing bolt lid closure
- Six types of cartridge media available
- Lid lifting mechanism
- 200°F Design temperature

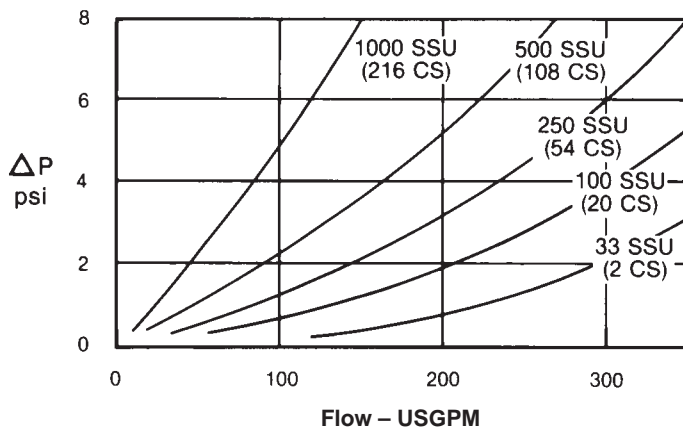
APPLICATIONS

- | | |
|----------------|----------------|
| Gasoline | Lube Oils |
| Cooling Water | Cutting Oils |
| Coolants | Gear Oil |
| Solvents | Hydraulic Oil |
| Kerosene | Quench Oil |
| Diesel Fuel | Insulating Oil |
| Biodiesel Fuel | |

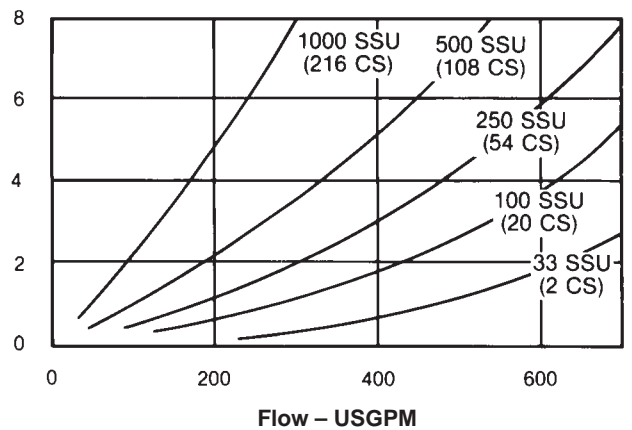


VF2012C-150

PRESSURE DROP CHARACTERISTICS



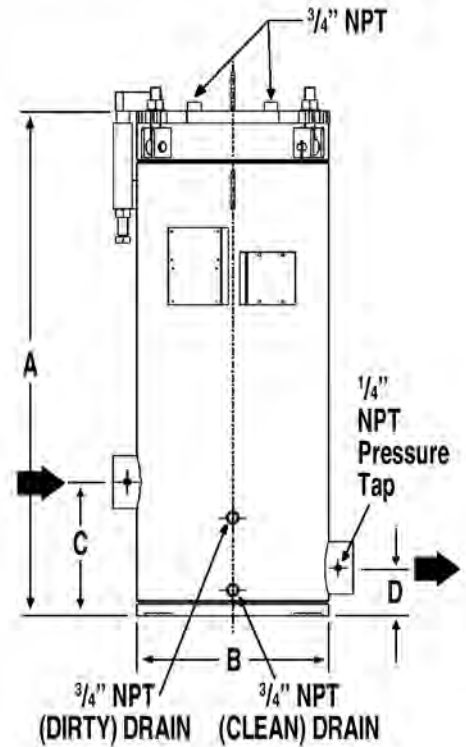
VF166C Housing with six FO-718PL05 Cartridges



VF2012C Housing with twelve FO-718PL05 Cartridges

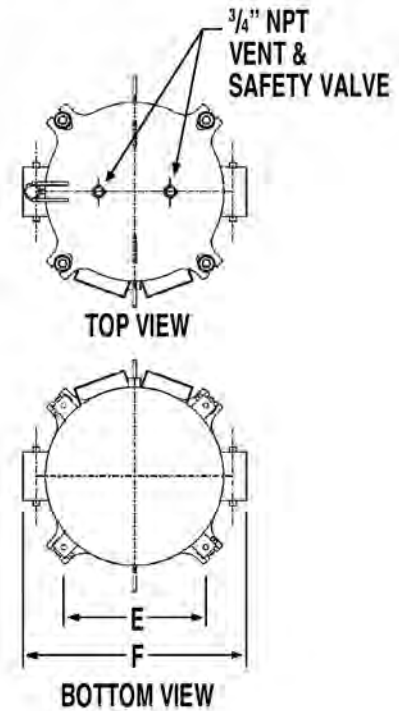
DIMENSIONS

Housing	VF166C	VF2012C
Inlet/Outlet	3" NPT	4" NPT
A	47¼" (120 cm)	52¾" (134 cm)
B	16" (40.6 cm)	20" (50.8 cm)
C	11" (27.9 cm)	14" (35.6 cm)
D	4" (10.2cm)	5" (12.7 cm)
E	13" (33 cm)	16" (40.6 cm)
F	20" (50.8 cm)	25" (63.5 cm)
Volume	38 gal (144 L)	65 gal (246 L)
Vessel Weight – empty	355 lbs (140 kg)	592 lbs (270 kg)
Shipping Weight	405 lbs (160 kg)	642 lbs (292 kg)
Number of Standard Cartridges	6	12
Lid Gasket – Buna-N	G-2033	G-2027



ORDERING INFORMATION (Specify)

Housing	VF166C150
	VF2012C150
	ASME Code Stamp – Specify if Required
Cartridge Types (not included with housing)	FO-718PL Series Pleated Media
	FO-618 FGA Series Fiberglass Depth Media
	FOS-618/718 Series Synthetic Media Pleated Cartridges
	LA-61801B Fullers Earth Media
	AC-718 Series Aquacon ® Water Absorbing Media Cartridge
	SD-718 Series Superdri ® dissolved water removal cartridges
Recommended Spares	1 Set of Spare Filter Cartridges
	1 Lid Gasket
Accessories	#120-H Differential Pressure Gauge
	VF166CI50EPX Internal Epoxy Coating
	G-2033A (VF166C150) Viton Lid Gaskets
	G-2027A (VF2012C150)



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before pouring slab



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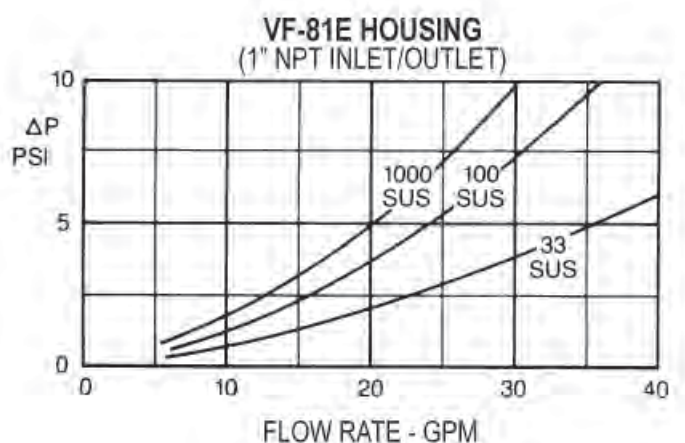
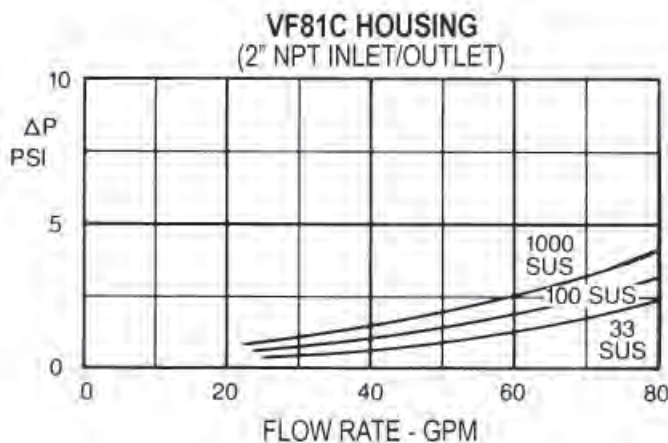
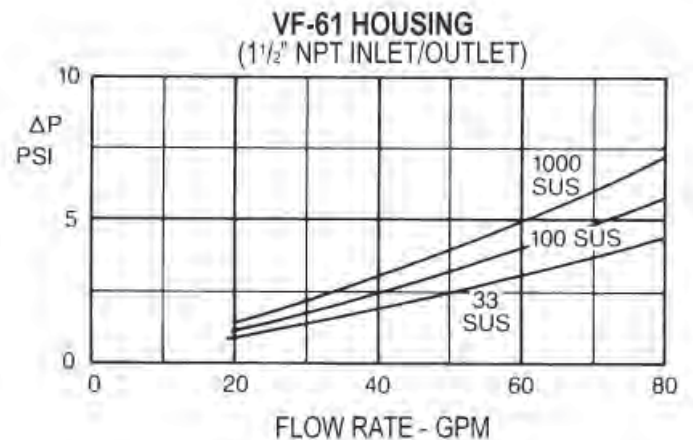
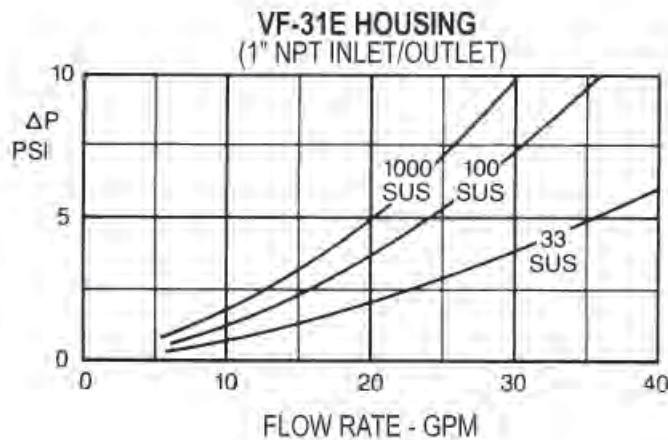


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FLOW RATE (USGPM) VS. PRESSURE DROP AT VARIOUS VISCOSITIES FOR EMPTY (NO CARTRIDGES INSTALLED) INDUSTRIAL FILTER VESSELS

NOTES:

1. Simply add the pressure drop from this sheet to the cartridge pressure drop at the corresponding flow rate to determine the total initial pressure drop across the vessel with clean cartridges installed. See Form #1532 and #1709 for cartridge information.
2. For most applications the filter size will be determined by cartridge flow rate considerations, not by pressure drop across the vessel hardware components. The one exception is the VF-81E, which has small (1") connections in relationship to the size cartridges it holds.





Fuel Dispensing Cart

Diesel Fuel / Gasoline

FEATURES

- Separates free water from diesel fuels and gasoline
- Removes solid particles down to 50 microns
- Protects underground fuel storage tanks against sedimentation
- Provides service station customers with clean and dry fuel

DESCRIPTION

The Fuel Dispensing Cart is a portable housing used to filter and separate dirt and free water from gasoline and diesel fuels at service station locations. A Teflon® Coated stainless steel mesh screen filter/separator cartridge is installed in the filter housing and provides efficient removal of contaminants.

The Fuel Dispensing Cart is installed between the fuel delivery truck and fuel storage tank and prevents any accumulated free water and dirt from being delivered to fuel storage. The filter housing incorporates a sump to collect free water which is drained after each use.

APPLICATIONS

- Gasoline
- Diesel Fuel

ORDERING INFORMATION

Housing/Cart PN: FDCART


Separator PN: SO-640PV

Note: Separator is required, and must be ordered separately.



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2054-R1 11/09



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Due to Velcon Filters' continuing product improvement, drawings, specifications and pictures are subject to change without notice.



Aluminum Filter Housing

Complete with Filter Cartridge Bypass

AVF816 Series

DESCRIPTION

The oil bypass filter housing was designed for sensitive equipment that requires oil flow even when the cartridge has reached its particulate or water capacity. High performance **Aquacon**[®] water and particulate removal filter cartridges are used with this housing.

Aquacon[®] cartridges filter out water by chemically locking it into layers of super-absorbent media. This cartridge along with the particulate cartridge effectively filters out dirt, rust and other particulates.

Both **Aquacon**[®] water and particulate cartridges for this housing have a uniquely designed oil bypass system. As the pressure drop across the cartridge reaches 65 psi (4.48 bar), the bypass valve opens and oil flow bypasses the fine cartridge media. As the oil bypasses the fine media, the oil is still filtered through a 75 micron media high capacity and high surface area pleated cartridge. This allows oil flow through the housing to the equipment even if the cartridge has reached its water or solids capacity.

HOUSING AND CARTRIDGE STANDARD FEATURES

- Housing aluminum construction
- Maximum working pressure 363 psi (25 Bar)
- Flow up to 32 gpm (121.1 Liters) with high viscous oil at 190 cSt (mm²/sec)
- Designed for high viscosity oil including 320 cSt (mm²/sec)
- Screw on head with no tools needed to remove or install
- Unique cartridge and housing bypass system that opens at 65psi (4.48 Bar)
- Dual pleat block cartridge:
 - 75 micron nominal high particulate capacity first layer filter media
 - 10 micron absolute second layer filter media
- Easy cartridge removal and installation

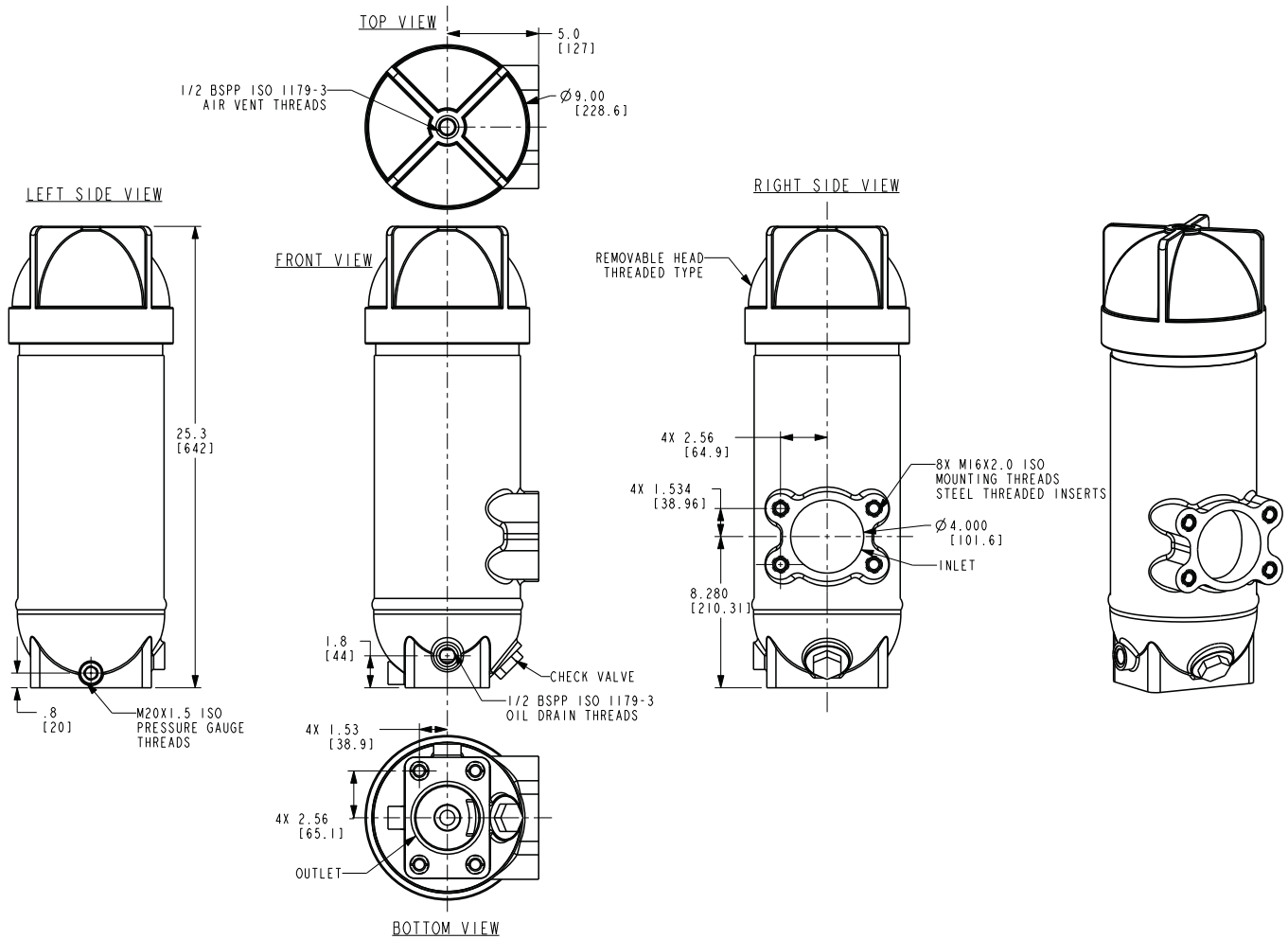
OPTIONAL FEATURES

- Chemical conversion corrosion protection
- Housing nameplate
- Electronic Differential Pressure Gauge



APPLICATIONS

- Gear oil
- Hydraulic oil
- Diesel/Biodiesel
- Turbine lube oil



ADDITIONAL FEATURES

- 1/2" BSPP ISO 1179-3 air vent and oil drain connections
- M20 x 1.5 pressure gauge connection
- M16 x 2.0 inlet and outlet mounting connections
- Endcaps constructed with high strength fiberglass filled nylon 66
- 75 psid (5.17 Bar) cartridge collapse strength
- Buna-N head and cartridge o-rings
- Cartridge and vessel tested to:
 - ISO 3734 Flow Fatigue
 - ISO 2942 Bubble Point
 - ISO 2941 Collapse Resistance
 - ISO 4572 Multipass
 - ISO 3968 Flow Characteristics

ORDERING INFORMATION

Velcon Part Number	Description	Quantity
AVF816	Aluminum Housing	1
FO-716PL75-2	Particulate filter cartridge	1
AC-716PL75-2	Aquacon [®] water absorbing and particulate cartridge	1
420X022	Housing head o-ring: 2-368 Buna-N	1
703X021	Electronic differential pressure gauge	1



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Section %-

Oil Filter

Systems

Lightweight Portable Handcart Filter Pump Removes Water and Dirt From Gear Oil

FEATURES

- Removes dirt and water from gear oil and other high viscosity oils
- Filters oils with viscosities up to 12,000 SUS (2,600 cSt.) – equivalent to an ISO VG 680 oil (SAE 140 wt gear oil) at 70°F
- Components specifically selected for use with high viscosity oils
 - large, reinforced suction hoses
 - 1 gpm flow rate
 - oversized motor
- Can also be used with lighter hydraulic, lube and insulating oils

SPECIFICATIONS

- 1 gpm flow rate
- Epoxy coated vessel interior and exterior
- Band clamp vessel closure
- 10-inch semipneumatic wheels
- Totally enclosed fan-cooled (TEFC) motor – ½ hp, 115 V, 1-phase, 60 Hz, 10 amps
- Self-priming positive displacement pump with built-in pressure relief valve
- Pressure gauge
- 3-wire power cord, 10 ft. long with 3-prong plug
- 1" Y strainer mounted on pump
- 9-ft. suction hose, 1" wire reinforced with 1" NPT male fitting on end
- 9-ft. discharge hose, ¾" 2 ply with ¾" NPT male fitting on end
- Weight: 106 lbs.
- Shipping Weight: 130 lbs.
- Height: 52", Length: 18", Width: 22"



MP1EG Portable Oil Filter

CARTRIDGE SELECTION

For 12,000 SUS

(ISO VG 680/SAE 140 wt gear oil at 70°F)
and lower

Dirt and Water Removal	AD-71825
Dirt Removal Only	FO-718PL05 or PL15

For 5,500 SUS

(ISO VG 320/SAE 90 wt gear oil at 70°F)
and lower

Above cartridges plus:	
Dirt and Water Removal	AC-71805
Dirt Removal Only	FO-718PL02

For 2,000 SUS

(ISO VG 150/SAE 40 wt automotive oil at 70°F)
and lower

Above cartridges plus:	
Dirt and Water Removal	AC-7181/2 and 01
Dirt Removal Only	FO-718PL1/2 and 01

OPTIONS & ORDERING INFORMATION

Specify model numbers as shown below:

MP1EG-1	115 vac, 1-phase, 60 Hz (basic unit)
MP1EGXP-1	115 vac, 1-phase, 60 Hz, explosion proof*
MP1EG-2	230 vac, 1-phase, 60 Hz
MP1EGXP-2	230 vac, 1-phase, 60 Hz, explosion proof*
MP1EG-7	230 vac, 1-phase, 50 Hz

*Note: Explosion proof units shipped without power cord, switch, or plug

For stationary base mounted unit, substitute "S" in model number for "P".

Example: MS1EG-1 = stationary base mtd 1 gpm filter pump, 115 vac, 1-ph, 60 Hz

- 703Y004 Delta P Gauge – Direct reading 0 - 50 psid differential pressure gauge
- 722Y006 Digital Flowmeter – Direct reading, displays flow rate, total flow volume, total resettable batch flow volume
- 550Y020 Flow Control Bypass – Allows manual adjustment of flow rate; controls pump cavitation
- 552Y030 Filter Bypass – Transfer oil without filtration



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Heavy Duty Portable Handcart Filter-Pump Removes Water and Dirt from Oils and Fuels

FEATURES

- 5 gpm flow rate
- High performance filter cartridge choices:
 - **Aquacon**® cartridge - removes free water and dirt
 - 4500 square inch high-capacity dirt filter
- Rugged welded steel construction
- TEFC Motor

DESCRIPTION

The MP5 is a compact, portable filter system designed for use at the site of contaminated oil. It is easily wheeled to the sump or reservoir by one person.

The MP5 is completely self-contained and requires only electricity for operation. Standard features are listed on the reverse side. Note that the unit incorporates a reliable gear pump with an **integral pump pressure relief valve** to prevent system over-pressure.

A selection of high performance filter cartridges is offered for use with the MP5. Cartridge changes can be made in only a few minutes.

APPLICATIONS

MP5s can be used with injection molding machines, mobile hydraulic equipment, small transformers, circuit breakers and various other types of equipment. Applications are as follows:

New Oil – Even new drums of oil are sometimes contaminated with dirt and water. The MP5 can remove this contaminant as it pumps the oil out of the drum.

Machine Oil Reservoirs – Good preventative maintenance practices include the routine filtering of used oil. This recycling procedure also extends the useful life of the oil.

Spilled and Leaked Oil – The MP5 can recover and recycle contaminated oil which would normally be discarded.



MP5 Portable Filter System

Types of Oil Include the following:

- | | |
|---------------------|-------------|
| Hydraulic Oil | Lube Oil |
| Insulating Oil | Cutting Oil |
| Circuit Breaker Oil | Quench Oil |
| Turbine Oil | Diesel Fuel |
| Biodiesel Fuel | |

MP5 SPECIFICATIONS

Standard features, all MP5 Models

- 5 gpm flow rate
- Powder coated interior and exterior
- 100 psi design pressure
- Welded steel construction
- 10" semi-pneumatic wheels
- Self-priming positive displacement pump with built-in pressure relief valve
- Static pressure gauge – indicates need for cartridge change
- ½ hp, 115V, 1-phase, 60 Hz, 10 Amp TEFC motor
- 10 ft. 3-wire power cord
- 10 ft. inlet and discharge hose, ¾" I.D.
- ¾" NPT male fittings on hose ends
- Suction Y-strainer mounted at pump inlet
- Weight: 116 lbs.
- Shipping weight: 139 lbs.
- Height: 38"; Width: 13¼"; Length: 26"

FILTER CARTRIDGES

The MP5 portable filter accepts all Velcon standard 618/718 size cartridges. Contact your local Velcon representative for a complete listing of available cartridges and their applications.

Dirt Removal: For particulate solids, use FO-718PL Series large surface area pleated media cartridges, available in micron ratings from 0.3 to 50. For colloidal contaminants, FO-618FGA Series Fiberglass depth cartridges, available in micron ratings from 5 to 25, are recommended.

Dirt and Free Water Removal: Use *Aquacon*® AC-718 super absorbent cartridges to remove up to two quarts of free water and also filter particulate solids. Available in micron ratings from 0.3 to 5.

Dissolved Water Removal: Use *Superdri*® cartridge model SD-718 to remove dissolved water from insulating oil. Specify Flow Control Bypass option to reduce 5 gpm flow rate to 3 gpm recommended flow rate for SD-718 cartridge.



ORDERING INFORMATION

Specify Model numbers as shown below. Units are shipped without cartridge.

MP5-1	115 vac, 1 phase, 60 Hz (basic unit)
MP5XP-1	115 vac, 1 phase, 60 Hz, explosion proof*
MP5-2	230 vac, 1 phase, 60 Hz
MP5XP-2	230 vac, 1 phase, 60 Hz, explosion proof*
MP5-7	230 vac, 1 phase, 50 Hz
MP5-10	Air Motor

For stationary base mounted unit, substitute "S" in the model number in place of the "P", e.g., MS5-1.

*Note: Explosion proof units shipped without power cord, switch or plug.

OPTIONS & ACCESSORIES

- 550Y020 Flow Control Bypass** – Allows manual adjustment of flow rate, controls pump cavitation
- 552Y030 Filter Bypass** – Transfer oil without filtration
- 703Y004 Delta P Gauge** – Direct reading 0 - 50 psid differential pressure gauge
- 722Y006 Digital Flowmeter** – Direct Reading, displays flow rate, total flow volume, total resettable batch flow volume

RECOMMENDED SPARES

- Filter Cartridge, box of 6
- G-1045 Std Buna-N Filter Housing Lid Gasket, 1 ea (or)
- G-1045A Viton-A Filter Housing Lid Gasket, 1 ea



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Lightweight Portable Handcart Filter-Pump

- Removes Water and Dirt from Oils and Fuels
- 5 GPM Flow Rate
- No Tools Required to Change Cartridges

DESCRIPTION

The MP5E is a complete filtration package on wheels. All you have to do is install the filter cartridge, plug it in, and watch it meet your toughest filtration requirements.

Designed for industrial applications, the MP5E uses a large filter cartridge with up to 4500 square inches of filter media. This improves filtration efficiency and capacity, reduces change-out frequency and gives the best long term operating costs.

More than 26 types of filter cartridges are available to meet your specific filtration requirements.

APPLICATIONS

The MP5E Portable Filter can be used for:

Transfer: Remove dirt and water while pumping oils or fuel from one place to another.

Preventive Maintenance: Routine filtering of oil at the machine reservoir extends the life of machine components and the oil itself.

Reclamation: Put spilled oil into a drum, filter it to remove dirt and water, and you can reuse the oil instead of throwing it away.

The MP5E Portable Filter effectively processes:

Insulating Oil	Quench Oil
Hydraulic Oil	Gasoline
Gear Oil	Cutting Oil
Lube Oil	Diesel Fuel
Transformer Oil	Kerosene
Biodiesel Fuel	



OPTIONS & ORDERING INFORMATION

Specify model numbers as shown below:

MP5E-1	115 vac, 1 phase, 60 Hz (basic unit)
MP5EXP-1	115 vac, 1 phase, 60 Hz, explosion proof*
MP5E-2	230 vac, 1 phase, 60 Hz
MP5EXP-2	230 vac, 1 phase, 60 Hz, explosion proof*
MP5E-7	230 vac, 1 phase, 50 Hz
MP5EXP-7	230 vac, 1 phase, 50 Hz, explosion proof*
MP5E-10	Air motor
550Y020	Flow Control Bypass – Allows manual adjustment of flow rate; controls pump cavitation
552Y030	Filter Bypass – Transfer oil without filtration
703Y004	Delta P Gauge – Direct reading 0 - 50 psid differential pressure gauge
722Y006	Digital Flowmeter – Direct reading, displays flow rate, total flow volume, total resettable batch flow volume
554Y001	Effluent Sample Tap - with 1/4 turn ball valve
725Y009	High Pressure Shut-off Switch, adjustable, with reset button
553Y035	4-Way Inlet Valve - reverses direction of flow through hoses

***Note:** Explosion proof units shipped without power cord, switch, or plug

For stationary base mounted unit, substitute "S" in model number for "P". Example: MS5E-1 = stationary base mtd 5 gpm filter pump, 115 vac, 1 ph, 60 Hz

CARTRIDGE SELECTION

The MP5E portable filter accepts all Velcon standard 618/718 size cartridges. Cartridges are available for removal of free water, dirt, and acids. Contact your local Velcon representative for a complete listing of available cartridges and their applications.

RECOMMENDED SPARES

- 6 cartridges
- 1 G-1016 Buna-N lid gasket

Note: If Viton-A lid gaskets are desired, order 2 G-1016A



SPECIFICATIONS

- 5 gpm flow rate
- Epoxy coated vessel interior and exterior
- Band clamp vessel closure
- 10 inch semipneumatic wheels
- Totally enclosed fan cooled (TEFC) motor 1/2 hp, 115V, 1 phase, 60 Hz, 10 amps
- Self priming positive displacement pump with built-in pressure relief valve
- Pressure gauge
- 3 wire power cord 10 feet long with 3 prong plug
- 9 feet inlet and discharge hose, 3/4" I.D.
- 3/4" NPT male fittings on hose ends
- Strainer mounted on inlet line
- Weight: 106 lbs. Shipping weight: 130 lbs.
- Height: 52" Length: 18" Width: 22"



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COMPANY HEADQUARTERS:
Velcon Filters, Inc.
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Colorado Springs, CO 80907-3410
Phone: 1.800.531.0180 / 1.719.531.5855
Fax: 719.531.5690
e-mail: vfsales@velcon.com
www.velcon.com

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Colorado Springs, Colorado
Sylacauga, Alabama
Henryetta, Oklahoma

OVERSEAS AFFILIATES:
Frankfurt/M., Germany & Singapore

*Liquid Filtration
and Separation
Specialists*

Twin Housing Lightweight, Portable Handcart Filter Pumps

Remove Water, Dirt, and Other Contaminants from Oils and Fuels
MCP5E, Two-Stage Series-Flow Model
MDP5E, One-Stage Alternate-Flow Model

FEATURES

- 5 gpm Standard, 1 and 10 gpm Optional
- Economical two-cartridge configurations
- Choice of different cartridge combinations
- Quick and easy cartridge change
- Minimum fluid spill during operation
- Self-contained, one person operation

DESCRIPTION

MCP5E Series-Flow – This model employs two different types of filter cartridges in series. Typically, the first of the MCP's two housings is utilized as a prefilter. With heavy carbon or dirt contamination, this prefilter holds a cost-effective particle or colloidal removal cartridge and the second in series holds an **Aquacon**[®] super-absorbent water removing cartridge.

Other cartridge combinations have proven to be effective for filtering vacuum pump oil and other oils in corrosive environments. Use either an economical dirt cartridge or an **Aquacon**[®] dirt and water cartridge in the first stage and either a Fuller's Earth or an Activated Alumina cartridge in the second. The first stage removes dirt or dirt and water while the second removes acids, gums, surfactants, varnishes, soaps, color bodies, corrosive gasses, polar compounds, and oxidation products.

MDP5E Alternate-Flow – Only one housing on this model is utilized at a time. The operator can manually switch the oil flow from one housing to the other at his option. This is very useful when down-time is critical. The oil can filter through one side while the cartridge is being changed in the other housing with little or no interruption of oil flow.

Another application of the MDP5E is to use a different type of cartridge in each of the housings. An economical dirt removing cartridge, for example, can be employed in the first housing for routine filtering. When water is detected in the oil, the flow can be manually diverted to the second housing, containing an **Aquacon**[®] Cartridge, for both water and dirt removal.



MDP5E-1

Contact your local Velcon Representative regarding other types of cartridges and cartridge combinations which are available.

APPLICATIONS

Hydraulic Oil
 Gear Oil
 Lube Oil
 Transformer Oil
 Vacuum Pump Oils:
 Hydrocarbon Base
 Perfluoropolyethers

Heat Transfer Fluids
 Cutting Oil
 Mineral Oil
 Phosphate Ester Oils
 Synthetic Oils
 Diesel Fuel
 Biodiesel

SPECIFICATIONS

Standard Features, MCP5E and MDP5E

- 5 gpm standard flow rate
- Epoxy powder coated vessel, both interior and exterior
- Band Clamp vessel closure – no tools required
- Operating pressure to 100 psi
- 10" semi-pneumatic wheels
- Self-priming positive displacement pump with built-in pressure relief valve
- Static Pressure Gauge on each housing – to indicate when cartridge must be changed
- 1/2 hp, 115V, 1-phase, 60 Hz, 10 Amp TEFC Motor
- 10 ft. 3-wire power cord
- 10 ft. Inlet and Discharge Hose, 3/4" I.D.
- 3/4" NPT Male Fittings on hose ends
- Suction Y-Strainer mounted at pump inlet
- Weight: 157 lbs.
- Shipping Weight: 202 lbs.
- Height: 52", Width: 22", Depth: 22"

ORDERING INFORMATION

Specify model number as shown below.

MCP5E-1 or MDP5E-1 115 v, 1-ph, 60 Hz

MCP5E-2 or MDP5E-2 230 v, 1-ph, 60 Hz

(Note: Units are shipped without filter cartridges.)

Also available: 1 gpm units, 10 gpm units, 3-phase power, 50 Hz power, explosion proof motor, air motor (contact Velcon for more information)

OPTIONS & ACCESSORIES

550Y020 Flow Control Bypass

552Y030 Filter Bypass

553Y035 Four-way Valve

554Y001 Sample Tap

703Z004 Differential Pressure Gauge (MCP)

703Y004 Differential Pressure Gauges (MDP)

722Y006 Digital Flowmeter

725Y009 High Pressure Shut-off Switch

RECOMMENDED SPARES

Filter Cartridge, box of 6 ea

G-1016 Std Buna-N Filter Housing Lid Gasket, 2 ea

G-1016A Viton-A Filter Housing Lid Gasket, 2 ea

FILTER CARTRIDGE SELECTION:

Application	Cartridge	Filter Area, Sq. In.	Micrometer Rating, Specify:	Notes
Dirt Removal: Particulates	FO-718PL Series Pleated Media	5000	1/3, 1/2, 1, 2, 5, 15, or 50	Maximum particle filtration
Dirt Removal: Colloidals	FO-618FGA Series Depth Media	N/A	5, 10, or 25	Most cost effective for "slime" removal
Dirt and Water Removal	AC/AD-718 Series Aquacon [®]	2500	1 or 5	Removes dirt and 1 to 2 quarts water
		2900	1/2	For circuit breaker & high-carbon oils
Acid Removal	LA-71801B Fuller's Earth			Use 1 gpm Filter Pumps
	LB-71801 Activated Alumina			Use 1 gpm Filter Pumps



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**Liquid Filtration
and Separation
Specialists**

Heavy Duty Portable Handcart Filter Pumps Double Capacity: 10 and 30 GPM Versions

Remove Water & Dirt From Oils and Fuels

- Choice of dirt or combination dirt and free water removal cartridges
- Two cartridge – double contaminant removal
- Rugged welded steel construction
- Large pneumatic wheels for soft surfaces
- Self-contained, one person operation
- Lift ring for easy lifting

DESCRIPTION

Double capacity HP Series Portable Filter Pumps are recommended for oils with higher concentrations of dirt, water and other contaminants. Two models are offered with a choice of 10 and 30 gpm flow rates.

The HP30, thirty-gallons per minute model is the preferred choice at electrical utility installations for transferring and filtering insulating oil. It has been proven to be economical, fast, and efficient for applications of this type involving larger volumes of oil.

The HP Series two-cartridge design filters and holds more than twice as much contaminant as single cartridge units. Several different types of filter cartridges are offered for specific applications. Cartridges can be changed in only a few minutes.

HP Series Filter Pumps are highly portable. Large pneumatic wheels allow the units to be moved over soft and irregular surfaces by one person. Rugged, welded steel construction makes them suitable for operation in the most difficult and demanding industrial environments. Units are completely self-contained and require only electrical power to operate.



**HP10 shown with
optional accessories**

FILTER CARTRIDGES

Dirt Removal: For dirt particles, use two FO-718PL Series large surface area pleated media cartridges. For colloidal contaminants, two FO-618FGA Series fiberglass depth cartridges are recommended.

Dirt and Water Removal: Use two **Aquacon**® AC-718 Series free water absorbent cartridges. Each removes 1 to 2 quarts of free water and also filters dirt particles.

Aquacon® Cartridges have a unique inner absorbent media. Absorbed water is chemically locked in. When the cartridges reach their water holding capacity, their accordion pleats swell shut. This causes an increase in the differential pressure which signals the operator to change the cartridges.

APPLICATIONS

Hydraulic Oil Transformer Oil Cutting Oil
 Lube Oil Quench Oil Gear Oil
 Diesel Fuel Biodiesel Fuel

PLEASE NOTE: Use of **Aquacon®** or Fiberglass Depth Cartridges with the HP30 (30 gpm) unit should be limited to oils with a viscosity of 100 SSU or less. Transformer and circuit breaker oils are acceptable. This limitation does not apply when using pleated media cartridges.

The HP30 unit should only be specified for use on insulating oil with a viscosity of 100 SSU. Please contact Velcon regarding application of the HP30 to other, more viscous fluids.

OPTIONS & ACCESSORIES

HP10	HP30	
550Y030	550Y040	Flow Control Bypass
552Y040	552Y050	Filter Bypass
440Y005	440Y007	"Y" Suction Strainer
440Y104	440Y106	Basket Suction Strainer
553Y040	553Y050	4-Way Inlet Valve
554Y040	554Y050	Full Port Isolation Valves (2 ea)
725Y003	725Y003	Pressure Shut-Off Switch (w/o alarm light)
725Z003	725Z003	Pressure Shut-Off Switch (w/alarm light)
703Y004	703Y004	Differential Pressure Gauge
440Y404	440Y404	Automatic Air Eliminator
661Y012	661Y012	Remote Stop/Start Switch (w/25 ft cord)
722Y006	722Y006	Digital Flowmeter/Totalizer
165Y012	165Y052	Male Cam Connections (2 ea, w/dust caps)
150Y4XX	150Y6XX	Hose w/Male x Female Cams (Specify length in ft, XX = 10, 15, 20, 25)
151Y4XX	151Y6XX	Hose w/Female Cams (Specify length in ft, XX = 10, 15, 20, 25)
165X014	165X054	Female Cam x Male NPT Fitting (1 ea, shipped loose)
165X012	165X052	Male Cam x Male NPT Fitting (1 ea, shipped loose)

SPECIFICATIONS

Standard Features, all HP Series Models

- Double capacity – holds two 18" length 618/718 style filter cartridges
- Carbon steel construction
- 10" pneumatic wheels
- Totally enclosed, fan cooled motor
- Built-in pump bypass to prevent system over-pressure
- Pressure gauge to indicate when elements must be changed
- Wiring complete to switch box – user to install power cord and plug
- Buna-N lid gasket
- Lift ring
- Height: 54", Width: 22", Depth: 31"

Model Number	HP10	HP30
Flow Rate	10 gpm	30 gpm
Motor Horse Power	1	2
1-Phase Amperage	115V/16A, 230V/8A	115V/24A, 230V/12A
3-Phase Amperage	230V/3.6A, 460V/1.8A	230V/6.8A, 460V/3.4A
Inlet/Outlet	1" NPT	1½" NPT
Weight	225 lbs.	270 lbs.
Shipping Weight	375 lbs.	420 lbs.

ORDERING INFORMATION

Specify model number as shown below.

HP10-1	or	HP30-1	115 v, 1-ph, 60 Hz
HP10-2	or	HP30-2	230 v, 1-ph, 60 Hz
HP10-3	or	HP30-3	230 v, 3-ph, 60 Hz
HP10-4	or	HP30-4	460 v, 3-ph, 60 Hz

Also available: 50 Hz power, explosion proof motor, variable speed motor, low rpm motor (contact Velcon)

RECOMMENDED SPARES

1 ea	G-1045	Standard Buna-N Lid gasket (or)
1 ea	G-1045A	Optional Viton-A Lid gasket



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**Liquid Filtration
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 Specialists**

Improved Oil Processing with Low Maintenance System

Velcon Filters has over 50 years experience designing and manufacturing coalescing filtration equipment. The TOC Series units combine the latest coalescing technology with the finest available microglass filter media to restore turbine lube oil to an exceptionally clean and dry condition. The units can be used to upgrade or replace older, low efficiency reservoir filtration systems.

PERFORMANCE

- Restore oil to an ISO cleanliness of 14/11 or better
- Continuously remove free water down to 150 ppm or less
- Prevent system sludging and premature oil degradation
- Field test data available on request

SIMPLICITY

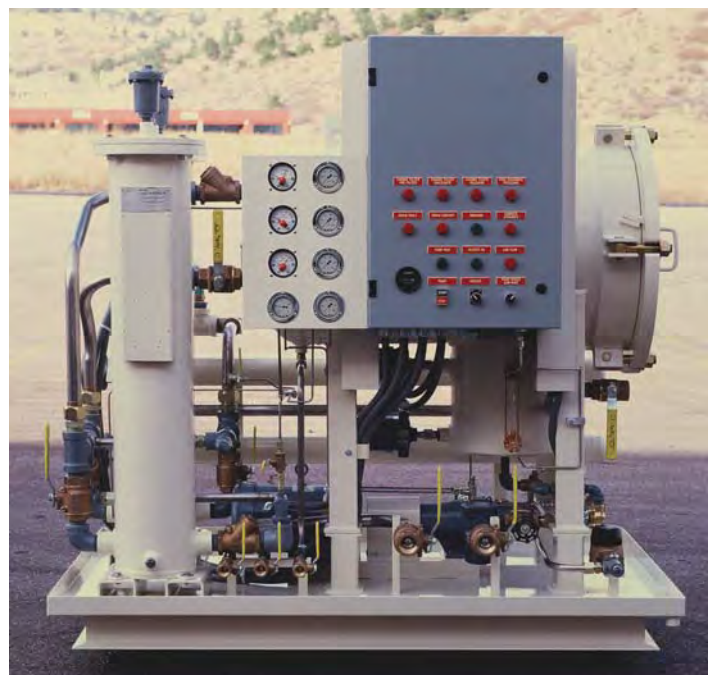
- Compact, one button operation for round-the-clock service
- No adjustment needed for varying contaminant inlet levels
- Prefilter extends life of specialized coalescing elements
- One-page operation summary, components labeled to match gauges

RELIABILITY

- Rugged ASME design vessels assure safe, leak-free service
- Heavy-duty Viking pump is factory coupled for years of maintenance free service – there are no other moving parts
- Magnetic starter with overload protection
- Complete system is factory hydro-tested and operated before shipping



TOC30 three stage filtration system with Pre-Filter, Filter/Separator, and Polishing Filter. Shown with high water level shut-off probe/switch.



TOC30 with optional inlet oil heater and automatic water drain.

TOC Series Turbine Oil Coalescing Systems

SPECIFICATIONS

Electrical

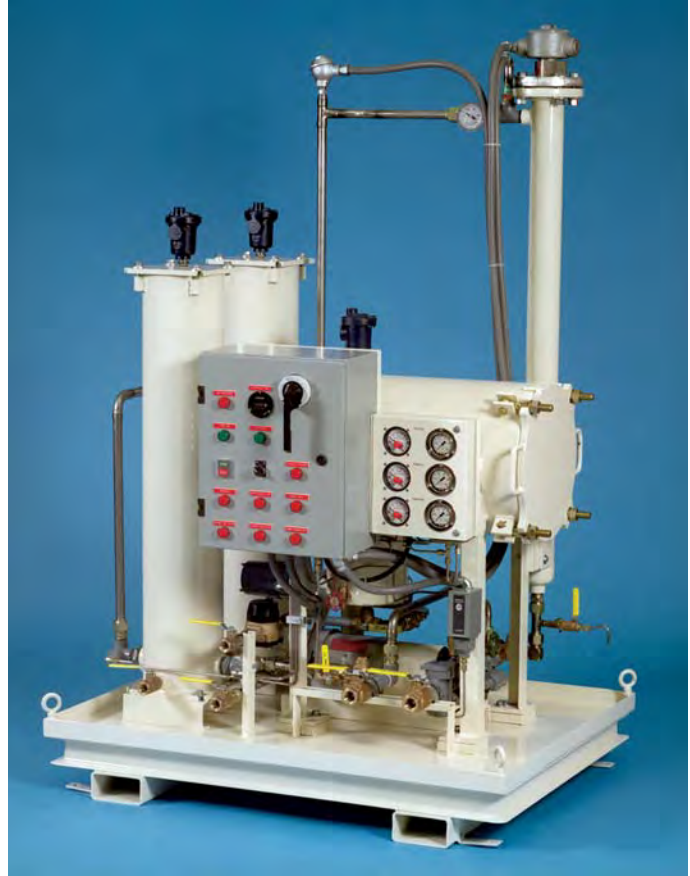
- 1750 RPM TEFC motor
- NEMA 4 motor control enclosure with “motor running” light
- Magnetic motor starter with manual reset and over-load protection
- Liquid-tight flexible conduit complete from panel to motor in accordance with IEEE standards. User to supply power cord and plug.
- Adjustable high pressure shut-off switch
- All electrical components UL listed/CSA approved

Mechanical

- Positive displacement gear pump with factory set internal bypass and external adjustable flow bypass, maximum output pressure 100 psi
- 304 stainless steel tubing with JIC plated steel fittings. External hoses not supplied.
- 1/4 turn ball valves installed on drains, inlet and outlet, and at each stage for isolation. All flow valves are full port design.
- Inlet/outlet connections with cam and groove fitting quick-disconnect male coupling with dust caps
- Pressure vessels built in accordance with ASME Sec. VIII for maximum operating pressure of 150 psi. Carbon steel construction.
- Self-venting automatic air eliminators on each stage
- 60 mesh in-line strainer, no tools needed for inspection

General

- Effluent sampling port for quick check on system performance
- Static and differential pressure gauges, with stainless steel tubing, for monitoring each stage
- Oven-cured, high corrosion resistant, powder coat white paint (polyester polyurethane)
- All controls and connections accessible from one side of system
- Filters tested to ANSI B93.31 (ISO 4572), multi-pass method for evaluating filtration performance of fine hydraulic fluid power filter elements. Beta ratio data available upon request.



TOC10 shown with optional inlet oil heater, polishing filter, and automatic water drain. Three stages of filtration are Pre-Filter A, Filter/Separator B, and Polishing Filter C (optional on TOC10). See HOW IT WORKS on next page.

HOW IT WORKS

The TOC Series Turbine Oil Coalescing Systems remove water and dirt from turbine lube oil. Contaminants are removed in stages (see photo) A, B, and C:

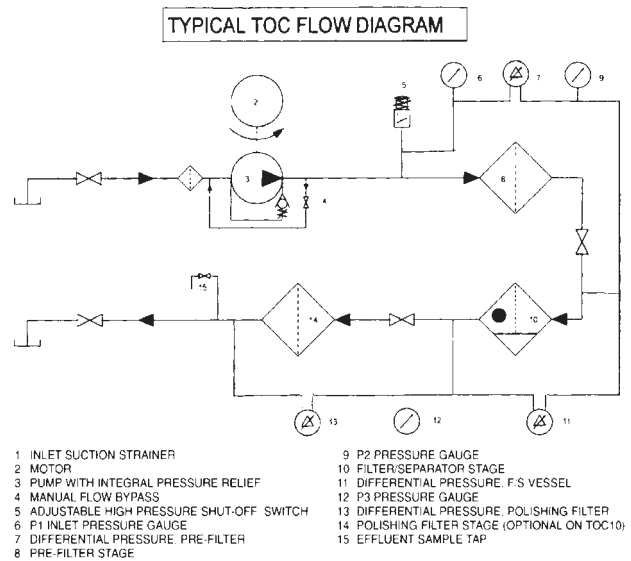
- A.** Particulate solid contaminants are removed in the Pre-Filter stage (#8 in diagram below) by cost effective, high surface area pleated synthetic media cartridges. This extends the life of the specialized filters downstream.

- B.** Free and emulsified water are removed in the Filter/ Separator stage (#10 below). Finely dispersed water passes through the coalescer element and grows into larger drops. These drops collect in the vessel sump where they are drained. A Teflon® coated screen separator prevents any small water drops from entering the effluent oil stream. Fine particulate solid contaminants are also removed by the coalescer elements.

- C.** The final Polishing stage (#14 below, optional on TOC10) uses synthetic media elements to remove fine particles.

TOC Series Flow Diagram

- 1 Inlet Suction Strainer
- 2 Motor
- 3 Pump with Integral Pressure Relief
- 4 Manual Flow Bypass
- 5 Adjustable High Pressure Shut-Off Switch
- 6 P1 Inlet Pressure Gauge
- 7 Differential Pressure, Pre-Filter
- 8 Pre-Filter Stage
- 9 P2 Pressure Gauge
- 10 Filter/Separator Stage
- 11 Differential Pressure, F/S Vessel
- 12 P3 Pressure Gauge
- 13 Differential Pressure, Polishing Filter
- 14 Polishing Filter Stage (Optional on TOC10)
- 15 Effluent Sample Tap



CARTRIDGES AND GASKETS

STAGE	TOC10	TOC30
PRE-FILTER	VF82SYS150	VF82SYS150
FILTER CARTRIDGE	FOS-618PLP8	FOS-618PLP8
QTY REQUIRED	2	2
RECOMM SPARES	4	4
LID GASKET	G-1045	G-1045
RECOMM SPARES	1	1
FILTER/SEPARATOR	HV1622TO30	HV2233SYS150
COALESCER CARTRIDGE	CC-62285	CC-63385
QTY REQUIRED	3	4
RECOMM SPARES	3	4
SEPARATOR CARTRIDGE	SO-424V	SO-430C
QTY REQUIRED	1	2
RECOMM SPARES	-	-
LID GASKET	G-2033	G-2036
RECOMM SPARES	1	1
POLISHING FILTER	VF82SYS150 (OPT)	VF82SYS150
FILTER CARTRIDGE	FOS-618PL1/2	FOS-618PL1/2
QTY REQUIRED	2	2
RECOMM SPARES	2	2
LID GASKET	G-1045	G-1045
RECOMM SPARES	1	1

TOC Series Turbine Oil Coalescing Systems

SPECIFICATIONS

	TOC10	TOC30
FLOWRATE	10 GPM	30 GPM
MOTOR HP	1 HP	2 HP
CONNECTION SIZE	1" MALE CAM	1 1/2" MALE CAM
DIMENSIONS (LxWxH) *	40" x 51" x 60"	42" x 66" x 60"
WEIGHT *	1,241 lbs	1,750 lbs
SHIPPING WT *	1,650 lbs	2,250 lbs

* For a basic unit with no options.

ORDERING INFORMATION

Specify model number as shown below. Units are shipped with one set of cartridges installed.

TOC10-1	115 v, 1 ph, 60 Hz
TOC10-2 or TOC30-2	230 v, 1 ph, 60 Hz
TOC10-3 or TOC30-3	230 v, 3 ph, 60 Hz
TOC10-4 or TOC30-4	460 v, 3 ph, 60 Hz

Also available: 50 Hz power, explosion proof motor, variable speed motor, low RPM motor (contact factory).

OPTIONS & ACCESSORIES


TOC10	TOC30	
552Z040	552Z050	Filter Bypass
553Z040	553Z050	4-Way Inlet Valve
724Y030	724Y030	High Water Level Shut-Off
025Y006	N/A	Polishing Filter Vessel
491Y001	491Y002	Polyurethane Casters (TOC10: 8", TOC30: 10")
491Y010	491Y012	Pneumatic Casters (TOC10: 10", TOC30: 12")
661Y012	661Y012	Remote Stop/Start Switch (w/25 ft cord)
744Y003	744Y001	Hour Meter
722Y006	722Y006	Digital Flowmeter/Totalizer

Also available: inlet oil heaters, auto water drain (contact factory).

RECOMMENDED SPARES

See Cartridges and Gaskets Table on page 3.

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**Liquid Filtration
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Specialists**



5 GPM Turbine Oil Coalescing System

TOC5-1

HEAVY DUTY PORTABLE SYSTEM

- Remove free water and dirt from turbine lube oil
- Two-stage filter/coalescer system
- Rugged welded steel construction
- Large pneumatic wheels for easy mobility

PERFORMANCE

- Restore oil to an ISO cleanliness of 14/11 or better
- Continuously remove free water down to 150 ppm or better
- Prevent system sludging and premature degradation

SIMPLICITY

- Complete, self-contained unit
- Compact, one-switch operation

RELIABILITY

- ASME designed housing assures safe, leak-free service
- Heavy duty gear pump offers years of maintenance free operation
- Uses latest high efficiency filter/coalescer and separator technology
- System is factory hydro-tested and operated before shipping

SPECIFICATIONS

- 1/2 hp, 120 vac, 1-ph, 60 Hz, 1750 rpm totally enclosed fan-cooled motor
- 5 gpm positive displacement gear pump with built-in pressure relief bypass
- Pressure housing built in accordance with ASME Sec. VIII for maximum operating pressure of 100 psi
- 12" pneumatic tires



TOC5 with optional air eliminator and differential pressure gauge (hoses not shown)

- 10 ft. long suction and discharge hoses, 3/4" diameter
- 1/4-turn ball valve at housing drain
- Inlet pressure gauge indicates when cartridge must be changed
- 10 ft. 3-wire power cord with on-off switch
- Valved sight glass
- Polyester polyurethane powder coat paint
- Shipping weight: 425 pounds
- Height: 48", Width: 24", Depth: 32"

ORDERING INFORMATION

Specify model number as shown below. Units are shipped with one set of cartridges installed.

TOC5-1 120 v, 1-ph, 60 Hz

Contact factory for alternate power options.

OPTIONS AND ACCESSORIES

552Y030 Filter Bypass
722Y006 Digital Flowmeter/Totalizer
703Y004 Direct Reading Differential Pressure Gauge
440Y404 Automatic Air Eliminator

RECOMMENDED SPARES

CC-63385 Replacement Filter/Coalescer Cartridge
SI-818 Replacement Separator Cartridge
G-1110 Spare Lid Gasket



TOC5 shown with filter/coalescer cartridge and separator cartridge



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Section 4

Other Products

VF-61 Differential Pressure Gauge

Assembly Part Number 10678
For Use with VF-61, VF-61E, VF-62

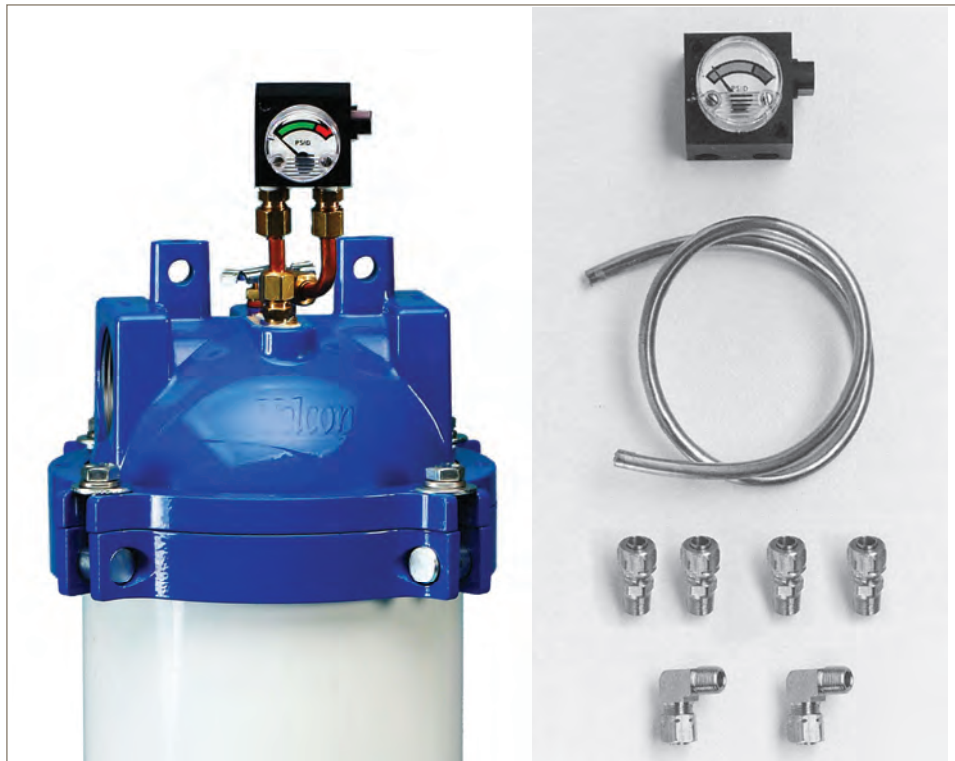


Description

This unit measures pressure difference between two points. The gauge allows for a simple reading on an easy-to-read scale. A red/green dial with a breakpoint located at 15 psid alerts the user of the condition of the process.

This kit consists of the following components:

- Differential Pressure Gauge: aluminum body, 1/8" NPT bottom, 1" molded lens & 0-20 psid scale,
- Compression Fittings: 4 straight, 2 90° elbow
- 1/4 O.D. Copper Tubing



Contact Information: Operation:

Parker Hannifin Corporation
Velcon Filtration Division
1210 Garden of the Gods Road
Colorado Springs, CO 80907

tel +1 719 531 5855
fax +1 719 531 5690
vfsales@parker.com

www.velcon.com

When the needle is in the green zone of the gauge during normal flow, the differential pressure is less than 15 psid across the installed element, and the element does not need to be changed out.

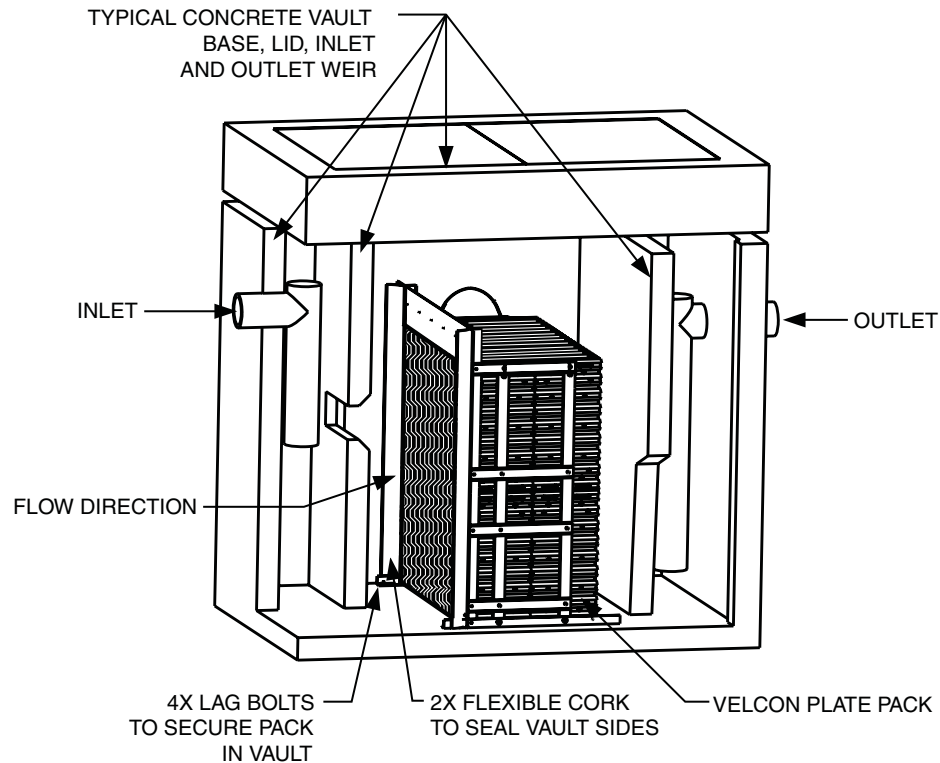
When the needle is in the red zone, the differential pressure is more than 15 psid and the element should be changed out. It has reached its recommended maximum pressure differential.

CAUTION:

Do not mount the P/N 10678 differential pressure gauge assembly any closer than 2" from a steel bracket or pipe. The gauge has a magnetic piston, and mounting too close to steel may affect the accuracy.



Oily Water Separator Plate Pack



DESCRIPTION

Velcon's oily water separators protect our environment from oil contamination in streams, lakes and other bodies of water. Oily water separator plate packs separate oil from water down to 10 parts per million or less. The treated water can be discharged into storm water drains*.

FEATURES

- Oiliophilic polypropylene plates filled with calcium carbonate for high temperature and improved fuel compatibility
- Fiberglass frame
- Easy installation: drop in and bolt down
- Minimum maintenance
- Simple and effective cleaning method

APPLICATIONS

- Oil removal from water or liquids with different specific gravities
- Downstream oil removal concentrations at or below 10 ppm that meet EPA guidelines
- Solids separation
- Placed in concrete vaults or large tanks
- Rainwater runoff
- Industrial water
- Workshop and service stations
- Vehicle wash bays
- Coolant "tramp oil" removal

SPECIFICATIONS

See table on reverse for standard concrete vault plate pack details.
Custom plate packs are also available upon request.

*Contact your local EPA guidelines for water discharge limits and specifications.

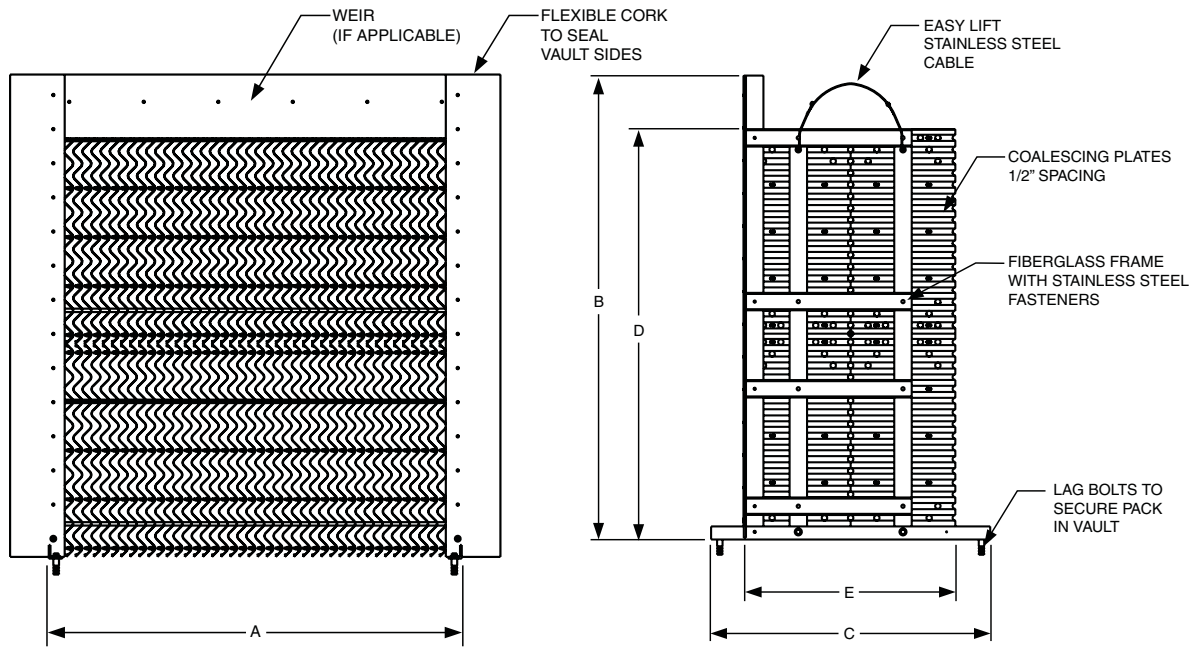


Plate Pack Frames

1/2" Spaced Polypropylene Plates For Standard Concrete Vaults

Concrete Vault Model No.	Velcon Plate Pack Model No.	Vault Design Flow (gpm)	Plate Pack Dimensions (inches)					Plates Separation Area (in ²)
			A	B	C	D	E	
25	PPF-25-25	25	19.1	23.7	32.0	23.7	24.0	276
466	PPF-466-110	110	35.6	53.2	32.0	47.0	24.0	1157
577	PPF-577-162	162	46.1	53.2	32.0	47.0	24.0	1434
5106	PPF-5106-183	183	55.3	60.0	32.0	47.0	24.0	1733
612-T1	PPF-612-219	219	60.1	72.7	32.0	47.0	24.0	1889
612-T2	PPF-612-438	438	60.1	72.7	56.0	47.0	48.0	3778
660	PPF-660-110	110	35.6	53.2	32.0	47.0	24.0	1157
712-T1	PPF-712-306	306	77.5	72.7	44.0	70.5	24.0	5640
712-T2	PPF-712-612	612	77.5	72.7	44.0	70.5	36.0	5640
814-T1	PPF-814-312	312	92.0	79.0	44.0	70.5	24.0	6583
818-1	PPF-818-564	564	92.0	70.5	32.0	70.5	24.0	4388
818-10	PPF-818-1015	1015	92.0	86.6	56.0	70.5	48.0	8777
820-2	PPF-820-1139	1139	92.0	70.5	56.0	70.5	48.0	8777

- Contact Velcon for custom vault plate pack sizes.
- Effluent calculations are based on 60 micron diameter oil droplet removal which under normal gravity flow conditions will provide 10 ppm oil in the effluent.
- Effluent calculations are based on influent values of water base, 100 ppm of 0.88 gm/cc oil, gravity feed, 50°F, and 1/2" spaced plates.
- Oil rise velocity is calculated through Stokes Law. Variables include oil drop diameter, time and vertical distance oil drop travels in plate pack, specific gravity of oil and water, viscosity of water, and temperature.

Velcon products are sold and serviced by a world-wide representative network. To order, contact Headquarters or your **LOCAL REPRESENTATIVE**:

COMPANY HEADQUARTERS:
 Velcon Filters, LLC
 1210 Garden of the Gods Road
 Colorado Springs, CO 80907-3410
 Phone: 1.800.531.0180 / 1.719.531.5855
 Fax: 719.531.5690
 e-mail: vfsales@velcon.com
 www.velcon.com

MANUFACTURING PLANTS LOCATED AT:
 Colorado Springs, Colorado
 Sylacauga, Alabama
 Henryetta, Oklahoma

OFFICES & AFFILIATES IN:
 Canada, Germany, Singapore & Spain



**Liquid Filtration
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Coalescing Plate Separator

VPSM Series

FEATURES

- Easy to install
- Minimum maintenance
- Compact
- Oil & solids separation
- Conforms to Waterboard & E.P.A. Guidelines

APPLICATIONS

- Workshop and service stations
- Vehicle washbays
- Coolant "Tramp Oil" removal
- Silt removal
- Rainwater runoff

SPECIFICATIONS

- Molded polyethylene tank

Dimensions:

VPSM5-P50	VPSM20-4P50
5 GPM	20 GPM
16" Wide	30" Wide
45" High	74" High
51" Long	63" Long

Connections:

Outlet:	1.25"	1.5"
Inlet:	1.25"	2.0"

- Vertical polypropylene plate packs with option of 1/4" (P25) and/or 1/2" (P50) spacing

ASSOCIATED EQUIPMENT & OPTIONS

- Positive displacement pump
- Low voltage level control system
- Installation



Model VPSM5-P50



Vertical Plate Pack (P25 or P50)

ADDITIONAL SPECIFICATIONS

	5GPM Flow Rate	20GPM Flow Rate
Voltage	120V	120V
Motor	1/2HP, 1PH	1.5HP, 1PH
Type of Pump	ASM D25 diaphragm (5GPM)	ASM D50 diaphragm (20GPM)
Suction pipe length	0'-16.5' with 1.0" pipe *16.5'-33' with 1.25" pipe	*0'-16.5' with 2.0" pipe 16.5'-33' with 2.5" pipe
Discharge pipe length	*0'-16.5' with 1.25" pipe 16.5'-66' with 1.5" pipe	0'-16.5' with 2.5" pipe 16.5'-66' with 3" pipe
Float type	MAC 3	MAC 3
Float cable length	16.5', 33', or 49'	16.5', 33', or 49'
Weight (including pump)	240 lbs.	620 lbs.

* Pipe diameter installed with system



VPSM20-4P50



VPSM5-P50



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VCA-D

Velcon Contaminant Analyzer

On-line Fuel Condition Monitor for Diesel
Real-time Particulate and Water Monitoring



Benefits

- Fuel quality accountability upon receipt
- Record of fuel quality at dispensing point
- System alarm or shutdown when fuel contaminant levels exceeded
- Reduce equipment downtime by preventing particulate and water from entering fuel storage
- 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



Contact Information: Product Features:

Parker Hannifin Corporation
Velcon Filtration Division
1210 Garden of the Gods Road
Colorado Springs, CO 80907

tel +1 719 531 5855
fax +1 719 531 5690
vfsales@parker.com

www.velcon.com

- Fuel quality accountability upon receipt and at dispensing
- System alarm or shutdown when fuel contaminant levels exceeded
- Vehicle Warranty Conformance by assuring fuel meets ISO 4406 and ASTM D975 Cleanliness Standards
- Real-time constant monitoring of your fuel condition
- Measurement/Standard:
 - Particulates: mg/L 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



ENGINEERING YOUR SUCCESS.

Description

As a “full-flow” analyzer, the VCA-D mounts within a fuel delivery system thereby providing a true representation of the pipeline contents. Other technologies rely on sampling only a small amount of fuel drawn from the main pipeline—a process often completed at very low flow rates, referred to as side-sampling. The VCA-D analyzes fuel at flow rates higher than 1000 gallons per minute through a 4-inch pipeline. Side-sampling has substantial

difficulty in accurately representing contamination in high fuel-flow applications.

Particle counters fail to differentiate with precision between water and solid contaminants thereby producing erroneous results. The VCA-D uses two separate sensor technologies to consistently differentiate between water and solid contaminants.

The VCA-D analyzes the contents of flowing fuel in a pipeline

approximately 600 times a second, and outputs an averaged result every two seconds in mg/l, ppm, and a representative ISO 4406 code. The VCA-D is an ideal tool to either measure the quality of fuel at receipt, assuring agreed upon cleanliness specification are met, or at dispensing points.

The VCA-D provides data to reassure the user that fuel cleanliness is within limits and where not, may be set to alarm or signal delivery system shutdown.

Product Specifications

MEASUREMENT/STANDARD

- Particulate Contaminant: mg/l (milligrams per liter)
- Water Contaminant: ppm (parts per million)

MECHANICAL

- Pressure Rating: 150 psi (10 bar)
- Flange Class: ANSI 150
- Flange Sizes: 3 & 4 in. (Other sizes available, please contact Velcon)

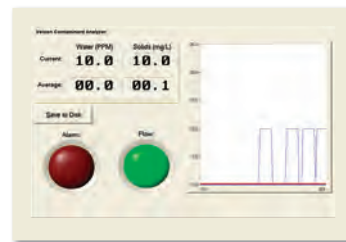
ELECTRONICS

- Configurable Output Control Alarm Relay
- Certification: Class 1 Zone 2, IP65, NEMA 4x
- Cable Length: 10 ft (3 m)
- Requirements: 9-36VDC 4A or 110-240VAC

- Control Box Dimensions: 12”W x 16”H x 8”D

DATA OUTPUT

- PC-Based Interface
- Local Data Storage
 - Downloadable to USB Storage Device
- Additional SCADA integration (optional)
- Cellular Telemetry (optional)
 - E-mail Reports
 - Global Reach



Real-time Data:
Water and Solids Concentration



Per Fueling Session:
E-mail Field Data Reporting
(with cellular telemetry option)



HYDROKIT®

For Diesel

Detect Free Water in Diesel Fuel

FEATURES

- **Easy to Use** – Automatically controls the sample size. Simple evaluation by color comparison.
- **Shelf Life** – For details on shelf life refer to date on box or contact Velcon at 1-800-531-0180.
- **Responds Consistently** – Responds consistently in a wide variety of undyed diesel fuels.
- **Carefully Controlled Quality** – Manufactured by Velcon Filters, Inc. to strict quality control specifications.

DESCRIPTION

The HYDROKIT® is an effective “Go, No-Go” field test designed to periodically check for free water, which is removed to ppm levels by properly operating filter/separators, **Aquacon**®, and monitor vessels. Samples are normally taken downstream of the vessel, but they can also be taken at other points in the fuel distribution system.

The HYDROKIT® is designed to indicate free water in excess of 200 ppm by changing the powder contained in the sample tube to a pink color. Other concentrations can be estimated using the other colors on the card. The HYDROKIT® provides better water determination than ASTM D2709 or D4176. The HYDROKIT® is designed for “fail-safe” operation, with false negative readings unlikely. Almost any error in performing the test will indicate the presence of wet fuel. If the sample indicates the presence of excessive water, it is always a good practice to repeat the test on a second sample.



APPLICATIONS

- Diesel Fuel, undyed
- Not for use with Avgas

ORDERING INFORMATION

<u>MODEL NO.</u>	<u>QTY OF TEST TUBES</u>
HKD 25	25

Each model above comes complete with:
sample tubes
wide mouth glass sample jar(s)
needle holder assembly
instruction card
color indicator comparison card

How To Use HYDROKIT®

- 1** Sample bottle must be clean.



- 2** Take sample downstream of vessel.



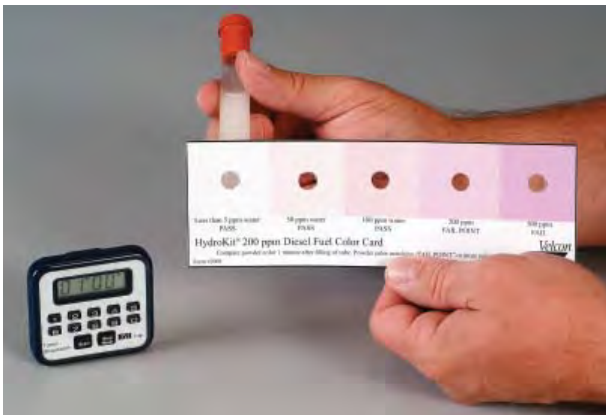
- 3** Push tube down into needle holder in sample.



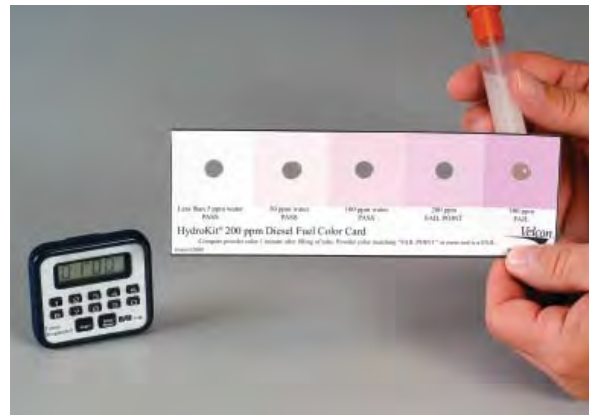
- 4** After tube fills, shake for 15 seconds. Set upright to allow powder to settle.



- 5** Check powder color at one minute.



- 6** If color is the same or darker than FAIL, more than 200 ppm of free water is present.



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Diesel/Biodiesel Fuel Field Test Kits

VFT Series Kits

Field test kits for diesel and biodiesel fuel to help determine the quality of fuel where it matters most.

DESCRIPTION

VFT-0100: Water and Visual Clarity

This is a simple two-part test in which diesel or biodiesel fuel is tested for

- Visual clarity
- Presence of entrained (dissolved) water

Visual clarity testing will often reveal particulates such as sediment, glycerin, or microbial residue. In the second part of the test, a vial of water detection fluid is added to the fuel, allowing the detection of entrained water to as low as 100ppm. At 500ppm, the detection fluid leaves a distinct red ring at the bottom of the sample bottle.

When to use it

This test should be used as an initial screening test for fuel deliveries and for periodic monitoring of fuel quality at the dispenser and storage tanks. It can also be used as a vehicle maintenance diagnostic to detect entrained water (a major cause of blown injector tips). Works for diesel, biodiesel, biodiesel blends.

Results within 5 minutes.

VFT-0150: Bio-Detect Field Test Kit

The Bio-Detect Field Test detects the presence of biodiesel in standard (petroleum-based) diesel fuel. This test detects biodiesel at levels as low as 1% (B1) and can be used as a pre-screening test for tactical vehicles such as emergency vehicles, aircraft, or in military applications. This test is also used as part of standard vehicle maintenance to indicate whether biodiesel fuel quality testing is required.

Results within 15 minutes.

APPLICATIONS

- Diesel fuel
- Biodiesel fuel



VFT-0100 Water & Visual Clarity



VFT-0150 Bio-Detect

VFT-0145: Glycerin Field Test

This is a test for the presence of glycerin in fuel, providing results within the range of 0.05% and 0.5% of mass for biodiesel fuel. This is an enzymatic test that has a greater than 99% correlation with the ASTM methods and it can be used for pure biodiesel and biodiesel blends. Glycerin is a byproduct of biodiesel production and should not be present in the final product (the ASTM specification for B100 is 0.24% of mass). Glycerin is known to be harmful to diesel fuel systems and engines.

When to use it

This test should be used as an initial screening test for fuel deliveries and for periodic monitoring of fuel quality at the dispenser and storage tanks. It can also be used to screen tactical (emergency) vehicles and generators for the presence of biodiesel fuel. Works for pure biodiesel and biodiesel blends.

Results within 15 minutes.



VFT-0145 Glycerin



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