

# CDF-X Frequently Asked Questions

This document provides answers to frequently asked questions we have received from many interested in the new EI1588 2" O.D. CDF-X water barrier cartridges. Should you have questions not covered in this literature, please submit your question(s) to [vfsales@parker.com](mailto:vfsales@parker.com).

## Will the user need to change/modify their housing before using EI1588 products?

Our new water and dirt barrier technology will not require any modification to your existing vessel nor flow rate. It will require that you update your vessel nameplate indicating that the vessel has been converted to EI1588 technology. In addition, ATA 103 and JIG Bulletin #58 mandate dP gauge to use a pressure limiting switch.

## Does the new water barrier technology require water sump?

For a Filter Water Separator (FWS), water is coalesced and collected in the housing sump. Sumps are needed on FWS to coalesce water from wetter fuel conditions that are typically at depots and loading areas. For into plane operations, fuel is expected to be dryer. The free area below the barrier elements provides sufficient sump area under normal conditions and when daily draining routines are performed. In a FWS, when water level reaches the second stage separator, the water could intrude through the separator and flow downstream of the vessel. In contrast, Parker Velcon water barrier technology uses a hydrophobic barrier with significantly much smaller pores sizes (<0.5 um). The smaller pores prevents water from bypassing downstream. In the case of gross water levels, the technology's superior hydrophobic attributes will continue to prevent water from flowing downstream and the monitor housing itself acts as its own sump.

## How long will the water barrier products last in service?

Currently, the recommended change out interval for an EI1583 monitor is one year. This recommended life was driven by the concerns that the longer SAP based products were in a fueling system, the greater the risk of possible SAP shedding. Since Parker Velcon water barrier technology does not contain SAP, shedding concern does not exist.

Laboratory testing performed on our water barrier technology has shown that the product's service life will likely exceed current SAP monitor technology, while improving the downstream effluent quality. We believe cartridge life of our water barrier technology can extend beyond 1 (one) year, but actual field results and regulations will dictate this.

## Will the user need to install an EI1598 water detection sensor downstream?

Parker Velcon water barrier technology was specifically developed as a drop-in solution to existing SAP monitor systems. It offers a superior solution for water slugs, emulsified water and solids/dirt removal when compared to the currently deployed EI1583 monitor technology. The currently deployed EI1583 technology does not warrant nor require the use of an electronic sensor; therefore, as a non-SAP replacement we do not believe that our new water barrier should either.

An EI1598 electronic sensor could be added to a fueling system as an alternative to chemical water detection tests.

## Is the water barrier material new?

No. Although the barrier is new to the aviation fuels market, this material has decades of proven success in markets such as: pharmaceuticals, semiconductor, food & beverage and high purity industrial chemicals within very demanding applications. Our testing to date indicates that the barrier is fit for purpose with aviation fuel and will perform well.



The CDF-X FAQs is published by the Marketing Department of Parker Hannifin Corporation | Filtration Group | Aerospace Filtration Division

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# CDF-X Frequently Asked Questions

Will we be developing water barriers in two-inch and six-inch sizes?

Yes. Our goal is to focus on completing the qualification of the two-inch product before beginning on our formal work for both five and six-inch products. We are confident that this technology is fit for purpose and will offer the same advantages for alternate sized products and applications as well.

How Will the New Technology Be Tested?

Working with EI and our industry partners, Parker AFD has worked to create a new meaningful testing specification for the water barrier technology. Most of the test criteria for this new specification was directly adopted from the EI1583 7th edition specification (as shown on the table to the right). We believe that the new EI1588 specification properly challenges the product's attributes in a laboratory setting, clearing it for field evaluation.

Test	Title	EI1583 7th	EI1588 1st
1	Media Migration & Starting Differential Pressure	✗	✗
2	50 ppm at rated flow	✗	✗
3	Water slug at rated flow	✗	✗
4	Mechanical Integrity of saturated element	✗	✗
5	Water slug at 10% rated flow	✗	✗
6	Solids test	✗	✗
7	Mechanical integrity of solids contaminated element	✗	✗
8	Freeze/thaw test	✗	✗
9	Full water immersion tests	✗	✗
10	Partial water immersion tests	✗	✗
11	Compatibility test	✗	✗
12	50 ppm water test, low flow	✗	✗
13	Full Scale vessel 50 ppm water test	✗	✗
14	Full Scale vessel water slug test	✗	✗
15	50 ppm with saline solution	✗	✗
16	Slug test at rated flow with saline solution	✗	✗
17	End to end element resistance	✗	✗
18	End cap adhesion integrity test	✗	✗

We are working closely with industry leaders and partners to develop and conduct the field evaluations soon. We are committed to working with our industry leaders and partners to assure clear communication of the laboratory and field evaluation results.

When will this be available to the marketplace?

Parker Velcon CDF-X is qualified to the latest EI1588 specifications and Stage 1 of the Robustness Programme (See Figure 1). For Stage 2 field robustness testing, we have been engaging with key industry partners and have established plans for the fuel conditioning program. Stage 2 is scheduled for Atlanta airport this month. Following Stage 2 testing will be into plane field trials which would normally require at least 1 (one) year to complete.

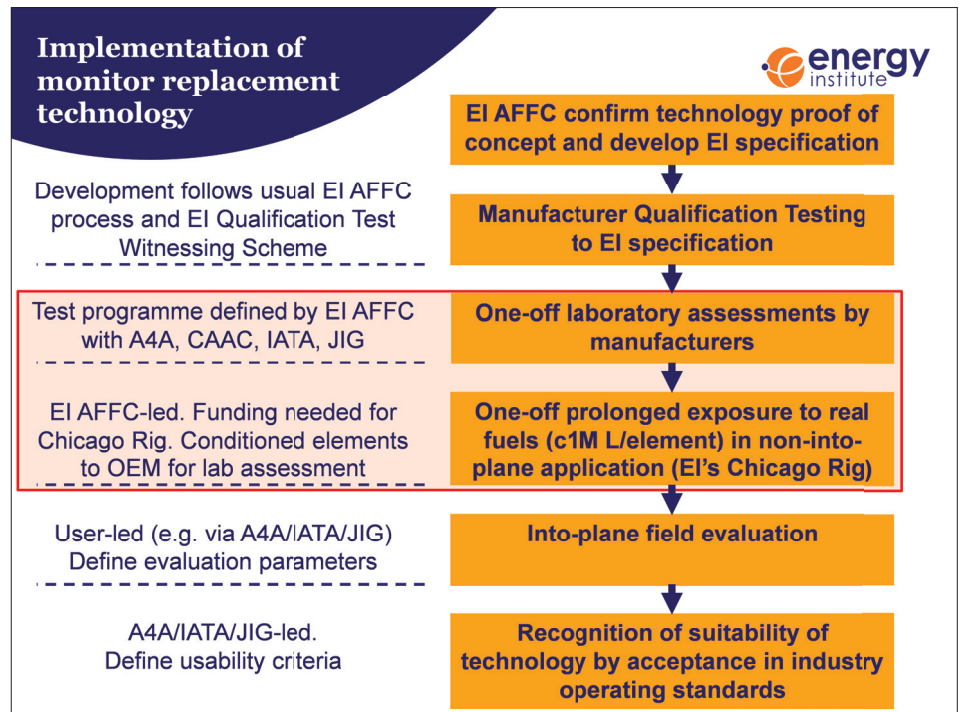


Figure 1: Monitor Replacement Implementation Schedule

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## What are the benefits of CDF-X?

- Absolutely NO SAP or other absorbent materials that could potentially shed contaminants into the fuel system components.
- Effective containment for dirt/solids removal, emulsified water and slug water.
- Efficient operation up to 22 psid
- Unlike SAP materials, our new barrier technology does not swell and constrict flow.
- Larger surface area for longer service life.
- Currently, we recommend change-out interval is one year for EI1583 monitors. The new water barrier technology has shown to have improved life in laboratory testing. The recommended change out period will be determined upon completion of the field evaluations.
- Due to the porosity of the barrier material, the effluent fuel is extremely clean. Laboratory tests have shown that the barrier is even effective in the removal of many micro-organisms that can be present in fuel. This may be a benefit to companies who defuel aircraft and may have concerns with unknown aircraft fuel tank cleanliness.
- Testing has shown that the barrier material is effective for fuel with FSII.
- Bacterial retentive.
- Significant improvement in downstream efficiency compared to SAP based CDF-P filter monitors and longer time required to reach 22 psid.
- Majority of differential pressure rise due to water entrapment is regained after flow shut-off.

## Water Barrier Technology End User Process Changes

With our Parker Velcon Water Barrier Technology, the water is rejected from the fuel on the water barrier surface, the water

coalesces into larger droplets and gravity pulls the water droplets to the bottom of the housing. Good practice guidelines require that all monitor housings be drained daily through the drain on the bottom of the housing. During this

daily sump draining, any coalesced and accumulated water in the housing will be drained/removed from the system.

## What are the current alternative Solutions for EI1583 Aviation Filter Monitors?

Technology	Pros	Cons
<b>EI1598 Electronic Water Sensor with EI1599 Dirt Defense Filter</b>	<ul style="list-style-type: none"> <li>• No SAP</li> <li>• Long filter life</li> <li>• Lower cost filters</li> <li>• Protection from solid particulates</li> <li>• Integrate with deadman circuit to stop flow</li> </ul>	<ul style="list-style-type: none"> <li>• Does not remove free water</li> <li>• Requires elaborate contingency plans in case of a water event</li> <li>• Possible small levels of water may contaminate fuel system</li> <li>• Possible costly airport downtime for water removal and prevention</li> <li>• Calibration costs</li> <li>• No emulsified water removal</li> <li>• No water slug removal</li> </ul>
<b>EI1581 Filter/Water Separator</b>	<ul style="list-style-type: none"> <li>• Proven water removal technology</li> <li>• Protection from solid particulates</li> <li>• Emulsified water removal</li> <li>• Slug protection</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced flow rate required to allow for vessels that meet footprint limits</li> <li>• Costly retrofitting (size, weight, re-piping)</li> <li>• Does not work well in "dry" systems</li> <li>• Complicated and costly slug protection</li> </ul>
<b>EI1588 Water Barrier Technology</b>	<ul style="list-style-type: none"> <li>• Simple drop-in solution: same footprint &amp; flow</li> <li>• No modifications to fuel filter monitor housings required</li> <li>• No SAP/SAP Shredding</li> <li>• Standard sizes from 2" to 6" O.D.</li> <li>• Same flow rates as SAP-based filter monitors</li> <li>• Protection from water slug (over 7 bar) and dirt/solids</li> <li>• Extended on-stream life over current SAP-base filter monitors</li> <li>• Compatible with fuel that contains FSII additive</li> </ul>	<ul style="list-style-type: none"> <li>• Requires regular draining of water from housing</li> <li>• Higher cost per element than existing SAP based filter monitors</li> </ul>