THE CLARIFIER

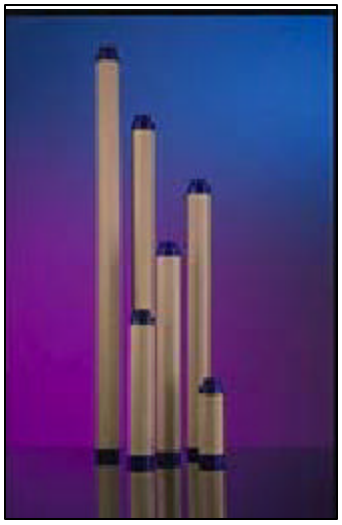
Volume 12 Number 1 ***March 2001***

API/IP 1583 UPDATE

The Institute of Petroleum had originally issued the ***"Specifications and Qualification Procedures – Aviation Fuel Filter Monitors with Absorbent Type Elements"*** in 1987. It was revised in January 1995. It has been updated in 2001 with the same title but is now a joint API/IP specification with the number: ***API/IP 1583***. As far as element performance testing, it is similar to the January 1995 edition, but with the additional **Run 12 low flow application.**

Quoting from the Foreword of API/IP 1583:

> "In the course of developing this edition of the specification, alignment with other aviation filtration specifications has been the main driver. The need for improved element performance was not a major concern within the industry except in one particular low flow application, now covered by Run 12 compliance. Rig tests of elements meeting second edition requirements using the third edition protocols contained herein have shown that there is equivalence in performance demands between this and the previous edition. It is therefore anticipated that provided the product complies with the requirements of Run 12, second Edition equipment covered by this specification may remain approved subject to the purchasers agreement and rights described above."



When the industry found the problems with the low flow, low water situations with water absorbing cartridges, it was Velcon who proposed the low flow, low water protocol. Velcon ran the initial witnessed tests to prove the acceptance of the revised media cartridges to meet the additional requirements of Run 12. Velcon's ACO-6xx01K, CDF-2xxK, and ACI-6xx01K/KTB cartridges have all been run to the performance requirements of API/IP 1583 and meet this latest Edition of API/IP 1583.

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Filter/Separators for Diesel Fuel

The question is often asked why Velcon recommends lower flow rates for diesel fuel than for Jet Fuel.

Diesel fuel is a heavier product, more viscous, has more waxy components, and is generally dirtier than Jet Fuel. The coalescers will plug up faster with particulate, so we recommend the more open "4" series coalescers. The "4" series are a compromise - "6" series will do a slightly better coalescing job, but they will plug up too fast. The "2" series will allow more dirt to go downstream, but they don't coalesce as well as the "4" series. (Jet Fuel coalescers will coalesce nicely in diesel fuel service, with correspondingly shorter life due to their tightness. The "85" series would be the choice if tightness was not an issue - an oversized pre-filter would be recommended to remove the dirt.)

Diesel fuel has a number of surfactant-type additives. There is always the possibility of the coalescers being disarmed in diesel fuel service. However, there is usually enough free water being coalesced out of the diesel fuel to result in a "flushing out of the surfactants" from the fiberglass layers of the coalescers. Operators should still be on the alert for disarmed coalescers - check for hazy diesel fuel downstream, discolored water and hazy diesel from the daily F/S sump drain, and be sure to change out **at or before 15 psid differential pressure** (delta P).

With the heavier specific gravity, and higher viscosity of diesel, as compared to Jet Fuel (kerosene), the flow rate is necessarily reduced to allow the coalesced water drops to form and fall by gravity. And at lower temperatures, the diesel fuel rapidly becomes more viscous, and the "waxies" come out of solution and block filters.

Of course, there are various levels of dirt, and specific gravities in different diesel fuels. So, we always plan for the worst condition. There is a trend to have more of the low sulfur diesel produced, which has very low conductivity, and can give more problems in electrostatic charging. Most users will put static dissipator in these low sulfur diesel fuels.

There were some tank truck fires where low sulfur diesel, with no static dissipator, was being flowed at twice the flow rate through a micronic filter, into tank trucks that had previously carried gasoline (switch loading). **The oil companies have to be aware that low sulfur diesel with the low conductivity has to be handled carefully.**

We have heard from some sources that more attention is being paid to have cleaner diesel fuel. Studies show that dirt particles larger than 5 microns can damage diesel fuel injectors on the engines. We have normally recommended our nominal 5 micron filter elements for diesel, although some users have used more open filter elements at various locations. **We will continue to recommend the nominal 5 micron pre-filter elements for diesel fuel.**

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Frequently Asked Questions & Answers

Q

What are Velcon's recommendations for operating instructions of a three-stage filter vessel:

a.) Installation of dp fittings
b.) Maximum dp for the vessel

A

See API-1581, 4th Edition, Paragraph 3.1.4.1 and 3.1.4.2:

3.1.4.1 Two-stage systems shall not exceed differential pressures of 70 kPa (10 psi) across a vessel having new elements and 42 kPa (6 psi) across the filter/coalescer stage when operating at rated flow with clean, dry fuel.

3.1.4.2 Multi-stage systems shall not exceed a differential pressure across new filter/coalescer elements of 42 kPa (6 psi), as measured between points upstream and downstream of the filter/ coalescers when operating at rated flow with clean, dry fuel. The total differential pressure across the vessel shall not exceed the sum of the differential pressure permitted for a two-stage system (Section 3.1.4.1) and the differential pressure permitted for the new multi-stage devices at rated flow.

Q

Are the coalescers and the CDF® elements to be changed at the same time?

A

No hard and fast rule exists on this one. If CDF's plug up, we recommend also changing the coalescers. If the coalescers are plugged up, but no appreciable delta P build-up appears on the CDF's, we recommend changing only the coalescers.

Filter/Separators for Diesel Fuel

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We also recommend the use of pleated paper separators in diesel fuel F/S vessels. This is not necessarily for better performance, but for economics to the user. The TCS separators too easily get "plugged up" with the waxy components in diesel fuel and are difficult or impossible to clean properly. So, if we can't properly clean the TCS separators, let's recommend the more economical one-time use pleated paper separators.

More on Pre-Mixed Jet Fuel

In earlier Clarifier articles we elaborated on the special draining procedures needed when the Jet Fuel is pre-mixed with anti-icing additive (Di-EGME).

We believe there are also occasions where properly pre-mixed fuel, with no appreciable water in the fuel (less than 2 ppm of free water) is delivered into aircraft/helicopter fuel tanks. Then, due to temperature changes, and/or other causes, the **anti-icing additive comes out of solution either as the viscous "apple jelly" or as concentrated liquid.** We have seen the Di-EGME appear as "dirty brown water", but when analyzed, it was concentrated Di-EGME.

This concentrated Di-EGME can "eat away" at aluminum tanks, or "rubber type" tank linings. It can also corrode fuel controls and other fuel system components in this concentrated form.

In addition to the upstream draining procedures in the fuel system, **we strongly encourage aircraft operators with pre-mixed fuel to daily drain the low points of their aircraft fuel tanks.**

AS³ 2001 – The Aviation Services and Suppliers SuperShow

Join Velcon Filters and hundreds of other aviation ground support companies in Long Beach, CA, for the Aviation Services & Suppliers SuperShow (AS³). Velcon Filters will have a booth at the show, which takes place May 1 - May 3, 2001, at the Long Beach Convention Center. Stop by our booth (# **621**) and ask for a demo of **GSCC**!

If you know anyone who would like to receive ***The Clarifier***, fax their name, company and address to:

We also welcome your comments and suggestions on topics covered in ***The Clarifier***.

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