

# THE CLARIFIER


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## Velcon continues API/IP 1581 5<sup>th</sup> Edition Testing

Velcon Filters, Inc. has continued to pass qualification tests for the Fifth Edition of API/IP 1581 Specification. In April Velcon successfully completed a test qualifying a horizontal filter/separator vessel with a 2330 GPM flow rate, in Category C (Commercial), Type S. In early

June, another test, this time for a horizontal vessel with a 1080 GPM, was successfully completed. We will be continuing to test vessels throughout the year, in order to be able to provide customers with Fifth Edition vessels and elements in various configurations. Velcon Filters,

Inc., in conjunction with Warner Lewis Jr. Industrie-Filter GmbH, has already been supplying 5th Edition vessels to Heathrow Airport in preparation for the new fuel facility there, and will soon be supplying vessels to the new Suvarnabhumi Airport being built in Bangkok later this year. 

Date	Test Vessel	Flow Rate	Category, API/IP 1581 5 <sup>th</sup> Edition	Coalescers	Separators	3 <sup>rd</sup> Stage, if any
June 2004	HV2856	1080	C - New & Existing Equipment	7 x I-656C5TB	2 x SO-648V	N/A
April 2004	HV4256	2330	C - New & Existing Equipment	17 x I-654C5TB	7 x SO-648V5	N/A
October 2003	R11 OshKosh	600	M - New & Existing Equipment	15 x I-440MM	15 x SI-542	N/A
September 2003	VV4256	2500	C - New & Existing Equipment	18 x I-654C5TB	8 x SO-646V5	N/A
July 2003	HV2856	1000	C - New & Existing Equipment	7 x I-656C5TB	2 x SO-648CM	N/A
June 2003	HV2856M	1312	C - Existing Equipment	7 x I-656C5TB	2 x SO-648V	N/A
June 2003	VV2752B	900	C - New & Existing Equipment	7 x I-644C5TB	3 x SO-644V5	N/A
April 2003	AAE	2000	M - New & Existing Equipment	50 x I-620MM	20 x SO-620C	N/A
December 2002	HVS2628M 3-Stage	600	M100 - New & Existing Equipment	10 x I-628A4TB	8 x SO-616GS	40 x CDF-215K
November 2002	HV2856	1000	M100 - New & Existing Equipment	7 X I-656A4TB	2 X SO-648CM	N/A

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# Torque Requirements for Vessels with “O-Ring Closure”

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 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

\*NOTE: These recommended torque values are only for vessels with an O-Ring closure.

## Velcon Service Awards

Congratulations to these Velcon employees who have recently celebrated special anniversaries with Velcon:

### 25 Years

Shirley Malone  
Joyce Steveson  
Joan Scher

### 20 Years

Gussie Kelley  
Shirley Blair  
Rachel Garrett  
Era Hopkins

### 15 Years

Gene Johnson

### 10 Years

Ron Davis  
Robin Mason  
Linda Conway

### 5 Years

Jim Medley  
Rolando Sanchea  
Becky Glenn  
Jason Aldaz  
Vicky Haywood

# New Literature Sheets: Safe & Sound, Pure & Simple


Velcon recently introduced two new literature sheets, based on the highly popular training posters of the same names. Now you can order the 8 1/2 x 11, double-sided literature sheets which contain the information in a more readable format. These sheets will now be included in our "Products for Fuel Handling" Catalogs - both in binder format and on CD. Please specify data sheet # 1932 & 1933 to order separately.

**Safe & Sound**  
Velcon Filters Give You More of Both

To keep your systems safe, watch for these problems. To keep your systems sound, pay attention to these components.

**PROBLEMS OF THE COMMON FUELLED BY OIL-FIRED FILTRATION COMPONENTS:**

1. The common problem is the presence of water in the fuel system. Water is a by-product of the combustion process and is carried over into the fuel system. It can cause corrosion and other problems.
2. The common problem is the presence of dirt in the fuel system. Dirt is carried over from the combustion process and can cause wear and tear on the fuel system.
3. The common problem is the presence of fuel in the fuel system. Fuel is carried over from the combustion process and can cause a fire hazard.
4. The common problem is the presence of air in the fuel system. Air is carried over from the combustion process and can cause a fire hazard.
5. The common problem is the presence of sediment in the fuel system. Sediment is carried over from the combustion process and can cause wear and tear on the fuel system.




**Pure & Simple**  
Velcon Filters Give You More of Both

Pure Fuel: How to make sure that's all you ever deliver

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5. The common problem is the presence of sediment in the fuel system. Sediment is carried over from the combustion process and can cause wear and tear on the fuel system.



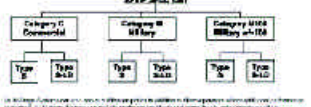
# API/IP 1581 5th Edition Specification Summary

Another new literature sheet, as shown on the right, is our API/IP 1581 5th Edition Specification Summary sheet. This double-sided sheet explains the key points of the specification for filter/separator vessels. This data sheet will also be added to our Fuel Handling Catalog binder and CD. Please specify data sheet #1934 to order it separately.

**API/IP 1581 5th Edition Specification Summary**

**API/IP 1581 5th Edition Specification\* Key Points**

1. Category II (Type 2) and Category III (Type 3) separator vessels shall be designed for a maximum flow rate of 2500 gpm.
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**FLTRATION SPECIFICATIONS**

TYPE	FLOW RATE	SEPARATION EFFICIENCY	OTHER REQUIREMENTS
Category II (Type 2)	2500 gpm	99.9%	...
Category III (Type 3)	2500 gpm	99.9%	...

# API/IP 1581 5th Edition Questions & Answers

**Q** What is the maximum diameter for separators?

**A** The maximum diameter for separators for new filter separator vessels is six (6) inches. (API/IP 1582 paragraph 4.2.1.7 (e)) Existing separators with a larger diameter than 6 inches can be qualified by conducting a full-scale test. (API/IP 1582 paragraph 2.1) Please note that although six inches diameter is the maximum diameter, smaller diameters can be supplied provided the liquid entrance velocity of the test cartridge is not exceeded and that the length/diameter ratio of the cartridge does not exceed that of the qualified system. (API/IP 1582 paragraph 2.6)

**Q** Can four (4) inch diameter coalescers be supplied?

**A** Yes, API/IP 1581 5th Edition, paragraph 4.2.1.7 (c) states: "The diameter of the filter/coalescers qualified shall be a maximum of 15.5 cm (6 inches). The diameter of filter/coalescers can vary but shall be the same in both single-element and full-scale tests."

**Q** If 2500 gpm is the maximum flow rate for new filter separators, what does this mean for existing filter separators that are currently operating at flow rates greater than 2500 gpm?

**A** Paragraph 4.4.1.2 of 1581 states that existing vessels with flow rates greater than 2500 gpm may be qualified by meeting similarity criteria with vessels full-scale tested at 2500 gpm.

**Q** What is the position concerning existing filter separators in mobile service?

**A** Paragraph 4.4.5.4 of 1581 states that existing vessels can be qualified by lowering the water injection rate to 0.5% by volume, instead of 3%. Vessels so qualified should be clearly marked as applicable for use in this service.

If you have any further questions concerning API/IP 1581 5th Edition please send them to [vfsales@velcon.com](mailto:vfsales@velcon.com) and we will reply, as well as add them to future Q&A of this newsletter.

## New Pleater in Alabama Plant

We recently added a new pleater to our production facility in Sylacauga Alabama. This new pleater is computer-controlled and can handle many different layers of filter media combined with different pleat configurations. This new pleater is a key to achieving our API/IP 1581 5<sup>th</sup> Edition and API/IP 1590 Specification qualifications.



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

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