



The Clarifier

Volume 6 Number 2 (includes issues from 1995 back to 1989) May 1995

This issue offers a collection of past *Clarifier* articles related to aviation and fuel handling

CDF-K[®] Series Tests Completed

Velcon Filters, Inc. has completed qualification testing of the CDF-K series cartridges to the Institute of Petroleum Monitor Specifications, latest edition. The K series is similar in construction and performance to the previously qualified J series, but has a different water absorbing media. Tests were witnessed by representatives from oil companies.

The CDF-K series cartridges are used in refuelers and servicers to ensure into-place delivery of clean, dry fuel. ■

March 1995

Aquacon[®] Spin-On Filters

Remove dirt & water from jet fuel avgas

Aquacon spin-on filters are now available for low flow rate filtration typical of remote fueling applications. The ACO-40501SP and ACO-40901SP remove dirt and water before they contaminate your fuels.

These cartridges feature Aquacon super-absorbent media which removes free and emulsified water to 5 ppm and particulate solids to a 1 micron nominal rating. The Aquacon media chemically locks water into layers of filter media from which it cannot be squeezed out. Particulate contaminants are removed by an outer layer of filter media. As the Aquacon cartridge reaches its water-holding

capacity, the filter media expands quickly, restricting fuel flow and signalling the need for a cartridge change.

Conveniently install Aquacon spin-on filters directly on the fuel dispenser. Four mounting heads are available to support a range of applications.

The ACO-40501SP is 5-1/2" tall with a 3-3/4" diameter. The ACO-40901SP is 8-1/2" tall with a 3-3/4" diameter. Maximum operating pressure is 50 psi and maximum operating temperature is 200° F. ■

March 1995

Clear and Bright Test

Have you ever taken the Clear and Bright test downstream of a filter/separator vessel or monitor vessel and observed large pieces of particulate matter . . . pieces that were obviously too large to pass through a one-micron or tighter rated coalescer or monitor element? Ever wonder how they got there? At the request of one of our customers, we ran a monitor vessel test in our Colorado Springs lab and were surprised at what we observed – large particles of matter downstream.

During our test we used red iron oxide test dirt (roughly 50% by weight of particles smaller than 1/4 micron) upstream. We saw no red iron downstream on the filter membrane sample pads. However, we did see the large particles of pipe scale. How did they get downstream? Apparently the operators had flushed their system through the monitor vessel without having elements installed! There were niches in the downstream (outlet) chamber where these large particles had lodged during the

flushing, and were slowly working their way out, years after the flush.

We've also heard customers complaining of seeing excess dirt in downstream samples (filter membrane and/or Clear and Bright tests in clear glass sample jars) after installing new elements. These customers were very embarrassed, to say the least, when our Velcon distributors came out to investigate the problem. They observed that the insides of the vessels had not been

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Hydrokit®

Now available with
sensitivity at
15+ ppm of water

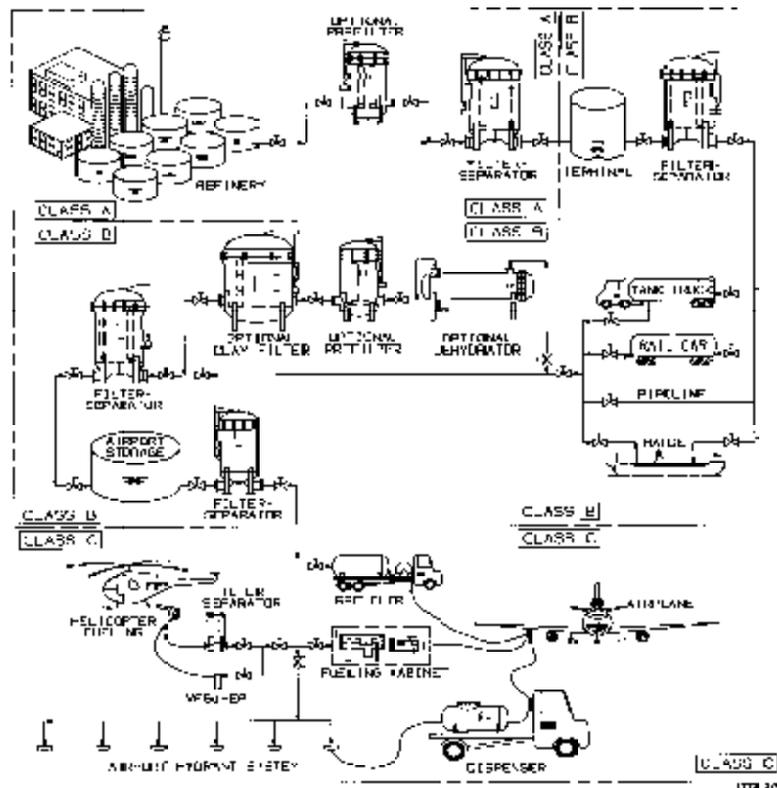
Velcon Filters, Inc. announces the availability of the 15 ppm water sensitivity HYDROKIT, an effective "Go, No-Go" field test for consistent response in detecting free water in a wide variety of aviation jet (turbine) fuels and diesel fuel.

The HYDROKIT's simple evaluation by color comparison makes it easy to use. Powder in the sample tube changes to a pink color when free water is present over 30 ppm, and over 15 ppm in the new HK25-15 and HK3-15 packages.

Choose from five different models varying in number of test tubes and water sensitivity. Each kit comes with sample test tubes, a wide mouth glass sample jar, needle holder assembly, instruction card and color indicator comparison card. ■

March 1995

Applications of Filters and Filter/Separators from the Refinery to the Aircraft



Recommended Placement of Filtration Vessels

March 1995

Clear & Bright

(Continued from page 1)

cleaned prior to the installation of new elements. In a number of these cases, the coalescers had burst due to operation at differential pressures way in excess of the recommended maximum of 15 psid.

The Clear and Bright test should be run and analyzed by experienced personnel. If you see the obviously large particulate matter, ask a few questions:

1. Are there elements installed in the vessel upstream?

2. Was the vessel cleaned before installation of the new elements?
3. Could this vessel have been used during flushing with no elements installed?
4. Could the elements have burst or collapsed due to operation at higher than 15 psid?
5. Are you taking the sample from the downstream sample point or drain, or from the upstream drain? There are vessels where it is not too obvious which is the upstream or downstream drain.

Also, occasional small fibers or particulate matter may exist in the

Clear and Bright jar possibly due to a bit of fiber migration from the elements (ten fibers per liter are acceptable per API-1581 and the IP Monitor Specifications), and to some slight particulate matter from the sampling connection or downstream pipeline. This takes some experience to understand the difference between "normal" acceptable fibers and slight particulate matter, versus evidence of a problem upstream. It is extremely difficult to pass this type of experience on to new QC personnel or to a new military QAR inspector. ■

December 1994

Valuable Velcon News

Stop...

Throwing away those used cartridges

In our continued effort to promote **FILter CARtridge REcycling (FILCARE)**, Velcon Filters is inserting a notice into each box of elements that we manufacture. The piece encourages the user to **STOP** before throwing away the used cartridges, and try recycling them instead. It's easy, quick, and environmentally friendly. Look for them now! As a special introductory offer, a 15% discount will be available to first-time FILCare customers. Contact Steve JoHansen at (719) 528-7260 for details. ■



December 1994

Field Problem Reports

Hints towards resolution

It's always useful to inspect new elements before draining the vessel. Although the shipping carton may show no wear-and-tear, elements can be damaged during shipping. While this rarely happens, it has happened more than once. Inspecting new elements could result in preventable downtime.

Distributors can protect elements during transit when they breakdown a carton from Velcon for unit sales. Unit cartons can be purchased at a reasonable cost, providing the right type of protection to prevent damage. For further information contact Velcon's order desk at (719)531-5855. ■

December 1994

Synthetic Separators Are Here

Velcon announces the availability of the white "synthetic" separator material in our SO-609SN and SO-609SNA separators. These separators are qualified to API 1581, 3rd Edition, to Group II, Class C conditions in the side-opener filter/separator vessels. The synthetic separators have the same low static charge generation characteristic as the Teflon® Coated Screen (TCS) separator vessels. The synthetic separators are designed for the operators who want the advantage of the low static charging separators, but who do not want to clean the separators for various reasons.

The SO-609SN and SO-609SNA separators can be ordered through your Velcon distributor. They are lower in price than the equivalent SO-609V and SO-609VA TCS separators, respectively. Qualification data sheets can be furnished for the vessel/element combinations that these separators qualify in.

Please contact Rick Waite, Petroleum Products Manager at (719) 528-7250 if you have any questions or need more information on the synthetic separators. ■

December 1994

Vessel Closure Torque Requirements

Bolted pressure vessel closures operate on the premise that the joint is clamped closed with a force sufficient to resist the internal pressure yet still maintain a seal. The clamping force, or pre-load, is applied by the closure bolts and its magnitude is controlled by the torque applied. Application of the correct preload is essential to maintaining a positive seal and avoiding closure failures from fatigue or overstressed vessel components.

The short term, and most obvious effect of grossly under-torqued bolts is insufficient clamping force resulting in a leaking closure. A more ominous result of under-torqued bolts in systems which see a great number of pressure cycles (such as refuelers, loading racks etc.), is bolt fatigue failure. Repeated applications of stress to the bolt eventually create a small crack at the surface of the bolt which continues to grow until the bolt breaks and the closure fails.

It is a good idea to re-torque the closure bolts after they have been in use for a month or so to ensure the joint has not "relaxed" and the preload reduced.

Over-torquing closure bolts will result in breaking or bending vessel bolt clips or actually breaking the bolt itself. Table One, below lists guideline torque

values for lubricated bolts for common sizes used for vessel closures. Always use lubricated bolts, as this reduces the required torque, improves torque accuracy, and retards corrosion.

A common cause of inaccurate bolt torque is inappropriate bolt torquing procedures. Key elements to the procedure are application of the torque in stages and in a specific cross-torquing sequence. For most applications, torque is applied to all bolts to 30% of full torque, then to all bolts to 60% of full torque, and finally to all bolts to 100% of full torque. Each torquing cycle is carried out in the applicable cross-torquing sequence. Torquing sequences vary with the number of bolts on the cover.

The tightening pattern is as follows:

Tighten two bolts diametrically opposite from each other, then tighten a second pair of bolts

diametrically opposite each other, approximately 90 degrees away from the first pair, and so on until all bolts have been tightened.

Using a clock as an example, the sequence would be:

12, 6, 9, 3, 11, 5, 10, 4, 7, 1, 8, 2.

On large vessels, the cross-torquing process is tedious but the addition of a second operator applying torque improves the situation vastly.

Correct closure torquing will result in many years of trouble-free vessel operation. Occasional inspections for bolt cracks or clip damage is good practice to detect possible closure problems before they occur. More detailed or specific information on bolt torquing requirements and procedures can be obtained by calling Jim Head at (719) 528-7255. ■

TABLE ONE	
Bolt Diameter (inches)	Recommended Torque (ft-lb)
1/2"	20
3/4"	45
1"	100
1-1/4"	160

December 1994

Hydrokit

Update

Smaller quantities now available

Velcon Filters is pleased to announce the availability of two additional new Hydrokit products. These are the HK25 and the HK3.0.

The HK25 contains 25 sample tubes, and is a convenient package for the smaller locations that do not need the larger HK1 (100 sample tubes) package. It contains one sample jar, one needle assembly and the same instructions as the HK1 package. Price is \$40.00.

The HK3.0 contains 3 sample tubes, and was designed (at the urging of United Airlines and some distributors) to be carried in the airplane. We

are modifying the instructions in this package so that the illustrations on the Form 1752 will also be included. This will make it easier for the pilots to run the test in a remote location. Price is \$15.75.

Both of these new products are available for immediate shipment from your Velcon distributor.

For planning purposes, we will be re-

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Hydrokit Update

(Continued from page 4)

numbering the Hydrokit products later in the year to more accurately identify the number of sample tubes per package. The HK6 will become HK600; the HK1 will become HK100; and the HK3.0 will become HK3. No major change, but it will become easier for all of us to identify the product.

We are also working on the release of another new Hydrokit product: the HK25-15. This 25 sample tube package will be designed to be sensitive to 15 ppm or more of water (versus 30 ppm or more in the existing Hydrokits). This will be a product that can be used by customers who point out that ATA-103 specifies 15 ppm (maximum) water in the fuel dispensed from storage and into aircraft. This should be available within 3 or 4 months. ■

September 1994

Standard Coalescing Tests

In the past, Velcon has performed standard coalescing and evaluation tests on returned coalescers from customers at no charge. However, due to the increase in our project activity, we find that we can no longer offer this free service. We will offer to perform the coalescing/evaluation checks for a charge of \$70.00 per coalescer. This charge is effective August 1994. There will not be a charge for tests where there is a suspected problem with the coalescer, or where a no-charge evaluation is authorized by a Velcon Marketing/Product Manager. ■

June 1994

Velcon's New Testing Lab

The View From Velcon

As we go to press on this issue of *The Clarifier*, the grand opening of our new Velcon test lab is just around the corner. For those of you attending Velcon's Open House at the end of June, you'll see for yourselves why I'm so excited about this facility.

One of the reasons I decided to relocate Velcon to Colorado Springs from San Jose was the opportunity to expand our R & D capabilities. One of our priorities is the design and production of the highest quality fuel filtering products available. When the lab opens in August, it will be the largest indoor jet fuel filter test facility in the world.

In its strictest sense, the lab will continue to spearhead the development of new Velcon products. In a wider sense, the lab will support Velcon's continuing desire to work with you, Velcon clients, to develop products specifically tailored to satisfy your needs.

I'm encouraging each and every one of you to come by for a tour, meet our talented lab staff, and see for yourself the largest indoor jet fuel filter test facility in the world, in operation.

Dave Taylor, President

8,200 square feet of R & D

In July of 1993, Velcon Filters moved its headquarters and a manufacturing plant from San Jose, CA to Colorado

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Pump Upstream of Filter/Separators

We have been asked a number of times if the pump can be placed downstream of a filter/separator vessel. We have recommended that pumps be placed *upstream*, and now, thanks to Howard Gammon, we can give you some valid reasons for this.

Placing the pump *downstream* of a filter/separator results in:

1. A negative effect on flow rate, particularly when the coalescers start increasing in differential pressure.
2. An adverse affect on air elimination on the filter/separator vessel.

The coalescers will then be only partially submerged in fuel, leading to excess flow at the bottom of the coalescers and separators, and possible water transmission downstream.

Much worse, the air space above the coalescers is likely to be a combination of air and fuel vapor mist that is highly charged electrostatically, and this can result in an internal fire.

Thus, we recommend that pumps be placed *upstream* of filtration equipment. ■

June 1994

Lab

(Continued from page 5)

Springs, CO. This was a complex process, involving a lot of manpower, brain-power, planning, and upheaval. At that time, Velcon decided the test facility also had to be moved. Providing our customers with the support and quick response that we are known for was the most important reason to have the test facility in Colorado Springs.

The test facility in San Jose was built in 1973. Over the years, it became clear that the lab test facility was a key investment to our growth, and that the lab made it possible to develop a variety of products that our customers needed while also allowing us to respond to customer problems quickly.

What also became clear over the years was that to provide quick response to customers and develop new products in a timely manner, the test facility had to be physically close to both technical and marketing people and to a manufacturing facility where test products could be made under the knowledgeable eyes of engineers.

Times change. In the world of fuel handling, many requirements have been tightened. The process of moving the lab turned out to be much more complex than moving equipment, furniture, and even people. Actually, the fuel test facility was not "moved", it was dismantled. With new mandatory specifications required, the Colorado Springs lab facility had to be built new. A variety of options for construction were analyzed: underground tanks, a special tank building, underground vaulted tanks and pumps. In the end, the Colorado Springs facility will be the *largest totally indoor jet fuel filter test facility in the world* at a cost of over \$1,000,000.

"New and Improved" Lab

These new requirements will result in a lab with improvements in both personnel and environmental safety. Experience is a very good teacher. Over the years, accidents and mishaps have occurred that required changes to the construction of fuel handling facilities. All of these changes have been incorporated into the Velcon lab. All electrical utilities in the facility are required to meet Class 1, DN1 Group D of the National Electrical Code. This is the official classification of the "explosion-proof" environment. This change further minimizes the chances of a fire in the facility.

The fuel pumps are also designed to minimize the chance of fire in that they are constructed of steel. The Denver fuel farm fire of 1991 bore witness to the need for steel pumps, which would have minimized the damage there.

The potential damage to the environment will also be reduced substantially. The lab's concrete floor is not only equipped with drainage notes that will collect spills, but under the concrete is a rubber barrier layer that extends up the walls to "double-contain" any fuel that may get through the concrete. Each room has concrete walls and a rubber barrier that extends from the floor to contain the fuel should the largest tank develop a leak.

The handling of water used to test filter/separators will be much improved. At times, the water drained from filter/separators contains trace amounts of entrained fuel. In the new lab, this water will be first cleaned by passing it through an oil/water separator, which will remove fuel levels to the ppm range. Following that, the water will pass through a series of activated carbon beds. This will remove the remaining fuel. This water will

then be pumped to our own evaporation pond, where it will quickly evaporate in the dry Colorado air. This completes the process of "no wastewater discharge" to the environment.

Our customers will also benefit. We have added higher capacity tanks and higher flow rate pumps to the system. This will allow us to obtain API qualifications of larger vessels.

Now for some "vital statistics":

Three - 14,000 gallon tanks
Two - 2,500 gallon tanks
One - 39,000 Gallon Evaporation Pond
Largest Pipe 10"
8,200 Square Feet Floor Space
12" Concrete over existing floor

"New and Improved" Products for Our Customers

The new facility will provide us with the capability to test at flow rates as high as 2500 gpm. This capability is critical to our Far East customers. Many airports in the Far East have fueling facilities that can refuel large jets at very high flow rates. In addition, many of these airports have single filter/separators that can handle these high flow rates. Due to the similarity requirements of API 1581, we must provide qualification tests at 1/2 the flow rate of those large filter/separators. One of our first tasks when the new facility is completed is to perform a qualification test at the 2500 gpm flow rate, utilizing a 44" diameter filter/separator. This will enable us to sell into those large filter/separators.

Another product that will undergo an upgrade will be the CDF monitors. Field testing is now underway on the CDF-K version. This model will be tested to the latest IP spec after field testing is complete. This model incorporates improvements that address

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Lab

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some field problems that have occurred in the past.

The US military, particularly the Air Force, is reevaluating much of their system of fuel handling. This includes the filter/separators that are used. Over the past few years, conversion of Air Force filter/separators to meet commercial API 1581 has proceeded. Further conversion may include updated designs of current coalescer models. Close ties with the Air Force, along with our partners, Gammon Technical Products and Beta Systems, will enable us to quickly respond to this new need.

Same Experienced Capable People

The "move" of the lab facility turned out to be quite complex. The expertise was much easier to transfer. All three of the people performing the fuel filter tests are now in Colorado Springs.

Although Jim Edwards, our test facility supervisor, is relatively new to Velcon, he is not new to fuel handling. Jim recently retired from the Air Force after 20 years experience with fuel handling. This experience involved fueling aircraft and operating and maintaining fueling equipment. Jim, a resident of Colorado Springs, has spent the last 8 months in San Jose, learning about filter testing. Although Jim learned a great deal about Velcon products and procedures in San Jose, both he and his wife, Vicky, are glad his long-distance "commute" is over.

David Garcia, one of our senior test technicians, has been in the nuts and bolts of fuel filter testing for all of his 5 years at Velcon. David knows both the API 1581 spec and the IP spec so well I think he could perform

the tests in his sleep. David is now beginning to adjust to the strange Colorado weather, after living his entire life in California.

Michael Gish, the senior "ist" test technician, has been performing a variety of tests on both fuel and oil filters for over 20 years with Velcon. He has performed over fifty witnessed qualification tests. Mike is our generalist, providing a variety of testing services for both the mundane and unusual designs that our engineers come up with.

When will it be done?

Construction of the new test facility continues. We are all looking forward to its completion, so we can get on with improving what are already the highest quality fuel filtering products available. Sales people want to continue to "fill their wagons" with new products.

Our construction contractor tells us that they will be done in August. Then our work begins to make it operational. At that time, the largest indoor fuel filter test facility in the world will begin to pay off for both Velcon and its customers. ■

June 1994

Sizing of Prefilter Vessels Size it Right

The value of a prefilter vessel upstream of a filter/separator vessel is readily apparent. The prefilter vessel, if properly sized with the correct micronic rated elements installed, will remove the particulate that would otherwise plug up the more expensive coalescer elements. This protects the coalescer elements so that they will remove any free water present and provide longer life.

We recommend that when sizing vessels for new installations, or for overhauling older sites, that the prefilters be sized to handle at least twice the maximum flow rate expected, and sometimes even three times the flow rate expected. Why the higher capacity? The slower flow rate through the filter elements makes them more efficient at removing and holding back the smaller particles. The time between changeouts is increased, which reduces manpower costs.

Take for example a typical new installation calling for a 600 USGPM maximum flow rate. Normal requests for quote would call for a 600 GPM filter/separator vessel, and possibly a 600

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Helpful Tips

Gasket "De-Swelling"

We have heard of gasket leaking problems at some Air Force bases where they are converting from JP-4 to JP-8 fuels. JP-4 has an effect on BUNA-N gaskets of swelling the gasket material a bit more than does JP-8 (similar fuel to Jet-A and Jet-A1, but with all

the additives, i.e: corrosion inhibitor, static dissipater, and fuel system icing inhibitor). Our recommendations if a customer is switching from JP-4 to JP-8 (or avgas or motor gasoline to a Jet A fuel) is to either simultaneously install new BUNA-N gaskets (vessel lid gaskets, flange gaskets, slug valve gaskets, etc.), or be prepared to do a lot of flange tightening after the conversion when the leaks may appear. ■

March 1994

Sizing

(Continued from page 7)

GPM prefilter (micronic) vessel, and sometimes the additional 600 GPM clay treatment vessel. Our 600 GPM prefilter vessel is VF-2029, containing 6 each FO-629PLF2 elements (or other micron rating).

Doubling the flow rate results in our 1200 GPM VF-2829, containing 12 each FO-629PLF2. However, extending the vessel height by 14 inches and installing 12 each FO-644PLF2M elements results in 1800 GPM rated VF-2844, which is only a few hundred dollars more than the 1200 GPM VF-2829. So, the VF-2844 would be our recommendation in this case!

Another side benefit which is not a well-known fact is that a prefilter vessel which is removing dirt at lower flow rates can also remove measurable amounts of surfactants. Certainly not as efficient as clay in this regard, it is still of value. We see this effect in our lab, and Jerry Dow, now retired from LAT in Charlotte, NC, was the first to actually measure this in the field.

Prefilters – oversize them for your own economic benefit!! ■

March 1994

————— *Peak Performance Tip*

Take It Easy With Those Additives

It is important to remember to turn off the additive proportioner when recirculating or defueling. Neglecting to do this could cause too much anti-icing additive to be released into the fuel, disarming coalescers and increasing the Delta P reading. It is also possible for too much additive to affect the epoxy coating in the filter/separator sump and tank bottom. ■

Spring 1993

Automatic Drain Valves

Velcon does not recommend, does not warrant, and now will not sell Automatic Drain Valves. The reasons for this policy are:

1. Automatic Drain Valves can malfunction too easily (dirt under the diaphragm, etc.), resulting in excess good product “down the drain”, or an expensive spill.
2. Even when they operate properly, they do not drain all the free water out of the vessel. Operators with Automatic Drain Valves either “forget” or intentionally do not open the manual water drain valves daily - which results in standing free water at the bottom of the vessel and most likely microbiological growth at the fuel/water interface.
3. They are not always installed properly. For example, the Cla-Val system requires a check valve in the supply line to the float control to insure pressure is kept on the drain valve to keep it closed when pressure is relieved from the vessel, as when draining the vessel for element changes. Too often this check valve is not installed, and the Cla-Val Automatic Drain Valve opens when the vessel is drained.

We recommend to those customers who have Automatic Water Drain Valves presently in use, that they remove these valves and plug those ports in the float control. ■

June 1994

Spin-On Filters for Avgas

Velcon introduces two spin-on filters designed for low flow rate filtration, typical of remote Avgas or Jet fueling applications. The ACO-40505SP and the ACO-40901SP both feature Aquacon super-absorbent media, which removes free and emulsified water to 5 ppm and particulate to 5 and 1 micron respectively.

Aquacon spin-on filters can be installed directly on the fuel dispenser. Five mounting head styles are available to support a range of applications.

An updated data sheet on Aquacon Aviation Fuel Filter Cartridges features information on these and other Aquacon cartridges for aviation applications. ■

Spring 1993

Metal Nameplates Now Available

For non-Velcon vessels that have been equipped with Velcon elements, metal nameplates indicating compliance with API 1581 are now available. These nameplates are available for \$10.00 and can be ordered through our Order Entry Department. Ask for Part Number 0552. Be prepared to advise us of the vessel model number, serial number, and element information.

Adhesive conversion labels, specifying compliance with API 1581 are also available, free of charge, from Marketing Services. Ask for Form 1448. ■

Spring 1993

Tier-By-Tier: Changing Clay Canister Elements

During the first element changeout of a new clay vessel, a customer recently reported that he found several used clay canister outer wraps torn, and clay on the vessel deckplate.

Our investigation of the matter revealed that the customer's mechanic had installed the elements one stack at a time rather than one tier at a time, as specified in the instruction manual. When clay elements are installed in stacks, the end caps of the elements being lowered into the vessel can tear the outer wraps of the elements already installed.

When clay elements are installed one tier at a time, the outer wraps are not damaged. The tier-by-tier procedure is a simple one:

1. Install the entire bottom tier of elements, lowering them carefully into place so that they are centered around the bottom seal plate.
2. Install centering plates and then the entire second tier of elements.
3. Repeat Step 2 for the third tier of elements.

To remove used clay canister elements, follow the tier-by-tier process in reverse. ■

Spring 1993

Proper Hardware is Critical

When installing new element hardware, be certain that it matches both the vessel and the elements. When the hardware matches only the vessel or only the elements, bypass can occur. Your local Velcon representative can assist you with hardware installation. Our Marketing Department is also available to answer your questions. ■

Spring 1993

Jet Fuel Types and Properties

Buckle up and prepare for take off

Ever wondered just what a JP-5 fuel was? Is it similar to standard commercial Jet-A? Which coalescer to use and what is the rated flow? Well, here is a layman's summary of the various jet fuels:

Jet-A narrow cut kerosene; standard commercial jet fuel in the U.S. which usually has no additives.

Jet-A1 like Jet-A, but has a lower freezing point. Used outside the U.S., and is the fuel of choice on long haul flights where the fuel temperature drops close to the freeze point. Usually is doped with static dissipater.

Jet-B wide cut kerosene, with "gasoline type" components present. Used widely in Canada, with static dissipater and has a very low flash point.

JP-4 like Jet-B, but with "all" the additives: corrosion inhibitor, static dissipater, anti-icing additive. Has

been used extensively by the US Air Force, but is being phased out in favor of the higher flash point, safer JP-8.

JP-5 like Jet-A, but with a higher flash point (140 deg F min.). This is the fuel used by the US Navy aboard their aircraft carriers. It has corrosion inhibitor and anti-icing (di-EGME) additives, but not the static dissipater.

JP-8 like Jet-A1, with "all" the additives: corrosion inhibitor, static dissipater, anti-icing additive. The USAF should be converted to this fuel by the year 2000.

As far as coalescers are concerned, the flow rates through our "85" and "87" series coalescers will be the same for any of the above fuels. Our API 1581, 3rd Edition qualifications apply to all the above fuels, even with their slightly different viscosities and gravities. ■

March 1994

Peak Performance Tip

Qualification Update

In May, 1992 we reported that Velcon had successfully completed 16 qualification tests to the Third Edition of API 1581. We are pleased to announce that another 13 tests have successfully been completed, bringing the total number of tests passed to 29!

Highlights include:

- Low flow rate vessels for Class B use
- High flow rate vessels for Class A and B use
- Low cost, low charging synthetic separators - for those who don't want to take the time to clean separators
- VV-1033 filter/separator - a no-frills vessel suitable for Group II, Class C (refueler) use at 100 GPM and 50 GPM for diesel fuel. ■

Spring 1993

Converting Bowser Filter/Separators with Gammon Technical Products Kit

Gammon Technical Products conversion kits, equipped with Velcon Filter's 6 inch diameter coalescer and separator elements, are fully qualified to API 1581, Second and Third Editions, Group II, Class B. Gammon kits are available for Bowser series 842 B, C, D, and E filter/separators and include all the necessary parts for making the conversion, except the coalescer elements, which can be purchased separately through local Velcon reps. Gammon also lends the purchaser all of the tools necessary to make the installation in the field, including a device for cutting the effluent standpipe down to the new required length.

To ensure a smooth, trouble-free conversion:

1. Check for good metal-to-metal contact throughout. Remove any paint or rust from the stand pipe to ensure good contact with the bonding strips. Check the contact

between the bonding strips and the adapter with a continuity meter. Good metal-to-metal contact reduces the possibility of the adapter becoming an unbonded charge collector with a high potential for electrostatic discharges.

2. You may encounter a standpipe made from nonstandard pipe. Before making a conversion, it is a good practice to measure the standpipe O.D. If it is more than 1/32" larger or smaller than the manifold supplied by Gammon, contact them before attempting the conversion.

3. When changing elements, the bolts around the neck of the adapter should be tightened to the torque recommended by Gammon Technical Products. Remember that gaskets may shrink slightly in service. ■

September 1992

Velcon Celebrates Its 40th Year

Forty years ago, Velcon Filters was founded as Enfab, Inc. by Lu Taylor, an Industrial Engineer, and the late Harold Higbee, a Tooling Engineer. Drawing on their extensive experience in the fiberglass industry, the company's first products were fabricated fiberglass components for the 2.75 Rocket.

The company was primarily engaged in manufacturing compressible fiberglass products on a job shop basis until 1960. The extensive technology gained during this period provided the basis for development of a proprietary fiberglass filter coalescer in 1957. This was initially introduced to the Military and Commercial Aviation Fuel markets, and subsequently to pipelines and refineries.

Thanks to the support and loyalty of our customers and distributors, our penetration of these markets has steadily increased. We now supply more replacement cartridges to purify jet fuel than any other company in the world.

Since 1953, our privately owned and operated company has prided itself on the development of innovative products, such as Teflon® Coated Screen separators and Aquacon water absorbing elements, and outstanding customer service. With Lu's son, Dave, now leading the way, we look forward to continuing to serve you for at least another 40 years! ■

Spring 1993

Helpful Tips

Eliminate Water Downstream of Your Filter

Even though you have a properly operating filter/separator or a vessel equipped with Aquacon or CDF cartridges, you may still get a small amount of water out of the nozzle first thing in the morning. No, your elements are not malfunctioning. Instead, dissolved water is condensing out of the fuel in that long length of pipe or fueling hose downstream of your filtration equipment. The fuel temperature in the pipe or hose may drop from over 100°F late in the day to 50° or 60°F in the early morning. As much as 1 ppm of dissolved water can condense out of the fuel per degree of temperature drop.

Recirculating fuel back into the storage tank before the first fueling is recommended to insure the driest fuel possible going into-plane. ■

September 1992

Pressure Surges In Filter/Separators

Both API 1581 and Mil-F-8901 specifications require that coalescer cartridges withstand 75 psi differential pressure. To qualify to these specifications, clean cartridges are loaded with contaminant until the pressure differential across the cartridge reaches 75 psi. This means that the pressure upstream of the cartridge is 75 psi greater than the pressure downstream.

In spite of this large safety factor over the recommended coalescer changeout pressure differential of 15 psi, ruptured elements are occasionally found in systems where high pressure differentials have not been

(Continued on page 11)

Pressure Surges

(Continued from page 10)

detected. The cause of the phenomenon may well be the effect of surge pressures on elements that are blocked with contaminant.

When new elements are installed in a filter/separator and the pump is turned on, the surge passes easily through the layers of the cartridge because there is little or no resistance created by trapped contaminant particles. However, if the pressure differential increases because of the gradual buildup of a dirt load in the cartridge, the resistance to this shock becomes greater and greater. It has been estimated that with a 15 psi pressure differential during normal flow, as much as 90% of a sudden shock pressure will become differential pressure as the surge passes through the coalescer element. In other words, the surge simply cannot pass through a cartridge that is blocked with contaminant. In a 300 psi system without surge controls, it is easy to see why elements can be ruptured when the pump is turned on. ■

September 1992

Refueling Military Aircraft

A large number of commercial airports have contracts to fuel military transit aircraft. According to our Naval and Air force QC specialists, if a filter/separator vessel is qualified to the latest edition of API 1581, Group II, Class C (mobile filter/separators), a certification letter can be issued to the airport of FBO stating that the effluent quality of the fuel will meet the requirements of Mil-F-8901E.

If you need this type of certification letter, please contact Rick Waite, Aviation Products Manager, and provide him with the filter/separator model number, flow rate, and elements currently installed. A certification letter will satisfy military inspectors. ■

May 1992

How to Improve the Performance of Water Absorbing Cartridges

Peak Performance Tip

Water can get into fuel in a variety of ways: leaking storage tanks, sheared-off vent pipes, leaking dome covers on trucks, etc. Numerous tales from the field attest that CDF and Aquacon cartridges stop the flow of contaminated fuel and protect against water transmission into aircraft.

To ensure that your water absorbing cartridges will perform properly at all times, we strongly encourage the following:

1. Drain sumps daily.

A. For vessels fitted with CDF or outside-to-in flowing ACO series Aquacon elements, the sumps must be drained to remove any water that may have accumulated. Remember that the product drained from the sumps of these vessels is unfiltered. Samples for checking fuel quality must be taken downstream of the elements. This may be done from the filter outlet chamber, the filter outlet nozzle sample connection, or the fueling nozzle, depending on the installation.

B. For filter/separators that have been converted to inside-to-outside flowing ACI series Aquacon elements, the samples taken from the drain sumps are filtered fuel and the procedures are the same as for filter/separator sump sampling.

2. Changeout when the differential pressure across the cartridge(s) reaches 15 psid or when the fuel flow noticeably decreases. Educate your operators/drivers about how these elements work. They may otherwise try to force a few more gallons through a plugged-up cartridge. The rapid on/off operation of some pumps can also create enough surge pressure to damage a plugged cartridge.

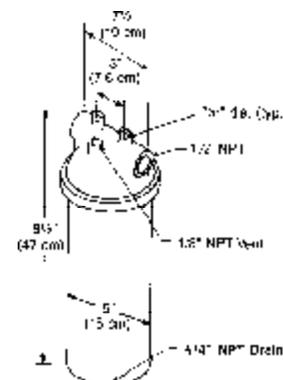
3. Be sure that a replacement cartridge is installed when one is removed. Some operators have mistakenly assumed that the reduced flow rate was due to an "oversensitive" cartridge. A replacement cartridge wasn't installed, and bad things happened. A little education about how water absorbing cartridges work can correct this misinformation. ■

September 1992

Product Innovation

New Improved Vessels

The model Numbers VF-61E and VF-61EP filter housings will now have drain valves with 1/4" NPT fittings. This will reduce the time required to drain the vessel when replacing elements. ■



September 1992

When Is It Time to Change Clay Elements?

This is a tough question we are often asked and for which there is no easy, universal answer. Many users mistakenly change elements on the basis of a 15 psi differential pressure reading. Delta P readings increase as a result of dirt and are not an indication of the surfactant removal ability of the clay, which is often used up before 15 psid is reached.

To check the condition of clay elements, we recommend taking upstream and downstream samples, then checking one or more of the following:

1. If the clay is doing its job, membrane samples should show an improvement in downstream color. However, this won't be detectable if the upstream fuel sample shows little or no color.
2. Active clay should produce a marked increase in the WSIM (or MSEP®) reading. However:

- A. The standard WSIM test is performed by sending a sample to an oil company lab.

This takes time and is costly. Often the fuel has been delivered to the aircraft long before the results are known.

- B. The Microsep unit available for performing MSEP (similar to WSIM) tests in the field is expensive, and requires a skilled operator.
3. Active clay should produce an increase in the interfacial tension of fuel over water (IFT). Unfortunately, this is also a lab test.
4. Active clay should produce a reduction in the electrical conductivity of the fuel. There are field instruments to measure this but unfortunately, we know of no data indicating how much this should be for various fuel/additive combinations. However, if there is no decrease in conductivity across the clay, you can be sure that the clay is completely spent.

MSEP is a registered trademark of EM-CEE Electronics, Inc.

May 1992

On-Off Ball Valves on Sampling Connections

Velcon **STRONGLY RECOMMENDS** installing on-off ball valves on sampling connections for both new and existing filter vessels. An on-off ball valve provides two advantages:

1. With the ball valve in the closed position, the sampling equipment can be connected with assurance of no fuel spray.
2. If the sampling quick-disconnect fitting were to start leaking without an on-off ball valve, system shutdown and draining would be required to fix the problem. ■

May 1992

3-Way Valves and API Publication 1581

API 1581 requires the installation of a direct reading pressure gauge and a downstream 3-way valve. Installing a 3-way valve allows the outlet pressure to be blocked and the operation of the gauge checked.

When quoting filter/separator vessels, Velcon normally specifies the Gammon Gauge (GTP-534-30A) and a downstream 3-way valve (option S). ■

November 1991

Show Your Latest API 1581 Qualification

Velcon now offers two ways to show your latest API 1581 qualification:

- 1) Adhesive decals for API qualified filter/separators are available from us at no charge. This decal (form 1448) can be used on other manufacturers' vessels as well as our own.
- 2) New metal nameplates can also be ordered for Velcon filter/separators showing the latest API 1581 Qualification. ■

November 1991

Relaxation Chambers Available

Our Beta Systems division has four 150 gallon relaxation chambers in stock, ready for immediate delivery. These are aluminum ASME code stamped vessels, suitable for 300 GPM systems that meet US Navy specifications for refuelers. Connections are 3 inch victaulic.

For more information, contact:

Paul Dunlevy
Beta Systems
1209 Freeway Drive
Reidsville, NC 27320-1737
Phone: (919)342-0306
Fax: (919)342-3516

November 1991

API 1581 - A Historical Perspective

API 1581 is an important industry document that receives frequent mention in Velcon literature and *The Clarifier*. API 1581 has become the accepted commercial standard for mechanical and performance Specifications and Qualification Procedures for Aviation Jet Fuel Filter/Separators.

Industry Standard Needed

Before this specification was developed in 1973, oil companies, airlines and fueling contractors relied on Mil-F-8901 or an oil company's specification for filtration guidelines. Unfortunately, Mil-F-8901 was (and is) only a performance specification, and was not really relevant to commercial equipment. Arguments about how Mil-F-8901 should be interpreted and applied were frequent.

Oil company specifications were more relevant than Mil-F-8901, but they all had different performance requirements. This resulted in different types and sizes of filter/separators and elements being supplied depending on the specification.

In the early 1970's, an API committee was formed to develop a relevant, standard performance specification for commercial equipment. After review by API members and filter manufacturers, the First Edition of API 1581 was published in May 1989.

Keep in mind that API specification procedures qualify the entire filter/separator, not just the elements. Strictly speaking, there is no such thing as an API qualified element. There are only elements that are used in a filter/separator that is qualified to API by test or by similarity to a tested vessel.

Velcon Develops New Elements to Meet First Edition Requirements

Prior to the First Edition of API 1581, Velcon supplied "6" and "80" series coalescers for specifications requiring uninhibited fuel. The "81" series coalescers were supplied for specifications requiring testing in fuel with the additive ASA-3. Velcon's "83" series coalescer was developed to meet the tighter filtration requirements of the Group II test. The Group II test included doping the test fuel with both ASA-3 and Santolene C. This combination of additives made both coalescing of water and filtration of the very fine red iron oxide (RIO) more difficult than in earlier specifications.

The "83" series coalescer was run in ten different qualification tests in a variety of filter/separator configurations. In 1978, the "84" series coalescer was developed for Group II, fixed installation (Class B) specifications. The "84" se-

ries passed these tests at higher flow rates than the "83" series.

Second Edition Makes Testing Tougher

The Second Edition of API 1581 took effect in June 1980. This edition increased the amount of ASA-3 additive used in the Group II test, and made water separation more difficult. The addition of clay treating before each test series also made for more rigorous testing.

The Second Edition contained a "Grandfather Clause" essentially stating that equipment qualified to the requirements of the First Edition could still be used. Since our customers were satisfied with the performance of the "83" series coalescers, and feared that the tighter filtration requirements of the Second Edition would result in shorter element life in the field, Velcon did not run any Second Edition qualification tests.

The Testing Gets Tough, The Tough Get Innovative

Velcon began gearing up for the rigorous demands of the Third Edition in 1987 with the development of our "85" series coalescer, for use in Class A and Class B fixed installations. This development was quickly followed by the "87" series coalescer, for use in Class B (fixed) and Class C (mobile) installations.

The Third Edition of API 1581 was marked by four major changes:

- 1) The addition of an upstream globe valve to ensure dispersion of the RIO.
- 2) Time limitations for the "Grandfather Clause".
- 3) The inclusion of fuel environmental tests.
- 4) Using Hitec E-580 fuel additive rather than Santolene C.

The use of a globe valve on the test equipment was the most significant change in the Third Edition, as it assured uniform test conditions regardless of the manufacturer.

Leading the Way

To date, Velcon has completed 16 qualification tests to the Third Edition of API 1581 for various configurations of Class A, B and C installations. To the best of our knowledge, the combined total of Third Edition qualification tests by other companies is about six.

The "85" and "87" series coalescers used in our Third Edition qualification tests provide finer filtration and longer service life, particularly in filter/separators that are changed on pressure differential. ■

Spring Brings Dormant Filtration Equipment to Life

Now that warm weather is here, it's time to clean up filtration equipment that was unused during the winter. The following suggestions will help you get ready:

- **Drain all water from the bottom of storage tanks and filter vessels.**
- **If the water drained out is dark in color and shows evidence of bug growth (slime), consider treating the fuel with BIOBOR JF.**
- **Recirculate the fuel as often as necessary to remove water, particulate and slime. ■**

May 1992

Product Innovations

Improved All-Fiberglass Coalescers

We have upgraded the outer layer of coalescing material in our all-fiberglass "0", "2", "4" and "6" series elements. This outer layer is immediately under the sock. The foam material is the same as we have always used on our API qualified "83", "85" and "87" series. This change will improve coalescing performance, but will have no effect on filtration performance.

Production of the improved design began in mid-February. You will notice the difference if you squeeze the element. The old design feels hard while the new design feels soft.

If you have any questions, please contact Rick Waite, Aviation Products Manager. ■

May 1992

"Winterizing" Filtration Equipment

With cold weather rapidly approaching in northern latitudes, the following suggestions will help keep your filtration equipment delivering clean, dry fuel:

- **Check that the sump and drain heaters are functioning.** Heaters should be large enough for your equipment and properly located. Localized heating can give a false sense of security, and allow the delivery of contaminated fuel.

"Everyone knows that when the fuel temperature is below freezing, any water in a system will be solidified, so they think, 'What's the harm until it thaws?' But, consider receiving a delivery of new fuel which may be above freezing and containing some water!"

Monte Parrish
NEI Fluid Technology

- **Check water-defense systems for complications caused by small amounts of frozen water.** Watch for ice partitioning a water detection probe, a freezing float mechanism, or an ice blockage in the line of a remotely located float control on a refueler.
- **Equipment with sight gauges should have isolation valves in good working condition.** Otherwise, there's a risk of water freezing in the sight glass. Frozen water near the base of the sight glass

or at the isolation valve can prevent an accurate sump check.

- **Check for automatic air eliminators that may have "frozen" closed.** A little "tapping" after changing elements in freezing weather will get the float to drop.
- **Apply a coating of grease to davit pipes, which are used to raise the heads of large filter/separators.** Water that seeps between the davit pipe and the guide pipe can freeze during cold weather, making it very difficult to raise the vessel head. Apply the grease when the head is in the raised position. Be sure there is a bead of grease around the davit pipe and the guide pipe after the head has been lowered into place. This practice can also be used for year-round protection against rust buildup between the two pipes.
- **If a system allows, recirculation of fuel through "prefilters" can help reduce ice crystal related restrictions in the dispensing filters.** The tighter the prefilter, the better.

For more information on cold weather operation, see GamGram No. 30, available from Gammon Technical Products, 235 Parker Ave., Manasquan, NJ 08736, (908)223-4600. ■

Many thanks to Monte Parrish for his contributions to this article

November 1991

Put an End to Bypass Problems

In side-opening filter/separators, when stacking open-ended coalescers two per stool, it is **critically important** to keep the element stack horizontal without any sag. Even a slight amount of sag (about 1/2") can lead to the elements angling away from the center plate, resulting in bypass. Installing a spider and insuring that the stack is **straight** is a **MUST** to prevent filter bypass in this situation.

Another method for preventing bypass problems in side-opening filter/separators is to install one-piece threaded-base coalescers with 6000T screw base adapters. With very few exceptions, all side-opening vessels can be fitted with screw base adapters. ■

May 1992

New Improved End Cap Design

For 6 Inch Diameter Coalescers

- It's been in the development mill for over 2 years!
- It improves the product's appearance and reinforces the image of a quality product!
- It's Threaded Base Coalescers with blue-colored, injection-molded, glass-filled, high-strength, heat-stabilized nylon end caps. These end caps are bonded to the coalescer with high strength epoxy.
- It's Open-Ended Coalescers with aluminum end caps, also bonded to the coalescer with heavy duty epoxy. ■

March 1990

All "6" and "83" Series Coalescers Upgraded to Cotton Socks

Beginning November 25, 1991, all "6" and "83" series coalescers will be produced with treated cotton socks. This is the same sock material that is used on our Group II qualified "85" and "87" series, and it has consistently given better coalescing performance than the synthetic material previously used on standard "6" and "83" series cartridges.

In the past, many customers who wanted the better performance of cotton on "6" and "83" cartridges had specified this by adding "#" to the end of the model number. You should continue using the "#" to guarantee you don't inadvertently get some older stock with synthetic socks. We will advise you in the future when it is no longer necessary to use the "#". ■

November 1991

MTBE OK for Coalescers

Many oil companies are adding MTBE (methyl tert-butyl ether) to automotive gasoline at the refinery. This is part of a growing trend to supply "cleaner" gasoline. Some people call this "oxygenated" gasoline.

We have been asked if MTBE, sometimes found in concentrations as high as 15%, will have any effect on coalescing at the refinery stage. After testing in our lab, we have found that MTBE has no adverse effect on either coalescing performance or our Aquacon cartridges.

However, further in the production process, when the manufacturer adds a potent detergent additive package to automotive gasoline, coalescers will not remove water at all. ■

November 1991

Our new 2 - lug 6000T Screw Base Adapter

When properly installed, with a lug on each side of the cross bar or "tongue," the 6000T adapter will not rotate.

Once the adapter is correctly mounted, it should be torqued to 15 ft. lbs. It's a good idea to check the torque on the 6000T adapter at each cartridge changeout. ■

June 1990 News Flash

Material Safety Data Sheets Not Required for Velcon Products

As part of the government's "Right to Know" laws, businesses are required to keep Material Safety Data Sheets (MSDS) on every product they use.

Under the Code of Federal Regulations, section 1910.1200 (c), Velcon's filter elements and vessels meet the definition of "article". "Articles" are exempt from the MSDS requirement.

If you require a letter stating that our products are exempt from this requirement, please let us know. ■

November 1991

New Improved Aluminum Coated Steel End Caps

In the past, tin-plate steel has been used for the end caps on our FO series filters (both pleated paper and fiberglass media types), and some of the Aquacon cartridges. We recently finished converting all of these to aluminumized steel.

The new caps have much better corrosion resistance. They are also much stronger (.03 vs. .015 inch thickness). This will significantly reduce freight damage. ■

November 1991

Stronger threads for 4XXXT Coalescers

An injection molded threaded insert will become standard on 4-inch diameter threaded-base coalescers. Typically, these cartridges are used in the old Bowser 842 Series vessels and in conversions using our 4000T threaded base adapters.

These inserts are made of the same durable glass-filled nylon as our highly successful 6-inch diameter blue end caps, which significantly improve resistance to cross-threading. The insert is molded into the polyester resin base during manufacture.

In the past, we have used a threaded aluminum insert on certain models designated "TM". These models will be phased out as the new nylon insert becomes standard.

The color of these inserts is close to that of the resin end caps. You'll have to look closely to spot them. ■

July 1991

Prevent Fires in Filter/Separators

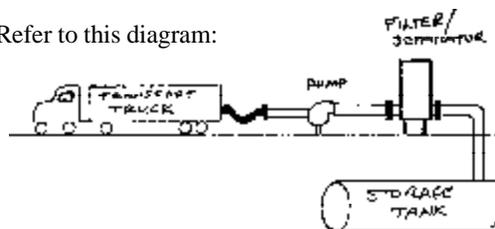
Fires in vessels start from sparks caused by electrostatic buildup in the coalescer. Air, which is needed to sustain the fire, can get into a filter/separator two ways:

1. **From the transport truck.** The air eliminator on the filter/separator is not sized to handle a lot of air, which can be pumped from the truck as it completes unloading fuel.
2. **Backwards through the air eliminator.** When there is no positive system pressure, fuel in the above-ground filter/separator will flow down into the tank, drawing air in backwards through the air eliminator.

To help prevent vessel fires, we recommend you install the following accessories:

1. A **check valve** above the air eliminator. This will prevent siphoning through the filter/separator.
2. A **large capacity air eliminator** (bulk air eliminator) located in the line after the pump and before the filter/separator.
3. A **spring-loaded check valve** (with a cracking pressure of less than 5 psi) in the line downstream of the filter/separator, above the storage tank.

Refer to this diagram:



For more information on fires in filter/separators, read GamGram No. 15, available from Gammon Technical Products, Manasquan, NJ (908)223-4600 ■

July 1991

"87" Series Now Qualified for Class B

We are pleased to announce that Velcon has just successfully completed a series of four API 1581, Third Edition, Group II, Class B qualification tests using "87" series coalescer elements. The tests covered both horizontal and vertical fixed vessels with both "V" and "C" series TCS separators. "87" series coalescers may now be used in any element sets for which the "85" series are qualified.

These tests were carried out to satisfy those customers who only wanted to stock one type of element for both their Class B and C equipment. The qualified flow-rate for a given "87" series coalescer element is the same as that of an "85" series coalescer of the same size.

We will continue to offer the "85" series because we believe it provides the greatest contaminant holding capacity for field operations of any coalescer element on the market. Customers who change their elements on pressure differential rather than time are advised to continue using the "85" series.

Note:

The "85" series coalescer is still the only element qualified for Group II, Class A service. So, while the "85" and "87" series are interchangeable for Class B service, they are not interchangeable for Class A service.

In summary:

Service	Series
Class A	"85"
Class B	"85" or "87"
Class C	"87"

To date, Velcon has completed 16 qualification tests to the Third Edition of API 1581 for various configurations of Class A, B and C. To the best of our knowledge, the combined total of Third Edition qualification tests by all other filter companies is about six.

Representatives of some of these companies are already making claims that their elements are qualified by test to the Third Edition. This is not a valid claim unless a similarity data sheet can be produced to show that the API requirements are met for the particular filter/separator for which the elements are proposed. API 1581 is a specification for qualifying filter/separators, not elements by themselves. ■

June 1991

Introducing the I-63185TB A New Coalescer Element

Last fall we announced the availability of Gammon Technical Products conversion kits for Bowser 842 Series vessels. These kits used our I-63385TB coalescers.

We are now recommending the new I-63185TB coalescer be used with the Gammon conversion kit. This new element meets the latest requirements of API 1581, and was designed specifically for use with the Gammon conversion kit. The new I-63185TB has a considerably lower price than the I-63385TB. Try it, we know you'll like it! ■

June 1991

After 25 Years, A Note of Clarification

One of our customers recently reported different results from running a water test on a dry TCS separator than when running the same test on a fuel-wetted element. He asked which is the correct way to water test a TCS separator.

The answer is that they should always be fuel-wetted prior to testing. This is the condition under which they are used, and this is the way they are tested by our lab personnel when preparing for the highly demanding conditions of an API qualification test.

We'll be revising our TCS Separator Maintenance data sheet (Form 1242) to include a note covering this. It's kind of surprising that this point hasn't come up before in the 25 or so years we've been providing TCS separator testing advice. ■

June 1991

New Information Now Available on Mobile Equipment

A revised data sheet is now available on our **Filter/Separators for Mobile Fueling Equipment**.

Improvements include:

1. Easier to read format.
2. Updated flow rates and dimensions. Remember, dimensions given are for **estimating purposes only**. We try to be as accurate as possible, but design improvements are ongoing.
3. Three new vessels:

HV-2456M	760 GPM
HV-2856M	1310 GPM
HV-2628M	885 GPM
4. Listing of appropriate "87" Series coalescers for applications where compliance to API Specification 1581, Third Edition is required. Unlike almost all competitive offerings, these filter/separators are **fully qualified by test to the Third Edition**. ■

March 1991

It's Elementary!

Our separator cartridge sheet (Form 1521-R3) has been replaced by an updated sheet:

**Separator Cartridges:
Filter/Separator 2nd Stage Elements**
(Form 1521-R4).

This sheet is designed as a companion piece to our recent sheet on coalescers: Coalescer Cartridges for Aviation Fuel and Industrial Use (Form 1732). Details include how separator cartridges work, construction and specifications. ■

March 1991

Here It Is!

New HV Series Horizontal F/S Data Sheet

When our Velcon Filter/Separator VV Series data sheet was first revised in late 1989, the HV Series Horizontal Filter/Separators for fixed installations were left off. Many of you thought we'd stopped making these vessels. "No, no," we assured you, "we're still making these vessels, we're just working on a new data sheet (Form 1736)."

Note the important benefits these popular vessels offer:

1. Convenient cartridge access makes for easy cartridge changeouts.
2. Minimizes the chances of dirt getting downstream during changeout.
3. Qualified to the latest edition of API 1581, Group II, Class B.
4. Cost effective!

Models are offered with flow rates ranging from 100 GPM to 1400 GPM.

In summary, we think the horizontal end opening configuration is the optimum design if alignment with microfilter and/or clay treater flanges is not a key factor. ■

February 1991

More New Equipment Qualified to API 1581, Third Edition

As a result of continuous testing, we are now able to offer Class A equipment that is fully qualified to the Third Edition of API 1581. Class A equipment is for use in fixed facilities, typically large marine terminals. ■

February 1991

Dummy Elements May Improve Monitor Operation

While it's not recommended practice, some monitors in the field are operated at flow rates far below their rated flow. This sometimes makes it impossible to get the pressure differential reading needed to be certain that elements are installed and intact.

At the request of some of our customers, we have developed Dummy Monitor Elements (DME) for use in such vessels. For a clean pressure drop reading of 2 to 3 PSID, sufficient DME elements should be used to bring the actual rate through the remaining CDF elements up to at least 50% of their rated flow.

DME's consist of two CDF element type blind end caps welded to an unperforated tube made of the same material. The process for welding the end caps to the body is also the same as used for CDF elements. Therefore, the DME series are chemically stable in aviation fuels and additives. The collapse strength is well in excess of 200 PSID.

<u>MODEL NO.</u>	<u>LENGTH</u>	<u>SCHED</u>	<u>QTY/CARTON</u>
DME-220	20"	15	12
DME-230	30"	15	12

Reusable DME's can yield a payback from the second element change onward.

For a CDF-230, 50% of rated flow is 15 GPM and for a CDF-220, 10 GPM. Here are some examples of how to calculate the number of elements required at reduced flow rates:

1. A 600 USGPM rated monitor containing 20 x CDF-230H is determined by measurement to be actually operating at only 60 USGPM.

$$\frac{60 \text{ USGPM actual flow rate}}{15 \text{ USGPM per CDF-230H}} = 4 \text{ x CDF-230H to be used}$$

$$20 \text{ holes total} - 4 \text{ x CDF-230H} = 16 \text{ x DME-230 to be used}$$

2. A 400 USGPM rated monitor containing 20 x CDF-220E is actually being operated at only 120 USGPM.

$$\frac{120 \text{ USGPM actual flow rate}}{10 \text{ USGPM per CDF-220E}} = 12 \text{ x CDF-220E to be used}$$

$$20 \text{ holes total} - 12 \text{ CDF-220E} = 8 \text{ x DME-220 to be used}$$

In cases where the equation does not work out to even elements, use the lesser number of CDF elements. For example, if the equation works out to 9.6 x CDF-230H for a vessel with 20 element holes, use 9 x CDF-230H and 11 x DME-230. ■

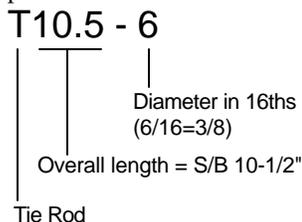
December 1990

New Tie Rod Model Numbers

The part numbering system for our tie rods is being changed to a format that tells you a whole lot more about the part – much like the part numbering system for coalescers and separators.

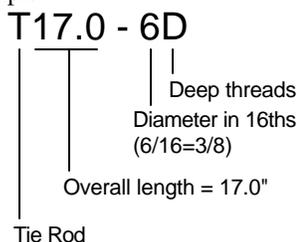
The basic format is: TXX.X - X

For example:



The *standard* threads are **3" deep** at one end, **2" deep** at the other. For SO-6XXG assemblies needing longer threaded ends, the part number is TXX.X - XD. The "D" indicates *deep threads* – 7" at one end, 4" at the other.

For example:



Bowser 842 Series Conversion API 1581

Gammon Technical Products conversion kits equipped with Velcon Filter's 6-inch diameter coalescer and separator elements are fully qualified to API 1581, Second and Third Editions, Group II, Class B for use in Bowser (or Keene) series 842 D and E filter/separators. A test was successfully carried out at our lab in mid-August at a 600 USGPM rated Bowser 842D-600 with a Gammon conversion kit installed. Ten airline, oil company and fueling contractor representatives witnessed the test.

February 1991

(Continued on page 19)

Bowser 842

(Continued from page 18)

The vessel was fitted with the Gammon conversion kit and 10 x I-63385TB and 3 x SO-640VA elements. The full complement of 4-inch elements for this vessel is 24 coalescers and 24 shrouds so the potential savings in replacement element cost is substantial. In addition, no manufacturer has an API 1581 Qualification to the Second or Third Edition at this time using 4-inch diameter coalescers with shrouds.

Gammon kits are available for a variety of Bowser vessel sizes and include all the necessary materials for making the conversion except the coalescer elements, which can be purchased separately through local Velcon reps. Gammon also lends the purchaser all of the necessary tools to make the installation in the field, including a device for cutting out the effluent stand pipe.

For further information, call Gammon Technical Products in Manasquan, NJ (210)223-4600. ■

September 1990

Element Update

The ACO-31005B *Aquacon* cartridge, which fits in Purolator's PR-172-3 vessel, has been replaced by the ACO-31001B – a one micron element.

Why the change? Why not offer both elements? Well . . . a major oil company using this element is standardizing on 1 micron elements for both Avgas and Jet Fuel. Unfortunately, there's just not a high enough demand for this element to allow us to offer both 1 and 5 micron versions. The 1 micron ACO-31001B can be used in both Avgas and Jet Fuel service.

The dimensions and collapse pressure remain the same. ■

September 1990

Keeping Those Floats Under Control

Our **Float Control/Slug Valve Hookup Instructions** (FCSVH, Rev. 3) have been revised. Updates include:

1. An arrow showing flow direction for the check valve (Y).
2. A note indicating that the automatic drain valve should be installed horizontally. Installing it horizontally prevents leakage and air pockets, which affect the operation of the diaphragm.
3. Showing the vent line from port V disconnected. The vent can be left open with a bucket underneath to catch "position change" drippings or it can be connected downstream of the manual or automatic water drain valve. ■

December 1990

Coalescers are in the Pink

As you probably know, those protective polybags covering coalescers can cause problems if they're not handled properly. It's recommended that the polybags be left on during installation and then removed SLOWLY before the vessel is closed. If the polybag is removed too quickly, it can cause a buildup of electrostatic charge and the possibility of generating a spark within the vessel.

Beginning this fall, to eliminate the static buildup problem entirely, we will be packaging our coalescers in polybags made of anti-static film.

Oh...by the way, so that you're not surprised when you open a new box of coalescers, the new anti-static polybags are a lovely shade of pink. ■

June 1990

Velcon R & D, at it Again

Velcon has successfully completed yet another round of API Testing! During the Merry Month of May, THREE tests were completed qualifying element sets to API 1581, Group II, Class B (fixed), Third Edition.

These tests incorporated our "85" series coalescer cartridges and also mark the qualification of our new, improved coalescer end caps (see March 1990, vol. 2, No. 1 News Flash).

1. Vertical Vessels Using "C" series Teflon coated screen separators.

This is good news for customers who currently have this style separator installed. Now they can have their filter/separators completely qualified to the Third Edition without changing separators.

2. Low flow rate (60 to 480 GPM) Horizontal Vessels.

This is good news for customers with smaller installations. ATA 103 requires receiving filter/separators to meet Class B. This new qualification also allows customers with fueling cabinets to be in complete compliance with the Third Edition.

3. Higher Flow Rate (up to 1984 GPM) Horizontal Vessels

Horizontal filter/separators offer substantial operating advantages over vertical vessels in fixed installations. We plan to publicize these in a new data sheet.

Of course, all appropriate similarity sheets will be added to our Group II Qualified Element listing. Watch for updates! ■

June 1990

CDF Maintenance Tips

CDF monitor elements are the most reliable water stopping devices that we know of. However, they are not indestructible and do require a minimal amount of care and maintenance:

1. **Drain Sumps Daily** in accordance with our instructions. Prolonged submersion in water can destroy the element's ability to stop water transmission.
2. **Do not reuse dried elements** that have previously gotten wet. When water saturated media is dried it may shrink and crack, leading to possible internal bypass.
3. **Replace elements after 2 years service.** The shutdown performance may deteriorate somewhat after that time, particularly in the case of water slugs at low flow rate.

All of these points are covered in our current installation instructions, but you should review them with your CDF element customers. These maintenance tips also apply to Aquacon cartridges. ■

June 1990

A Trio of Trade Tips

1. Velcon encourages the use of Teflon Coated Screen separators in filter/separators used for fueling jet aircraft because:
 - A. Pleated paper separators generate a higher electrostatic charge in the fuel than Teflon Coated Separators.
 - B. Teflon Coated Separators offer greater long run economy. TCS separators can be cleaned, tested, and reused under normal operating conditions.
 - C. The cylindrical shape of the TCS prevents the entrapment of water droplets in the top pleats which might occur in horizontal vessels with paper separators.
2. When changing out a vertical filter/separator, be sure to drain a few gallons out of the "dirty" drain valve on the coalescer inlet compartment. This should be done **in addition** to fully draining the water drain valve (or clean compartment drain valve).

Checking the "dirty" drain valve insures that no dirty fuel remains inside the coalescer compartment or elements. It's very important to drain the vessel completely because when the coalescer cartridges are removed, dirt can be shaken loose. If the vessel is not drained completely, the dirt can contaminate the deckplate, making the cleanup process more difficult before installing the new elements.

3. If the Pressure Relief Valve received has a "box car" seal, leave it intact. This insures the manufacturer's warranty in case of defects. Removing the seal voids the warranty. The relief valve is preset at the factory, the setting is stamped on the nameplate, and a wire seal is installed to prevent the setting from being adjusted. ■

December 1989

A Great Product Made Even Better

The threaded base coalescers offer:

1. Durable injection-molded caps that are tougher than polyester resin caps.
2. A **much** stronger square boss. During testing, three sockets were broken. The boss remained undamaged.
3. Self-aligning lead-in, which makes

screwing the element on much easier than competitive designs.

4. Caps with reinforcing ribs to minimize flexing. With 75 psi pushing against the end cap, and generating over 1 ton of force, these ribs ensure that the caps will withstand the pressure.
5. Much higher temperature resistance. The resin design was lim-

ited to 160° F, while the new injection-molded cap is rated at 225° F.

Open-ended coalescers **and** threaded-base coalescers feature:

1. Socks tucked under the caps rather than pulled over them.
2. Lower weight per cartridge. The new style caps shave 1.2 pounds off threaded base coalescers and 2 pounds off open-ended coalescers. ■

March 1990