



ADVANCED WATER ENGINEERING, INC.

INDIAN HARBOUR BEACH, FL 32937

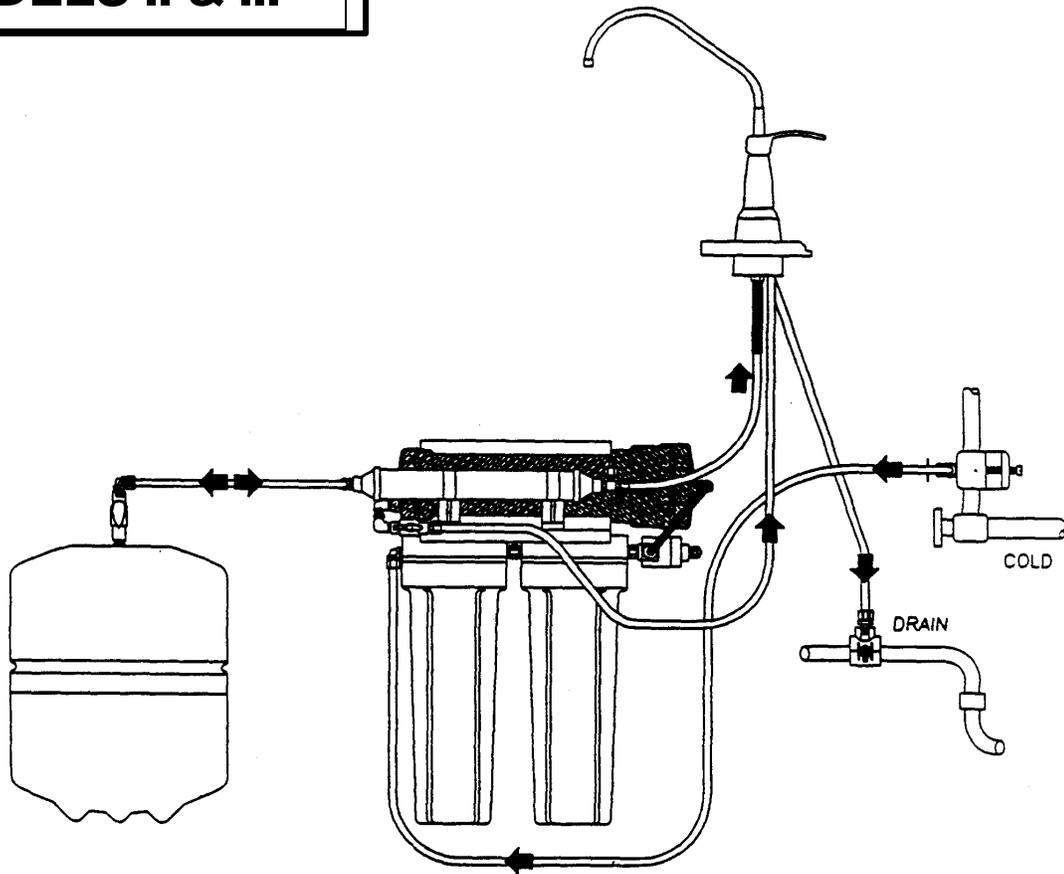
(321)777-4909 FAX: (321)773-8338

e-mail: info@advancedwater.com

www.advancedwater.com

AWE LINE PRESSURE REVERSE OSMOSIS DRINKING WATER SYSTEMS

MODELS II & III



SECTION 1

Equipment Description

The FORMULA Reverse Osmosis Drinking Water treatment system consists of three components: the Reverse Osmosis filter assembly, the Storage Tank, and the Service Connections.

REVERSE OSMOSIS FILTER ASSEMBLY

MODEL IDENTIFICATION: The filter assembly consists of two 10-inch pre-filters in series, the reverse osmosis membrane, the post-filter, and the auto-shutoff valve. Model II is a standard 15 gpd, Model III is a standard 25 gpd, and Model III+ is a modified 35 gpd.

PRE-FILTER: Table 1 shows the various configurations of suspended particle filters and dechlorinating filters used in the FORMULA product line. The particle filters are used to prevent damage to the Reverse Osmosis membrane and to prevent clogging of the flow control and auto-shutoff valve. The dechlorinating filter is a carbon block filter, no fines carbon cartridge containing approximately 4 million square feet of surface area. This carbon is capable of treating approximately 6,000 gallons of water entering the filter with a free chlorine residual of 2.5 ppm. The carbon filter is required to protect thin film membranes from free chlorine. Change the carbon filter every year or sooner depending on your water supply and dealer recommendations.

R.O. ELEMENT HOUSING: The housing contains the reverse **osmosis membrane, which is the backbone** of the system. **The R.O. membrane element separates** the clean water at the molecular level from the majority of impurities and stores the “product”, or R.O., water in the storage tank. The above impurities are concentrated in the waste or “brine” water and sent to drain. The R.O. housing element is the large, white vessel mounted with two white “C” clamps.

POST FILTER: The post filter contains activated carbon and is used solely for marketing reasons after the water leaves the storage tank. The post filter is white and mounted in front of the R.O. element housing.

AUTO SHUTOFF VALVE: Prevents water flow to drain when product tank is full.

STORAGE TANK: The storage tank assembly is used to store approximately 3 gallons of R.O. water. The tank is pressurized with an air charge of 5 to 7 psi to force water back to the faucet.

Note: If system is installed in unusually cold environment or the system is treating very cold water, the air charge of the tank may need to be increased. This is due to contraction of the air inside the tank when exposed to a low temperature environment. Conversely, if the system is installed in high altitudes or very high temperatures, some air may need to be bled from the permanent tank charge to achieve a 5-7 psi tank pressure. It is possible to operate the tank in a horizontal position. The tank will discharge completely in any position. Although the tank has 3.2-gallon maximum capacity, the actual quantity of water that can be stored will be a function of the incoming raw water pressure, T.D.S. and temperature. A 1/4" valve is provided to isolate the storage tank from the system.

SERVICE CONNECTIONS: The sink-top **faucet** is dedicated to dispense water from the storage tank. It can rotate a full 360 degrees and can dispense water continuously or intermittently. The faucet is equipped with an "air gap" feature to prevent a cross connection between the potable water supply & waste water drain.

The **T-Link Ball Valve** is used to provide raw water feed to the R.O. systems and is designed to attach to most under sink plumbing. Note that the R.O. must be fed COLD water only. Hot water will permanently damage the system and void the warranty. The T-valve will also serve as a shut-off to the system.

The drain saddle 1/4" is used for the R.O. waste water and can be easily installed on either PVC or metal pipe drains.

A Tee with plug is available for Icemaker connection and is found on the outlet side of the post filter. Note the gray plastic plug located in this fitting. It is to be left in place if no auxiliary connections are to be made. To remove the plug, cut the head off the plug, unscrew the fitting and push the plug through the grab ring (see section 6 for reference).

SECTION 2

General Instructions

CAUTION: CONNECTING THE SYSTEM TO HOT WATER (OVER 100°F) WILL DESTROY THE MODULE AND VOID THE WARRANTY.

1. PREPARATION

- A. The filter assembly should be mounted on or against a vertical surface in a position to allow access for service and filter cartridge replacement. At the same time: the assembly should be relatively near the faucet to maximize flow.
- B. The storage tank should be located where it can be removed if necessary, but does not take away needed storage space. The storage tank may be placed on its side.
- C. The sink top faucet should be positioned to assure a free-flow into the sink. It must also be in a location that allows ready access to the mounting hardware from under the sink.

2. INSTALLATION OF T-VALVE ASSEMBLY

- A. Turn off the Cold Water Supply
- B. **The i-Link Ball valve Assembly** may be used to make connection to **3/8"** plastic, copper or corrugated tubing. To install, carefully cut the tubing with hacksaw or tubing cutter. Usually a single cut is all that is needed. Remove nuts and rubber grommets from the T-Link. Place one of the nuts and one of the rubber grommets on each piece of tubing and screw the nuts onto the T-Link. A slight bend in the tubing might be needed to accommodate the T-Link.
- C. Firmly push one end of the 1/4" yellow raw water feed tubing into the valve.

3. INSTALLATION OF FAUCET ASSEMBLY

Note: The system is equipped with an "air gap" faucet to prevent a cross connection between the raw potable water supply and waste water drain.

See page 6 for faucet installation and assembly instructions.

4. INSTALLATION OF THE RO DRAIN

CAUTION: The R.O. Drain should be installed above the trap and on the vertical or horizontal tailpiece. It should never be placed on the same side of the drain system as the garbage disposal or subsequent overflowing of the R.O. Drain Air Gap will occur. To minimize the dripping sound of the reject water entering the drain, the R.O. Drain Saddle can be located either high on the vertical drain tube or on a horizontal drain tube.

- A. Drill a 3/8" hole into the drainpipe, observing the above "Caution" concerning positioning.
- B. Attach the drain saddle lining up the drain hole with the hole drilled in the plumbing.
- C. Hand tighten both screws evenly using a Philips screw driver

5. MOUNTING THE FILTER ASSEMBLY

The Filter Assembly can either be mounted on the cabinet sidewall so that the filters are up off the cabinet floor or the assembly can be set on the cabinet floor. Care must be taken to assure the sidewall is sufficiently strong to support the 15-pound weight of the operating assembly

- A. Hold the Filter Assembly on the side wall at adequate clearance for removal of pre-filter bowls. Remove the Filter assembly and mark the mounting screw centers. The mounting screws must be 6" center to center, with at least 2" vertical clearance above them.
- B. Drill 1/8" holes at the center marks.
- C. Screw the #10 X 3/4 hex screw into the sidewall leaving enough protruding to allow the bracket mounting slots to slide over them.
- D. Mount the Filter Assembly on the hex screws.

6. STORAGE TANK

- A. Place Storage Tank in the desired location.

7. CONNECTING THE COMPONENTS

Each component on the R.O. filter assembly connection is made by following the Fast-Tite® assembly instructions on page 6-7.

- A. Connect yellow tubing from raw water supply valve to the inlet pre-filter. (Refer to Figure 1 & 2).
- B. Connect **BLUE** tubing to the product water tee on post filter to faucet. (Refer to Figure 2).
- C. Connect **1/4" BLACK** tubing to faucet air gap and **3/8" RED** tubing from faucet air gap to drain.

8. START-UP PROCEDURE

A. Turn on the feed water valve and watch carefully for leaks.

B. Turn on the storage tank valve and check for leaks.

C. Correct any leakage problems as necessary.

CAUTION: Do not use the first gallon of water from faucet or from the icemaker. This first gallon of water flushes the entire system, removing any preservatives used during shipping and storage, preparing it to produce R.O. water.

SECTION 3

Service Instructions

Pre-Filter Replacement

- 1 Turn off water valve and storage tank valve.
2. Open faucet to release pressure.
3. Unscrew the white pre-filter housing.
4. Replace pre-filter. (Replacement part number found on filter housing.)
5. Clean housing, if necessary, with a mild chlorine solution. Rinse away all chlorine before reassembly.
6. Before reinstalling pre-filter, make certain O-ring is seated in housing.

R.O. Membrane Element Replacement

1. Follow steps 1 and 2 for pre-filter replacement.
2. Disconnect tubing and unscrew R.O. Housing end cap (Refer to Figure 2).
3. With a pair of pliers, grasp membrane end and pull out. A small amount of twisting may be needed.
4. Clean housing, if necessary, with a mild chlorine solution. **Rinse away all chlorine** before reassembly.
5. Wet the small O-Ring on the end of the membrane element.
6. Insert into housing and firmly push while also rotating slightly, when pushing in you will feel the membrane stop. With a little more pressure and turning action the membrane will move in another 1/4" .3/8" of an inch. When this occurs the O-Ring has been properly seated.
7. Inspect housing O-Ring for damage. If damaged, replace. Wet and install the O-Ring on the housing. Replace end cap and tubing.
8. Follow Start-up procedure for restart unit.

Post Filter Replacement

1. Follow steps 1 and 2 for pre-filter replacement.
2. Disconnect tubing to filter.
3. Remove post filter from holding clips.
4. Remove end fitting.
5. Remove ALL Teflon tape from inlet/outlet post-filter fittings.
6. Rewrap with new Teflon tape.
7. Reinstall end fitting.
8. Place new post filter into clips.
9. Reconnect tubing to filter.
10. Follow start-up procedure to restart unit. (Refer to previous page)

SECTION 4

Sanitizing Instructions

1. Make a mild sanitizing solution by adding one-half ounce of 5.25% (laundry strength) chlorine bleach to 1 gallon of water.
2. Turn off RO System, drain storage tank, and remove membrane element and pre-filters.
3. Membrane element must remain wet. Put membrane element in a plastic bag.
4. Fill empty pre-filter housing with sanitizing solution and turn on raw water. After holding tank is full, let system stand idle for approximately 30 minutes.
5. Turn off water.
6. Drain holding tank via the R.O. faucet.
7. Reinstall new pre-filters and membrane element.
8. Replace post filter.
9. Disconnect line to faucet (and ice maker] and put approximately 10 drops of sanitizing solution in these lines and reconnect.
10. Follow start-up procedure to restart unit. (Refer to previous page)

SECTION 5

Faucet Installation

NOTE: THIS FAUCET IS DESIGNED FOR USE WITH RESIDENTIAL REVERSE OSMOSIS SYSTEM AND MEETS ALL APPLICABLE PLUMBING CODES AND STANDARDS. BACK FLOW PREVENTION IS PROVIDED WHETHER CAUSED BY BACKPRESSURE OR BACK SIPHONAGE.

General instructions:

Note: The system is equipped with an “air gap” faucet to prevent a cross connection between the raw potable water supply and waste water drain.

A. Drilling porcelain enamel sinks.

This is not complicated but requires caution and patience. Porcelain is a glass-like material that covers a base metal, so extreme care should be taken to keep from chipping this surface. There are several methods that allow ceramic sinks to be drilled safely and easily. One that we suggest is:

1. Locate faucet placement and tape off the area with masking tape.
2. Using a drill at slow speeds, drill through the porcelain using 1/4” carbide tipped drill.
Note: The bits dull in a very short period of time when used for drilling porcelain and should be replaced or sharpened frequently.
3. Cut through the porcelain and base materials using a 1 -1/4” carbide tipped hole saw at very slow speeds.

A second method to cut through a porcelain enamel sink is to use a Relton® Porcelain Cutter Kit, which is available through a full line plumbing Supply Company. Remove metal chips immediately from the sink surface as stains will occur.

B. Drilling a Ceramic Tile Counter

1. Take off the ceramic layer of the tile using a silicon carbide grinding wheel. Grind away enough of the material to accommodate a 1-1/4" carbide drill bit.
2. Operate the drill at low speeds, especially when the bit is about to penetrate the tile.

C. Drilling Stainless Steel Sinks

1. Determine faucet locations and center punch the stainless for the drill bit.
2. After drilling a pilot hole using a high speed carbide bit, increase the bit size until you have drilled a hole at least 1-1/4" in diameter.

TOOLS NECESSARY FOR INSTALLATION	
To provide a 1-1/4" hole in your countertop:	
Drill	Hole saw or cutter
Knife or Shears	1/2" Wrench

Step-by-step assembly:

STEP 1

Read all instructions before beginning installation. Verify that all parts have been received.

STEP 2

Prepare mounting hole:

See instructions from previous column.

Use existing third hole in sink if available.

STEP 3

Air gap and drain faucet connections:

- A. Run 1/4" red air gap and 3/8" red drain tubing up through hole in counter.
- B. Hold faucet over mounting. hole.
- C. Press 1/4" red Air gap tubing firmly over the 1/4" Barbed Connector on faucet.
- D. Press 3/8" tubing over the 3/8" Barbed Connector on the faucet.
- E. Lower faucet into mounting hole

NOTE:FOR PROPER FIT, CUT POLY TUBING

SQUARE, NOT AT AN ANGLE (Refer to Sec. 6)

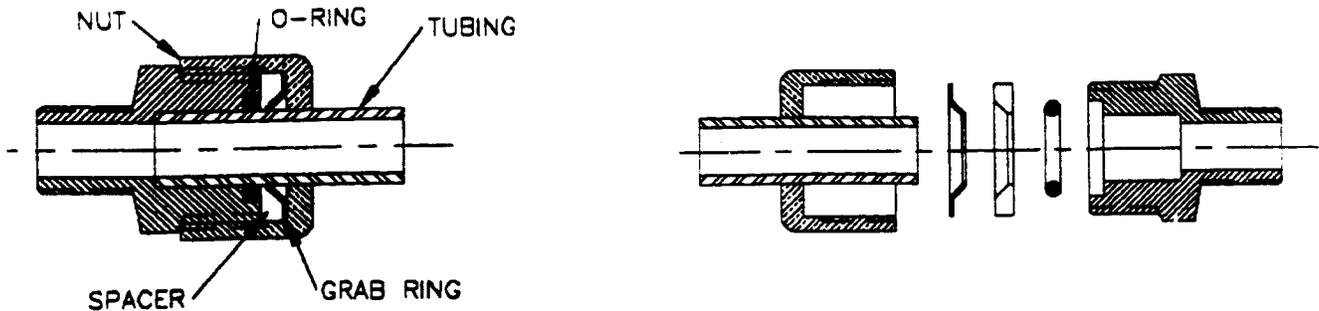
STEP 4

Install Faucet assembly in mounting hole:

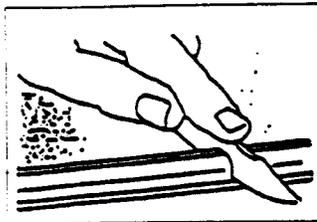
- A. Position faucet through hole in countertop with front in desired position.
- B. Position Retainer Plate, Spacer, Washer and *Star* washer, over base screw and thread hex nut onto base screw and tighten.
- C. Place Compression Hex Nut, Compression Sleeve and insert onto the 1/4" Blue Product Water Supply plastic tubing.
- D. Insert tubing into Base Screw and use wrench to tighten Compression Hex Nut.

NOTE: **BE CAREFUL NOT TO OVERTIGHTEN**

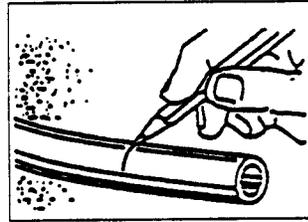
SECTION 6 Tubing installation



Fast & Tite fitting assembly cross section drawing



Step 1 - Cut the tube squarely and remove any burrs.



Step 2 - Mark from end of tube the length of insertions. (See Table B at right)

The FAST & TITE thermoplastic tube fittings install without tools in seconds and provide a tight, sure, leakproof seal without clamps or adjustments. Unique 302 stainless steel "grab ring," for tube retention, coupled with a Nitrile O-Ring for positive seal assures good tube connection with only hand tight assembly. Vibration or tube movement will not break the seal and cause leakage. Preassembled in either highly inert polypropylene, or strong, durable nylon.

When necessary, fittings can be disassembled by hand for fast systems drainage. Fittings are completely reusable. Parts are easily replaced. O-rings are standard size and universally available.

All ingredients in FAST & TITE fittings meet FDA and NSF requirements for food contact and potable water.

Ratings are based on use with copper tubing, and in all cases represent the maximum recommended working pressure of the fitting only. Working pressures vs. temperatures of other types of tubing may limit the tube and fitting assembly to pressures lower than shown above. Consult factory for recommendations on applications other than shown above.

Working Pressure for Fittings Air-Oil-Water Pressure in PSI

Tube O.D.	Up to 75°F	76° to 125°F	126° to 175~F
1/4"	300	300	300
3/8"	250	250	150

TEMPERATURE RANGE: Black polypropylene :0° to +212°F

TABLE B

Tube size	Insertion L.ength without Tube Support	Insertion Length with Tube Support
1/40.D.	9/16"	5/8"
3/80.D.	3/4"	13/16"

Step 3

Loosen nut on fitting until three threads are visible. Fittings for glass tubes must be disassembled and the grab ring removed.

Step4

Moisten end of the tube with water. Push the tubes STRAIGHT in to fittings until it bottoms on the fittings shoulders. Tighten nut by hand. Additional tightening should not be necessary, but 1/4 additional turn may be added if desired. DO NOT OVER-TIGHTEN nut or threads will strip and the fitting will not function properly. A proper assembly will not show the insertion mark extending beyond the nut. if the insertion mark is visible, then steps 1 thru 4 must be repeated.

Step 5

When using clear vinyl tubing, it is necessary to use a "TS" tube support. Disassemble the fitting and place the nut, grab ring, spacer and tube support, in that order on the tube. Locate the grab ring at the insertion mark as shown, Seat the O-Ring in the body then proceed with Step 4.

TABLE 1: FORMULA MODELS and COMPONENTS

PART#	MODEL#	GPD*	FILTERS			MEMBRANE	WATER APPLICATION					
			PRE#1	PRE#2 1	POST		CL ₂	No Cl ₂	T.D.S.	°F	PSI	pH
R9010A	FORMULA III Auto Shut off	24	5 micron S7604	Carbon S9050	Carbon S60GS10RO	T.F.C. R9606	•		3,000	40-100	35-100	2-11

* GPD based on 250 PPM NaCl, 90% reject, 77 °F, 60 PSI, pH 8, 15% recovery

NOTE: Parts and specifications are subject to change.

FLOW DIAGRAM and LABELING

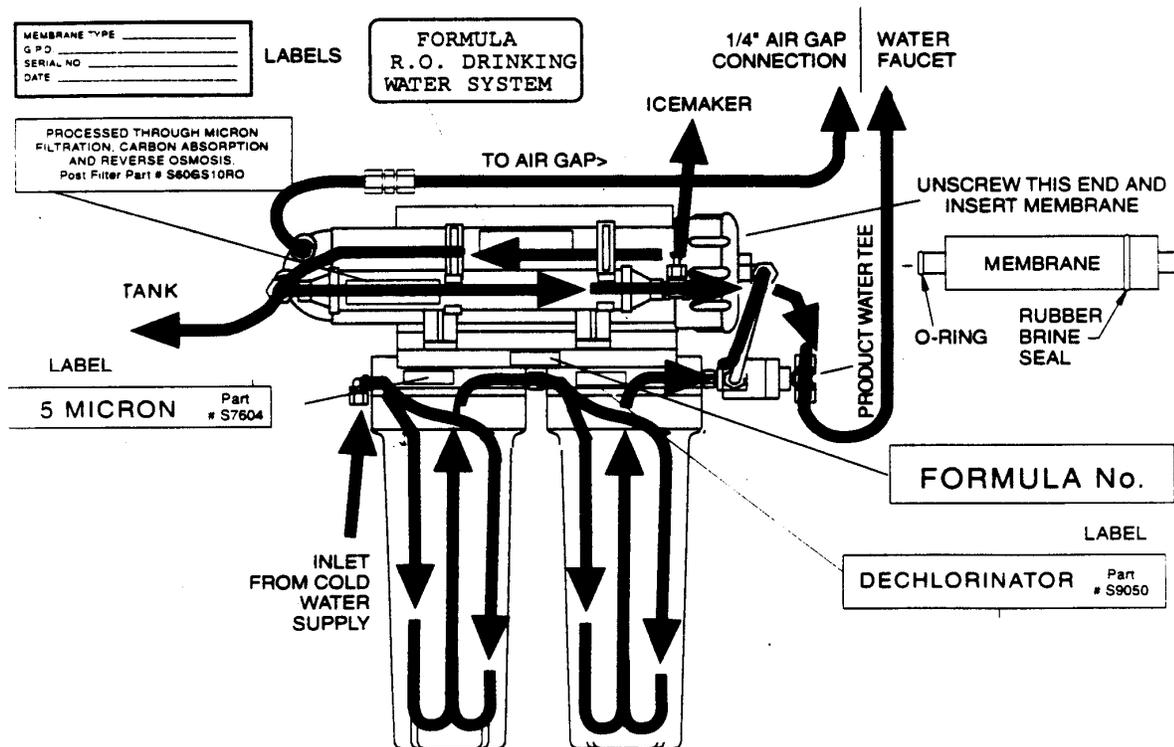


FIGURE 2

Troubleshooting

SYMPTOM	PROBABLE CAUSE	CORRECTION
1. NO PRODUCTION WATER LOW PRODUCTION	<ol style="list-style-type: none"> 1. Tank air pressure too high. 2. Water supply turned off. 3. Low water pressure. <ol style="list-style-type: none"> a: Pre-filter clogged. b: R.O. element damaged. 4. Plugged Post filter. 5. Increased raw water total dissolved Solids. 6. Low raw water temperature. 7. System undersized for application. 8. Flow restrictor clogged. 9. Storage tank valve clogged. 	<ol style="list-style-type: none"> 1. Set tank at 5-7 PSI (empty). 2. Turn on water supply. 3. <ol style="list-style-type: none"> a: Change Pre-filter. b: Change or replace element. 4. Change Post filter. 5. Increase raw water pressure. 6. Increase raw water pressure or install 50 foot coil of 1/4" copper tubing prior to Pre filters in heated space. 7. Replace element with large capacity unit and/or add second storage tank. 8. Clean or replace flow restrictor. 9. Open storage tank valve.
2. LOW OR POOR WATER QUALITY	<ol style="list-style-type: none"> 1. All of the above with particular emphasis on flow restrictor, TDS, water temperature & pressure. 2. R.O. water stood too long in tank. 3. Bacteriological fouling. 4 Membrane fouling and hydrolysis. <ol style="list-style-type: none"> a: brine seal leaking. b: product water O-Ring leaking. c: product water check-valve failure. 	<ol style="list-style-type: none"> 1. See all above solutions. 2. Open faucet to drain tank. 3. Sanitize system. 4. Requires further pre-treatment and/or new membrane. <ol style="list-style-type: none"> a: Check membrane brine seal. b: Check product water O-Ring. c: Replace check-valve.
3. BAD TASTE	<ol style="list-style-type: none"> 1. Taste leaching from pressure tank Post Carbon filter exhausted. 2. System fouled by micro-organisms. 3. Hydrogen-Sulfide gas present in raw water. 4. Storage tank bladder ruptured. 	<ol style="list-style-type: none"> 1. Change Post Carbon filter. 2. Change Post Carbon filter, sanitize system, including icemaker lines/equipment. 3. Pretreat with Hydrogen-Sulfide removal system. (KDF has proven effective for Hydrogen-Sulfide removal when used in RO applications). 4. Replace storage tank and sanitize.
4. FLOW RESTRICTOR CLOGGING	<ol style="list-style-type: none"> 1. Bacteria fouled. 2 Iron fouled. 3. Raw water excessively turbid. 	<ol style="list-style-type: none"> 1. Sanitize system. 2. Iron removal pre-treatment required. 3. One or more additional micron filters are needed.
5. CARBON FINES IN PRODUCT WATER	<ol style="list-style-type: none"> 1. Coming from Post Carbon filter. 	<ol style="list-style-type: none"> 1. Cycle faucet on/off until carbon is flushed clean.