Aviation Fueling Facilities

IATA – Aviation Energy Forum 2025

John Leonard

Facet
Filtration Group®

Goal of Aviation Filtration:
Clean/Dry On-Spec Fuel

- **Clean:** Less than .26 mg/l Solids & 10 Fibers/l
- **Dry:** Less than 15 ppm Free/Entrained Water
- **On-Spec:** ASTM D-1655, D-7566, D-910

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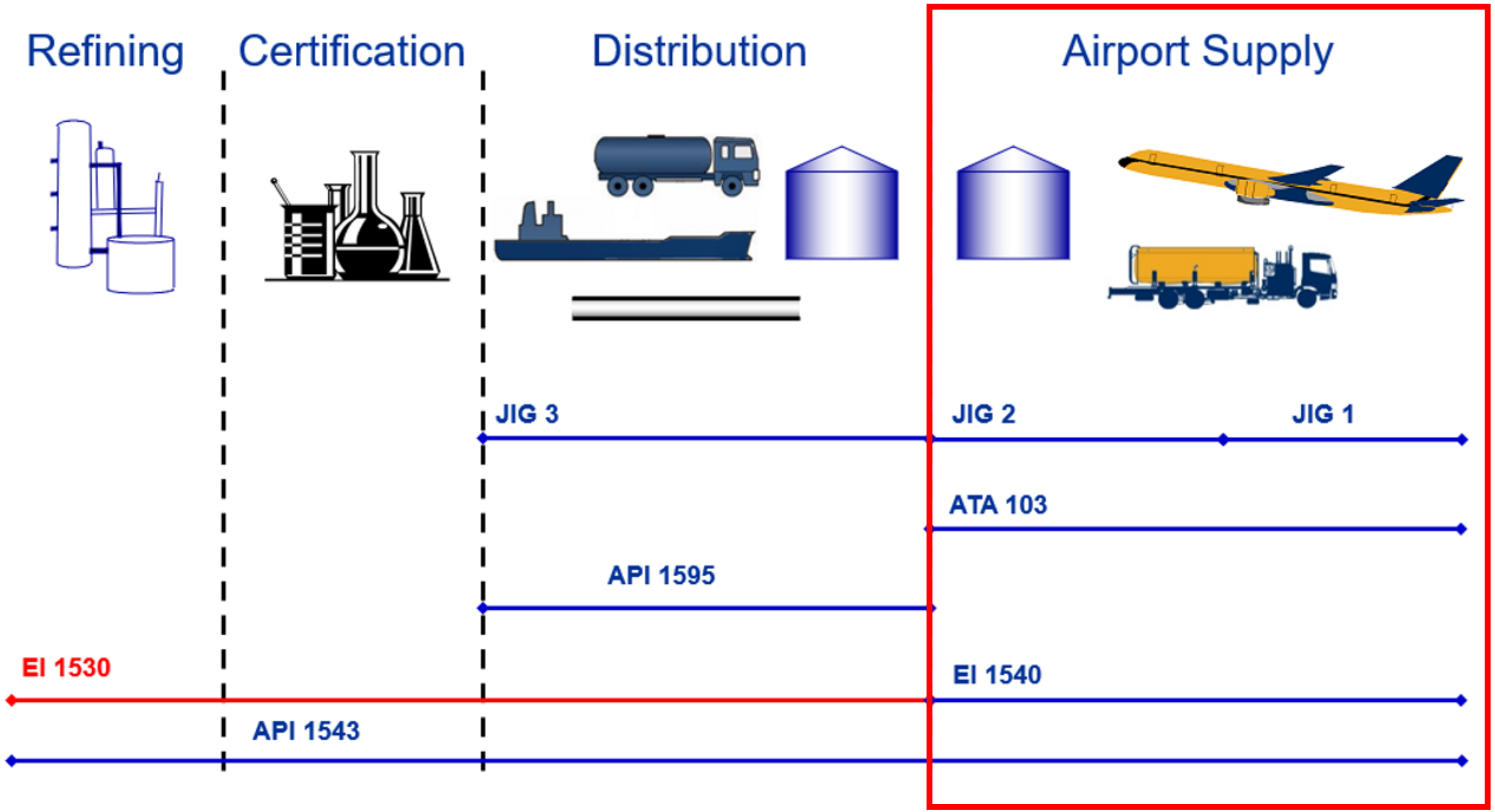

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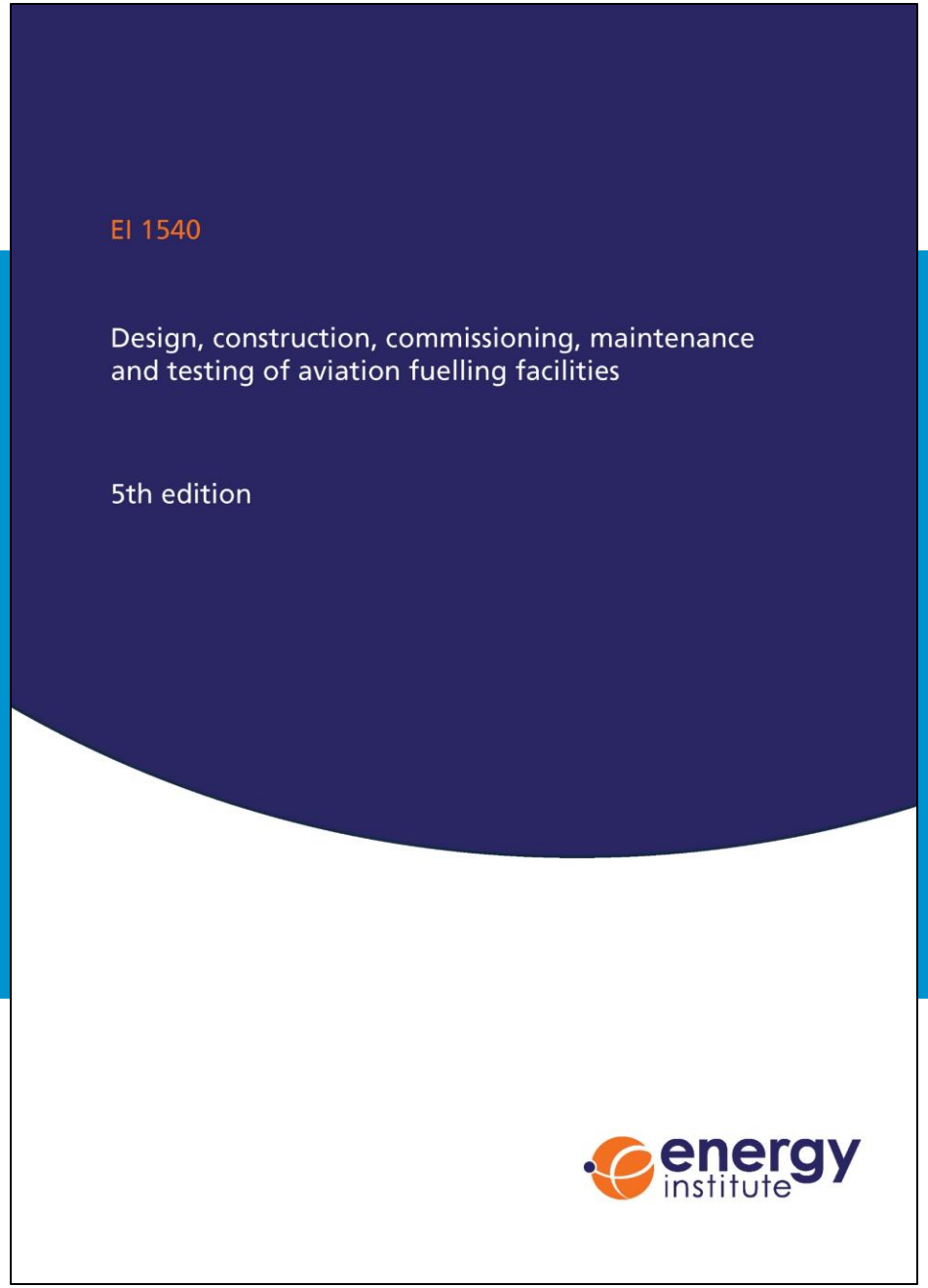
EI 1540

Design, Construction, Commissioning, Maintenance and Testing of Aviation Fueling Facilities



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Basic Aviation Filtration

- **Micro-Filter (EI 1590)**
  Removal of Rigid Contaminants from the Liquid Hydrocarbon Stream
- **Filter/Water Separator (EI 1581/EI 1582)**
  Removal of Extremely Fine Rigid Contaminants and Free Water from the Liquid Hydrocarbon Stream

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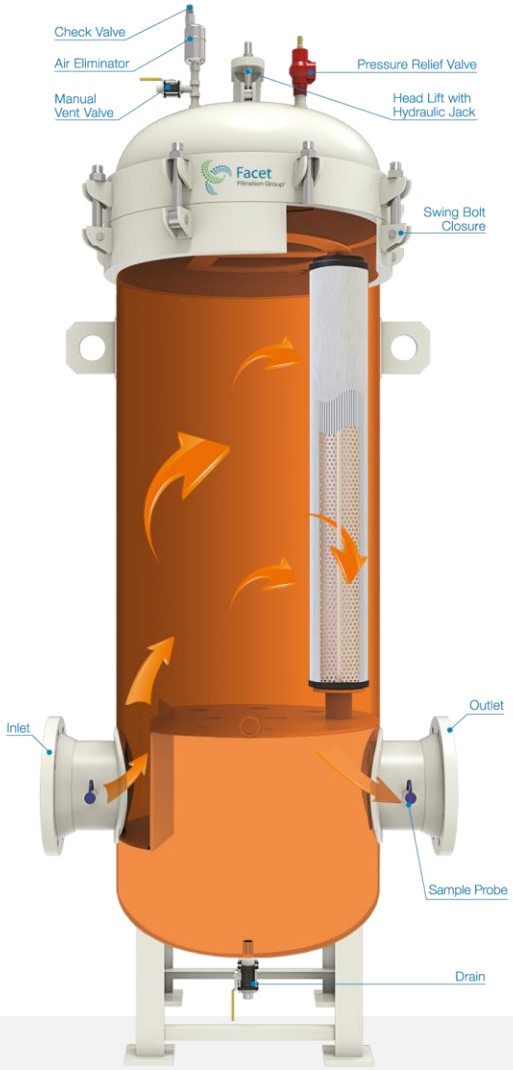
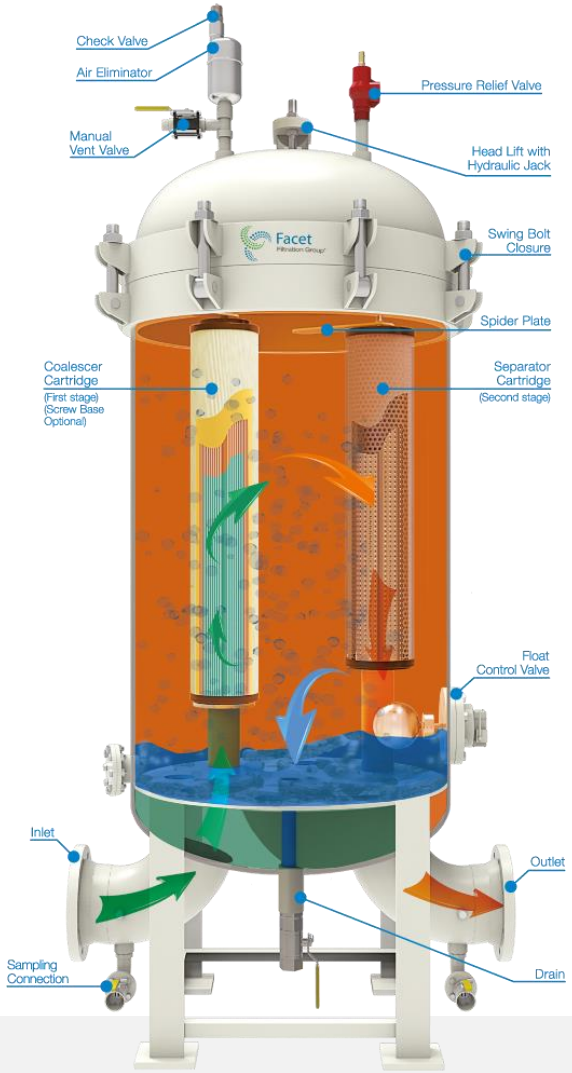
Micro-Filter



Filter/Water Separator



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Built to comply with ASME Code Section VIII – Div. 1 & EI 1596 3rd Edition

Standard Accessories

- Direct Reading Differential Pressure Gauge
- Air Eliminator with Check Valve
- Pressure/Thermal Relief Valve
- Manual Sump Drain (Spring Loaded)
- Automatic Water Defense System that will stop fuel flow or alert operating personnel when activated by high water level (FWS only)
- Upstream & Downstream Sampling Connections
- Data Plate
- Similarity Data Sheet (FWS only)
- Placard Indicating Filter Change Dates

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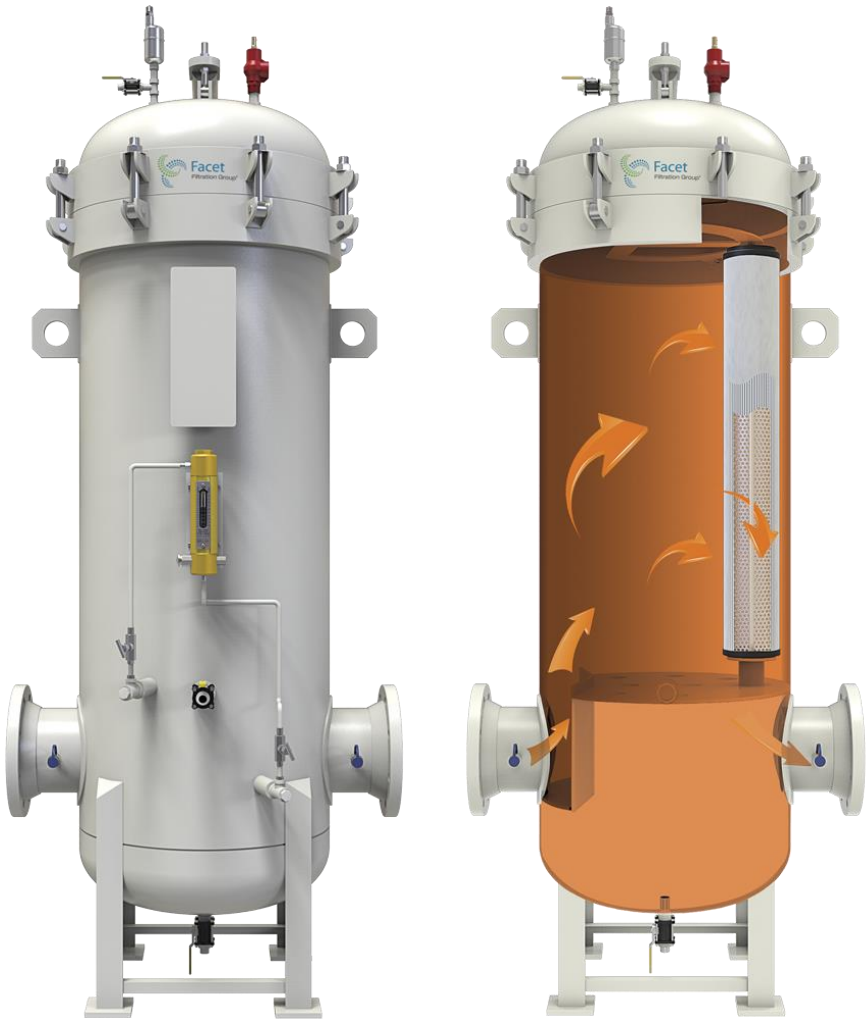
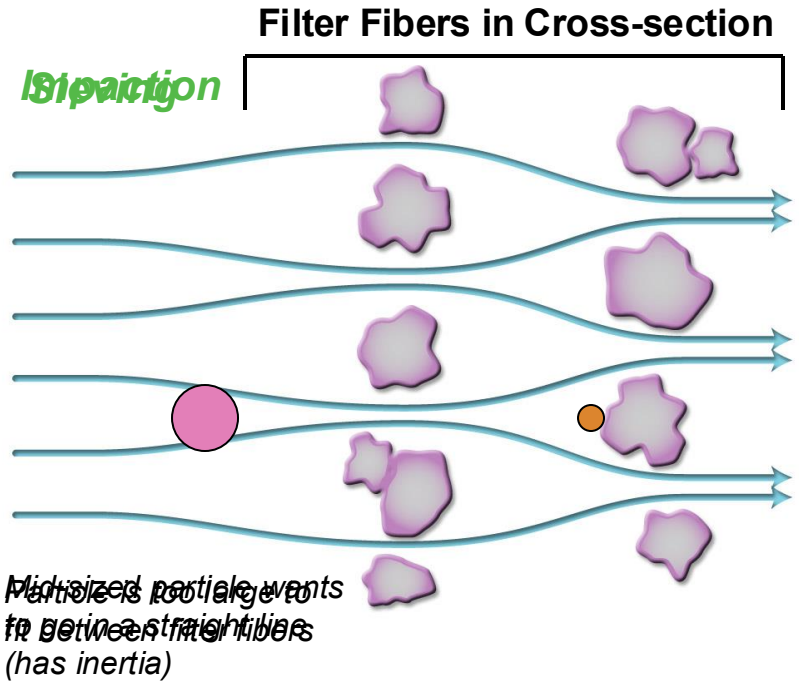
Micro-Filter Operation





Sieving & Impaction

Elements Qualified to EI 1590

Allowed Micron Ratings: 1, 2, 3, 5 & 10

Allowed Diameters: 2”, 4” & 6”

Vessels Qualified to EI 1596

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Micro-Filters

FA Series

EI 1590 Qualified

Per EI 1590, the efficiency is measured gravimetrically using ASTM D2276

Upstream contaminant concentration = 50 mg/L

Downstream contamination limit < 0.15 mg/L

Efficiency = 1 - (0.15 mg/L / 50 mg/L) X 100 = 99.7%

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FA Series
Microfilter Cartridges
EI 1590 Qualified

Facet FA Series microfilters offer superior filtration for removing ultra-fine solid contaminants such as rust, scale, granular and other types of solids from aviation fuel systems. They are designed to flow from the outside to inside.

Facet FA Series microfilters are manufactured using proprietary combinations of Micro Fiberglass and Cellulose to achieve the desired removal rating.

Benefits

- FA Series media provides high efficiencies, superior strength and durability
- One piece construction reduces downtime, cartridge change-out costs and eliminates filter bypass concerns
- Retention ratings available in 1, 2, 3 and 5 microns
- All metal components are treated against corrosion. Spirally wound core reduces weight resulting in lower freight costs

Standard Design Features

- Removal Efficiency: Effluent solids <0.15 mg/liter
- Structural Strength: 75 psi (5.17 bar)

Materials

- Filter Media: Micro Fiberglass/Cellulose
- End Caps: Steel Powder Coated
- Center Tube: Spiral Wound Steel Powder Coated
- Gaskets: Buna-N
- Adhesive: Plastisol

FILTER SIZE AND DIMENSIONS

MODEL NUMBER	MICRON	FLOW RATE		NOMINAL LENGTH		OUTSIDE DIAMETER		INSIDE DIAMETER	
		gpm	lpm	in	mm	in	mm	in	mm
FA-614-1A	1	55	208	14½	370	6	152	3½	89
FA-628-1A	1	113	428	28¾	730	6	152	3½	89
FA-644-1A	1	176	666	44	1118	6	152	3½	89
FA-614-2A	2	55	208	14½	370	6	152	3½	89
FA-628-2A	2	113	428	28¾	730	6	152	3½	89
FA-644-2A	2	176	666	44	1118	6	152	3½	89
FA-614-3A	3	55	208	14½	370	6	152	3½	89
FA-628-3A	3	113	428	28¾	730	6	152	3½	89
FA-644-3A	3	176	666	44	1118	6	152	3½	89
FA-614-5	5	62	235	14½	370	6	152	3½	89
FA-628-5	5	128	485	28¾	730	6	152	3½	89
FA-644-5	5	200	757	44	1118	6	152	3½	89
FA-614-5CIF	5	62	235	14½	370	6¼	155	3⁹⁄₁₆	97
FA-628-5CIF	5	128	485	29¼	740	6¼	155	3⁹⁄₁₆	97
FA-644-5CIF	5	200	757	43¾	1111	6¼	155	3⁹⁄₁₆	97

EI 1590 Qualified Microfilters

FO-6xxA1, FO-6xxA2, FO-6xxA3, FO-6xxA5
Long-lasting, High Capacity & Efficient Performance
Up to Three Times Greater Solids Capacity

- Primarily designed to be used as prefilter (micronic) cartridges for use in jet fuel handling systems.
- Used to extend the life of coalescer cartridges in filter/separator vessels described in EI 1581.

DESCRIPTION

Parker has qualified cellulose and microfiberglass media filter cartridges to EI Specification 1590, "Specifications and Qualification Procedures for Aviation Fuel Microfilters."

- UP TO THREE TIMES GREATER SOLIDS CAPACITY than regular pleated paper cartridges
- Large Surface Area – Allows high flow rate with low initial pressure drop and maximum contaminant holding capacity.
- Resin Impregnated Microglass Media – Maintains strength, resists effects of water and heat.
- 75 psi Collapse Strength – Heavy gauge aluminized steel center tube and injection molded end caps give safety margin against pressure surges.
- Aluminized Steel Components – Resist corrosion from most industrial fluids.
- Buna-N Gaskets – The best general gasket material available assures positive seal in most fluids.
- Urethane Bonding Material – Endcaps urethane-bonded to media to prevent internal bypassing
- 98%+ Filtration Efficiency
- Threaded Base also available

SPECIFICATIONS

- 75 psi Collapse strength
- 1, 2, 3 & 5 micron efficiency (per EI 1590)
- 5 - 9 Operating pH range
- 250°F (121°C) Maximum operating temperature

APPLICATIONS

Parker Velcon pleated media cartridges are suitable for a broad range of polar and non-polar fluids.

Recommended for applications where the contaminant is granular & hard, allowing maximum utilization of the high surface area and depth media.

Parker Velcon

ENGINEERING YOUR SUCCESS.

Microfilter Element
EIMF-Type (4 inch)

FAUDI aviation

Qualified to specification EI 1590 3rd Edition

Microfilters are used as pre-filters for the efficient and continuous removal of solids such as rust, sand and other particulates from aviation fuels.

FAUDI Aviation microfilters are used in refineries, terminals and airport depots, primarily as pre-filters to lengthen the service life of downstream coalescer elements in filter/water separators. FAUDI Aviation microfilters are highly efficient and thus cost effective due to their large filter surfaces area. Microfilters are suitable for filtration of AVGAS.

Application Areas

- Airports
- Transfer stations
- Bulk fuel depots
- Refineries
- General Aviation

Technical Data

Nominal filtration:	According to EI 1590 3rd Edition
Flow direction:	Out-to-in
Change-out differential pressure:	1.5 bar (22 psi)
Maximum pressure differential rating:	5.2 bar (75 psi)
Service time (max.):	60 months[1)]
Storage time (max.):	60 months[1) 2)]
Operating temperature:	Min. -30°C (-22°F) / Max. 80°C (176°F)

1) Manufacturer recommendation
2) Manufacturer recommendation: 20°C and max. 50% humidity after date of shipment out of stock of FAUDI Aviation GmbH

Standard Design

Outside diameter:	101 mm (4 inch)
Center tube:	Polyamide, reinforced glass fibre
Gaskets:	NBR (Buna-N)
End caps:	Polyamide, reinforced glass fibre
Labeling on end caps:	According to EI specification
Protective outer wrap	

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Sustainability

CIF Series

Crushable Incinerable Filters

Facet
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Sustainability

Waste Impact Comparison

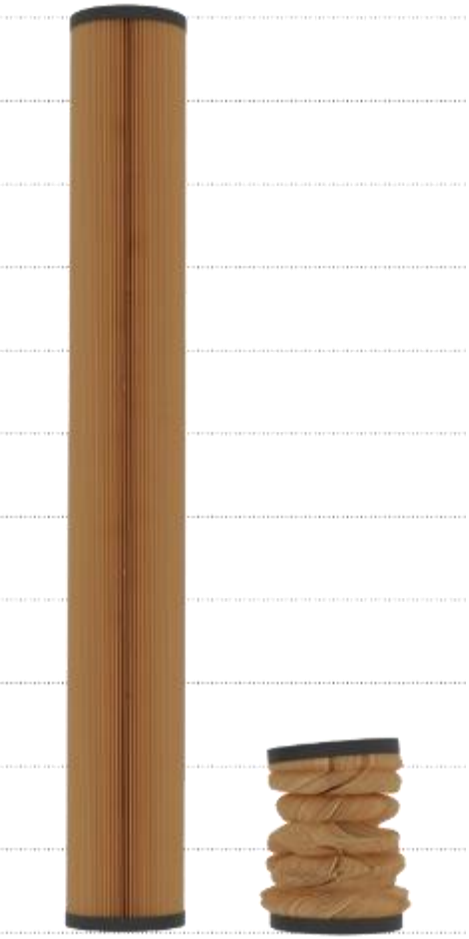
In 2023, Facet sold over 53,000 Micro-Filters

Waste Impact of Standard 44" Microfilter (with metal components):

Approximately 54,000 cu. ft./625,000 lbs of waste heading to a landfill

Waste Impact of CIF:

Approximately 10,800 cu. ft./13,500 lbs of waste heading to a landfill



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Micro-Filter (EI 1590)

Required Documentation

Facet Filtration Group®

Making the world safer, healthier & more productive

EI 1590 Certification

PECOFacet , 5935 S. 129th E. Ave. Ste. A. Tulsa, OK, 74134, Phone 918-272-8700, certifies that the following element/vessel configuration meets the element performance requirements of the Energy Institute Specification for, Aviation Fuel Micro Filters (EI 1590, 3rd Edition), September 2014.

Customer:	Aviation Filtration
Location:	DFW
Identification:	Jet Farm
Vessel:	6M-314
S/N:	F9635
Flow Rate:	1057 GPM
Elements:	FA-644-1A
Quantity:	6

Prepared By: *Andrew Thompson*
Product Engineer
7/17/2018

MICROFILTER OPERATIONAL DATA PLATE FOR CURRENT CONFIGURATION

Facet Filtration Group®

Facet (Oklahoma) LLC.
5935 S. 129th E. Ave., Suite A
Tulsa, OK 74134 USA
(918) 272-8700 (800) 223-9910
www.facetfiltration.com

VESSEL SERIAL NUMBER: _____

ELEMENT MODEL/TYPE: _____

QUANTITY OF ELEMENTS INSTALLED: _____

MAXIMUM OPERATIONAL FLOW RATE: _____

COMPLIES WITH EI 1590: _____ EDITION

TORQUE FOR ELEMENTS INSTALLATION: _____

MAXIMUM CHANGE OUT DP: _____

DATE ELEMENTS INSTALLED:
(to be added by user / operator)

PLATE TO BE REPLACED OR AMENDED AT EACH ELEMENT CHANGEOUT

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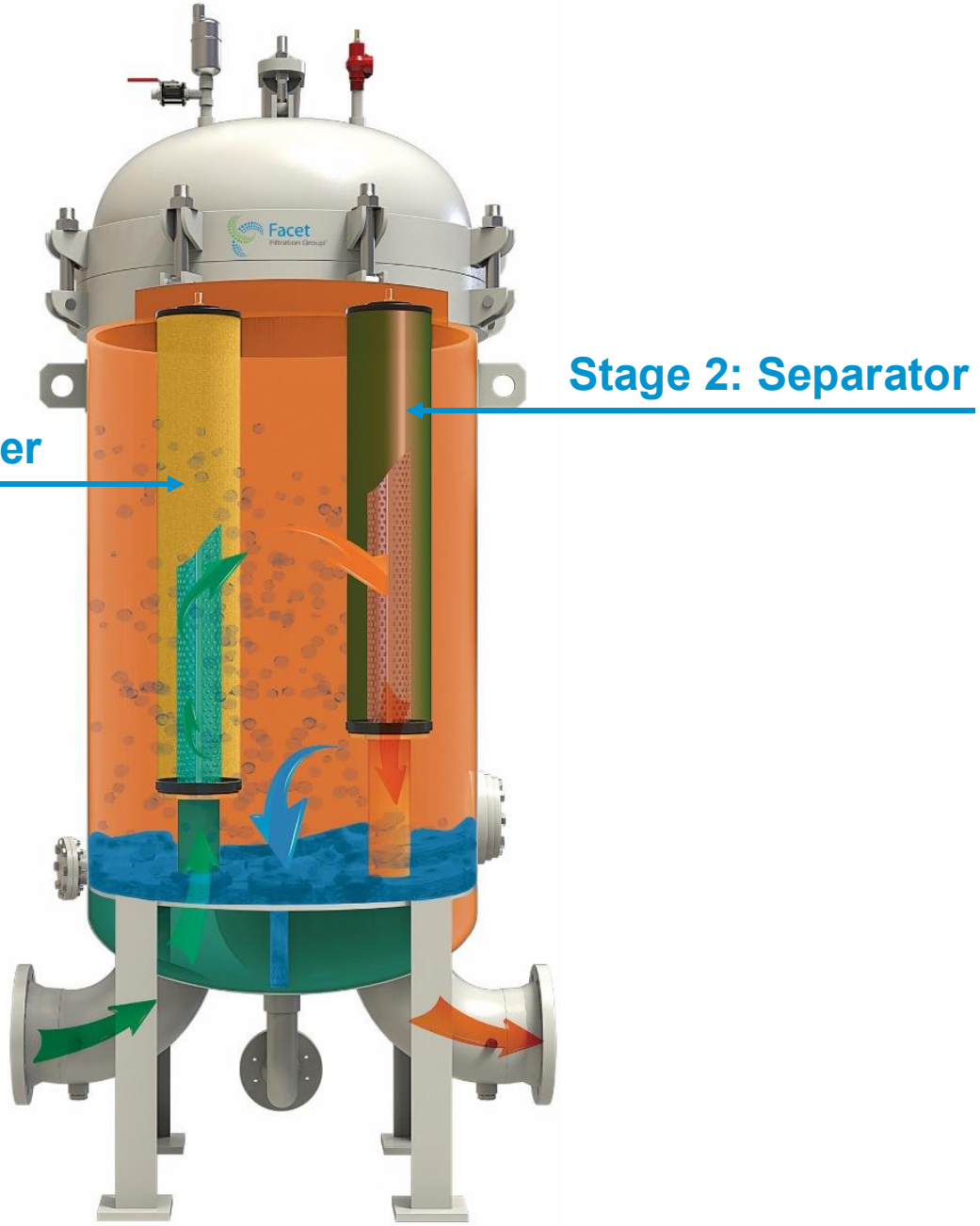
Separation

2-Stage Filter/Water Separator

(Liquid/Liquid Separation)



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Filter/Water Separators

EI 1581 / 7th Edition

2-Stage Filter/Water Separators

- Vessel Built to ASME Code Section VIII – Division 1
- Comply with EI 1596

VCS

HCS

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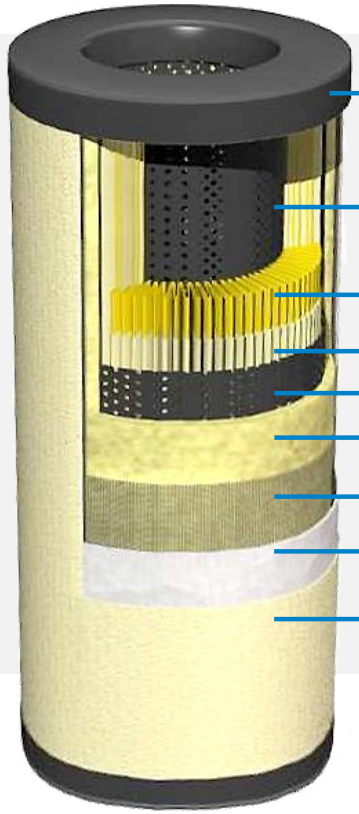
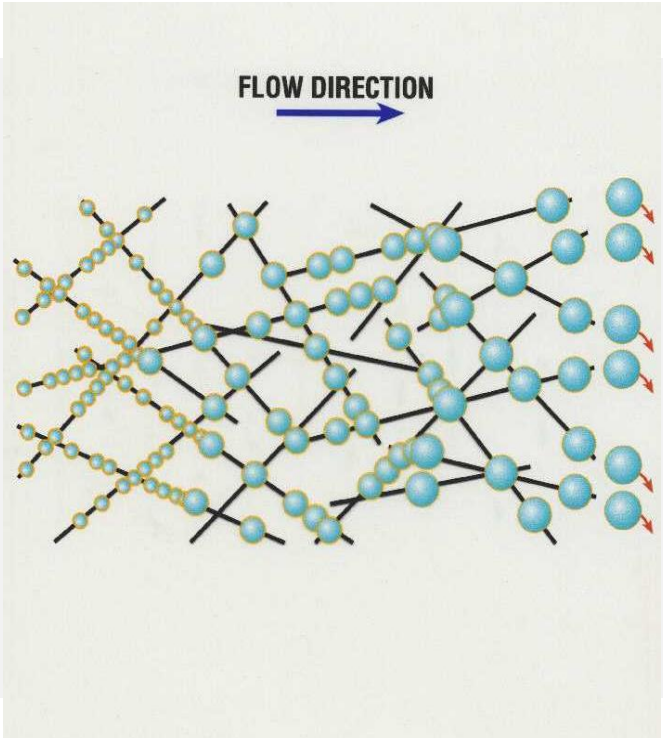
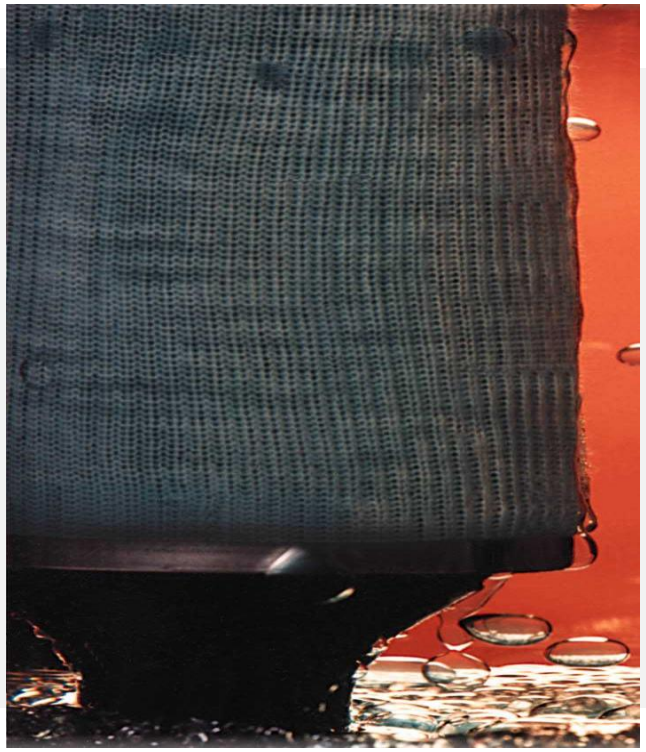
FWS Operation



Flow Direction: Inside to Out



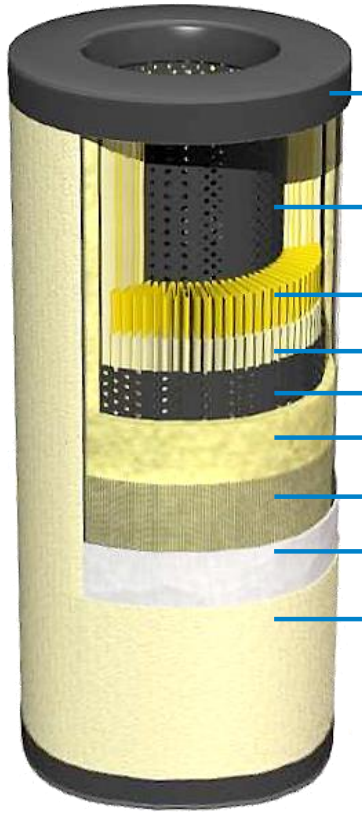


Initiation, propagation, and coming together of free water droplets to form single drops that have gained sufficient mass to fall via gravity to the sump

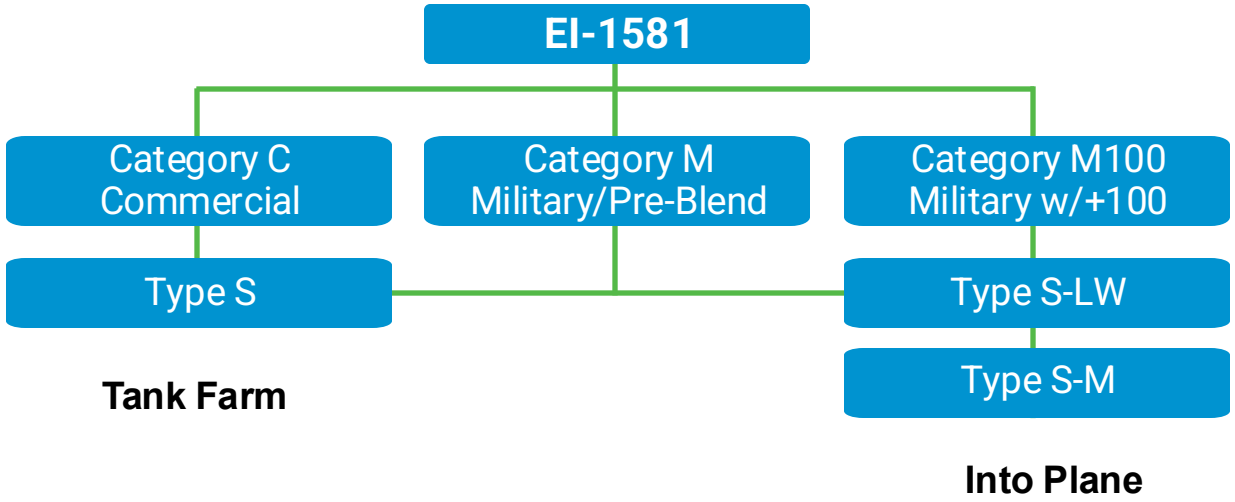
Facet Filtration Group®

Aviation Grade Coalescers

Built to EI 1581 / 7th Edition* Specifications



Flow Direction: Inside to Out



*Note: 7th Edition is in effect as of August 2024

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Separators

Second Stage

Separator Media – 3 Common Types:

Pleated Paper (SP)
Silicon treated cellulose
5 or 25 µ

Teflon (ST)
Teflon coated stainless steel mesh wire
70 µ

Synthetic (SS)
Hydrophobic synthetic nylon mesh
50 µ

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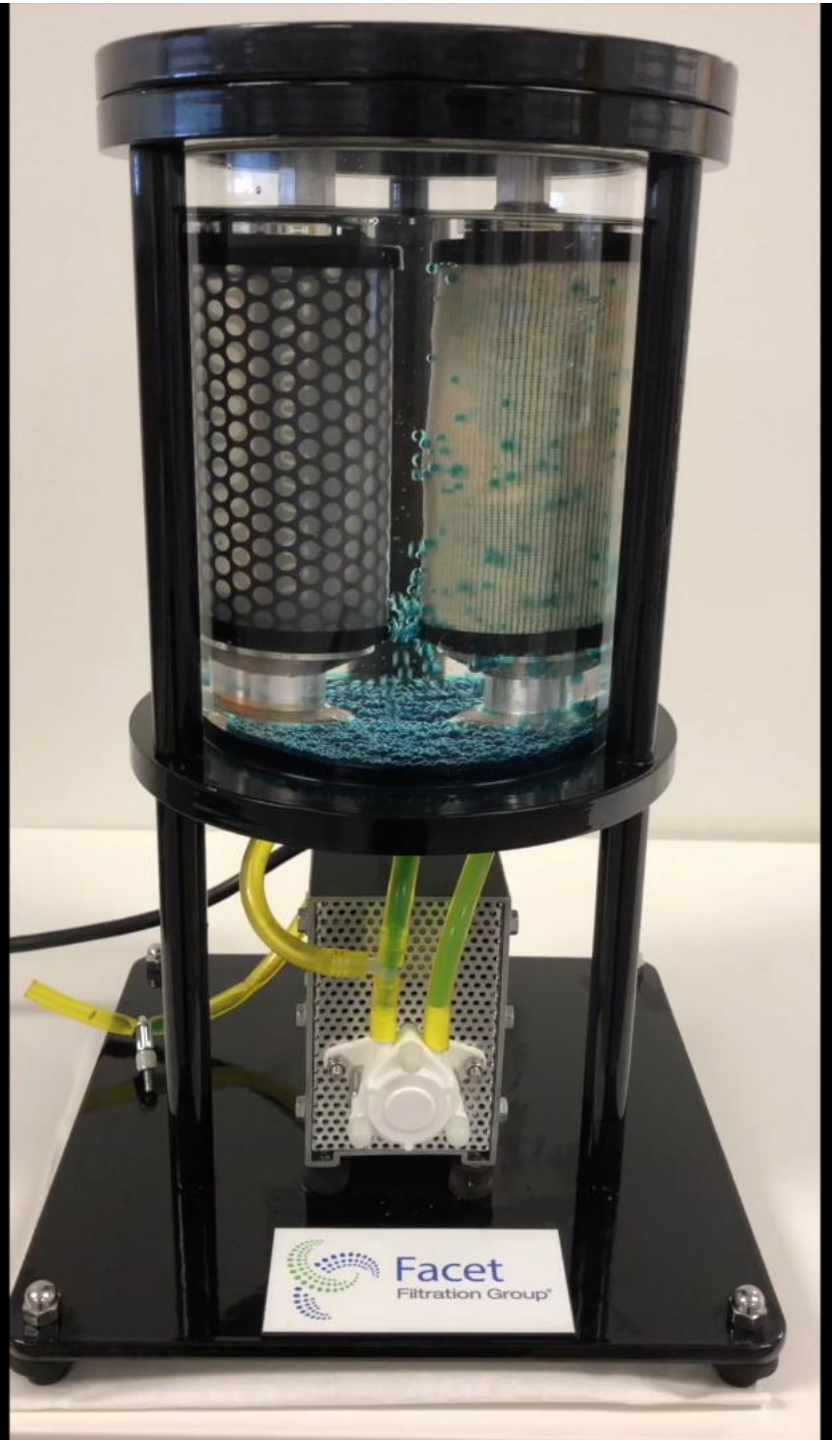
Note: Only Teflon and Synthetic can be qualified to EI 1581
Note: The Coalescer and Separator must be Fuel Compatible
Note: Both styles are cleanable & reusable
Note: The Coalescer & Separator Qualifications are usually manufacturer-specific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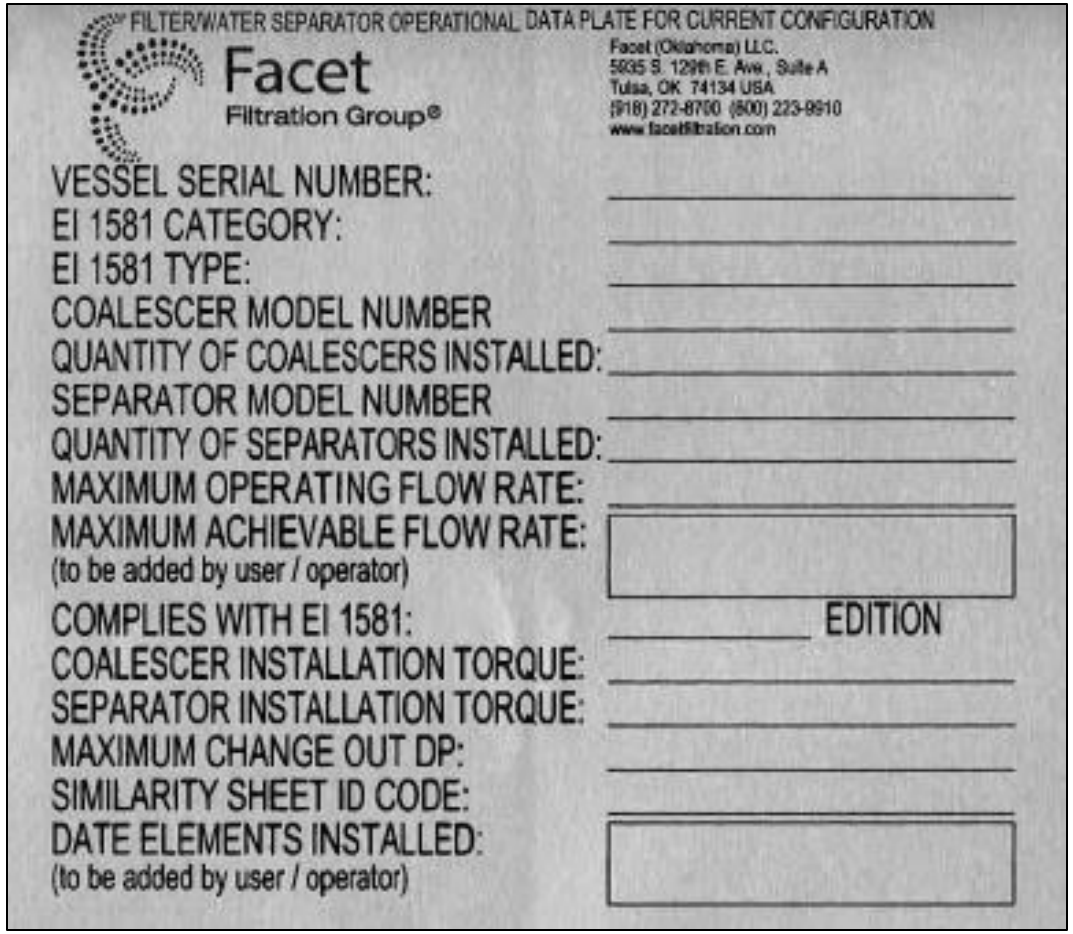
Filter/Water Separator (EI 1582)

Required Documentation



FILTER/WATER SEPARATOR OPERATIONAL DATA PLATE FOR CURRENT CONFIGURATION

Facet Filtration Group®

Facet (Oklahoma) LLC.
5935 S. 129th E. Ave., Suite A
Tulsa, OK 74134 USA
(918) 272-8700 (800) 223-9910
www.facetfiltration.com

VESSEL SERIAL NUMBER: _____
EI 1581 CATEGORY: _____
EI 1581 TYPE: _____
COALESCER MODEL NUMBER _____
QUANTITY OF COALESCERS INSTALLED: _____
SEPARATOR MODEL NUMBER _____
QUANTITY OF SEPARATORS INSTALLED: _____
MAXIMUM OPERATING FLOW RATE: _____
MAXIMUM ACHIEVABLE FLOW RATE: _____
(to be added by user / operator)
COMPLIES WITH EI 1581: _____ EDITION
COALESCER INSTALLATION TORQUE: _____
SEPARATOR INSTALLATION TORQUE: _____
MAXIMUM CHANGE OUT DP: _____
SIMILARITY SHEET ID CODE: _____
DATE ELEMENTS INSTALLED: _____
(to be added by user / operator)

Facet Filtration Group®
5935 S 129th E Ave Suite A
Tulsa, OK. 74134 U.S.A.
(918) 272-8700 Fax (918) 272-8787

energy INSTITUTE

EI 1582 2nd edition Similarity Sheet Reference Number/ID Code:			EI-7-18451		
1581 Qualification Report Number:	APIS-3-012	Prepared for:		Solares Florida Corporation	
Parameter	US customary units	Qualified Vessel	Candidate Vessel	Pass/Fail	Notes
Vessel Manufacturer		Facet	Facet		
Vessel Model Number		VCS-C-1656-844	VCS-433-224		
Vessel Serial Number		900145	F13464-1		
EI 1581 Category (2.6)		C	C	Pass	Category must be the same
EI 1581 Type (2.6)		S	S	Pass	Type must be the same or Qualified = S
Number of Element Stages	EA	2	2	Pass	Stages must be the same
Vessel configuration					
Orientation (2.2a)		Vertical	Vertical	Pass	Orientation must be the same
Vessel Inside Diameter	in	41.250	21.500		
Element Layout (2.2b & 2.4)		Side-by-side/ Engaged	Side-by-side/ Side-to-side	Pass	Layout must be the same
Sump					
Location (2.2c)		Vertical vessel – bottom, centre	Vertical vessel – bottom, centre	Pass	Location must be the same
Volume (2.2c)	in3	13698.3	2772.0	Pass	Candidate must be > or = to Qualified
Inlet Connection Position (2.2d)		Vertical – pipe entering bottom, below deck plate	Vertical – pipe entering bottom, below deck plate	Pass	Inlets must be in the same location
Outlet Connection Position (2.2e)		Vertical – pipe exiting bottom, below deck plate	Vertical – pipe exiting bottom, below deck plate	Pass	Outlet must be in the same location
Element mounting positions (2.2f)		Vertical – side-by-side, engaged	Vertical – side-by-side, side-to-side	Pass	Location must be the same
Water Defense System Present?			Unknown		
Rated flow of vessel (2.5)	usgpm	2500	300	Pass	Candidate must be < or = to Qualified or when qualified is at max (9464 liters, 2500 USG) candidate must be <= 2 times qualified
1st Stage (filter/coalescer element)					
Model Number (2.6)		CAA56-5SB	CAA33-5SB	Pass	Model/Series/Family = Qualified
Quantity	EA	16	4		
Number of Elements/Cartridges in Stack	EA	1	1		
Element/Cartridge Overall Length	in	56.000	33.000		
Element/Cartridge Effective Media Length	in	53.320	30.320		
Outside Diameter	in	6.000	6.000		
Number of filter/coalescer plugs and their part number	EA	0	0		Part Number: 698428 for Facet vessels. Part Number: 698428-375 for Velcon vessels.
Spacing					
Between 1st Stage Elements (2.3a)	in	0.250	0.500	Pass	Candidate must be > or = to Qualified
Between 1st & 2nd Stage Elements (2.3c)	in	0.250	0.863	Pass	Candidate must be > or = to Qualified
Between 1st Stage Elements & Vessel (2.3d)	in	0.250	0.500	Pass	Candidate must be > or = to Qualified
Mean Linear Flowrate (2.7)	usgpm/in	2.930	2.473	Pass	Candidate must be < or = to Qualified
Volume	in3	25333.8	3732.2		
2nd Stage (separator element)					
Model Number (2.6)		SS644FD-5	SS624FB-5	Pass	Model/Series/Family = Qualified
Quantity	EA	8	2		
Number of Elements/Cartridges in Stack	EA	1	1		
Element/Cartridge Overall Length	in	44.000	24.000		
Element/Cartridge Effective Media Length	in	42.750	22.750		
Outside Diameter	in	6.000	6.000		
Number of separator plugs and their part number	EA	0	0		Part Number: 698428 for Facet vessels. Part Number: 698428-375 for Velcon vessels.
Spacing					
Between 2nd Stage Elements (2.3b)	in	0.250	4.000	Pass	Candidate must be > or = to Qualified
Between 2nd Stage Elements & Vessel (2.3d)	in	0.250	0.500	Pass	Candidate must be > or = to Qualified
Length/Outside Diameter (L/D) Ratio (2.6)		7.33	4.00	Pass	Candidate must be < or = to Qualified
Liquid Entrance Velocity (2.8)	ft/s	0.125	0.112	Pass	Candidate must be < or = to Qualified
Volume	in3	9952.6	1357.2		Volume of all 2nd Stage Elements
3rd Stage (filter monitor elements in separators)					
Model Number					
Quantity	EA				
Quantity per 2nd Stage Separator	EA				
Vessel					
Length of Vessel	in	58.375	37.375		Deck plate to lid opening
Vessel Volume	in3	78012.6	13569.0		Volume inside of the vessel
Vessel Void Volume	in3	42726.2	8479.6		Empty space not occupied by elements
Positive water drainage (2.10)			Yes	Pass	Candidate must have positive water drainage
Area Ratio					
Void Volume Ratio (2.9)		0.548	0.625	Pass	Candidate must be > or = to Qualified
ãSAe/Acv (2.9a) Side-by-side		16.857	8.659	Pass	Candidate must be < or = to Qualified
ãAe/Acv (All elements to vessel) (2.9b) End opposed		N/A	N/A		Candidate must be < or = to Qualified

For the candidate system to meet EI 1581 by similarity, each entry is required to produce a pass in the pass/fail column.
Data are not required in any cells shaded grey.

The passes above confirm that the candidate vessel meets all requirements of EI 1582 2nd edition, and therefore is qualified to EI 1581 7th edition.

Name: Raj Tiwari
Signed: Raj Tiwari
Company: Facet - Tulsa, OK
Date: 1/20/2025

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TOGETHER, WE ARE MAKING
THE WORLD SAFER, HEALTHIER
AND MORE PRODUCTIVE.
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Making the World Safer, Healthier & More Productive