

Fuel Dispensing and Transfer Filtration

For Clean Diesel Applications





ENGINEERING YOUR SUCCESS.

Table Of Contents

Bulk Fuel Filtration	4-7
How it works	
RVFS Solutions	4
Bulk Filtration Specs	5
Mounting Information	6
How to order	7
Dispensing Fuel Filtration	8-11
FBO Solutions	8
Technical specifications	9
Mounting information	9
How to order	10
Replacement Elements	11
Duplex Filtration	12
Portable Filtration	13
Additional Pre-filtration Capabilities	14-15
PFG Manufacturing Contacts	16



FBO Fuel Pump Application



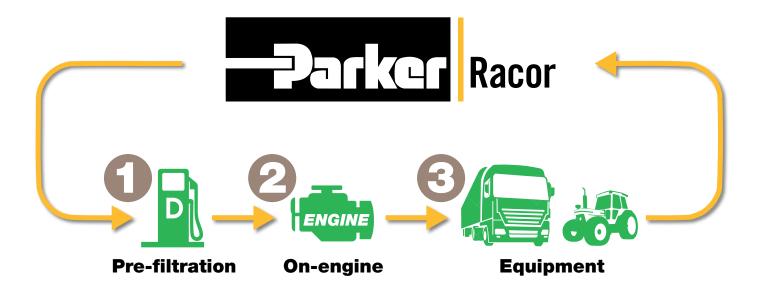
FBO Duplex Application



FBO Transfer Application



FBO Equipment Application



Why Pre-filtration?

Because of the difficulties of maintaining a clean supply of diesel at all times, more consideration should be applied to upstream sources of contamination as well as at the engine. Filtering recirculation systems can be applied to storage and onboard systems, along with high efficiency filters at the dispensing pump. Careful monitoring of fuel quality and filter performance is needed to protect sensitive diesel engine injection systems.

For example, the fuel used on a highway construction project may have travelled the following route: **Refinery - piped to storage - tanker to distribution center - tanker to local retailer - tanker to on-site storage.**





Filtration in the fuel transfer process, fuel dispensing, on engine and equipment offers the best approach for clean diesel.

How it works.

Particulate Removing

A particulate removing filter system uses a single stage element. When contaminated fuel enters the vessel, particulate (rust, scale, dirt, and other contaminants) is removed, providing clean diesel to your engine and equipment.

Coalescer/Separator

A coalescer/separator system consists of two elements, creating a two stage filtration process. When contaminated fuel enters the vessel, particulate (rust, scale, dirt, and other contaminants) is removed and water is coalesced by the first stage filter (coalescing is when the water droplets collect on the media and then fall into the sump to be removed). Any free water is separated by the second stage element providing clean, dry diesel to your engine and equipment.

Bulk Filtration: RV Series

Parker Racor RV Series vessels are designed to be used in bulk fuel storage, fuel dispensing, fuel transfer, and large engine applications.

The RV Series set up as a coalescer/separator (RVFS), will remove emulsified free water and solids from diesel fuel. When equipped with coalescer/separator filters, water can be **drained and removed** from the RVFS sump.

RV filter vessels offer economy, versatility, unparalleled **high efficiency**, and **low maintenance** solutions to many fuel delivery and industrial filtration applications. The vessels will accept particulate filters (RVMF) or coalescer/separator filters.

Filter vessels are used in the diesel and re-fueling industry on fuel dispensing locations, **providing clean diesel**.

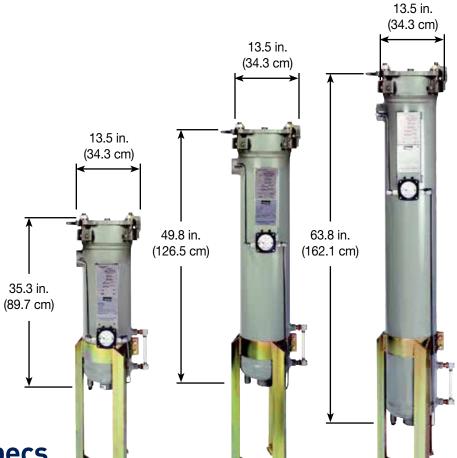
RV Series vessels provide the required filtration for today's high-pressure common-rail engines.

Product Features:

- Carbon Steel Construction
- ASME Code Stamped
- Interior: Epoxy Coated To
 MIL-C-4556E
- Exterior: Grey Primer Coated
- Hinged Cover
- Connections are 2" NPTF

Optional Features:

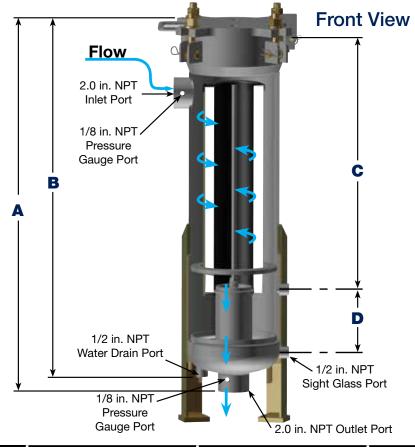
 Optional Accessories Include: pressure relief valve, automatic air eliminator, drain valve, water-in-fuel sight glass, leg mounts or wall mounts, and differential pressure gauge.



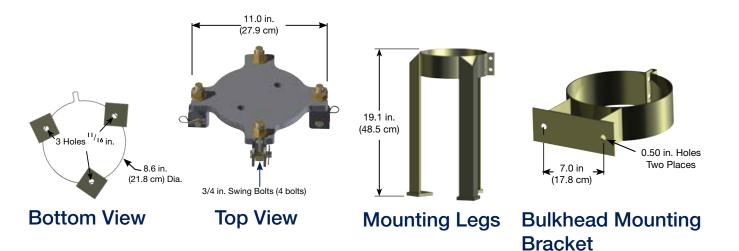
Bulk Filtration Specs

Specifications	RVFS-1/RVMF-1	RVFS-2/RVMF-2	RVFS-3/RVMF-3	
Inlet and Outlet Ports	2 in. NPT	2 in. NPT	2 in. NPT	
Vent and Relief Ports	3/4 in. NPT	3/4 in. NPT	3/4 in. NPT	
Water Level Gauge Ports	1/2 in. NPT	1/2 in. NPT	1/2 in. NPT	
Differential Gauge Ports	1/8 in. NPT	1/8 in. NPT	1/8 in. NPT	
Pressure and Temperature	150 PSI @ 160°F (10.3 bar @ 71°C)			
ASME Code Stamped	Yes	Yes	Yes	
Fuel Flow Rate - Diesel Fuel - RVFS	25 GPM (94.6 LPM)	50 GPM (189.3 LPM)	75 GPM (283.9 LPM)	
Fuel Flow Rate - Diesel Fuel - RVMF	66 GPM (250 LPM)	133 GPM (503 LPM)	200 GPM (757 LPM)	
Pressure Drop - Clean	2 PSID (0.14 bar)	2 PSID (0.14 bar)	2 PSID (0.14 bar)	
Pressure Drop/Filter Change-out	15 PSID (1.0 bar)	15 PSID (1.0 bar)	15 PSID (1.0 bar)	
Height	35.3 in. (89.7 cm)	49.8 in. (126.5 cm)	63.8 in. (162.1 cm)	
Width	13.5 in. (34.3 cm)	13.5 in. (34.3 cm)	13.5 in. (34.3 cm)	
Depth	13.2 in. (33.5 cm)	13.2 in. (33.5 cm)	13.2 in. (33.5 cm)	
Dry Weight	100 lbs. (45 kgs)	115 lbs. (52 kgs)	130 lbs. (59 kgs)	
Overhead Service Clearance	16.0 in. (40.6 cm)	32.0 in. (81.3 cm)	47.0 in. (119.4 cm)	

Mounting Information



Specs	RVFS-1/	RVMF-1	RVFS-2/	RVMF-2	RVFS-3/	/RVMF-3
Dimensions	in.	cm	in.	cm	in.	cm
А	35.3	89.7	49.8	126.5	63.8	162.1
В	34.0	86.4	48.5	123.2	62.4	158.5
С	24.8	63.0	39.3	99.8	54.0	137.2
D	6.0	15.2	6.0	15.2	6.0	15.2



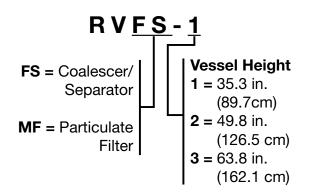
Ordering

A Available for quick delivery.

	Part#'s Supplied wi	th Quick Delivery Vessels
RVFS-1-10C	71330-150	Pressure Relief Valve (150 PSIG)
RVFS-2-10C	70906	Water Level Gauge, (290 PSIG)
RVFS-3-10C	72059	Differential Pressure Gauge Assembly
	7206075	1/2" NPT Stainless Steel Drain Valve
	71981	Mounting Legs
	72153-1, 2, or 3	Hold Down Plate Kit
	10 micron Filters	10 micron Coalescer/10 micron Separator Cartridge

B Customization - the way you need it. (Customized systems sold assembled or unassembled.)

1: Select A Vessel



3: Select a Filter

RVFS Coalescer/Separator Cartridge Options

Vessel Series	1 micron	5 micron	10 micron	25 micron	40 micron			
H0CP	*HOCP Coalescer Cartridge - Requires HSP filter							
RVFS-1	H0CP-15801	H0CP-15805	H0CP-15810	H0CP-15825	H0CP-15840			
RVFS-2	H0CP-30801	H0CP-30805	H0CP-30810	H0CP-30825	H0CP-30840			
RVFS-3	H0CP-44801	H0CP-44805	H0CP-44810	H0CP-44825	H0CP-44840			
***HSP S	eparator Cartri	dge - Pleated F	Paper					
RVFS-1	HSP-15401	HSP-15405	HSP-15410	HSP-15425				
RVFS-2	HSP-30401	HSP-30405	HSP-30410	HSP-30425				
RVFS-3	HSP-44401	HSP-44405	HSP-44410	HSP-44425				

For RVFS-1, 2, and 3, customer must order one HOCP and one HSP filter. A RVFS system consists of one coalescer and one separator filter.

2: Select Accessories

Part Number	<u>Description</u>
71330-150	Pressure Relief Valve (150 PSIG)
70906	Water Level Gauge, (290 PSIG)
72061-RVFS	Water Level Gauge S.S. (300 PSIG)
71679	3/4" Stainless Steel Air Eliminator
72059	Differential Pressure Gauge Assembly
719435	1/2" NPT Brass Drain Valve
720605	1/2" NPT Stainless Steel Drain Valve
7194375	3/4" NPT Brass Vent Valve
7206075	3/4" NPT Stainless Steel Vent Valve
71981	Mounting Legs
71982	Wall Mount Bracket
72482	Inlet Check Valve

RVMF Particulate Cartridge Options

Vessel Series	1 micron	5 micron	10 micron	25 micron
HFP Partic	ulate Cartridg	e - Pleated Pa	per	
RVMF-1	HFP-14601	HFP-14605	HFP-14610	HFP-14625
RVMF-2	HFP-28601	HFP-28605	HFP-28610	HFP-28625
RVMF-3	HFP-43601	HFP-43605	HFP-43610	HFP-43625

A RVMF system consists of one particulate filter.

Dispensing Filtration: FBO Series

Parker Racor's FBO assemblies are specifically designed to meet filtration requirements of today's high-pressure common-rail diesel injection systems.

Common applications include: mobile refuelers, refueling cabinets, fuel dispensing pumps, large diesel engines, bulk fuel handling, and fuel transfer.

Filter Options

FBO filter systems have three filter options to meet various requirements: Particulate filter, coalescer/separator filter, or water absorber filter. For fuel dispensing applications, a coalescer/separator filter is recommended.

FBO filter systems are designed to meet the toughest diesel refueling conditions and feature easy cartridge filter change-outs.



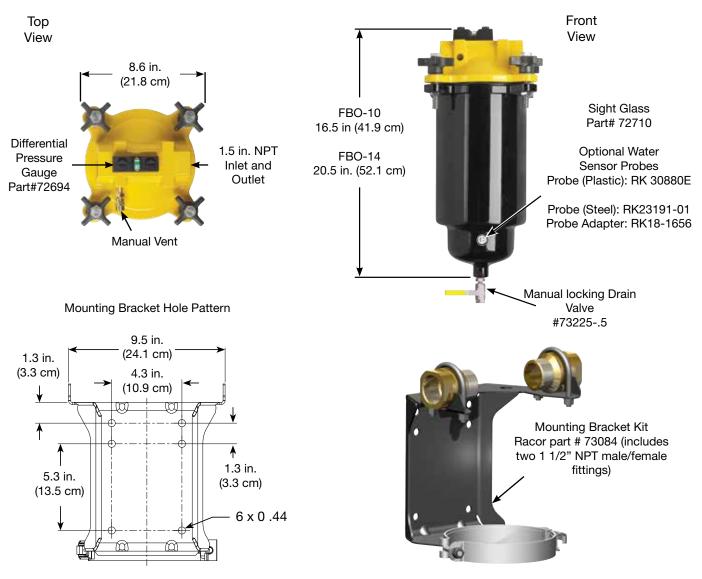
Product Features

- Die-Cast Aluminum Head
- Steel Bowl Assembly
- Powder Coated Components
- Locking Ring Collar
- 1.5" NPT Inlet and Outlet Ports
- Maximum Pressure: 150 PSI (10 bar) and Maximum Temperature 160°F (71°C)
- Lockable Manual Drain Valve: 1/2" NPT (part# 73225-.5)
- Grounding Lug
- Manual Vent Valve

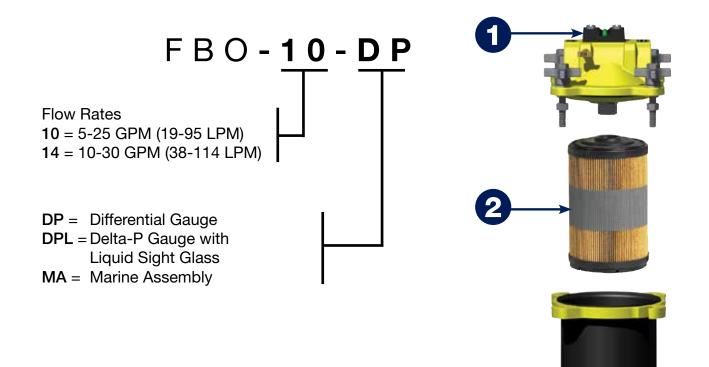
Technical Information

Specifications	Maximum Flow Rates	Clean	Change
FBO-10	Diesel	Delta P	Delta P
Particulate Filter	25 GPM (94.6 LPM)	2.5 PSID	15 PSID
Water Separator	20 GPM (75.7 LPM)	2.5 PSID	15 PSID
Water Absorber	20 GPM (75.7 LPM)	2.5 PSID	30 PSID
FBO-14	Diesel	Delta P	Delta P
Particulate Filter	30 GPM (113.6 LPM)	2.5 PSID	15 PSID
Water Separator	25 GPM (94.6 LPM)	2.5 PSID	15 PSID
Water Absorber	25 GPM (94.6 LPM)	2.5 PSID	30 PSID

Mounting Information



How to Order



Guide to help you specify the right FBO system with the accessories you need.

**Popular Option	0	2	3	4
	Delta-P Gauge	Filter	Sight Glass	Drain Valve
FBO-10		Order Separately (see next page)		
FBO-10-DP	•	Order Separately (see next page)		
FBO-10-DPL**	•	Order Separately (see next page)	•	•
FBO-14		Order Separately (see next page)		
FBO-14-DP	•	Order Separately (see next page)		
FBO-14-DPL**	•	Order Separately (see next page)	•	•
FBO-10-25M ²	•	FB0 60332	•	•
FBO-14-25M ²	•	FBO 60341	•	•

² FBO Assemblies available for quick delivery.

Replacement Filters

Filters are used to protect the OEM supplied fuel system.

Coalescer/Separator

Coalescer/separator filters are a two stage element that removes water and contaminants from diesel fuel streams and are the most popular filters.

Particulate Filter

Particulate filters remove contaminants down to one micron. Particulate filters can also be used upstream, before a water separator filter, to extend filter life.

Water Absorber

Water absorber filters absorb water and filter out contaminants from diesel fuel.



Part# FBO 60338





Part# FBO 60341

Part# FBO 60344

FBO	Micron Rating	Coalescer/Separator	Particulate	Water Absorber
	1	FB0 60327	FB0 60330	FB0 60333
	5	FB0 60328	FB0 60331	FB0 60334
	10	FB0 60353	FB0 60354	FB0 60355
FBO-10 (6 X 10 Filter)	25	FBO 60329	FB0 60332	FB0 60335
	1	FB0 60336	FB0 60339	FB0 60342
	5	FB0 60337	FB0 60340	FB0 60343
	10	FB0 60356	FB0 60357	FB0 60358
FBO-14 (6 X 14 Filter)	25	FB0 60338	FB0 60341	FB0 60344

Duplex Diesel Filtration

DFBO Duplex Filter:

The DFBO duplex filter brings Racor FBO filters to the engine room or any other high flow environment. Made with cast-iron head and steel bowls meet Marine specific applications, that require ABS certification (Marine model: DFBO-14-MA not shown)

The DFBO comes with the two 25 micron coalescer/separator elements. A particulate filter or a water absorptive filter may be used.

Features and Benefits

- Head material is cast-iron, and bowl material is steel.
- Install in vacuum or pressure applications.
- Fluroelastomer seals for biodiesel compatibility.
- Selector valve allows you to isolate filters to have standby filtration.
- Water-in-fuel sight glass available.



FBO-14-DPL-Duplex Filter:

The FBO Duplex Stand was designed with continuous duty applications in mind. The Duplex Stand assembly allows the isolation of one filter at a time for servicing while still in operation. The duplex design ensures that fuel is filtered without interruption.

A particulate filter, a coalescer/separator filter, or a water absorptive filter can be used.

Features and Benefits

- Die-Cast Aluminum Head
- Locking Ring Collar (no v-clamps)
- Maximum Pressure: 150 PSI (10 bar)
- Maximum Temperature: 160°F (71°C)
- Manual Vent Valve and Grounding Lug
- 1" NPT Inlet and Outlet Ports
- Steel Bowl Assembly
- Powder Coated Components
- Lockable Manual Drain Valve: 1/2" NPT (part# 73225-.5)



Part# shown: FBO-14-DPL-Duplex

Portable Diesel Filtration

These portable units are a cost effective way to filter diesel and biodiesel, in storage or transport. Filter Carts are fully portable and self-contained. They are easily moved at the job-site by one person using the built-in wheels and handle. Filter carts can polish, clean up, and recycle old or contaminated fuel. They can also be used in preventative maintenance practices to keep fuel tanks clean.

Features and Benefits

- Versatile and portable
- Viton[®] seals and gaskets
- Site glass and drain valve to detect and remove water
- Particulate removal, coalescer/separation, and water absorption filtration
- Drip pans to capture dripping fluids and prevent environmental issues
- Filter shows differential pressure for filter element changeout

Viton[®] is a registered trademark of DuPont™







Part# shown: FC-20-1-120V

Part# shown: FC-10-1

	-C-16-25	FC-20-1-120V	FC-10-1
	FC-16-25	FC-20-1-120V	FC-10-1
Enclosed Cart			•
2 Wheel Cart	•		•
4 Wheel Cart		•	
Available Bypass Valve for fluid transfer only		•	
Holding Tank			•
Additional Mesh Strainer		•	•
FBO-10			•
FBO-14	•	•	
5 micron element			•
10 micron element		•	
25 micron element	•		
120V Power Requirement		•	•
110V Power Requirement	•		
Hose Kit/Wands	•	Order FC-20-1-120V-kit for fuel cart plus kit	•
Flow Rate (GPM)	16	17	10

Additional Pre-filtration Products

icountACM20

State-of-the-Art Fuel Contamination Monitoring

Fully functional particle counter approved for use on fuels.

- Two minute test procedure
- Fully manufactured by Parker with 20 years experience in the Particle Counter Measuring market
- Laser optical scanning analysis
- Multi-standard ISO cleanliness reporting
- On-board, rear-mounted pump enables monitoring possibilities. For example: Fuel storage/vehicle tanks and fuel storage drums
- Latest averaging software as standard
- Downloader software



ACM202022US

icountOS

Portable Condition Monitoring for Fuel Systems

- Fluid viscosity as high as 300cSt (usable range) will be able to pass through the detector at the proper flow rate
- Quick connections for testing online and offline
- Reporting Standards ISO4406:1999, NAS1638 and RH% moisture sensor display in high intensity OLED format
- Data Storage up to 250,000 test points of information
- Compact, lightweight and robust, truly portable iOS makes field analysis simple, quick and easy
- Able to sample directly from a hydraulic reservoir, barrel and vehicle fuel tank or from a high

pressure, online hydraulic system with the addition of a pressure reducing adaptor

- Completely self contained, with laser detection particle counter (icountPD), rechargeable battery and flow management pump
- No special software needed
- Embedded web page generator for data download onto any PC or laptop via a universal RJ45 connection interface
- Fast detection of the presence of contamination with a sampling period from 5 seconds to 999 seconds
- · Wi-fi access



icountBSplus

The benchtop solution to fluid contamination bottle sampling

- Quick sample bottle analysis with variable test time options from 15 seconds and volume capacities from 25ml
- Repeatable and re-producible result performance to ISO4406:1999, NAS1638 AS4509E and GOST 17216:2001 (Differential and Cumulative) particle count distributions
- On-board compressor and 'shop' air capability

- icounBSplus has the capability for on-line fluid measurement configuration as well as off-line fluid sampling
- Design concept allowing for portability. DC and rechargeable battery pack power option built in
- CE compliant
- On-board thermal printer
- 500 test memory (fully downloadable)



Fuel Filter Funnel

Racor Filter Funnel (RFF) is a heavy-duty, fast-flow, filter-in-a-funnel that separates damaging free water and contaminants from gasoline, diesel, heating oil, and kerosene.

The RFF family of products is capable of removing free water and solids down to 0.005 inches and allows you to visually inspect the integrity of your fuel supply as you refuel.

The RFF family is manufactured using industrial-grade black

electro-conductive polypropylene. Carbon powder is injected into the plastic so that the RFF will conduct static electricity. The grounding capability of the RFF is an important safety feature. Always use proper fuel handling procedures and follow local, state, and federal regulations.









Specifications	RFF1C	RFF3C	RFF8C	RFF15C
Max. Flow Rate	2.5 GPM (9.4 LPM)	3.5 GPM (13.2 LPM)	5 GPM (18.9 LPM)	12 GPM (45.4 LPM)
Micron Rating	50 micron	50 micron	50 micron	50 micron
Height	6.0 in. (15.2 cm)	9.0 in. (22.9 cm)	10.0 in. (25.4 cm)	10.0 in. (25.4 cm)
Diameter	3.5 in. (8.9 cm)	5.5 in. (14.0 cm)	8.5 in. (21.6 cm)	8.5 in. (21.6 cm)
Weight	0.2 lb (0.09 kg)	0.3 lb (0.14 kg)	0.6 lb (0.27 kg)	1.0 lb (0.45 kg)

How They Work

The Racor Filter Funnel comes complete with a built-in DuPont Teflon® PTFE (polytetrafluoroethylene) coated stainless steel screen filter. As fuel is being filtered, free water and contaminates collect on the bottom. Because water is heavier than fuel, free water will settle to the bottom. When you have a substantial amount of water (approximately 1 cup), dispose of it properly and resume refueling.

When properly used, the filter will separate free water from hydrocarbon fuels. Free water is a collection of water molecules in the bottom of fuel cans, tanks, or drums, formed when fuel is stored for even short periods of time. The free water formation is due to condensation in the air and/or separation of water molecules from fuel.

Water may be present in hydrocarbon fuels as free water or as an emulsion, small droplets of water suspended in fuel. Water may be emulsified in fuel by vibration or by emulsifying additives such as alcohol, or detergents. The RFF filter will not remove emulsified water. Instead, install a Racor fuel filter/water separator to remove emulsified water from your fuel delivery or engine fuel system.

Excessive filling will cause pressure and can force water through the funnels filter. If funnel filter is more than 1/3 covered with water and flow rate begins to slow, stop fueling immediately, properly dispose of water and contaminates from the funnel, then continue fueling.

2-cycle oil contains detergents, which may allow some water to pass through the filter screen. The only safe way to filter out water is to add the 2- cycle oil to the tank after filtering the fuel through the funnel. Additives containing alcohol can emulsify and bind water to fuel. The filter cannot remove this bound water. Add additives after fueling.

Do not attempt to remove the filter from the funnel, filter is permanently attached to the funnel.

The RFF is designed to work with fuels only. CAUTION! Do not use the RFF for anything but filtering fuels, other liquids may compromise the effectiveness of the filter.

Another purpose for using a RFF is to facilitate the inspection of fuel for contamination in the form of solids (down to 50 micron) and free water. Don't forget to check the fuel filter sump for water. If water or contamination are found, dispose of properly.

To test the RFF, simply fill with water, roughly 1/3 the way up the screen. This amount of water should not pass through the Teflon® coated filter screen. Keep this amount in mind when using the RFF knowing that the head pressure caused by the weight of more than this may cause water to pass through the screen.

Always dispose of water, contaminates, or dirty fuel in a proper manner.

Periodically inspect the funnel for physical damage. Store the funnel properly as some fuel may remain on the surfaces.

Worldwide Filtration Manufacturing Locations

North America

Compressed Air Treatment Filtration & Separation/Balston Haverhill, MA 978 858 0505

www.parker.com/balston

Airtek/domnick hunter/Zander Lancaster, NY 716 686 6400 www.parker.com/faf

Finite Airtek Filtration/Finite Oxford, MI 248 628 6400 www.parker.com/finitefilter

Engine Filtration & Water Purification Racor

Modesto, CA 209 521 7860 www.parker.com/racor

Holly Springs, MS 662 252 2656 www.parker.com/racor

Racor – Village Marine Tec. Gardena, CA 310 516 9911 desalination.parker.com

Parker Sea Recovery Carson, CA 310 637 3400 www.searecovery.com

Hydraulic Filtration

Hýdraulic Filter Metamora, OH 419 644 4311 www.parker.com/hydraulicfilter

Laval, QC Canada 450 629 9594 www.parkerfarr.com

Process Filtration

domnick hunter Process Filtration Oxnard, CA 805 604 3400 www.parker.com/processfiltration

Madison, WI 608 824 0500 www.scilog.com

Phoenixville, PA 610 933 1600 www.parker.com/processfiltration

Aerospace Filtration

Velcon Filtration Colorado Springs, CO 719 531 5855 www.velcon.com

Europe

Compressed Air Treatment domnick hunter Filtration & Separation Gateshead, England +44 (0) 191 402 9000 www.parker.com/dhfns

Parker Gas Separations Etten-Leur, Netherlands +31 76 508 5300 www.parker.com/dhfns

Hiross Zander Padova Business Unit Padova, Italy +39 049 9712 111 www.parker.com/hzd

Hiross Zander Essen Business Unit Essen, Germany +49 2054 9340 www.parker.com/hzd

Engine Filtration & Water Purification Bacor

Dewsbury, England +44 (0) 1924 487 000 www.parker.com/rfde

Racor Research & Development Stuttgart, Germany +49 (0)711 7071 290-10 www.parker.com/rfde

Hydraulic Filtration Hydraulic Filter

Hydraulic Filter Arnhem, Holland +31 26 3760376 www.parker.com/hfde

Urjala Operation Urjala, Finland

+358 20 753 2500 www.parker.com/hfde

Condition Monitoring Centre Norfolk, England +44 (0) 1842 763 299 www.parker.com/hfde

Parker Kittiwake

West Sussex, England +44 (0) 1903 731 470 www.kittiwake.com

Parker Procal Peterborough, England +44 (0) 1733 232 495 www.kittiwake.com

Process Filtration

domnick hunter Process Filtration Birtley, England +44 (0) 191 410 5121 www.parker.com/processfiltration

Parker Twin Filter BV

Zaandam, Netherlands +31(0)75 655 50 00 www.twinfilter.com

Asia Pacific

Australia Castle Hill, Australia +61 2 9634 7777 www.parker.com/australia

China Shanghai, China +86 21 5031 2525 www.parker.com/china

India Navi Mumbai, India +91 22 651 370 8185 www.parker.com/india

Parker Fowler Bangalore, India +91 80 2783 6794 www.johnfowlerindia.com

Japan Tokyo, Japan +81 45 870 1522 www.parker.com/japan

Parker Techno Osaka, Japan +81 66 340 1600 www.techno.taiyo-ltd.co.jp

Korea Hwaseon-City +82 31 359 0852 www.parker.com/korea

Singapore Jurong Town, Singapore +65 6887 6300 www.parker.com/singapore

Thailand Bangkok, Thailand +66 2186 7000 www.parker.com/thailand

Latin America

Parker Comercio Ltda. Filtration Division Sao Paulo, Brazil +55 12 4009 3500 www.parker.com/br

Pan American Division Miami, FL 305 470 8800 www.parker.com/panam

Aeroport Kempton Park, South Africa +27 11 9610700 www.parker.com/africa

RSI 0020 Rev C 09/15

© 2015 Parker Hannifin Corporation. Product names are trademarks or registered trademarks of their respective companies.

Parker Racor

Parker Hannifin Corporation **Filtration Group Global Headquarters** 6035 Parkland Boulevard Cleveland, OH 44124-4141 phone 216 896 3000 www.parker.com