

Replacement Parts

| Model | Replacement Part |
|--------------|---|
| SF-MT-0.5-10 | 0.5 micron MicroTec™ Sediment Filter |
| CF-0.5-10 | 0.5 micron Carbon Block Pre-Filter |
| MEM-S-0025 | 25 gpd (95 lpd) TFC Membrane |
| MEM-S-0040 | 40 gpd (151 lpd) TFC Membrane |
| MEM-S-0060 | 60 gpd (228 lpd) TFC Membrane |
| MEM-S-0090 | 90 gpd (340 lpd) TFC Membrane (use 2 for 180 gpd (680 lpd) System) |
| FR-25 | Flow Restrictor for 25 gpd (95 lpd) System |
| FR-40 | Flow Restrictor for 40 gpd (151 lpd) System |
| FR-60 | Flow Restrictor for 60 gpd (228 lpd) System |
| FR-90 | Flow Restrictor for 90 gpd (340 lpd) System |
| FR-180 | Flow Restrictor for 180 gpd (680 lpd) System |
| GHA-4 | 1/4" (6.35 mm) Garden Hose Adapter |
| XWR-UNIV | Filter Wrench |

Optional Accessories

| Model | Optional Part |
|-------------|-------------------------------------|
| FAU-SMP | Quick Connect Faucet Coupler |
| TK-CL-25 | Total Chlorine Test Kit |
| TS-C61 | Conductivity (micro-Siemens) Tester |
| TS-T71 | TDS (Total Dissolved Solids) Tester |
| VA-FVK-4 | Flush Valve Kit |
| BPLF-MO-115 | Low-Flow Booster Pump, 115V |
| BPLF-MO-230 | Low-Flow Booster Pump, 230V |
| BPHF-MO-115 | Hi-Flow Booster Pump, 115V |
| BPHF-MO-230 | Hi-Flow Booster Pump, 230V |
| TS-C61 | Conductivity Meter |

See our Catalog or our Web Site for Liquid Level Controls and other Optional Accessories

SpectraPure®

INNOVATORS IN WATER TECHNOLOGY

The CSP™ System Reverse Osmosis Water Purification System (Single and Dual Membrane Models)



INSTALLATION AND OPERATING MANUAL

WARNING

Please read carefully before proceeding with installation. Failure to follow any attached instructions or operating parameter may lead to the product's failure and possible damage to property.

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SpectraPure® Inc. assumes no responsibility for water damage due to leaks. It is the user's responsibility to determine that the system is leak-free.

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CHOOSING A MOUNTING LOCATION

When considering a location for the installation of the RO System, consider the following factors:

Light Sources

1. Most of the components of this system are plastic and are subject to damage by ultraviolet light from the sun and other sources such as metal halide lighting.
2. Algae is more likely to thrive inside the clear filter housings when exposed to bright light.
3. Avoid installing this unit in bright light or direct sunlight.

Temperature Extremes

1. The unit must be kept out of areas that are subject to freezing temperatures.
2. High temperatures greater than 100° F (38° C) must be avoided. If the unit is used outside, avoid putting the system in direct sunlight or connecting it to a garden hose that may be exposed to sunlight.

STEP 1. Determine best location for the RO system to be mounted to allow for future system maintenance. Use two (2) self tapping screws and a Phillips screwdriver. Measure the distance between the key hole slots on the back of the bracket and install screws .



Leave enough space and tubing so that you can pull the system out for maintenance.



TIPS FOR LONG MEMBRANE LIFE

1. Replacement of 1 micron sediment filter once every 6 months. This will prevent membrane fouling due to silt or sediment depositing on the membrane.
2. Replacement of 1 micron carbon block filter at least once every 6 months or when chlorine breakthrough occurs. This will ensure good membrane life and protect the membrane from chlorine damage.
3. Membrane should not be operated at lower than the recommended concentrate to purified water ratios, as described on page 10-11.
4. Operating reverse osmosis systems on softened feed water greatly reduces the chances of membrane fouling.
5. Use the optional flush valve kit after each use of the system to extend membrane life up to 6 months.

STORAGE

1. It is recommended that you store your RO System in a cool place when not being used.
2. Your RO System must be protected from freezing or temperatures above 100° F (38°C).

TERMS AND CONDITIONS OF SALE

1. Shipping charges on units or parts submitted to our facility for repair or replacement must be borne by the registered purchaser. After repair or replacement, the factory will return the unit or part freight prepaid to the customer.
2. We assume no warranty liability in connection with our equipment other than as herein specified.
3. This warranty is in lieu of all other warranties expressed or implied, including warranties of fitness for a particular purpose.
4. We do not authorize any person or representative to assume for us any other obligation on the sale of our equipment. This is the exclusive remedy and liability for consequential damages under any and all warranties which are excluded to the extent exclusion is permitted by law.
5. Proof of original purchase date must accompany all warranty claims.
6. SpectraPure, Inc. reserves the right to change prices without notice when necessary. All prices in the catalog are quoted in US dollars.
7. Claims for error in quantity or condition must be made within 10 days of receipt of material. SpectraPure, Inc. will not be responsible for any claimed shortages not reported within 10 days. Returns other than warranty claims may be subject to 20% restocking fee.
8. SpectraPure, Inc. cannot be held liable for damage or loss to a shipment by a freight carrier. Check shipment for damage before acceptance or note on freight bill subject to inspection for concealed damage. Consignee must file claim. SpectraPure, Inc. will offer as much assistance as possible.
9. A complete credit check is required prior to shipping on a Net 30 or "C.O.D. - CUSTOMER CHECK ACCEPTABLE" basis. In the interim period during which credit references are being evaluated, all orders must be shipped "C.O.D. - CERTIFIED FUNDS" (cash, cashiers check or money order).
10. All returned checks (due to insufficient funds or closed accounts) will be subjected to a **\$25 penalty charge**.

Invoices on Net 30 accounts not paid within 30 days of shipment will be considered delinquent and will accrue Finance charges at the rate of 1.5% per month (18% per annum).

THREE YEAR LIMITED WARRANTY

Effective on products purchased after March 10, 2005.

SpectraPure, Inc.® warrants the product to the original owner only to be free of defects in material and workmanship for a period of three years from the date of receipt. SpectraPure's liability under this warranty shall be limited to repairing or replacing at SpectraPure's option, without charge, F.O.B. SpectraPure's factory, any product of SpectraPure's manufacture. SpectraPure will not be liable for any cost of removal, installation, transportation or any other charges which may arise in connection with a warranty claim. Products which are sold but not manufactured by SpectraPure are subject to the warranty provided by the manufacturer of said products and not by SpectraPure's warranty. SpectraPure will not be liable for damage or wear to products caused by abnormal operating conditions, accident, abuse, misuse, unauthorized alteration or repair or, if the product was not installed in accordance with SpectraPure's or other manufacture's printed installation and operating conditions, or damage caused by hot water, freezing, flood, fire or acts of God.

SpectraPure will not be responsible for any consequential damages arising from installation or use of the product, including any water or mold damage due to flooding which may occur due to malfunction or faulty installation, including, but not limited to failure by installer to over- or under-tighten fittings, housings, and/ or push-style fittings, or improper installation of push-style fittings. Consumable items such as pre filters and membranes are not covered under the 3 year warranty.

SpectraPure warrants (pro-rated) the performance of tested SpectraSelect™ RO membrane elements only, for one year from date of receipt by the buyer, providing that the loss of performance was not caused by fouling, neglect or water conditions exceeding the feed water parameters listed in the applicable product manual (refer to detailed membrane warranty information). SpectraPure will, on confirmation of loss of performance during the warranty period, credit the pro-rated amount of the current catalog price of the element. The disposable filters and cartridges are not covered under the warranty.

To obtain service under this warranty, the defective system or components must be returned to SpectraPure with proof of purchase, installation date, failure date and supporting installation data. Any defective product to be returned to the factory must be sent freight prepaid; documentation supporting the warranty claim and a Return Goods Authorization (RGA) number must be included. SpectraPure will not be liable for shipping damages due to the improper packaging of the returned equipment and all returned goods must also have adequate insurance coverage and a tracking number.

SpectraPure will not pay for loss or damage caused directly or indirectly by the presence, growth, proliferation, spread or any activity of "fungus", wet or dry rot or bacteria. Such loss or damage is excluded regardless of any other cause or event that contributes concurrently or in any sequence to the loss. We will not pay for loss or damage caused by or resulting from continuous or repeated seepage or leakage of water, or the presence or condensation of humidity, moisture or vapor, that occurs over a period of 14 days or more. "Fungus" and "fungi" mean any type or form of fungus or Mycota or any by-product or type of infestation produced by such fungus or Mycota, including but not limited to, mold, mildew, mycotoxins, spores, scents or any biogenic aerosols.

SpectraPure will not be liable for any incidental or consequential damages, losses or expenses arising from installation, use, or any other causes. There are no expressed or implied warranties, including merchantability or fitness for a particular purpose, which extend beyond those warranties described or referred to above.

*** The three year limited warranty does not apply to consumable items, including but not limited to, filters and cartridges unless specifically stated above**

TROUBLESHOOTING GUIDE

Product Water - Low Production Rate

| Cause | Corrective Action |
|-----------------------|---|
| Plugged pre-filters | Replace pre-filters |
| Low water temperature | Heat feed water or use higher GPD membrane |
| Low water pressure | Use booster pump or use higher GPD membrane |
| Fouled membrane | Replace membrane |

MEMBRANE TROUBLESHOOTING GUIDE

The following chart illustrates the procedure for determination of RO membrane performance. However, the chart represents only rough guidelines for determining performance of RO membrane. Depending on your tap water chemistry, the rejection characteristics of the membrane may vary significantly.

| Method of Testing | Calculate % Rejection | Test Results | Conclusion |
|-------------------------|--|---------------------------------|--|
| TDS/Conductivity Tester | Measure feed water (X) RO product water (Y) for TDS/Conductivity | Is Rejection greater than 95% ? | No - Replace Membrane Yes - Membrane OK |
| Alkalinity Test Kit | Measure feed water (X) RO product water (Y) for Alkalinity | Is Rejection greater than 90% ? | No - Replace Membrane Yes - Membrane OK |
| Hardness Test Kit** | Measure feed water (X) RO product water (Y) for Hardness | Is Rejection greater than 90%? | No - Replace Membrane Yes - Membrane OK |

**Caution: This test is not to be used on softened water sources.

Membrane Output Calculation Example

What is the expected GPD from a 75 GPD System at 40 psi pressure and 60°F water temperature?

$$PCF = 40 \div 60 = 0.666$$

$$TCF = 0.754 \text{ (from Table 1)}$$

$$\text{Expected GPD} = 75 \times 0.666 \times 0.754 = 37.7 \text{ GPD} \pm 15\%$$

37.7 GPD would be the Actual Production Rate

TESTING THE QUALITY OF THE MEMBRANE

The performance of a RO membrane is measured by its ability to reject salts (or TDS (Total Dissolved Solids)).

Important: Test the quality of the membrane once every 6 months.

Note: This procedure will require a Conductivity Meter (TS-C61) or (TS-T71).

Procedure:

1. Measure tap water conductivity. (Call it X)
2. Run the system for 15-20 minutes.
3. Rinse test instrument cell 2-3 times with RO water.
4. Measure RO water conductivity directly from the blue product water line. (Call it Y).
5. Subtract RO water conductivity from tap water conductivity. $(X - Y)$
6. Divide this quantity by tap water conductivity. $(X - Y) \div X$
7. Rejection = $[(X - Y) \div X] \times 100$

* Conductivity in the above procedure could be replaced by hardness, alkalinity, nitrate, phosphate, silica etc. (measured in ppm or mg/l).

Rejection of the RO Membrane Calculation Example

1. Tap water hardness = 150 ppm (X)
2. RO water hardness = 7 ppm (Y)
3. $X - Y = 143 \text{ ppm}$
4. $(X - Y) \div X = 143 \div 150 = 0.953$
5. Rejection = $[(X - Y) \div X] \times 100 = 0.953 \times 100 = 95.3$

Membrane Hardness Rejection = 95.3 % : Rejection rates less than 95% may indicate that the membrane should be replaced.

WHAT IS REVERSE OSMOSIS

Osmosis is a process in nature that allows fluid of a lower concentration to pass through a semi-permeable membrane into a fluid of a higher concentration (See Figure 1). Because of the difference in salt concentration, pure water flows through the membrane as though a pressure were being applied to it (Figure 2). The effective driving force is called the osmotic pressure. As a rough guide, the osmotic pressure is equal to about 1 psi (pounds per square inch) per 100 ppm Total Dissolved Solids (TDS). When enough pressure is applied to the solution with a higher concentration it can then pass through the membrane into the solution of lower concentration. (See Figure 3). This is the basis of Reverse Osmosis.

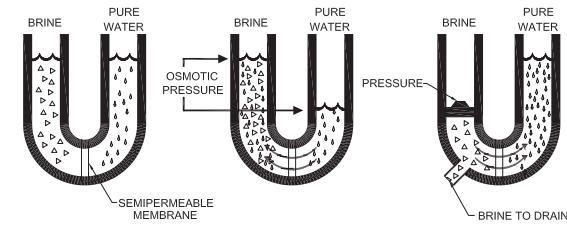


Figure 1

Figure 2

Figure 3

Household water pressure is used to force tap water through the semi-permeable R.O. membrane. The membrane only allows the purest of water molecules to pass through it while over 98% of most salts and other impurities are rejected and automatically rinsed from the membrane down the drain.

WHAT DOES THE SYSTEM DO?

SpectraPure's CSP™ RO System uses household water pressure to reverse a natural physical process called osmosis. Water, under pressure is forced through a semi-permeable membrane where minerals and impurities are screened out and sent down the drain with waste water. These minerals and impurities are measured as total dissolved solids (TDS).

The system connects to a house COLD water pipe for a water supply. The system includes replaceable sediment, carbon pre-filters and a membrane. The sediment pre-filter removes sand, dirt, rust particles and other particulates while the carbon pre-filter takes chlorine and organics out of the feed water. The water then passes through the RO membrane.

The CSP™ System gives you a continuous supply of sparkling clear, delicious water for drinking, cooking, hydroponics etc. Foods will look better and taste better too. The reliability with the CSP™ Water Treatment System is greatly improved over other systems and costly maintenance is avoided. The system eliminates the need to buy bottled water. Instead, it puts high quality water at your fingertips.

SYSTEM SPECIFICATIONS

| | |
|----------------------|---|
| Sediment Pre-Filter | 0.5 micron MicroTec™ sediment pre-filter |
| Carbon Filter | 0.5 micron carbon block pre-filter |
| RO Membrane Type | Thin-Film Composite (TFC) |
| Rejection Rate | Greater than 98% average |
| Input Water Pressure | 60 psi (4.15 bar) line pressure* |
| Input Water Temp | 77°F (25°C) |
| Recovery Rate | 20% (i.e. 20% of the water will be collected as pure water) |

Nominal Membrane Flow Rates @ 60 psi & 77° F :

| GPD (lpd) | Product Water Flow Rate | Concentrate Flow Rate |
|-----------|-------------------------|-----------------------|
| 25 (95) | 66 ml/min | 264 ml/min |
| 40 (151) | 105ml/min | 420 ml/min |
| 60 (228) | 158 ml/min | 632 ml/min |
| 90 (340) | 235ml/min | 940 ml/min |
| 180 (680) | 470ml/min | 1880 ml/min |

Reverse Osmosis Feed Water Requirements

For the 1 year TFC membrane pro-rated warranty to be honored, the following conditions must be met:

| | |
|----------------------------|---|
| Operating Pressure* | 40 – 80 psi (2.75 – 5.5 bar) |
| pH Range | 3 – 11 |
| Maximum Temperature | 100° F (38° C) |
| Maximum Turbidity | 1.0 NTU |
| Maximum Silt Density Index | 5.0 (based on 15 min. test time) |
| Maximum Chlorine | less than 0.1 ppm |
| Maximum TDS | 2000 ppm |
| Maximum Hardness | 10 grains (170 ppm as CaCO ₃) |
| Maximum Iron | less than 0.1 ppm |
| Maximum Manganese | less than 0.1 ppm |
| Maximum Hydrogen Sulfide | 0 ppm |
| Langlier Saturation Index | LSI must be negative |

*Operating pressure less than 40 psi will require a booster pump:
less than 49 GPD use BPLF-MO-115(-230),
more than 49 GPD use BPHF-MO-115(-230).

*Operating pressure greater than 80 psi will require a pressure reducing valve.

MEMBRANE OUTPUT CALCULATION

Membranes produce the rated gallons per day (GPD) at 60 psi (4.1 bars) operating pressure, 77°F (25°C) operating temperature and 500 ppm total dissolved solids.

Membrane output gallons per day (GPD) depends on operating pressure, water temperature and the ppm TDS in the feed water.

$$\text{Expected GPD} = \text{Rated GPD} \times \text{PCF} \times \text{TCF}$$

PCF is the pressure correction factor

TCF is the temperature correction factor

Calculation of Pressure Correction Factor (PCF): The output (GPD) from the membrane is directly proportional to the applied pressure.

Note: The membrane is rated to produce the rated GPD at 60 psi. For any pressure other than 60 psi the output GPD is multiplied by the PCF.

$$\text{PCF} = \text{Line Pressure (in psi)} \div 60$$

Calculation of Temperature Correction Factor (TCF): The output (GPD) also decreases with decrease in temperature. This is because water viscosity increases with decrease in water temperature.

Temperature Correction Factor Table (TCF)

| °F/°C | TCF | °F/°C | TCF | °F/°C | TCF |
|---------|-------|---------|-------|---------|-------|
| 41.0/5 | 0.521 | 59.0/15 | 0.730 | 77.0/25 | 1.000 |
| 42.8/6 | 0.540 | 60.8/16 | 0.754 | 78.8/26 | 1.031 |
| 44.6/7 | 0.560 | 62.6/17 | 0.779 | 80.6/27 | 1.063 |
| 46.4/8 | 0.578 | 64.4/18 | 0.804 | 82.4/28 | 1.094 |
| 48.2/9 | 0.598 | 66.2/19 | 0.830 | 84.2/29 | 1.127 |
| 50.0/10 | 0.620 | 68.0/20 | 0.857 | 86.0/30 | 1.161 |
| 51.8/11 | 0.640 | 69.8/21 | 0.884 | 87.8/31 | 1.196 |
| 53.6/12 | 0.661 | 71.6/22 | 0.912 | 89.6/32 | 1.232 |
| 55.4/13 | 0.684 | 73.4/23 | 0.941 | 91.4/33 | 1.267 |
| 57.2/14 | 0.707 | 75.2/24 | 0.970 | 93.2/34 | 1.304 |

from the yellow tubing (see Flow Restrictor Removal, Adjustment, and Replacement). Reconnect the tubing to the membrane housing. Place the flow restrictor in a safe location where it will not be accidentally crushed or damaged.

11. Put the yellow concentrate tubing and the blue product water tubing in the drain and turn on the system water supply. Allow the system to flush for several minutes to remove any loose particles.
12. Turn off the water supply to the system. Remove the yellow tubing from the membrane tubing from the membrane housing and replace the flow restrictor assembly as described on page 12-13.
13. Re-insert the flow restrictor end of the yellow tubing into its push-fitting at the RO membrane and reconnect the yellow concentrate tubing to the membrane housing.
14. Turn on the water supply to the system and check for leaks. Check, and if necessary adjust, the Concentrate to Purified Water Ratio per the procedures described in that section.

Fig. G: Removing the Membrane Element

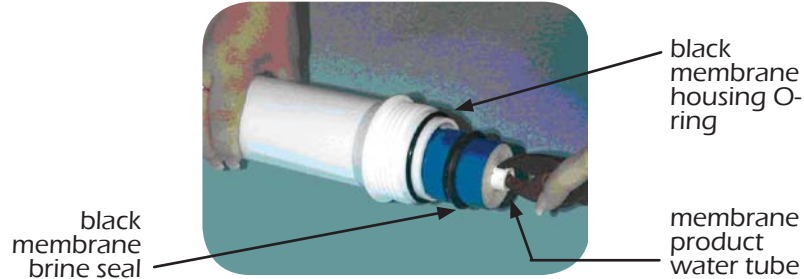
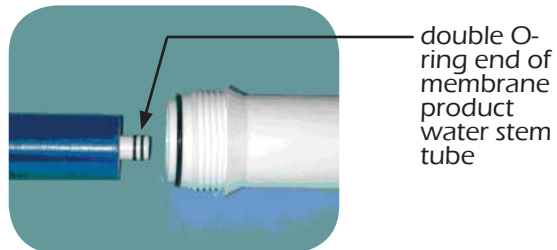


Fig. H: Inserting the New Membrane Element



SYSTEM DESCRIPTION

The CSP™ RO System is a three stage reverse osmosis system.

1. First, the incoming feed water is passed through a 0.5 micron Micro-Tec sediment pre filter. This filter is required to remove excess turbidity (particulate matter) that may cause the membrane to plug.
2. The second stage of filtration is a 0.5 micron carbon block pre-filter. This filter removes organics and chlorine from the feed water that can damage the membrane.
3. The third filtration stage of the system is a high rejection thin film composite (TFC) reverse osmosis membrane. It removes over 98% of most inorganic salts, all micro-organisms and almost all high molecular weight organics in the water.

Fig. A: Filter Diagram

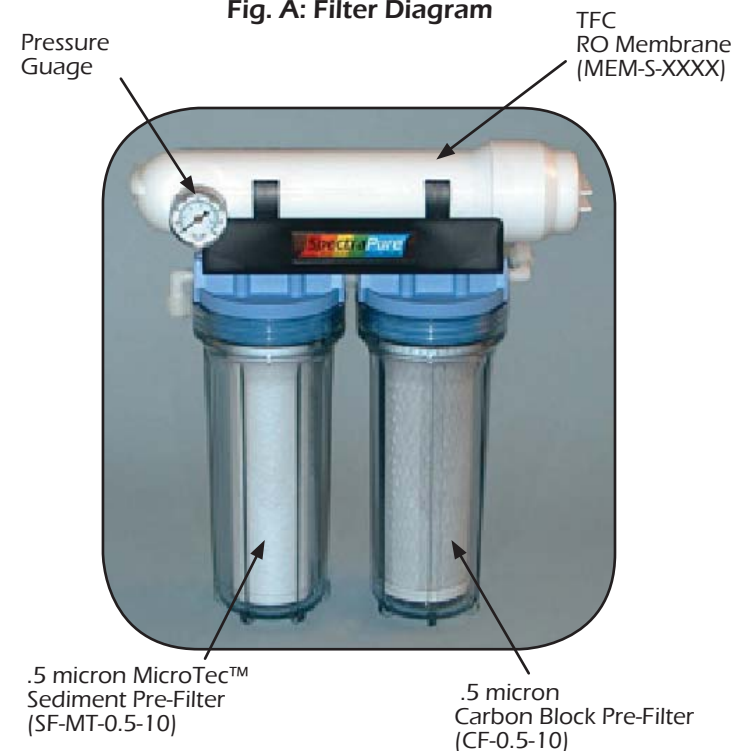


Fig. B: Single-Membrane Assembly
Top/Rear View

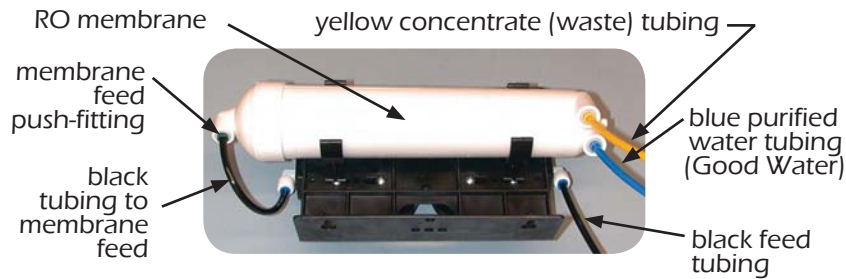
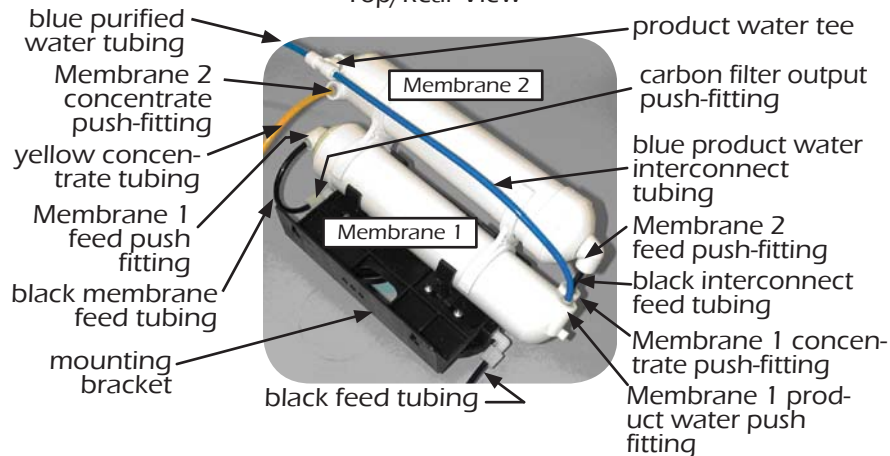


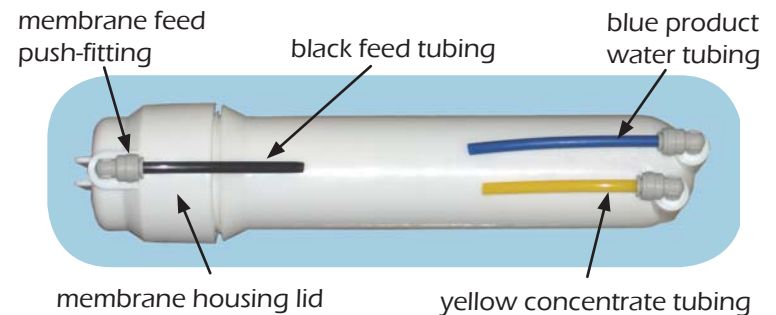
Fig. C: Dual-Membrane Assembly
Top/Rear View



RO MEMBRANE REPLACEMENT

1. Turn off the water supply to the RO system. Place the system where the membrane housing is easily accessible.
 2. Remove the black tubing from the membrane feed push-fitting by depressing the collar on the fitting with your thumb and pulling the tubing from the push-fitting (Page 12).
 3. Lift the membrane housing from the retention clips.
 4. Unscrew the membrane housing lid. This may require two people.
 5. Use a pair of pliers to grasp the membrane stem and pull the membrane from the housing (Fig. G).
 6. Remove the black housing O-ring (Fig. H). Wash the empty housing with soapy water. Rinse thoroughly with hot, clean water.
 7. Insert new membrane into the housing, with the double O-ring end first (Fig.H). The tube must fit into the recess at the bottom of the membrane housing. When the membrane is aligned with the hole, firmly push the membrane into the hole until it bottoms out.
 8. Place the black housing O-ring on the housing rim and carefully screw the lid back on to the base.
 9. Reconnect the black tubing to the membrane feed push-fitting.
- Note: If you have a dual-membrane system, perform steps 2 thru 9 on the second membrane now.
10. Disconnect the yellow concentrate tubing (Fig. F) from the membrane housing and remove the flow restrictor (Fig. E)

Fig. F: Membrane Housing



RO MEMBRANE REPLACEMENT

In order to accurately determine the condition of the RO Membrane, a conductivity tester capable of reading the tap water conductivity and the product water conductivity would typically be required.

You may also use an alkalinity test kit (on softened water sources) or a hardness test kit (cannot be used on softened water sources).

Before performing any membrane test, the waste -to-product water ratio must be 4 to 1 or greater.

Note: All water sources are different and are subject to changes in conductivity from season to season which could affect the monitor reading depending on the time of the year. For this reason we recommend the use of a conductivity tester in order to register the most accurate measurement for determining the condition of the RO membrane.

MEMBRANE WARNING: All SpectraPure RO membranes, except for encapsulated membranes, must remain moist at all times. It is the customer's responsibility to inspect the membrane upon receipt and maintain adequate moisture.

**Replacement membranes should be kept in the sealed non-permeable shipping bag and in a refrigerator until use. The membrane can be kept there for up to 1 year.
(DO NOT FREEZE)**

SYSTEM INITIALIAZTION

If you are setting up your system for the first time or replacing a membrane, please see the "Measuring Waste to Product Water Ratio" on page 10 .

Using the Pressure Guage

The pressure guage is used to monitor the condition of the pre-filters. When the pre-filters are new, the gauge will indicate the actual available water pressure. As the pre-filters collect particulates, the pressure will begin to drop. A 15% (or more) drop in pressure would indicate that the pre-filters are in need of replacement.

System Hook-Up

1. Attach the garden hose adapter to your cold water source. Never run hot water (greater than 100° F (38° C)) through the system.
2. Place the yellow concentrate tubing and the blue purified water tubing into drain. Do not restrict flow from these lines.
3. Open the cold water supply valve. You may use pressure up to 80 psi (5.5 bar).

Check the system to ensure that all fittings are tight and leak-free before leaving the system unattended.

Note: It is recommended that at least 2 gallons (7.57 liters) of purified water be discarded before collecting purified water for use. If the unit is not used for several days, run the system for at least 15 minutes before collecting any water.

SpectraPure®Inc. assumes no responsibility for water damage due to leaks. It is the user's responsibility to determine that the system is leak-free.

MEASURING WASTE TO PRODUCT WATER RATIO.

This procedure will assure you of maximum life and reliability of your SpectraPure System. Failure to perform this procedure can permanently damage the membrane and will void the pro-rated Membrane Warranty.

In order to maximize the life of your SpectraPure RO Membrane, you may need to adjust the ratio of the concentrate to purified water. If not enough concentrate is allowed to flow past the membrane during operation, the impurities will precipitate out on the membrane surface, clogging the RO Membrane. To keep this from happening, the Concentrate to Purified Water Ratio must be checked and adjusted in order to compensate for pressure and temperature variations that exist in all water supplies. The flow rate of the concentrate must be a minimum of 4X the product flow rate. 4X to 6X is an acceptable concentrate flow rate.

Procedure:

1. Open the cold water supply valve and let the system run for 15 minutes. Direct both tubes down the drain.
2. Collect product water from the blue tubing into a measuring cup for one minute. Measure the collected amount in milli-liters. Do the same with the waste water from the yellow line.

WASTE (YELLOW) IN MILILITERS _____

DIVIDED BY

PRODUCT (BLUE) IN MILILITERS _____

The resultant is the Concentrate to Product Ratio

(Although not needed in this procedure, the daily product flow rate in Gallons per Day (GPD) can be calculated to be equal to the product flow rate times 0.38).

3. If ratio is less than 4:1

Disconnect yellow drain line from the membrane housing and then remove flow restrictor. Use the appropriate Waste to Product ratio to determine how long to cut the flow restrictor in order to obtain a 4:1 ratio. (Figure D)

* Please refer to pages 12-13 for Flow Restrictor Removal, Adjustment, and Replacement. *

4. **If ratio is greater than 6:1**, flow restrictor requires replacement (Please contact SpectraPure Inc).
5. Turn on feed supply.
6. This completes the procedure.

CARBON BLOCK FILTER REPLACEMENT

Replace the Carbon Block Filter at least every 6 months OR when chlorine breakthrough greater than 0.1 ppm occurs in the yellow concentrate line**. To test for chlorine breakthrough, collect a 10 ml sample of the concentrate from the yellow tubing and test the chlorine concentration using test kit TK-CL-25. If the chlorine concentration is above 0.1 ppm, replace the carbon pre-filter.

Carbon Block Filter Replacement

Materials Required: 0.5 micron Carbon Block Filter (CF-0.5-10), Filter Wrench, Chlorine Test Kit (TK-CL-25)

Procedure:

1. Turn off water supply to the system.
2. Refer to Fig. A (System Diagram). Using the provided filter housing wrench, remove the second housing from the left. Unscrew it counterclockwise as viewed from the bottom.
3. Remove the old filter and discard.
4. Thoroughly wash the housing with a mixture of hot soapy water and a few teaspoons of household bleach. Rinse well with clean hot water.
5. Install the new carbon block filter, making sure that the black gaskets on both ends of the filter are firmly seated in the gasket recesses.
6. Screw the housing back onto the assembly, and hand tighten **only**. **NOTE: Do not use filter wrench to tighten housings. Over-tightening will damage housings and void your warranty.**
7. Turn on system water supply and check for leaks.

**NOTE: A drop in the system's production is "in most cases" an indication that the sediment and/or carbon filter has become saturated with contaminants and will need to be replaced.

SEDIMENT PRE-FILTER REPLACEMENT

For maximum contaminant removal and long membrane life, the sediment and carbon pre-filters must be changed at least 6-month intervals.** If your water contains a great deal of sediment or chlorine, the pre-filters may require more frequent changes to maintain adequate production rate and extended membrane life.

Sediment Pre-Filter Replacement

Materials Required: 0.5-micron MicroTec™ Sediment Filter (SF-MT-0.5-10), Filter Wrench

Procedure:

1. Turn off water supply to the system.
2. Refer to Fig. A (System Diagram). Using the provided filter housing wrench, remove the first housing from the left. Unscrew it counterclockwise as viewed from the bottom.
3. Remove the old filter and discard.
4. Thoroughly wash the housing with a mixture of hot soapy water and a few teaspoons of household bleach. Rinse well with clean hot water.
5. Install the new pre-filter onto the round port on the head of the housing. Screw the housing back onto the assembly, and hand tighten **only**. **NOTE: Do not use filter wrench to tighten housings. Over-tightening will damage housings and void your warranty.**
6. Proceed with carbon block filter replacement.

**NOTE: A drop in the system's production is "in most cases" an indication that the sediment and/or carbon filter has become saturated with contaminants and will need to be replaced.

Fig. D: Flow Restrictor Tables
(For 4:1 Concentrate to Product Ratio)

FR-25 & FR-40 (RED)

| PRODUCT RATE | | CUT TO LENGTH | |
|--------------|-----|---------------|------|
| ml./min. | gpd | in. | cm. |
| 110 | 42 | 1 | 2.5 |
| 84 | 32 | 2 | 5.1 |
| 75 | 29 | 3 | 7.6 |
| 69 | 26 | 4 | 10.2 |
| 63 | 24 | 5 | 12.7 |
| 60 | 23 | 6 | 15.2 |
| 55 | 21 | 7 | 17.8 |
| 51 | 19 | 8 | 20.3 |
| 47 | 18 | 9 | 22.9 |
| 45 | 17 | 10 | 25.4 |
| 44 | 17 | 11 | 27.9 |
| 42 | 16 | 12 | 30.5 |
| 40 | 15 | 13 | 33.0 |
| 39 | 15 | 14 | 35.6 |
| 38 | 14 | 15 | 38.1 |
| 37 | 14 | 16 | 40.6 |

FR-60 (ORANGE)

| PRODUCT RATE | | CUT TO LENGTH | |
|--------------|-----|---------------|------|
| ml./min. | gpd | in. | cm. |
| 158 | 60 | 1 | 2.5 |
| 130 | 49 | 2 | 5.1 |
| 123 | 47 | 3 | 7.6 |
| 110 | 42 | 4 | 10.2 |
| 99 | 38 | 5 | 12.7 |
| 94 | 36 | 6 | 15.2 |
| 93 | 35 | 7 | 17.8 |
| 88 | 33 | 8 | 20.3 |
| 84 | 32 | 9 | 22.9 |
| 79 | 30 | 10 | 25.4 |
| 76 | 29 | 11 | 27.9 |
| 74 | 28 | 12 | 30.5 |
| 71 | 27 | 13 | 33.0 |
| 68 | 26 | 14 | 35.6 |
| 66 | 25 | 15 | 38.1 |
| 66 | 25 | 16 | 40.6 |

FR-90 (YELLOW)

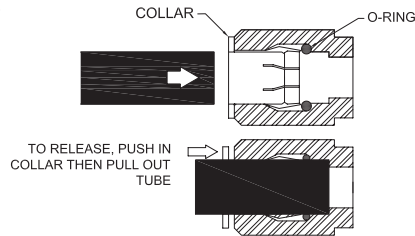
| PRODUCT RATE | | CUT TO LENGTH | |
|--------------|-----|---------------|------|
| ml./min. | gpd | in. | cm. |
| 269 | 102 | 1 | 2.5 |
| 233 | 88 | 2 | 5.1 |
| 213 | 81 | 3 | 7.6 |
| 198 | 75 | 4 | 10.2 |
| 183 | 69 | 5 | 12.7 |
| 175 | 67 | 6 | 15.2 |
| 164 | 62 | 7 | 17.8 |
| 154 | 58 | 8 | 20.3 |
| 148 | 56 | 9 | 22.9 |
| 141 | 54 | 10 | 25.4 |
| 136 | 52 | 11 | 27.9 |
| 133 | 50 | 12 | 30.5 |
| 129 | 49 | 13 | 33.0 |
| 128 | 48 | 14 | 35.6 |
| 124 | 47 | 15 | 38.1 |
| 124 | 47 | 16 | 40.6 |

FR-180 (GREEN)

| PRODUCT RATE | | CUT TO LENGTH | |
|--------------|-----|---------------|------|
| ml./min. | gpd | in. | cm. |
| 490 | 186 | 1 | 2.5 |
| 460 | 175 | 2 | 5.1 |
| 430 | 163 | 3 | 7.6 |
| 400 | 152 | 4 | 10.2 |
| 379 | 144 | 5 | 12.7 |
| 356 | 135 | 6 | 15.2 |
| 344 | 131 | 7 | 17.8 |
| 326 | 124 | 8 | 20.3 |
| 311 | 118 | 9 | 22.9 |
| 300 | 114 | 10 | 25.4 |
| 289 | 110 | 11 | 27.9 |
| 281 | 107 | 12 | 30.5 |
| 270 | 103 | 13 | 33.0 |
| 263 | 100 | 14 | 35.6 |
| 259 | 98 | 15 | 38.1 |
| 256 | 97 | 16 | 40.6 |

FLOW RESTRICTOR REMOVAL, ADJUSTMENT AND REPLACEMENT

1. Locate the yellow concentrate tubing (Fig. B for Single-Membrane System or Fig. C) for Dual-Membrane System). Remove the tubing from its push-fitting at the membrane as follows:
 - a.) Firmly depress and hold the push-fitting collar down with your thumbnail.
 - b.) While the push-fitting collar is depressed, pull the tubing straight out of the push-fitting. Once the tubing is removed, release the collar.



2. Carefully remove the flow restrictor assembly, now visible as a plastic insert in the end of the yellow tubing (Fig. E). You may use an object such as a dull knife to help pry the flow restrictor insert from the end of the tubing. The entire flow restrictor (consisting of the insert collar and thin capillary tubing) may then be gently extracted.

Note: Take care not to crush or otherwise damage the delicate capillary tubing.

3. Refer to the Flow Restrictor Tables (Fig. D). Find the table that represents the Flow Restrictor Assembly for the system that you have. Find the **product concentrate flow rate** in the left-hand column and the **length of the flow restrictor** in the right-hand column.

Example: If your Flow Restrictor Assembly is for a 90 GPD Membrane and the **product flow rate** is 170 mL/Min, then the flow restrictor length should be cut to 6.5 inches (16.5 mm). 170 is about halfway between 164 (7 in.) and 175 (6 in.).

4. Using a new single-edge razor blade, carefully measure and then cut the flow restrictor to the total length indicated.

5. Re-insert the flow restrictor assembly into the yellow tubing and firmly re-seat the insert into the end of the yellow tubing by carefully pressing on the insert with your thumbnail. Care should be taken not to crush or otherwise damage the end of the capillary tubing protruding from the end of the insert.
6. Re-insert the yellow tubing into its push-fitting in the RO membrane as follows:
 - a.) Moisten the O-ring seal inside the concentrate outlet fitting by dripping a few drops of clean water into the fitting.
 - b.) Grasp the yellow tubing near the flow restrictor end, and insert the tubing into the push-fitting. Push the tubing into the fitting until resistance is felt, approximately 1/2 inch (12.7 mm). The tubing is now resting on the O-ring seal inside the fitting.
 - c.) Firmly push the tubing approximately an additional 1/4 inch (6.35 mm) further into the fitting to completely seat the line into the fitting and O-ring seal.
7. Turn on the system water supply and check for leaks prior to further use or testing. If a leak is observed, you may not have pushed the yellow tubing into the push-fitting far enough to seal the tubing against the O-ring. Turn off the system water supply and reseat the tubing as described above.

Fig. E: Flow Restrictor Assembly

