## **1000 GPD COMMERCIAL RO SYSTEM INSTRUCTIONS**

1) Always use extra length tubing to make your connections, you will move the unit to replace the filters in the future.

2) Read the push-in fitting material on page 2, make sure you push the tube completely in.

3) If a fitting is not push-in, then use moderate pressure to snug up the fittings. Modern fittings do not rely on brute strength. They rely on teflon tape, o-rings or gaskets to make the seal (just snug the fitting to make it secure). Do not use glue. Plastic fittings that have been screwed on too tightly are subject to splitting. Stressed fittings may take days or even months to leak.

- 4) Please, Please, Please read this installation guide before installing the unit. This guide will answer a lot of your basic R.O. questions.
- 5) Ok! You installed it without reading the guide. Please read the guide before contacting us with questions or problems.
- 6) A 1000 GPD system makes about 40 pure RO water gallons per hour. Yes, more water goes to drain than is made. All RO systems make drain water while operating.

7) This systems max water pressure is 100 psi. Failure to read these directions, not using the correct membranes, not fast flushing your filters or not changing your filters on time could cause your pump to fail and cause water damage around your RO system. If there is any concern of mismanagement of the system, please install a water leak detection device. The booster pump normally operates around 90-95 psi. Membranes will get clogged due to normal use and will need to be replaced. Do not subject the RO system to over 100 PSI.

## **REPLACEMENT FILTERS:**

Commercial RO Filter Pack6 x 150 GPD RO membranes\*\*\*Image: Commercial RO Filter PackImage: Commercial RO Filter PackImage: Commercial RO Filter PackImage: Commercial RO Filter PackReplace this filter pack every 6-12<br/>months or 3,000 total gallons.Replace your RO membrane every 10-15,000<br/>gallons, when rejection rate is <90%, when<br/>PSI gauge is over 100 psi (membranes)

\*\*\* You cannot use less than a 150 GPD membrane in this system \*\*\*

Thanks, Chris, The H2O Guru

clogged) OR when RO production slows.

#### How to use Push In Fittings & how to remove Tubing

#### Connecting:

**Cut the tube square.** It is essential that the outside diameter be free of score marks and that burrs and sharp edges be removed before inserting into fitting. Make tubing cuts flush with a sharp pair of scissors or a tubing cutter.

**Insert tube.** Fittings grips before it seals. Make sure the tube is pushed in all the way.

**Push up to tube stop.** Push the tube into the fitting, to the tube stop. The collet (gripper) has stainless steel teeth which hold the tube firmly in position while the 'O' ring provides a permanent leak proof seal.

**Pull to check secure.** Pull on the tube to check it is secure. It is a good practice to test the system prior to considering your handy work is done. The system doesn't full pressurize until the tank is full.

#### **Disconnecting:**

**Push in Collet and remove tube.** To disconnect, ensure the system is depressurized before removing the tubing from the quick connect fitting. Push in collets squarely against face of fitting. With the Collet held in this position, the tube can be removed. The fitting can then be re-used.

**Tubing Release Wrench.** In your installation kit we have provided you a tubing release wrench to assist in removing tubing. 3/8" tubing can be removed by hand, but the wrench makes this process much easier. Please see picture on right. The flat part of the wrench is pushed against the collet as you pull the tubing out in the opposite direction.



'O' Ring

Collet

Stainless Steel Teeth

## **1000 GPD COMMERCIAL RO SYSTEM ILLUSTRATION**

\*\*\* Please familiarize yourself with the layout below. Please also ensure you have all the parts below before you begin \*\*\*



**IMPORTANT!** Before we begin installation, we would like to make sure you are aware that you MUST flush the carbon filters before making any RO water on new systems and after any subsequent carbon filter changes. This is easily done by removing the tube from the stage 3 (blue housing on far left) and inserting your 3/8" drain line into this fitting. Turn on the supply line's inline ball valve. Flush filters for 30 minutes or until the water runs clear. IF you do not perform this step and you clog your system, the pressure gauge will likely be over 100 psi.



-Use wrench to remove prefilter tube-



With the prefilter tube removed, insert drain line into this fitting to flush the carbon blocks for 30 minutes before making RO water.

#### Preparing for Installation :

Check out the area you will be working in. Is it safe? Any electrical around that should be turned off? Unplug all electrical cords in your area (garbage disposal etc). Do you have enough room? How about the lighting, will you be able to see what you are doing? Different areas have different requirements to meet local codes. Our systems are sold all over the globe. We are presenting a generic method of installation. You will need to check out the local building codes to assure that your unit is installed in compliance with code.

## 1000 GPD COMMERCIAL RO INSTALLATION STEPS

STEP 1) Install the Drain Saddle. I like to start with the drain saddle. It is made up of two



plastic parts and a foam washer. (*Pic #1*) The foam washer mounts onto the drain saddle. Remove the backing paper. Position the foam over the fitting hole in the one half of the drain saddle. This foam makes a water tight seal. The drain saddle has to mount on the drain pipe coming from the bottom of the sink. If you look at any drain pipe, they all have a bend in them



that is called a (P-Trap.) What is important is that you mount the saddle valve on the *Pic* #2 way <u>down</u> to the P-Trap, not after it. You also want to mount the drain saddle at least one inch higher than the start of the bend, but not more than 4 inches higher. Note you do not want to mount the drain saddle on the garbage disposal line. Once you have positioned the drain saddle on the pipe (*Pic* #2), leave enough room to attach the tube & for you to work. Just snug the screws. Do not crank down on them, Just snug enough so that the drain saddle



is secure and will not wiggle around. Now you need to drill a hole. Get your 3/8" drill bit out and drill right through the opening in the drain saddle (*Pic #3*). Just use light pressure. Now just drill through the one side of the pipe - don't drill through the other side. Ok, that's done for now. Attach tubing into the blue quick connect fitting in the drain saddle. The waste water is the life blood of the system. If the system cannot drain correctly, it will not function for long. The drain line should never be blocked or restricted (*i.e. restricted beyond the flow restrictor*).

Pic #3

**STEP 2**) Install the Tap/Feed Water Supply Valve Connection. Tap water supply connections have multiple options available (pex, pvc, garden hose, etc.).

We include the following with your system:

- 1/2 " feed port into your stage 1 sediment filter (bottom right housing)
- 1/2 " inline ball valve and
- 12 feet x 1/2" RO Tubing for your tap water supply line

#### Tips for installing your tap water supply line:

**#1.)** Ideally, your supply line is less than 12 feet. Longer distances will reduce system GPD production.

**#2.)** Never install non-necesary items on your supply line (tds meter probes, additional inline ball valves, flowmeters OR add a stage with less than a 5 micron size filter, etc..) this will reduce flow going into your system.

**#3.)** Make sure to leave enough slack in your supply line so you can change filters easily and tilt the system to remove air bubbles. (We will install the tap water supply line in **step 4**).

## **COMMERCIAL RO INSTALLATION STEPS (contd)**

**STEP 3**) Install the Drain Line. Cut a piece of tubing long enough to go from the installed drain saddle fitting (installed in **STEP 1**) into the Flow Restrictor fitting. Finish this step by connecting the tubing you just cut into these two items quick connect fittings Please leave enough slack on the drain line to flush your prefilters. <u>The drain line is easily used to connect to stage 3, ideal for the mandatory flushing requirement of this system</u>.

STEP 4 ) <u>Install the FEED / Tap Water Supply Line.</u> Cut a piece of tubing long enough to go from the installed supply valve fitting (installed in STEP 2) into the STAGE 1's 1/2" inline ball valve. Finish this step by connecting the tubing into these two item's quick connect fittings. <u>Close the tap water supply line inline ball valve.</u> (blue handle perpendicular to the tubing). Remember! The supply line's inline ball valve can easily be closed if a leak is detected. <u>Next, slowly open your tap water supply connection.</u>

STEP 5 ) RINSE THE PREFILTERS (MANDATORY STEP). We MUST rinse the pre-filters to

remove the carbon dust so your system will have zero chance of clogging. We must flush the prefilters for all NEW systems and after we change any carbon filter(s).

**First,** unplug the tubing leaving STAGE 3 (the prefilter line). This can be done by hand, it is always easier with the wrench. Use the flat part of the wrench to press against the collet & pull the tubing in the opposite direction to remove the tubing from the housing.

## Next, disconnect the drain line from the flow restrictor and insert the drain line directly into the fitting coming out of STAGE 3.

**Finally**, turn on the tap water supply line feeding your system water. To do this: open your tap water supply connection & open the supply line's inline ball valve ( turn the blue handle so the handle is parallel with the tubing). Grey water will begin to come out of the third prefilter and directly into the drain. <u>Keep the pump **unplugged** for this step</u>.

\*\*\*Allow the system to flush the prefilters until the water is completely clear (about 30 minutes).\*\*\*

#### Done! When water runs clear:

1.) Close the inline ball valve on the water supply line and 2.) Return / reconnect the drain line back into the flow restrictor and

3.) Re-connect the prefilter line to the male elbow fitting coming out of STAGE 3. Make sure the tube is pushed all the way in.





## COMMERCIAL RO SYSTEM INSTALLATION STEPS (contd)

STEP 6 ) For New systems (or whenever you replace your membrane), <u>Open the pure</u> <u>RO water out inline ball valve and plug in your booster pump</u>. DISCARD the first hour of pure RO water the system produces. Some commercial systems include a DI bypass that sends RO water directly down the drain (so this step is a flip of a switch on some systems). For systems without a di bypass, you still must discard the first hour of water production the RO membranes produce (RO water) to remove the preservative chemical on found on every new membrane.

**STEP 7 )** <u>Remove Trapped air in your RO system</u>. Your ASOV (automatic shut off valve) and HPS (booster pump high pressure switch) will not function properly until all of the air is out of your system. It can take 2-3 days to remove all of the air in your system. To expedite the removal of air in your system (and you can start making your pure water) <u>DO THIS:</u> While making RO water, tilt the system from left to right and back and forth. Also tap on the ASOV. <u>You will hear air gushing out of the drain line</u>. Continue to tilt system back and forth and tap the ASOV until you no longer hear air gushing down the drain when you tilt the system. Your system should not produce a vibration or noise after the first few days of usages. You may hear water running to drain. Air trapped in your system will confuse the pump's high pressure switch and the auto shut off valve. Please wait 3-4 days before calling or attempting repair. The water in the system will absorb the air and the valve will begin to function normally.

**STEP 8**) <u>Check waste to pure water ratio.</u> Using a gallon jug, time how long it takes to fill one pure RO water gallon and one drain water gallon. We <u>MUST</u> always have more drain water than pure water. The adjustable flow restrictor controls the amount of drain water. To increase the amount of drain water, insert the smaller of the two allen wrenches provided into the allen wrench port of the flow restrictor and turn counter clockwise for 1/2 a turn. To reduce the amount of drain water, turn the allen wrench clockwise 1/2 turn.

**STEP 9**) <u>Check HPS setting.</u> As mentioned previously, the adjustable 60/40 High Pressure Switch (HPS) controls the booster pump. The switch is factory set to TURN OFF the booster pump when there is over 60 psi on the pure RO water line. The pump will TURN ON when the pure RO water line pressure goes down to below 40 psi. Although the factory setting should not need adjustment, it is adjustable by about 10 psi either way. The switch can be adjusted using the larger of the two allen wrenches in your installation kit <u>AFTER the air in your</u> <u>system is fully removed</u>. Adjustments may be needed if the pump does not turn on or off on time. All issues related to the pump timing can be "boiled down" to one of two things: <u>more pump or less pump</u>. For <u>more pump</u>, make clockwise 1/4 turn adjustments; for less pump, make counter clockwise 1/4 turn adjustments. Any HPS adjustments could take 10-15 minutes to materialize, be patient!

**STEP 10 ) Check for leaks.** Close all of the pure water valve(s) and allow the RO system to fully pressurize. At this time the HPS should turn off the booster pump and the ASOV should close and your system should stop sending water down the drain. <u>Verify this is the case.</u> Now that your system is fully pressurized, Check for leaks ! <u>Check again</u> in a few minutes, then <u>check again</u> in about half an hour and finally after one hour. <u>One last check of your</u> <u>work after 3 days</u>. The system will not fully pressurize and remove all of the trapped air until 24 hours of use. *Enjoy your pure RO water!* 

## COMMERCIAL RO SYSTEM FILTER CHANGING GUIDE

#### How to tighten housings when replacing filters:

When screwing housings back into the caps of the RO system, we suggest lifting the housing up into the cap by way of pressure coming from your hand holding the BASE of the housing. With constant pressure from your hand, lift the housing up into the cap while turning the housing clockwise with your other hand at the same time. <u>NEVER use the wrench to tighten housings!</u> Note the removable plug extension (look up into the housing cap). The plug is to help guide the filter when screwing on the housing.



#### How to replace membranes:

**Step A )** Unplug following 3 tubes: the <u>Drain Line</u>, the <u>Pure RO Water Line</u> & the <u>Prefiltered</u> <u>Water Line</u>. (*note: the pure RO water line goes into the asov on the side with the screws, the prefilter line comes from the asov on the side opposite of the 4 screws*).



**Step B )** Remove the three blue 20" housings using the housing wrench (turn housings counter-clockwise).

**Step C**) The membrane housings pull straight out. The housings are all clipped together. What is important is that there are 4 clips holding the membranes to the back of the box frame. Pull the membrane housings straight out directly towards you like the arrows in the picture on the right.



## **COMMERCIAL RO SYSTEM FILTER CHANGING GUIDE (contd)**

**Step D )** Place membranes on a table. There will be water, a bath towel underneath is recommended to catch the water that will spill out.



**Step E )** Unplug the 6 prefilter lines. (*prefilter* lines go into the caps of the membrane housings)



**Step F )** Remove the caps of the RO membrane housings.



**Step G )** We lubricate all systems membranes and O-rings with a silicone lubricant. If you don't have this handy, a small amount of dishsoap will work great. Do not use vasoline!



**Step H )** Remove the old RO membranes with a wrench. Twisting them a bit before pulling them out will make this a easier process. When installing new membranes, be mindful that the membrane is pushed ALL the way into the housing before screwing on the cap.



# 5357-2LM2-B738

#### **BOOSTER PUMP**



## **Key Features:**

- All component materials meet stringent global approval standards (including NSF, FDA, and EC 1935/2004)
- Quiet, maintenance-free operation
- New design improves priming and diaphragm protection
- Enhanced sealing for leak resistance
- Integral dampener to reduce pulsation/water hammer

## **Technical Specifications:**

+	Pump design:	3 chamber diaphragm pump, self-priming, dry run tolerant	
	Typical applications:	Light commercial feedwater boost for 500-1000 GPD reverse osmosis and other filtration technologies as well as carbonation	
	Materials:		
6	Housing:	Nylon	
	Valves:	EPDM	
.	Diaphragm:	Santoprene	
8.85 I	Fasteners:	Stainless steel, zinc plated carbon steel	
5	Liquid temperature:	170°F (77°C) maximum	
	Ports:	3/8" John Guest "Push-fit" (other options available)	
	Switch:	None	
	Bypass:	Pressure relief valve factory set to 130 PSI	
	Motor:		
	Туре:	Permanent magnet, totally enclosed, non-ventilated	
	Voltage:	24 VDC (other options available)	
<u>+</u>	Leads:	14 AWG w/ 2 pin Molex connector. Compatible with Aquatec power supply (part number 20-PWS-002, 6.7a, 100-240 VAC in, 24 VDC out)	
	Temp limits:	For user safety, optimal performance, and maximum motor life,	
		this motor is equipped with a thermal protector that	
		limits motor shell temperature to 145°F (63°C)	
	Duty cycle:	See heat rise graph	
	Mounting plate:	Powder coated steel mounting plate (other options available)	



WEIGHT: 6.3 pounds

**a**quatec

# **5300 Series**

## Pump Model: 5357-2LM2-B738

All performance testing is conducted in a controlled environment with 70°F (21°C) ambient and water temperature, and 30 PSI inlet pressure. Voltage is fixed at 24 VDC. Both performance and heat rise data will vary with changes to environmental and operating conditions. Additional inlet pressure increase will result in similar increase in discharge pressure. Maximum inlet pressure rating is 80 PSI (5.4 Bar).

Shaded areas within the charts below denote performance points at which the pump can run continuously, without thermal breaker interruption. Within the unshaded areas, the pump will require periodic shutdown for motor cooling.

PERFORMANCE DATA				
DISCHARGE PRESSURE	30 PSI (2 BAR) INLET PRESSURE			
PSI (BAR)	FLOW: GPM (LPM)	CURRENT: AMPS		
130 (10)	0.0	4.6		
120 (8)	0.6 (2.3)	4.4		
90 (6)	1.4 (5.3)	3.8		
60 (4)	1.5 (5.7)	2.8		
30 (2)	1.6 (6.1)	1.9		



The lower curve of the Heat Rise graph plots the highest current where this pump model can run without a cooling requirement. The upper curve represents the highest current draw of this pump model, under which the thermal breaker would open after approximately sixty (60) minutes and the motor would require approximately thirty (30) minutes of cooling before it restarts. Power cycling should be limited to six (6) times per minute.

ALL PERFORMANCE AND HEAT RISE FIGURES ARE APPROXIMATE. ACTUAL VALUES WILL VARY ACCORDING TO AMBIENT AND OPERATING CONDITIONS.

## THE AUTOMATIC SHUT OFF VALVE ASOV



Looks very complex, but is really very simple.

The water is simply traveling across the valve from left to right or right to left depends on how you look at it.

Pure water travels across the top of the unit. (side with the screws) Prefiltered water travels across the bottom.

<u>NOTE!</u> The arrow found on the bottom of the ASOV (indicating the flow of water) <u>applies to the prefiltered water only, as the pure water side can flow through the</u> <u>ASOV from either side.</u>

The valve has a top and a bottom. The top is the side with the (4) screws visible. The bottom has no visible screws and is marked in and out.

The bottom of the valve is connected between the pre-filters and the membrane. Water from the pre-filters is directed to the (in). The filtered water continues from the out to the membrane end with only one connection. The membrane water inlet.

So the bottom of this valve goes in between the filters and the membrane.

The top is the side with the (4) screws connects across the pure water line. From the membrane pure water outlet. You connect to the (in). The pure water outlet of the membrane is on the end with two connections. One connection goes to drain, the other is the pure water. The drain connection is not the one you want.

Once you have located the pure water line, cut it and install the automatic shut off valve. From the membrane to (in) and to the rest of the system (out).

Install the ASOV in the position shown, i.e. with the bottom side down flat.

It can take a few days to get the air of a new system... In the interim the ASOV may hum or vibrate and let water drain through to the drain constantly.

Sometimes several days are needed to absorb the air. Again, to expedite removal of the air in your system: Begin making RO water. Turn the RO system on its left side, then right side and finally back and forth while tapping the ASOV.

### **RO SYSTEM EVALUATION - perform 3 days AFTER installation:**

## HOW LONG TO MAKE ONE GALLON TEST:

**<u>Step 1</u>**: Open a pure RO water outlet (either a RO faucet or a inline ball valve's blue handle). The picture on right shows a ball valve that is open

**Note1!** If you have a fast flush flow restrictor, ensure the black handle is in the closed / perpendicular / "normal operations position"

**Note2!** If you are using a pressure tank, ensure the tank ball valve is in the closed position (perpendicular to the tubing) like the picture on the right

<u>Step 2:</u> OK! Now we are all set up. Next, with a milk jug (or other one gallon container), time how long it takes to fill one gallon of pure RO water - remember - a 50 GPD (gallon per day) membrane should make ONE gallon in about 30 minutes. We are projecting our test here to the entire day - the more accurate you are with this test, the more accurate your result will be.

RECORD time to fill ONE gallon of pure RO water:

RECORD time to fill ONE gallon of drain water:

RECORD water temperature:\_\_\_\_\_ If your system is new or moved to a new location... you will want to RECORD time to fill ONE gallon from the tubing feeding your RO system tap water:\_\_\_\_\_

## HOW TO PERFORM A TDS TEST (easy!):

Worldwide, water quality is measured by TDS (total dissolved solids). This may sound daunting; however, we are confident that if you know how to use a ball point pen, you can master this in a couple of minutes. To perform a TDS test, you need

simply a TDS meter. We sell these for less than \$20!----->>

<u>Step 3</u>: AFTER making one gallon of pure RO water, if you have a fast flush flow restrictor, perform a fast flush. To do this, leave your pure RO water outlet in the open position and turn the black handle to the right 90 degrees so it is parallel to the tubing. The picture on right shows a fast flush flow restrictor in "fast flush" mode.

During this time, we are removing tds creep, sending most of the water down the drain. After 5 minutes of fast flushing, return the fast flush's black handle to the "normal operations" position. **Step 4 :** Next, let a few cups of water pour out of your pure RO water outlet.

**Step 5 :** While we are waiting for step 4, get a clean glass or container for your pure RO water sample (do not use the cap of the tds meter). Collect 6 oz. of pure RO water in this container. **Step 6 :** To test your TDS, open the TDS meter's cap and place the tds meter in the center of your sample. Press the only button on the tds meter. Record the number that appears on the LCD screen below: (always test RO water, then tap water & then drain water)

RECORD RO water quality (A):\_\_\_\_\_

RECORD TAP water quality (B):\_\_\_\_

RECORD DRAIN water quality (C):\_\_\_

#### **RECORD YOUR MEMBRANES REJECTION RATE:**

(to find your membranes rejection rate, use a calculator and take:["A" divided by "B" minus 1])

- Average TDS in US homes: = 250 ppm (parts per million) TDS (total dissolved solids)
- TDS level considered excellent for drinking water:= < 50 ppm TDS.
- *Minimum acceptable rejection rate before it's time to replace your membrane: = 90%*
- Average RO water quality for our customers who change filters on time = < 10 ppm TDS.

#### Water Terminology & FAQ

<u>Pressure Reducing Valve (PRV)</u> This valve is installed when your house pressure is above 70 psi. This valve reduces your line pressure to 70 psi. (Your RO membrane only needs 50-60 psi to operate as designed, so a PRV is an easy plug & play solution to high water pressure that causes continuous drain water & other issues.

<u>Automatic Shut Off Valve ((ASOV)</u> the ASOV is what shuts your system off & prevents your system from making continuous drain water. When the pure water line reaches 2/3 of your incoming water supply pressure, the ASOV will activate and close the prefilter line, preventing water from going into the membrane and the drain.

<u>Fast Flushing</u> Fast flushing is an important maintenance step for your system as it washes the stale water out of your system. For drinking water RO systems, we recommend fast flushing for 5-15 minutes at least once every 2 weeks. For systems with a DI stage, we additionally recommend fast flushing a couple of minutes before & after you make a batch of RODI water as this preserves the life of your membrane & deionization resin.

<u>System Purge</u> Not to be confused with fast flushing above - a system purge is when we run the system for 15 minutes without any filters OR membrane to clean and remove potential clogs. Be sure to flip the black fast flush handle several times during this step and tap the ASOV and/or permeate pump a few times with your hand. This method is the fastest way to resolve clogs on new systems & after filter changes. Although it is rare for a any system to need a purge, needing to perform this step on a new system or location may indicate that you have low house pressure (less than 50 psi) or low flow (less than 1.5 GPM) going into your RO system.

<u>Booster Pump</u> IF you have lower than 50 psi on your water supply line feeding your RODI system water, we advise getting a booster pump. The pump we have sold for 35+ years is very reliable & above else the quietest plug & play pump we have tested. Although our powerstation booster pump is designed for well water applications with 40/60 cut in/out well pump switch's, this pump works great for city water & several other applications - please contact us for applicability if you are not certain at 772-461-0256.

<u>Depressurizing the System</u> To change filters, membranes, remove tubing or open housings we must relieve the pressure in the system. Turn off your water supply going into the system & open a pure RO valve. After a few minutes the system will be depressurized & the tubing & housings will be able to open.

<u>System Life Expectancy</u> We recommend replacing your entire system after 7 years of use. Contact us to receive our best deal. Typically our discount for a system repurchase is less than \$100 difference than if you were to purchase a new membrane and filter pack.

<u>System Environment</u> Your system cannot be exposed to freezing temperatures, hot water, fire or higher than 75 psi water pressure. IF your system was exposed to any of these, you must replace the entire system. IF your system is exposed to direct sunlight, bacteria growth should be expected, filter life & water quality will be less. TDS Test: A TDS meter quickly & accurately lets you know when to change your DI resin & your membrane.

TDO TESI. A TDO meter quickly & accurately lets you know when to change your Difesin & your membrane.

#### Troubleshooting FAQ's - (please see our online FAQ guide at www.airwaterice.com/pages/faq for more!)

**FAQ#1:** <u>The vertical DI housing has air trapped inside. Is this normal?</u> It's nothing to worry about. Water is part air (h2o). Normally the cartridge will fill 1/4 of the way full with water when pure RODI water is being made.

**FAQ#2:** <u>Slow or No pure RO water?</u> RO systems make water at a rate of 2-6 gallons per hour, a slow trickle. If this happened all of the sudden or after changing filters, make sure your fast flush is closed, (black handle perpendicular to the tubing). New systems or new locations for old systems with low water production typically have something to do with either the house pressure being low or less than ideal supply connection. If this has happened over time, it's likely time to replace your filters and/or membrane or if you have a drinking water system with a FULL pressure tank, it is time to recharge the pressure tank.

**FAQ#3:** <u>No drain water?</u> All RO & RODI systems send water to the drain while operating. If you cannot hear water going down the drain, unplug the drain line & check. Your system will not last very long if no drain water is being made. Disconnect the fast flush flow restrictor from the system. Look through the fast flush into a light. Do you see a small pinhole from both positions (open/closed)? If you do not, it is clogged. Use your water supply line or a air compressor to blow out the debris. This method will also work for a clogged permeate pump. IF this still does not allow drain water to pass, perform a system purge, then a RO system evaluation and contact us.

FAQ#4: <u>Continuous drain water.</u> Please ensure your fast flush flow restrictor's black handle is pointed up, at a right angle, perpendicular to the tubing like this!----->

Note! For rodi systems with DI bypasses installed, please also ensure the blue ball valve's handles to the left of

the flow restrictor are in the closed position like this!----->

\*\*\*If you still have drain water after ensuring correct positions above: perform a Fast flush. If your system still makes drain water, you will need to perform a System Purge & RO



don't change your filters or membrane on time, continuous drain water is likely. Having low (below 40 psi) or high (above 75 psi) house pressure will also cause your system to have continuous drain water.



## CHANGING FILTERS GUIDE:

#### Caution!

- $\circ~$  Do not attempt to open a filter that is under pressure.
- Have a sponge and perhaps a small pail handy. You will spill some water.
- Turn off / unplug any close electrical systems.
- The floor might become wet and slippery.

**Note!** This is a general guide. Have the instruction manual for your specific system handy. Your systems manual will go into detail about your systems specific features, valve positions and more!

#### The Basic Filter Changing Process: (at least every 6 - 12 months)

step 1: Turn off the water supply going into the RO / RODI system

step 2: Open a pure RO or RODI water outlet ( ro faucet, ball valve OR di bypass) to relieve the water pressure

#### step 3: Change the filters

- 3.1 Unscrew the filter housings & remove the old filters and/or membrane (use the housing wrench).
- 3.2 Clean the housings with soap & water and rinse thoroughly.
- **3.3** Change the filters. **Note1**) When re-attaching the housings, NEVER use the housing wrench to tighten the housings. **Note 2**) Ensure the housing's O-rings are in place and properly seated before attempting to re-attach the housings. **Note 3**) For in-line filters, please note the arrow on the filters indicating the directional flow of water. **Note 4**) All In-line filters have blue dust caps, please remove & discard these in the same way tubing is removed... press in on the collet with your finger or wrench & pull tubing in the opposite direction (see pic)------>

step 4: Fast flush the system\_

- 4.1 Turn your fast flush flow restrictor's black handle parallel to the tubing- see picture above.
- 4.2 Next, open a pure RO water line (i.e. RO faucet, inline ball valve, etc). Now you are fast flushing!
- 4.3 Fast flush your system for 15 minutes.
- **4.4** After fast flushing, please ensure you return the flow restrictor's black handle back to the closed (normal operations) position (black handle pointed up perpendicular to the tubing).

step 5: If you are replacing your membrane, discard the first hour of RO water the system makes.

IMPORTANT! Fast flushing sends almost all of the carbon dust/"fines" out of the system & directly into the drain as opposed to potentially clogging your system. Fast flushing is great way to keep your membrane clean & extend the life of your di resin. **Note!** Always fast flush immediately after installing new filters. If you have dramatically reduced pure RO water, little or no drain water, or constant drain water **AFTER** installing new filters and/or membrane, the following 3 items are the most common reasons why. IF these 3 items don't solve your problem, perform a system purge (see below).

Is your **fast flush in the closed position** ? Is your **pressure tank pressurized**\*\*\* ? IF you have a **DI bypass, is it closed**?



<u>How to PURGE</u>: Step 1: Remove all of your filters & remove the membrane. Step 2: Screw the filter housings & membrane housings back on the system <u>without</u> the filters or membrane. Step 3: Open a RO water line with the fast flush in the closed/normal operations mode for 30 minutes without any filters or membrane. During this step, turn the fast flush's black handle back & forth multiple times & tap the automatic shut off valve (ASOV) and/ or the permeate pump with your hand. Purging clears potential clogs 99% of the time. If this does not work, remove the fast flush flow restrictor. Hold the fast flush up to a light. You should see a large hole when the fast flush is open AND a small hole when the fast flush is closed. If you do not see light through the fast flush in both positions, your fast flush is clogged. To clear the clog: blow through, use a air compressor or your water supply line... this method also works for permeate pumps that get clogged. \*\*\*To recharge your pressure tank, inflate schrader valve to 7-9 psi with the tank empty & ball valve open.

#### When to change the filters?

The drain water made should be included in your calculation of when to change your filters. Drain water is the lifeblood of your system & essential for pure RO water. We plumb most of our RO systems to get a 3:1 waste to pure water ratio. This means for a filter rated for a 3,000 gallon life, it will be exhausted after we make 750 pure RO gallons as we have sent 2,250 gallons down the drain. Change filters when pure RO water production slows, if a filter look visually dirty, if the filter has reached the end of its filter life rating OR at least every year, whichever comes FIRST. If you have well water or otherwise hard water to begin with, you will need to change filters more often. Please note the membrane is always sold seperately from our filter packs.





**Carbon Filters:** (Stage 2-3) (*pre-filter*) [ life= 3,000 total gallons or 1 year for full 10" carbon filters or 1,500 gallons or 1 year for inline carbon filters **Carbon** filters **Changing** carbon filters on time extends the life of your membrane. Among other things, carbon filters protect your membrane from chlorine & chloramines.



**Reverse Osmosis (RO) Membrane:** (Stage 3-4) (*the filter*) [life= 6,000 - 15,000 total gallons, 1.5 - 5 years, or when rejection rate drops below 90%. Membranes are normally changed because of slow or no production. The other reason to replace the membrane is production of excessive amounts of poor quality water. Chlorine exposure, inadequate carbon filter replacements or low pressure are usually to blame for a membranes reduced life. Many water chemistry matters go into membrane life expectancy & we cannot accurately predict how your membrane will do. *What you must know is when your carbon blocks are exhausted, they allow chlorine to pass through to the membrane. A process called oxidation begins. This initially causes a reduction in pure RO water. Next, your membrane sheets break, putting holes in your membrane & you will have a large amount of poor quality water. When new, RO membranes reject 95-99% of TDS. Over the next 2-5 years, this rejection rate will decrease. You will need a TDS meter to easily perform a TDS test\*\*\* to find your membranes rejection rate. Temperature and water pressure play a role in your membranes production. Please see 2 charts below!* 



**Deionization (DI) Resin Filters:** (Stage 4-8) (*post-filter*) [ life= minimum 3,000 ppm TDS capacity for our full 10" DI cartridges or [1500 ppm TDS capacity] for our inline di filters. Resin may smell "fishy" when exhausted. The color changing feature of our di resin goes from green or blue to a golden brown color and is a INDICATOR that the resin is exhausted. We recommend performing a TDS test when color changes. A rough mathematical equation of resin filter life: If your RO tds is 10 ppm, take 3,000/10 = 300 gallons of zero tds water before the resin is exhausted & needs replacement.

**<u>Ultra Violet (UV)</u>**: (*post-filter*) [ life= 1 year] UV lights will make a humming noise when in need of replacement. Another way to check is temperature, a working light produces a warm housing.

Mineral Filters (calcium and magnesium) (post-filter) [life= 1,000 gallons or 1 year]

\*\*\***How to perform a tds test?** <u>ALWAYS make one gallon of pure RO water before a TDS test to avoid testing the stale "tds creep" water in your system.</u> Get a clean glass. Pour about 6 oz of pure RO water in the glass. Put your TDS meter in the glass & press the button on the TDS meter. Record the number. Pour out the glass and then test your TAP water, & then test your DRAIN water. Don't use the cap of the TDS meter - again, you want to sample about 6 oz of water! As always, we are committed to your success. Please contact us with any questions!

## **1000 GPD COMMERCIAL RO SYSTEM PICTURES & DIAGRAM**

