



The Next Generation in Reverse Osmosis!



Company Introduction

Topper Manufacturing Corporation is:

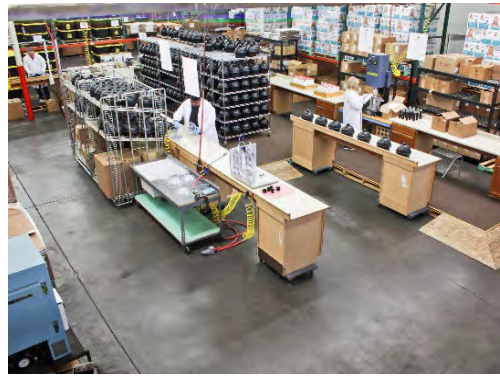
- California “C” Corporation
- Located in Southern California
- Offices & Manufacturing in Torrance, CA
- Developers of a Multi-Patented Reverse Osmosis System



Operation Overview

Made in Torrance, CA - USA

Production Capacity: 900 systems per day





TITLE	PATENT NO.	TITLE	PATENT NO.
RO WATER PURIFYING SYSTEM	6,110,360	BIOLOGICAL RO SYSTEM	6,290,856
RO STORAGE TANKS	7,726,511,B2	RO STORAGE TANK ASSEMBLIES	8,409,386
RO STORAGE TANK	ZL200680039327.3	RO BUILT-IN PRESSURE REGULATION	9,731,984,B2
RO STORAGE TANKS	7,763,171,B2	RO BUILT-IN PRESSURE REGULATION-CHINA	10,457,574,B2
RO STORAGE TANKS	8,409,386,B1	DISTRIBUTION VALVE	9,856,987,B2
RO STORAGE TANKS	4,991,724	RO SYSTEM CONTROL VALVES	11,000,807
RO STORAGE TANKS	10-1390685	RO PARALLEL PROCESSING	10,464,022, B2
RO FILTRATION SYSTEMS	7,601,256,B2	RO LEAK DETECTION SYSTEM	11,305,238
RO FILTRATION SYSTEMS	287,425		
RO FILTRATION SYSTEMS	5,123,184		



The Beginning of RO Systems

Countertop Gravity RO Systems

RO systems with a gravity dispensing action to the glass. This is like an open bucket/tank with a lid. Water from the membrane drips into the bucket/tank until a sensor or a float valve turns the system off. Great system for regular use. Excellent rejection rate, Waste ratios are good. Production is maximized.

Negative: this type of system is not Hermetically sealed and is subjected to ambient influences. Bulky, and cannot be used under the sink.





Undercounter Air Charged RO Systems

Typical air to water under counter RO system uses a storage tank with two adjacent chambers separated with a flexible bladder/diaphragm. One chamber is pre-charged with air at about 5 psi. The RO water gradually fills the other chamber against the air on the opposite side of the bladder/diaphragm creating back-pressure against the membrane. A valve senses pressure at a pre described % of feed pressure and shuts the feed off when full, wasting no water. This type of RO system usually has a multiple of individual components with an array of connections. Great system widely used for under the counter installations. Excellent rejection rates.

Negative: can be very complex plumbing, Waste ratios are ever increasing as system fills, delivering water at variable speeds, producing inconsistent sized ice cubes from ice makers, will not work with automatic coffee makers, without oversizing storage reservoirs. Air charged tanks lose air over time, some faster than others causing no water to be deliverable. Butyl rubber bladders breed bacteria to an uncontrollable level and may leech Nitrosamines. Systems are large and take up as much as 2 cubic feet of space.





RO Systems with Permeate Pump

Permeate Pump style is an add on device to a typical air to water RO system. This device added to the air to water system is designed to reduce the back pressure against the output of the membrane that goes to the air charged tank. This reduces waste ratios and increases water quality. The typical air tank will be taken to a higher pressure and greater volume, however, by increasing pressure in the tank, you are creating a higher volume flow rate, subjecting the post filter to be bypassed. Negative: delivered water is so fast initially that the post treatment cannot properly filter water due to loss of contact time. Variable delivery speeds to the glass or any other outlets; Ice makers, coffee machines become inoperable because they are timer-based devices. The permeate pump makes an already complex system more complex and is noisy.





Tankless RO Systems

The Tankless RO systems are larger membrane systems with either a single large membrane or a multiple of larger than typical POU RO membranes along with the other types of filter treatment processes. This category of product is typically a larger system for under the counter home set ups. The flow rate was designed for on demand use of which under ideal conditions is an excellent process. Rejection is excellent again under ideal conditions.

Negative: This type of system is subject to a drop in production in varying water temperature markets. The flow can reduce delivery speed to half or less in the cold-water markets, The % rejection suffers when the system is not in use within hours due to (TDS Creep) and can take upwards of three minutes to clear membrane envelope to be RO quality, wasting water the entire time as you clear. Some newer types have permeate re-circulation/flushing to prevent TDS creep requiring electricity. The user needs to be assured of electrical un-switched power under the sink. Garbage disposal industry reports that only 58% of the home population has switched power under the sink. 21% have no power. And the remaining 21% will be sharing their sliver of the pie with the rest of the POU water market.





Water-On-Water®

Water-on-Water® type of RO systems use a tank with two chambers separated by a flexible bladder. One chamber for permeate from the RO membrane the other chamber for concentrate/squeeze water from the membrane or tap water to squeeze the permeate water at an even flow rate. Control mechanisms are placed to sense between full for shut off, to squeeze for water delivery and waste flow. As the system shifts to replenishing tank permeate, water then enters into the permeate water chamber thus displacing water used for squeezing that joins the concentrate/waste line until permeate water chamber is full then the system shuts off. This technology will produce at a higher production rate and quality of water, with a more even waste ratio (efficiency) and even dispensing flow rate. If the concentrate side of the membrane is used for the squeezing of permeate water, this action cleans the membrane with high velocity to prevent bio/calcium fouling of the membrane. WOW RO type systems generally have a smaller footprint, can entertain smaller cartridges while still enjoying a longer service life and have no air to lose.

Negative Some Water-on-Water® type systems can be extremely complex and large, with up to 120 leak points, some will not supply from basements.





Kinetico K5 Water/Water





Coway Water/Water





WOWRO 50 Water-On-Water®





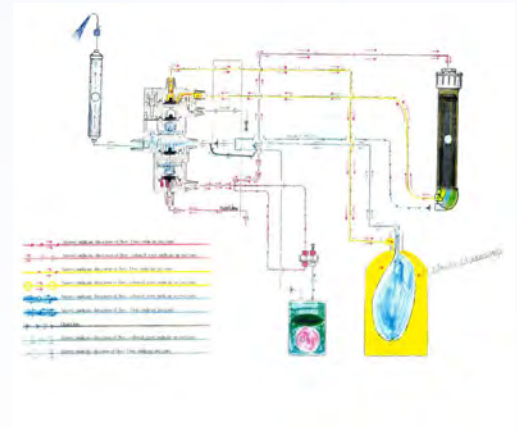
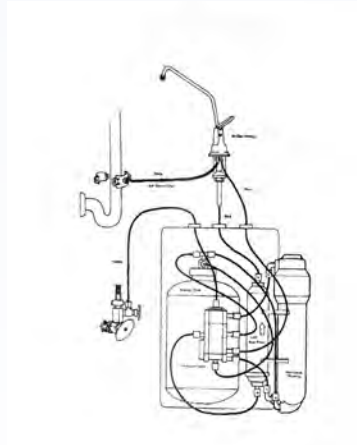
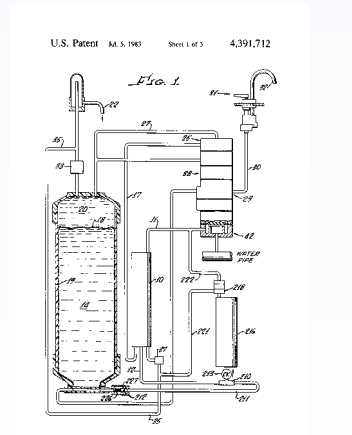
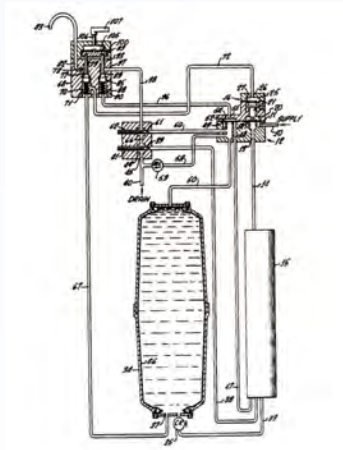
History of Water-on-Water A Beall Development

1974

1983

1986

1998



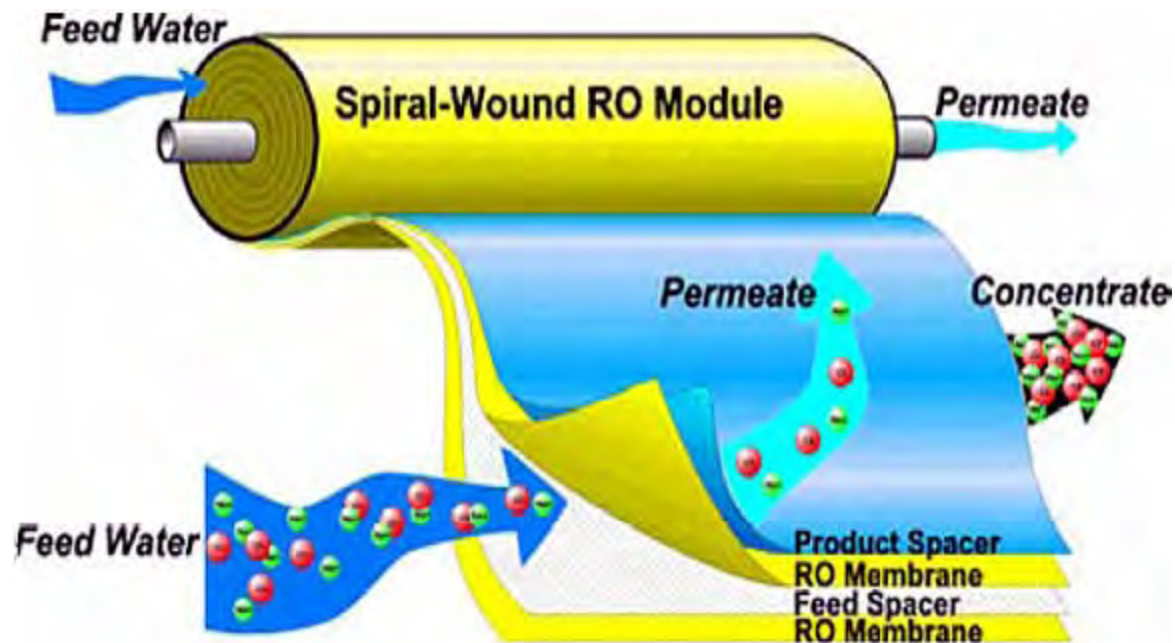
WOW Products



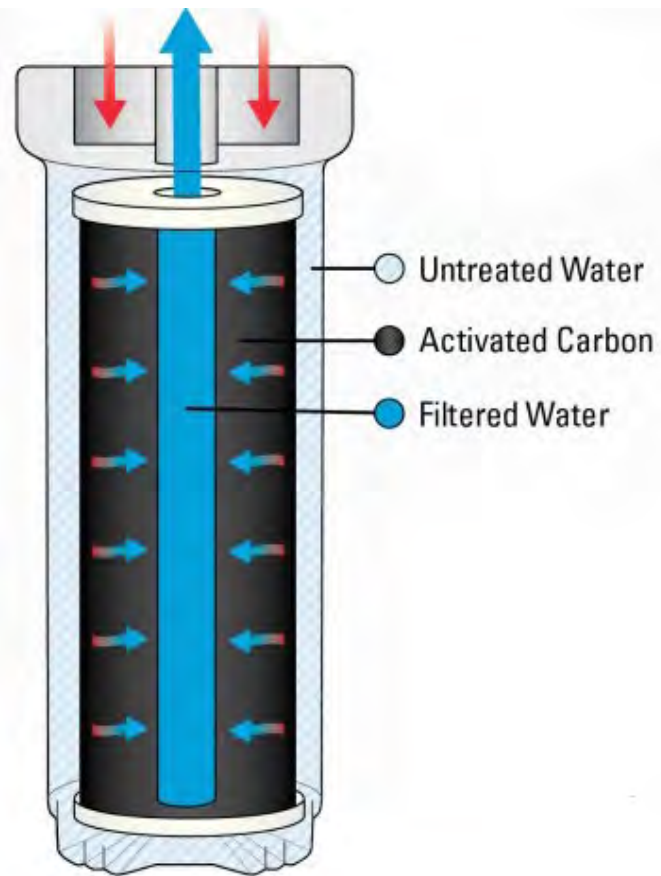
WOW Products



Typical RO Membrane



Carbon Block



Old RO Systems

(breeds bacteria and leaches nitrosamines from storage tank)



Traditional RO System Problems

- **Inefficient and wasteful** – As many as 10 gallons of water can be wasted to create 1 gallon of product water.
- **Bulky** – Up to 2 X the size of the Topper's WOW system.
- **Inconsistent water delivery** – often produces half full ice cubes and varying pots of coffee.
- Up to **4 hours to replace** product water.
- Minimum 45 psi to work properly.

The Topper Advantages

Convertible

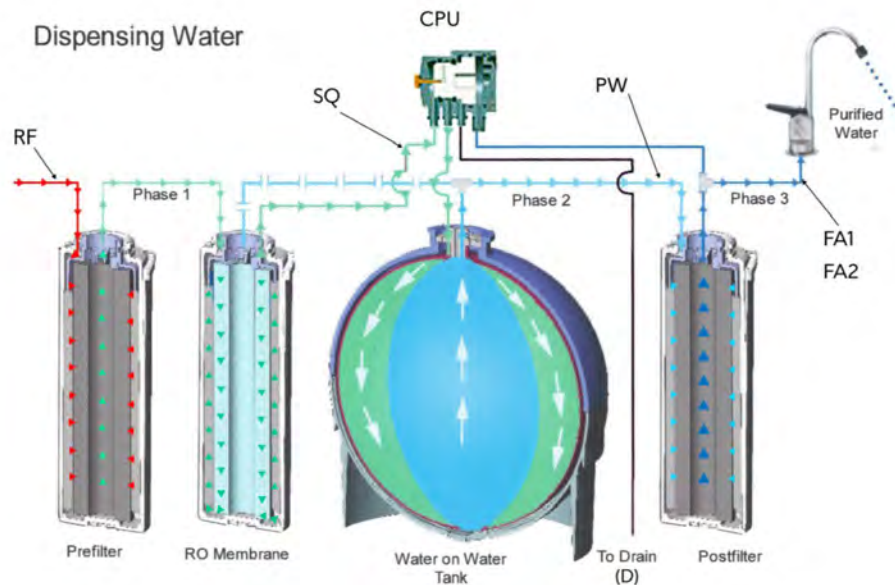
The only POU RO system in the world designed to go either **under the sink** or **on the counter!**



The Topper Advantages

Fast-Forward Flush System

The system automatically **flushes the RO membrane** extending membrane life and reducing biological build up, reducing scale and allowing the system to operate in a higher iron environment.



The Topper Advantages

Low Maintenance

Topper's WOWRO technology has very low maintenance with cartridges due to water processing time.

- Rapid replacement of stored water = less water through pre-filter.
- Fast forward flush of membrane reduces bio-fouling & scaling.
- Longer service life of cartridges = less cartridge replacements.



Topper's WOW Water-on-Water Advantages

- **WOW Technology allows for** – Sizing systems up or down in size.
- **High Efficiency** – **2:1 efficiency rated** - reducing wastewater up to 500% over conventional RO systems.
- **Versatility** - The only POU RO system in the world designed to go **above or below the counter**.
- **Quick, Clean Water Production** – High quality water - **up to 50% faster** than traditional “Air on Water” competitors (with same membranes).
- **Low Maintenance** - Quick connect sanitary change cartridges & **auto fast forward flush membranes**.
- **Consistent Flow** – with WOW vs. diminishing flows with air-to-water systems.
- **Broadest range of operating conditions**– **25 psi lower** than the closest competitor and operates in higher hardness conditions without a water softener.
- **Leak Detection with Auto Shut-off**

Topper's WOW Water-on-Water Current Applications:

- Residential (renters & homeowners)
- Coffee Brewers
- RV's
- Marine
- Office Services
- Dentist Chairs
- Vegetable Misting Units
- Direct to Consumer (DTC)
- Hospital Faucets
- Commercial Ice Makers
- Now expanding into Food Service

Topper System Components

- **1 Moving Part** – Allows for **Higher reliability**.
- **The Valve (Processor)** – Patented technology key in producing RO water with "**no backpressure**" on the membrane.
- **Tank** - Patented technology allows for much **smaller tank**.
- **Manifold Patented Technology** – eliminates hoses, bulky mess and leaks inherent in other systems.
- **Filters - Bayonet** / quick connect design for easy maintenance and safe, sterile exchange.
- **Regulated Feed Pressure**.
- **Leak Detection with Auto Shut-off**

Conclusion

- Size – Ability to size up or down
- Easy install
- Consistent dispensing flow
- Less water waste
- More water available daily
- Operates as low as 20 psi; others 45 psi
- Cartridges last longer; less water down the drain
- More reliable - 1 moving part
- No one is advertising due to the lack of product differentiation
- Countertop / Under Counter
- Lower maintenance – quick connect cartridges
- No air tank to be re-charged
- Leak Detection Auto Shut-off



MADE IN THE U.S.A.

Contact Information

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www.wowwater.com

Est. 2006

A BEALL DEVELOPMENT
U.S. and foreign patents issued and pending



More Reliable
More Versatile
More Efficient

Auto Leak Detection /
Shut-off system

WOW
WATER-ON-WATER™
REVERSE OSMOSIS



Specifications

Model:	WOW RO 50/ 20-210-001
Temperature Range:	40° F (4.44° C) - 100° F (37.77° C)
Pressure Range:	20 - 125 psi (1.38 - 8.62 Bar)
Membrane Rating:	50 - 180 gpd
Efficiency Rating:	27.50%
TDS Rejection:	95.4%
Dimensions:	14"x9-1/2"x10-1/2"
Weight:	10 lbs

Forty years of innovation and over 28 patents issued or pending have led to the most technically advanced product on the market, clearly differentiating itself from all other RO systems including traditional Air on Water.



**Certified for Nitrates, Nitrites, Arsenic
and TDS Reduction**

Introducing the next generation of RO technology.

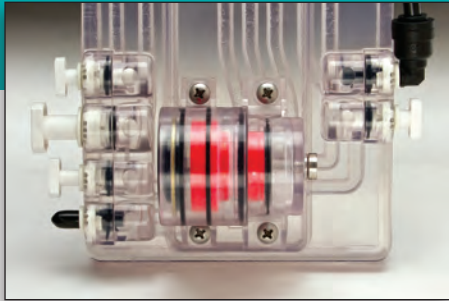
*Results may vary depending on water conditions.

**Modular expansion of WOW Water improves production and fill time to customer requirements.

WOWwater.com

Looking Under the Hood:

The Superiority of WOW RO™ Water-on-Water™ Technology

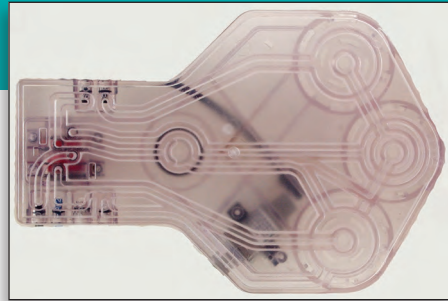


CPU PRESSURE SENSOR

Patent Pending WOW RO™ CPU pressure sensor acts like a traffic cop to automatically sense when to fill, stop, and empty the waste water. Traditional air captive systems have nothing comparable.

KEY TAKEAWAYS

- Only one moving part, increasing reliability
- Zero back pressure producing water faster with less wasted water



MANIFOLD DESIGN

Patented streamlined molded plastic channel technology in manifold design completely eliminates hoses to filters, removing the single biggest cause of leaks.

KEY TAKEAWAYS

- No "rat's nest" of internal hoses
- No complex installation



PATENTED WOW RO™ TANK

Hermetically sealed storage tanks dramatically reduce potential for contamination and ensure consistent dispensing flow rate even at low psi.

KEY TAKEAWAYS

- Tank is a part of complete unit; Plug and play design
- Additional tanks can be added for additional storage

Summary of WOW Water Technology Advantages

- Efficiency of water-on-water™ technology reduces waste and extends life span of filters
- Compact size takes up less space than traditional air captive systems
- Self-cleaning membrane to reduce maintenance cost
- Substantially faster water make-up
- No diminishing flow rate; consistent water flow to last drop
- Modular and scalable providing control over flow rate and draw down.
- Tailored TDS levels for coffee service industry
- Auto leak detection/shut-off system

WOW
WATER-ON-WATER™
REVERSE OSMOSIS

WOWwater.com



More Reliable. More Versatile. More Efficient.

TOPPER MANUFACTURING CO., 23880 Madison Street, Torrance, CA 90505,
310-375-5000 A BEALL DEVELOPMENT - U.S. and foreign patents: 6,110,360-7,601,256
-7,726,511-9,731,984-44991724-1390685-ZL200680039327. V7.2-26-21



MICROLINE® R.O. DRINKING WATER SYSTEM

MODEL T.F.C.-335

REDUCTION PERFORMANCE CLAIMS: This system has been tested according to NSF/ANSI 58 for reduction of the substances listed below. The concentration of the indicated substances in water entering the system was reduced to a concentration less than or equal to the permissible limit for water leaving the system, as specified in NSF/ANSI 58. Retesting occurs every five years. Testing was performed under standard laboratory conditions. Actual performance may vary.

	NSF/ANSI 58 Standard Requirements		Actual Test Results
	Influent Challenge Concentration (mg/l) ¹	Maximum Allowable Product Water Concentration (mg/l) ¹	Average % Reduction ²
Arsenic (Pentavalent) ²	0.30 ± 10%	0.010	97
Barium	10.0 ± 10%	2.0	96
Cadmium	0.03 ± 10%	0.005	98
Chromium (Hexavalent)	0.30 ± 10%	0.1	96
Chromium (Trivalent)	0.30 ± 10%	0.1	98
Copper	3.0 ± 10%	1.3	99
Fluoride	8.0 ± 10%	1.5	94
Lead	0.15 ± 10%	0.010	99
Nitrate + Nitrite (both as N) ⁴	30.0 ± 10%	10.0	86
Nitrate (as N) ⁴	27.0 ± 10%	10.0	87
Nitrite (as N) ⁴	3.0 ± 10%	1.0	77
Radium 226/228 ⁵	25 pCi/l ± 10%	5 pCi/l	80
Selenium	0.1 ± 10%	0.05	97
Total Dissolved Solids	750 ± 40 mg/l	187	95

Test Parameters:

pH	7.5±0.5
Turbidity	≤ 1 NTU
Temperature	77±2° F
Pressure	50 psig

- 1 Unless otherwise indicated.
- 2 Average based upon actual test data.
- 3 This system has been tested for the treatment of water containing pentavalent arsenic (also known as As(V), As(+5), or arsenate) at concentrations of 0.30 mg/L or less. This system reduces pentavalent arsenic, but may not remove other forms of arsenic. This system is to be used on water supplies containing a detectable free chlorine residual at the system inlet or on water supplies that have been demonstrated to contain only pentavalent arsenic. Treatment with chloramine (combined chlorine) is not sufficient to ensure complete conversion of trivalent arsenic to pentavalent arsenic. Please see the Arsenic Facts section of the Performance Data Sheet for further information.
- 4 This system is acceptable for treatment of influent concentrations of no more than 27 mg/L nitrate and 3 mg/L nitrite in combination measured as N and is certified for nitrate/nitrite reduction only for water supplies with a pressure of 280 kPa (40 psig) or greater.
- 5 The reduction of Radium was verified by using Barium as a surrogate under NSF/ANSI Standard 58.

APPLICATION GUIDELINES/SPECIFICATIONS AND FEATURES

Water Supply Parameters	Chemical	Limit	Caution: Do not use with water that is microbiologically unsafe or of unknown quality, without adequate disinfection before or after the system.
Water Pressure: 40–100 psig (280–690 kPa)	Hardness:	<170 mg/l	
Water Temperature: 40°–100° F (4°–38° C)	Iron:	<0.1 mg/l	
pH Operating Range: 4–11	Manganese:	<0.05 mg/l	
Optimum rejection at pH: 7.0 - 7.5	Hydrogen Sulfide:	0	
Max. T.D.S. Level: 2000 ppm	Water supplies that exceed limits for Hardness, Iron, Manganese and Hydrogen Sulfide require pretreatment.		

DRINKING WATER SYSTEM ASSEMBLY COMPONENTS

Sediment/Carbon Prefilter:	5 Micron/Activated Carbon Block Filter, Part No. S7028
Membrane Type:	Thin Film Composite (T.F.C.), Part No. S1229RS
Carbon Post Filter:	Activated Carbon Filter, Part No. S7025

Refer to owner's manual for proper operation, installation instructions, warranty information, service interval recommendations, parts and service availability. See the test kit(s) for sampling instructions.

SYSTEM RATING

Average T.D.S. Reduction: 95%
System Production: 12 gallons per day (45 liters per day) **Recovery Rating:** 30% **Efficiency Rating:** 14%
 Measured at 50 psig, 77±2°F, 750±40 mg/L T.D.S., per section 6 of NSF/ANSI standard 58 product water to pressurized storage tank. Recovery rating means the percentage of the influent water to the membrane portion of the system that is available to the user as reverse osmosis treated water when the system is operated without a storage tank or when the storage tank is bypassed. Efficiency rating means the percentage of the influent water to the system that is available to the user as reverse osmosis treated water under operating conditions that approximate typical daily usage. Sodium Chloride was used as a surrogate for T.D.S. System rating determined by laboratory testing at NSF.

MEMBRANE RATING

Membrane Production: 41-53 gallons per day (155–201 liters per day) **Membrane T.D.S. Reduction:** 96% minimum
 Note: Measured at industry standard condition of 65 psig, 77°F, 250 ppm T.D.S., and discharging to atmosphere. Actual system production and contaminant reduction will depend upon water temperature, pressure, pH and T.D.S. level, membrane variation and usage pattern.

MICROLINE® R.O. DRINKING WATER SYSTEM

MODEL T.F.C.-435

REDUCTION PERFORMANCE CLAIMS: This system has been tested according to NSF/ANSI 58 for reduction of the substances listed below. The concentration of the indicated substances in water entering the system was reduced to a concentration less than or equal to the permissible limit for water leaving the system, as specified in NSF/ANSI 58. Retesting occurs every five years. Testing was performed under standard laboratory conditions. Actual performance may vary.

	NSF/ANSI 58 Standard Requirements		Actual Test Results	Test Parameters:
	Influent Challenge Concentration (mg/l) ²	Maximum Allowable Product Water Concentration (mg/l) ¹	Average % Reduction ²	
Arsenic (Pentavalent) ³	0.30 ± 10%	0.010	97	pH 7.5±0.5
Barium	10.0 ± 10%	2.0	96	Turbidity ≤ 1 NTU
Cadmium	0.03 ± 10%	0.005	98	Temperature 77°±2° F
Chromium (Hexavalent)	0.30 ± 10%	0.1	96	Pressure 50 psig
Chromium (Trivalent)	0.30 ± 10%	0.1	98	1 Unless otherwise indicated.
Copper	3.0 ± 10%	1.3	99	2 Average based upon actual test data.
Fluoride	8.0 ± 10%	1.5	94	3 This system has been tested for the treatment of water containing pentavalent arsenic (also known as As(V), As(+5), or arsenate) at concentrations of 0.30 mg/L or less. This system reduces pentavalent arsenic, but may not remove other forms of arsenic. This system is to be used on water supplies containing a detectable free chlorine residual at the system inlet or on water supplies that have been demonstrated to contain only pentavalent arsenic. Treatment with chloramine (combined chlorine) is <u>not</u> sufficient to ensure complete conversion of trivalent arsenic to pentavalent arsenic. Please see the Arsenic Facts section of the Performance Data Sheet for further information.
Lead	0.15 ± 10%	0.010	99	4 This system is acceptable for treatment of influent concentrations of no more than 27 mg/L nitrate and 3 mg/L nitrite in combination measured as N and is certified for nitrate/nitrite reduction only for water supplies with a pressure of 280 kPa (40 psig) or greater.
Nitrate + Nitrite (both as N) ⁴	30.0 ± 10%	10.0	86	5 The reduction of Radium was verified by using Barium as a surrogate under NSF/ANSI Standard 58.
Nitrate (as N) ⁴	27.0 ± 10%	10.0	87	
Nitrite (as N) ⁴	3.0 ± 10%	1.0	77	
Radium 226/228 ⁵	25 pCi/l ± 10%	5 pCi/l	80	
Selenium	0.1 ± 10%	0.05	97	
Total Dissolved Solids	750 ± 40 mg/l	187	95	

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Optimum rejection at pH: 7.0 - 7.5	Hydrogen Sulfide:	0	
Max. T.D.S. Level: 2000 ppm	Water supplies that exceed limits for Hardness, Iron, Manganese and Hydrogen Sulfide require pretreatment.		

DRINKING WATER SYSTEM ASSEMBLY COMPONENTS

Sediment/Carbon Prefilter:	5 Micron Filter, Part No. S7028
Membrane Type:	Thin Film Composite (T.F.C.), Part No. S1229RS
Carbon Post Filter:	Activated Carbon Filter, Part No. S7025
In-Line Carbon Post Filter:	In-Line Activated Carbon Filter, Part No. S7206W-JG

Refer to owner's manual for proper operation, installation instructions, warranty information, service interval recommendations, parts and service availability. See the test kit(s) for sampling instructions.

SYSTEM RATING

Average T.D.S. Reduction: 95%

System Production: 12 gallons per day (45 liters per day) **Recovery Rating:** 30% **Efficiency Rating:** 14%

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MEMBRANE RATING

Membrane Production: 41-53 gallons per day (155–201 liters per day) **Membrane T.D.S. Reduction:** 96% minimum

Note: Measured at industry standard condition of 65 psig, 77°F, 250 ppm T.D.S., and discharging to atmosphere. Actual system production and contaminant reduction will depend upon water temperature, pressure, pH and T.D.S. level, membrane variation and usage pattern.

PERFORMANCE DATA

IMPORTANT:

Read this performance data and compare the capabilities of this system with your actual water treatment needs.

It is recommended that before installing a water treatment system, you have your water supply tested to determine your actual water treatment needs.

This system has been tested according to NSF/ANSI 58 for the reduction of substances listed below. The concentration of the indicated substances in water entering the system was reduced to a concentration less than or equal to the permissible limit for water leaving the system as specified in NSF/ANSI 58.

The GRO-350B/GRO-350M shall only be used for arsenic reduction on chlorinated water supplies containing detectable residual free chlorine at the system inlet. Water systems using an in-line chlorinator should provide a one-minute chlorine contact time before the RO system.

WARNING: Do not use with water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system. Systems certified for cyst reduction may be used on disinfected waters that may contain filterable cysts.

NOTE: Substances reduced are not necessarily in your water. Filter must be maintained according to manufacturer's instructions, including replacement of filter cartridges.

The tested efficiency rating for these systems is 22.05%. Efficiency rating means the percentage of the influent water to the system that is available to the user as reverse osmosis treated water under operating conditions that approximate typical daily usage.

The tested recovery rating is 38.65%. Recovery rating means the percentage of the influent water to the membrane portion of the system that is available to the user as reverse osmosis treated water when the system is operated without a storage tank or when the storage tank is bypassed.

The GRO-350B/GRO-350M has been tested for the treatment of water containing pentavalent arsenic [also known as As(V), As(+5), or arsenate] at concentrations of 0.050 mg/L or less. This system reduces pentavalent arsenic, but may not remove other forms of arsenic. This system is to be used on water supplies containing a detectable free chlorine residual or on water supplies that have been demonstrated to contain only pentavalent arsenic. Treatment with chloramine (combined chlorine) is not sufficient to ensure complete conversion of trivalent arsenic to pentavalent arsenic. Please see the Arsenic Facts section of the Performance Data Sheet for further information.

EPA # 082989-CHN-001

System Production Rate:	14.96 gpd (56.63 Lpd)
Recovery Rating:	38.65%
Efficiency Rating:	22.05%
TDS Rejection:	96.9%



System Tested and Certified by NSF International against NSF/ANSI Standard 42, 58, and CSA B483.1 for the reduction of the claims specified on the Performance Data Sheet.

GRO-350B/GRO-350M SYSTEM INSTALLED WITH FDF1-RC, GRO50-RC, F1GC-RC FILTER CARTRIDGES

Model GRO-350B / GRO-350M

Substance	Influent Challenge Concentration	Max Permissible Product Water Concentration	Reduction Requirements	Average Reduction
Standard 42				
Chlorine Taste and Odor	2.0 mg/L ± 10%		>50%	95.9%
Standard 58				
Total Dissolved Solids	750 ± 40 mg/L	187 mg/L		96.9%
Pentavalent Arsenic	0.050 mg/L ± 10%	0.010 mg/L		88.0%
Fluoride	8.0 mg/L ± 10%	1.5 mg/L		93.6%
Cysts*	Minimum 50,000/mL		99.95%	>99.99%
Turbidity	11 mg/L ± 1 NTU	0.5 NTU		>99.1%
Lead	0.15 mg/L ± 10%	0.010 mg/L		98.6%
Selenium	0.10 mg/L ± 10%	0.05 mg/L		97.9%
Copper	3.0 mg/L ± 10%	1.3 mg/L		98.5%
Cadmium	0.03 mg/L ± 10%	0.005 mg/L		99.1%
Hexavalent Chromium	0.3 mg/L ± 10%	0.1 mg/L		95.4%
Trivalent Chromium	0.3 mg/L ± 10%	0.1 mg/L		98.2%
Radium 226/228	25 pCi/L ± 10%	5 pCi/L		80.0%
Barium	10.0 mg/L ± 10%	2.0 mg/L		95.3%

*NSF/ANSI Standard 58 certified to reduce cysts such as Cryptosporidium and Giardia by mechanical means.

Arsenic Fact Sheet

Arsenic (abbreviated As) is found naturally in some well water. Arsenic in water has no color, taste or odor. It must be measured by a lab test. Public water utilities must have their water tested for arsenic. You can get the results from your water utility. If you have your own well, you can have the water tested. The local health department or state environmental health agency can provide a list of certified labs. There are two forms of arsenic: pentavalent arsenic [also called As(V), As(+5), and arsenate] and trivalent arsenic [also called As(III), As(+3) and arsenite]. In well water, arsenic may be pentavalent, trivalent, or a combination of both. Special sampling procedures are needed for a lab to determine what type and how much of each type of arsenic is in the water. Check with the labs in your area to see if they can provide this type of service. Reverse osmosis (RO) water treatment systems do not remove trivalent arsenic from water very well. RO systems are very effective at removing pentavalent arsenic. A free chlorine residual will rapidly convert trivalent arsenic to pentavalent arsenic. Other water treatment chemicals such as ozone and potassium permanganate will also change trivalent arsenic to pentavalent arsenic. A combined chlorine residual (also called chloramine) may not convert all the trivalent arsenic. If you get your water from a public water utility, contact the utility to find out if free chlorine or combined chlorine is used in the water system. The GRO-350B/GRO-350M system is designed to remove pentavalent arsenic. It will not convert trivalent arsenic to pentavalent arsenic. The system was tested in a lab. Under those conditions, the system reduced 0.050 mg/L (ppm) pentavalent arsenic to 0.010 mg/L (ppm) [the USEPA standard for drinking water] or less. The performance of the system may be different at your installation. Have the treated water tested for arsenic to check if the system is working properly. The RO component of the GRO-350B/GRO-350M system must be replaced every 12-24 months to ensure the system will continue to remove pentavalent arsenic. The component identification and locations where you can purchase the component are listed in the installation/operation manual.

PERFORMANCE DATA

IMPORTANT:

Read this performance data and compare the capabilities of this system with your actual water treatment needs.

It is recommended that before installing a water treatment system, you have your water supply tested to determine your actual water treatment needs.

This system has been tested according to NSF/ANSI 58 for the reduction of substances listed below. The concentration of the indicated substances in water entering the system was reduced to a concentration less than or equal to the permissible limit for water leaving the system as specified in NSF/ANSI 58.

The GRO-475B/GRO-475M shall only be used for arsenic reduction on chlorinated water supplies containing detectable residual free chlorine at the system inlet. Water systems using an in-line chlorinator should provide a one-minute chlorine contact time before the RO system.

WARNING: Do not use with water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system. Systems certified for cyst reduction may be used on disinfected waters that may contain filterable cysts.

NOTE: Substances reduced are not necessarily in your water. Filter must be maintained according to manufacturer's instructions, including replacement of filter cartridges.

The tested efficiency rating for these systems is 23.57%. Efficiency rating means the percentage of the influent water to the system that is available to the user as reverse osmosis treated water under operating conditions that approximate typical daily usage.

The tested recovery rating is 41.05%. Recovery rating means the percentage of the influent water to the membrane portion of the system that is available to the user as reverse osmosis treated water when the system is operated without a storage tank or when the storage tank is bypassed.

The GRO-475B/GRO-475M has been tested for the treatment of water containing pentavalent arsenic [also known as As(V), As(+5), or arsenate] at concentrations of 0.050 mg/L or less. This system reduces pentavalent arsenic, but may not remove other forms of arsenic. This system is to be used on water supplies containing a detectable free chlorine residual or on water supplies that have been demonstrated to contain only pentavalent arsenic. Treatment with chloramine (combined chlorine) is not sufficient to ensure complete conversion of trivalent arsenic to pentavalent arsenic. Please see the Arsenic Facts section of the Performance Data Sheet for further information.

EPA # 082989-CHN-001

System Production Rate:	21.08 gpd (79.77 Lpd)
Recovery Rating:	41.05%
Efficiency Rating:	23.57%
TDS Rejection:	96.3%



System Tested and Certified by NSF International against NSF/ANSI Standard 42, 53, 58, and CSA B483.1 for the reduction of the claims specified on the Performance Data Sheet.

GRO-475B/GRO-475M SYSTEM INSTALLED WITH FDF1-RC, GRO75-RC, F1B1-RC, F1GC-RC FILTER CARTRIDGES

Model GRO-475B / GRO-475M

Substance	Influent Challenge Concentration	Max Permissible Product Water Concentration	Reduction Requirements	Average Reduction
Standard 42				
Chlorine Taste and Odor	2.0 mg/L ± 10%		≥50%	95.9%
Standard 53				
Cysts*	Minimum 50,000/L		99.95%	99.99%
Atrazine	0.009 mg/L ± 10%	0.003 mg/L		93.7%
Lead (pH 6.5)	0.15 mg/L ± 10%	0.010 mg/L		99.9%
Lead (pH 8.5)	0.15 mg/L ± 10%	0.010 mg/L		99.6%
Lindane	0.002 mg/L ± 10%	0.0002 mg/L		97.4%
Standard 58				
Total Dissolved Solids	750 ± 40 mg/L	187 mg/L		96.3%
Pentavalent Arsenic	0.050 mg/L ± 10%	0.010 mg/L		88.0%
Fluoride	8.0 mg/L ± 10%	1.5 mg/L		93.6%
Cysts*	Minimum 50,000/mL		99.95%	99.99%
Turbidity	11 mg/L ± 1 NTU	0.5 NTU		≥99.1%
Lead	0.15 mg/L ± 10%	0.010 mg/L		98.6%
Selenium	0.10 mg/L ± 10%	0.05 mg/L		97.9%
Copper	3.0 mg/L ± 10%	1.3 mg/L		98.5%
Cadmium	0.03 mg/L ± 10%	0.005 mg/L		99.1%
Hexavalent Chromium	0.3 mg/L ± 10%	0.1 mg/L		96.4%
Trivalent Chromium	0.3 mg/L ± 10%	0.1 mg/L		98.2%
Radium 226/228	25 pCi/L ± 10%	5 pCi/L		80.0%
Barium	10.0 mg/L ± 10%	2.0 mg/L		96.3%

* NSF/ANSI Standard 53 and 58 certified to reduce cysts such as Cryptosporidium and Giardia by mechanical means.

Performance Data for the Drinking Water System AO-US-RO-4000						
Models	Replacement	Operating pressure range	Operating temp. range	Recovery rating	Efficiency rating	Daily Production (DPR)
AO-US-RO-4000	AO-4000-CARBON and AO-RO-RM-R	40-100 psi 275-689 kPa	40-90° F 4.44-32.2° C	29.43%	17.91%	1332 gallons 50.4liters
Manufactured by: A.O. Smith Corporation 11270 West Park Place Milwaukee, WI 53224 877.333.7108						



Testing Performed under NSF/ANSI Standards 42, 53, 58, 401 & P473 and in accordance with the California Department of Health Services Drinking Water Treatment Device Program. This System has been tested according to NSF/ANSI 42, 53, 401 & P473 for reduction of the substances listed below. The concentration of the indicated substances in water entering the System was reduced to a concentration less than or equal to the permissible limit for water leaving the System, as specified in NSF/ANSI 42, 53, 58, 401 & P473.

NSF/ANSI 42	Minimum Reduction	Overall % Reduction	Results
Chlorine Reduction, Free Available	<0.5 mg/l	96.06%	Pass
Chloramine Reduction, Free Available	<0.5 mg/l	96.06%	Pass
Particulate Reduction	85%	99.9%	Pass

NSF/ANSI 53	Minimum Reduction	Overall % Reduction	Results
Cyst Live Cryptosporidium & Giardia	99.95%	>99.95%	Pass
Mercury Reduction pH 8.5	<2 ug/L	>96.7%	Pass
Mercury Reduction pH 6.5	<2 ug/L	>96.6%	Pass
Lead Reduction pH 6.5	<10 ug/L	>99.4%	Pass
Lead Reduction pH 8.5	<10 ug/L	>99.3%	Pass
MTBE Reduction	<5 ug/L	86.6%	Pass
Turbidity	<0.5 NTU	99.1%	Pass
VOC Surrogate Test	95%	99.4%	Pass
Asbestos	99%	>99%	Pass

NSF/ANSI 58	Maximum Concentration	Minimum Reduction	Overall % Reduction	Results
Arsenic Pentavalent	0.30 mg/L ± 10%	80.0%	97.6%	Pass
Barium	10.0mg/L ± 10%	80.0%	95.2%	Pass
Cadmium	0.30 mg/L ± 10%	83.3%	95.3%	Pass
Chromium Hexavalent	0.30mg/L ± 10%	66.7%	97.0%	Pass
Chromium Trivalent	0.30 mg/L ± 10%	66.7%	96.6%	Pass
Copper	0.30mg/L ± 10%	56.7%	96.6%	Pass
Fluoride	8.0mg/L ± 10%	81.2%	95.7%	Pass
Lead	.15mg/L ± 10%	93.3%	96.6%	Pass
Nitrate/Nitrite	30.0 mg/L ± 10%	66.7%	82.4%	Pass
Radium 226/228	25pCi/L ± 10%	80.0%	80.0%	Pass
Selenium	0.10 mg/L ± 10%	50.0%	97.9%	Pass
TDS	750mg/L ± 10%	75.0%	95.0%	Pass
Turbidity	11 ± NTU	95.4%	99.1%	Pass

NSF/ANSI 401	Maximum Concentration	Minimum Reduction	Overall % Reduction	Results
Atenolol	30 ng/L	94.2%	94.2%	Pass
Bisphenol A	300 ng/L	98.80%	98.9%	Pass
Carbamazepine	200 ng/L	98.6%	98.6%	Pass
DEET	200 ng/L	98.7%	98.7%	Pass
Estrone	20 ng/L	96.30%	96.5%	Pass
Ibuprofen	60 ng/L	95.3%	95.4%	Pass
Linuron	20 ng/L	96.6%	96.6%	Pass
Meprobamate	60 ng/L	94.7%	94.7%	Pass
Metolachlor	200 ng/L	98.6%	98.6%	Pass
Naproxen	20 ng/L	96.3%	96.4%	Pass
Nonyl phenol	200 ng/L	97.50%	97.5%	Pass
Phenytoin	30 ng/L	95.50%	95.6%	Pass
TCEP	700 ng/L	98%	98%	Pass
TCP	700 ng/L	97.8%	97.8%	Pass
Trimethoprim	20 ng/L	96.7%	96.7%	Pass

NSF P473	Influent challenge concentration	Maximum permissible concentration	Overall % reduction	Results
Perfluorooctanoic acid (PFOA) & Perfluorooctane sulfonate (PFOS)	1.5 ± 10% ug/L	0.07 ug/L	95.8%	Pass

Organic chemicals included by surrogate testing				
VOCs (by surrogate testing using chloroform)	Drinking water regulatory level (MCL/MAC) mg/L	Influent/Unfiltered	Effluent/Filtered	Percent Reduction
alachlor	0.002	0.050	0.001	>98%
atrazine	0.003	0.100	0.003	>97%
benzene	0.005	0.081	0.001	>99%
carbofuran	0.04	0.190	0.001	>99%
carbon tetrachloride	0.005	0.078	0.0018	98%
chlorobenzene	0.1	0.077	0.001	>99%
chloropicrin	—	0.015	0.0002	99%
2,4-D	0.07	0.110	0.0017	98%
dibromochloropropane (DBCP)	0.0002	0.052	0.00002	>99%
o-dichlorobenzene	0.6	0.080	0.001	>99%
p-dichlorobenzene	0.075	0.040	0.001	>98%
1,2-dichloroethane	0.005	0.088	0.0048	95%
1,1-dichloroethylene	0.007	0.083	0.001	>99%
cis-1,2-dichloroethylene	0.07	0.170	0.0005	>99%
trans-1,2-dichloroethylene	0.1	0.086	0.001	>99%
1,2-dichloropropane	0.005	0.080	0.001	>99%
cis-1,3-dichloropropylene	—	0.079	0.001	>99%
dinoseb	0.007	0.170	0.0002	99%
endrin	0.002	0.053	0.00059	99%
ethylbenzene	0.7	0.088	0.001	>99%
ethylene dibromide (EDB)	0.00005	0.044	0.00002	>99%
haloacetonitriles (HAN)				
bromochloroacetonitrile	—	0.022	0.0005	98%
dibromoacetonitrile	—	0.024	0.0006	98%
dichloroacetonitrile	—	0.0096	0.0002	98%
trichloroacetonitrile	—	0.015	0.0003	98%
haloketones (HK)				
1,1-dichloro-2-propanone	—	0.0072	0.0001	99%
1,1,1-trichloro-2-propanone	—	0.0082	0.0003	96%
heptachlor (H34, Heptox)	0.0004	0.025	0.00001	>99%
heptachlor epoxide	0.0002	0.0107	0.0002	98%
hexachlorobutadiene	—	0.044	0.001	>98%
hexachlorocyclopentadiene	0.05	0.060	0.000002	>99%
lindane	0.0002	0.055	0.00001	>99%
methoxychlor	0.04	0.050	0.0001	>99%
pentachlorophenol	0.001	0.096	0.001	>99%
simazine	0.004	0.120	0.004	>97%
styrene	0.1	0.150	0.0005	>99%
1,1,2,2-tetrachloroethane	—	0.081	0.001	>99%
tetrachloroethylene	0.005	0.081	0.001	>99%
toluene	1	0.078	0.001	>99%
2,4,5-TP (silvex)	0.05	0.270	0.0016	99%
tribromoacetic acid	—	0.042	0.001	>98%
1,2,4-trichlorobenzene	0.07	0.160	0.0005	>99%
1,1,1-trichloroethane	0.2	0.084	0.0046	95%
1,1,2-trichloroethane	0.005	0.150	0.0005	>99%
trichloroethylene	0.005	0.180	0.0010	>99%
trihalomethanes (THMs)		Influent/Unfiltered	Effluent/Filtered	Percent Reduction
bromodichloromethane (THM)	0.080	0.300	0.015	95%
bromoform (THM)				
chloroform (THM)				
chlorodibromomethane (THM)				
xylenes (total)	10	0.070	0.001	>99%

- All contaminants reduced by this filter are listed.
- Not all contaminants listed may be present in your water.
- Does not remove all contaminants that may be present in tap water.

- Filter is only to be used with cold water.
- Filter usage must comply with all state and local laws.
- Testing was performed under standard laboratory conditions, actual performance may vary.

- Systems certified for cyst reduction may be used on disinfected waters that may contain filterable cysts.
- See owner's manual for general installation conditions and needs plus manufacturer's limited warranty.

System Tested and Certified by NSF International against NSF/ANSI Standards 42, 53, 58 & 401 and conforms to NSF protocol P473 for reduction of claims specified on the Performance Data Sheet and at www.nsf.org.

For use with municipally treated water only. Do not use with water that is microbiologically unsafe or of unknown water quality without adequate disinfection before or after the System.

WaterMaker^{FIVE} Performance Data Sheet

System Performance

This system has been tested according to NSF/ANSI 58 for reduction of the substances listed below. The concentration of the indicated substances in water leaving the system was reduced to a concentration less than or equal to the permissible limit for water leaving the system, as specified in NSF/ANSI 58. This system has also been tested and certified against CSA Standard B483.1 - Drinking Water Treatment Systems. Do not use with water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system. Systems certified for cyst reduction may be used on disinfected water that may contain filterable cysts.

This system has been tested for the treatment of water containing pentavalent arsenic (also known as AS(V), As⁵⁺, or arsenate) at concentrations of ≤ 300 ppb. This system reduces pentavalent arsenic, but may not reduce other forms of arsenic. This system is to be used on water supplies containing a detectable free chlorine residual at the system outlet or on water supplies that have been demonstrated to contain only pentavalent arsenic. Treatment with chloramine (combined chlorine) is not sufficient to ensure complete conversion of trivalent arsenic to pentavalent arsenic. Please see the Arsenic Facts section of the Performance Data Sheet for further information.

Testing was performed under standard laboratory conditions, actual performance may vary. Incoming water must be free of potential membrane foulants such as Iron, Hydrogen Sulfide and Manganese. Efficiency rating means the percentage of the influent water to the system that is available to the user as reverse osmosis treated water under operating conditions that approximate typical daily usage. Recovery rating means the percentage of the influent water to the membrane portion of the system that is available to the user as reverse osmosis treated water when the system is operated without a storage tank or when the storage tank is bypassed.



Model Number: WaterMaker Five, WM5-50
 Avg. Recovery: 30.7%
 Temperature: 4°C - 38°C (40°F - 100°F)

Avg Daily Production Rate: 67.76 L/d (17.9 gpd)
 Avg Efficiency: 17.8%
 Pressure: 2.81 - 5.62 kg/cm² (40-80 psi)

	Influent Challenge Concentration	Maximum Allowable Concentration	Actual Minimum % Reduction	Average Percent Reduction
Arsenic (pentavalent)	50 ppb	10 ppb	98.1	99.0
Barium	10.0 mg/L ± 10%	2.0 mg/L	95.0	98.8
Cadmium	0.03 mg/L ± 10%	0.005 mg/L	94.0	98.3
Chromium 6 (Hexavalent)	0.3 mg/L ± 10%	0.1 mg/L	95.5	98.3
Chromium 3 (Trivalent)	0.3 mg/L ± 10%	0.1 mg/L	98.4	99.0
Copper	3.0 mg/L ± 10%	1.3 mg/L	95.0	98.4
Cysts	Min 50,000/mL	110 counts/mL	>99.99	>99.99
Fluoride	8.0 mL ± 10%	1.5 mL	87.0	93.8
Lead	0.15 mL ± 25%	0.010 mL	90.4	96.8
Radium 226/228	25 pCi/L ± 10%	5 pCi/L	95.0	98.8
Selenium	0.10 mg/L ± 10%	0.05 mg/L	94.4	97.9
Turbidity	11 ± 1 NTU	0.5 NTU	96.4	98.7
TDS (Total Dissolved Solids)	740 mL	187 mL	86.6	93.1

System Maintenance

This reverse osmosis system contains a replaceable component critical to the efficiency of the system. Replacement of the reverse osmosis component should be with one of identical specifications, as defined by the manufacturer, to ensure the same efficiency and contaminant reduction performance. System manual at www.nimbuswater.com/products/residential/watermakerfive.html. Feed water conditions may affect replacement intervals.

Part Number	Description	Replacement Interval
104592	TF50, 4 stage cartridge	12 months
104803	5th stage inline post filter	6-12 months

Purotwist Manual Introduction



The Purotwist RO System conforms to NSF/ANSI Standard 58 for performance claims as verified and sustained by test data. All pre and post filtration demands were removed prior to contaminant reduction performance testing by the Water Quality Association laboratory.



The Purotwist reverse osmosis drinking water system is designed for easy installation and maintenance. You will insure a successful installation as well as reliable operation by carefully reading this manual and following the operational guidelines. Please note that routine maintenance is essential to the longevity and performance of the system. Filters should be changed every six months (see below) depending on the quality of the feed water supply. **The Purotwist RO installation should comply with all state and local laws and regulations. Manufacturer recommends a TDS test every six months.** This system is acceptable for treatment of influent concentrations of no more than 27 mg/L nitrate and 3 mg/L nitrite in combination measured as N and is certified for nitrate/nitrite reduction only for water supplies with a pressure of 40 psig or greater. This reverse osmosis system contains a replaceable component critical to the efficiency of the system. Replacement of the reverse osmosis component should be with one of identical specifications, as defined by the manufacturer, to assure the same efficiency and contaminant reduction performance.

Necessary Installation Tools	
• Variable speed drill	• Teflon tape
• Relton Drill	• Small knife
• 1" hole saw	• Phillips screw driver

Recommended Filter & Membrane Replacement Schedule		
Filter/Membrane	Part #	Frequency
Sediment	Q5605	6 months
Carbon GAC Prefilter	Q5633	6 months
Carbon GAC Postfilter	Q5633	6 months
* RO Membrane	TQ56-35FC/NSF	2-5 years

(optional, 50gpd membrane #TQ56-50FC)

Conditions for operation of TFC - Thin Film Composite Membrane

Used in the PT4000T36, PT4T36-SS/UV AG

Source Water Supply - TFC	
Community / Private	Bacteriologically Safe
System Pressure min/max	30 / 100 psi
Temperature	4° / 38°C (40° / 100° F)
pH Range	3.0 to 11.0
Maximum supply TDS level	2000 mg/L
Turbidity	< 1.0 net turbidity (NTU)

Chemical Parameters - TFC	
Hardness (CaCO ₃)	< 350 mg/L (< 20 gpg)
Iron (Fe)	< 0.1 mg/L
Manganese (Mn)	< 0.05 mg/L
Hydrogen Sulfide (H ₂ S)	0.00 mg/L
Production Rate	
¹ Efficiency Rate	12.1 %
² Recovery Rate	21 %
Daily Production Rate	17 gpd

Test parameters: 25± 1°C, 50 psi and pH of 7.5

¹ Efficiency rating means the percentage of the influent water to the system that is available to the user as reverse osmosis treated water under operating conditions that approximate typical daily usage

² Recovery rating means the percentage of the influent water to the membrane portion of the system that is available to the user as reverse osmosis treated water when the system is operated without a storage tank or when the storage tank is bypassed.

Caution: Do not use this system where the water is microbiologically unsafe or of unknown quality. This system is for use on potable water only. Source water exceeding the chemical parameters (listed above) requires pretreatment.

Goldline Manual Introduction



The Goldline RO System conforms to NSF/ANSI Standards 58 for performance claims as verified and sustained by test data. All pre and post filtration demands were removed prior to contaminant reduction performance testing by the Water Quality Association laboratory.



The Goldline reverse osmosis drinking water system is designed for easy installation and maintenance. You will insure a successful installation as well as reliable operation by carefully reading this manual and following the operational guidelines. Please note that routine maintenance is essential to the longevity and performance of the system. Filters should be changed every six months (see below) depending on the quality of the feed water supply. **The Goldline RO installation should comply with all state and local laws and regulations. Manufacturer recommends a TDS test every six months.** This system is acceptable for treatment of influent concentrations of no more than 27 mg/L nitrate and 3 mg/L nitrite in combination measured as N and is certified for nitrate/nitrite reduction only for water supplies with a pressure of 40 psig or greater. This reverse osmosis system contains a replaceable component critical to the efficiency of the system. Replacement of the reverse osmosis component should be with one of identical specifications, as defined by the manufacturer, to assure the same efficiency and contaminant reduction performance.

Necessary Installation Tools	
• Variable speed drill	• Teflon tape
• Relton Drill	• Small knife
• 1" hole saw	• Phillips screw driver

Recommended Filter & Membrane Replacement Schedule		
Filter/Membrane	Part #	Frequency
Sediment	93023	6 months
Carbon Block Prefilter	32-250-125-975	6 months
Carbon Postfilter	CL10ROT40-B	6 months
* RO Membrane	1204694	2-5 years

Conditions for operation of TFC - Thin Film Composite Membrane Used in the Goldline-50

Source Water Supply - TFC	
Community / Private	Bacteriologically Safe
System Pressure min/max	30 / 100 psi
Temperature	4° / 38°C (40° / 100° F)
pH Range	3.0 to 11.0
Maximum supply TDS level	1800 mg/L
Turbidity	< 1.0 net turbidity (NTU)

Chemical Parameters - TFC	
Hardness (CaCO ₃)	< 170 mg/L (< 10 gpg)
Iron (Fe)	< 0.1 mg/L
Manganese (Mn)	< 0.05 mg/L
Hydrogen Sulfide (H ₂ S)	0.00 mg/L
Production Rate	
¹ Efficiency Rate	8.67%
² Recovery Rate	23.87 %
Daily Production Rate	11.19 gpd

Test parameters: 25± 1°C, 50 psi and pH of 7.5

¹ Efficiency rating means the percentage of the influent water to the system that is available to the user as reverse osmosis treated water under operating conditions that approximate typical daily usage

² Recovery rating means the percentage of the influent water to the membrane portion of the system that is available to the user as reverse osmosis treated water when the system is operated without a storage tank or when the storage tank is bypassed.

Caution: Do not use with water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system. Systems certified for cyst reduction may be used on disinfected water that may contain filterable cysts

REDUCTION PERFORMANCE CLAIMS: This system has been tested according to NSF/ANSI 58 for reduction of the substances listed below. The concentration of the indicated substances in water entering the system was reduced to a concentration less than or equal to the permissible limit for water leaving the system, as specified in NSF/ANSI 58. Retesting occurs every five years. Testing was performed under standard laboratory conditions. Actual performance may vary.

	NSF/ANSI 58 Standard Requirements		Actual Test Results	Test Parameters:
	Influent Challenge Concentration (mg/l) ¹	Maximum Allowable Product Water Concentration (mg/l) ¹	Average % Reduction ²	
Arsenic (Pentavalent) ³	0.30 ± 10%	0.010	97	pH 7.5±0.5
Barium	10.0 ± 10%	2.0	96	Turbidity ≤ 1 NTU
Cadmium	0.03 ± 10%	0.005	98	Temperature 77°±2° F
Chromium (Hexavalent)	0.30 ± 10%	0.1	96	Pressure 50 psig
Chromium (Trivalent)	0.30 ± 10%	0.1	98	1 Unless otherwise indicated.
Copper	3.0 ± 10%	1.3	99	2 Average based upon actual test data.
Fluoride	8.0 ± 10%	1.5	94	3 This system has been tested for the treatment of water containing pentavalent arsenic (also known as As(V), As(+5), or arsenate) at concentrations of 0.30 mg/L or less. This system reduces pentavalent arsenic, but may not remove other forms of arsenic. This system is to be used on water supplies containing a detectable free chlorine residual at the system inlet or on water supplies that have been demonstrated to contain only pentavalent arsenic. Treatment with chloramine (combined chlorine) is not sufficient to ensure complete conversion of trivalent arsenic to pentavalent arsenic. Please see the Arsenic Facts section of the Performance Data Sheet for further information.
Lead	0.15 ± 10%	0.010	99	4 This system is acceptable for treatment of influent concentrations of no more than 27 mg/L nitrate and 3 mg/L nitrite in combination measured as N and is certified for nitrate/nitrite reduction only for water supplies with a pressure of 280 kPa (40 psig) or greater.
Nitrate + Nitrite (both as N) ⁴	30.0 ± 10%	10.0	86	5 The reduction of Radium was verified by using Barium as a surrogate under NSF/ANSI Standard 58.
Nitrate (as N) ⁴	27.0 ± 10%	10.0	87	
Nitrite (as N) ⁴	3.0 ± 10%	1.0	77	
Radium 226/228 ⁵	25 pCi/l ± 10%	5 pCi/l	80	
Selenium	0.1 ± 10%	0.05	97	
Total Dissolved Solids	750 ± 40 mg/l	187	95	
Cysts	50,000#/ml minimum	99.95% reduction requirement	99.99	

(The cyst reduction claim includes oocysts of Cryptosporidium and cysts of Giardia and Entamoeba.)

APPLICATION GUIDELINES/SPECIFICATIONS AND FEATURES

Water Supply Parameters	Chemical	Limit	Caution:
Water Pressure: 40–100 psig (280–690 kPa)	Hardness:	<170 mg/l	Do not use with water that is microbiologically unsafe or of unknown quality, without adequate disinfection before or after the system. Systems certified for cyst reduction may be used on disinfected water that may contain filterable cysts.
Water Temperature: 40°–100° F (4°–38° C)	Iron:	<0.1 mg/l	
pH Operating Range: 4–11	Manganese:	<0.05 mg/l	
Optimum rejection at pH: 7.0 - 7.5	Hydrogen Sulfide:	0	
Max. T.D.S. Level: 2000 ppm	Water supplies that exceed limits for Hardness, Iron, Manganese and Hydrogen Sulfide require pretreatment.		

DRINKING WATER SYSTEM ASSEMBLY COMPONENTS

Sediment Prefilter:	5 Micron Filter, Part No. S7111
Carbon Prefilter:	Activated Carbon Filter, Part No. S7125
Membrane Type:	Thin Film Composite (T.F.C.), Part No. S1448RS
In-Line Carbon Post Filter:	In-Line Activated Carbon Filter, Part No. S7206W-JG

Refer to owner's manual for proper operation, installation instructions, warranty information, service interval recommendations, parts and service availability. See the test kit(s) for sampling instructions.

SYSTEM RATING

Average T.D.S. Reduction: 95%
System Production: 12 gallons per day (45 liters per day) **Recovery Rating:** 30% **Efficiency Rating:** 14%
 Measured at 50 psig, 77°±2°F, 750±40 mg/L T.D.S., per section 6 of NSF/ANSI standard 58 product water to pressurized storage tank. Recovery rating means the percentage of the influent water to the membrane portion of the system that is available to the user as reverse osmosis treated water when the system is operated without a storage tank or when the storage tank is bypassed. Efficiency rating means the percentage of the influent water to the system that is available to the user as reverse osmosis treated water under operating conditions that approximate typical daily usage. Sodium Chloride was used as a surrogate for T.D.S. System rating determined by laboratory testing at NSF.

MEMBRANE RATING

Membrane Production: 41-53 gallons per day (155–201 liters per day) **Membrane T.D.S. Reduction:** 96% minimum
 Note: Measured at industry standard condition of 65 psig, 77°F, 250 ppm T.D.S., and discharging to atmosphere. Actual system production and contaminant reduction will depend upon water temperature, pressure, pH and T.D.S. level, membrane variation and usage pattern.

Performance Data Sheet



293 Wright Street
 Delavan, WI 53115
 Phone: 1-800-937-6664

Model# RO2000 Series B

Operating Pressure: 50-90 PSI
 Operating Temperature: 40-100 F
 Water Hardness: <120 ppm (7 gpg)
 pH Range: 3-11
 TDS: <1000 ppm
 The performance claims are made by the RO2000 Series B.

This system has been tested according to NSF/ANSI 58 for the reduction of the substances listed below. The concentration of the indicated substances in water entering the system was reduced to a concentration less than or equal to the permissible limit for water leaving the system, as specified in NSF/ANSI 58.

Specifications

Daily Production Rate	7.2 GPD
Volume of Unit	3.4 gallon
Recovery Rate	16%
Pressure Drop at Rated Flow	5 PSI
System Weight	5 lbs
System Dimension	15x5.5x17.5

Test parameters of 25±1°C, 50 psi, and pH of 7.5±.5.

Function

- Barium Reduction
- Cadmium Reduction
- Copper Reduction
- Cyst Reduction
- Hexavalent Chromium Reduction
- Lead Reduction
- Radium 226/228 Reduction
- Selenium Reduction
- TDS Reduction
- Trivalent Chromium Reduction



System tested and certified by NSF international against NSF/ANSI Standard 58 for the reduction of Barium, Cadmium, Copper, Cyst, Hexavalent Chromium, Lead, Radium 226/228, Selenium, TDS, Trivalent Chromium

General Installation/Operation/Maintenance Requirements

- Installation needs to comply with state and local laws and regulations
- Do not use with water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after system. Systems certified for cyst reduction may be used on disinfected water that may contain filterable cysts.
- This system shall only be used for arsenic reduction on chlorinated water supplies containing detectable free chlorine residual and should provide a one minute chlorine contact time before the RO system.
- This reverse osmosis system contains a replaceable treatment component critical for effective reduction of total dissolved solids. The product water shall be tested periodically to verify that system is performing satisfactorily.

Replacement Parts

OMNI ITEM#	DESCRIPTIONS	SERVICE LIFE
RS4	Sediment filter	4 months
CB1	Carbon block filter	4 months
OM1	TFC membrane	24-36 months
R200	Inline carbon filter	12 months

Warranty

RO2000 Series B Reverse Osmosis Systems are warranted to the original owner to be free of defects in material and workmanship from the date of manufacturing for one year. While testing was performed under laboratory conditions, actual performance may vary.

Performance Claims For WHER25

Substance	NSF Required Influent Challenge Concentration (mg/L) ⁴	NSF Max. Permissible Product Water Concentration (mg/L) ¹	Average Influent (mg/L) ¹	Avg./Max Effluent (mg/L) ¹	Avg./Min. Percent Reduction
Arsenic (pentavalent) ²	0.30 ± 10%	0.010	0.320	0.006 / 0.011	98.2 / 96.6
Barium ²	10 ± 10%	2.0	10	0.23 / 0.58	97.8 / 94.4
Cadmium ²	0.03 ± 10%	0.005	0.028	0.0005 / 0.0012	98.1 / 95.7
Chromium (VI) ²	0.3 ± 10%	0.1	0.310	0.009 / 0.017	97.0 / 94.4
Chromium (III) ²	0.3 ± 10%	0.1	0.310	0.005 / 0.007	98.3 / 97.7
Copper ²	3.0 ± 10%	1.3	2.9	0.033 / 0.047	98.8 / 98.4
Cysts ²	≥50,000 #/mL ⁴	99.95% ³	160000 #/mL ⁴	9 / 33 #/mL ⁴	99.99 / 99.98
Lead ²	0.15 ± 10%	0.010	0.16	0.001 / 0.003	99.1 / 98.1
Nitrate plus Nitrite (as N) ²	30 ± 10%	10.0	29	7.2 / 8.6	75.4 / 70.8
Nitrate (as N) ²	27.0 ± 10%	10	26	6.6 / 7.9	74.9 / 70.0
Nitrite (as N) ²	3.0 ± 10%	1.0	3.2	0.61 / 0.75	80.9 / 76.6
Radium 226/228 ²	25 pCi/L ⁵ ± 10%	5 pCi/L ⁵	25 pCi/L ⁵	5 / 5 pCi/L ⁵	80 / 80 pCi/L ⁵
Selenium ²	0.10 ± 10%	0.05	0.10	0.002 / 0.003	98.0 / 97.0
Turbidity ²	11 ± 1 NTU ⁶	0.5 NTU ⁶	11 NTU ⁶	0.1 / 0.2 NTU ⁶	99.0 / 98.3
TDS ²	750 ± 40	187	740	70 / 100	90.6 / 86.5
Chlorine Taste and Odor ²	2.0 ± 10%	1.0	1.9	0.09 / 0.19	95.2 / 90.5
Ammonium ⁷	1.2 ± 10%	1.0 ⁸	2.5	0.24	90
Bicarbonate ⁷	300 ± 10%	100 ⁸	280	10	96
Bromide ⁷	1.5 ± 10%	3.3 ⁸	11	1.3	89
Chloride ⁷	800 ± 10%	250 ⁸	770	60	92
Magnesium ⁷	30 ± 10%	10 ⁸	31	<1.0	97
Sodium ⁷	350 ± 10%	117 ⁸	340	40	88
Sulfate ⁷	800 ± 10%	250 ⁸	780	12	98
Tannin ⁷	3.0 ± 10%	1.0 ⁸	2.9	0.1	97
Zinc ⁷	15 ± 10%	5.0 ⁸	15	0.25	98

Daily Production Rate Model WHER25 – 18.46 gal/day (69.87 liters/day)²
 Efficiency Rating Model WHER25⁹ – 12.22%
 Recovery Rating Model WHER25¹⁰ – 22.95 %

- ¹ mg/L means Milligrams Per Liter, which is equivalent to parts per million (PPM).
- ² Tested by NSF International according to NSF/ANSI Standard 58.
- ³ NSF minimum percent reduction requirement. Acceptance level for this substance is based on percent reduction rather than maximum effluent concentration
- ⁴ #/mL means Particles Per Milliliter.
- ⁵ pCi/L means Pico Curies Per Liter.
- ⁶ NTU means Nephelometric Turbidity Units.
- ⁷ Tested by Spectrum Labs, a qualified independent laboratory, against accepted industry protocol.
- ⁸ There is no maximum permissible effluent concentration for this substance because it is not included in the chemical reduction claims listed in NSF Standard 58. The maximum effluent concentrations listed were established by Spectrum Labs and are based on one third of the target influent.
- ⁹ Efficiency rating means the percentage of the influent water to the system that is available to the user as reverse osmosis treated water under operating conditions that approximate daily usage.
- ¹⁰ Recovery rating means the percentage of the influent water to the membrane portion of the system that is available to the user as reverse osmosis treated water when the system is operated without a storage tank or when the storage tank is by-passed.

Arsenic Fact Sheet

Background

Arsenic (abbreviated As) can occur naturally in well water. There are two forms of arsenic: pentavalent arsenic (also called As (V), As (+5), and arsenate) and trivalent arsenic (also called As(III), As(+3), and arsenite). Although both forms are potentially harmful to human health, trivalent arsenic is considered more harmful than pentavalent arsenic. In well water, arsenic may be pentavalent, trivalent, or a combination of both. Additional information about arsenic in water can be found on the Internet at the U.S. Environmental Protection Agency (USEPA) website: www.epa.gov/safewater/arsenic.html.

Testing Your Water

Arsenic in water has no color, taste or odor. It must be measured by a lab test. Public water utilities must have their water tested for arsenic. You can get the results from your water utility. If you have your own well, you can have the water tested. The local health department or the state environmental health agency can provide a list of certified labs. The cost is typically \$15 to \$30.

Pentavalent vs. Trivalent Arsenic Removal

These systems are very effective at reducing pentavalent arsenic from drinking water. These models were tested in a lab and proven to reduce 300 parts per billion (ppb) pentavalent arsenic to below 10 ppb, the USEPA standard for safe drinking water.

RO systems are not as effective at reducing trivalent arsenic from water. These models will not convert trivalent arsenic to pentavalent arsenic. If you have free chlorine residual in contact with your water supply for at least one minute any trivalent arsenic will be converted to pentavalent arsenic and reduced by this RO. Other water treatment chemicals such as ozone, and potassium permanganate will also change trivalent arsenic to pentavalent arsenic. A combined chlorine residual (also called chloramine) may not convert all the trivalent arsenic. If you get your water from a public water utility, contact the utility to find out if free chlorine or combined chlorine is used in the water system.

Maintenance

It is strongly recommended that you follow the maintenance instructions and have your water tested periodically to make sure the system is performing properly. See replacement element information above for recommendations on maintaining your Reverse Osmosis drinking water treatment system.

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FOR IOWA ONLY

All sales in Iowa require the following signature before consummation of sale. These signatures must be retained by seller/renter for 2 years minimum.

Buyer/Renter _____ Date _____

Seller _____ Date _____

Sellers Address _____

Sellers Phone # _____

Product: Whirlpool Model WHER25
 Ecodyne Water Systems
 1890 Woodlane Drive
 Woodbury, MN 55125
 1-866-986-3223



Model WHER25 has been tested and certified by NSF International against NSF/ANSI Standard 42 for the reduction of chlorine, taste and odor, Standard 58 for the reduction of arsenic, barium, cadmium, chromium (hexavalent), chromium (trivalent), copper, cysts, lead, nitrate (as N), nitrite (as N), radium 226/228, selenium, turbidity and TDS.

System Specifications

GENERAL SPECIFICATIONS

- Minimum/Maximum Operating Temperature: 2°C-38°C (35.6°F - 100.4°F)
- Minimum/Maximum Operating Pressure: 344.74-827.37 kPa (50/120 psi)
- System Flow Rate: 1.89 Lpm (.5 gpm)
- TDS Influent challenge concentration (mg/L): 750 +/- 40mg/L
- TDS Maximum permissible product water concentration (mg/L): 187
- Water Supply: 0-10 gpg hardness, 0 - 0.1 iron
- pH Range: 3-11
- Rated Filter Capacity (Auxiliary and Postfilter): 1895 L (500 gallons)

MODEL SPECIFIC INFORMATION

- Model Name: K5 Drinking Water Station with 3 Gallon Standard Tank
 - Product Water Production Rate (Daily Production Rate): 90.47 Lpd (23.9 gpd)
 - Recovery Rating* : 34.6%
 - Efficiency Rating** : 16.3%
- Model Name: K5 Drinking Water Station with 3 Gallon WOW Tank
 - Product Water Production Rate (Daily Production Rate): 148.39 Lpd (39.2 gpd)
 - Recovery Rating* : 36.7%
 - Efficiency Rating** : 22.8%

* Recovery Rating means the percentage of the influent water to the membrane portion of the system that is available to the user as reverse osmosis treated water when the system is operated without a storage tank or when the storage tank is by-passed.

** Efficiency Rating means the percentage of the influent water to the system that is available to the user as reverse osmosis treated water under operating conditions that approximate typical daily usage.



Tested and certified by WQA against NSF/ANSI Standards 42, 53, 58, and 372 for the reduction of claims specified on the Performance Data Sheet. Conforms to CSA Standard B483.1 - Drinking Water Treatment Systems and NSF Protocol P231 - Microbiological Water Purifiers (refer to the Performance Data Sheet for individual contaminants and reduction performance).

Do not use with water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system. Systems certified for cyst reduction may be used on disinfected water that may contain filterable cysts.

This system is acceptable for treatment of influent concentrations of no more than 27 mg/L nitrate and 3 mg/L nitrite in combination measured as N and are certified for nitrate/nitrite reduction only for water supplies with a pressure of 344.74 kPa (50 psi) or greater.

WQA certified our product performance, and reviewed our manufacturing facility and procedures to assure product consistency and integrity. They also assure that our literature accurately reflects our product capabilities. The system and installation must comply with state/provincial and local laws and regulations.

Conforms to NSF Protocol P231. When used in conjunction with a 3 Gallon Standard Tank and Prefilter (Part Nos. 9309A or 9461A), the K5 Drinking Water Station equipped with a Perfecta Virus/Bacteria Guard (Part No. 12873B) meets the minimum requirements for health and sanitation characteristics of microbiological water purifiers.

Conforms to NSF/ANSI 53 for VOC reduction. See performance data sheet for individual contaminants and reduction performance.

Conforms to NSF/ANSI 53 and NSF/ANSI 58 for pentavalent arsenic reduction. See performance data sheet and Arsenic Facts section section for an explanation of reduction performance.

The following cartridges are not NSF or WQA Certified: Arsenic Guard, Perchlorate Guard, Chloramine Guard, and Mineral Plus.

U.S. Patent number 8,741,148 B



Performance Data for the OptimH2O™ Drinking Water System: Model AQ-RO-3

Replacement	Operating pressure range	Operating temp range	Recovery Rating	Efficiency Rating	Daily Production (DPR)
AQ-RO3-RO, AQ-RO3-Carbon, AQ-RO3-Claryum	40-100 psi 275-689 kPa	40-90° F 4-44-32.2° C	29.43%	17.91%	13.32 gallons 50.4 liters

Manufactured by: Aquasana, Inc. 6310 Midway Road · Haltom City, Texas 76117 · 866.662.6885

Testing Performed under NSF/ANSI Standards 42 and 53 and in accordance with the California Department of Health Services Drinking Water Treatment Device Program. This system has been tested according to NSF/ANSI 42, 53, 58, 401 & P473 for reduction of the substances listed below. The concentration of the indicated substances in water entering the system was reduced to a concentration less than or equal to the permissible limit for water leaving the system, as specified in NSF/ANSI 42, 53, 58, 401 & P473.

NSF/ANSI 42	Minimum reduction	Overall % reduction	Results
Chlorine Reduction, Free Available	<0.5 mg/l	97.66%	Pass
Chloramine Reduction, Free Available	<0.5 mg/l	97.66%	Pass
Particulate Reduction	85%	99.9%	Pass

NSF/ANSI 53	Required reduction	Overall % reduction	Results
Cyst Live Cryptosporidium & Giardia	99.95%	>99.99%	Pass
Mercury Reduction pH 8.5	<2 ug/L	>95.8%	Pass
Mercury Reduction pH 6.5	<2 ug/L	>96.5%	Pass
Lead Reduction pH 6.5	<10 ug/L	>99.4%	Pass
Lead Reduction pH 8.5	<10 ug/L	>99.3%	Pass
MTBE Reduction	<5 ug/L	86.6%	Pass
Turbidity	<0.5 NTU	99.1%	Pass
VOC Surrogate Test	95%	99.4%	Pass
Asbestos Reduction	99%	>99%	Pass

NSF/ANSI 58	Maximum Concentration	Minimum Reduction	Overall % Reduction	Results
Arsenic Pentavalent	0.30% ±10%	80.0%	97.6%	Pass
Barium	10.0% ±10%	80.0%	95.2%	Pass
Cadmium	0.30% ±10%	83.3%	95.3%	Pass
Chromium Hexavalent	0.30% ±10%	66.7%	97.0%	Pass
Chromium Trivalent	0.30% ±10%	66.7%	96.6%	Pass
Copper	0.30% ±10%	56.7%	96.6%	Pass
Fluoride	8.0% ±10%	81.2%	95.7%	Pass
Lead	0.15% ±10%	93.3%	96.6%	Pass
Nitrate/Nitrite	30.0% ±10%	66.70%	82.40%	Pass
Radium 226/228	25% ±10%	80.0%	80.0%	Pass
Selenium	0.10% ±10%	50.0%	97.9%	Pass
TDS	750% ±10%	75.0%	95.0%	Pass
Turbidity	11 ± NTU	95.4%	99.1%	Pass

NSF/ANSI 401	Maximum Concentration	Minimum Reduction	Overall % Reduction	Results
Atenolol	30 ng/L	94.2%	94.2%	Pass
Bisphenol A	300 ng/L	98.80%	98.9%	Pass
Carbamazepine	200 ng/L	98.6%	98.6%	Pass
DEET	200 ng/L	98.7%	98.7%	Pass
Estrone	20 ng/L	96.30%	96.5%	Pass
Ibuprofen	60 ng/L	95.3%	95.4%	Pass
Linuron	20 ng/L	96.6%	96.6%	Pass
Meprobamate	60 ng/L	94.7%	94.7%	Pass
Metolachlor	200 ng/L	98.6%	98.6%	Pass
Naproxen	20 ng/L	96.3%	96.4%	Pass
Nonyl phenol	200 ng/L	97.50%	97.5%	Pass
Phenytoin	30 ng/L	95.50%	95.6%	Pass
TCEP	700 ng/L	98%	98%	Pass
TCPP	700 ng/L	97.8%	97.8%	Pass
Trimethoprim	20 ng/L	96.7%	96.7%	Pass

NSF P473	Influent challenge concentration	Maximum permissible product water concentration	Overall % reduction	Results
Perfluorooctanoic acid (PFOA) & Perfluorooctane sulfonate (PFOS)	1.5 ±10% ug/L	0.07 ug/L	96%	Pass

Do not use with water that is microbiologically unsafe or of unknown water quality without adequate disinfection before or after the system.

Organic chemicals included by surrogate testing

VOCs (by surrogate testing using chloroform)	Drinking water regulatory level (MCL/MAC) mg/L	Influent/ Unfiltered	Effluent/ Filtered	Percent Reduction
alachlor	0.002	0.050	0.001	>98%
atrazine	0.003	0.100	0.003	>97%
benzene	0.005	0.081	0.001	>99%
carbofuran	0.04	0.190	0.001	>99%
carbon tetrachloride	0.005	0.078	0.0018	98%
chlorobenzene	0.1	0.077	0.001	>99%
chloropicrin	—	0.015	0.0002	99%
2,4-D	0.07	0.110	0.0017	98%
dibromochloropropane (DBCP)	0.0002	0.052	0.00002	>99%
o-dichlorobenzene	0.6	0.080	0.001	>99%
p-dichlorobenzene	0.075	0.040	0.001	>98%
1,2-dichloroethane	0.005	0.088	0.0048	95%
1,1-dichloroethylene	0.007	0.083	0.001	>99%
cis-1,2-dichloroethylene	0.07	0.170	0.0005	>99%
trans-1,2-dichloroethylene	0.1	0.086	0.001	>99%
1,2-dichloropropane	0.005	0.080	0.001	>99%
cis-1,3-dichloropropylene	—	0.079	0.001	>99%
dinoseb	0.007	0.170	0.0002	99%
endrin	0.002	0.053	0.00059	99%
ethylbenzene	0.7	0.088	0.001	>99%
ethylene dibromide (EDB)	0.00005	0.044	0.00002	>99%
haloacetonitriles (HAN)				
Bromochloroacetonitrile	—	0.022	0.0005	98%
Dibromoacetonitrile	—	0.024	0.0006	98%
Dichloroacetonitrile	—	0.0096	0.0002	98%
Trichloroacetonitrile	—	0.015	0.0003	98%
haloketones (HK)				
1,1-dichloro-2-propanone	—	0.0072	0.0001	99%
1,1,1-trichloro-2-propanone	—	0.0082	0.0003	96%
heptachlor (H-34, Heptox)	0.0004	0.025	0.00001	>99%
heptachlor epoxide	0.0002	0.0107	0.0002	98%
hexachlorobutadiene	—	0.044	0.001	>98%
hexachlorocyclopentadiene	0.05	0.060	0.000002	>99%
lindane	0.0002	0.055	0.00001	>99%
methoxychlor	0.04	0.050	0.0001	>99%
pentachlorophenol	0.001	0.096	0.001	>99%
simazine	0.004	0.120	0.004	>97%
styrene	0.1	0.150	0.0005	>99%
1,1,2,2-tetrachloroethane	—	0.081	0.001	>99%
tetrachloroethylene	0.005	0.081	0.001	>99%
toluene	1	0.078	0.001	>99%
2,4,5-TP (silvex)	0.05	0.270	0.0016	99%
tribromoacetic acid	—	0.042	0.001	>98%
1,2,4-trichlorobenzene	0.07	0.160	0.0005	>99%
1,1,1-trichloroethane	0.2	0.084	0.0046	95%
1,1,2-trichloroethane	0.005	0.150	0.0005	>99%
trichloroethylene	0.005	0.180	0.0010	>99%
Trihalomethanes (THMs)		Influent/ Unfiltered	Effluent/ Filtered	Percent Reduction
Bromodichloromethane (THM)				
Bromoform (THM)				
Chloroform (THM)	0.080	0.300	0.015	95%
Chlorodibromomethane (THM)				
Xylenes (total)	10	0.070	0.001	>99%

The AQ-RO3 has been tested and certified by NSF International against NSF/ANSI Standards 42, 53 and 401 in model AQ-RO-3 for the reduction claims specified on the Performance Data Sheet as verified and substantiated by test data and at nsf.org.

The AQ-RO-3 has been tested and certified by NSF International against NSF/ANSI Standard 58 for the reduction claims specified on the Performance Data Sheet as verified and substantiated by test data and at nsf.org.

PERFORMANCE DATA

PERFORMANCE CLAIMS FOR 385 SERIES

Models	Replacement Elements	Operating Pressure Range	Operating Temperature Range	Recovery Rating	Efficiency Rating	Daily Production Rate (DPR)
ERO-385, ERO-385E, ERO-385Plus	7278913, 7382746, 7382762	40 - 100 PSI (275 - 689 kPa)	40 - 100 °F (5 - 38 °C)	41.8%	26.2%	15.75 gal./day (59.6 liters/day)
NSF/ANSI Standard 42		Minimum Reduction:		Overall % Reduction:		Results:
Chlorine Taste & Odor		<0.5 mg/L		97.5%		Pass
NSF/ANSI Standard 473		Influent Challenge Concentration:	Maximum Permissible Concentration:	Overall % Reduction:		Results:
Perfluorooctanoic acid (PFOA) & Perfluorooctane sulfonate (PFOS)		1.5 µg/L ±10%	0.07 µg/L	97.7%		Pass
NSF/ANSI Standard 53		Influent Challenge Concentration:	Maximum Permissible Concentration:	Overall % Reduction:		Results:
VOC Surrogate Test		300 µg/L	15 µg/L	99.4%		Pass
MTBE		15 µg/L	5 µg/L	99.4%		Pass
NSF/ANSI Standard 58		Influent Challenge Concentration:	Maximum Permissible Concentration:	Overall % Reduction:		Results:
Arsenic (pentavalent)		0.30 mg/L ±10%	0.010 mg/L	98.2%		Pass
Barium		10 mg/L ±10%	2.0 mg/L	97.8%		Pass
Cadmium		0.03 mg/L ±10%	0.005 mg/L	98.1%		Pass
Chromium (VI)		0.3 mg/L ±10%	0.1 mg/L	97.0%		Pass
Chromium (III)		0.3 mg/L ±10%	0.1 mg/L	98.3%		Pass
Copper		3.0 mg/L ±10%	1.3 mg/L	98.8%		Pass
Cysts		≥50,000 particles/mL		99.95%		Pass
Lead		0.15 mg/L ±10%	0.010 mg/L	99.1%		Pass
Fluoride		8.0 mg/L ±10%	1.5 mg/L	96.5%		Pass
Nitrate plus Nitrite (as N)		30 mg/L ±10%	10.0 mg/L	75.9%		Pass
Nitrate (as N)		27.0 mg/L ±10%	10.0 mg/L	75.7%		Pass
Nitrite (as N)		3.0 mg/L ±10%	1.0 mg/L	75.8%		Pass
Radium 226/228		25 pCi/L ±10%	5 pCi/L	80%		Pass
Selenium		0.10 mg/L ±10%	0.05 mg/L	98.0%		Pass
Turbidity		11 ±1 NTU	0.5 NTU	99.0%		Pass
TDS		750 mg/L ±40	187 mg/L	90.6%		Pass
Ammonium ¹		1.2 mg/L ±10%	-	90%		Pass
Bicarbonate ¹		300 mg/L ±10%	-	96%		Pass
Bromide ¹		1.5 mg/L ±10%	-	89%		Pass
Chloride ¹		800 mg/L ±10%	-	92%		Pass
Magnesium ¹		30 mg/L ±10%	-	97%		Pass
Sodium ¹		350 mg/L ±10%	-	98%		Pass
Sulfate ¹		800 mg/L ±10%	-	98%		Pass
Tannin ¹		3.0 mg/L ±10%	-	97%		Pass
Zinc ¹		15 mg/L ±10%	-	98%		Pass
NSF/ANSI Standard 401		Influent Challenge Concentration:	Maximum Permissible Concentration:	Overall % Reduction:		Results:
Atenolol		200 ng/L ±20%	60 ng/L	99.5%		Pass
Bisphenol A		2,000 ng/L ±20%	300 ng/L	98.2%		Pass
Carbamazepine		1,400 ng/L ±20%	200 ng/L	97.1%		Pass
DEET		1,400 ng/L ±20%	200 ng/L	99.2%		Pass
Estrone		140 ng/L ±20%	20 ng/L	98.9%		Pass
Ibuprofen		400 ng/L ±20%	60 ng/L	94.5%		Pass
Linuron		140 ng/L ±20%	20 ng/L	96.8%		Pass
Meprobamate		400 ng/L ±20%	60 ng/L	99.0%		Pass
Metolachlor		1,400 ng/L ±20%	200 ng/L	97.5%		Pass
Naproxen		140 ng/L ±20%	20 ng/L	98.7%		Pass
Nonyl phenol		1,400 ng/L ±20%	200 ng/L	98.4%		Pass
Phenytoin		200 ng/L ±20%	30 ng/L	99.5%		Pass
TCEP		5,000 ng/L ±20%	700 ng/L	97.0%		Pass
TCCP		5,000 ng/L ±20%	700 ng/L	96.5%		Pass
Trimethoprim		140 ng/L ±20%	20 ng/L	98.9%		Pass

¹ Tested by Spectrum Labs, a qualified independent laboratory, against accepted industry protocol.

PERFORMANCE DATA

VOCs (by surrogate testing using chloroform)	Maximum Permissible Concentration	Effluent/Unfiltered	Effluent/Filtered	% Reduction
Alachlor	2.0 µg/L	50 µg/L	1.0 µg/L	>98%
Atrazine	3.0 µg/L	100 µg/L	3.0 µg/L	>97%
Benzene	5.0 µg/L	81 µg/L	1.0 µg/L	99%
Carbofuran	40 µg/L	190 µg/L	1.0 µg/L	>99%
Carbon Tetrachloride	5.0 µg/L	78 µg/L	1.8 µg/L	98%
Chlorobenzene	100 µg/L	77 µg/L	1.0 µg/L	99%
Chloropicrin	NA	15 µg/L	0.2 µg/L	99%
2,4-D	70 µg/L	110 µg/L	1.7 µg/L	98%
Dibromochloropropane (DBCP)	0.2 µg/L	52 µg/L	0.02 µg/L	>99%
o-Dichlorobenzene	600 µg/L	80 µg/L	1.0 µg/L	99%
p-Dichlorobenzene	75 µg/L	40 µg/L	1.0 µg/L	98%
1,2-Dichloroethane	5.0 µg/L	88 µg/L	4.8 µg/L	95%
1,1-Dichloroethylene	7.0 µg/L	83 µg/L	1.0 µg/L	99%
cis-1,2-Dichloroethylene	70 µg/L	170 µg/L	0.5 µg/L	>99%
trans-1,2-Dichloroethylene	100 µg/L	86 µg/L	1.0 µg/L	99%
1,2-Dichloropropane	5.0 µg/L	80 µg/L	1.0 µg/L	96%
cis-1,3-Dichloropropylene	NA	79 µg/L	1.0 µg/L	99%
Dinoseb	7.0 µg/L	170 µg/L	0.2 µg/L	99%
Endrin	2.0 µg/L	53 µg/L	0.59 µg/L	99%
Ethylbenzene	700 µg/L	88 µg/L	1.0 µg/L	99%
Ethyl Dibromide (EDB)	0.05 µg/L	44 µg/L	0.02 µg/L	>99%
Halooxonitriles (HAN)				
Bromochloroacetonitrile	NA	22 µg/L	0.5 µg/L	98%
Dibromoacetonitrile	NA	24 µg/L	0.6 µg/L	98%
Dichloroacetonitrile	NA	9.6 µg/L	0.2 µg/L	98%
Trichloroacetonitrile	NA	15 µg/L	0.3 µg/L	98%
Haloketones (HK)				
1,1-dichloro-2-propanone	NA	7.2 µg/L	0.1 µg/L	99%
1,1,1-trichloro-2-propanone	NA	8.2 µg/L	0.3 µg/L	96%
Heptachlor	0.4 µg/L	25 µg/L	0.01 µg/L	>99%
Heptachlor Epoxide	0.2 µg/L	10.7 µg/L	0.2 µg/L	98%
Hexachlorobutadiene	NA	44 µg/L	1.0 µg/L	98%
Hexachlorocyclopentadiene	50 µg/L	60 µg/L	0.002 µg/L	>99%
Lindane	0.2 µg/L	55 µg/L	0.01 µg/L	>99%
Methoxychlor	40 µg/L	50 µg/L	0.1 µg/L	>99%
Pentachlorophenol	1.0 µg/L	96 µg/L	1.0 µg/L	99%
Simazine	4.0 µg/L	120 µg/L	4.0 µg/L	97%
Styrene	100 µg/L	150 µg/L	0.5 µg/L	>99%
1,1,2,2-Tetrachloroethane	NA	81 µg/L	1.0 µg/L	99%
Tetrachloroethylene	5.0 µg/L	81 µg/L	1.0 µg/L	99%
Toluene	1,000 µg/L	78 µg/L	1.0 µg/L	99%
2,4,5-TP (silvex)	50 µg/L	270 µg/L	1.6 µg/L	99%
Tribromoacetic acid	NA	42 µg/L	1.0 µg/L	98%
1,2,4-Trichlorobenzene	70 µg/L	160 µg/L	0.5 µg/L	>99%
1,1,1-Trichloroethane	200 µg/L	84 µg/L	4.6 µg/L	95%
1,1,2-Trichloroethane	5.0 µg/L	150 µg/L	0.5 µg/L	>99%
Trichloroethylene	5.0 µg/L	180 µg/L	1.0 µg/L	>99%
Chloroform (THM)				
Bromoform (THM)				
Bromodichloromethane (THM)	80 µg/L	300 µg/L	15 µg/L	95%
Chlorodibromomethane (THM)				
Xylenes (total)	10,000 µg/L	70 µg/L	1.0 µg/L	99%

FILTER PERFORMANCE DATA FOR 385 SERIES

Flow Rate	0.9 gallons per minute (3.4 liters per minute)
Capacity	310 gallons (1,173 liters)

Performance Data Sheet PWRO4ZRO ZeroWaste® RO

Watts Pure Water
8716 W Ludlow Drive Suite #1
Peoria, AZ 85381
1-(800)-224-1299

While testing was performed under standard laboratory conditions, actual performance may vary

GENERAL USE CONDITIONS:

1. System to be used with municipal or well water sources treated and tested on regular basis to insure bacteriological safe quality. Do not use with water that is microbiologically unsafe or unknown quality without adequate disinfection before and after the system. Systems certified for cyst reduction may be used on disinfected water that may contain filterable cysts.
2. Operating Temperature: Maximum: 100°F (37.8°C) Minimum: 40° (4.4°) C/F
3. Operating Water Pressure: Maximum: 85 psi (7.0kg/cm2) Minimum: 40 psi (2.8kg/cm2)
4. pH 2 to 11
5. Hardness of more than 10 grains per gallon (170 ppm) may reduce TFM membrane life expectancy.
6. Recommend TDS (Total Dissolved Solids) not to exceed 1800 ppm.

RECOMMENDED REPLACEMENT PARTS AND CHANGE INTERVALS:

Depending on incoming feed water conditions replacement time frame may vary.

Description	Change time Frame
Sediment Pre-filter: #7100330	6 Months
Carbon Pre-filter: #7100446	6 Months
Final Carbon filter #7100454	12 Months
R.O. Membrane: #7100122	2 to 5 years

This system has been tested according to NSF/ANSI 58 for reduction of the substances listed below. Conforms to NSF/ANSI 58 for TDS, Cyst reduction and Nitrate/Nitrite claims as verified and substantiated by test data. The concentration of the indicated substances in water entering the system was reduced to a concentration less than or equal to the permissible limit for water leaving the system as specified in NSF/ANSI 58.

	Avg. In. (mg/L)	Avg. Eff. (mg/L)	% Reduction	pH	Pressure	Max Eff. mg/L	Inf. challenge concentration mg/L	Max Allowable concentration mg/L
Cysts	222,077#/ml	10 #/ml	99.99%			58	minimum 50,000/mL	N/A
Nitrate	26.0 mg/L	1.8 mg/L	93.2%		50 psi	3.0 mg/L	27±10%	10.0
Nitrite	2.9 mg/L	0.19 mg/L	82%		50 psi	0.77mg/L	3.0±10%	1.0
TDS	730	24	98.0%	0.32			750±40mg/L	187

Recovery - 14.0%

Daily Production Rate - 10 GPD

Efficiency - 6%

Depending on water chemistry, water temperature, and water pressure, R.O. Systems production and performance will vary.

Efficiency rating means the percentage of the influent water to the system that is available to the user as reverse osmosis treated water under operating conditions that approximate typical daily usage. Recovery rating means the percentage of the influent water to the membrane portion of the system that is available to the user as reverse osmosis treated water when the system is operated without a storage tank or when the storage tank is bypassed. There is an average of 4 gallons of reject water for every 1 gallon of product water produced.

REFER TO OWNER'S INSTALLATION/SERVICE MANUAL FOR FURTHER MAINTENANCE REQUIREMENTS AND WARRANTY INFORMATION.

This system is acceptable for treatment of influent concentrations of no more than 27 mg/L nitrate and 3 mg/L nitrite in combination measured as N and is certified for nitrate/nitrite reduction only for water supplies with a pressure of 280 kPa (40 psig) or greater.

MODELS TLRO4H50T AND TLRO4H75T SYSTEM CONFORMS TO NSF STANDARD 58 FOR SPECIFIC CLAIMS.

GENERAL USE CONDITIONS:

1. System to be used with municipal or well water sources treated and tested on regular basis to ensure bacteriological safe quality. DO NOT use with water that is microbiologically unsafe or of unknown quality without adequate disinfection before and after the system. Systems certified for cyst reduction may be used on disinfected water that may contain filterable cysts.
2. Operating Temperature: Maximum: 100°F (38°C) Minimum: 40°F (4°C)
3. Operating Water Pressure: Maximum: 100 psi (690kPa) Minimum: 40 psi (275kPa)
4. pH 2 to 11
5. Maximum Iron present in incoming water supply must be less than 0.2 ppm.
6. Hardness of more than 10 grains per gallon (170 ppm) may reduce RO membrane life expectancy.
7. Recommend TDS (Total Dissolved Solids) not to exceed 1800 ppm.

This system has been tested according to NSF/ANSI 58 for reduction of the substances listed below. The concentration of the indicated substances in water entering the system was reduced to a concentration less than or equal to the permissible limit for water leaving the system as specified in NSF/ANSI 58. This system has been tested for the treatment of water containing pentavalent arsenic (also known as As (V), As (+5), or arsenate) at concentrations of 0.05 mg/L or less. This system reduces pentavalent arsenic, but may not remove other forms of arsenic. This system is to be used on water supplies containing a detectable free chlorine residual at the system inlet or on water supplies that have been demonstrated to contain only pentavalent arsenic. Treatment with chloramine (combined chlorine) is not sufficient to ensure complete conversion of trivalent arsenic to pentavalent arsenic. Please see the Arsenic Facts section of the Performance Data Sheet for further information.



	% Reduction	Inf. challenge concentration mg/L	Max Allowable concentration mg/L
Arsenic (Pentavalent)	97.6%	0.05±10%	0.010 mg/L
Barium Reduction	96.6%	10.0±10%	2.0
Cadmium Reduction	98.7%	0.03±10%	0.005
Chromium (Hexavalent)	96.4%	0.3±10%	0.1
Chromium (Trivalent)	98.5%	0.3±10%	0.1
Copper Reduction	99.3%	3.0±10%	1.3
Cysts	>99.99%	minimum 50,000/mL	N/A
Fluoride Reduction	94.5%	8.0±10%	1.5
Lead Reduction	99.0%	0.15±10%	0.010
Radium 226/228	80.0%	25pCiL±10%	5pCiL
Selenium	97.3%	0.10±10%	0.05
TDS	SEE BELOW	750±40mg/L	187
Turbidity	99.1%	11±1NTU	0.5NTU
TLRO4H50T	Recovery - 31.21%	Daily Production Rate - 21.60 GPD	Efficiency - 18.63% TDS - 94.9%
TLRO4H75T	Recovery - 34.09%	Daily Production Rate - 27.17 GPD	Efficiency - 21.69% TDS - 95.9%

Depending on water chemistry, water temperature, and water pressure, Paragon Water Systems production and performance will vary. Efficiency rating means the percentage of the influent water to the system that is available to the user as reverse osmosis treated water under operating conditions that approximate typical daily usage. Recovery rating means the percentage of the influent water to the membrane portion of the system that is available to the user as reverse osmosis treated water when the system is operated without a storage tank or when the storage tank is bypassed. There is an average of 4 gallons of reject water for every 1 gallon of product water produced.

SECTION II. SPECIFICATIONS

TABLE A - QUALIFIED SYSTEM PERFORMANCE

Because the performance of an Membrane is highly dependent upon pressure, temperature, pH and TDS, the following should be used for comparison purposes only.

	U.S.	Metric
Membrane Production ¹	41-53 gpd	155-201 lpd
Membrane TDS Reduction ¹	96% minimum	96% minimum
System Production ²	12 gpd	45 lpd
Recovery Rating ²	30%	30%
Efficiency Rating ²	14%	14%
TDS Reduction ²	90%+ typical	90%+ typical
Drain (reject water) Flow	3-5 x product flow	3-5 x product flow
Empty Storage Tank Precharge	5-7 psig air	35-48 kPa air
Storage Tank Capacity ²	1.7 gallons	6.4 liters

¹ Industry standards measure membrane performance with no backpressure on the product water, at 65 psig (448kPa) and 77°F (25°C). Further conditions on the above are 250 ppm TDS. Production rate and TDS reduction figures are for a new Membrane that has been rinsed for 24 hours. The production rate of a new Membrane can decrease by 10% per year or more, depending upon the scaling and fouling tendencies of the Feed Water.

² Measured at 50 psig, 77±2° F, 750±40 mg/l TDS per section 6 of NSF/ANSI Standard 58. Recovery rating means the percentage of the influent water to the membrane portion of the system that is available to the user as reverse osmosis treated water when the system is operated without a storage tank or when the storage tank is bypassed. Efficiency rating means the percentage of the influent water to the system that is available to the user as reverse osmosis treated water under operating conditions that approximate typical daily usage. This reverse osmosis system contains a replaceable component critical to the efficiency of the system. Replacement of the membrane should be with one of identical specifications, as defined by the manufacturer, to assure the same efficiency and contaminant reduction performance.

TABLE B - RECOMMENDED OPERATING LIMITS FOR FEED WATER

Specifications	T.F.C. Membrane
Water Pressure	40-100 psig (280-690 kPa)
TDS	2000 ppm (also mg/l) max.
Temperature	40-100°F (4-38°C)
pH	4-11 (optimum rejection at pH 7.0 - 7.5)
Hardness	Less than 10 gpg (170 mg/l) or soften
Iron	Less than 0.1 ppm (also mg/l)
Manganese	Less than 0.05 ppm (also mg/l)
Hydrogen Sulfide	None
Chlorine	See note
Bacteria	Must be potable**

NOTE: Chlorine will damage a T.F.C. Membrane. The Sediment/Carbon Prefilter has been designed to reduce chlorine from the incoming water. Change filter every 6 to 12 months, more often if the water contains more than 1 ppm chlorine.

****DO NOT USE WITH WATER THAT IS MICROBIOLOGICALLY UNSAFE OR OF UNKNOWN QUALITY, WITHOUT ADEQUATE DISINFECTION BEFORE OR AFTER THE SYSTEM.**

SYSTEM SPECIFICATIONS

QUALIFIED SYSTEM PERFORMANCE

For good performance of a Membrane consider the pressure, temperature, pH and TDS. The below Table 1 must be used for comparison purposes only.

Specifications	U.S.	Metric
Membrane Production ¹	41 - 53 gallons/day	155 - 201 (L/day)
Membrane TDS Reduction ¹	96% minimum	96% minimum
System Production ²	12 gallons/day	45 (L/day)
Recovery Rating ²	30%	30%
Efficiency Rating ²	14%	14%
TDS Reduction ²	90%+ typical	90%+ typical
Drain (reject water) Flow	3-5 x product flow	3-5 x product flow
Empty Storage Tank Pre-charge	5 - 7 PSIG air	35 - 48 kPa air
Storage Tank Capacity ²	1.7 gallons	6.4 L

Table 1: Qualified System Performance

¹Industry standards measure membrane performance with no back pressure on the product water, at 65 PSIG (448 kPa) and 77 °F (25 °C). Further conditions on the above are 250 ppm TDS. Production rate and TDS reduction figures are for a new Membrane that has been rinsed for 24 hours. The production rate of a new Membrane can decrease by 10% per year or more if the scaling and fouling tendencies of the Feed Water increase.

²Measured at 50 PSIG (345 kPa), 77 °F ± 2 °F, 750±40 mg/l TDS per section 6 of NSF/ANSI Standard 58. Recovery rating means the percentage of the influent water to the membrane portion of the system that is available to the user as reverse osmosis treated water when the system is operated without a storage tank or when the storage tank is bypassed. Efficiency rating means the percentage of the influent water to the system that is available to the user as reverse osmosis treated water under operating conditions that approximate typical daily usage. This reverse osmosis system contains a replaceable component critical to the efficiency of the system. Replacement of the membrane should be with one of identical specifications, as defined by the manufacturer, to assure the same efficiency and contaminant reduction performance.

RECOMMENDED OPERATING LIMITS FOR FEED WATER

Do not use with water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system. Systems certified for cyst reduction may be used on disinfected waters that may contain filterable cysts.

Specifications	T.F.C. Membrane
Water Pressure	40 - 100 PSIG (280 - 690 kPa)
TDS	2000 ppm (also mg/l) max.
Temperature	40-100 °F (4-38 °C)
pH	4-11 (optimum rejection at pH 7.0 - 7.5)
Hardness	Less than 10 gpg (170 mg/l) or soften
Iron	Less than 0.1 ppm (also mg/l)
Manganese	Less than 0.05 ppm (also mg/l)
Hydrogen Sulfide	None
Chlorine	See note
Bacteria	Must be potable**

Table 2: Recommended Operating Limits

NOTE: Chlorine will damage a T.F.C. Membrane. The Sediment/Carbon module is designed to reduce chlorine from the Feed Water. Make sure to change the filter every 6 - 12 months or more often if the water contains more than 1 PPM chlorine.

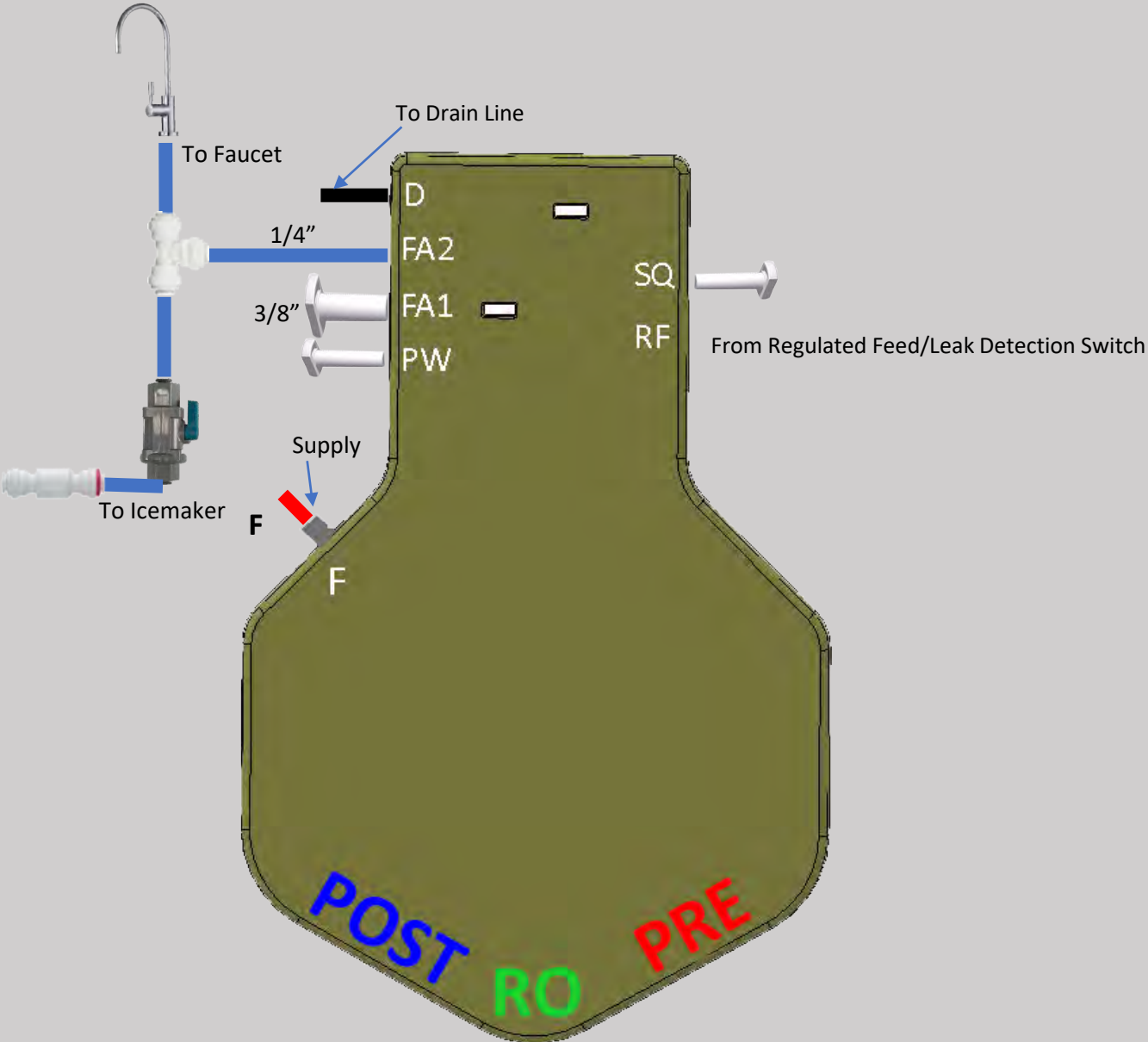
Inspecting Cartridges



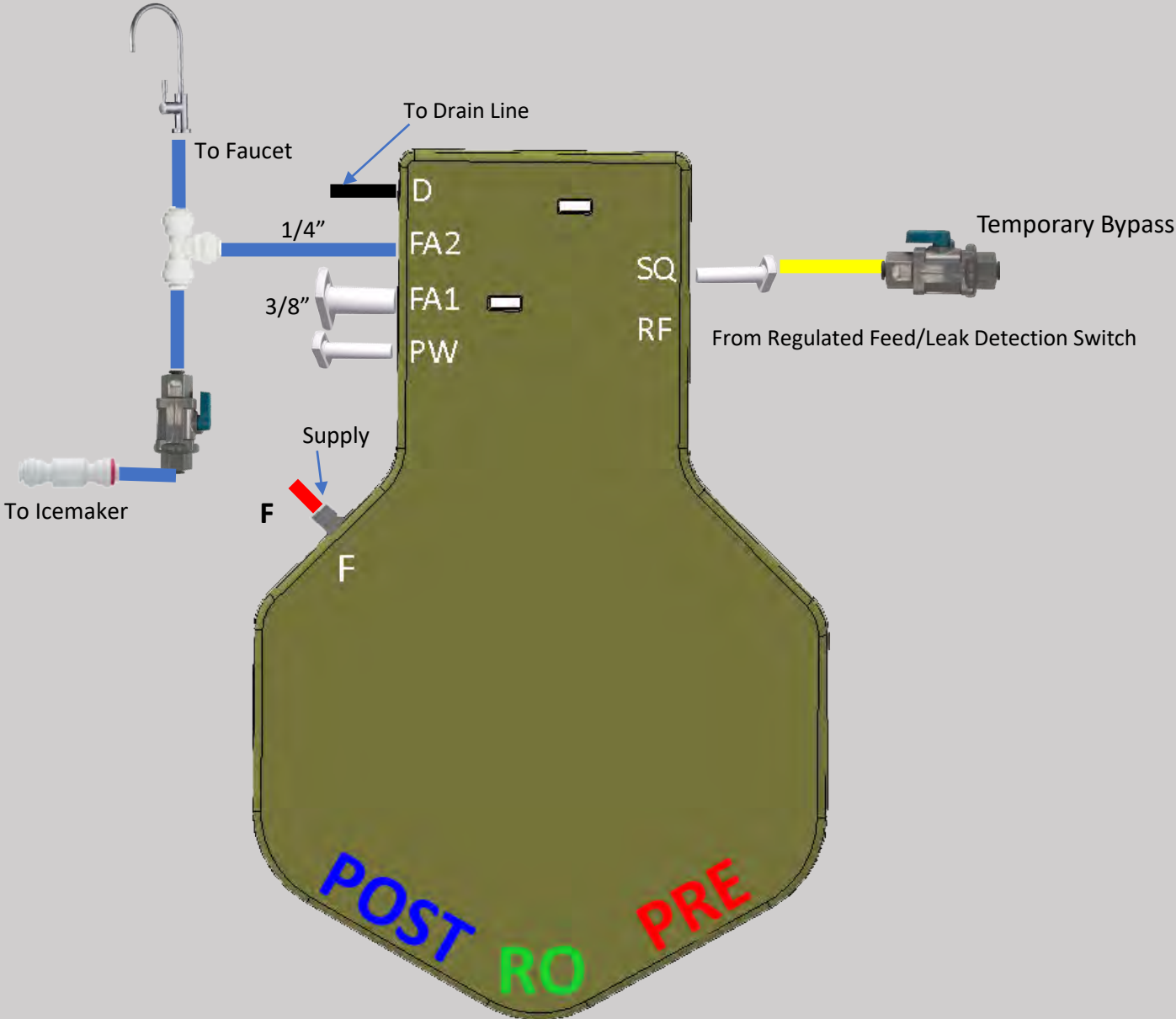
Leak Trigger Discussion



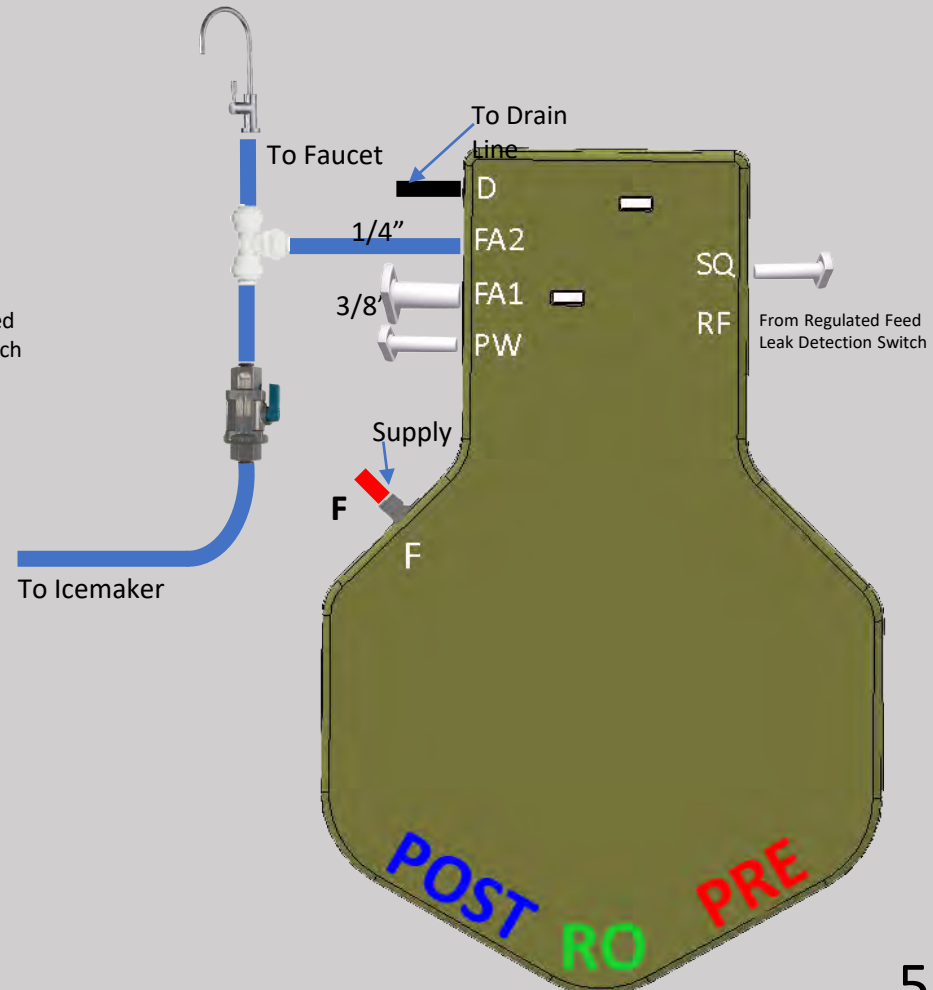
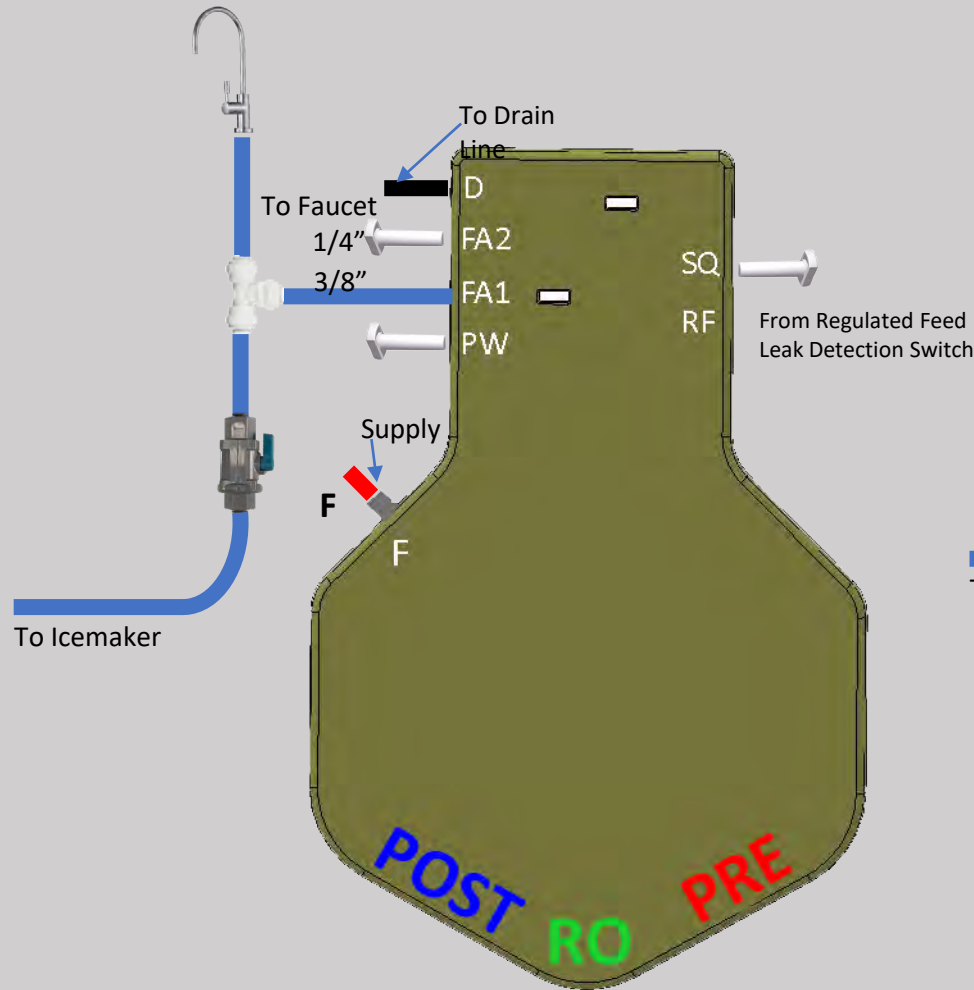
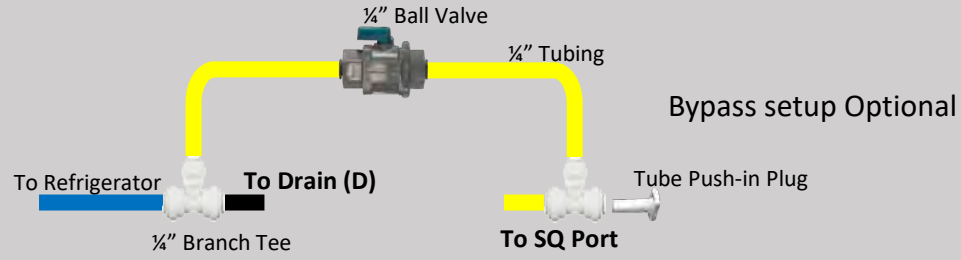
Sample of Icemaker Connection-FA2



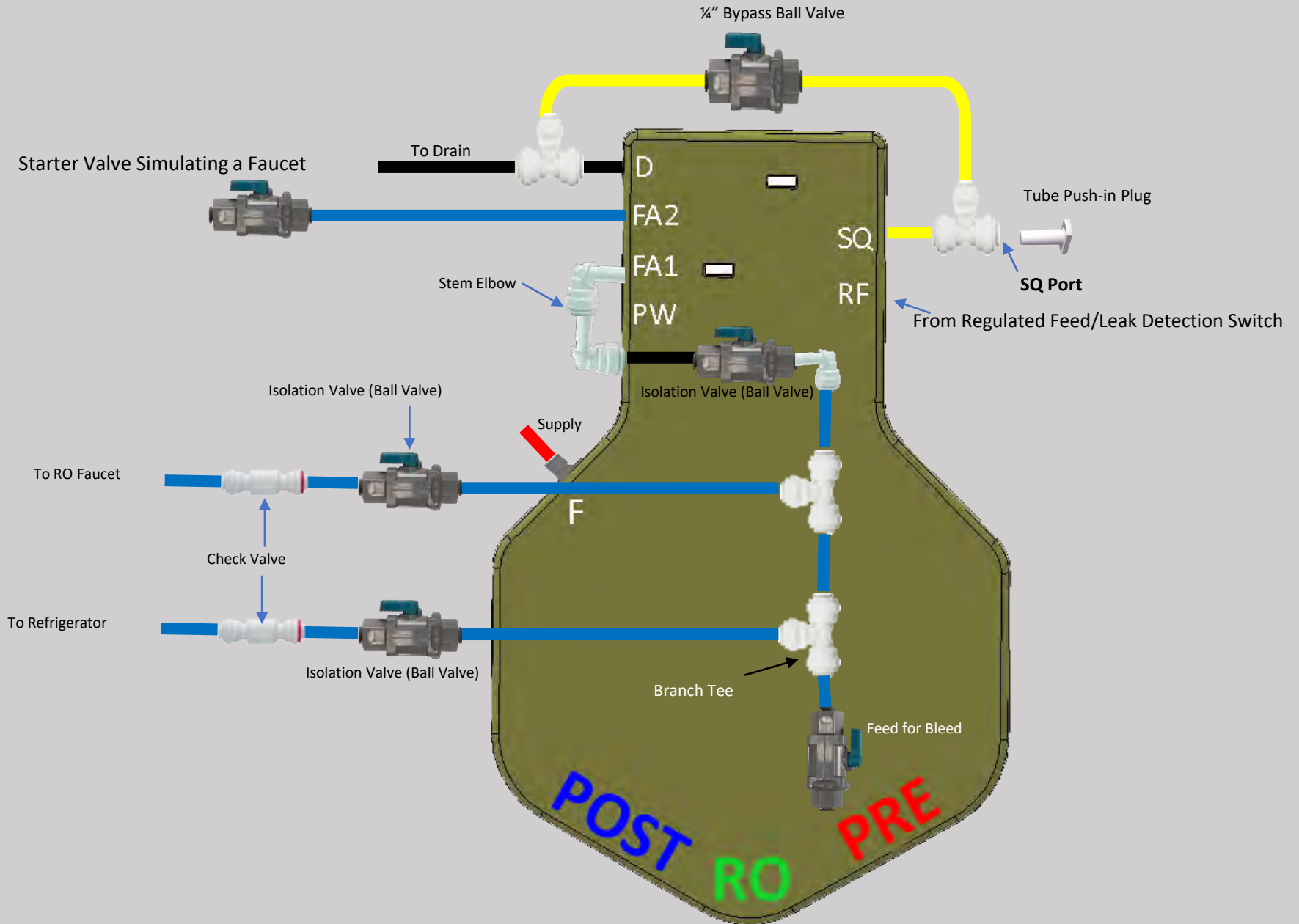
Sample of Icemaker Connection-FA2 With Temporary Bypass



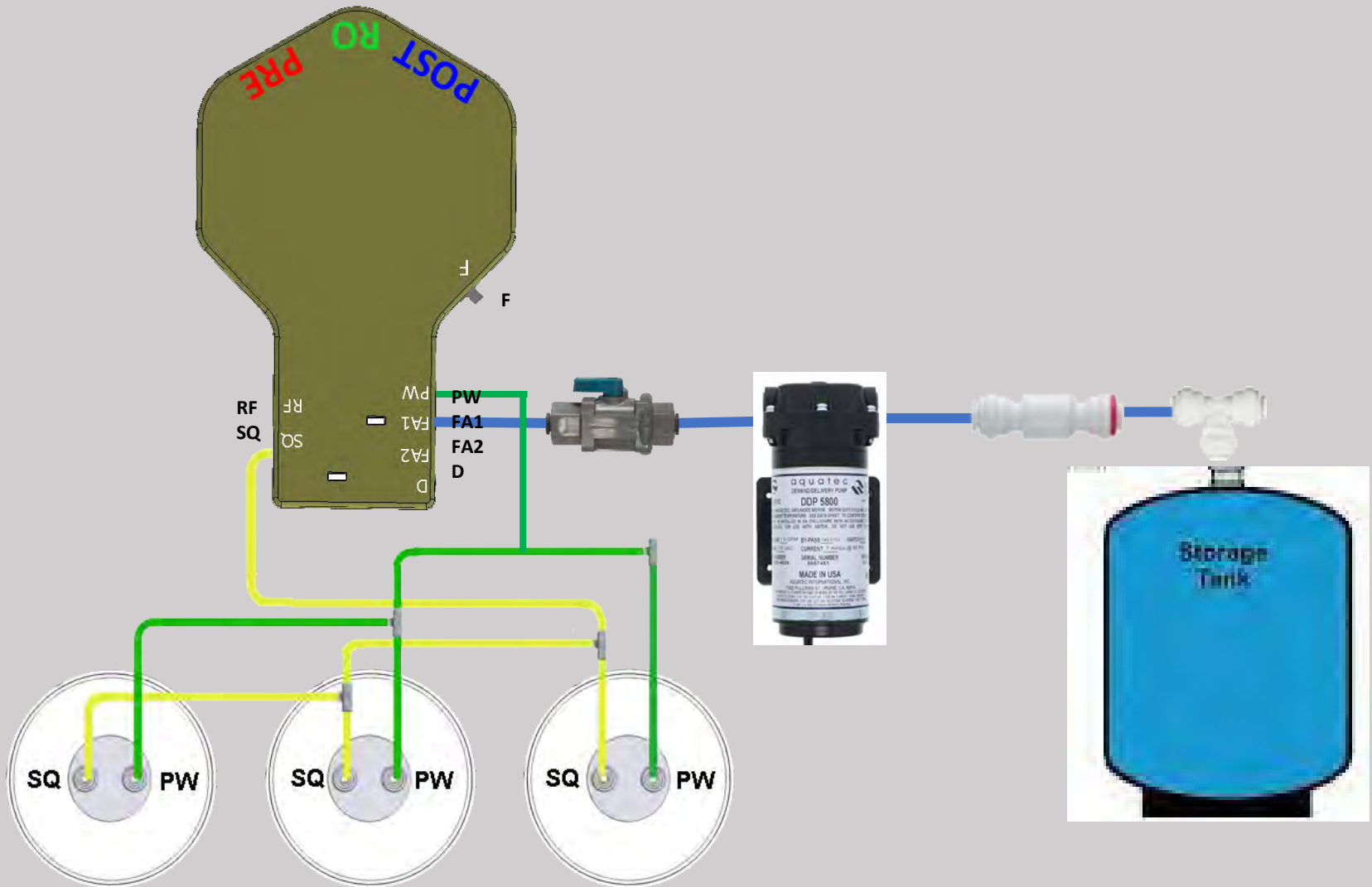
Sample of Icemaker Connection-FA1 or FA2 with Bypass



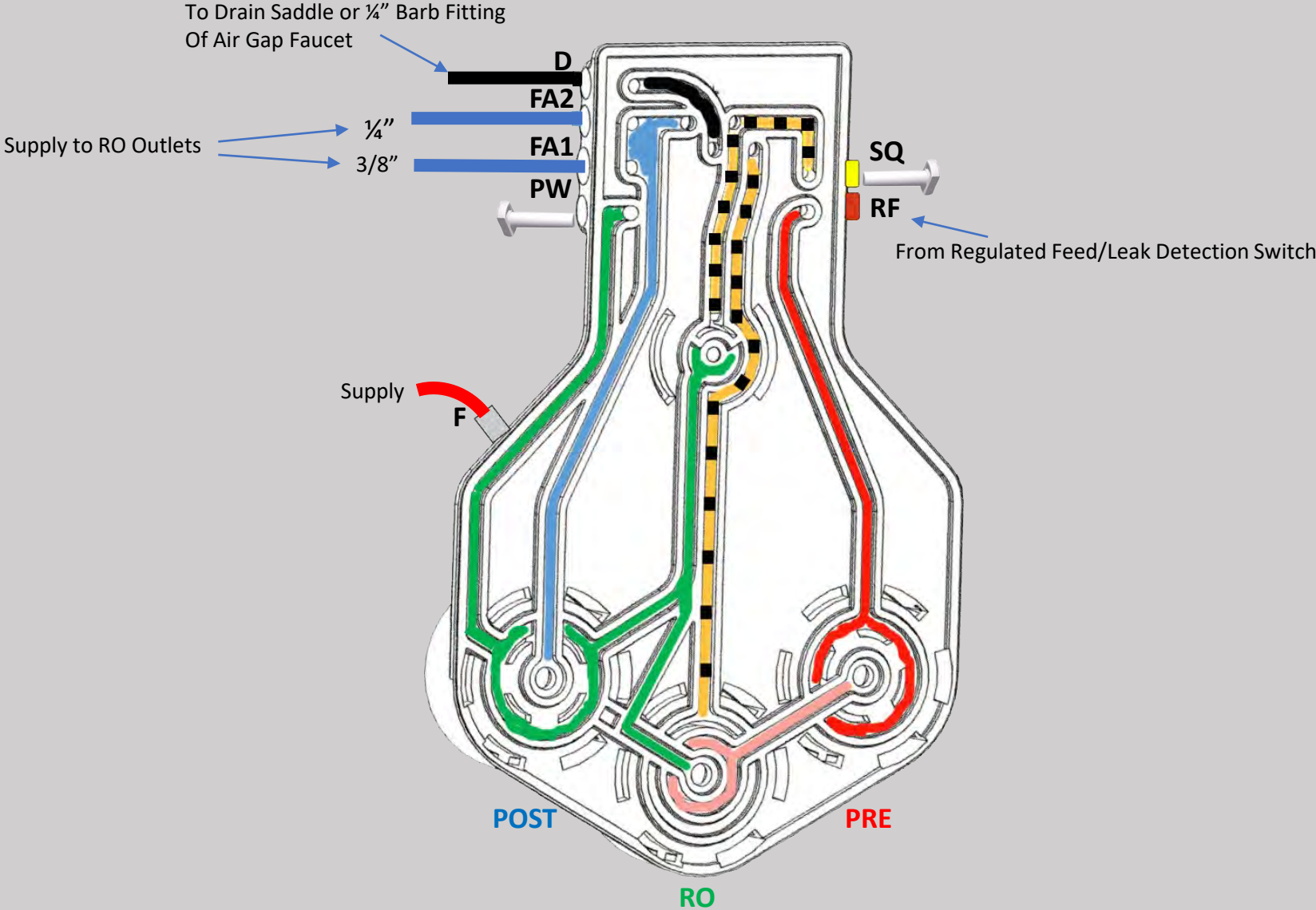
Remote/Basement Installation Diagram



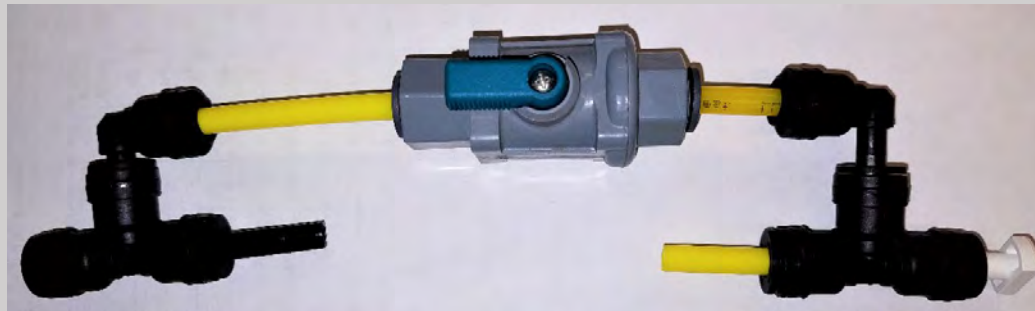
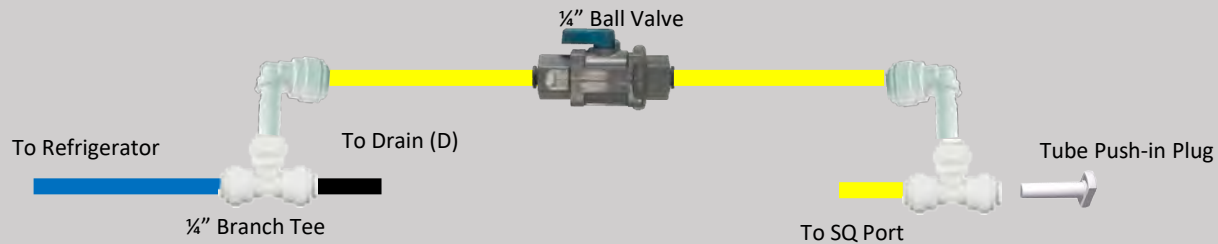
WOWRO System long distant run with extra pressure



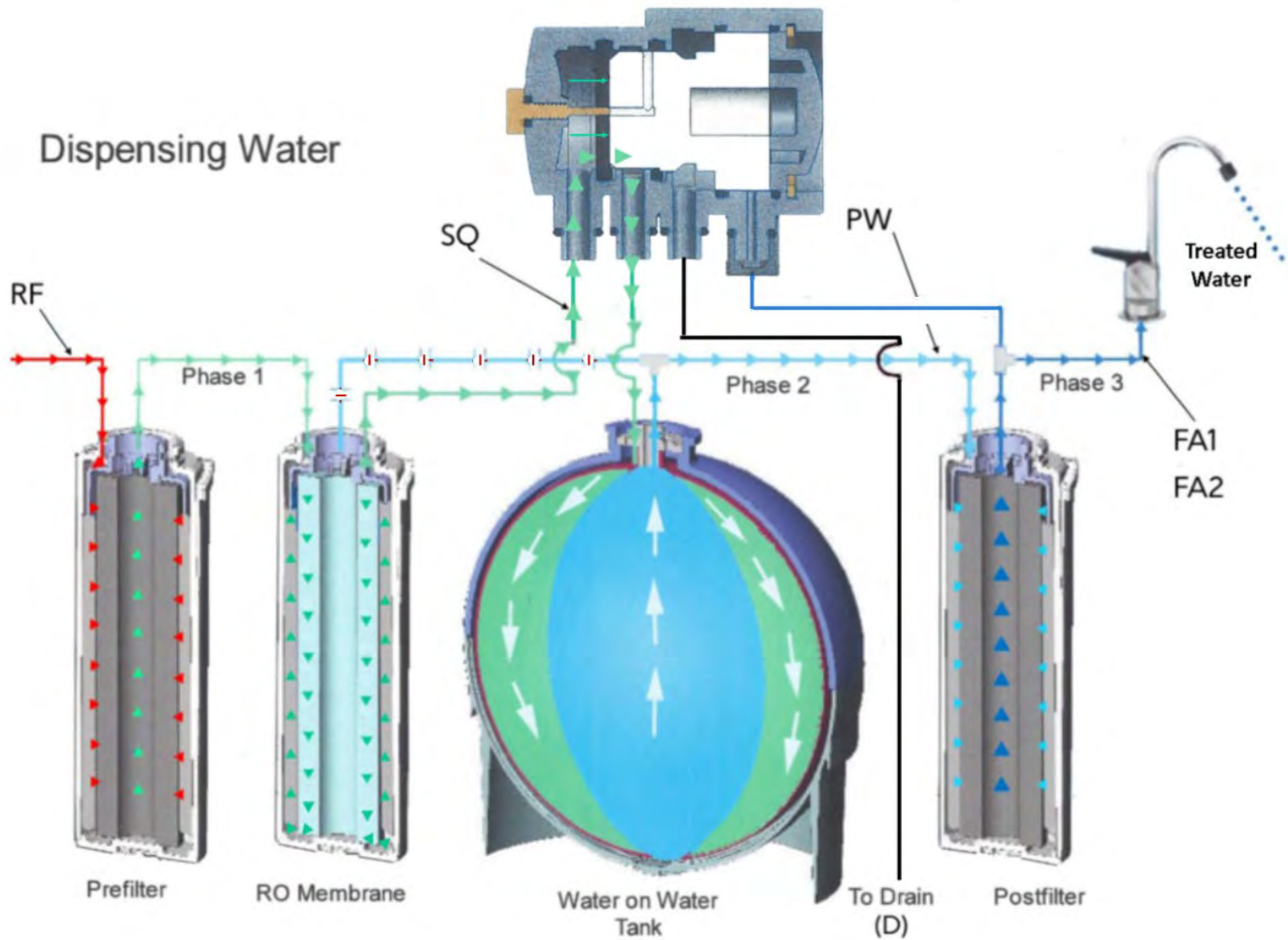
System Hookup and Flow Diagram

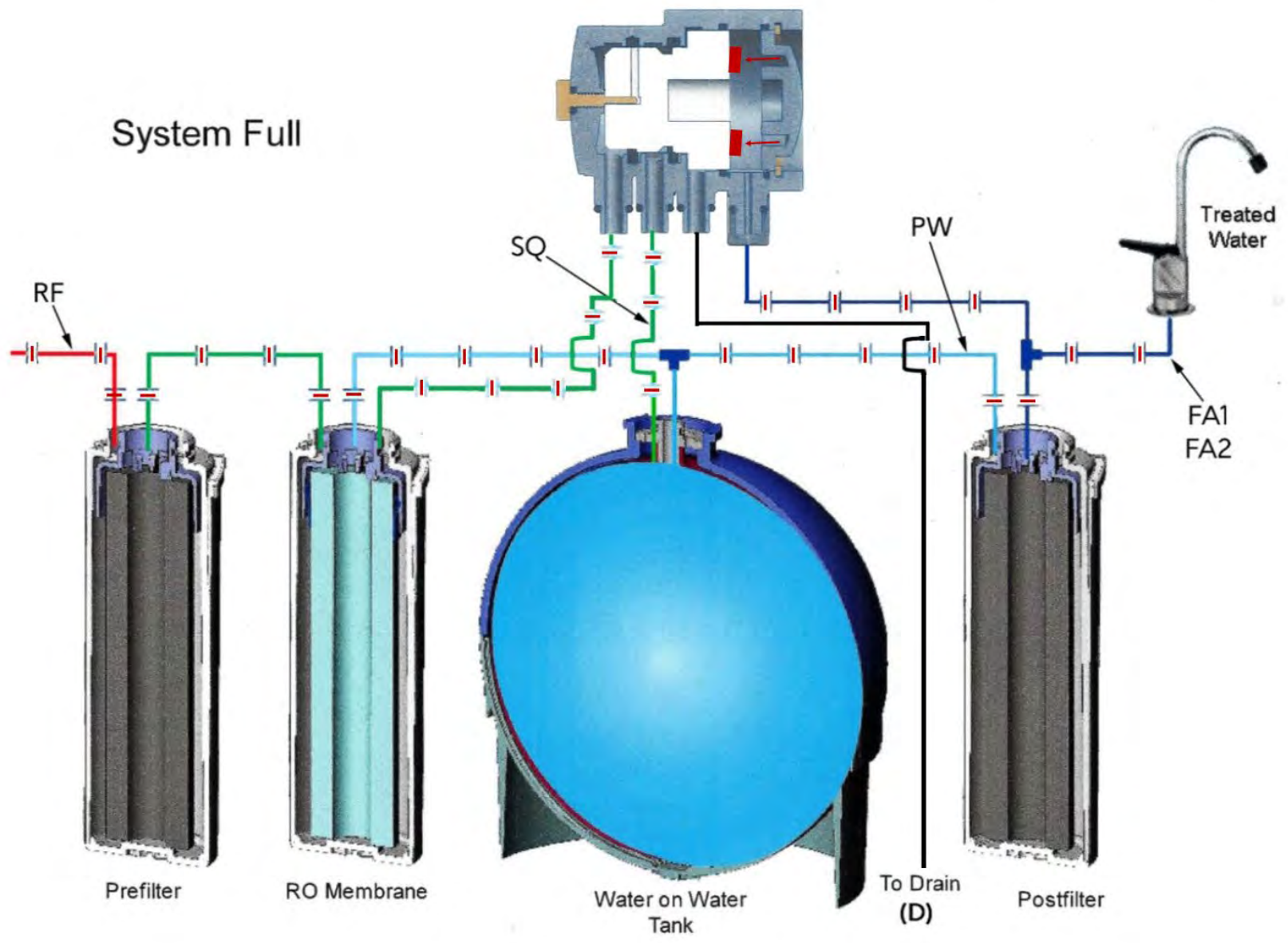


Manual Bypass for WOWRO



The Manual Reset can be an add-on to any of the WOWRO systems. It is typically used to expedite start-ups from a dry system to restarting a membrane that was over Concentrated by leaving the faucet open after tank has drained.





Making RO Water

