Performance Data

Reverse Osmosis Filter System - Model WHAROS5

IMPORTANT NOTICE: Read this performance data and compare the capabilities of this unit with your actual water treatment needs. It is recommended that, before purchasing a water treatment unit, you have your water supply tested to determine your actual water treatment needs. This filter system is designed to be used for the reduction of the substances listed below. Do not use where water 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), As (+5), or arsenate) at concentrations of 0.30 mg/L or less. This system reduces pentavalent arsenic, but may not reduce other forms of arsenic. This system shall 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 on page 8 for further information. While testing was performed under standard laboratory conditions, actual performance of this system may vary based on local water conditions. Some or all of the contaminants reduced by this unit may not be in your water supply. See elsewhere in this owner's manual for further instructions on filter replacement, system installation, operating procedures, and warranty. The maintenance instructions must be followed for the product to perform as indicated below.

General Information

This product is an undercounter system that filters and stores quality drinking water ready for use. It contains a carbon sediment filter, RO membrane, and an activated carbon post filter. This system has been tested according to NSF/ANSI 42, 53, 58, 401 and P231 for reduction of substances listed below. The concentration of the indicated substances in water entering the systems were reduced to a concentration less than or equal to the permissible limit for water leaving the system, as specified in NSF/ANSI 58. The testing was performed using spiked chlorine free deionized water with ≤1 NTU turbidity, 7.5 ± 0.5 pH, 25 ±1°C, and 1µS/cm conductivity.

Maintenance

Replacement filter prices may vary. Estimated costs of replacement filter elements (part number WHEERF), or replacement membranes (part number WHEERM), range from $39 to $59.

Application Specifications for Feed Water

Pressure .....40-100 psig (2.8-7.0 kg/cm^2)

Temperature.....40-100°F (5-38°C)

Maximum TDS Level.....2000 mg/L

Maximum Hardness @ 6.9 pH.....10 gpg* (171 mg/L)

Maximum Iron, Manganese, Hydrogen Sulfide.....0 mg/L

Maximum Chlorine .....2.0 mg/L**

pH Range.....4-10

* Grains per gallon.

** A carbon prefilter is part of this system to protect the reverse osmosis membrane from deterioration should there be chlorine in the supply water. This reverse osmosis system contains a replaceable treatment component critical for effective reduction of TDS. The product water shall be tested periodically to verify that the system is performing satisfactorily.

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 (276 kPa) or greater.

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PERFORMANCE CLAIMS FOR DRINKING WATER SYSTEM						
Model	**Replacement Elements**	**Operating Pressure Range**	**Operating Temperature Range**	**Recovery Rating**	**Efficiency Rating**	**Daily Production Rate (DPR)**
WHAROS5	WHEERF & WHEERM	40 -100 PSI (275 - 689 kPa)	40 - 100 °F (5 - 38 °C)	20.35%	8.94%	12.20 gal./day (46.2 liters/day)

NSF/ANSI Standard 42*	Minimum Reduction	Overall % Reduction	Results
Chlorine Taste & Odor	<0.5 mg/L	97.5%	Pass

NSF/ANSI Standard 53*	Influent Challenge Concentration	Maximum Permissible Concentration or % Reduction	Overall % Reduction	Results
VOC Surrogate Test	300 µg/L ±30 µg/L	95%	99.4%	Pass
MTBE	15 µg/L ±20%	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%	99.99%	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
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
Ammonium**	1.2 mg/L ±10%	–	90%	Pass
Bicarbonate**	300 mg/L ±10%	–	96%	Pass
Bromide**	1.5 mg/L ±10%	–	89%	Pass
Chloride**	800 mg/L ±10%	–	92%	Pass
Magnesium**	30 mg/L ±10%	–	97%	Pass
Sodium**	350 mg/L ±10%	–	98%	Pass
Sulfate**	800 mg/L ±10%	–	98%	Pass
Tannin**	3.0 mg/L ±10%	–	97%	Pass
Zinc**	15 mg/L ±10%	–	98%	Pass

NSF/ANSI Standard 58	Average Influent Concentration	Average Effluent Concentration	Minimum % Reduction	Average % Reduction
Nitrate plus Nitrite (as N)*	30.28 mg/L	1.12 mg/L	95.07%	96.30%
Nitrate (as N)*	27.28 mg/L	1.00 mg/L	94.53%	96.35%
Nitrite (as N)*	3.00 mg/L	0.13 mg/L	94.48%	95.74%
TDS*	750 mg/L	36 mg/L	95.20%	96.80%

* Certified by IAPMO R&T.

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

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NSF/ANSI Standard 401*	Influent Challenge Concentration	Maximum Permissible Concentration	Overall % Reduction	Results
Atenolol	200 ng/L ±20%	30 ng/L	99.5%	Pass
Bisphenol A	2,000 ng/L ±20%	300 ng/L	97.7%	Pass
Carbamazepine	1,400 ng/L ±20%	200 ng/L	96.3%	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	96.6%	Pass
Meprobamate	400 ng/L ±20%	60 ng/L	98.2%	Pass
Metolachlor	1,400 ng/L ±20%	200 ng/L	96.9%	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	96.2%	Pass
Trimethoprim	140 ng/L ±20%	20 ng/L	98.9%	Pass

VOCs (by surrogate testing using chloroform)*		Influent Challenge Concentration	Maximum Permissible Concentration
Alachlor		50 µg/L	1.0 µg/L
Atrazine		100 µg/L	3.0 µg/L
Benzene		81 µg/L	1.0 µg/L
Carbofuran		190 µg/L	1.0 µg/L
Carbon Tetrachloride		78 µg/L	1.8 µg/L
Chlorobenzene		77 µg/L	1.0 µg/L
Chloropicrin		15 µg/L	0.2 µg/L
2,4-D		110 µg/L	1.7 µg/L
Dibromochloropropane (DBCP)		52 µg/L	0.02 µg/L
o-Dichlorobenzene		80 µg/L	1.0 µg/L
p-Dichlorobenzene		40 µg/L	1.0 µg/L
1,2-Dichloroethane		88 µg/L	4.8 µg/L
1,1-Dichloroethylene		83 µg/L	1.0 µg/L
cis-1,2-Dichloroethylene		170 µg/L	0.5 µg/L
trans-1,2-Dichloroethylene		86 µg/L	1.0 µg/L
1,2-Dichloropropane		80 µg/L	1.0 µg/L
cis-1,3-Dichloropropylene		79 µg/L	1.0 µg/L
Dinoseb		170 µg/L	0.2 µg/L
Endrin		53 µg/L	0.59 µg/L
Ethylbenzene		88 µg/L	1.0 µg/L
Ethyl Dibromide (EDB)		44 µg/L	0.02 µg/L
Haloacetonitriles (HAN)	Bromochloroacetonitrile	22 µg/L	0.5 µg/L
	Dibromoacetonitrile	24 µg/L	0.6 µg/L
	Dichloroacetonitrile	9.6 µg/L	0.2 µg/L
	Trichloroacetonitrile	15 µg/L	0.3 µg/L
Haloketones (HK)	1,1-dichloro-2-propanone	7.2 µg/L	0.1 µg/L
	1,1,1-trichloro-2-propanone	8.2 µg/L	0.3 µg/L

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VOCs (by surrogate testing using chloroform)*	Influent Challenge Concentration	Maximum Permissible Concentration
Heptachlor	25 µg/L	0.01 µg/L
Heptachlor Epoxide	10.7 µg/L	0.2 µg/L
Hexachlorobutadiene	44 µg/L	1.0 µg/L
Hexachlorocyclopentadiene	60 µg/L	0.002 µg/L
Lindane	55 µg/L	0.01 µg/L
Methoxychlor	50 µg/L	0.1 µg/L
Pentachlorophenol	96 µg/L	1.0 µg/L
Simazine	120 µg/L	4.0 µg/L
Styrene	150 µg/L	0.5 µg/L
1,1,2,2-Tetrachloroethane	81 µg/L	1.0 µg/L
Tetrachloroethylene	81 µg/L	1.0 µg/L
Toluene	78 µg/L	1.0 µg/L
2,4,5-TP (silvex)	270 µg/L	1.6 µg/L
Tribromoacetic acid	42 µg/L	1.0 µg/L
1,2,4-Trichlorobenzene	160 µg/L	0.5 µg/L
1,1,1-Trichloroethane	84 µg/L	4.6 µg/L
1,1,2-Trichloroethane	150 µg/L	0.5 µg/L
Trichloroethylene	180 µg/L	1.0 µg/L
Chloroform (THM)	300 µg/L	15 µg/L
Bromoform (THM)		
Bromodichloromethane (THM)		
Chlorodibromomethane (THM)		
Xylenes (total)	70 µg/L	1.0 µg/L

Substance	Log Reduction	% Reduction
Cyst*	3.5	99.95%
Virus*	4	99.99%
Bacteria*	6	99.9999%

FILTER PERFORMANCE DATA	
Flow Rate	0.9 gallons per minute (3.4 liters per minute)
Capacity	230 gallons (871 liters)

Substance*	Influent Challenge Concentration	Maximum Permissible Product Water Concentration
Perfluorooctanoic acid (PFOA) & Perfluorooctane sulfonate (PFOS)	0.0015 mg/L ±20%	0.00002 mg/L

This system has been tested according to NSF/ANSI standards for the reduction of substances listed above. 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 Standards 42, 53, 58, 401 and P231.

Testing was performed under standard laboratory conditions. Actual performance may 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.

Do not use with water that is microbiologically unsafe or of unknown quality, without adequate disinfection before or after the system. This system is certified for cyst reduction, and 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 is certified for nitrate/nitrite reduction only for water supplies with a pressure of 40 psig (276 kPa) or greater.

* Certified by IAPMO R&T.

Performance Data

Compounds certified under NSF/ANSI 401 have been deemed as 'incidental contaminants / emerging compounds.' Incidental contaminants are those compounds that have been detected in drinking water supplies at trace levels. While occurring at only trace levels, these compounds can affect the public acceptance/perception of drinking water quality.

The system conforms to NSF protocol P231 for microbiological water purifiers. The system is not intended to convert wastewater or raw sewage into drinking water.

Spent adsorption media will not be regenerated and used.

The system is to be supplied only with cold water.

The system and installation shall comply with applicable state and local regulations.

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.

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 reduce other forms of arsenic. This system shall 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 below for further information.

ARSENIC FACTS

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 water filtration system.