THE CLARIFIER

Volume 13 Number 1 **April 2002**

Velcon Soars Again!

Here is our latest limited edition poster. This year, we chose the exciting photo showing Lockheed Martin's Joint Strike Fighter, the F-35. This stealth fighter is expected to usher in a new generation of transformational weapons. To receive your copy of this poster, please contact us at vfsales@velcon.com, or www.velcon.com.

Coalescer Cartridge Changeout Recommendations

Velcon Filters recommends that coalescer cartridges should be changed in accordance with one of the following (whichever comes first):

A. When the differential pressure reaches the level specified on the cover page of the Operating Manual (15 psid for Jet Fuel and Avgas).

B. After an operating period of one year if the recommended differential pressure limit has not been reached.

C. Whenever effluent product is hazy.

The above changeout recommendation is included in all of our Aviation Fuel filter/separator vessel operating manuals.

We advise a one year changeout because there can be an insidious degradation to the coalescing ability of coalescers due to trace surfactants or a buildup of FSII. Most operators do not have easy access to run single element coalescer tests at one year, and then again at 18 months, as permitted by ATA-103.

Changing the coalescers at one year is good insurance to keep them from being disarmed. With a large amount of fiberglass contained in the inner pleated paper of the API/IP-1581 3rd Edition "qualified coalescers" ("qualified coalescers" is in quotes because, technically, it is a vessel/element combination that is qualified) we see the coalescers holding up better to being disarmed by surfactants.

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Relaxation Vessels

The subject "Relaxation Vessels" might bring to mind a leisurely cruise aboard a luxury liner, or the LoveBoat. However, Relaxation Vessels in a Jet Fuel system have nothing to do with smooth sailing on the high seas. A rather informal definition of a Relaxation Vessel is a "bump in the line" for Jet Fuel to take a break and ease away the stress of being forced through narrow passages – read on!

Consider the path of Jet Fuel as it is pumped from the refinery through a pipeline, aboard ship, into transport trucks, into terminals, and finally into the aircraft where it is burned in the jet engines for propulsion. The fuel is pumped through a number of various filter vessels (micronic, clay, dehydrator, filter/separator, monitors) in its "tortuous" path to the aircraft. In passing through the elements in these vessels, particularly the filter/ separator and monitor vessels, the fuel can become charged with static electricity.

Static electricity – huh? Remember dragging your feet across a carpet and then touching an object, like the doorknob, or your younger brother's nose? The visible and audible spark jumping from your finger to the

doorknob (or your brother's nose)? This is an example of static electricity.

Fuel becoming charged with static electricity can be dangerous. If there is enough charge produced, a spark could occur between the fuel and the vessel and a fire could occur. A lot of Jet Fuel is treated with static dissipator additive (Stadis 450) to add conductivity to the fuel to help dissipate the charge before a spark could occur. In the United States, however, most of the Jet Fuel is not treated with static dissipator additive, because there are a lot of clay treatment vessels in the system to remove unwanted surfactants. The clay also easily removes the static dissipator.

With no static dissipator in the U.S. Jet Fuel, how do we deal with the danger of highly charged Jet Fuel? Well designed fuel systems will provide for "relaxation" of the fuel after the F/ S or monitor vessels. Some systems have Relaxation Vessels downstream of the F/S and/or monitor vessels. These vessels provide for a relatively quiet place for the fuel to slow down, so that the charge can dissipate, or be conducted away from the fuel through the vessel and to ground. The Relaxation Vessels normally have the capacity for 30 seconds relaxation time. In a 600 gpm system, the Relaxation Vessel would normally have a 300 gallon capacity to accomplish the 30 second industry recommended relaxation time. On the outside, the Relaxation Vessels look like big F/S or micronic vessels. They are usually carbon steel coated internally with epoxy, but could also be made of aluminum or stainless steel. Relaxation Vessels can be vertical or horizontal. The Relaxation Vessels should also have the following accessories: pressure relief valve, automatic air eliminator, and manual drain. The drain should be opened daily to remove any water which could condense out of the fuel overnight. The vessel design should also allow access to occasionally clean the interior.

Section A-2-1.2.5 in NFPA 407 goes into more detail about the 30 seconds relaxation time; and also the subject of low conductivity fuel when fueling aircraft. This should be required reading for anyone involved in fueling aircraft. This Section still does not answer the question raised by refueler/ servicer builders about how much relaxation time is recommended downstream of the final filter/separator or monitor vessel for into-plane fueling. Is 0 seconds satisfactory? 3 seconds? At this time there is no agreed upon minimum relaxation time for low conductivity jet fuel downstream of the final filter when fueling aircraft.

Could your system use a Relaxation Vessel?

Velcon Filters, Inc. CO-718CE Clay Canisters

The following article is a reprint from the September, 1997 Clarifier. Many people have been asking about our clay canisters lately, so we thought it might be time to include this information again.

Direction of flow is from outside to inside. Maximum rate of flow per canister is 7 USGPM. The lower the flow rate, the better, since the longer the residence time (time of contact between the fuel and the clay) the more efficient the clay becomes in removing surfactants.

See Velcon Data Sheets 1223 and 1231 for technical details on the clay and CO-718CE cartridges. See the ASTM Manual No. 5, Manual of Aviation Fuel Quality Control Procedures for more information on clay treatment.

It is emphasized that clay treatment is not a mechanical filtering process. The clay adsorbs surfactants from the fuel in a surface attachment process. This can be likened to magnetic attraction of magnetic particles by a magnet. Because it is not a mechanical filtering process, relying on differential pressure buildup to change clay canisters is not reliable. Monitoring the MSEP or Swiftkit values upstream and downstream of clay is the only reliable indicator for predicting when to change clay. If the differential pressure across a clay treatment vessel reaches 15 psid, it has long ago stopped removing surfactants and is now an expensive, and not too efficient prefilter.

Care should be used when removing and installing clay canisters to insure against bypass or tearing of the outerwrap. When removing the canisters when they are stacked 3-high, for example, remove one canister per tie rod carefully so that the outer wrap does not scrape adjacent canister end caps. If there are 31 stacks or tie rods in the vessel, remove the top 31 canisters. This will help prevent tearing of the outer wrap and spilling of spent clay in the vessel bottom, which could increase time spent in cleaning the deckplate before installing the new canisters.

After the old canisters are removed and the deckplate is cleaned, install the bottom tier of 31 canisters carefully. Do not drop the canisters in place, but lower them carefully to insure proper centering on the mounting adapters. Then install the center plates, and the next tier of canisters, etc.

Coalescer Cartridge Changeout Recommendation, cont'd

However, even with a coalescer appearing to coalesce well, when we run an Interfacial Tension Test (IFT Test) with the first fuel coming from the coalescer over the first water, we have observed a good number of coalescers with IFTs lower than 30. This means that there is an unobserved (insidious) buildup of surfactants in the pleated media. Then it becomes a guess as to how long the coalescer will last before being badly disarmed by the surfactants. Microbial growth in systems (hydrants, storage tanks, etc.) upstream can also disarm coalescers with their waste by-products.

Even checking the sump for hazy fuel is not always a foolproof way to evaluate the installed coalescers. The coalescers might possibly be disarmed, but if there is no water in the system and encountering the coalescer elements, the sump product can still appear "clear and bright." But if the sump draining shows discolored water, and hazy fuel, it is a sure bet that the coalescers are disarmed and need changing.

Thus, Velcon continues to recommend a one year changeout of coalescers in the U.S. and around the world.

AS³ Tradeshow Winners

***Mike Wilkinson**, president of Rampmaster, Division of General Transervice, Inc.,Coatesville, PA - winnner of the Buffalo.*

The AS³ (Aviation Services and Suppliers Supershow) in Indianapolis, IN, was well attended in spite of the weather. Velcon Filters raffled stuffed Colorado wildlife. Two of the lucky winners are shown here. Not shown is the winner of the Howling Coyote, Joe Wulfkuhle, Equipment Specialist, of the Office of Aircraft Services in Phoenix, AZ.

***Carolyn Kachel,** Customer Service Rep. for Flightcraft, Inc., Portland, OR, with Gene Johnson of Velcon Filters. Carolyn won the Bobcat.*

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If you know anyone who would like to receive ***The Clarifier***, fax their name, company and address to the address listed on the left.

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

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