Filter/Separator Cartridges for Aviation Fuel Handling
Optional dehydrator, prefilter, and clay treater vessels are not required but are recommended to ensure delivery of clean dry fuel and to extend the life of the coalescer and separator cartridges in the filter/separator vessels.
Three categories are based on specific fuel types:
- Category C: For commercial aviation turbine fuels
- Category M: For military aviation turbine fuels and JP-8
- Category M100: For thermal stability enhanced JP-8 military aviation turbine fuels

Three types of filter/separator vessels for various locations in an aviation fueling system:
- Type S: Capable of handling significant amounts of water and dirt in the fuel
- Type S-LD: Capable of handling significant water and low dirt content
- Type S-LW: Capable of handling significant dirt and low water content

* Prefilter elements compliance with EI 1590 and vessel compliance with EI 1596 is customer dependent.

Optional EI 1383 Qualified Vessels/Absorbent Type Cartridges for jet fuel without anti-icing additive.
**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
- Used as a first-stage cartridge in Filter/Separators
- Remove particulates and coalesce water into large water drops
- Also available in screw base design

**HOW COALESCE WORKS:**
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.

The left photo below 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 gravity pulls the droplet to the bottom of the vessel. The larger the drops, the faster and more efficiently they fall out. (See top right photo.) In general, particle removal efficiency increases with coalescing efficiency. This

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

APPLICATION
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.

CONSTRUCTION
Parker Velcon single-unit
coalesscer 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
Parker 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 microns are used in various
combinations to achieve desired
results. Parker Velcon’s latest
coalesscer 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 micron in the pleated
media.
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.

JF5 Series Coalescers.
JF5 Series Cartridges are Parker Velcon’s newest design. Combined with V5NS Series Separators, they offer higher flow rates and extended service life.

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.

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.

GENERAL SPECIFICATIONS

- 75 psi maximum pressure differential rating
- 5 to 9 pH range
- 150°–160°F max. 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.
EI1581 5TH EDITION QUALIFIED COALESCERS

The I-6xxC5 (TB), I-6xxMM, I-6xxA4, and I-6xxJF5 (TB) Series coalescers ("xx" denotes nominal cartridge length) incorporate 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 Parker Velcon’s I-6xx85 (TB) and I-6xx87 (TB) cartridges. These cartridges are available in either threaded base or open-end configuration.

CATEGORY FUels

Parker Velcon has tested and qualified a comprehensive range of products to meet the EI 1581 5th Edition Specification. For a complete listing of Parker Velcon’s current qualification tests, please visit our website at www.velcon.com/vessels.

The categories for this specification are:

CATEGORY C

This category replaces the previous class A, B, & C of EI 1581 Third Edition. Parker Velcon’s new coalescer cartridges that meet Category C requirements are the I-6xxC5 Series ("xx" denotes nominal cartridge length). These cartridges have been developed to provide better water removal performance in surfactant-laden fuels, and improved filtration efficiency combined with longer life. Category ‘C’ cartridges can be used at any point in the fuel distribution system – from refineries to in-plant fueling.

CATEGORY M

This category covers military fuels, such as JP8 (similar to Jet A but containing anti-icing and other additives). Parker Velcon’s coalescer products for this category are the I-6xxMM Series cartridges.

Category M qualified cartridges also qualify for Category C.

CATEGORY M100

This category is for military fuels such as JP8+100. The ‘+100’ additive allows fuels to run at higher operating temperatures and reduces maintenance for high per-formance military jet engines. Parker Velcon’s coalescer cartridges for the M100 Category are the I-6xxA4 Series.

ADDITIONAL INFORMATION

The 5th Edition also allows operators to incorporate third stage filter cartridges with each category. Parker Velcon has currently qualified the CDF®-2xx Series monitor (water absorbing) cartridges for Category C and the FOW-2xx Series filter cartridges for Category M100.

Another aspect of the EI 1581 5th Edition specification is the description of filter/separators as Type S (water and dirt), Type S-LW (for applications where low amounts of water are expected) and Type S-LD (for applications where low amounts of dirt are expected). Products qualified for Type S are also qualified for Types S-LD and Type S-LW.

To obtain your authorized Parker Velcon EI 1581 5th Edition Similarity Data Report for existing vessels, please complete the Similarity Certification form (#VEL1728).
Separator Cartridges
Filter/Separator 2nd Stage Elements

FEATURES

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

DESCRIPTION

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 hydro-carbon 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.

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:

- Teflon® Coated Screen (TCS) Cartridges are, by far, the most popular type of separator cartridge. With proper cleaning and inspection, cost effective TCS elements can be reused over many changeout cycles. And, TCS 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 TCS 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 and re-use 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 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.

INNER TUBE HOLE PATTERN

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

Velcon Model Numbers include significant product information. Example:

S O - 6 3 6 P V

Code identifying Media, Tube Type, and End Cap Design
Approx. Length in inches
Approx. Diameter in inches
Outside-to-Inside Flow Separator Cartridge
### CARTRIDGE CODE IDENTIFICATION

<table>
<thead>
<tr>
<th>Model</th>
<th>Flow Control (perforation)</th>
<th>Dimensions (inches)</th>
<th>Media</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>OD</td>
<td>Mounting</td>
</tr>
<tr>
<td>SO-3xxC</td>
<td>Uniform</td>
<td>3¼</td>
<td>2</td>
</tr>
<tr>
<td>SO-3xxV</td>
<td>Variable</td>
<td>3¼</td>
<td>2</td>
</tr>
<tr>
<td>SO-4xxC</td>
<td>Uniform</td>
<td>4½</td>
<td>3½</td>
</tr>
<tr>
<td>SO-4xxV</td>
<td>Variable</td>
<td>4½</td>
<td>3½</td>
</tr>
<tr>
<td>SO-6xxC</td>
<td>Uniform</td>
<td>6</td>
<td>3½</td>
</tr>
<tr>
<td>SO-6xxCA</td>
<td>Uniform</td>
<td>6</td>
<td>3½</td>
</tr>
<tr>
<td>SO-6xxCM</td>
<td>Uniform</td>
<td>6</td>
<td>4½</td>
</tr>
<tr>
<td>SO-6xxVA(5)</td>
<td>Variable</td>
<td>6</td>
<td>3½</td>
</tr>
<tr>
<td>SO-6xxV(5)</td>
<td>Variable</td>
<td>6</td>
<td>4½</td>
</tr>
<tr>
<td>SO-6xxPV(5)</td>
<td>Variable</td>
<td>6</td>
<td>4½</td>
</tr>
<tr>
<td>SO-6xxPLF3*</td>
<td>Variable</td>
<td>6</td>
<td>4½ 1/8</td>
</tr>
<tr>
<td>SO-6xxPLBZ*</td>
<td>Uniform</td>
<td>6</td>
<td>3½</td>
</tr>
<tr>
<td>SO-6xxVASN(5)</td>
<td>Variable</td>
<td>6</td>
<td>4½</td>
</tr>
<tr>
<td>SO-6xxPVSN(5)</td>
<td>Variable</td>
<td>6</td>
<td>4½</td>
</tr>
</tbody>
</table>

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

### SPECIFICATIONS

- TCS medium is 200 mesh stainless steel screen coated on both sides with green Teflon®
- 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
- Aluminum Tube
- Aluminum and/or glass filled nylon endcaps
- Buna-N gaskets
- pH range: 5 to 9
- Maximum operating temperature: 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.

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.

### EI 1581 5TH EDITION QUALIFIED SEPARATORS

The SO-6xxV5, SO-6xxPV5, and SO-6xxVA5 are Teflon® Coated Screen (TCS) cartridges. SO-6xxVSN(5), SO-6xxPVSN(5), and SO-6xxVASN(5) are synthetic separator cartridges. To achieve optimum flow distribution all of these cartridges incorporate a variable hole pattern inner tube combined with a uniform hole pattern outer tube specifically designed for installation in vertical filter/separators. Please refer to Parker Velcon’s data sheet #1521 for overall separator dimensions and general specifications.

### CATEGORY FUELS

Parker Velcon has tested and qualified a comprehensive range of products to meet the EI 1581 5th Edition Specification. For a complete listing of Parker Velcon’s current qualification tests, please visit our website at [www.velcon.com/vessels](http://www.velcon.com/vessels).

The categories for this specification are:

#### CATEGORY C

All of Parker Velcon’s TCS Separator Cartridges are qualified for Category C.

#### CATEGORY M

This category covers military fuels, such as JP8 (similar to Jet A but containing anti-icing and other additives). Parker Velcon’s separators for this category are currently TCS Separators SO-6xxV5, SO-6xxVA5, and SO-6xxPV5, as well as Synthetic Separators SO-6xxVSN, SO-6xxPVSN, SO-6xxVSN5 and SO-6xxVASN.

Category M qualified cartridges also qualify for Category C.

#### CATEGORY M100

This category is for military fuels such as JP8+100. The TCS Separators for M100 are currently the SO-6xxCM and SO-6xxGS (three-stage).

To obtain your authorized Parker Velcon EI 1581 5th Edition Similarity Data Report for existing vessels, please complete Velcon Similarity Certification form # 1728.
Canister Separator
SI-xxxx Series
Fully Qualified to EI 1581 5th Edition, Category M

DESCRIPTION
The SI-xxxx Series separator canister is composed of an inner Teflon®-coated 200 mesh screen. The open endcap on the five inch canister has a locking bayonet mount with wavy spring. The blind end has a nozzle to fit a DOD coalescer o-ring endcap.

These separators are qualified to Category M and M100 of the EI 1581 5th Edition Specification.

APPLICATION
The SI-xxxx Series separator canisters are made to fit over first stage coalescers in DOD military vessels such as those originally made to the MIL-F-27629, MIL-F-27630, and MIL-PRF-52308 specifications.

The inner Teflon coating repels water droplets as fuel exits the canisters, adding another layer of protection to the fueling system. The water droplets in the annular gap between the outside diameter of the coalescer and the inside diameter of the separator canister fall to the sump area at the bottom of the filter vessel, where they can then be drained.

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Model #</th>
<th>NSN #</th>
<th>OAL (in.)</th>
<th>OD (in.)</th>
<th>ID (in.)</th>
<th>Micron Rating (μm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SI-422A*</td>
<td>4330-01-152-2376</td>
<td>21.56</td>
<td>4.46</td>
<td>4</td>
<td>140</td>
</tr>
<tr>
<td>SI-443*</td>
<td>4930-01-561-5968</td>
<td>43</td>
<td>4.6</td>
<td>4.5</td>
<td>140</td>
</tr>
<tr>
<td>SI-522</td>
<td>4330-01-511-8316</td>
<td>22.44</td>
<td>5.23</td>
<td>4</td>
<td>140</td>
</tr>
<tr>
<td>SI-522E</td>
<td>4330-00-112-0256</td>
<td>22.44</td>
<td>5.23</td>
<td>4</td>
<td>140</td>
</tr>
<tr>
<td>SI-542</td>
<td>4330-01-511-8274</td>
<td>42.5</td>
<td>5.23</td>
<td>4</td>
<td>140</td>
</tr>
</tbody>
</table>

*SI-422A and SI-443 have open endcap with no bayonet mount, and are not EI 1581 qualified. SI-443 is not qualified to any of the MIL specs listed above.
Military Coalescer
I-4xxA4 & MM Family
Qualified to API/EI 1581 5th Edition, Category M, M100, MIL-PRF-52308J, MIL-PRF-32148

DESCRIPTION
The I-4xxMM filter/coalescer cartridge has an internal multi-layer pleat block with a large surface area for greater dirt holding capacity. A fine fiber micro-glass shell provides optimum water removal characteristics. The advanced composition of our “MM” Series media allows most vessel configurations to meet EI 1581 5th Edition, Category M, performance requirements.

Identical in form and fit to the I-4xxMM, the I-4xxA4 filter/coalescer cartridges allows most vessel configurations to meet EI 1581 5th Edition, Category M100 performance requirements.

APPLICATION
These cartridges are designed to fit in DOD military vessels such as those originally made to the MIL-F-27629 and 27630 specifications.

I-440MM filter/coalescer (NSN 4330-01-511-8268) has been specifically designed to replace a stack of two standard DOD filter/coalescers (NSN 4330-00-983-0998). The I-440MM is also a direct replacement for the previous 3rd Edition model, I-44087 (NSN 4330-01-407-3548).

An objective of the 40-inch cartridge is to eliminate three potential leakage points (there are o-rings at each end of a 20-inch cartridge). The I-440MM has a top blind end and an o-ring at the lower end. Use one Gammon GTP-5935-M alignment pin in the top blind cap to provide a locator for spider plate alignment.

I-440AMM has an o-ring at each end to accommodate a few existing filter/separator vessels that use tie rods instead of spider plates to hold the cartridges. I-420MM (NSN 4330-01-511-8209) and I-420MMA (NSN 4330-01-477-7985), the 20-inch coalescers, also have an o-ring at each end and are direct replacements for the 20-inch DOD cartridge. No alignment pin is required for any of these models.

* I-440AMM: Alternative version with O-Ring seals on both ends

Bottom—Mounting end with O-ring seal
Top—Blind cap
GTP-5935-M Alignment Pin
### CARTRIDGE SELECTION

<table>
<thead>
<tr>
<th>Parker Velcon P/N</th>
<th>NSN (National Stock Number)</th>
<th>Spec.</th>
<th>Dim (in.)</th>
<th>Endcaps</th>
<th>Seal</th>
<th>Blind Cap</th>
<th>Max Rated Flow (USGPM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-420A4</td>
<td>4330-01-548-4867</td>
<td>Category M100: API/EI 1581, 5th Ed.</td>
<td>20 3.625</td>
<td>Injection molded glass filled nylon 6/6</td>
<td>O-ring, both ends</td>
<td>N/A</td>
<td>20</td>
</tr>
<tr>
<td>I-420MM</td>
<td>4330-01-511-8209</td>
<td>Category M: API/EI 1581, 5th Ed. and MIL-PRF-52308J</td>
<td>20.125 3.75</td>
<td>Aluminum</td>
<td>Flat gaskets</td>
<td>N/A</td>
<td>17.5</td>
</tr>
<tr>
<td>I-420MMA</td>
<td>4330-01-477-7965</td>
<td>MIL-PRF-32148</td>
<td>24.125 3.75</td>
<td>Aluminum</td>
<td>Flat gaskets</td>
<td>N/A</td>
<td>21</td>
</tr>
<tr>
<td>I-420MMF</td>
<td>4330-00-931-2472</td>
<td>Category M100: API/EI 1581, 5th Ed.</td>
<td>39.875 3.625</td>
<td>Injection molded glass filled nylon 6/6</td>
<td>O-ring, one end</td>
<td>Opposite End</td>
<td>40</td>
</tr>
<tr>
<td>I-440MM</td>
<td>4330-01-511-8288</td>
<td>Category M: API/EI 1581, 5th Ed. and MIL-PRF-52308J</td>
<td>39.875 3.625</td>
<td>Injection molded glass filled nylon 6/6</td>
<td>O-ring, both ends</td>
<td>N/A</td>
<td>40</td>
</tr>
<tr>
<td>I-440AM</td>
<td>N/A</td>
<td>Category M: API/EI 1581, 5th Ed.</td>
<td>39.875 3.625</td>
<td>Injection molded glass filled nylon 6/6</td>
<td>O-ring, both ends</td>
<td>N/A</td>
<td>40</td>
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<tr>
<td>I-620MM</td>
<td>4330-01-516-8994</td>
<td>Category M: API/EI 1581, 5th Ed.</td>
<td>20.125 6.0</td>
<td>Aluminum</td>
<td>Flat gaskets</td>
<td>N/A</td>
<td>45.5</td>
</tr>
</tbody>
</table>

### SPECIFICATIONS
- Changeout Differential Pressure: 15 psid
- Maximum Pressure Rating: 75 psid
- Maximum Operating Temperature: 160 °F
- Micron Rating: 0.4
OS Series Coalescer/Separator Cartridges

Designed for superior performance in VF-61 & VF-609 Housings, Facet’s VFCS-21 & VFCS-22 Filter/Separator Vessels & Racor’s FBO-10 & FBO-14 Housings

FEATURES

- Can be used with pre-mixed fuel containing anti-icing additive
- One piece replacement combination coalescer and separator cartridge
- OS-51288 Cartridge: Laboratory tested to 0.2% water in incoming fuel, 10 ppm in effluent*
- Teflon® coated screen separator
- Reliable radial sump seal design
- Nominal 0.5 micron particle efficiency for jet fuel and avgas; 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 aviation and diesel fuels. They are designed to fit into VF-61, VF-609, VF-64 & VF-65 housings, Facet’s VFCS-21 and VFCS-22 filter/separator housings.

Performance is improved due to Teflon® coated screen separators and reliable radial sump seals.

*Fuel was additive free and tested at 35USGPM

® 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**

<table>
<thead>
<tr>
<th>MODEL NUMBER</th>
<th>VESSEL MODEL NUMBER</th>
<th>FOR PRODUCT</th>
<th>FLOW RATE USGPM (max)</th>
<th>MICRON RATING</th>
<th>DIMENSIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OD</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>in.</td>
</tr>
<tr>
<td>OS-51288</td>
<td>VF-61</td>
<td>Jet Fuel/ Avgas</td>
<td>35/45</td>
<td>0.5</td>
<td>6</td>
</tr>
<tr>
<td>OS-60988</td>
<td>VFCS-21 VFCS-21</td>
<td>Jet Fuel/ Avgas</td>
<td>35/45</td>
<td>0.5</td>
<td>6</td>
</tr>
<tr>
<td>OS-61288</td>
<td>FBO-14 FBO-14</td>
<td>Jet Fuel/ Avgas</td>
<td>50/60</td>
<td>0.5</td>
<td>6</td>
</tr>
<tr>
<td>OS-51286</td>
<td>VF-61</td>
<td>Diesel Fuel</td>
<td>18</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>OS-60986</td>
<td>VFCS-21 VFCS-21</td>
<td>Diesel Fuel</td>
<td>18</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>OS-61286</td>
<td>VFCS-22 VFCS-22</td>
<td>Diesel Fuel</td>
<td>24</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

*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. One water defense option is to use the Water Detection Probe, Velcon part number 125-Q.
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 Parker Velcon Vel-Max® housings

DESCRIPTION

The Parker 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.

VEL-MAX® FILTER/SEPARATOR CONFIGURATION

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

<table>
<thead>
<tr>
<th>Housing with Cartridges</th>
<th>Jet gpm</th>
<th>Jet lpm</th>
<th>Avgas gpm</th>
<th>Avgas lpm</th>
<th>Diesel gpm</th>
<th>Diesel lpm</th>
</tr>
</thead>
<tbody>
<tr>
<td>VX-1</td>
<td>37</td>
<td>140</td>
<td>55</td>
<td>208</td>
<td>25</td>
<td>95</td>
</tr>
<tr>
<td>VX-2</td>
<td>75</td>
<td>284</td>
<td>100</td>
<td>378</td>
<td>50</td>
<td>189</td>
</tr>
<tr>
<td>VX-3</td>
<td>112</td>
<td>424</td>
<td>168</td>
<td>636</td>
<td>75</td>
<td>284</td>
</tr>
</tbody>
</table>

For more information on the Vel-Max® Filter Vessel please refer to data sheet #1961. Vel-Max® and Aquacon® are registered trademarks of Parker Hannifin.
### CARTRIDGE SELECTION TABLES FOR VEL-MAX® HOUSINGS

#### JET & AVGAS APPLICATIONS

<table>
<thead>
<tr>
<th>Housing</th>
<th>Cartridge</th>
<th>Model #</th>
<th>Micron Rating</th>
<th>Dimensions (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OAL</td>
</tr>
<tr>
<td>VX-1</td>
<td>Coalescer</td>
<td>O-81588</td>
<td>0.5</td>
<td>15.0</td>
</tr>
<tr>
<td></td>
<td>Separator</td>
<td>SO-415VX5</td>
<td>N/A</td>
<td>15.0</td>
</tr>
<tr>
<td>VX-2</td>
<td>Coalescer</td>
<td>O-83088</td>
<td>0.5</td>
<td>30.0</td>
</tr>
<tr>
<td></td>
<td>Separator</td>
<td>SO-430VX5</td>
<td>N/A</td>
<td>30.0</td>
</tr>
<tr>
<td>VX-3</td>
<td>Coalescer</td>
<td>O-84488</td>
<td>0.5</td>
<td>44.0</td>
</tr>
<tr>
<td></td>
<td>Separator</td>
<td>SO-444C</td>
<td>N/A</td>
<td>44.0</td>
</tr>
</tbody>
</table>

#### DIESEL APPLICATIONS

<table>
<thead>
<tr>
<th>Housing</th>
<th>Cartridge</th>
<th>Model #</th>
<th>Micron Rating</th>
<th>Dimensions (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OAL</td>
</tr>
<tr>
<td>VX-1</td>
<td>Coalescer</td>
<td>O-8150</td>
<td>25</td>
<td>15.0</td>
</tr>
<tr>
<td></td>
<td>Coalescer</td>
<td>O-8152</td>
<td>5</td>
<td>15.0</td>
</tr>
<tr>
<td></td>
<td>Coalescer</td>
<td>O-8154</td>
<td>3</td>
<td>15.0</td>
</tr>
<tr>
<td></td>
<td>Coalescer</td>
<td>O-8156</td>
<td>2</td>
<td>15.0</td>
</tr>
<tr>
<td></td>
<td>Separator</td>
<td>SO-415PL</td>
<td>N/A</td>
<td>15.0</td>
</tr>
<tr>
<td>VX-2</td>
<td>Coalescer</td>
<td>O-8300</td>
<td>25</td>
<td>30.0</td>
</tr>
<tr>
<td></td>
<td>Coalescer</td>
<td>O-8302</td>
<td>5</td>
<td>30.0</td>
</tr>
<tr>
<td></td>
<td>Coalescer</td>
<td>O-8304</td>
<td>3</td>
<td>30.0</td>
</tr>
<tr>
<td></td>
<td>Coalescer</td>
<td>O-8306</td>
<td>2</td>
<td>30.0</td>
</tr>
<tr>
<td></td>
<td>Separator</td>
<td>SO-430PL</td>
<td>N/A</td>
<td>30.0</td>
</tr>
<tr>
<td>VX-3</td>
<td>Coalescer</td>
<td>O-8440</td>
<td>25</td>
<td>44.0</td>
</tr>
<tr>
<td></td>
<td>Coalescer</td>
<td>O-8442</td>
<td>5</td>
<td>44.0</td>
</tr>
<tr>
<td></td>
<td>Coalescer</td>
<td>O-8444</td>
<td>3</td>
<td>44.0</td>
</tr>
<tr>
<td></td>
<td>Coalescer</td>
<td>O-8446</td>
<td>2</td>
<td>44.0</td>
</tr>
<tr>
<td></td>
<td>Separator</td>
<td>SO-444PL</td>
<td>N/A</td>
<td>44.0</td>
</tr>
</tbody>
</table>

**NOTES:**

1. If converting from Parker 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 Parker Velcon filter cartridges that can be used in the Vel-Max® Housing, see below and corresponding data sheet as marked.

<table>
<thead>
<tr>
<th>Type</th>
<th>1-High</th>
<th>2-High</th>
<th>3-High</th>
<th>Data Sheet #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Micronic Filter Cartridges</td>
<td>FO-614PLFxx*</td>
<td>FO-629PLFx</td>
<td>FO-644PLFx</td>
<td>1549</td>
</tr>
<tr>
<td>Pleated Paper</td>
<td>FO-614PLFx</td>
<td>FO-629PLFx</td>
<td>FO-644PLFx</td>
<td>1550</td>
</tr>
<tr>
<td>Fiberglass Depth</td>
<td>FO-614FGxx</td>
<td>FO-629FGxx</td>
<td>FO-644FGxx</td>
<td>1681</td>
</tr>
<tr>
<td>Aquacon® Cartridges</td>
<td>ACO-61401L</td>
<td>ACO-62901L</td>
<td>ACO-64401L</td>
<td>1582</td>
</tr>
<tr>
<td>Jet Fuel/Avgas</td>
<td>AC-61405</td>
<td>AC-62905</td>
<td>AC-64405</td>
<td>1555</td>
</tr>
<tr>
<td>Gasoline</td>
<td>AD-61425</td>
<td>AD-62925</td>
<td>AD-64425</td>
<td>1655</td>
</tr>
<tr>
<td>Diesel</td>
<td>CDF-215N</td>
<td>CDF-230N</td>
<td>N/A</td>
<td>1962</td>
</tr>
</tbody>
</table>

*The suffix “xx” on the part number denotes the micron rating of the cartridge. Example: FO-614PLFS is a 5 micron filter.*
Replacement Cartridges for Facet SuperFlex™ 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 Facet SuperFlex housings in diesel and jet fuel/avgas service

DESCRIPTION

The Parker Velcon coalescer and separator are installed together in the Facet SuperFlex 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 downstream by the separator. The water settles down to the sump where it is manually drained.

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

<table>
<thead>
<tr>
<th>Housing with Cartridges</th>
<th>Jet (gpm / lpm)</th>
<th>Avgas (gpm / lpm)</th>
<th>Diesel (gpm / lpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>gpm</td>
<td>lpm</td>
<td>gpm</td>
</tr>
<tr>
<td>1-High</td>
<td>37</td>
<td>140</td>
<td>55</td>
</tr>
<tr>
<td>2-High</td>
<td>75</td>
<td>284</td>
<td>100</td>
</tr>
<tr>
<td>3-High</td>
<td>112</td>
<td>424</td>
<td>168</td>
</tr>
</tbody>
</table>
CARTRIDGE SELECTION TABLES FOR SUPERFLEX HOUSINGS

JET FUEL & AVGAS APPLICATIONS

<table>
<thead>
<tr>
<th>Housing</th>
<th>Cartridge</th>
<th>Model #</th>
<th>Micron Rating</th>
<th>Dimensions (Inches)</th>
<th>NOTES:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coalescer</td>
<td>O-81488</td>
<td>0.5</td>
<td>13.6875, 5.625, 7.625</td>
<td>1. If converting from Parker Velcon’s <em>Aquacon®</em> water absorbing cartridges to coalescer/separator cartridges, please order Part Number EA35A end seal plate.</td>
</tr>
<tr>
<td></td>
<td>Separator</td>
<td>SO-412V5</td>
<td>N/A</td>
<td>11.5, 1.875, 4.0</td>
<td></td>
</tr>
<tr>
<td>1-High</td>
<td>Coalescer</td>
<td>O-82888</td>
<td>0.5</td>
<td>27.5, 5.625, 7.625</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Separator</td>
<td>SO-422V5</td>
<td>N/A</td>
<td>21.5, 1.875, 4.0</td>
<td></td>
</tr>
<tr>
<td>2-High</td>
<td>Coalescer</td>
<td>O-84288</td>
<td>0.5</td>
<td>41.3125, 5.625, 7.625</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Separator</td>
<td>SO-432V5</td>
<td>N/A</td>
<td>31.5, 1.875, 4.0</td>
<td></td>
</tr>
</tbody>
</table>

DIAMEL APPLICATIONS

<table>
<thead>
<tr>
<th>Housing</th>
<th>Cartridge</th>
<th>Model #</th>
<th>Micron Rating</th>
<th>Dimensions (Inches)</th>
<th>NOTES:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coalescer</td>
<td>O-8140</td>
<td>25</td>
<td>13.6875, 5.625, 7.625</td>
<td>1. If converting from Parker Velcon’s <em>Aquacon®</em> water absorbing cartridges to coalescer/separator cartridges, please order Part Number EA35A end seal plate.</td>
</tr>
<tr>
<td></td>
<td>Coalescer</td>
<td>O-8142</td>
<td>5</td>
<td>10.5, 1.875, 4.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coalescer</td>
<td>O-8144</td>
<td>3</td>
<td>21.5, 1.875, 4.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coalescer</td>
<td>O-8146</td>
<td>2</td>
<td>31.5, 1.875, 4.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Separator</td>
<td>SO-410PL</td>
<td>N/A</td>
<td>10.5, 1.875, 4.0</td>
<td>2. Separators used for jet fuel/avgas applications (SO-4xxV5) are Teflon®-coated and can be cleaned and reused. See data sheet #1242 for cleaning and maintenance instructions.</td>
</tr>
<tr>
<td>1-High</td>
<td>Coalescer</td>
<td>O-8280</td>
<td>25</td>
<td>27.5, 5.625, 7.625</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coalescer</td>
<td>O-8282</td>
<td>5</td>
<td>21.5, 1.875, 4.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coalescer</td>
<td>O-8284</td>
<td>3</td>
<td>31.5, 1.875, 4.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coalescer</td>
<td>O-8286</td>
<td>2</td>
<td>10.5, 1.875, 4.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Separator</td>
<td>SO-422PL</td>
<td>N/A</td>
<td>21.5, 1.875, 4.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coalescer</td>
<td>O-8422</td>
<td>5</td>
<td>31.5, 1.875, 4.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coalescer</td>
<td>O-8424</td>
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<td>41.3125, 5.625, 7.625</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coalescer</td>
<td>O-8426</td>
<td>2</td>
<td>31.5, 1.875, 4.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Separator</td>
<td>SO-432PL</td>
<td>N/A</td>
<td>31.5, 1.875, 4.0</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Type</th>
<th>1-High</th>
<th>2-High</th>
<th>3-High</th>
<th>Data Sheet #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Micronic Filter Cartridges</td>
<td>FO-614PLFx*</td>
<td>FO-629PLFx</td>
<td>FO-644PLFx</td>
<td>1549</td>
</tr>
<tr>
<td></td>
<td>FO-614FGx</td>
<td>FO-629FGx</td>
<td>FO-644FGx</td>
<td>1550</td>
</tr>
<tr>
<td><em>Aquacon®</em> Cartridges</td>
<td>ACO-61401L</td>
<td>ACO-62901L</td>
<td>ACO-64401L</td>
<td>1681</td>
</tr>
<tr>
<td>Jet Fuel/avgas</td>
<td>AC-61405</td>
<td>AC-62905</td>
<td>AC-64405</td>
<td>1582</td>
</tr>
<tr>
<td>Gasoline</td>
<td>AD-61425</td>
<td>AD-62925</td>
<td>AD-64425</td>
<td>1655</td>
</tr>
<tr>
<td>Diesel</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*The suffix “x” or “xx” on the part number denotes the micron rating of the cartridge. Example: FO-614PLF5 is a 5 micron filter.
Aviation Fuel Filtration in commercial applications is governed by the complex, stringent requirements of EI 1581, 5th Edition. Refer to the appropriate Parker Velcon literature or contact your Parker 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:
   a. Find the approximate viscosity of your hydrocarbon fluid on the Chart Y-axis.
   b. Find the corresponding Specific Flow Rate (gpm/inch) on the X-axis.
   c. 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:
   a. 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.
   b. 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:
   a. Refer to the Parker Velcon literature for HV (horizontal) or VV (vertical) Filter/ Separators.
   b. 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 Teflon® separators and cannot be cleaned off – nullifying their cost effectiveness. Refer to Parker 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 limited.

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.
EI 1581 5th Edition
Specification Summary

EI 1581 5th Edition Specification* Key Points

1. Category “C” filter/separators are for use in commercial Jet-A or Jet-A1 fuel are tested in fuel containing anti-static additive Stadis 450 and corrosion inhibitor DCI-4A.

2. Category “M” filter/separators are for use in military JP-8 or JP-5 fuel. They are tested in fuel containing Stadis 450, DCI-4A, and anti-icing additive Di-EGME. (Note: testing to Category “M” also qualifies for Category “C”.)

3. Category “M100” filter/separators are for use in military JP8+100 fuel. They are tested in fuel containing Stadis 450, DCI-4A, Di-EGME, and thermal stability additive Spec Aid 8Q462.

4. Type “S” filter/separators are used at filtration points where significant levels of water but minimal amounts of dirt can be expected. (Note: testing to Type “S” also qualifies for both Type “S-LD” and Type “S-LW”.)

5. Type “S-LD” filter/separators are used at filtration points where significant levels of water but minimal amounts of dirt can be expected.

6. Type “S-LW” filter/separators can be used for mobile applications where minimal amounts of water can be expected in the jet fuel.

7. Multi-Stage Systems can be used at all filtration points in addition to filter/separators where additional performance is desired. Multi-stage devices can include upstream pre-filters and downstream water absorbing filters.

8. The EI specification procedures qualify the entire filter/sePARATOR, not just the elements. Elements are used in an EI qualified filter/separators but the qualification would apply to the corresponding elements and vessels as a whole.

9. A filter/separators of similar geometry to the tested vessel can be qualified by similarity providing that a complex set of criteria are met. This is particularly significant in establishing EI qualification for existing equipment in the field. EI Specification 1582** details the similarity specifications that have to be met in order for a filter/separators to be qualified by similarity.

10. In order for a filter/separators to be accepted as meeting the EI specification, it must be tested to the specification with an official witness designated by the EI committee present. This witness ensures that all procedures are followed per specification and that all test results meet the specification requirements. EI then issues a qualification approval for the:
   a. Elements
   b. Housing
   c. Flowrate
   d. Fuel Category


Addendum 20th Dec. 2006: Added to section 3.2.2.7 – vessel sump design must allow for water drainage – flat sumps are not allowed.


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EI SPEC 1581

Category C
Commercial

  Type S
  Type S-LD
  Type S-LW

Category M
Military

  Type S
  Type S-LD
  Type S-LW

Category M100
Military w/+100

  Type S
  Type S-LD
  Type S-LW
# Filter/separator specifications

## Major mechanical, test, & performance requirements

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Specification Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Test fuel additives</strong></td>
<td></td>
</tr>
<tr>
<td>Category C</td>
<td>1.0 mg/l STADIS 450 + 15.0 mg/l DCI-4A</td>
</tr>
<tr>
<td>Category M</td>
<td>2.0 mg/l STADIS 450 + 15 mg/l DCI-4A + 0.15% DI-EGME</td>
</tr>
<tr>
<td>Category M100</td>
<td>2.0 mg/l STADIS 450 + 15 mg/l DCI-4A + 0.15% DI-EGME + 256 mg/l SPEC AID 8Q462</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test series to be run</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Single element</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Full scale</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fuel handling</th>
<th>Single element</th>
<th>Full scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single element</td>
<td>Single pass from 1 tank to another</td>
<td>Recirculate</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fuel temperature</th>
<th>Minimum temperature</th>
<th>40°F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum temperature</td>
<td>90°F</td>
<td></td>
</tr>
<tr>
<td>Deviation from test start temperature</td>
<td>+/- 11°F</td>
<td></td>
</tr>
</tbody>
</table>

**Maximum clean initial differential pressure**
6 psid across filter/coalescer stage, 10 psid across vessel

**Structural strength of filter/coalescer element**
75 psid with no rupture, bypassing of seals, or pinhole leaks

**Structural integrity of filter/coalescer element**
No media or structural deterioration such as leaks or tears

<table>
<thead>
<tr>
<th>Maximum effluent contaminant levels during tests</th>
<th>Fiber content</th>
<th>10 fibers per liter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solids content</td>
<td>1.0 milligram per gallon</td>
<td></td>
</tr>
<tr>
<td>Free water content</td>
<td>15 parts per million</td>
<td></td>
</tr>
</tbody>
</table>

**Conditioning run test**
3 gpm for single element test, 10% of rated flow for full scale test

<table>
<thead>
<tr>
<th>Test duration</th>
<th>30 minutes</th>
</tr>
</thead>
</table>

**Water coalescence test - Clean element**
Rated flow

<table>
<thead>
<tr>
<th>Test duration</th>
<th>30 minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water injection rate</td>
<td>0.01% By volume</td>
</tr>
</tbody>
</table>

**Solids holding test**
75 minutes for single element, 45 min for full scale

<table>
<thead>
<tr>
<th>Test duration - Type S-LD</th>
<th>Add solids until pressure reaches 22.5 psid, then run additional 45 minutes with no addition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solids injection rate</td>
<td>72 mg/gal</td>
</tr>
<tr>
<td>Maximum delta P at 50 minutes - Type S</td>
<td>15 psid</td>
</tr>
<tr>
<td>Maximum pressure at 75 minutes - Type S</td>
<td>45 psid</td>
</tr>
</tbody>
</table>

**Water coalescence test - Dirty element**
1st period: 150 minutes, 2nd period: 30 minutes

<table>
<thead>
<tr>
<th>Water injection rate</th>
<th>1st period: 0.01%, 2nd period: 3.0% (0.5% For S-LW)</th>
</tr>
</thead>
</table>

**Vertical vessel length to diameter ratio**

<table>
<thead>
<tr>
<th>Vessel ≤ 24 inches</th>
<th>Vessel &gt; 24 inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum spacing between elements and between element &amp; vessel wall</td>
<td>1.75</td>
</tr>
<tr>
<td></td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>0.5 inches</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vertical vessel length to diameter ratio</th>
<th>1.75</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum spacing between elements and between element &amp; vessel wall</td>
<td>2.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vertical vessel length to diameter ratio</th>
<th>0.5 inches</th>
</tr>
</thead>
</table>
# Similarity Certification Form

(See form VEL1739 on our website or print out this form and send to contact info below)

**Email:** velconquotes@parker.com  
**Fax No.:** 719-531-5690  
**To: Parker Velcon**  
1210 Garden of the Gods Road  
Colorado Springs, CO 80907-3410  
**Attn: Aviation Products Manager**  
**Email:** velconquotes@parker.com  
**Fax No.:** 719-531-5690  
**To: Parker Velcon**  
1210 Garden of the Gods Road  
Colorado Springs, CO 80907-3410  
**Attn: Aviation Products Manager**

Please recommend coalescer cartridges, separators, monitor cartridges and conversion hardware, if any, for the vessels listed below to qualify them to EI 1581 5th Edition, or EI Certificate as appropriate, to satisfy requirements of ATA 103 and JIG.

<table>
<thead>
<tr>
<th>Vessel Model No.</th>
<th>Max Flow Rate USGPM</th>
<th>Presently Installed: Qty</th>
<th>Model No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HV-2833M150</td>
<td></td>
<td></td>
<td>I-633C5TB</td>
</tr>
<tr>
<td>SO54321</td>
<td></td>
<td></td>
<td>SO-636V</td>
</tr>
</tbody>
</table>

**EXAMPLE (For EI 1581 5th Edition Conversion)**

**Vessel Model No.** HV-2833M150  
**Serial No.** SO54321  
**Presently Installed:**  
Qty 7 Model No. I-633C5TB Coalescer Cartridges  
Qty 2 Model No. SO-636V Separator Cartridges  
Qty ______ Model No. ______ Monitor Cartridges

**Fixed ( ) Mobile (X)  
API/EI - 1581 5th Edition: Category C (X) Category M ( ) Category M100 ( )  
EI 1583 Certificate ( )
SO-6xxG Separator Assembly
Installation Instructions

<table>
<thead>
<tr>
<th>ASSEMBLY P/N</th>
<th>TIE ROD P/N</th>
<th>LENGTH (IN.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SO-606G</td>
<td>T11.0-6D</td>
<td>11</td>
</tr>
<tr>
<td>SO-613G</td>
<td>T18.0-6D</td>
<td>18</td>
</tr>
<tr>
<td>SO-616G</td>
<td>T21.0-6D</td>
<td>21</td>
</tr>
<tr>
<td>SO-623G</td>
<td>T28.0-6D</td>
<td>28</td>
</tr>
<tr>
<td>SO-633G</td>
<td>T38.0-6D</td>
<td>38</td>
</tr>
</tbody>
</table>

NOTE:
These nuts and washers are located at underside of the adapter when shipped.

At installation, relocate as shown at left with tie rod protruding 1-1/4" below base of adapter.
1. Throughout the entire procedure, AVOID LETTING SCREEN COME IN CONTACT WITH YOUR BARE SKIN, particularly after the cartridge has been cleaned. Hold the cartridge by the end-caps. If necessary to handle the screen during removal or installation, use a clean, dry, non-abrasive material, such as a poly-bag from one of the coalescers, between your hand and the screen.

2. After removing the cartridge from the vessel, submerge it in clean fuel and gently scrub the entire screen surface with a soft bristle brush or a lint free cloth.

3. SURFACE INSPECTION. Holding the cartridge by the endcaps, visually inspect the entire surface of the screen for any nicks or cuts. If there are any visible flaws, they should be patched (see Step 6).

4. WATER TEST. Be sure that the separator is fuel-wetted before performing this test. Hold the cartridge by the end-cap at an angle, and gradually pour water over the entire screen surface. Do not spray the water and do not let it fall more than a distance of three inches before contacting the screen.

5. The water will bead and roll off the surface of properly functioning separators (as it would on a freshly-waxed car). If this is the case, the separator has passed the Water Test and can be reused.

6. If any portion of the Teflon coated screen is wetted by the water (the water will seep into the pores of the screen; this is very obvious to the eye), the cartridge has failed the Water Test. The wetted area must be cleaned again (see Step 7), and the recleaned cartridge should pass the Water Test before it is reinstalled.

NOTE: The separator in the photo above has been purposely disarmed to show a water-wetted surface.
7. If the separator passes the Surface Inspection and Water Test, rinse it thoroughly in clean fuel to remove traces of water. Let the separators air dry prior to reinstalling.

8. If a separator fails the Surface Inspection due to visible nicks, cuts, or other flaws in the screen that can be caused by mishandling, they can be patched if they are smaller than ¼ inch (size of dot ●). Use two-part epoxy base putty. Thoroughly clean area with isopropyl alcohol before applying putty.

9. If a separator fails the Water Test due to visible wetted areas, try washing the cartridge with hot water. Use pressurized hot water from a tap or hose and thoroughly spray the wetted area. Scrubbing with a soft brush will often help on stubborn areas. Allow the cartridge to dry, then perform the Water Test again. If the cartridge continues to fail the Water Test, it must be replaced.

10. If gaskets should become dislodged, thoroughly clean gasket and end-cap surfaces with a solvent such as MEK or Acetone. Apply a cyanoacrylate adhesive, such as Bostik #7432, to end-cap. Place gasket onto end-cap, applying pressure over entire surface of gasket. Let dry approximately 30 seconds.

11. REMINDER. While reinstalling the Teflon coated screen separators, be sure to avoid handling the screen with your bare hands. If you must handle the screen, use a clean, dry, non-abrasive material, such as a poly-bag. Be sure to remove all poly-bags prior to closing vessel.

NOTE: The above cleaning instructions are also applicable to the Parker Velcon synthetic media separators. These can be cleaned a maximum of two times before they should be replaced.
Parker Velcon recommends changing coalescer and monitor cartridges when the pressure differential reaches 15 PSID and the filter/separator is being operated at its rated flow. The system, however, will often be operating at lower flow rates with a corresponding lower differential pressure. If, for example, a 600 GPM filter/separator shows a differential of 12 PSID at 300 GPM and the flow rate was increased to 600 GPM, the differential would be about 28 PSID which is considerably above the recommended pressure drop for changing cartridges.

It is important, therefore, to know the pressure differential characteristics at lower flow rates for a set of coalescer cartridges which are plugged to the extent that they would show a 15 PSID differential at rated flow. The graph below contains this information for Parker Velcon cartridges.

Vessel pressure drop characteristics for coalescer and monitor cartridges complying with ATA Specification 103.

**EXAMPLES:**

- A 1000 GPM filter/separator is operating at 600 GPM (60% of rated flow). If the pressure differential is less than 8 PSID, the cartridges do not require changing. If the pressure differential is 8 PSID or more, however, the elements are due for a changeout.

**EXCEPTION:**

If the system in this example is limited to a maximum flow of 750 GPM by pump capacity or some other factor, then 750 GPM should be considered 100% of rated flow rather than higher rating of the filter/separator. In this case, the 600 GPM flow would be 80% of rated flow and the differential at this rate can be as high as 11½ PSID without changing elements.

**NOTE:**

“Stick-on” labels (Form #VEL1979) of the above graph can be obtained from Parker Velcon, Colorado Springs. These labels can be affixed to the vessel near the differential pressure gauge.
Mission

Parker Velcon is committed to being the world’s preferred company for the expert solutions we deliver to our customers.

Values

Superior customer service
Profitable growth
Meet or exceed customer expectations
Accountability
Integrity

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