

Racor RVFS Vessel Series Installation, Operation and Service

- Prefilter Vessel
- Vertical Filter Separator
- Fuel Monitor
- Clay Treater
- Multi-Purpose Applications



*Global Filtration
Technology*



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BEGINS ON PAGE 18**
*Drawings, Parts List, Flow Charts,
Dimensions, etc.*

**PLEASE READ
SAFETY GUIDELINES
PAGE 27**

RVFS MULTI-PURPOSE VESSEL SERIES

RVFS FILTER VESSEL APPLICATION (Racor Vertical Filter Separator)

The RVFS multi-purpose vessel series is versatile in meeting various fuel and hydrocarbon fluid filtration requirements and applications. *The RVFS Vessel Series is designed to be used as:*

- Filter Separator to remove emulsified, free and entrained water and solids from liquid hydrocarbon or air/gas streams.
- Pre-filter to remove solid contaminants such as dirt, rust scale, sand and other solid materials from a hydrocarbon flow stream.
- Water absorbing filter to remove water and solids from a hydrocarbon flow stream.
- Clay treater to remove surfactants, additives and color from a hydrocarbon flow stream.

RVFS Vessel Description

A hinged access cover is provided to facilitate cleaning of the interior as well as the replacement of elements installed in the vessel.

Mounting supports for anchoring the vessels are available in the form of adjustable legs or bulkhead brackets.

Standard vessels are equipped with:

- 2" NPT inlet and outlet connections
- 3/4" NPT vent and pressure relief ports
- 1/2" NPT main drain & liquid level gauge ports
- 1/8" NPT differential pressure gauge ports

Custom vessel configurations are available

and may affect the design/operating conditions, nozzle size and type as well as location.

Information Needed For Service or Parts

Name plates attached to each vessel contain important information specific to the vessel's design and application. Information from the nameplate such as model number, serial number, operating conditions, flow rate, element and gasket part numbers and quantities will be required when contacting your Racor Hydrocarbon Filtration representative for parts or service. This information will also be required when contacting your representative or the factory regarding technical questions.

FILTRATION APPLICATIONS PRE-FILTER APPLICATION

Pre-filters are utilized as first stage filtration for heavily

contaminated fuel or hydrocarbon fluids to protect filter separators and any mechanical components installed in the piping system down stream. To achieve good filtration performance, Racor combines media composed of cellulose, synthetic and glass fibers. This media is pleated in several unique ways, then utilized in our pre-filter elements. This offers operators longer life and higher contaminant holding capacity.

Available Pre-filter Element Size

Elements are available in single, double or triple length sizes and in various micron ratings. (See Element Chart on Page 19.)



Typical Pre-Filter Application

Pre-filter Fuel Flow-Direction and Operation

Contaminated fuel enters the filter vessel through the inlet port located on the side of the vessel near the top and passes through the pleated pre-filter media, flowing outside-in. Silicone resin impregnated media sheds water and provides maximum solids contaminate removal.

Silicone treated pre-filters remove solids and can remove free water from fuels. Such water droplets are repelled by the pre-filter and directed by gravity to the vessel sump where the water can be drained. The clean filtered fuel then flows down through the element center tube and exits through the outlet port located on the bottom of the filter vessel.

Maximize Element Life & Filtration Performance

To obtain maximum element life and filtration performance, maintenance personnel *must use a differential pressure gauge to monitor element condition.*

Element Changeout

Elements are recommended to be *changed at 20 PSI differential or after one year of service, whichever occurs first.*

FILTER SEPARATOR APPLICATION

Filter separators are a two-stage design and use a combination of coalescer and separator elements to remove water and solids contamination from fuels and hydrocarbon liquid flow streams. This element combination provides the driest and cleanest fuels possible where high water content is the main problem.

When Is A Pre-Filter Recommended

The main function of the filter/separator vessel is to remove water. *Should the solids particle load in the flow stream be high, a pre-filter is recommended upstream* to remove solids and extend the life of the coalescer elements.

Filter/Separator Fuel Flow Direction and Operation

Contaminated fuel enters the filter vessel through the inlet port located on the side of the vessel near the top and passes through the multiple layers of the first stage coalescer element, flowing outside-in.

Solids contaminants are removed by the outside layer of pleated filtration media. Water is coalesced by an interior fiberglass shell. The coalesced water then falls by gravity to the filter vessel sump to be drained.

The fuel then passes through the second stage separator element which acts as a hydrophobic barrier that repels water and directs it to the filter vessel sump to be drained. Separator elements are available in a silicon treated pleated paper, Teflon® coated stainless steel screen and a synthetic screen.

The clean, dry fuel then flows down through the element center tube and exits through the outlet port located on the bottom of the filter vessel.



Typical Filter Separator Application

Maximize Element Life & Filtration Performance

To obtain maximum element life and filtration performance, maintenance personnel *must use a differential pressure gauge to monitor element condition.*

Element Changeout

Elements are recommended to be changed at 15 PSI differential or after one year of service, whichever occurs first.

WATER ABSORBING ELEMENTS

Application

Water absorbing elements are commonly used in hydrocarbon fuel applications where water is not a constant problem, but at times is present. Also in applications where water would be a problem to an operation if allowed to remain in the hydrocarbon product flow stream. In some filtration applications, a water-absorbing element is required to remove small amounts of free or emulsified water, in addition to removing solids contaminants. Water absorbing elements are most often used to filter aviation gasoline, jet fuel, diesel fuel, hydraulic and cooling fluids.

Type of Filter to Use With High Water Content

Hydrocarbon flow streams with high water content levels *should use a filter separator vessel utilizing coalescer and separator elements* so the water can be coalesced and drained off.



Typical Water Absorbent Monitor Application

Type of Filter to Use With High Solids Content

Hydrocarbon flow streams with high solids content levels *should use a pre-filter vessel with pre-filter elements* to remove large quantities of solids. *A filter vessel with water absorbing elements can be used down stream of a pre-filter and or filter separator* to ensure clean dry product delivery and longer life of the water absorbing element.

When Not to Use Water Absorbing Elements

When used to filter hydraulic or cooling fluids, *water absorbing elements should not be used if the fluids are "milky."* Such fluids should be drained and changed before installing water absorbing elements. Under such conditions, the elements would have very short life and would need to be changed very soon.

Monitor Element Fuel Flow Direction and Operation

Contaminated fuel enters the filter vessel through the inlet port located on the side of the vessel near the top and passes through the multiple layers of the water absorbent element media, flowing outside-in.

Water absorbing elements use a high performance water absorbing media that can hold 25 times its weight in water. As the media becomes saturated with water, fuel flow is greatly restricted, if the element is not changed. The clean, dry fuel then flows down through the element center tube and exits through the outlet port located on the bottom of the filter vessel.

Maximize Element Life & Filtration Performance

To obtain maximum element life and filtration performance, maintenance personnel *must use a differential pressure gauge to monitor element condition.*

Element Changeout

Elements are recommended to be changed at 15 PSI differential or after one year of service, whichever occurs first.

CLAY TREATER

Application

Clay elements are used to remove (by adsorption), surface active agents (surfactants), color and additives commonly found in jet fuel or may also be used to remove acids or products of oxidation from various hydrocarbon flow streams such as lube oils and hydraulic fluids.

Unwanted Contaminants Present in Fuel

These unwanted contaminants may be present in the fuel at the processing and refining levels or picked up from various transportation methods such as trucks, ships and pipelines that carry several types of petroleum products in addition to jet fuel.

Installation Location

Clay elements are commonly installed in the upstream piping system to prevent the accumulation of surfactants in the filter separator elements. Accumulation of surfactants in the coalescing element media will reduce the water coalescing efficiency of the filter separator unit and allow water to continue downstream.

Clay Element Fuel Flow Direction and Operation

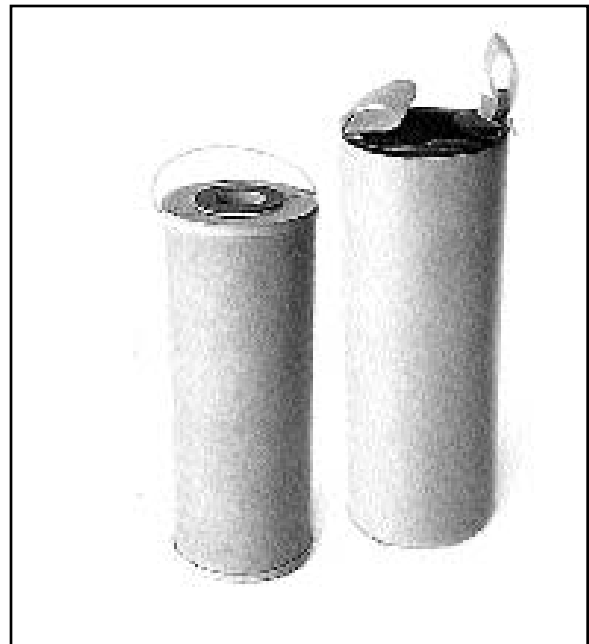
Contaminated fuel enters the filter vessel through the inlet port located on the side of the vessel near the top and passes through the clay media, flowing outside-in. Surfactants and impurities are adsorbed by the clay media as fuel passes through the element. The treated fuel then flows down through the element center tube and exits through the outlet port located on the bottom of the filter vessel.

Measurement of Clay Element Condition

Important: Clay element condition is not measured by differential pressure as are pre-filter, water absorbent and filter separator type elements. To obtain maximum clay element life and downstream filter separator performance, *maintenance personnel must use a Microseparometer (MSEP) test ASTM Method 3948 to monitor clay element condition.* MSEP test would need to be run before and after the clay treater to obtain a measure of the improvement in MSEP rating.

Element Changeout

Elements are recommended to be changed if the MSEP reading is not improved downstream of the clay treater, poor results are being measured downstream of the filter separator or after one year of service, whichever occurs first.



Racor Clay Bags and Canisters

CARBON TREATER

Application

Carbon elements are used to remove by adsorption, chlorine, chlorinated organic compounds, odors, unwanted colors, deodorization and decolorization of hydrocarbon based solvents and for deoiling of industrial water. These unwanted contaminants may be present in the hydrocarbon product at the processing and refining levels or picked up from various process operations.

Carbon Element Flow Direction and Operation

Contaminated product enters the filter vessel through the inlet port located on the side of the vessel near the top and passes through the carbon media, flowing outside-in. Contaminants and impurities are adsorbed by the carbon media as the product passes through the element.

Measurement of Carbon Element Condition & Element Changeout

Carbon element condition is not measured by differential pressure as are pre-filter, water absorbent and filter/seperator type elements.

To obtain maximum carbon element life, elements are recommended to be changed when poor results are being measured downstream of the carbon filter or after one year of service, whichever occurs first.

GENERAL ELEMENT INFORMATION

Element Micron Rating Guide

The following element micron ratings should be used as a general guide when filtering the fluids listed below: (Preferred micron rating listed first).

Aviation Gas	1 or 5 Micron
Diesel Fuel	10 or 25 Micron
Gasoline	5 or 10 Micron
Hydraulic Fluids	5 or 10 Micron
Jet Fuel	.3 or .5 Micron

Consult the factory when filtering fluids not listed; highly contaminated fluids, or fluids with excess water.

GENERAL ACCESSORY INFORMATION

Installation Tips

Normally, accessory items such as differential pressure gauges, air eliminators, relief valves, liquid level gauges and manual drain valves will come factory installed. Inspect all items for damage before operation.

Should such items be shipped uninstalled or in separate containers, inspect all items for possible damage before installation.

All tubing lines should be formed with tubing benders to prevent kinking or flattening of the tubing.

Check All Factory Connections For Tightness

Check all factory connections for tightness before operation.

Tubing and pipe fittings can become loose during transit and should always be checked and tightened, if necessary, before operation.

RVFS INSTALLATION INSTRUCTIONS/TIPS

1. Remove vessel from shipping container and inspect for any damage that may have occurred during transit. Replace any damaged parts before operating. Remove any protective packing materials and properly dispose of along with shipping container.

Note: Before disposal, be sure to inspect shipping container for any parts that may have been shipped loose.

2. Provide a suitable mounting surface and anchor bolts, nuts and washers of adequate size.
3. Secure unit in place before opening the access cover or proceeding with connecting piping.

Safety Warning: Opening the access cover before the vessel is securely mounted may cause the vessel to become unstable and could result in the vessel falling.

4. Once the vessel is securely mounted, the access cover can be safely opened to inspect the vessel internals.

Note: Factory Installed Elements

Elements may be installed at the factory before shipment, if so, inspect for any damage that may have occurred during transit.

Note: If Elements Are Not Factory Installed

Vessels shipped without elements installed will be tagged calling attention to this fact.

5. If no damage is found and elements are installed, check all elements to be sure that all elements are properly aligned on the filter element stool knife edges and that the top filter element end yoke is properly seated. **Tighten all elements to the recommended torque rating, see chart on page 21.**
6. Inspect the cover o-ring seal for any damage and replace if necessary.
7. Place the cover seal in the o-ring gland, close vessel access cover, being careful not to damage the cover seal, and tighten all bolts evenly and securely.
8. Remove any flange face or thread protectors from all connections.

9. Proceed with connecting piping using a minimum number of turns and fittings to minimize additional turbulence in the inlet piping as well as product/water emulsification and additional system pressure loss.

10. Align all piping to and from the vessel as closely as possible with the connections on the vessel. Proper alignment will avoid overstressing the connections on the vessel.

11. Use thread sealant for threaded connections or the correct gaskets between flanged connections. Be sure that thread sealant and gaskets are compatible with the intended application.

12. Provide shutoff valves in the inlet/outlet piping to isolate the vessel from the piping system for servicing the unit or complete removal of the vessel from the process stream should be necessary.

13. Provide suitable vent and drain lines from the vessel to a suitable collection point for drained water or product to be collected for later processing or disposal.

Warning: Correctly Identify Inlet & Outlet Connections

Correctly identify the inlet and outlet connections before connecting the vessel in the system. The unit will not perform properly should the connections be reversed.

PRE-OPERATIONAL CHECK

When all piping connections have been made, check that all accessory items have been installed and inspected. A final check should be made before filling the vessel with fluid to test.

1. Verify that all anchor bolts are tight.
2. Verify that any flanged connections have the proper gaskets installed and that flange bolts are tight.
3. Verify that any threaded connections have the proper sealing compound and that all connections are tight.
4. Verify that all accessory items are properly installed and all connections are tight.
5. Verify that all tubing lines are in good condition and all tube fittings are tight.
6. Verify that all vessel access cover bolts are tight.
7. Verify that all packing nuts or glands on valves and liquid level gauges are tight.
8. Verify that any electrical connections are proper and in conformance with local electrical code requirements.
9. Verify that electrical power connected is of the proper voltage.
10. Verify that any electrical equipment used is in conformance with local electrical code requirements for the location and of adequate size and that there are no hazards present. A fused disconnect should be provided in the wiring system to protect electrical equipment from overload and to provide a power disconnect close to the equipment.
11. Should insulation be installed, verify that the insulation does not interfere with the visual inspection or operation of the controls.
12. Verify that all surplus materials that may be a hazard to the operator or any combustible materials have been removed from the immediate area.

SAFETY WARNING: Adequate fire fighting equipment should be provided for the operating area before conducting a fluid test and at all times when performing any maintenance or service work in the operating area. Provide “*No Smoking*” signs in the operating area.

PERSONNEL SAFETY PRECAUTIONS

The following precautions are recommended for the safety of the operating personnel:

1. The fluid being filtered is volatile. No smoking is permitted in the area where the system pumps, storage tanks and filtering equipment are located.
2. Any fluid spill must be cleaned up immediately. Dispose of all contaminated cleaning materials in a fire-safe container.
3. Any clothing contaminated with fluid must be removed immediately and disposed of in a fire-safe container.
4. Fluid resistant gloves must be worn when handling parts that have been in contact with the fluid.
5. When servicing the filtering equipment, allow for maximum ventilation to disperse fumes. An air mask may be worn when servicing the vessel main body.
6. Use only non-sparking tools when performing maintenance on the filtering equipment and on the fuel system components.
7. Avoid any unnecessary contact of fluid to the skin or clothing. Always wear safety gloves.
8. Avoid any spillage of liquid in the operating area. Any spills must be cleaned up immediately to reduce injury from slipping.
9. Personnel should wash hands thoroughly after any maintenance to the filtering equipment or any of its components. Apply medication to any cuts or abrasions.
10. Secure medical attention for any serious cuts, stomach discomfort or breathing difficulties that may be caused by excessive inhalation of fumes.

PRE-OPERATIONAL FLUID TEST

After all of the aforementioned procedures have been followed, the filter system is ready for a fluid test prior to being placed in full operation.

1. Close the drain valves and open the vent valve, or make sure the air eliminator is unrestricted.
2. Open the gauge cocks on the liquid level gauge if used.
3. Open the main valve from the storage tank to SLOWLY fill the system piping and filter vessel with fluid using head pressure from the storage tank.
4. If head pressure is not available, the system piping and filter vessel will need to be filled using the system pump.

Instruction

If Positive Displacement Pump Is Used

1. If a positive displacement pump is used in the system, a bypass line must be installed around the filter vessel, or a pressure relief valve be installed in the piping to prevent excessive pressure that may cause damage.
2. Start the system pump and SLOWLY open the main valve on the inlet piping.
3. Allow the filter vessel to fill SLOWLY and completely.
4. Close the vents and SLOWLY open the main valve on the outlet piping of the filter vessel.
5. **If Fluid Mist Occurs**
There will be a slight emission of fluid mist when the filter vessel is on line and when the air eliminator vents, the manual vent is opened or when excess thermal pressure is discharged from the pressure relief valve.
6. Inspect all connections for leaks.
7. Tighten connections or replace gaskets where necessary. If tightening connections fails to stop leaks, inspect for damage and replace parts as necessary.
8. Check all components for proper operation and valve alignment.
9. Verify that all fluid spills have been cleaned and dried and removed from the area.

CAUTION: Use Only Non-sparking Tools

Use only non-sparking tools when performing any maintenance or service work.

FILTER OPERATION PROCEDURES (After Installation & Fluid Tests)

After installation of the filter vessel is complete (including the fluid test for leaks), the filter vessel is ready for operation. ***To place the filter vessel on stream, the following procedures must be observed.***

1. Verify all drain valves are closed.
Should an automatic drain valve be installed, any valves located downstream should be open to permit discharge of accumulated water.
2. Verify liquid level gauge cocks are open, if equipped.
3. Verify air eliminator and pressure relief valves are not restricted. If the filter vessel is only equipped with a manual air vent valve, this manual vent will need to be open until the vessel is full.
4. Open the main valve in the outlet line leading from the filter vessel.
5. Open the main valve from the storage tank to SLOWLY fill the system piping and filter vessel with fluid using head pressure from the storage tank.
 - A. If head pressure is not available, start the system pump and slowly open the main valve in the inlet line to fill the filter vessel.
 - B. Allow the unit to fill slowly and completely.
 - C. Allow the vent valve to remain open (if so equipped) long enough to allow entrapped air to escape.
 - D. Close the vent valve as soon as the filter vessel is full.
6. When the filter vessel is filled and vented, open the main inlet and outlet valves to full open position. Check the flow meter, if installed, to verify flow rate.
7. Verify that the system pressure does not exceed the design pressure of any of the components in the system.
8. Check the differential pressure and record the reading and the date.

Element Changeout

For maximum performance and efficiency, the elements must be replaced when the differential pressure reaches 15 PSID, or replaced at least once each year, whichever occurs first.

FILTER MAINTENANCE

IMPORTANT: Replacement Parts & Elements

Use only Parker Racor Hydrocarbon filters, replacement elements, and parts. Do not mix elements of different manufacture, as there may be differences in construction, sealing and pressure drop characteristics.

SAFETY WARNING

1. Use Only Non-sparking Tools
Only non-sparking tools should be used when performing any maintenance or service work on this equipment.
2. Turn Off Any Heating Device
If any type of heating device is used, be sure to turn it off before draining the unit.
3. Due to the toxic effects of some of the additives used in liquid hydrocarbon products, care should be taken in handling any parts that have been in contact with liquid product.

There are no moving parts in the filter vessel. Maintenance of the unit is minimized to the occasional replacement of elements inside the filter vessel. The frequency of the element change will depend on the amount of solids contaminant in the product stream.

Element Replacement Procedures

When the differential pressure reading indicates that replacement of the elements is necessary, *the following procedure must be observed.*

1. Shut off product pump.
2. Close filter vessel inlet and outlet main valves.
3. Open vent valve (if so equipped).
4. Open drain valve.
5. Allow filter vessel to completely vent and drain before opening.
6. Loosen and remove cover access bolts.
7. Open the filter vessel access cover.
8. Discard old access cover gasket to a fire-safe place.

NOTE: Element Configuration & Assembly

There is a possibility that the element configuration could be a long single element or two or three short elements stacked with center seals between each element. ***Be careful not to drop the center seal or any of the hardware into the bottom of the filter vessel while changing elements.*** All of these parts are required for re-assembly and any parts dropped into the bottom of the filter vessel must be retrieved before the filter vessel can be put back in operation. Any parts not recovered may cause damage to equipment downstream.

DIFFERENCES IN ELEMENT CHANGING PROCEDURES

The element changing procedure will be slightly different depending on the application and the type of elements installed. ***The following paragraphs will detail each of the available element configurations.*** Proceed to the changing instructions that best fit your element configuration.

ELEMENT TYPES

6" Pre-filter, Water Absorbing Element (See Figure 1) Clay Canister Type Elements (See Figure 2)

NOTE: *It is not necessary to remove the center rod from the element-mounting adapter when replacing elements.*

If the center rod is removed from the adapter, thread the jam nut onto the center rod until approximately 1 1/2" (one and one-half inches) of center rod is extending through the jam nut.

Screw the center rod into the element adapter until the jam nut is securely seated against the adapter and locked in place.

1. Remove the element(s) by removing the hex nut, lock washer, flat metal washer, gasket washer and end yoke from the center rod.
2. Slide the old element(s) from the center rod. Be careful not to dislodge any solids debris from the element as the element is removed from the vessel. Any solids that fall back into the vessel could fall into the clean product chamber, contaminating the down-stream process.
3. Discard old elements to a fire-safe place, per current local EPA regulations.
4. Clean all interior surfaces of the filter vessel including the mounting adapter and element mounting hardware.
5. Using clean product, flush any solids debris from the bottom of the filter vessel through the vessel drain connection. Solids that are too large or are in too great of quantity must be removed by another method.
6. Once the filter vessel is clean, the new elements are ready to install.

CAUTION:**Handle Elements Only By End Caps**

Elements should only be handled by the end caps to prevent physical damage to the media. Performance of the elements may also be affected by touching the media even though no physical damage is apparent.

7. Slide the new element(s) on to the center rod.
8. Re-assemble the end yoke, gasket washer, flat metal washer, lock washer and hex nut to the center rod. If elements are stacked, be sure that the center seals are installed between each element.
9. Verify that the elements are seated properly on the adapters and center seals.
10. Using a torque wrench, tighten the hex nuts to recommended torque shown on *page 21*.
11. Install a new access cover gasket of the proper type and close the filter vessel access cover.
12. Tighten all closure bolts evenly and securely.
13. Follow the instructions outlined in the "FILTER OPERATION PROCEDURES" section on *page 7* to return the filter vessel to service.

**Coalescer/Separator
Type Elements
(See Figure 3).**

NOTE: *It is not necessary to remove the center rod from the element-mounting adapter when replacing elements.*

1. If the center rod is removed from the adapter, thread the jam nut on to the center rod until approximately 1 - 1/2" (one and one-half inches) of center rod is extending through the jam nut.
2. Screw the center rod into the element adapter until the jam nut is securely seated against the adapter and locked in place.
3. Remove the *coalescer element(s)* by removing the hex nut, lock washer, flat metal washer, gasket washer and end yoke from the center rod.

4. Slide the old coalescer element(s) from the filter vessel. Be careful not to dislodge any solids debris from the element as the element is removed from the vessel. Any solids that fall back into the vessel could fall into the clean product chamber, contaminating the down stream process.
5. Remove the *separator element(s)* by removing the hex nut, lock washer, flat metal washer, gasket washer and end yoke from the center rod.
6. Slide the old separator element(s) from the filter vessel. Be careful not to dislodge any solids debris from the element as the element is removed from the vessel. Any solids that fall back into the vessel could fall into the clean product chamber contaminating the down-stream process.
7. Discard old elements to a fire-safe place, per current local EPA regulations.
8. Clean all interior surfaces of the filter vessel including the mounting adapter and element mounting hardware.
9. Using clean product, flush any solids debris from the bottom of the filter vessel through the vessel drain connection. Solids that are too large or are in too great of quantity must be removed by another method.
10. Once the filter vessel is clean, the new elements are ready to install.

CAUTION:**Elements Should Only Be Handled By End Caps**

Elements should only be handled by the end caps to prevent physical damage to the media. Performance of the elements may also be affected by touching the media even though no physical damage is apparent.

11. Slide the new separator element(s) onto the center rod.
12. Re-assemble the end yoke, gasket washer, flat metal washer, lock washer and hex nut to the center rod. If the separator elements are stacked, be sure that the center seals are installed between each element.
13. Verify that the elements are seated properly on the adapters and knife edge center seals.

COALESCER/SEPARATOR TYPE ELEMENTS

Continued From Page 9

(See Figure 3).

14. Using a torque wrench, tighten the hex nuts to 60 inch pounds (5 foot pounds).
15. Slide the new coalescer element(s) over the separator element(s), which were just installed. The coalescer element must center on the knife edge seal ring in the bottom of the vessel.
16. Re-assemble the end yoke, gasket washer, flat metal washer, lock washer and hex nut to the center rod. If the coalescer element(s) are stacked, be sure that the center seals are installed between each element.
17. Verify that the elements are seated properly on the seal ring and knife edge center seals.
18. Using a torque wrench, tighten the hex nuts to 120 inch pounds (10 foot pounds).
19. Install a new access cover o-ring gasket of the proper type and close the filter vessel access cover.
20. Tighten all closure bolts evenly and securely.
21. Follow the instructions outlined in the "FILTER OPERATION PROCEDURES" section on *page 7* to return the filter vessel to service.

**NOTE: Standard Closure Seal is:
Buna-N O-Ring P/N 72025**

6" PRE-FILTER & MONITOR ELEMENT MOUNTING HARDWARE

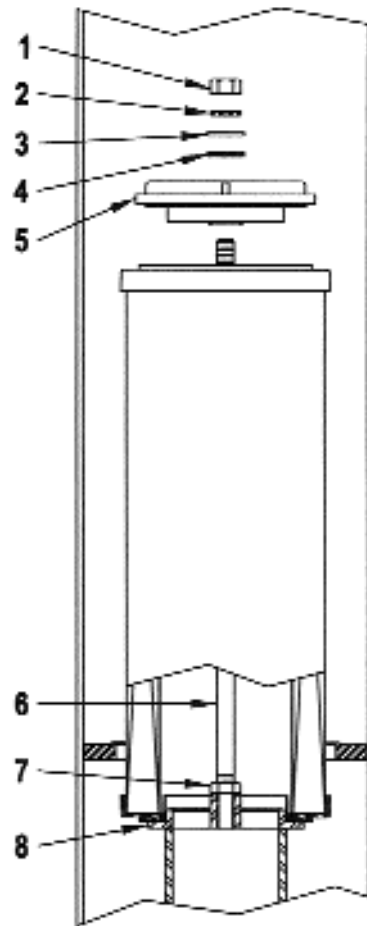


Figure 1

Parts List

1. Hex Nut
2. Star Lock Washer
3. Flat Washer
4. Gasket Washer *
5. End Yoke
6. Center Rod
7. Jam Nut
8. Mounting Stool

*Gasket Washers Are Supplied With
New Element.

7" CLAY CANISTER ELEMENT MOUNTING HARDWARE

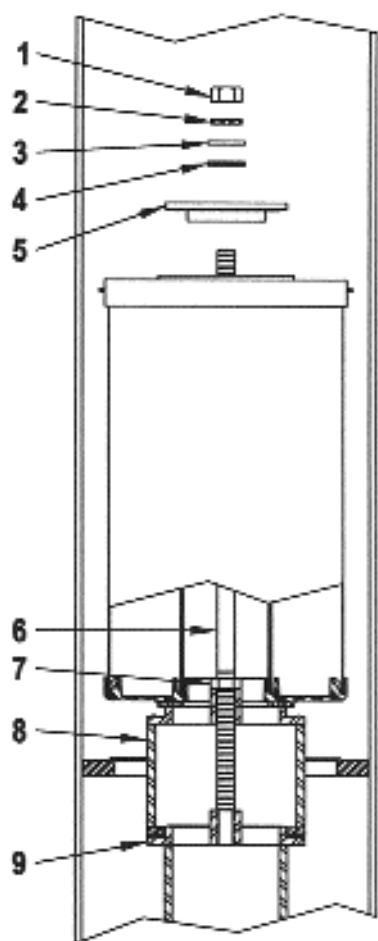


Figure 2

Parts List

1. Hex Nut
2. Star Lock Washer
3. Flat Washer
4. Gasket Washer *
5. End Yoke
6. Center Rod
7. Jam Nut
8. Mounting Stool Adapter
9. Mounting Stool

*Gasket Washers Are Supplied With New Element.

Center Seal Required If Elements Are Stacked Two Deep.

FILTER/SEPARATOR ELEMENT MOUNTING HARDWARE

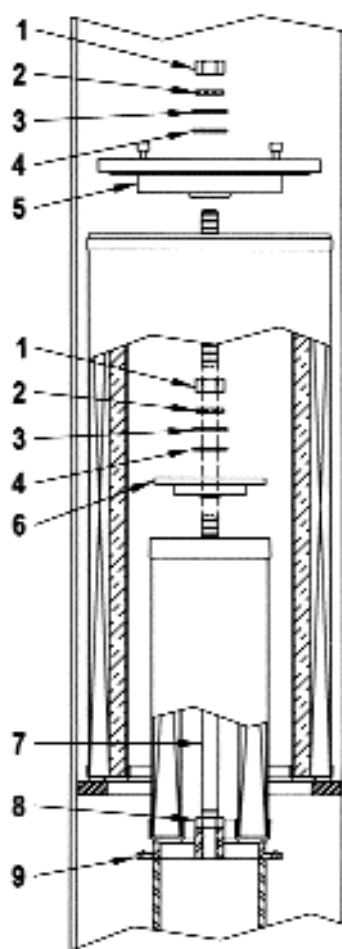


Figure 3

Parts List

1. Hex Nut
2. Star Lock Washer
3. Flat Washer
4. Gasket Washer *
5. Coalescer Yoke
6. Separator Yoke
7. Center Rod
8. Jam Nut
9. Mounting Stool

*Gasket Washers Are Supplied With New Element.

RVFS EQUIPMENT OPTIONS

CAUTION: Do This Before Removal or Repair of Filter

Filter vessel must be relieved of internal pressure, drained and vented before removal or repair of any accessory option.

DIFFERENTIAL PRESSURE GAUGE

Application

The primary reason for installing a differential pressure gauge on a filter vessel is to determine the difference between the pressure in the inlet chamber and the outlet chamber. The resulting number of pounds difference is a direct indication of the condition of the elements contained in the filter vessel.

Operation

While under pressure, fluid enters the filter vessel through the inlet connection and flows through the element(s) to the outlet connection. During this filtering process, there is a gradual clogging of the element with solid contaminants. This will result in a gradual increase of pressure and decrease in product flow. The condition of the element(s) is indicated by the amount of pressure loss shown on the gauge.

Element Changeout

When the filter vessel has been in operation for some time, a gradual increase in the difference of inlet and outlet pressures will be indicated on the gauge. When the actual differential pressure reaches the recommended change-out differential pressure (shown on the vessel nameplate), the elements must be replaced.

Gauge Type

The gauge shown in *Figure 4* is a direct reading type. The large indicating pointer is free to swing toward the high-pressure side while the filter vessel is in operation. ***When the filter vessel is not in operation, the indicator will return to the zero mark.***

Gauge Reading Results

In addition, a dead hand or maximum pointer indicator will also be included on the standard direct reading differential gauge. *The dead hand indicator will provide indication of the maximum differential pressure that occurred during a time period or system cycle.* This feature is also desirable in systems where line surges or hydraulic hammer may be expected.

Installation of Direct Reading Gauges

Figure 4 illustrates the standard installation assembly of the direct reading differential pressure gauge assembly recommended for Parker Racor Hydrocarbon Filters RVFS type filter vessels.

Tubing lines are to be threaded into the connections provided on the filter vessel inlet and outlet connections and on the differential pressure gauge high and low pressure ports.

Check differential pressure gauge mounting bracket screws to be sure they are tightened securely. This will minimize vibrations and possible breakage of the connecting tubes or pipes. All tubing, pipes and fittings should be checked for obstructions or damage before any connections are made and the filter vessel is put into operation. Make certain that all connections are tight before operation.

CAUTION: Do not over-tighten connections.

Stripped threads on the fittings may result in leaky joints. Replace damaged fittings and/or flattened or kinked tubing with new parts before filter vessel is put into operation.

NOTE: Valves Should Remain Open

Any valves installed in the differential pressure gauge hookup assembly should remain open while the filter vessel is in operation.



Figure 4
Standard Direct Reading Differential
Pressure Gauge Assembly

AIR ELIMINATOR

Application

In many fluid systems, a filter vessel will tend to trap air or vapor in a partially filled condition. A float operated air eliminator will automatically vent to the atmosphere any trapped air or vapor which might be entrained in the fluid passing through the unit. The air eliminator is mounted at the top of the filter vessel at the position best suited for the collection of air and vapor.

Operation

Since the air eliminator mechanism is fully automatic, it requires no attention during operation. As the air accumulates in the chamber of the air eliminator, the float drops and opens the internal vent valve. When the air is exhausted, the liquid will rise in the chamber of the air eliminator and lift the float shutting the internal vent valve.

Installation of Air Eliminator

Figure 5 illustrates the standard hook-up assembly of the automatic air eliminator recommended for Parker Racor Hydrocarbon Filtration RVFS type filter vessels.



Figure 5
Standard Automatic Eliminator Assembly

A pipe nipple and the air eliminator are threaded into the vent connection provided on top of the filter vessel. Make certain that all connections are tight before operation.

Figure 6 - Illustrates a pipe tee and a manual vent valve installed below the air eliminator for venting purposes when a check valve is installed in the outlet of the air eliminator. The check valve can be installed to prevent air from entering the filter vessel when the system is not operating and there is potential for fluid in the filter vessel to drain back by gravity through the piping system.



Figure 6
Automatic Air Eliminator with Check Valve and Manual Vent Valve Assembly

If Air Eliminator Fails

Should the air eliminator fail to function, or should it permit fuel to leak from the air outlet:

1. Remove the assembly and check the float mechanism.
2. In some cases, washing the mechanism with naphtha or gasoline and blowing out with compressed air will remove dirt or debris, which might be causing the linkage to stick.
3. If the linkage remains stiff or will not move, replace the air eliminator.

RELIEF VALVE

Application

Relief valves are installed on filter vessels to provide for the bleed-off of excess pressure caused by line surges or thermal expansion. In general, the valves are not designed to handle relief of full flow on a bypass operation, but only to *relieve excess pressure*.

Operation

Since the relief valve mechanism is fully automatic, it requires no attention during operation. As excess pressure accumulates inside the filter vessel, the excess pressure overcomes the spring mechanism inside the relief valve and the relief valve opens momentarily or until the pressure returns to normal levels. Once the pressure is relieved to a level below the relief valve set point, the spring mechanism will force the relief valve closed.



Figure 7
Standard Relief Valve Assembly

Installation of Relief Valve

Figure 7 illustrates the standard hook-up assembly of the relief valve recommended for Parker Racor RVFS type filter vessels.

The relief valve will thread directly into the relief connection provided on top of the filter vessel. Make certain that all connections are tight before operation.

MANUAL VENT AND DRAIN VALVES

Application

Manual vent valves are manually operated ball valves installed on the filter vessel to provide a way to vent the filter vessel when an automatic air eliminator is not used. *The filter vessel will need to be vented during either the filling or draining operation.*

A manual vent valve also is required when the automatic air eliminator is installed and equipped with a check valve to prevent the return of air into the filter vessel. See Figure 6 on previous page.

Manual drain valves are manually operated ball valves that are installed on the filter vessel drain connection. This valve provides a way to drain fluid from the filter vessel. *Manual drain valves should be opened frequently during operation so that accumulated solids and water can be removed.*

CAUTION: Always drain and thoroughly vent the filter vessel before element replacement or maintenance on any of its components.

Operation of Manual Vent and Drain Valves

Manual vent and drain valves can be fully opened or fully closed by turning the handle 90 degrees.

Installation of Manual Vent Valve

Figure 8 illustrates the standard hook-up assembly of the manual vent valve recommended for Parker Racor RVFS type filter vessels should the filter vessel not be equipped with an automatic air eliminator.



Figure 8
Standard Manual Vent Valve Assembly

A pipe nipple and the manual vent valve are to be threaded into the vent connection provided on top of the filter vessel. Make certain that all connections are tight before operation.

Figure 9 illustrates the standard hook-up assembly of the manual drain valve recommended for Parker Racor RVFS type filter vessels.



Figure 9
Standard Manual Drain Valve Assembly

A pipe nipple and the manual drain valve are to be threaded into the drain connection provided in the bottom of the filter vessel. Make certain that all connections are tight before operation.

LIQUID LEVEL GAUGE

Application

A liquid level gauge will provide visual observation of the level of two immiscible fluids in the sump of a filter vessel. A liquid level gauge will be of most use when the filter vessel is operating as a filter separator to coalesce water from a hydrocarbon product stream (sometimes referred to as a water sight glass).

Operation Liquid Level Gauge

When the liquid level gauge is used to determine the level of two immiscible liquids, such as fuel and water, the level is read by the position of the interface of the two liquids. Water is heavier than most hydrocarbon products and will be the most common fluid being coalesced or removed from a hydrocarbon product stream. Once the water is coalesced into droplets, the water droplets will settle and collect in the sump at the bottom of the filter vessel.

Location of Liquid Level Gauge

The liquid level gauge will be positioned in the sump area near the bottom of the filter vessel.

Installation of Liquid Level Gauge

Figure 10 illustrates the standard hook-up assembly of the type liquid level gauge recommended for Parker Racor RVFS type filter vessels.

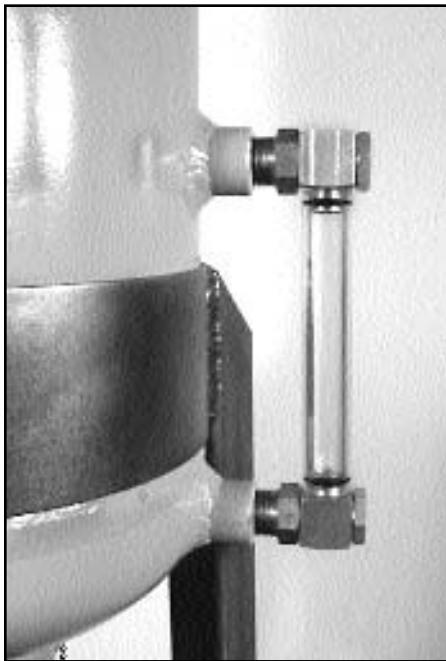


Figure 10
Standard Liquid Level Gauge Assembly

The upper and lower liquid level gauge valves, if supplied, will thread directly into the two connections provided on lower side of the filter vessel and will need to be aligned properly to accept the clear level indicator tube. Guard rods are provided on some models to protect the level indicator tube from breakage. *Should the level indicator tube be broken, the gauge valves, if equipped, can be closed to prevent product spillage.*

Make certain that all connections, gauge valve stem packing nuts and level indicator tube packing nuts are tight before operation.

CAUTION: Do not over-tighten packing nuts or other connections. Stripped threads on the fittings may result in leaky joints. Replace any damaged fittings or parts before the filter vessel is put into operation.

NOTE:

Gauge Valves to Remain Open

Gauge valves, if supplied, in the liquid level gauge assembly should remain open while the filter vessel is in operation.

MECHANICAL DUAL GRAVITY DRAINER

Application

A mechanical dual gravity drainer is a device designed to automatically drain a heavier liquid such as water from a flow stream of a lighter hydrocarbon product. This type of drainer would be used in an application where water is considered a contaminate and is being removed from the flow stream.

A filter separator vessel is designed to remove water from a hydrocarbon flow stream. Water is coalesced from the product flow stream and being heavier than the hydrocarbon product, will fall by gravity into the sump located at the bottom of the vessel. The water can then be drained from the sump by a manually operated drain valve or automatically by a Mechanical Dual Gravity Drainer mounted in the drain line at the bottom of the vessel.

Operation of Mechanical Dual Gravity Drainer

Since the drainer mechanism is fully automatic, it requires no attention during operation. A mechanical dual gravity drainer uses a weighted float that is designed to float in water and sink in the hydrocarbon product. Water will accumulate in the sump of the vessel and equalize into the drainer body. As the water level increases in the chamber of the drainer, the float rises and opens the internal mechanical drain valve. Water is then expelled by the system operating pressure through the drain port. As water is expelled through the drain port, it is replaced by hydrocarbon product entering the body of the drainer lowering the float and closing the internal drain valve.

Installation of Mechanical Dual Gravity Drainer

Instructions will be provided for the standard hook-up assembly of the mechanical dual gravity drainer recommended from Parker Racor RVFS type filter separator vessels.

Location of Mechanical Dual Gravity Drainer

Pipe nipples, fittings and the mechanical dual gravity drainer are to be threaded into the drain connection provided on the bottom of the filter separator vessel and to one of the liquid level gauge connections.

A manual drain valve should also be installed in order to drain the filter separator vessel for maintenance purposes. Make certain that all connections are tight before operation.

If Mechanical Dual Gravity Drainer Fails or Leaks

Should the Mechanical Dual Gravity Drainer fail to function, or should it permit fuel to leak from the outlet:

1. Remove the assembly and check the float mechanism.
2. In some cases, washing the mechanism with naphtha or gasoline and blowing out with compressed air will remove dirt or debris, which might be causing the linkage to stick.
3. If the linkage remains stiff or will not move, replace the automatic drainer.

SUMP HEATER

Application

A sump heater is an electrical heating device for providing freeze protection only to the sump area of a filter separator vessel. A filter separator vessel is designed to remove water from a hydrocarbon product stream. The water being removed will settle by gravity into the sump of the filter separator vessel. In the winter, water left in the sump can freeze and cause operational problems as well as damage to equipment.

Operation - Use Only in Cold Weather

A sump heater is a device that will only be of use in cold weather and should be turned off when freezing is not a threat or during service or maintenance periods.

Install a disconnect switch at site close to where the heater is installed.

SUMP HEATER SAFETY PROCEDURES

A sump heater is an electrical device and has the potential to cause electrocution, fire or an explosion should it be installed or operated improperly.

1. Check local electrical codes as well as the area classification where the electrical device will be installed and operated to determine the proper type of heating device and hook-up required.
2. Disconnect electrical power from the sump heater before draining the vessel of all liquid.
3. Never operate the heating device when the filter separator vessel is empty. The heater element as well as the filter vessel may be damaged.

Installation of Sump Heater - Normally Preinstalled

1. Normally, if ordered as an option, the filter separator vessel will come with the sump heater device preinstalled from the factory.
2. Should the sump heater device be ordered separate for installation at the job site, detailed instructions will be supplied.

3. A qualified electrician should perform the installation and hook-up.

WATER PROBE

Application

A water probe is an electrical device for measuring conductance. Water is a conductor and normally a hydrocarbon product is a non-conductor. A filter separator vessel is designed to remove water from a hydrocarbon product stream. The water being removed will settle by gravity into the sump of the filter separator vessel.

Location of Water Probe

A water probe is positioned in a filter separator vessel near the sump area and will provide an electrical signal indicating rising water in the sump of the filter separator upon water making contact with the probe. The electrical signal (usually a contact closure) can be used to shut down or divert flow or alert operators by audible or visual methods.

Operation

A water probe is an electrical device that will only be of use in a filter separator vessel where water is considered a contaminant and is being removed from a hydrocarbon product flow stream. Water is detected by conductance and normally a contact closure is provided for customer use. Water probes are available in various voltages and styles.

Location of Disconnect Switch

Install a disconnect switch at the site close to where the water probe is installed.

WATER PROBE SAFETY PROCEDURES

A water probe is an electrical device and has the potential to cause electrocution, fire or an explosion should it be installed or operated improperly.

1. Check local electrical codes as well as the area classification where the electrical device will be installed and operated to determine the proper type of water probe and hook-up required.
2. Disconnect electrical power from the water probe before draining and servicing the vessel.

Installation of Water Probe

1. Normally, if ordered as an option, the filter separator vessel will come with the water probe pre-installed from the factory.
2. Should the water probe be ordered separate for installation at the job site, detailed instructions will be supplied.
3. A qualified electrician should perform the installation and hook-up.

SAMPLE PROBES

Application

Sample probes are installed on filter vessels to provide a way to draw a sample of the product flow stream for testing. Contamination is normal in a hydrocarbon product flow stream, the type and level of contamination may be used to determine the quality of the product being delivered.

Location of Sample Probes

Sample probes are normally installed in the inlet and the outlet connections of the filter vessel.

Operation

A sample of the hydrocarbon product flow stream is taken at the sample connection and filtered through a special filter disk. Samples may be taken to determine the quantity of solids and or water in the product being delivered. Delivery of product with too high solids or water content may be considered “off spec” and rejected due to poor quality. Sample probes can also be used to determine how well the elements in a filter vessel may be working by comparing upstream and downstream samples of the product.

Installation of Sample Probes

Figure 11 illustrates the standard hook-up assembly of the sample probes recommended for Parker Racor RVFS type filter vessels.

The sample probes will thread into a connection added to the filter vessel inlet and outlet connections. The sample probe is provided with a tube that extends to the center of the piping and has a bevel cut which faces upstream to collect the sample. The sample probe is also provided with a quick connector and a ball valve to isolate the connection. Make certain that all connections are tight before operation.

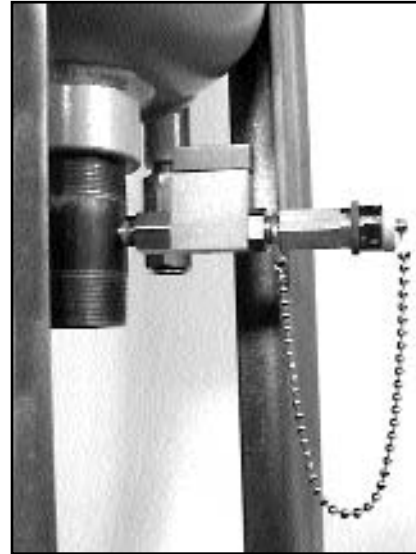


Figure 11
Standard Sample Outlet Probe Assembly



Figure 11
Standard Sample Inlet Probe Assembly

Specification Drawings, Dimensions, Flow Charts, & Parts Lists

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RVFS ELEMENT OPTIONS CHART

Recommended For Diesel Fuel Applications

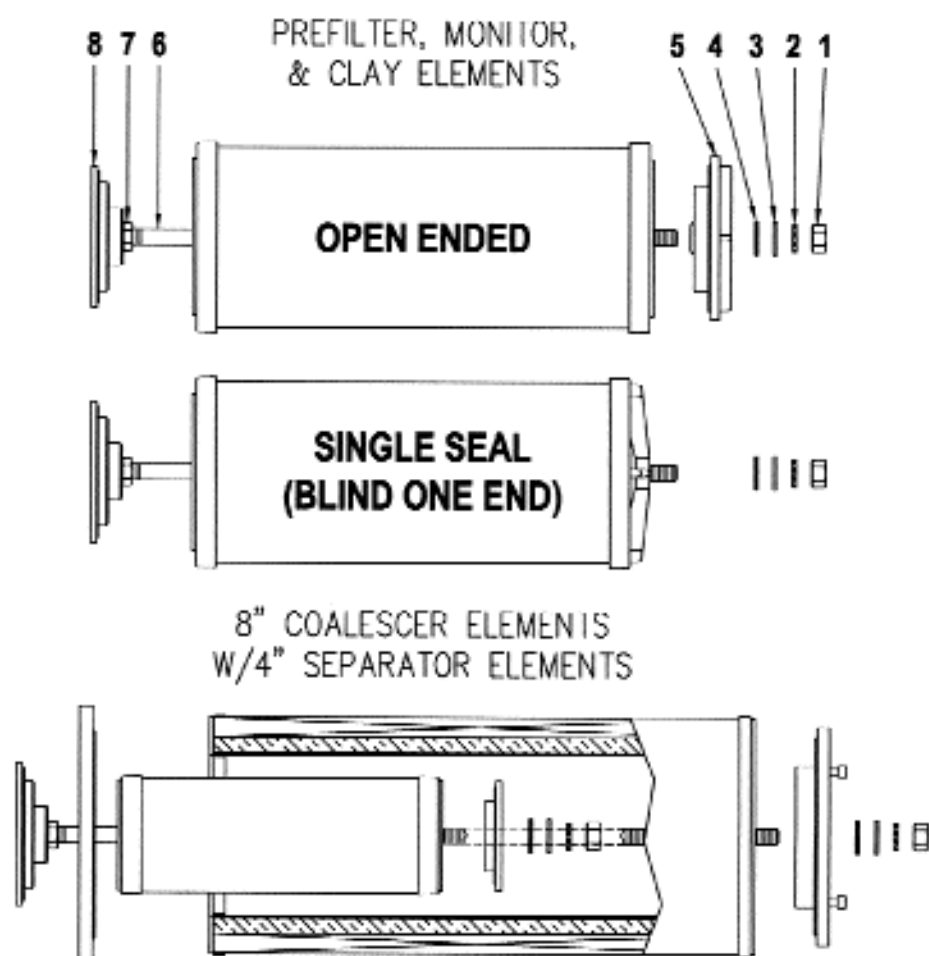
PRODUCT	MICRON	RVFS-1	RVFS-2	RVFS-3
<i>Coalescer</i>	5 mic	OCP-15858	OCP-30858	OCP-44858
	10 mic	OCP-15868	OCP-30868	OCP-44868
	25 mic	OCP-15878	OCP-30878	OCP-44878
<i>Separator, Paper</i>	5 mic	SP-15404	SP-30404	SP-44404
	10 mic	SP-15405	SP-30405	SP-44405
	25 mic	SP-15407	SP-30407	SP-44407
<i>Prefilters, Cellulose</i>	2 mic	FP-14602	FP-30602	FP-44602
	5 mic	FP-14604	FP-30604	FP-44604
	10 mic	FP-14605	FP-30605	FP-44605
	25 mic	FP-14607	FP-30607	FP-44607
<i>Prefilters, Synthetic</i>	5 mic	FS-14604	FS-30604	FS-44604
<i>H₂O Absorbing</i>	5 mic	(1) FW-61405	(2) FW-61405	(3) FW-61405
	10 mic	(1) FW-61410	(2) FW-61410	(3) FW-61410
	25 mic	(1) FW-61425	(2) FW-61425	(3) FW-61425

Recommended For Aviation Fuel Applications

PRODUCT	MICRON	RVFS-1	RVFS-2	RVFS-3
<i>Coalescer</i>	1/2 mic	OCP-15832	OCP-30832	OCP-44832
	1 mic	OCP-15854	OCP-30854	OCP-44854
	2 mic	OCP-15855	OCP-30855	OCP-44855
<i>Separator, Synthetic</i>	N/A	SS-15401	SS-30401	SS-44401
<i>Separator, Teflon</i>	N/A	ST-15401	ST-30401	ST-44401
<i>Prefilters, Cellulose</i>	1 mic	FP-14601	FP-30601	FP-44601
	2 mic	FP-14602	FP-30602	FP-44602
	5 mic	FP-14604	FP-30604	FP-44604
<i>Prefilters, Synthetic</i>	1 mic	FS-14601	FS-30601	FS-44601
	5 mic	FS-14604	FS-30604	FS-44604
<i>H₂O Absorbing</i>	1 mic	(1) FW-61401	(2) FW-61401	(3) FW-61401
	5 mic	(1) FW-61405	(2) FW-61405	(3) FW-61405
<i>Clay Canisters</i>	N/A	N/A	(1) FCC-18701	(2) FCC-18701

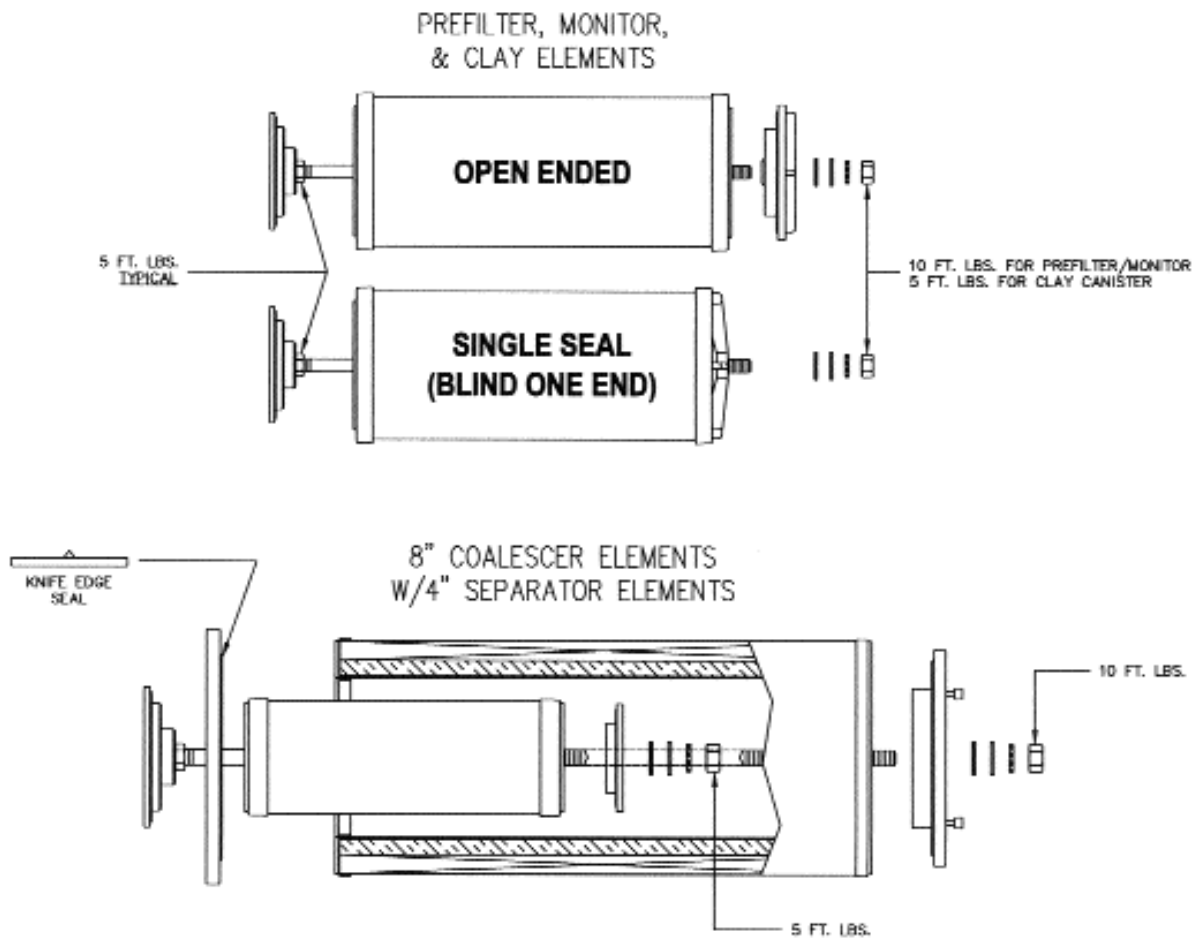
**NOTE: Standard Closure Seal is:
Buna-N O-Ring P/N 72025**

RVFS-1, -2, & -3 ELEMENT MOUNTING HARDWARE PARTS LIST



PARTS LIST	MAT'L	PART NO.
1 HEX NUT	.50-13 SS	71329
2 STAR LOCK WASHER	.50 SS	72139
3 FLAT WASHER	.50 SS	71328
4 GASKET WASHER **	BUNA-N	70029
5 END YOKE		
6" PREFILTER/MONITOR	GFBN	70871
7" CLAY CANISTER *	ALUM	72463
8" COALESCER	ALUM	72177
4" SEPARATOR	ALUM	71122
6 CENTER ROD	.50-13 SS	EXISTING
7 JAM NUT	.50-13 SS	72141
8 MOUNTING STOOL	EXISTING	EXISTING
* CENTER SEAL, P/N 72464, REQ'D FOR STACKED CLAY ELEMENTS.		
** GASKET WASHERS ARE SUPPLIED WITH NEW ELEMENT.		

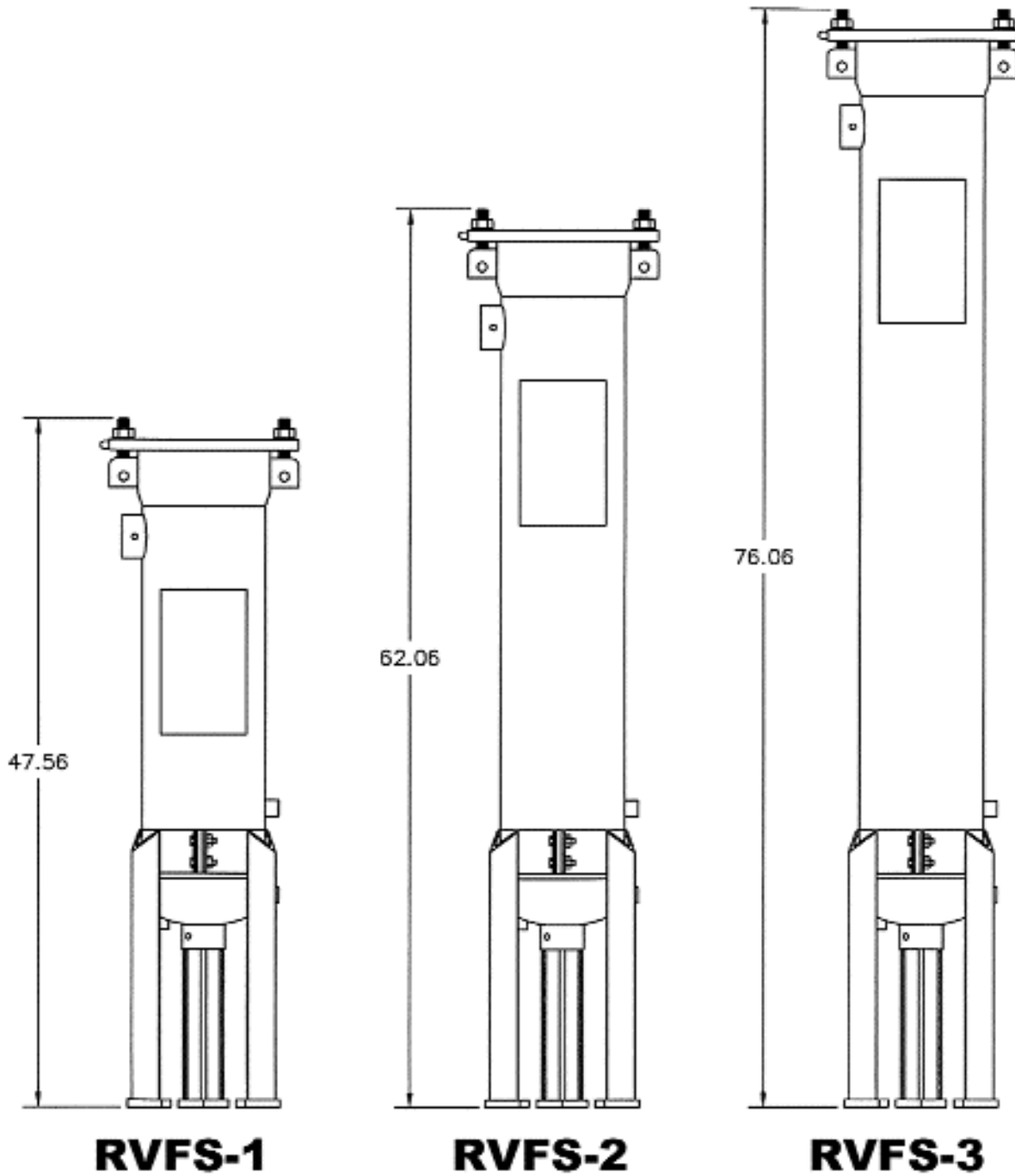
RVFS-1, -2, & -3 RECOMMENDED SEALING TORQUE



TORQUE CONVERSION TABLE			
FOOT- POUNDS	INCH- POUNDS	KILOGRAM- METERS	NEWTON- METERS
5	60	.69	6.78
7	84	.97	9.49
10	120	1.38	13.55
15	180	2.07	20.34
20	240	2.77	27.12
30	360	4.15	40.67

RECOMMENDED CHANGE OUT
 COALESCER: 15 PSID
 FILTERS: 20 PSID

Racor Hydrocarbon Filters In-Stock Filter Vessels



RVFS SPECIFICATIONS

DESIGN DETAILS	RVFS-1	RVFS-2	RVFS-3
Inlet & Outlet Ports	2 in. NPT		
Vent & Relief Ports	3/4 in. NPT		
Drain & Liquid Level Gauge Ports	1/2 in. NPT		
Differential Gauge Ports	1/8 in. NPT		
Design Pressure & Temperature	250 PSI @ 250 Deg. F (17 bar @ 121 Deg. C)		
ASME Code Stamped	Yes		
Pressure Drop - Clean	2 PSID (.14 bar)		
Pressure Drop - Dirty	15 PSID (1.04 bar)		
Height	39 in. (991 mm)	51 in. (1295 mm)	65 in. (1651 mm)
Width	13.75 in. (350 mm)	13.75 in. (350 mm)	13.75 in. (350 mm)
Depth	13.5 in. (343 mm)	13.5 in. (343 mm)	13.5 in. (343 mm)
Dry Weight	100 lbs. (45 kgs)	115 lbs. (52 kgs)	130 lbs. (59 kgs)
Overhead Space for Element Change	16 in. (406 mm)	32 in. (813 mm)	47 in. (1194mm)

***NOTE:** Overall dimensions will vary depending on mounting leg or bulkhead method of installation.

RVFS MAXIMUM FLOW RATES

Diesel @ 37 SSU

	Filter Sep.	Prefilter	Monitor	Clay
RVFS-1	25	66	29	N/A
RVFS-2	50	133	58	N/A
RVFS-3	75	200	87	N/A

Aviation @ 32 SSU

	Filter Sep.	Prefilter	Monitor	Clay
RVFS-1	50	66	58	N/A
RVFS-2	100	133	116	7
RVFS-3	150	200	174	14

Lube Oils and Other Hydrocarbon Applications

	Filter Sep.	Prefilter	Monitor	Clay
RVFS-1	*	*	*	*
RVFS-2	*	*	*	*
RVFS-3	*	*	*	*

***Consult factory for flow rates. Factory will require details of the application for proper sizing.**

RVFS OPTIONAL EQUIPMENT

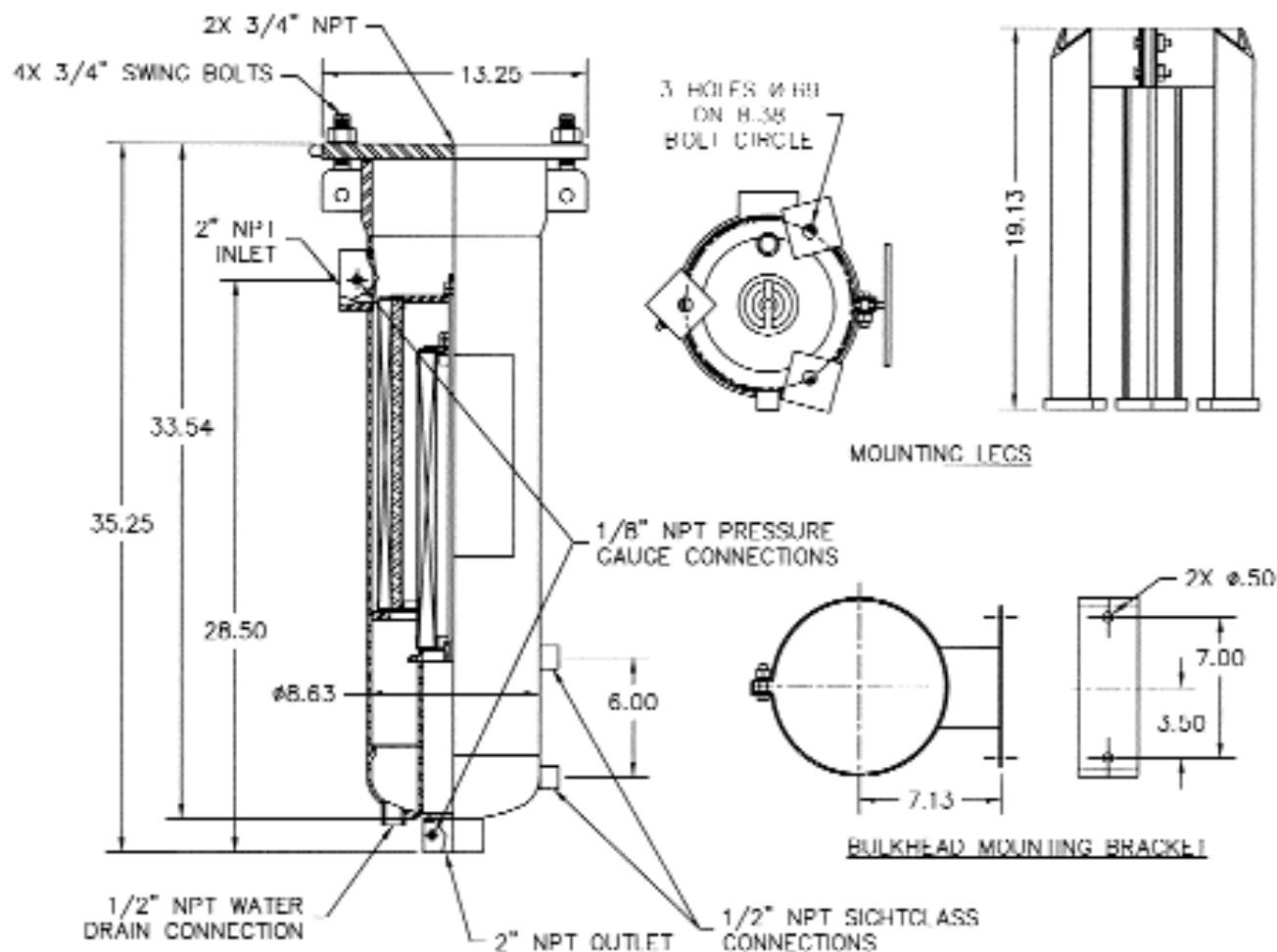
Diesel / Industrial Applications

*Differential Pressure Gauge	72059
*Stainless Auto Air Eliminator	71679
Or Brass Manual Air Vent	71943-.75
*Pressure Relief Valve, 125 PSI	71330-.125
*Brass H ₂ O Sight Glass, 125 PSI	70906
Or Electronic Water Probe (12 VDC)	RK 30880
Or Electronic Water Probe (110 VAC)	
Or Auto Drain Valve	71166
*Brass Manual Drain Valve	71943-.5
*Bulkhead Mounting Brackets (pair)	71982
Or Adjustable Mounting Legs	71981

Aviation Applications

*Differential Pressure Gauge	72059
*Stainless Auto Air Eliminator	71679
Or Stainless Manual Air Vent	72060-.75
*Stainless Check Valve for Air Eliminator	72482
*Pressure Relief Valve, 125 PSI	71330-.125
*Stainless H ₂ O Sight Glass, 300 PSI	72061
Or Electronic Water Probe (12 VDC)	RK 30880
Or Electronic Water Probe (110 VAC)	
Or Auto Drain Valve	71166
Stainless Manual Drain Valve	72060-.5
*Bulkhead Mounting Brackets (pair)	71982
Or Adjustable Mounting Legs	71981

RVFS-1



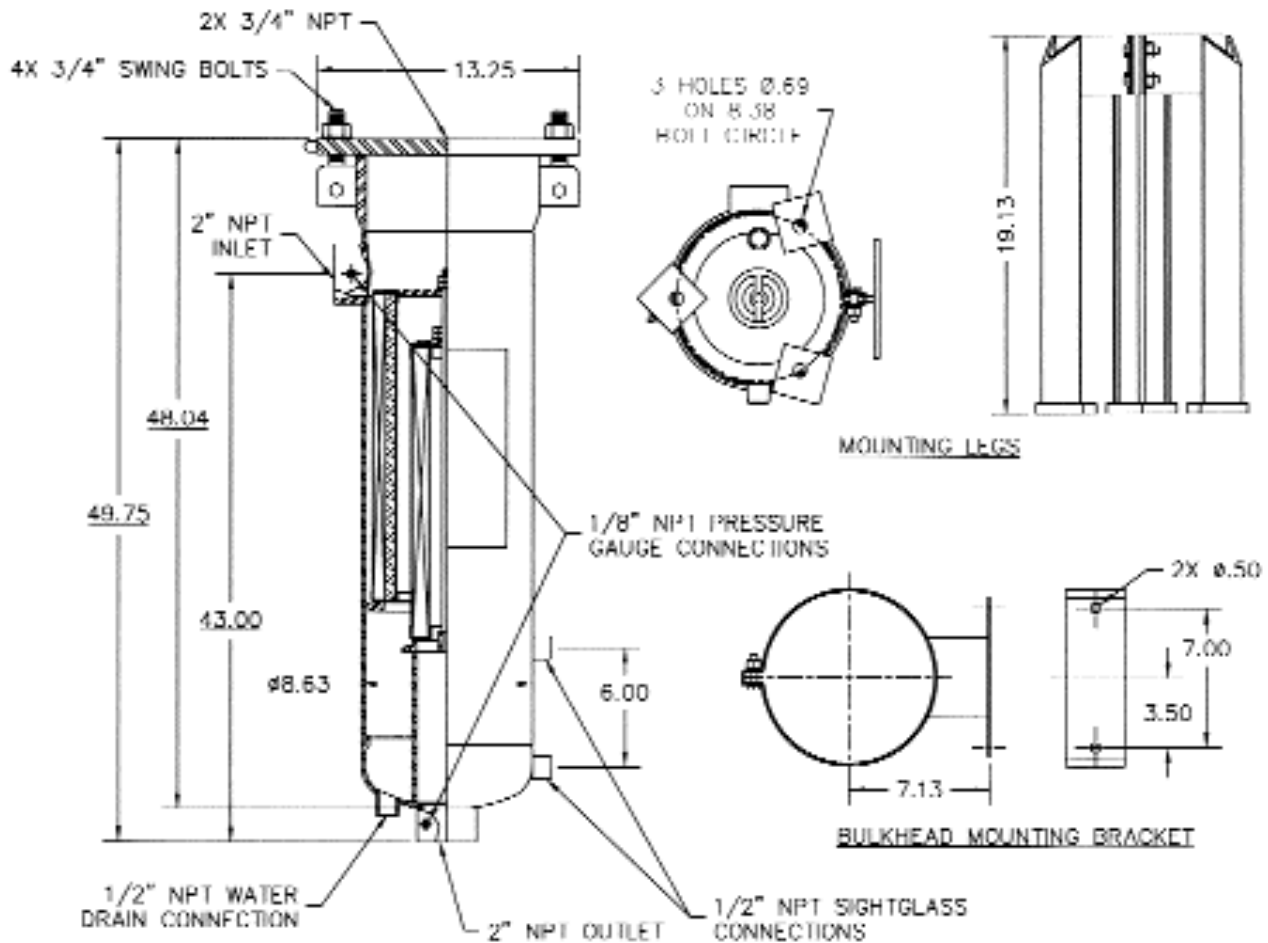
OPTIONAL EQUIPMENT: DIESEL SERVICE

- Differential Pressure Gauge
- Stainless Auto Air Eliminator
OR Brass Manual Air Vent
- Pressure Relief Valve, 125 PSI
- Brass H₂O Sight Glass, 125 PSI
OR Electronic Water Probe
OR Auto Drain Valve
- Brass Manual Drain Valve
- Bulkhead Mounting Brackets (Pair)
OR Mounting Legs

OPTIONAL EQUIPMENT: AVIATION SERVICE

- Differential Pressure Gauge
- Stainless Auto Air Eliminator
OR Stainless Manual Air Vent
- Pressure Relief Valve, 125 PSI
- Stainless H₂O Sight Glass, 300 PSI
OR Electronic Water Probe
OR Auto Drain Valve
- Stainless Manual Drain Valve
- Bulkhead Mounting Brackets (Pair)
OR Mounting Legs

RVFS-2



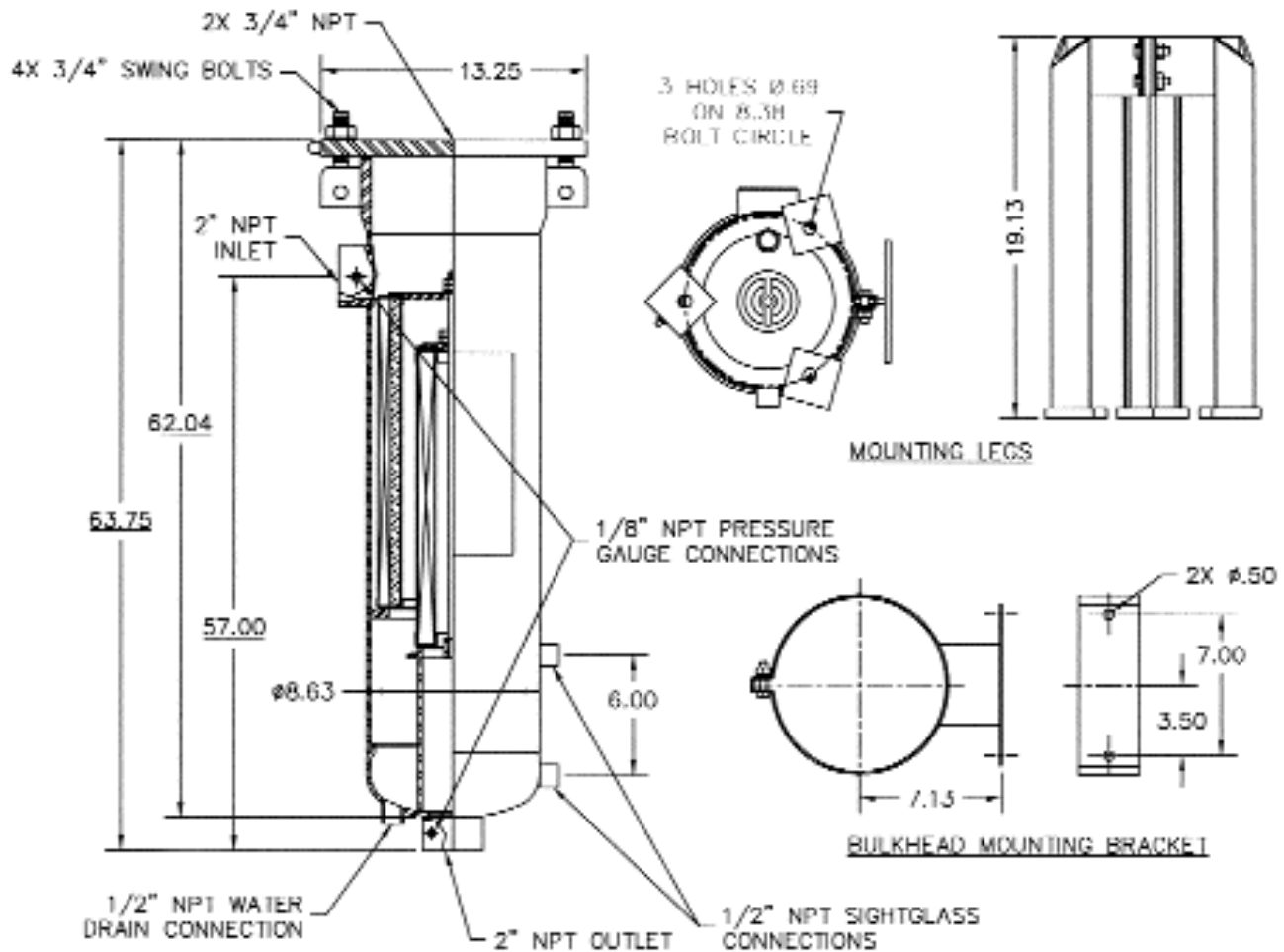
OPTIONAL EQUIPMENT: DIESEL SERVICE

- Differential Pressure Gauge
- Stainless Auto Air Eliminator
OR Brass Manual Air Vent
- Pressure Relief Valve, 125 PSI
- Brass H₂O Sight Glass, 125 PSI
OR Electronic Water Probe
OR Auto Drain Valve
- Brass Manual Drain Valve
- Bulkhead Mounting Brackets (Pair)
OR Mounting Legs

OPTIONAL EQUIPMENT: AVIATION SERVICE

- Differential Pressure Gauge
- Stainless Auto Air Eliminator
OR Stainless Manual Air Vent
- Pressure Relief Valve, 125 PSI
- Stainless H₂O Sight Glass, 300 PSI
OR Electronic Water Probe
OR Auto Drain Valve
- Stainless Manual Drain Valve
- Bulkhead Mounting Brackets (Pair)
OR Mounting Legs

RVFS-3



OPTIONAL EQUIPMENT: DIESEL SERVICE

- Differential Pressure Gauge
- Stainless Auto Air Eliminator
- OR Brass Manual Air Vent
- Pressure Relief Valve, 125 PSI
- Brass H₂O Sight Glass, 125 PSI
- OR Electronic Water Probe
- OR Auto Drain Valve
- Brass Manual Drain Valve
- Bulkhead Mounting Brackets (Pair)
- OR Mounting Legs

OPTIONAL EQUIPMENT: AVIATION SERVICE

- Differential Pressure Gauge
- Stainless Auto Air Eliminator
- OR Stainless Manual Air Vent
- Pressure Relief Valve, 125 PSI
- Stainless H₂O Sight Glass, 300 PSI
- OR Electronic Water Probe
- OR Auto Drain Valve
- Stainless Manual Drain Valve
- Bulkhead Mounting Brackets (Pair)
- OR Mounting Legs

SAFETY PRECAUTIONS

The following precautions are recommended for the safety of the operating personnel:

1. The fluid being filtered is volatile. No smoking is permitted in the area where the system pumps, storage tanks and filtering equipment are located.
2. Any fluid spill must be cleaned up immediately. Dispose of all contaminated cleaning materials in a fire-safe container.
3. Any clothing contaminated with fluid must be removed immediately and disposed of in a fire-safe container.
4. Fluid resistant gloves must be worn when handling parts that have been in contact with the fluid.
5. When servicing the filtering equipment, allow for maximum ventilation to disperse fumes. An air mask may be worn when servicing the vessel main body.
6. Use only non-sparking tools when performing maintenance on the filtering equipment and on the fuel system components.
7. Avoid any unnecessary contact of fluid to the skin or clothing. Always wear safety gloves and glasses.
8. Avoid any spillage of liquid in the operating area. Any spills must be cleaned up immediately to reduce injury from slipping.
9. Personnel should wash hands thoroughly after any maintenance to the filtering equipment or any of its components. Apply medication to any cuts or abrasions.
10. Secure medical attention for any serious cuts, stomach discomfort or breathing difficulties that may be caused by excessive inhalation of fumes.

SAFETY WARNINGS

Adequate fire fighting equipment should be provided for the operating area before conducting a fluid test and at all times when performing any maintenance or service work in the operating area. Provide “No Smoking” signs in the operating area.

1. Opening the access cover before the vessel is securely mounted may cause the vessel to become unstable and could result in vessel falling over.
2. Correctly identify the inlet and outlet connections before connecting the vessel in the system. The unit will not perform properly should the connections be reversed.
3. Turn off any heating devices before performing any maintenance or service work.
4. Due to the toxic effects of some of the additives used in liquid hydrocarbon products, care should be taken in handling any parts that have been in contact with liquid product.
5. Filter vessel must be relieved of internal pressure, drained or vented before removal or repair of any accessory option.
6. Do not over-tighten packing nuts or other connections. Stripped threads on the fittings may result in leaky joints. Replace any damaged fittings or parts before the filter vessel is put into operation.

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Brochure 7537

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