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# Vel-Max®
# Vessel Manual

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## TABLE OF CONTENTS

APPENDIX

## GENERAL DESCRIPTION

The Parker Velcon Vel-Max® vessel that you have received consists of the vessel and accessory equipment to meet your specific requirements. Descriptive literature covering the accessories is included near the back of this manual.

A variety of filter cartridges, and associated hardware kits, can be used with this vessel.

The Vel-Max vessel can be configured in 4 different ways. These are:

- Prefilter vessel for particle removal
- Filter/separator for both water and particle removal
- Fuel monitor utilizing patented ***Aquacon*** or **CDF** cartridges
- Clay treater, for surfactant removal

Each of these configurations are discussed in more detail following. See the specific section covering your configuration for cartridge installation, startup procedures, operating information, cartridge change-out, and other necessary information.

## INSTALLATION OF VESSEL

1. Identify the vessel inlet and outlet by the markings provided on the vessel piping connections. The inlet is near the top opening of the vessel; the outlet is at the bottom of the vessel. The vessel must be installed in the correct flow direction to perform properly and to avoid damage to the system. (Note: some filter cartridges flow opposite the normal flow direction. ADI cartridges require inlet flow to enter at the bottom of the vessel.)

2. Inlet and outlet piping should be carefully aligned to avoid stressing the vessel connections during installation. Installation of shut-off valves on both sides of the vessel is recommended to ease cartridge changeout or vessel inspection.

| | |
|---|---|
| ⚠ CAUTION | STEPS 3 AND 4 SHOULD BE PERFORMED BEFORE REMOVING HINGED COVER TO INSURE STABILITY OF THE VESSEL |

3. Insure that the leg assembly is bolted snugly to the vessel body.

4. Bolt the legs to a stable, horizontal base.

5. Adjust the vessel body to the necessary height, if required, by loosening the leg assembly and retightening after required vessel location has been achieved.

6. Thread appropriate fittings to the inlet and outlet connections. Use pipe dope or Teflon® thread to seal the threaded connections.

7. Connect any accessories that are not already installed. See Accessory Parts List and literature as required.

8. Cartridges are normally packed separately. Refer to the appropriate section for the configuration that you have purchased.

| | |
|---|---|
| **NOTE** | THE VESSEL MUST BE PROVIDED WITH A PRESSURE RELIEF VALVE IF THE SYSTEM HAS POSITIVE DISPLACEMENT PUMPS UPSTREAM OR AUTOMATIC SHUT-OFF VALVES DOWNSTREAM OF THE VESSEL |

## VEL-MAX CONFIGURATIONS KITS

The following is a listing of the kits required for each configuration. Make sure that your vessel includes the appropriate conversion kit for your configuration. Kit installation instructions are included with each conversion kit. Install the kit before proceeding.

| Configuration | VX-1 | VX-2 | VX-3 |
|---|---|---|---|
| **FILTER/ SEPARATOR** | VX1-FSKIT | VX2-FSKIT | VX3-FSKIT |
| **AVIATION *Aquacon* (6" OD)** | VX1-AVKIT | VX2-AVKIT | VX3-AVKIT |
| **AVIATION PREFILTER (6" OD)** | VX1-AVKIT | VX2-AVKIT | VX3-AVKIT |
| **INDUSTRIAL PREFILTER or CLAY CARTRIDGE (6.25" OD)** | VX1-INKIT | N/A | VX3-INKIT |
| **INDUSTRIAL *Aquacon* (6.25" OD)** | VX1-INKIT | N/A | VX3-INKIT |
| **CDF® CARTRIDGES** | VX1-CDKIT | VX2-CDKIT | N/A |

## START-UP PROCEDURE (VESSEL ON PRESSURE SIDE OF CENTRIFUGAL PUMP)

Place the below valves in these positions:

1. Manual drain valve – closed
2. Manual air eliminator – open
3. Inlet and outlet valves – both closed

Install appropriate filter cartridge(s). Consult cartridge installation instructions, which follow in this manual.

Replace vessel cover and torque bolts to 45-50 ft-lbs (62-68 N-m).

The vessel is now ready to be filled with the product.

The following operation instructions can be used for initial start-up and for subsequent start-ups after installation of replacement cartridges or servicing of the vessel.

1. Start the system pump.
2. Slightly open the inlet valve, allowing the vessel to slowly fill with the product. (Take about 10-15 minutes to fill the vessel to eliminate the possibility of an internal fire).
3. If the unit is equipped with a manual air eliminator valve, leave the valve cracked open until the fluid flows from the opening; then close quickly.
4. If equipped with an automatic air eliminator, the unit is filled when the air eliminator stops flowing air. When the Parker Velcon vessel is filled with the product. Fully open the inlet valve, and slowly open the outlet valve.
5. When the unit is in operation, take a differential pressure reading and record the reading. The differential pressure (ΔP) should be between 1 and 10 depending on the purchase specification. If there is no ΔP, the system should be shut down and the vessel inspected for broken seals or possibly elements left out. See differential pressure readings under OPERATING INFORMATION.

## START-UP PROCEDURE (VESSEL ON SUCTION SIDE OF PUMP)

Place the below valves in these positions:

1. Manual drain valve – closed
2. Manual cover valve– open
3. Inlet and outlet valves – both closed
4. Vessel cover open

Install appropriate filter cartridge(s). Consult cartridge installation instructions which follow in this manual.

The vessel is now ready to be filled with the product.

The following operation instructions can be used for initial start-up and for subsequent start-ups after installation of replacement cartridges or servicing of the vessel.

1. Obtain the product, place in bucket.
2. Pour the product into the top of the open vessel. Pour until vessel is almost full.
3. Close the cover and torque the bolts to 45-50 ft-lbs (62-68 N-m).
4. Using a funnel, completely fill the vessel by pouring fuel into the cover valve through the funnel. Be careful to minimize any spills. Close the cover valve when the vessel is full.
5. Open the inlet and outlet valves.
6. Start the system pump to begin flowing through the vessel.

When the unit is in operation, take a differential pressure reading and record the reading. The differential pressure (ΔP) should be between 1 and 10 depending on the purchase specification. If there is no ΔP, the system should be shut down and the vessel inspected for broken seals or possibly elements left out. See differential pressure readings under OPERATING INFORMATION.

# FILTER/SEPARATOR

## DESCRIPTION

The Parker Velcon Filter/Separator that you have received consists of the vessel, separately purchased first and second stage elements, and accessory equipment to meet your specific requirements. Descriptive literature covering the accessories is included near the back of this manual.

Parker Velcon Filter/Separators are manufactured to meet a variety of different end uses and specifications. The finest workmanship has gone into the building of this Parker Velcon Filter/Separator. It is of no value, however, if elements are improperly installed or the unit is improperly operated. We urge you to read the manual carefully and follow the instructions given.

A Parker Velcon Filter/Separator is specifically designed to remove solid contaminants and water from the product. To accomplish this, the Filter/Separator is equipped with two types of cartridges through which the product passes in sequence.

### *FIRST STAGE – COALESCER CARTRIDGES*

These cartridges have two functions. They filter solid contaminants out of the product and coalesce water into droplets. Any water present in the influent product is usually emulsified into tiny drops by the action of the pumps handling the product. The first stage cartridges coalesce these tiny drops into drops of sufficient size to settle out of the product rapidly.

### *SECOND STAGE – SEPARATOR CARTRIDGES*

The function of the second stage cartridges is to repel coalesced water droplets that have not yet settled so that they are prevented from going downstream with the product.

The water should be drained manually on a daily basis (automatic drain valves are not recommended). Proper provision for drainage of accumulated water is of key importance in the operation of any Filter/Separator. If the water level gets too high, it will be carried downstream.

## FILTER/SEPARATOR CARTRIDGE INSTALLATION

### SEPARATOR CARTRIDGE

1. Insure the tie rod is securely mounted.
2. Remove the separator cartridge from the packaging. Handle carefully by the end caps. DO NOT TOUCH THE SURFACE OF THE SEPARATOR MEDIA.
3. Install the separator cartridge over the tie rod. Make sure to center the separator on the mount and seat it squarely to achieve a good seal.
4. Install the seal plate, rubber gasket, flat washer, lock washer, and nut as shown in Figure 1 (Page 14).
5. Torque the nut as illustrated in Figure 1 (Page 14).

### COALESCER CARTRIDGE

1. Remove the coalescer cartridge from the packaging.
2. Install the coalescer cartridge over the separator cartridge previously installed. Center the cartridge in the vessel to achieve a good seal.
3. Install the seal plate, rubber gasket, flat washer, lock washer and nut as shown in Figure 1 (Page 14).
4. Torque the nut as illustrated in Figure 1 (Page 14).

| | |
|---|---|
| ⚠ CAUTION | USE ONLY PARKER VELCON CARTRIDGES IN THIS FILTER/ SEPARATOR. PARKER HANNIFIN CANNOT WARRANT PERFORMANCE IF ANY OTHER MANUFACTURER'S CARTRIDGES ARE USED. |

# FUEL MONITOR USING CDF® CARTRIDGES

### DESCRIPTION

The Parker Velcon Monitor vessel configuration that you have received consists of the vessel, separately purchased monitor cartridges, and accessories to meet your specific requirements. Descriptive literature covering the accessories is included elsewhere in this manual.

The Parker Velcon Monitor vessel is specifically designed to absorb free water and remove solid contaminants from the product being filtered. Five CDF® cartridges are mounted on the adapter. The cartridges flow outside to inside.

### CDF® MONITOR CARTRIDGES

These cartridges absorb water and filter solids from avgas and jet fuel. They provide positive protection against water slug transmission. The cartridges are tested and qualified to EI 1583.

| | |
|---|---|
| ⚠ CAUTION | DO NOT USE CDF® MONITOR CARTRIDGES WITH PRE-MIXED FUEL CONTAINING ANTI-ICING ADDITIVES (DiEGME, FIZZY®, Prist®, or FSII) |

### CDF® MONITOR CARTRIDGE INSTALLATION

1. Make sure that the proper conversion kit is installed for the CDF configuration.
2. Insure that the tie rod is securely mounted.
3. Remove the CDF cartridge from the packaging.
4. Install the cartridge by inserting the snout end into the adapter holes. Seat each cartridge firmly by giving it a slight twisting motion while pushing it into the hole.
5. Install the star-shaped spider down the tie rod over the ends of the cartridges. Install the nut onto the tie rod and tighten snugly to secure the spider.
6. Torque the nut as illustrated in Figure 2 (Page 15).

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| **NOTE** | VESSEL MUST BE PROVIDED WITH PRESSURE RELIEF VALVE IF THE SYSTEM HAS A POSITIVE DISPLACEMENT PUMP UPSTREAM OR AUTOMATIC SHUT-OFF VALVE DOWNSTREAM OF THE VESSEL.<br><br>USE ONLY PARKER VELCON CARTRIDGES IN THIS FILTER. PARKER HANNIFIN CANNOT WARRANT PERFORMANCE IF ANY OTHER MANUFACTURER'S CARTRIDGES ARE USED. |

# CLAY TREATER

### DESCRIPTION

The Parker Velcon Clay Treater vessel configuration that you have received consists of the vessel, separately purchased clay cartridges, and accessories to meet your specific requirements. Descriptive literature covering the accessories is included elsewhere in this manual.

The Parker Velcon Clay Treater vessel is specifically designed to remove surfactant material from the product being treated. One or more LA-61801B cartridges are mounted on the adapter. The cartridges flow outside-to-inside.

### LA-61801B CLAY CANISTERS

Attapulgus clay canisters are used to remove surfactants from jet fuel and other petroleum products.

### LA-61801B CLAY TREATER CANISTER INSTALLATION

1. Make sure that you have the proper installation kit for the LA-61801B clay treater canister. This will be same kit as used for the industrial (6-1/4" OD) prefilters.
2. Insure that the tie rod is securely mounted.
3. Remove the clay canister cartridge from the packaging.
4. Install the LA-61801B canister over the tie rod, making sure to center and squarely mount on the base to achieve a good seal..
5. If the vessel is a VX-3, install a spacer seal plate on top of the first canister.
6. Install another LA-61801B canister over the tie rod.
7. Install the seal plate, rubber gasket, flat washer, lock washer, and nut as shown in Figure 3 (Page 16).
8. Torque the nut as illustrated in Figure 3 (Page 16).

| | |
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| **NOTE** | USE ONLY PARKER PARKER VELCON CARTRIDGES IN THIS FILTER. PARKER HANNIFIN CANNOT WARRANT PERFORMANCE IF ANY OTHER MANUFACTURER'S CARTRIDGES ARE USED. |

# FUEL MONITOR USING AVIATION *Aquacon*® CARTRIDGES (6” OD)

### DESCRIPTION

The Parker Velcon Monitor vessel configuration that you have received consists of the vessel, separately purchased monitor cartridge, and accessories to meet your specific requirements. Descriptive literature covering the accessories is included elsewhere in this manual.

The Parker Velcon Monitor vessel is specifically designed to absorb free water and remove solid contaminants from the product being filtered. The ***Aquacon***® cartridge is mounted on the center mount. The cartridge flows outside to inside.

ADI cartridges flow inside to outside. The vessel flow direction must be reversed, with the inlet at the bottom, to use these cartridges. Make sure the flow direction is correct when using this cartridge family.

### *Aquacon*® MONITOR CARTRIDGES

These cartridges absorb water and filter solids from avgas and jet fuel. They provide positive protection against water slug transmission. The cartridges are tested and qualified to EI 1583.

| | |
|---|---|
| ⚠ CAUTION | DO NOT USE ***Aquacon***® MONITOR CARTRIDGES WITH PRE-MIXED FUEL CONTAINING ANTI-ICING ADDITIVES (DiEGME, FIZZY®, Prist®, or FSII) |

### AQUACON® MONITOR CARTRIDGE INSTALLATION

1. Make sure that you have the proper installation kit for the 6” OD ***Aquacon*** monitor cartridge.
2. Insure that the tie rod is securely mounted.
3. Remove the ***Aquacon*** cartridge from the packaging.
4. Install the cartridge by inserting over the tie rod, making sure the bottom cap is centered and squarely mounted to the base to achieve a good seal.
5. If the vessel is a VX2, install the necessary spacer seal plate to center and seal the filters. Install another filter on top of the seal plate.
6. If the vessel is a VX3, install another spacer seal plate. Install another filter on top of the seal plate.
7. Install the seal plate, rubber washer, flat washer, lock washer and nut as illustrated in Figure 2 (Page 15).
8. Torque the nut as illustrated in Figure 4 (Page 17).

| | |
|---|---|
| **NOTE** | VESSEL MUST BE PROVIDED WITH PRESSURE RELIEF VALVE IF THE SYSTEM HAS A POSITIVE DISPLACEMENT PUMP UPSTREAM OR AUTOMATIC SHUT-OFF VALVE DOWNSTREAM OF THE VESSEL.<br><br>USE ONLY PARKER VELCON CARTRIDGES IN THIS FILTER. PARKER HANNIFIN CANNOT WARRANT PERFORMANCE IF ANY OTHER MANUFACTURER’S CARTRIDGES ARE USED. |

# INDUSTRIAL PREFILTER (6-1/4" OD)

### DESCRIPTION

The Parker Velcon Prefilter vessel configuration that you have received consists of the vessel, separately purchased filter cartridges, and accessories to meet your specific requirements. Descriptive literature covering the accessories is included elsewhere in this manual.

The Parker Velcon Prefilter vessel is specifically designed to remove solid particles from the product being treated. The FO-7xxxx cartridges are mounted on the vessel base. The cartridges flow outside-to-inside.

### FO-7XXXX FILTER CARTRIDGES

Prefilter cartridges are used to remove particles from jet fuel, oils, and other petroleum products.

### FO-7XXXX PREFILTER CARTRIDGE INSTALLATION

1. Make sure that you have the proper installation kit for the 6-1/4" OD FO-7xxxx prefilter.
2. Insure that the tie rod is securely mounted.
3. Remove the prefilter cartridge from the packaging.
4. Install the filter over the tie rod, making sure to center and squarely mount on the base to achieve a good seal.
5. If the vessel is a VX3, install the necessary spacer seal plate.
6. Install another filter over the spacer seal plate.
7. Install the seal plate, rubber gasket, flat washer, lock washer, and nut as shown in Figure 3 (Page 16).
8. Torque the nut as illustrated in Figure 3 (Page 16).

| NOTE | USE ONLY PARKER VELCON CARTRIDGES IN THIS FILTER. PARKER HANNIFIN CANNOT WARRANT PERFORMANCE IF ANY OTHER MANUFACTURER'S CARTRIDGES ARE USED. |
|---|---|

# AVIATION PREFILTER (6" OD)

### DESCRIPTION

The Parker Velcon Prefilter vessel configuration that you have received consists of the vessel, separately purchased filter cartridges, and accessories to meet your specific requirements. Descriptive literature covering the accessories is included elsewhere in this manual.

The Parker Velcon Prefilter vessel is specifically designed to remove solid particles from the product being treated. The FO-6xxxx cartridges are mounted on the vessel base. The cartridges flow outside-to-inside.

### FO-6XXXX FILTER CARTRIDGES

Prefilter cartridges are used to remove particles from jet fuel, and other petroleum fuels.

### FO-6XXXX PREFILTER CARTRIDGE INSTALLATION

1. Make sure that you have the proper installation kit for the 6" OD aviation prefilter.
2. Insure that the tie rod is securely mounted.
3. Remove the prefilter cartridge from the packaging.
4. Install the filter over the tie rod, making sure to center and squarely mount on the base to achieve a good seal..
5. If the vessel is a VX2, install the necessary spacer seal plate on top of the filter. Install another filter on top of the seal plate.
6. If the vessel is a VX3, install another spacer seal plate and another filter.
7. Install the seal plate, rubber gasket, flat washer, lock washer, and nut as shown in Figure 2 (Page 15).
8. Torque the nut as illustrated in Figure 4 (Page 17).

| NOTE | USE ONLY PARKER VELCON CARTRIDGES IN THIS FILTER. PARKER HANNIFIN CANNOT WARRANT PERFORMANCE IF ANY OTHER MANUFACTURER'S CARTRIDGES ARE USED. |
|---|---|

# FUEL MONITOR USING INDUSTRIAL *Aquacon®* CARTRIDGES (6-1/4” OD)

**DESCRIPTION**

The Parker Velcon Monitor vessel configuration that you have received consists of the vessel, separately purchased monitor cartridge, and accessories to meet your specific requirements. Descriptive literature covering the accessories is included elsewhere in this manual.

The Parker Velcon Monitor vessel is specifically designed to absorb free water and remove solid contaminants from the product being filtered. The ***Aquacon*** cartridge is mounted on the center mount. The cartridge flows outside to inside.

***Aquacon®* MONITOR CARTRIDGES**

These cartridges absorb water and filter solids from lubricating and other oils. They provide positive protection against water slug transmission.

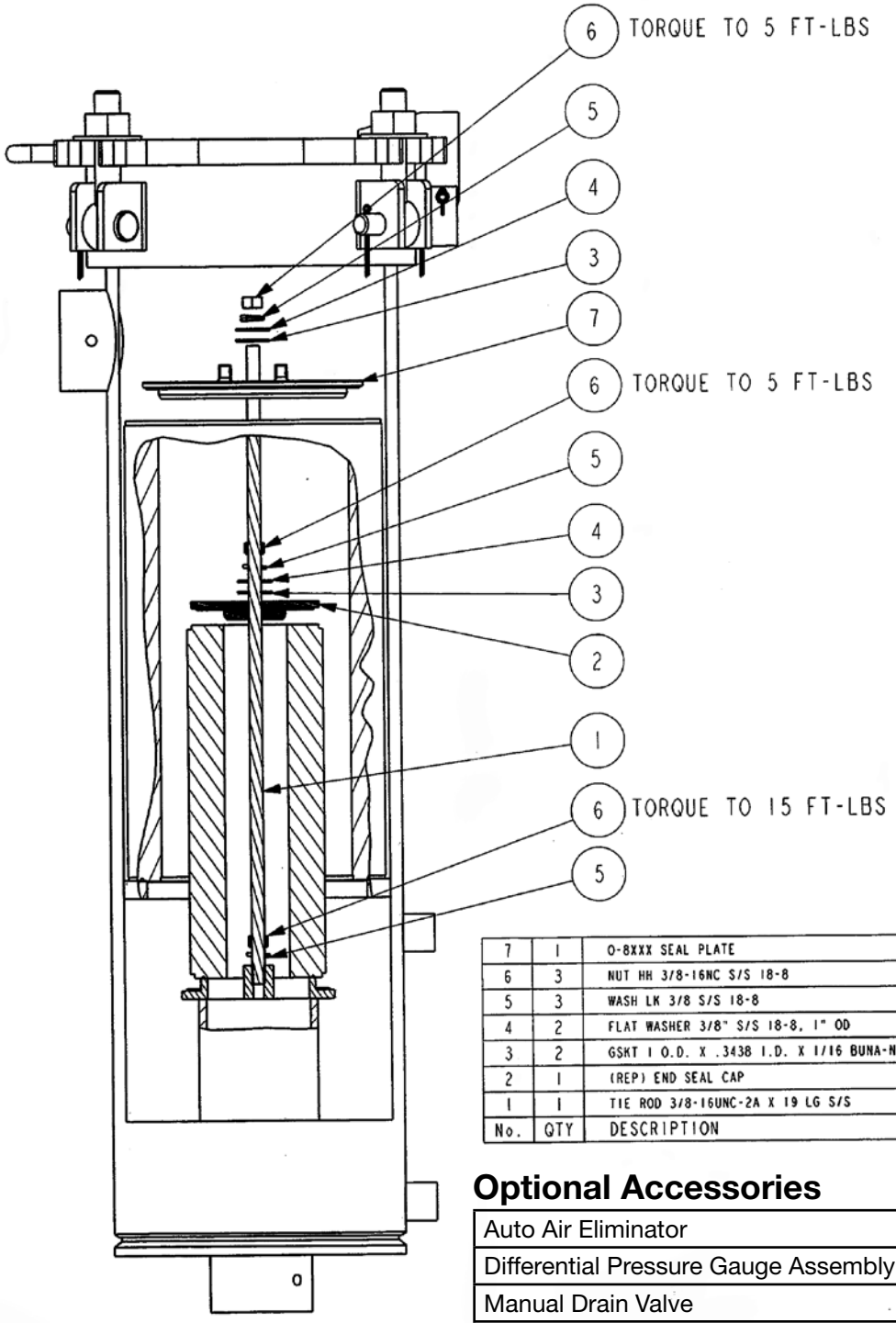
**INDUSTRIAL *Aquacon®* MONITOR CARTRIDGE INSTALLATION**

1. Make sure that you have the proper installation kit for the 6-1/4” OD industrial ***Aquacon*** cartridge.
2. Insure that the tie rod is securely mounted.
3. Remove the ***Aquacon*** AC-7xxxx cartridge from the packaging.
4. Install the cartridge by inserting over the tie rod, making sure the bottom cap is centered and squarely mounted to the base to achieve a good seal.
5. If the vessel is a VX3, install the necessary spacer seal plate to center and seal the top of the filter. Install another filter on top of the seal plate.
6. Install the seal plate, rubber washer, flat washer, lock washer and nut as illustrated in Figure 3 (Page 16).
7. Torque the nut as illustrated in Figure 3 (Page 16).

| NOTE | VESSEL MUST BE PROVIDED WITH PRESSURE RELIEF VALVE IF THE SYSTEM HAS A POSITIVE DISPLACEMENT PUMP UPSTREAM OR AUTOMATIC SHUT-OFF VALVE DOWNSTREAM OF THE VESSEL.<br><br>USE ONLY PARKER VELCON CARTRIDGES IN THIS FILTER. PARKER HANNIFIN CANNOT WARRANT PERFORMANCE IF ANY OTHER MANUFACTURER’S CARTRIDGES ARE USED. |
|---|---|

# Appendix

# FIGURE 1: FILTER/SEPARATOR CONFIGURATION

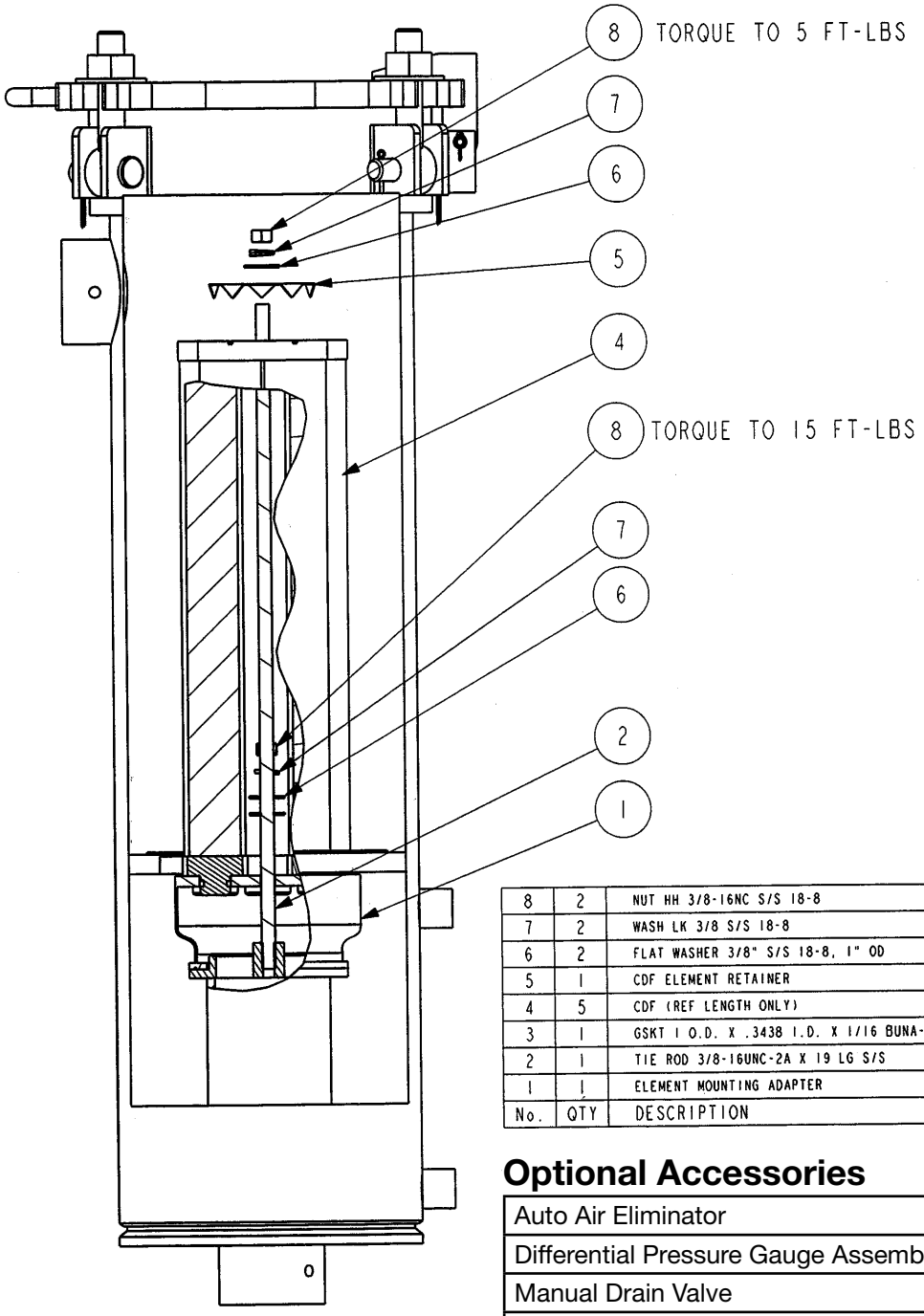



| No. | QTY | DESCRIPTION | P/N |
|---|---|---|---|
| 7 | 1 | O-8XXX SEAL PLATE | EA35 |
| 6 | 3 | NUT HH 3/8-16NC S/S 18-8 | K07 |
| 5 | 3 | WASH LK 3/8 S/S 18-8 | K05 |
| 4 | 2 | FLAT WASHER 3/8" S/S 18-8, 1" OD | K06 |
| 3 | 2 | GSKT 1 O.D. X .3438 I.D. X 1/16 BUNA-N | G-0305 |
| 2 | 1 | (REP) END SEAL CAP | 12-02MMOD |
| 1 | 1 | TIE ROD 3/8-16UNC-2A X 19 LG S/S | T19.0-6 |

## Optional Accessories

| | |
|---|---|
| Auto Air Eliminator | 101-G |
| Differential Pressure Gauge Assembly | 703X008 |
| Manual Drain Valve | 115-I |
| Pressure Relief Valve | 130-BU |
| Sight Glass | 138-P |

# FIGURE 2: CDF MONITOR CONFIGURATION

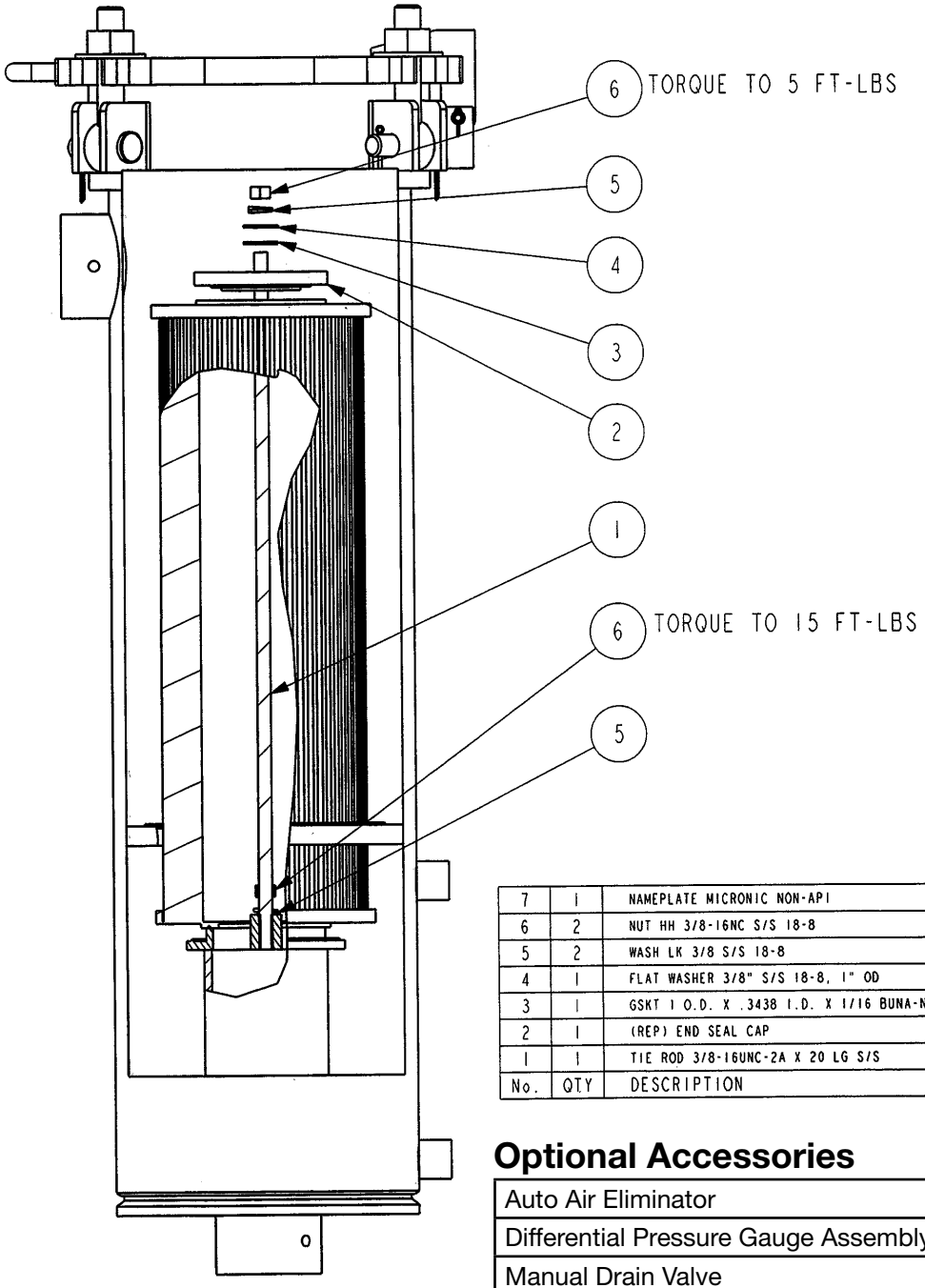



| No. | QTY | DESCRIPTION | P/N |
|---|---|---|---|
| 8 | 2 | NUT HH 3/8-16NC S/S 18-8 | K07 |
| 7 | 2 | WASH LK 3/8 S/S 18-8 | K05 |
| 6 | 2 | FLAT WASHER 3/8" S/S 18-8, 1" OD | K06 |
| 5 | 1 | CDF ELEMENT RETAINER | N94 |
| 4 | 5 | CDF (REF LENGTH ONLY) | CDF-215K |
| 3 | 1 | GSKT 1 O.D. X .3438 I.D. X 1/16 BUNA-N | G-0305 |
| 2 | 1 | TIE ROD 3/8-16UNC-2A X 19 LG S/S | T19.0-6 |
| 1 | 1 | ELEMENT MOUNTING ADAPTER | EA3 |

## Optional Accessories

| | |
|---|---|
| Auto Air Eliminator | 101-G |
| Differential Pressure Gauge Assembly | 703X008 |
| Manual Drain Valve | 115-I |
| Pressure Relief Valve | 130-BU |
| Sight Glass | 138-P |

# FIGURE 3: 6” or 6.25” OD x 2.625” ID Configuration

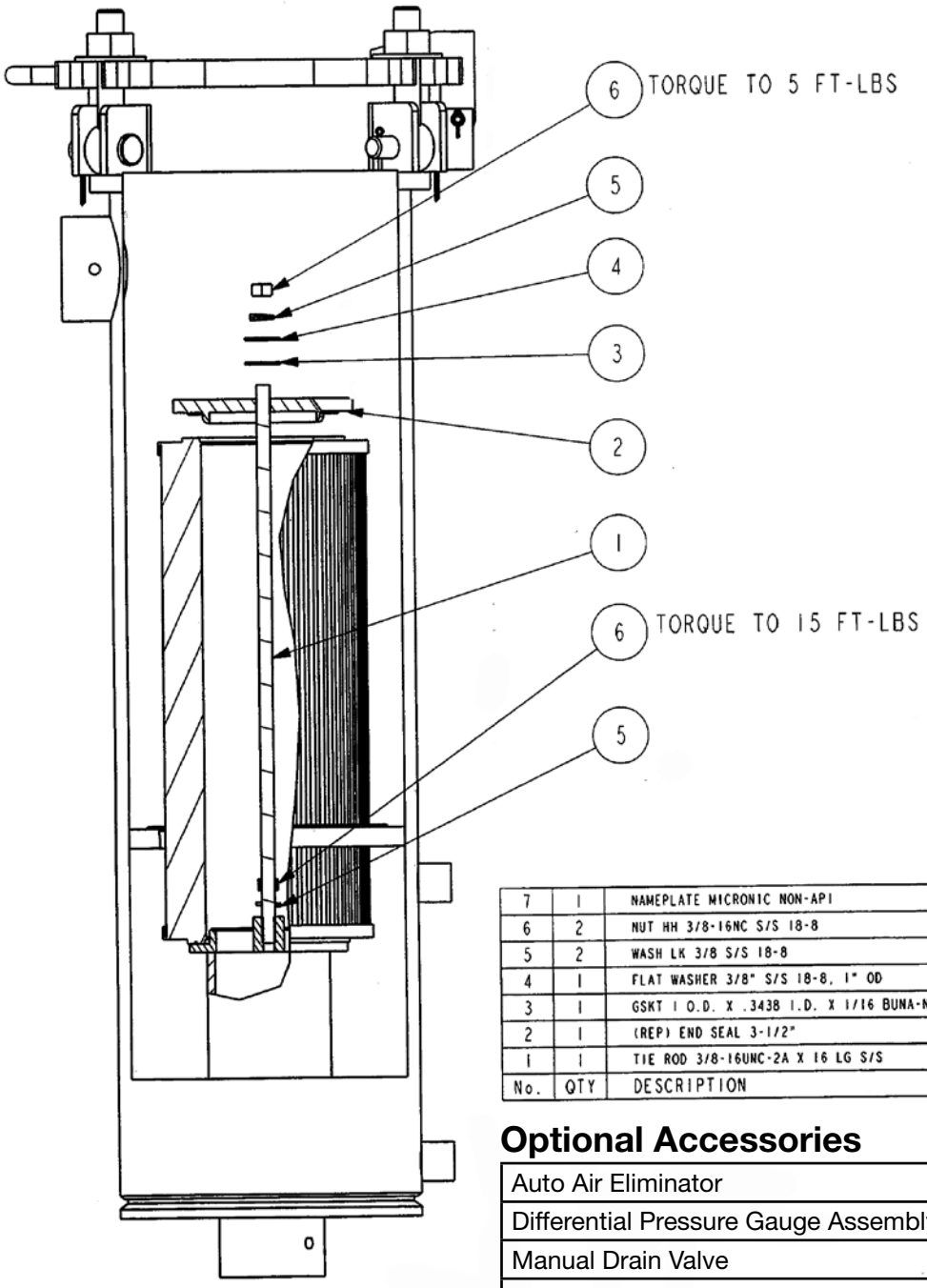



| No. | QTY | DESCRIPTION | P/N |
|---|---|---|---|
| 7 | 1 | NAMEPLATE MICRONIC NON-API | N47 |
| 6 | 2 | NUT HH 3/8-16NC S/S 18-8 | K07 |
| 5 | 2 | WASH LK 3/8 S/S 18-8 | K05 |
| 4 | 1 | FLAT WASHER 3/8" S/S 18-8, 1" OD | K06 |
| 3 | 1 | GSKT 1 O.D. X .3438 I.D. X 1/16 BUNA-N | G-0305 |
| 2 | 1 | (REP) END SEAL CAP | 12-02M |
| 1 | 1 | TIE ROD 3/8-16UNC-2A X 20 LG S/S | T20.0-6 |

## Optional Accessories

| | |
|---|---|
| Auto Air Eliminator | 101-G |
| Differential Pressure Gauge Assembly | 703X008 |
| Manual Drain Valve | 115-I |
| Pressure Relief Valve | 130-BU |
| Sight Glass | 138-P |

# FIGURE 4: 6” OD x 3.5” ID Configuration




| No. | QTY | DESCRIPTION | P/N |
|---|---|---|---|
| 7 | 1 | NAMEPLATE MICRONIC NON-API | N47 |
| 6 | 2 | NUT HH 3/8-16NC S/S 18-8 | K07 |
| 5 | 2 | WASH LK 3/8 S/S 18-8 | K05 |
| 4 | 1 | FLAT WASHER 3/8" S/S 18-8, 1" OD | K06 |
| 3 | 1 | GSKT 1 O.D. X .3438 I.D. X 1/16 BUNA-N | G-0305 |
| 2 | 1 | (REP) END SEAL 3-1/2" | 12-02C |
| 1 | 1 | TIE ROD 3/8-16UNC-2A X 16 LG S/S | T16.0-6 |

## Optional Accessories

| | |
|---|---|
| Auto Air Eliminator | 101-G |
| Differential Pressure Gauge Assembly | 703X008 |
| Manual Drain Valve | 115-I |
| Pressure Relief Valve | 130-BU |
| Sight Glass | 138-P |

# VEL-MAX® FILTER VESSEL

### DESCRIPTION

The compact Parker Velcon Vel-Max® Filter Vessel is suitable for flow rates 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)

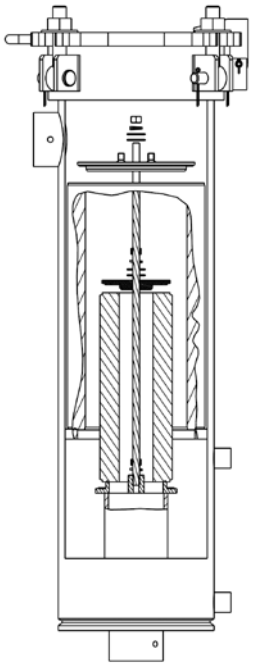
### OPTIONAL FEATURES

- 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, VX-2, showing optional leg assembly, differential pressure gauge, sight glass assembly, and air eliminator.

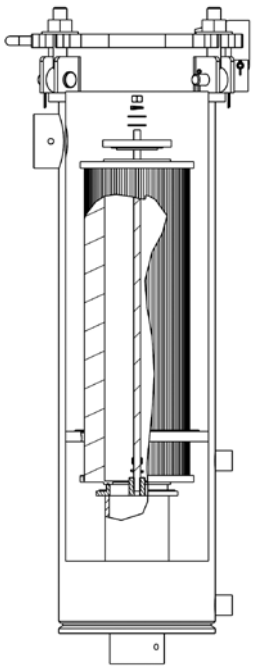
## VEL-MAX FILTER VESSEL CONFIGURATIONS/APPLICATIONS

### FILTER/SEPARATOR CONFIGURATION



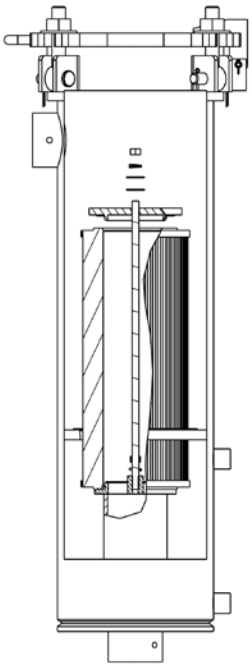
Vel-Max® Series for liquid/liquid separation uses a 2-stage coalescer separator cartridge combination to remove free and emulsified water from a liquid product stream. The first stage coalescing cartridge provides filtration as well as coalescing of free and emulsified water. The second stage separator 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



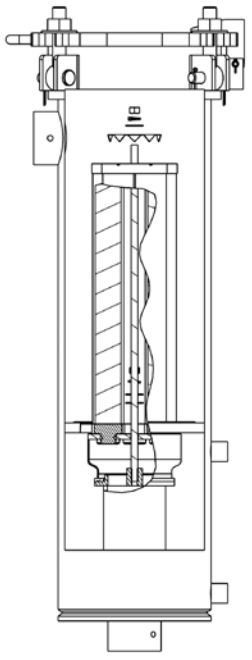
Vel-Max® Series for 6" or 6.25" OD x 2.625" ID cartridges can be used in several ways. To remove solid contaminants from a flow stream, use the vessel with a pleated media filter. When used with Aquacon® cartridges the Vel-Max® will remove solids and free water by absorption from a fuel or industrial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



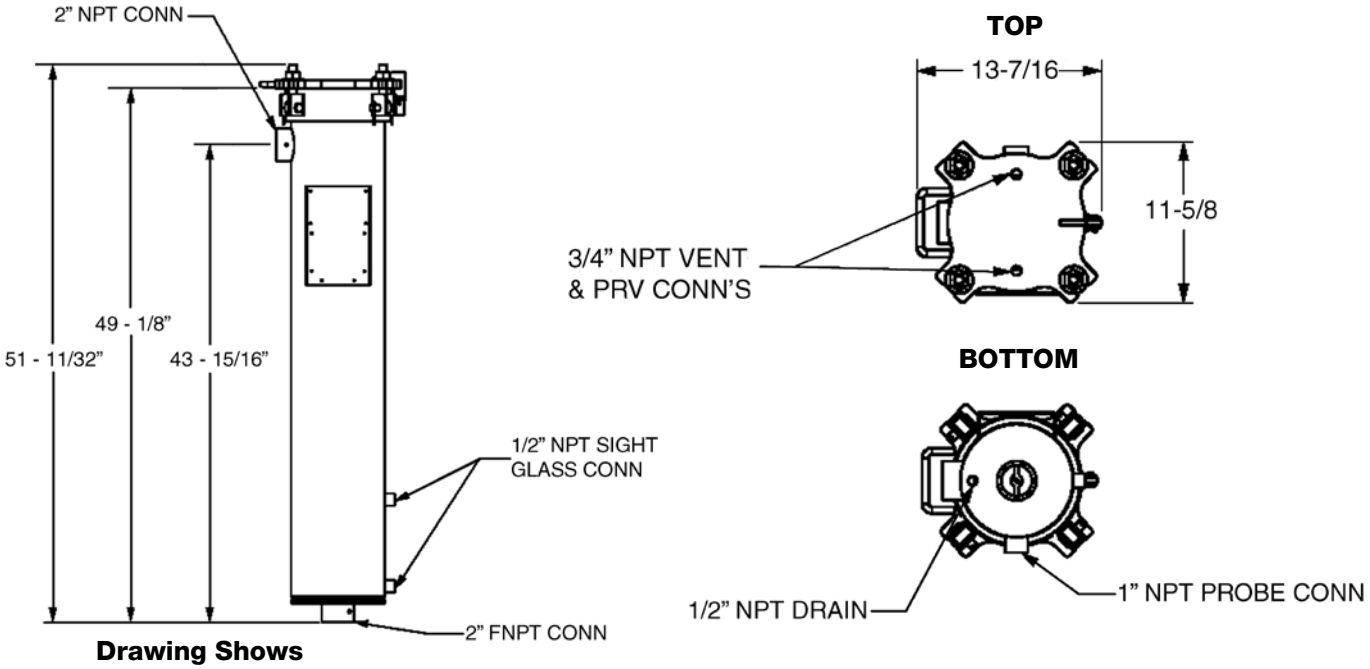
Vel-Max® Series can be adapted to use 2" diameter CDF® type monitor cartridges* for removing solid contaminants and free water by absorption from jet fuel or aviation gasoline flow streams.

| | |
|---|---|
| ⚠ CAUTION | DO NOT USE ***Aquacon®*** or CDF® MONITOR CARTRIDGES WITH PRE-MIXED JET FUEL CONTAINING ANTI-ICING ADDITIVES (DiEGME, FIZZY®, Prist®, or 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 |




**Drawing Shows Dimensions for VX-2**

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, 100ºF) | 3.5 | 7.5 | 11.5 |
| | INSULATING OIL (80ºF) | 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 ***Aquacon***® CARTRIDGES 6" OD x 3.5" ID | JET FUEL / KEROSENE | 58 | 115 | 176 |
| INDUSTRIAL MICRONIC & ***Aquacon***® 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 | | 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 | PCS | 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-614PLF*xx* | FO-614PLF*xx* (STACK OF 2) | FO-614PLF*xx* (STACK OF 3) |
| | | | FO-629PLF*xx* | FO-644PLF*xx* |
| | FIBERGLASS DEPTH | FO-614FG*xx* | FO-614FG*xx* (STACK OF 2) | FO-614FG*xx* (STACK OF 3) |
| | | | FO-629FG*xx* | FO-644FG*xx* |
| AVIATION ***Aquacon***® CARTRIDGES* | | ACO-61401L | ACO-61401R (STACK OF 2) | ACO-61405 (STACK OF 3) |
| | | | ACO-62901R | ACO-64401R |
| INDUSTRIAL ***Aquacon***® CARTRIDGES | | AC-61405 | A(C/D)-614*xx* (STACK OF 2) | A(C/D)-614*xx* (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-718PL*xx* | N/A | (FO/FOS)-718*xx* (STACK OF 2) |
| | | FOS-618PL*xx* | | |
| | | FOS-718PL*xx* | | FO-736PL*xx* |
| | | | | FOS-636PL*xx* |
| | FIBERGLASS DEPTH | FO-618FGA*xx* | | FO-618FGA*xx* (STACK OF 2) |
| | | | | FO-636FGA*xx* |
| INDUSTRIAL ***Aquacon***® CARTRIDGES | | AC-718*xx* | | AC-718*xx* (STACK OF 2) |
| | | | | AC-736*xx* |
| CLAY (FULLER'S EARTH) CARTRIDGES | | LA-61801B | | LA-61801B (STACK OF 2) |
| **CDF® MONITOR CONFIGURATION** | | **VX-1** | **VX-2** | **VX-3** |
| CDF® CARTRIDGES* | | CDF-215P | CDF-230P | N/A |

*The suffix "xx" on the part number of cartridges denotes the micron rating of the cartridge.*
*Contact the Aerospace Filtration Division 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)*

# SEPARATOR CARTRIDGES

### FEATURES

- Optimum 2nd stage water removal
- Choice of PTFE Coated Screen, Synthetic or Pleated Paper Media
- Field proven performance
- Largest selection of replacement elements

### GENERAL

Separator Cartridges are employed as the second stage in filter/separator vessels. Their sole function is to repel coalesced water drops produced by the first stage cartridges while allowing hydrocarbon fluids to pass through. Water drops settle into the filter/separator sump and are not carried downstream. All particle filtering is done by the first stage coalescer cartridge.

### HOW SEPARATOR CARTRIDGES WORK

Flow direction is from outside-to-inside. The top photo insert shows water being repelled by the hydrophobic separator medium on the cartridge's outside surface. Hydrocarbon fluids, on the other hand, easily pass through and exit the separator cartridge. Cartridges with three different types of repelling media are offered:

**PTFE Coated Screen (PCS) Cartridges** are, by far, the most popular type of separator cartridge. With proper cleaning and inspection (see Parker Velcon Form #VEL1242), cost effective PCS elements can be reused over many changeout cycles. And, PCS cartridges generate considerably less static charge than pleated paper cartridges. These features have made them the preferred choice for aircraft fueling applications.

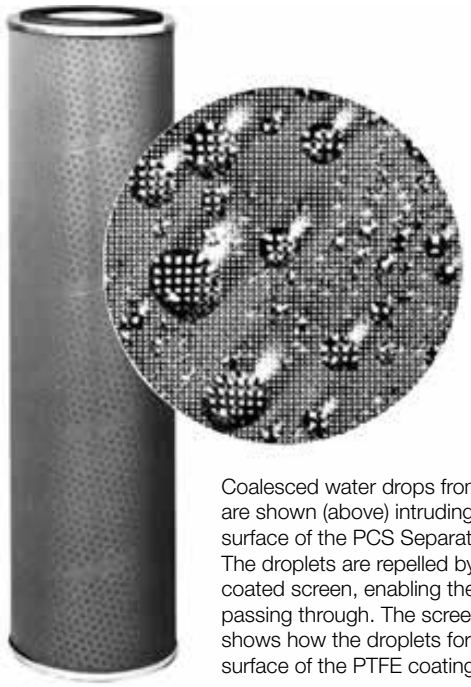
**Pleated Paper Cartridges** cannot be reused and are replaced at every coalescer cartridge changeout. They are often used with diesel and other fuel oils which may contain materials that adhere to PCS cartridges and cannot be cleaned off.

**Synthetic Media Cartridges** can be cleaned a maximum of two times. They are intended for customers who do not want to take the time to clean separators.

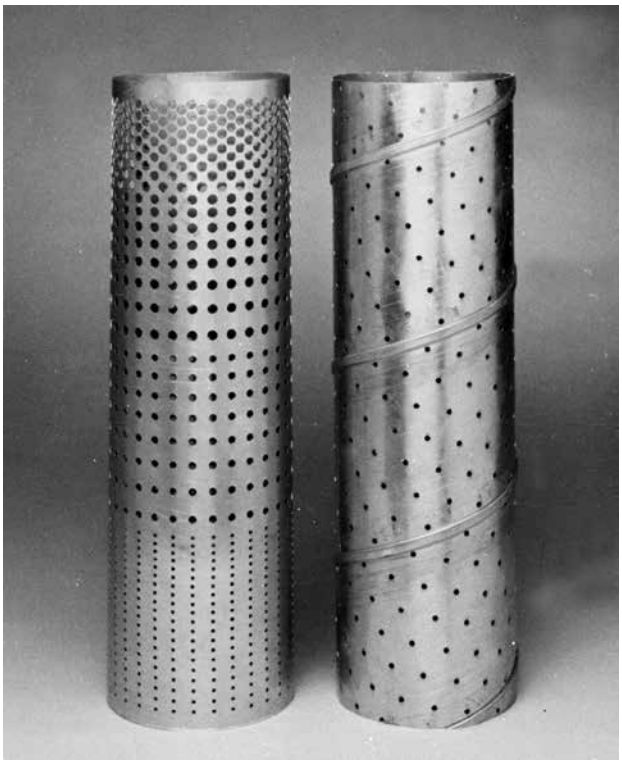
### SEPARATOR CARTRIDGE PERFORMANCE

Maintaining a uniform flow along the length of the cartridge optimizes performance and reduces the number of cartridges required. Flow is controlled by a tube, inside each cartridge, through which the hydrocarbon fluid exits the cartridge and the filter/separator vessel. Two styles of inner tube are offered. See bottom photo.

Cartridges with uniform hole pattern inner tubes are adequate for many applications. However, where optimum



Coalesced water drops from the first stage are shown (above) intruding upon the surface of the PCS Separator Cartridge. The droplets are repelled by the PTFE coated screen, enabling the droplets from passing through. The screen magnification shows how the droplets form on the surface of the PTFE coating.



Variable Hole Pattern Inner Tube

Uniform Hole Pattern Inner Tube

flow distribution is required, cartridges with variable hole pattern inner tubes are recommended. When converting older equipment, a lesser number of variable hole pattern cartridges is usually required. Operating costs will therefore be reduced.

### SEPARATOR CARTRIDGES

Model numbers containing a "C" in denotes a uniform hole pattern on the inner tube with PCS media, while the codes with a "V" signifies a variable hole pattern with PCS media. Blind caps have a hole for the tie rod.

**Parker Velcon Model Numbers** include significant product information.

***Example:***

**SO - 6 36 PV**

- **PV** — **Code Identifying Media, Tube Type, and End Cap Design**
- **36** — **Approx. Length in inches**
- **6** — **Approx. Diameter in inches**
- **SO** — **Outside-to-Inside Flow Separator Cartridge**

### CARTRIDGE CODE IDENTIFICATION

| Model | Flow Control (hole pattern) | OD (in.) | Mounting End ID (in.) | Opposite End ID (in.) | Media |
|---|---|---|---|---|---|
| SO-3xxC | Uniform | 3 1/16 | 2 | Blind | PCS |
| SO-3xxV | Variable | 3 1/16 | 2 | Blind | PCS |
| SO-4xxC | Uniform | 4 9/16 | 3½ | Blind | PCS |
| SO-4xxV | Variable | 4 9/16 | 3½ | Blind | PCS |
| SO-6xxC | Uniform | 6 | 3½ | 3½ | PCS |
| SO-6xxCA | Uniform | 6 | 3½ | Blind | PCS |
| SO-6xxCM | Uniform | 6 | 4½ | Blind | PCS |
| SO-6xxVA(5) | Variable | 6 | 3½ | Blind | PCS |
| SO-6xxV(5) | Variable | 6 | 4½ | Blind | PCS |
| SO-6xxPV(5) | Variable | 6 | 41/8 | Blind | PCS |
| SO-6xxPLF3* | Uniform | 6 | 3½ | 3½ | Pleated Paper |
| SO-6xxPLBZ* | Uniform | 6 | 3½ | Blind | Pleated Paper |
| SO-6xxVASN(5)** | Variable | 6 | 3½ | Blind | Synthetic |
| SO-6xxVSN(5)** | Variable | 6 | 4½ | Blind | Synthetic |
| SO-6xxPVSN(5)** | Variable | 6 | 41/8 | Blind | Synthetic |

**The shelf life for pleated paper separators (for example, SO-xxxPLF3 and SO-6xxPLBZ) is one year.*
***Patent Info Available Upon Request*

### GENERAL SPECIFICATIONS

- PCS medium is 200 mesh stainless steel screen coated on both sides with green PTFE.
- The screen is lockseam folded and fastened with an internal aluminum clip
- Pleated medium is silicone treated resin impregnated paper with a protective outer aluminum screen jacket
- Tubes are aluminum
- End caps are aluminum and/or glass filled nylon
- Gaskets are Buna-N
- pH range is 5 to 9
- Maximum operating temperature is 200°F

### SO SERIES CARTRIDGES

The code identification table to the left are the most commonly used. A variety of other styles are available for special applications. Contact a local area distributor for details.

SO-6xxPLF3 pleated separators come in lengths of 11,14, 16, 29, and 33 inches. SO-6xxPLBZ pleated separators come in lengths of 22, 29, 33, and 44 inches.

SO-6xxC cartridges are available in these same stackable lengths plus longer lengths. Single-unit designs, however, are recommended for installation ease and lower cost. Other styles listed in the table are not intended to be stacked.

Parker Velcon variable size hole pattern cartridges should not be replaced with uniform hole pattern cartridges unless appropriate full-scale test data can be supplied showing equivalent performance.

For more information about EI 1581 5th Edition qualified separators, please reference data sheet 1923.

SO-6xxVASN/VSN/PVSN separators are intended for customers who want a separator for disposal use rather than a re-useable filter, which can be cleaned a maximum of two times.

# PLEATED MEDIA FILTER CARTRIDGES

### HIGH EFFICIENCY, LONG LIFE CARTRIDGES FOR AVIATION FUEL

- **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 elements** – Available for easier installation.

### SPECIFICATIONS

- 75 psi Collapse strength
- 5 - 9 Operating pH range
- Micron ratings from 1/4 to 75
- 98%+ Nominal filtration efficiency
- 250°F Maximum operating temperature
- Recommended changeout differential pressure - 25 psid. 15 psid for Aviation applications.
- Multi-pass (Beta Ratio) data available on request

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

*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.*

FO-412PLxx FO-512PLxx FO-718PLxx FO-644PLFxxTB

**CARTRIDGE INFORMATION**

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

| Model | Dimensions | Nominal Micron Rating | Protective Outer Wrap |
|---|---|---|---|
| FO-412PL2 | 4" x 12¼" x 1¾" ID | 2 | No |
| FO-412PL5 | | 5 | No |
| FO-418PL5 | 4" x 18" x 1¾" ID | 5 | No |
| FO-418PL15 | | 15 | No |
| FO-512PL1/2 | For VF-61 Housing | ½ | No |
| FO-512PL05 | | 5 | No |
| FO-512PL25 | | 25 | No |
| FO-614PLF½ | 6" x 14½" x 3½" ID | 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-614PLF75 | | 75 | No |
| FO-629PLF1/4 | 6" x 29" x 3½" ID | ¼ | Yes |
| FO-629PLF1/2 | | ½ | Yes |
| FO-629PLF1 | | 1 | Yes |
| FO-629PLF2 | | 2 | Yes |
| FO-629PLF5 | | 5 | Yes |
| FO-629PLF10 | | 10 | Yes |
| FO-629PLF25 | | 25 | Yes |
| FO-629PLF1/2TB | 6" x 29" Threaded Base | ½ | Yes |
| FO-629PLF1TB | | 1 | Yes |
| FO-629PLF2TB | | 2 | Yes |
| FO-629PLF5TB | | 5 | Yes |
| FO-629PLF25TB | | 25 | Yes |
| FO-644PLF1/2 | 6" x 44" x 3½" ID | 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 |

| Model | Dimensions | Nominal Micron Rating | Protective Outer Wrap |
|---|---|---|---|
| FO-644PLF1/4TB | 6" x 44" Threaded Base | 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 |
| FO-656PLF1M | 6" x 56" x 3½" ID | 1 | Yes |
| FO-656PLF1/2TB | 6" x 56" Threaded Base | ½ | Yes |
| FO-656PLF1TB | | 1 | Yes |
| FO-656PLF2TB | | 2 | Yes |
| FO-656PLF5TB | | 5 | Yes |
| FO-656PLF25TB | | 25 | Yes |
| FO-718PLP3 | 6¼" x 18" x 2 9/16" ID | 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 |
| FO-736PLP3 | 6¼" x 36" 2 9/16" ID | 0.3 | No |
| FO-736PL1/2 | | ½ | No |
| FO-736PL05 | | 5 | Yes |
| FO-736PL15 | | 15 | Yes |
| FO-822PLP3 | 8" x 22 ⅛" x 2" ID | 0.3 | No |
| FO-822PL1/2 | | ½ | No |
| FO-822PL05 | | 5 | No |
| FO-829PL05 | 8" x 29 ½" 2" ID | 5 | No |
| **FOH** | | | |
| FOH-644PLF1 | 6" X 44" X 3½ ID | 1 | Yes |
| FOH-644PLF1/2 | | 0.5 | Yes |
| FOH-644PLF1TB | 6" x 44" Threaded Base | 1 | Yes |
| FOH-644PLF2TB | | 2 | Yes |
| FOH-644PLF2 | 6" X 44" X 3½ ID | 2 | Yes |
| FOH-644PLF5 | | 5 | Yes |

# *Aquacon*® WATER ABSORBING CARTRIDGES

**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.

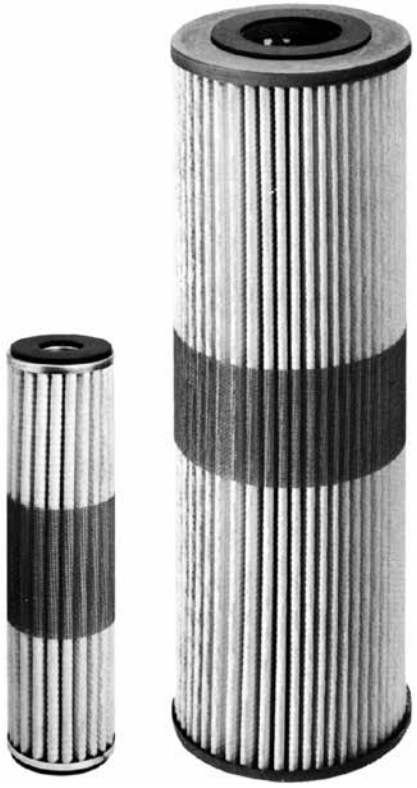
When the ***Aquacon*** Cartridge reaches its water holding limit, the media swells shut and the differential pressure rapidly increases. This signals the operator that the cartridge must be changed.

**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 Parker Velcon particle removal filters specifically made for gasohol. Consult your Parker AFD representative.

## CARTRIDGE INFORMATION

New types of ***Aquacon***® Cartridges are being introduced continually.

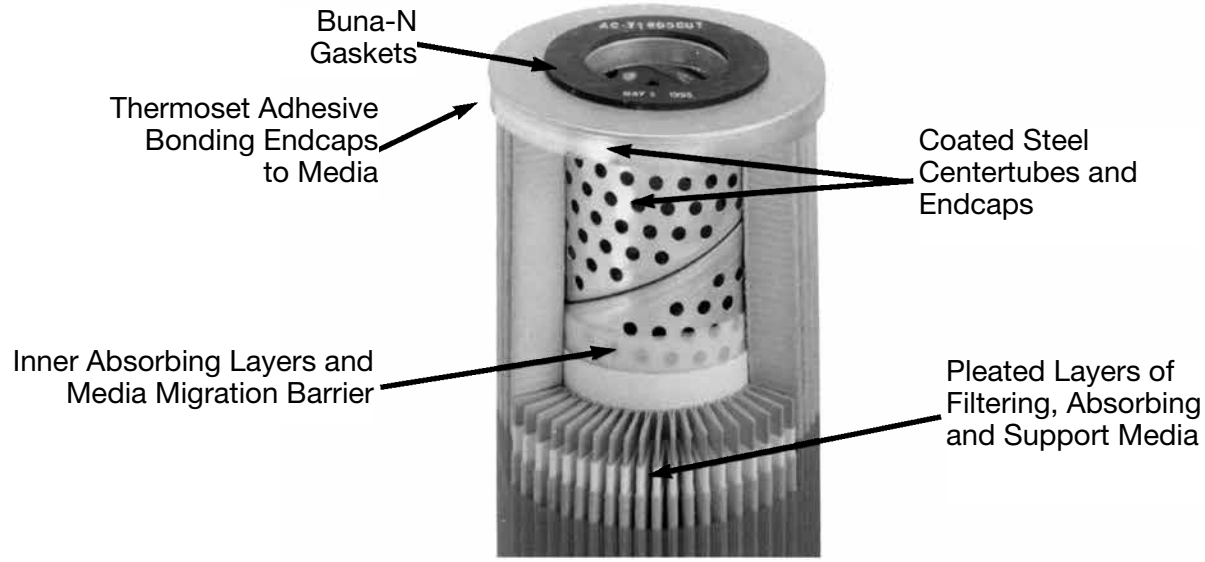
Contact your local Parker AFD Representative for up-to-date information.

| 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 Parker Velcon VF-31 Housings |
| **AC-5121/2E**(2) | 0.5 | 3 | 1 7/8 | 5 5/8 | 12 1/8 | 75 | Fits Parker Velcon VF-61 Housings |
| **AC-51205** | 5 | 40 | 1 7/8 | 5 5/8 | 12 1/8 | 75 | |
| **AC-52405** | 5 | 40 | 1 7/8 | 5 5/8 | 24 1/2 | 75 | Fits Parker Velcon VF-62 Housings |
| **AC-61405** | 5 | 40 | 3 1/2 | 6 | 14 1/2 | 100 | Interchanges with Parker 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 Parker Velcon industrial housings and portable filters, interchangeable with Parker 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.*

*Notes: (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



# ACO *AQUACON*® AVIATION FUEL FILTER CARTRIDGES

- Free and emulsified water removal to less than 5 ppm
- 1/2 micrometer particle removal
- Provides protection against “slugs” of water
- Pressure increase signals need for cartridge change
- Use with existing filter housings
- Improved configuration to help reduce risk of super absorbent polymer (SAP) migration downstream

**DESCRIPTION**

Patented ***Aquacon*** Filter Cartridges have a unique high-capacity inner filter medium which removes all free and emulsified water from hydrocarbon fuels down to less than 5 ppm in the effluent. Absorbed water is chemically locked into this medium.

When a cartridge reaches its water holding capacity, its accordion pleats swell and cause an increase in the differential pressure which signals the operator to change the cartridge.

Solid contaminants are removed by the cartridge’s two particulate filter media layers. The pleated accordion style design provides a large surface area for maximum dirt holding capacity. Models are offered for particle filtration down to 1/2 micrometer size with 98% plus efficiency. Performance is not affected by the presence of common surface active agents.

Compact ***Aquacon*** Cartridges are quick and easy to install. Models are available to fit most existing standard housings. Refer to Cartridge Selection Table on reverse side.

Use Form VEL1846 for cartridge changeout recommendations at flow rates less than rated flow.

| Model Number | Micron Ratings | Inside Diameter (Inches) | Outside Diameter (Inches) | Length (Inches) | Collapse Pressure (psi) | Maximum Flow Rate (USGPM) | Interchange Information |
|---|---|---|---|---|---|---|---|
| **ACO-21001R** | 0.5 | 1 1/32 | 2 5/8 | 9 3/4 | 60 | 15 | Fits VF-31E Housing |
| **ACO-31001R** | 0.5 | 1 5/16 | 3 | 9 3/4 | 75 | 20 | Fits Purolator Vessel PR-172-3 |
| **ACO-40801R** | 0.5 | 1 3/4 | 4 | 8 | 100 | 13 | Rellumit Replacement |
| **ACO-41201R** | 0.5 | 1 3/4 | 4 | 12 1/4 | 100 | 20 | Replaces Facet C-707; Purolator Vessel PAG-50 |
| **ACO-41601R** | 0.5 | 1 3/4 | 4 | 15 13/16 | 100 | 27 | Rellumit Replacement |
| **ACO-41801R** | 0.5 | 1 3/4 | 4 | 18 | 100 | 30 | Replaces Facet C-706 and Keene BP-419, BP-518 |
| **ACO-41901R** | 0.5 | 1 3/4 | 4 | 19 7/8 | 175 | 32 | Rellumit Replacement |
| **ACO-51201R** | 0.5 | 1 7/8 | 5 5/8 | 12 1/4 | 75 | 50 | Fits VF-61 Housing |
| **ACO-512P3R** | 0.3 | 1 7/8 | 5 5/8 | 12 1/4 | 75 | 50 | Fits VF-61 Housing |
| **ACO-60801R** | 0.5 | 3 1/2 | 6 | 8 1/4 | 100 | 30 | Omeco 6” x 8” Replacement |
| **ACO-60901R** | 0.5 | 1 1/2 | 6 | 9 11/16 | 100 | 36 | Fits Fram/Facet VFCS-21 (Element CC-21-7); VF-609 |
| **ACO-609P3R** | 0.3 | 1 1/2 | 6 | 9 9/16 | 100 | 36 | Fits Fram/Facet VFCS-21 (Element CC-21-7); VF-609 |
| **ACO-61201R** | 0.5 | 1 1/2 | 6 | 13 3/4 | 100 | 48 | Fits Fram/Facet VFCS-22 (Element CC-22-7) |
| **ACO-61401R** | 0.5 | 3 1/2 | 6 | 14 1/2 | 175 | 58 | Qualified to EI 1583 |
| **ACO-62201RTB** | 0.5 | 3 1/2 | 6 | 22 | 175 | 88 | |
| **ACO-62901R** | 0.5 | 3 1/2 | 6 | 28 3/4 | 175 | 115 | |
| **ACO-63301R** | 0.5 | 3 1/2 | 6 | 33 1/4 | 175 | 133 | |
| **ACO-64401R** | 0.5 | 3 1/2 | 6 | 43 1/4 | 175 | 173 | |
| **ACO-64401RTB** | 0.5 | 3 1/2 | 6 | 44 | 175 | 176 | |
| **ACO-71801R** | 0.5 | 2 1/2 | 6 1/4 | 18 | 75 | 65 | Fits VF-71E Housing |

## TECHNICAL INFORMATION

1. Max. operating temp.: 250°F (121.1°C)
2. Micron ratings are nominal at 98%+ efficiency
3. Aquacon Cartridges can significantly reduce flow when loaded with water or dirt. Appropriate precautions should be taken in applications where fuel flow must be maintained or where surge conditions can occur.
4. Replace the cartridge if the differential pressure exceeds 15 psid. For service life information, please refer to Operating Procedure VEL1839 or consult your company fuel handling procedures.
5. Typical water holding capacity for ACO-61401R is 700-800 ml.
6. All ACO 6 inch diameter filters are qualified to EI1583 7th Edition. Other diameters are based off of the 6 inch design and filter performance will have similar results.

| | |
|---|---|
| ⚠ CAUTION | 1/2 micron rated ***Aquacon***® Cartridges are recommended for use with jet fuel and avgas. Effluent fuel quality meets requirements for EI 1583. |
| **NOTE** | DO NOT USE WITH PRE-MIXED FUELS CONTAINING ANTI-ICING ADDITIVES |

# CDF® FUEL MONITOR CARTRIDGES - EI 1583 6TH EDITION P SERIES

**FIELD PROVEN: CDF® REPLACEMENT CARTRIDGES ASSURE CLEAN DRY FUEL DELIVERY**


## FEATURES

- CDF® P SERIES are qualified to EI 1583 7th Edition specification for aviation fuel filter monitors
- IMPROVED SALT WATER PERFORMANCE
- CONDUCTIVE END CAPS and adhesive to reduce static charge within the vessel.
- O-RING SEAL minimizes the possibility of bypassing contaminated fuel at differential pressures up to 175 psi.
- RUGGED CONSTRUCTION collapse strength exceeds 175 psi differential pressure.

## DESCRIPTION

The Parker Velcon CDF® P Series cartridges provide superior performance and reliability in standard fuel monitor housings through a unique, combination of media that absorbs water and filters solids that might be present in the fuel while helping reduce static charge build-up inside the vessel.

The injection molded endcaps bond with the media and with the O-ring seal on the outlet end. This minimizes the possibility of bypassing contaminated fuel or transmission of water downstream at low flow rates.

As the cartridge removes water and/or contaminant from the influent fuel the pressure differential will increase along with a decrease in flow rate. These changes are the result of flow restriction caused by dirt retention or water absorption in the media. The rate of these changes depends on the quantity of water or contamination in the fuel.

## ORDERING INFORMATION

Specify Parker Velcon Model Number from the Cartridge Selection Table. CDF® Cartridges are packaged 20 per carton.

| | |
|---|---|
| ⚠ CAUTION | DO NOT USE WITH PRE-MIXED FUEL CONTAINING ANTI-ICING ADDITIVES. |

*® CDF is a registered trademark of Parker Hannifin.*

**EI SPECIFICATION 1583 SEVENTH EDITION INFORMATION**

Parker Velcon CDF® P Series Cartridges incorporate several structural features designed to meet the requirements of EI1583 7th Edition including:

- Increased product conductivity to decrease the risk of electrostatic discharges
- Improved media structure to lower the risk of media migration
- Lower initial DP - a major factor for installations that require changing cartridges at 15 PSID.
- New structure that provides longer cartridge life in the presence of small amounts of water

Some of the requirements of the 7th edition of EI1583 are:

- Partial Water Immersion Test
- Salt resistance tests
- Water slug test at low flow (10% of rated flow)
- Tests for trace SAP migration (< 50 ppb)
- Structural integrity test
- Low water (50 ppmv) at low flow (10% of rated flow)
- Testing for cartridge conductivity

**CARTRIDGE SELECTION TABLE**

| Cartridge Flow Rate USGPM | Parker Velcon Model Number | Overall Length | Replacements for: | |
|---|---|---|---|---|
| | | | Facet Model Number | Faudi Model Number |
| 5 | CDF-205P | 5 13/16" | FG-205-7 | M.2-134/6B) |
| 10 | CDF-210P | 10 13/16" | FG-210-7 | M.2-261/6B) |
| 15 | CDF-215P | 15 13/16" | FG-215-7 | M.2-387/6B) |
| 20 | CDF-220P | 20 13/16" | FG-220-7 | M.2-515/6B) |
| 25 | CDF-225P | 25 13/16" | FG-225-7 | M.2-642/6B) |
| 30 | CDF-230P | 30 13/16" | FG-230-7 | M.2-770/6B) |

**SPECIFICATIONS AND TECHNICAL INFORMATION CDF® P SERIES**

- 175 psid (12 bar) collapse strength
- 0.5 micron rating
- 250°F (121.1°C) maximum operating temperature
- Recommended changeout differential pressure = 15 psid
- Typical water holding capacity for CDF-230P is 120 ml.
- For service life information, please refer to Operating Procedures VEL1839 or consult your company fuel handling procedures.

# SYNTHETIC MEDIA FILTER CARTRIDGES - FOS SERIES

**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

## DESCRIPTIONS

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

- 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

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.

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.

FOS-636PLP8 , FOS-618PL1/2,
FOS-618PL8, FOS-512PL25

## GENERAL SPECIFICATION

- 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 aluminized steel. FOS-512PL25 end caps are aluminum.
- End cap bonding material is urethane.

## CARTRIDGE SELECTION TABLE

| Cartridge Model | O.D. (Inches) | I.D. (Inchec) | Length (Inches) | Surface Area ($In.^2$) | Nominal[1] Rating (Microns) | Beta | Size[2] where Beta=75 | ACFTD Capacity (GMS) |
|---|---|---|---|---|---|---|---|---|
| FOS-512PL25 | 5⅝ | n.a. | 12¼ | 2390 | 25 | n.a. | 60 | 210 |
| FOS-718PL25 | 6¼ | 2⁹⁄₁₆ | 18 | 3970 | 25 | n.a. | 60 | 360 |
| FOS-618PL05 | 6 | 2⁹⁄₁₆ | 18 | 2000 | 5 | 3.5 | 37 | 172 |
| FOS-618PLP8 | 6 | 2⁹⁄₁₆ | 18 | 2000 | 0.8 | 90 | 8 | 87 |
| FOS-618PL1/2 | 6 | 2⁹⁄₁₆ | 18 | 2000 | ½ | 250 | 4 | 71 |
| FOS-636PL05 | 6 | 2⁹⁄₁₆ | 36 | 4160 | 5 | 3.5 | 37 | 358 |
| FOS-636PLP8 | 6 | 2⁹⁄₁₆ | 36 | 4160 | 0.8 | 90 | 8 | 180 |
| FOS-636PL1/2 | 6 | 2⁹⁄₁₆ | 36 | 4160 | ½ | 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.*

# OPERATION OF VESSELS CONTAINING WATER ABSORBING CARTRIDGES (ACO/CDF®) FOR AVIATION FUEL

| | |
|---|---|
| **NOTE** | IF PUMP DISCHARGE PRESSURE CAN EXCEED 25 PSI, DO NOT USE THIS CARTRIDGE UNLESS PRESSURE GAUGES ARE INSTALLED TO MEASURE THE DIFFERENTIAL PRESSURE. FOR ALL SYSTEMS, DIFFERENTIAL PRESSURE GAUGES ARE STRONGLY RECOMMENDED, ALONG WITH DAILY MONITORING OF DP. IF THE GAUGES CANNOT BE OBSERVED EASILY DURING FLOW, AN ELECTRONIC MONITORING METHOD, WITH FLOW SHUTDOWN CAPABILITY, IS RECOMMENDED. |

| | |
|---|---|
| **NOTE** | ALWAYS ENSURE THAT THE VESSEL AND DRAIN PLUG ARE PROPERLY GROUNDED. IF THE AQUACON® CARTRIDGE (ACO-XXXXX) IS USED IN A VF-31E, VF-61, VF-61E, OR VF-609 OR SIMILAR SIZED HOUSINGS, PLEASE REFER TO THE INSTRUCTIONS FOR THE HOUSINGS IN WHICH CARTRIDGES ARE INSTALLED FOR MORE INFORMATION. |

**Contact Parker Aerospace Filtration Division for more information.**

**RECOMMENDED PROCEDURES* TO FOLLOW WITH WATER ABSORBING CARTRIDGES IN A VESSEL:**

- **Quality Control Checks**.
  Reinforce quality control checks and diligently conduct water removal procedures at all locations in the fuel distribution system. This includes daily draining of all sumps, low points, and dead legs in the piping system.
- **Monitor dP Daily**
  If operating at reduced flow, record differential pressure and flow rate and calculate normalized differential pressure. *(See page 2)*. ***Change ACO & CDF® cartridges when normalized differential pressure reaches 15 psid**. Replace all cartridges if the normalized differential pressure has dropped 5 psid below the previous reading.***
- **Check for Free Water Content.**
  Sample fuel and check for free water content using the Parker Velcon Hydrokit® or other chemical method in accordance with your company's fuel handling procedures. Replace cartridges if the water content exceeds your company guidelines.
- **EI Monitor Spec. 1583.**
  In converted filter/separator vessels where the deckplate or manifold strength does not meet the 15 bar (220 psi) strength required by the EI Monitor Spec. 1583, a differential pressure limiting device, set from 25-30 psid, should be installed across the vessel.
- **Spare Water Absorbing Cartridge.**
  Have a spare set of water absorbing cartridges on hand, or available at a nearby Parker AFD Distributor, for the unexpected plug-up.
- **Confirm dP if Operating below 50%.**
  If fueling unit is operating consistently below 50% of rated flow then periodically check fueling unit at test stand and check DP at flow rate of 50% or higher and confirm corrected DP.
- **Check for Fibers and Hose End Strainers.**
  After changing cartridges circulate flow through vessel for at least 3 minutes, use millipores to check for fibers and also check hose end strainers.
- **Cartridge Restricting Flow**.
  As the cartridges begin to restrict the flow due to a water slug, ALL upstream and downstream piping should be checked and purged before resuming operations with a new set of cartridges. Any aircraft involved in fueling when the flow through a cartridge is restricted, should also be checked for the possibility of water reaching the aircraft. Check the tank to determine where the excess water came from, and purge the tank of any water before resuming operation.
- **Cartridges should not be dried and re-used.**
  When water saturated media is dried, it may shrink and crack, leading to possible internal bypass.

**Please also check with your company's fuel handling guidelines and operating procedures.*

***ATA 103 compliance now requires 15 psid normalized differential pressure changeout.*

**SERVICE LIFE**

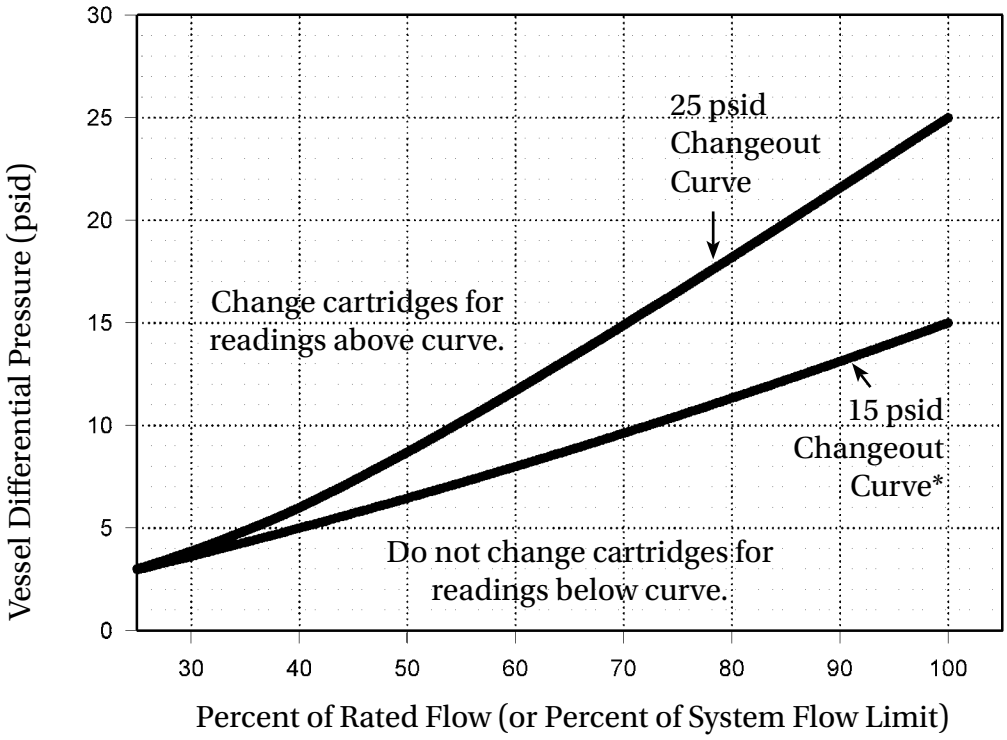
Service life for all water absorbing cartridges, including two (2), five (5) and six (6) inch diameter cartridges, should be one (1) year, unless stated otherwise by your company's fuel handling procedures.

| | |
|---|---|
| CAUTION | **DO NOT USE WATER ABSORBING CARTRIDGES 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 PARKER VELCON PARTICLE REMOVAL FILTERS SPECIFICALLY MADE FOR GASOHOL. CONSULT YOUR PARKER AFD REPRESENTATIVE. |

For technical support, contact Parker Aerospace Filtration Division or your authorized Parker AFD distributor. Also visit us on-line at www.velcon.com

**CARTRIDGE CHANGEOUT CURVES**
**SPENT CARTRIDGES AT REDUCED FLOW RATES**




***EXAMPLE:*** **(25 psid changeout)** A 600 GPM monitor vessel is operating at 300 GPM (50% of system flow limit). If the pressure differential is less than **8 psid**, the cartridges do not require changing; however, if the pressure differential is 8 psid or more, or if the cartridges have been in service for one year, the cartridges are due for changeout.

**(15 psi changeout)** For the same vessel, at 50% of system flow limit, if the pressure differential is less than **6.5 psid**, do not change the cartridges; however, if the pressure differential is 6.5 psid or more, or after one year of service, the cartridges are due for changeout.

*Decal VEL1846 - Cartridge Changeout Curve for cartridges with 25 psid changeout requirements*
**Decal VEL1979 - Cartridge Changeout Curve for cartridges with 15 psid changeout requirement (per ATA 103)*

VEL1970R7 0109

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