



Installation and Maintenance Manual Reverse Osmosis Filtration Systems

INTRODUCTION AND SAFETY INFORMATION

Read and follow all steps and information boxes carefully before installing and using your Reverse Osmosis System.

Do not use this product to make safe drinking water from non-potable water sources. Do not use the system on microbiologically unsafe water, or water of unknown quality without adequate disinfection before or after the system.

This reverse osmosis system contains replaceable components (membrane elements and filters). These components are critical for the effective reduction of total dissolved solids and specific contaminants that are listed in the Appendix.

The reverse osmosis system requires mains water pressures of 60 psi minimum to 125 psi maximum. Water pressure can be reduced by installing a pressure reducing valve in the water supply pipe to the RO system. A booster pump should be used for low pressure applications and can be purchased from our online store along with a pressure gauge to determine the mains supply pressure.

A low water supply pressure **will** affect the production rate and rejection capability of your reverse osmosis membrane. The factors effecting RO production rate can be calculated using the formulas on Page 20 of this instruction manual. The formulas will allow you to compare your reverse osmosis system operation against manufacturers' data. If you need assistance please contact the Osmotics helpdesk.

Do not install the reverse osmosis system in extreme hot or cold temperature environments. Temperature of the water supply to the reverse osmosis system must be between 40°F (4.5°C) and 100°F (38°C). Do not install on **hot** water lines.

Reverse osmosis membranes contain a food grade preservative for storage and shipment. **New membranes should be flushed for one hour prior to use.** This flush removes the preservative. The preservative is not harmful but makes the product water taste objectionable.

WHAT IS REVERSE OSMOSIS?

Reverse Osmosis was originally designed to make sea water drinkable for the navy. It is ideal for anyone on a low sodium diet. An R.O. membrane has a pore size much smaller than a bacterial virus, or the cryptosporidium parasite. When functioning properly it will remove all micro organisms from tap water and produce sterile water.

Reverse osmosis is the reversal of the natural flow of osmosis. In a water purification system, the goal is not to dilute the salt solution, but to separate the pure water from the salt and other contaminants. When the natural osmotic flow is reversed, water from the salt solution is forced to pass through the membrane in the opposite direction by application of pressure-thus the term REVERSE OSMOSIS.

Through this process, we are able to produce pure water by screening out the salts and other contaminants.

THE BASIC REVERSE OSMOSIS SYSTEM

Your Osmotics Reverse Osmosis (RO) Filter System is a water treatment and purification unit. It uses water pressure to reverse a natural physical process called *osmosis*. Water, under pressure, is forced through a semi-permeable membrane to filter out minerals and impurities. Clean water leaves the membrane via the blue outlet tubing. Minerals and impurities are sent to the drain with RO waste water via the green or black outlet tubing.

The system includes replaceable filters and membrane elements. The Sediment Filter removes sand, silt, dirt, rust particles and other sediments. The carbon filter removes chlorine and other contaminants from the water supply before they enter the RO membrane. Chlorine at levels exceeding 0.1ppm will damage the RO membrane, it is essential that the carbon filter is replaced at the recommended intervals stated in this manual. The deionisation filter cartridge (if fitted) removes any residual contaminants that remain in the product water after passing through the RO membrane.

Replacement filter elements and membranes are available from our online store 24 hours a day. Use the part number from the parts list or identification sticker on your RO system to order from our website. Complete filter replacement kits are available for your filter system if required.



WARNING: Use of replacement parts not supplied by Osmotics.co.uk will render system warranties null and void. Replacement parts are available from the Osmotics web store : www.osmotics.co.uk

BEFORE INSTALLING THE REVERSE OSMOSIS SYSTEM

Best performance of the system will be achieved when the incoming water has been treated (softened).

The water coming into the system must be within certain limits for Sediment content, pressure, and temperature. Refer to the specifications in the appendix to determine if your installation is within the limits. Supply pressure is the most important parameter, pressures below 60psi will result in your system not producing water to its' full potential in both volume and TDS levels.

If your RO system does not have a pressure gauge, it is worth purchasing one to determine your system operating conditions.



NOTE: Pressure gauges to determine operating conditions are available from the Osmotics web store : www.osmotics.co.uk

The filters and membrane elements in the RO system need to be replaced on a regular basis. Follow the instructions for replacement and maintenance guidelines that are in this manual.



WARNING: The Osmotics RO system is designed to work without the aid of a storage tank. Storage tanks are available to purchase from our online store if you would like to store drinking water.



NOTE: For optimal system performance, use the system for at least two minutes continuously each day. Use of the membrane flush valve for 5 minutes prior to and following water production is advisable.

REVERSE OSMOSIS PACKAGE

The reverse osmosis system is purchased as an completed kit. Before starting installation check that the following components have been supplied:

Quantity	Item	Part Number
1	Reverse Osmosis System	
1	Instruction Manual	
Tubing		
3	2 x Metres ¼" Reverse Osmosis tubing (supplied either as 1 length of 6 meters or 3 x 2 meters of selected colours).	
Membrane		
1	TFC Reverse Osmosis membrane	OS-XXGPD*
Supply and Waste kit		
1	Waste drain kit	OS-WC
1	Supply feed valve	OS-FWC
1	Filter Housing Wrench	OS-FW10



*** NOTE:** Replace the XX with the GPD rating of the membrane you wish to replace. For example OS-75GPD. If you are unsure please contact the Osmotics support team at support@osmotics.co.uk



NOTE: A garden tap type feed water connection can be supplied to connect to your domestic water supply, please contact info@osmotics.co.uk for details. This type of tap connector is ideal for installing your RO System in a garage.

LOCATION OF SYSTEM

The reverse osmosis system is designed for installation under a sink, usually in a kitchen or bathroom. You may also install the system in a garage or outhouse and use the garden tap adaptor available from Osmotics.co.uk

The RO system can also be located in a location away from the faucet. A nearby water source and drain point are required. The location for installation must not be subjected to temperatures below 4.5°C

Water Supply: To provide supply water to the RO system inlet, a feed supply fitting is required or install pipe fittings as needed.

Drain Point: A suitable drain point is needed for rejected water from the RO system. A floor drain, washing machine connection, standpipe, sump, etc. are all acceptable.



WARNING: All components and tubing should be located in an area which is not exposed to freezing temperatures. Do not expose unit or tubing to direct sunlight.

Dispensing Faucet: The faucet (if supplied) should be placed near the sink where drinking water is normally obtained.

A 2-inch diameter flat surface is required above and below the installation site. The thickness of mounting surface should not exceed 1-1/4 inches. Avoid any strengthening webbing on the underside of the sink.

Feed Water Connection: The feed water valve should be located as close to the RO Filter assembly as possible. USE A POTABLE COLD WATER SUPPLY ONLY. Softened water is preferred but not essential as it will extend the life of the RO membrane element.



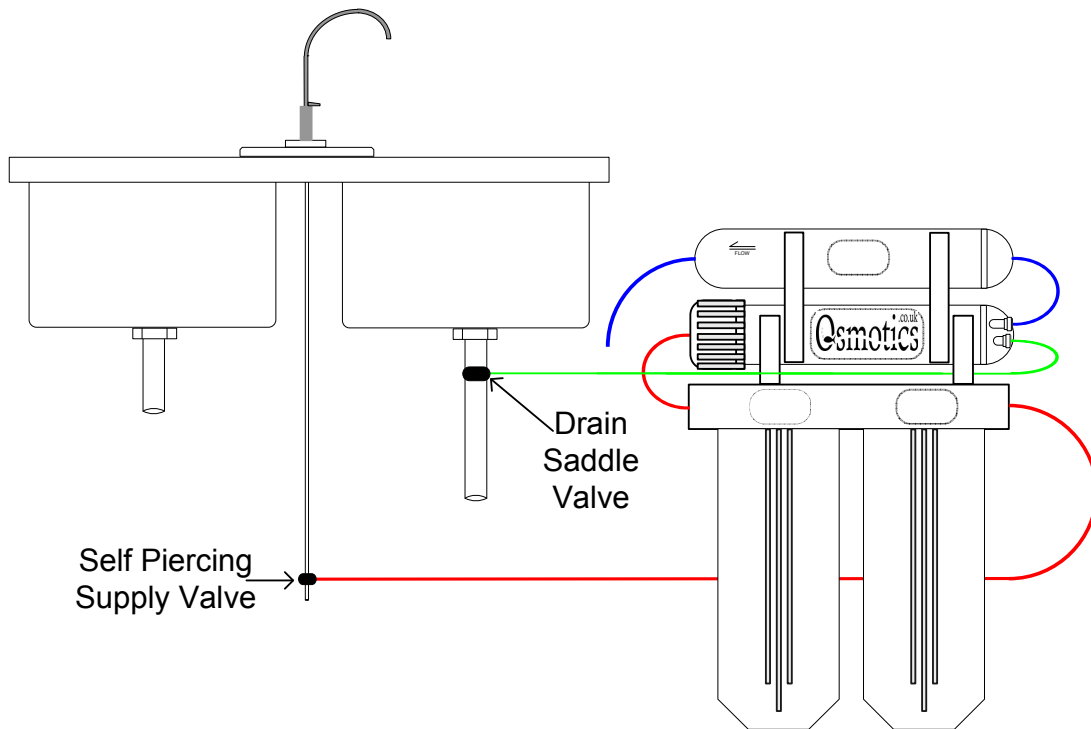
NOTE: Keep the lengths of tubing short. Longer lengths of tubing will decrease system performance. A booster pump can be used on the supply line to increase efficiency and water production, please contact info@osmotics.co.uk for details.

Drain Connection: Depending on plumbing regulations, the waste water may need to go to drain through an anti-siphon air gap. Do not connect the system drain line to a dishwasher drain or near a garbage disposal. Back pressure from these units may cause an overflow. Allow adequate tubing lengths for final system placement.



NOTE: All plumbing should be completed in accordance with local plumbing regulations. Some regulations may require installation by a licensed plumber; check with the local plumbing authority prior to installation.

Figure 1 : Typical Under-Sink Installation



REQUIRED TOOLS AND MATERIALS

- Adjustable wrench, and larger adjustable jaw pliers or pipe wrench.
- Slotted and Phillips head screwdrivers.
- Sharp Knife or Tubing cutters (available from Osmotics.co.uk online store)
- Electric drill and bits for cutting the faucet mounting hole and drain entry hole.

INSTALLATION

- STEP 1: Install cold water supply valve
- STEP 2: Install drain adapter
- STEP 3: Install faucet (Optional)
- STEP 4: Install RO Membrane
- STEP 5: Install Auto Shut Off Valve (Optional)
- STEP 6: Make tubing connections
- STEP 7: Install RO assembly
- STEP 8: System Start Up
- STEP 9: Pressure Test

STEP 1: INSTALL COLD WATER SUPPLY VALVE

Water Supply Valve:

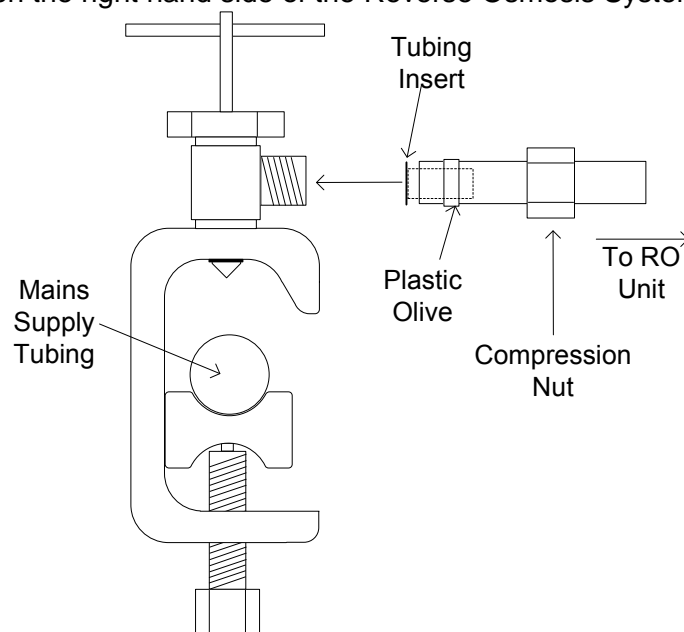
A self piercing water supply valve is supplied with your Reverse Osmosis System. If you do not wish to install this on your mains water supply line, alternative installation accessories are available from the Osmotics.co.uk web site.

Turn off your house cold water supply valve under the sink or at the main house incoming valve prior to installing the RO system supply valve.

Slide the supply valve over the copper tubing and tighten the bottom bolt assembly firmly to hold the clamp in position (see illustration below). Pierce the copper tubing by turning the needle valve handle clockwise until it is firmly seated. The valve is closed in this position.

Turn on the main supply valve to pressurize the cold water line. Immediately check for any signs of leakage. Connect the supplied ¼" plastic tubing into the compression nut with the plastic olive and tubing insert in place then tighten the nut firmly. When ready to supply water to the system, turn the needle valve handle counter-clockwise until fully open.

The red tubing supplied should connect to the inlet side of the Reverse Osmosis System. The Inlet side is marked with an "IN" and is identified with a RED collet on the right hand side of the Reverse Osmosis System.



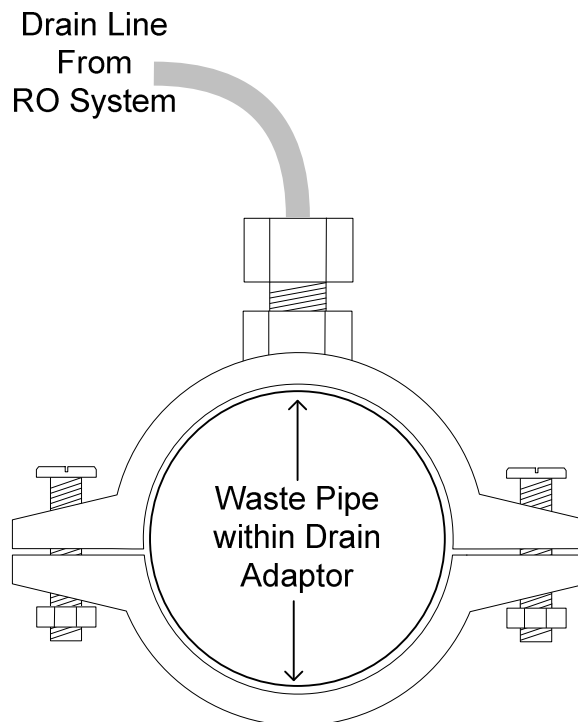
NOTE: Consult a licensed plumber if you are not familiar with plumbing procedures.


STEP 2: INSTALL DRAIN ADAPTER

The drain adapter has a rubber inlet that accepts the 1/4-inch green or black waste tube.

Fix the drain adapter in position around the waste line from your sink. Drill a 1/4" hole through the tubing inlet into the waste line. Attach the waste line from your Reverse Osmosis system to the drain adapter.

The waste line on your Reverse Osmosis System can be found to the right hand side of the system behind the membrane housing. The waste line has a green or black collet to identify it. If this is not present, follow the waste line from the RO membrane to the flow restrictor and flush assembly. The tee on the end of this line is the connection to waste.




 **NOTE:** The drain adaptor includes a sealing pad which should be fitted in between the waste pipe and the inlet side of the drain adaptor. Failure to correctly fit the sealing pad will result in leakage from the drain outlet.

STEP 3: INSTALL FAUCET (Optional)

Select a location for the faucet. Be sure it will fit flat against the sink or counter and that there is space underneath for tubing.

Connect Blue Reverse Osmosis system product tubing to Faucet.

 **WARNING:** Do not drink product water from the outlet of the deionisation filter cartridge if fitted. A T-Fitting will be required between the RO Membrane outlet and the deionisation filter to supply drinking water to a tank and faucet.

STEP 4: INSTALL REVERSE OSMOSIS MEMBRANE



NOTE: To prevent RO Membrane fouling ensure that the pre-filters are flushed prior to connecting them to the membrane housing. Failure to complete this step may result in premature membrane failure.

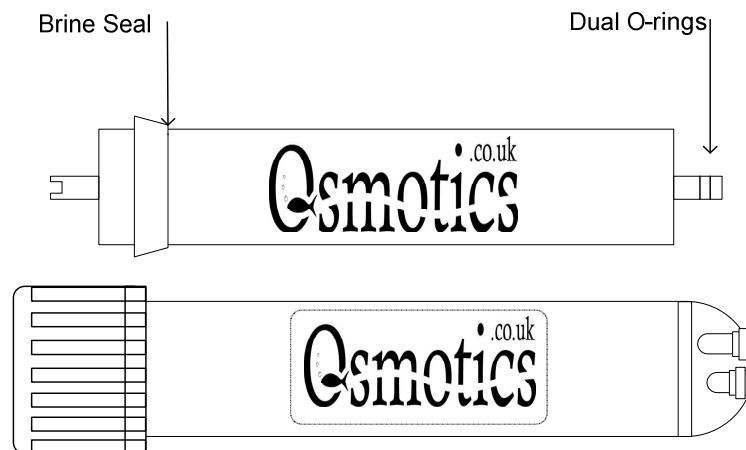
Disconnect the red tubing from the RO Membrane housing cap and unscrew until the cap has been removed. NOTE: The red tubing joins the membrane housing and pre filter housings.

Remove the membrane packaging. DO NOT remove the white tape or blue outer covering of the membrane itself. Only the clear packaging that the membrane is in should be removed.

Insert the membrane into the membrane housing with the two o-rings first, push the membrane securely into the housing until it has seated correctly. The large black gasket seal will still be visible from the filter housing opening.

Refit the membrane housing cap ensuring the o-ring seal is lubricated. Hand tighten the cap, do not over-tighten or use tools to tighten the membrane housing. Re-insert the red tubing from the pre filter housings to the membrane housing.

The following diagram shows the membrane in the correct orientation for insertion into the membrane housing.



STEP 5: INSTALLING AUTO SHUT OFF VALVE (Optional)



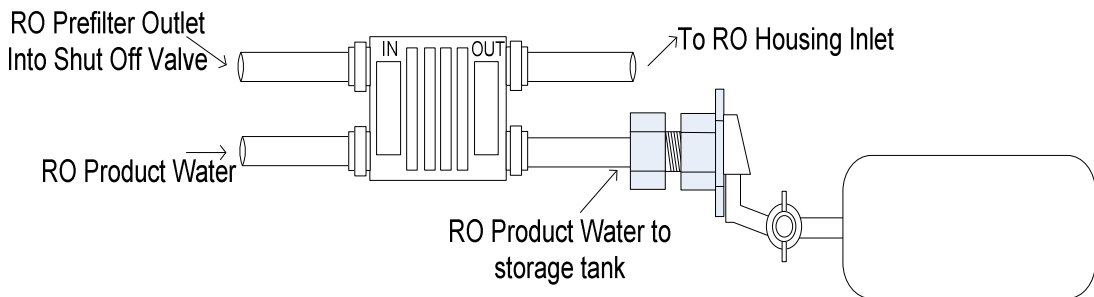
NOTE: An Auto Shut Off valve kit is available from the Osmotics online store. Installation of this kit allows unattended operation of the Reverse Osmosis system. The system will automatically cease production of water when the feed container or vessel is full.

The "in & out" markings are on the top of the valve. The top side of the valve is the high pressure side and the bottom side is the low pressure side.

The outlet from the filter housings goes to the "in" on the top of the valve. The "out" goes to the membrane housing inlet using the red tubing supplied.

The membrane housing product water outlet connects to the "in" on the bottom side of the auto shut off valve. The "out" on the bottom goes to the float valve in the container or vessel being filled.

The valve automatically shuts off production when the back pressure reaches approximately 65% of the incoming line pressure.



STEP 6: INSTALLING BOOSTER PUMP (Optional)



NOTE: Booster pumps are available from the Osmotics online store. Low water pressure is usually the cause if you are experiencing low production rates. Fitting a booster pump will increase water production, stabilise TDS and reduce waste water production.

Use the "in & out" markings which are on the plastic head of the pump to determine flow direction through the pump. The pump should be installed between the last pre-filter housing and the first membrane housing, this protects the pump from harmful sediment which may be present prior to the pre-filters.

STEP 7: MAKE TUBING CONNECTIONS

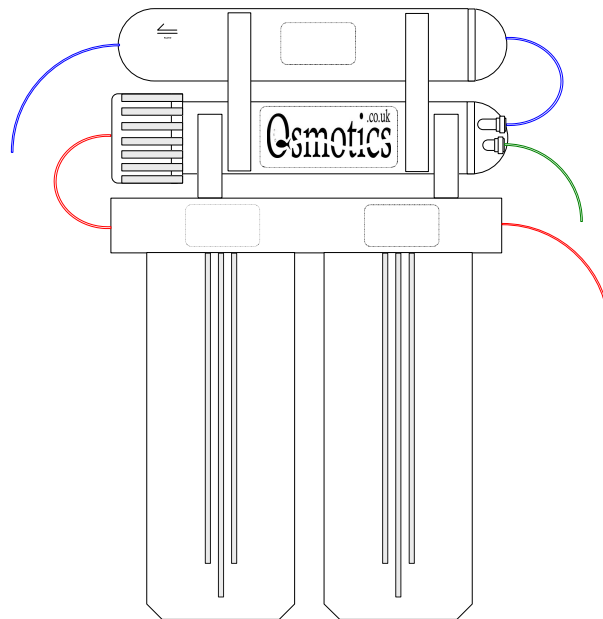


NOTE: When inserting tubing into quick connect fittings, wet the tubing. Water will help the tubing slide into the rubber inlet.

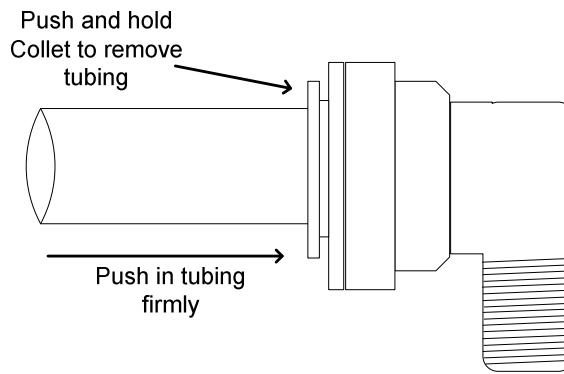
Feed connection—red tubing from feed valve or garden tap connector to elbow connector on right hand side of filter system (marked “IN”). This connection may be labeled as Water In or have a red collet cover fitted.

Drain connection—green or black tubing from the lower outlet on the RO Membrane Housing. The tubing is routed to the rear of the membrane housing where the waste connection should be made. This connection may be labeled as Waste or Drain and have a green collet cover fitted.

Product Water connection—blue tubing from upper outlet of RO Membrane Housing (or DI filter pod if fitted). This connection may be labeled as Faucet or have a blue collet cover fitted.



CAUTION: Elements contain a food grade preservative. The use of sterile/latex gloves is recommended.



NOTE: When removing tubing from quick connect fittings; always hold the collet against the fitting body whilst pulling the tube from the fitting.



NOTE: If a fitting is leaking, ensure that the tubing end is clean and square. The tubing must be securely pushed home into the fitting body.

STEP 8: INSTALL RO ASSEMBLY

The tubing is attached to the RO System by the quick connect fittings. When choosing a location for the system, allow enough tubing for it to be moved for periodic servicing of the filters and membrane elements.



WARNING: Be sure to lubricate the o-rings in the filter housings if performing system maintenance.



WARNING: Do not turn the incoming water valve on until the all fittings and connections are confirmed secure. Shipping vibration may have resulted in fittings becoming loose.

STEP 9: SYSTEM STARTUP

1. Inspect all connections.
2. Remove filter housings.
3. Remove all pre-filters from packaging.
4. Lubricate element O-rings and Filter Housing O-rings with lubricant such as Vaseline or Silicone.
5. Fit sediment and carbon filters into their respective housings.
6. Fill deionisation stages with resin if not already complete.
7. Replace filter housings and tighten using supplied wrench.
8. Disconnect the membrane housing inlet tubing and remove housing cap.
9. Securely insert o-ring end of membrane elements into membrane housing.



NOTE: To prevent RO Membrane fouling ensure that the pre-filters are flushed prior to connecting them to the membrane housing. Failure to complete this step may result in premature membrane failure.

This is achieved by removing red inlet tubing to the RO membrane housing and flowing water through the pre-filters for 5 minutes to drain.

10. Replace membrane housing cap and reconnect inlet tubing to membrane housing (red).

STEP 10: PRESSURE TEST SYSTEM

To check for leaks, the system must be filled with water and brought up to operating pressure. It is advisable to ensure the filter housings are tight prior to introducing water. The supplied housing wrench can be used to ensure a good seal is achieved.

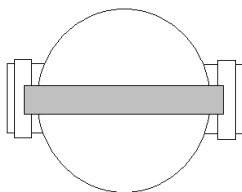
1. Open cold water feed valve slowly. Run at 1/2 open for a minute, then open fully.
2. Open filter outlet valve or system faucet (optional) until water flows.
3. Check for leaks.
4. Purge the system. Run water through the RO system for one hour. This purges air and clears residual membrane preservative. If any of the filter housings do not fill with water, see troubleshooting section.
5. The RO system is now ready for use.

STEP 10: SYSTEM USE

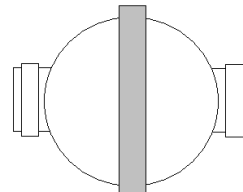


NOTE: A Flush kit is installed on all Osmotics Reverse Osmosis systems. The flush valve must be in the closed position to produce water. Before and after each production period, open the flush valve for five minutes to assist in membrane cleaning. Completing this task will increase membrane life.

When you first start producing water and during every subsequent start-up of the Reverse Osmosis system the membrane will produce a 'spike' in Total Dissolved solids which affects water quality, this spike lasts no longer than 30 seconds. If your water quality is critical you must ensure this spike is bypassed or absorbed by use of a final deionisation stage.



**To Flush Membrane
Open Flush Valve**



**To Produce Water
Close Flush Valve**

The flush valve should be in the closed position for water production. Open flush valve for 5 minutes prior to, and following water production.

PERIODIC MAINTENANCE OF THE RO SYSTEM

The components of the RO system are designed to function with minimal maintenance. However, the membrane elements and filters will need to be replaced on a regular basis. Run the system for at least two minutes each day for optimal performance.



NOTE: Periodic use of the membrane flush valve will increase the service life of the membrane by flushing water across the membrane removing particulates and scale build up.



WARNING: Use of replacement parts not supplied by Osmotics.co.uk will render system warranties null and void. Replacement parts are available from the Osmotics web store : www.osmotics.co.uk

REPLACEMENT OF PREFILTER AND POSTFILTER

The carbon and sediment pre-filters remove sediment and certain chemicals, such as chlorine, from the water. Depending on water use and the amount of impurities, these filters should be replaced every six months or 2500 gallons. Water production volumes may be estimated from time in use or by purchasing the Osmotics Flow Meter available from our online store.

REPLACEMENT OF RO MEMBRANE ELEMENTS

The functional life of the RO membrane elements will vary based on feed water quality. Product water should be tested periodically to verify the membrane elements are performing properly. For most residential applications, the RO membrane elements should be replaced every two to four years or when product water rate drops off indicating scaling (particularly in hard water areas).



NOTE: The one hour flush removes a food grade preservative from the membrane elements. It is not harmful but may affect the taste of the water.

REPLACEMENT OF THE PREFILTER, CARBON FILTER, RO MEMBRANE ELEMENTS AND DEIONISATION FILTER



WARNING: Use of replacement parts not supplied by Osmotics.co.uk will render system warranties null and void. Replacement parts are available from the Osmotics web store : www.osmotics.co.uk

12. Turn off the water supply to the RO System.
12. Reduce system water pressure by opening the faucet or outlet valve.
12. Disconnect the feed and drain tubing connectors.
12. Move system into a contained area, such as a sink or drain.
12. Remove the filter housings as necessary using the supplied filter housing wrench.



NOTE: If changing only the pre-filter and post-filter, the other housings do not need to be removed. If changing the membrane elements, the pre-filter, post-filter and flow restrictor should also be changed.

6. Remove exhausted filters and dispose of them in a responsible manner.
7. Replacing Reverse Osmosis Membrane Elements:
 - a. Remove filter housings. Remove and discard used elements.
 - b. Remove new RO membrane from packaging.
 - c. Lubricate membrane O-rings and membrane housing O-rings with silicone lubricant.
 - d. Securely insert O-ring end of membrane into membrane housing.
 - e. Replace membrane housing cap.
 - f. Connect membrane housing to pre filter housings.




NOTE: When replacing membrane elements ensure membrane flushing for one hour; this removes a food grade preservative from the membrane elements. It is not harmful but may affect the taste of the water.

8. Replacing pre filters.
 - a. Remove new pre filter from packaging. Ensure gaskets are secure.
 - b. Insert pre filter into correct housing on filter bracket.
 - c. Lubricate housing O-ring with silicone lubricant.
 - d. With the pre filter element in place, screw the housing back onto the system. Do not over tighten, use the supplied wrench.
9. Replacing carbon filters
 - a. Remove new carbon filter from packaging. Ensure gaskets are secure.
 - b. Insert carbon filter into correct housing on filter bracket.
 - c. Lubricate housing O-ring with silicone lubricant.
 - d. With the carbon filter element in place, screw the housing back onto the system. Do not over tighten, use the supplied wrench.

11. Replace deionization resin.

- a. Remove screw cap of deionization filter.
- b. Remove baffle plate (if fitted) and foam disc, plate can be removed by pressing on one edge and rotating plate out.
- c. Dispose of used resin as directed by local authority.
- d. Feed new resin into filter body ensuring it is very tightly packed.
- e. Replace foam sponge and baffle plate (if fitted) in housing entry and screw cap onto housing ensuring o-ring is in place.

12. Re-connect tubing and fittings to the filter housings.


	<p>NOTE: To prevent RO Membrane fouling ensure that the pre-filters are flushed prior to connecting them to the membrane housing. Failure to complete this step may result in premature membrane failure.</p> <p>This is achieved by removing red inlet tubing to the RO membrane housing and flowing water through the pre-filters for 5 minutes to drain.</p>
---	--

13. Open the faucet or outlet valve and run water for five minutes.

14. Close the faucet or outlet valve and allow the system to stand idle for 20 to 30 minutes.

15. Check for system leaks.

The Reverse Osmosis system is now ready for use.

	<p>NOTE: The filter housings are sealed using an O-Ring. Tighten by hand. If any leaks are detected when water pressure is applied, the housings can be tightened further with the supplied filter housing wrench.</p>
---	---

TROUBLESHOOTING GUIDE

PROBLEM	CAUSE	SOLUTION
Little or no RO water production or quantity.	Feed valve is off or plugged.	Open valve or remove debris from valve orifice.
	Blocked prefilters	Replace sediment and carbon prefilters.
	Scaled or fouled RO membrane	Replace membrane.
	Storage tank air precharge pressure is too high.	Drain tank and adjust air precharge to supplier's specification (e.g., 5-7 psi).
	Undetected RO product water leak.	Find and repair leak.
	The production capacity sizing exceeds capabilities at local pressure and temperature conditions are exceeded.	Install an RO booster pump with tank switch controls.
	System functioning correctly, a regular drip rate is normal.	Time how long it takes to produce one litre of product water and then calculate the resultant gallons per day. Remember that all RO membranes are specified in US Gallons per day which is lower than UK Gallons per day.
Little or no RO water flow from faucet (if supplied)	Storage tank air loss or ruptured diaphragm/bladder.	Restore the correct empty tank air charge (e.g., 5-7 psi). If water remains in the tank after air is pumped into the air valve, the diaphragm or bladder is likely ruptured and the entire tank (or replaceable bladder, if applicable) needs to be replaced.
	Plugged carbon postfilter due to carbon fines collecting on the outlet media retainer. First verify acceptable flow before the postfilter or with the postfilter removed.	Replace carbon postfilter.
	Storage tank valve partially closed.	Open tank valve fully.
	Crimped tubing line to RO faucet.	Replace section of crimped tubing.
Bad tasting water from RO faucet First, attempt to identify the taste -e.g., metallic, sour /astringent,	Metallic - copper tubing used from product hookup.	Tap water taste - The RO membrane is extremely scaled, deteriorated, or ruptured.
	Bitter/astringent - excess CO2 in RO water lowers pH.	This may be a seasonal problem resulting from changes in local water chemistry.
	Plastic/rubber - new plastic tubing after postfilter; diaphragm/bladder in tank;	First check the postfilter sealing gaskets to make sure bypass is not occurring. If okay, replace

plastic, rubber, rotten egg, musty, salty, same as tap water.	exhausted postfilter.	postfilter.
	Rotten egg - H ₂ S in household water supply not removed by RO; system contaminated due to long period of no use or improper sanitizing.	H ₂ S in the water supply must be removed prior to the RO system using conventional technologies such as aeration or oxidation / filtration. If non pathogenic contamination of the RO system is suspected, replace all filters, "flush" the RO system to clean and sanitize purification assembly and tank. Verify acceptable RO performance when finished.
	Musty - Water stale with high bacteria counts due to long periods of no use.	Replace filters and sanitize purification assembly and tank. Verify acceptable RO performance when finished.
	Salty - A malfunctioning water softener, which is not properly rinsing after regeneration, allowing high TDS brine into the RO feedwater.	Repair water softener.
	Tap water taste - The RO membrane is extremely scaled, deteriorated, or ruptured.	Determine the cause of membrane failure, correct the problem, and replace the membrane.
RO water TDS too high	Scaled, deteriorated, or ruptured RO membrane. A scaled membrane can result from blocked reject flow control. A deterioration can result from chlorine attack on a TFC membrane. A ruptured membrane can result from failed product check valve.	Replace the membrane (and associated cause of scaling, deterioration, or rupturing). Perform required sanitizing.
	Feed pressure too low for the membrane. Recommend minimum pressure of 40 psi for TFC membranes.	Check if a pressure regulator is on the main house water line which can be reset to a higher pressure. If not, install an RO booster pump with tank switch controls.
	The carbon post-filter (if fitted) is not sufficiently flushed on new installation or service. Carbon fines in product water affect TDS reading.	Drain about one litre of water from the RO faucet every few hours throughout a day.
	New replacement membrane has been fitted.	The membrane will require four to six hours of continuous use before stabilising fully.
	Deionisation stage if fitted has become exhausted.	Bypass deionisation stage at start-up to divert TDS spike from resin.

RO water TDS too high cont...	Manufacturing variances between housings and standard Deionisation cartridge allowing bypass and 'rattling' of cartridge in housing.	Unscrew base of deionisation stage 1 turn to ensure a snug fit within the housing. This will not affect operation of housing or cartridge but will prevent water bypassing stage.
	Deionisation stage not full with resin and not packed sufficiently within cartridge.	Remove deionisation cartridge and repack resin ensuring it is completely full and tamped down as tightly as possible.
	Residual contaminants from manufacturing process within system components still causing elevated TDS readings	TDS levels will reduce over a few days as contaminants are flushed. If this lasts more than a week of use contact Osmotics.
One or more filter housings is/are emptying or not filling fully.	Air lock within system.	Unscrew pre-filter housing when system is running to bleed air off. Care required to not overflow the housings.
	One or more pre-filter housings continue to fill with air following purge.	Air leak on system fittings or tubing causing ingress of air. Check all fittings and tubing for secure connection.

APPENDIX 1

Operating Limits

Membrane Type : Polyamide Thin-Film Composite
Maximum Operating Temperature : 113°F (45°C)
Maximum Operating Pressure : 125 psig (8.3 bar)
Maximum Feed Flow Rate : 2.0 gpm (7.6 lpm)
pH Range, Continuous Operation : 2 – 11
Maximum Feed Silt Density Index : (SDI) 5
Free Chlorine Tolerance <0.1 ppm

Keep elements moist at all times after initial wetting.

If operating limits and guidelines given in this bulletin are not strictly followed, the limited warranty will be null and void.

To prevent biological growth during prolonged system shutdowns, it is recommended that membrane elements be immersed in a preservative solution.

The membrane shows some resistance to short-term attack by chlorine (hypochlorite). Continuous exposure, however, may damage the membrane and should be avoided.

The customer is fully responsible for the effects of incompatible chemicals and lubricants on elements. Their use will void the element limited warranty.

Membrane Rejection Data

The Osmotics reverse osmosis membrane gives excellent performance for a wide variety of applications including low-pressure tap water purification, single-pass seawater desalination, chemical processing, and waste treatment. Our membranes exhibit high rejection at low pressures with very stable long-term operation.

Component	Symbol	% Rejection
Sodium	Na ⁺	98
Calcium	Ca ⁺²	99.5
Magnesium	Mg ⁺²	99.5
Potassium	K ⁺	97
Iron	Fe ⁺²	95-98
Manganese	Mn ⁺²	95-98
Aluminium	Al ⁺³	98-99
*Ammonium	NH ₄ ⁺	86-92
Copper	Cu ⁺²	98-99
Nickel	Ni ⁺²	98-99
Zinc	Zn ⁺²	98-99
Strontium	Sr ⁺²	96-98
Cadmium	Cd ⁺²	96-98
Silver	Ag ⁺	93-96
Mercury	Hg ⁺²	96-98
Barium	Ba ⁺²	96-98
Chromium	Cr ⁺³	96-98
Lead	Pb ⁺²	96-98
Chloride	Cl ⁻¹	98.8
Bicarbonate	HCO ₃ ⁻	60-75
Fluoride	F ⁻	87-93
*Silicate	SiO ₂ ⁻²	85-90
Phosphate	PO ₄ ⁻³	98-99
*Chromate	CrO ₄ ⁻²	86-92
*Cyanide	CN ⁻	86-92
Sulfite	SO ₃ ⁻²	96-98
Thiosulfate	S ₂ O ₃ ⁻²	98-99
Ferrocyanide	Fe(CN) ₆ ⁻³	98-99
Bromide	Br ⁺	87-93
*Borate	B ₄ O ₂ ⁻²	30-50
Sulfate	SO ₄ ⁻²	99.5
Arsenic	As	94-96
Selenium	Se ⁻²	94-96
Bacteria and virus		99.9
Pyrogen		99.9

FACTORS AFFECTING RO PRODUCTION RATE FROM YOUR REVERSE OSMOSIS SYSTEM.

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.

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

where PCF is the pressure correction factor, TCF is the temperature correction factor and OCF is the osmotic correction factor.

1. Calculation of PCF:

The output GPD from the membrane are 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 (Pressure correction factor).

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

2. Calculation of TCF:

The output GPD also decreases with decrease in temperature. This is because the water viscosity increases with decrease in water temperature. The GPD increases by approximately 3% for every °C rise in temperature. (Refer to the following table for TCF values).

Table 1: Temperature Correction Factors (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

3. Calculation of OCF:

The output GPD of the system decreases with an increase in ppm TDS of tap water. This is because the osmotic pressure increases with increase in ppm TDS, and the increased osmotic pressure reduces the net driving force for pure water passage through the membrane. The osmotic pressure is approximately 1 psi for every 100 ppm TDS.

Note: Generally speaking, the effect of osmotic pressure can be neglected for most tap water supplies and the OCF can be assumed to be 1.

Example: What is the expected GPD from a 50 GPD system at 40 psi pressure and 60°F water temperature?

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

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

$$OCF = 1$$

$$\text{Expected GPD} = 50 \times 0.666 \times 0.754 \times 1 = 25.10 \text{ GPD}$$