

MICROLINE[®] R.O. DRINKING WATER SYSTEM

MODEL T.F.C.-435

Performance Data Sheet



Tested and Certified by NSF International against NSF/ANSI Standard 58 for the reduction of: Arsenic (Pentavalent), Barium, Cadmium, Chromium (Hexavalent), Chromium (Trivalent), Copper, Cyst, Fluoride, Lead, Nitrate, Nitrite, Radium 226/228, Selenium and TDS.

This reverse osmosis system contains replaceable treatment components critical for effective performance. It is the user's responsibility to, and the manufacturer strongly recommends that the user, periodically test the product water to verify that system is performing satisfactorily.

A note for systems with the water quality monitor:

The Water Quality Monitor has been integrated into the system cover for instant monitoring at the touch of a button. The monitor compares the level of the total dissolved solids in the incoming (feed) water versus the product water and calculates the percent rejection. The monitor is preset to indicate a level of 75% rejection. NSF/ANSI Standard 58 requires a 75% total dissolved solids rejection to pass the requirement of the standard.

A green light indicates that the percent rejection is at or above the set (desired) value and that the system is producing quality water.

An amber light indicates that the product water quality is less than acceptable. Because the Water Quality Monitor was designed to operate best while the system is making water, a false reading may occur if tested when your R.O. drinking water system is not making water. Please empty the storage tank, wait 15 minutes for the system to begin making water, and test your water quality again. If the Water Quality Monitor light is still amber, change the 9 volt battery and test your water quality again. If the Water Quality Monitor light is still amber, please contact a water treatment professional for service. The Water Quality Monitor requires a 9 volt battery, which is included.

microline[®]

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If Microline[®] replacement filters and membranes are not used, health related contaminant reduction claims are invalid.

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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. 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	98	pH 7.5±0.5
Barium	10.0 ± 10%	2.0	99	Turbidity ≤ 1 NTU
Cadmium	0.03 ± 10%	0.005	95	Temperature 77° ± 2° F
Chromium (Hexavalent)	0.30 ± 10%	0.1	88	Pressure 50 psig
Chromium (Trivalent)	0.30 ± 10%	0.1	97	1 Unless otherwise indicated.
Copper	3.0 ± 10%	1.3	99	2 Average based upon actual test data.
Fluoride	8.0 ± 10%	1.5	97	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 more information.
Lead	0.15 ± 10%	0.010	98	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	80	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	80	
Nitrite (as N) ⁴	3.0 ± 10%	1.0	78	
Radium 226/228 ⁵	25 pCi/l ± 10%	5 pCi/l	80	
Selenium	0.1 ± 10%	0.05	98	
Total Dissolved Solids	750 ± 40 mg/l	187	94	
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: 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 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 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: 94%
System Production: 13 gallons per day (49 liters per day) **Recovery Rating:** 33% **Efficiency Rating:** 17%
 Measured at 50 psig, 77° ± 2° F, 751 mg/L T.D.S., per section 6.7 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: 35±7 gallons per day (106–159 liters per day) **Membrane T.D.S. Reduction:** 95% minimum
 Note: Measured at industry standard condition of 50 psig, 77° F, 350 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.

ADDITIONAL STATE OF IOWA INFORMATION

REDUCTION PERFORMANCE Test Parameters: 751 mg/l T.D.S.; 7.5±0.5 pH; ≤ 1 NTU; 77° ±2° F; 50 psig

	Influent (avg. mg/l) ¹	Effluent (max. mg/l) ¹	Minimum % Rejection	EPA MCL ² (mg/l) ¹
Arsenic (Pentavalent) ³	0.28	0.011	96	0.010
Barium	9.4	0.001	99	2.0
Cadmium	0.029	0.004	86	0.005
Chromium (Hexavalent)	0.16	0.04	75	0.1
Chromium (Trivalent)	0.15	0.0052	97	0.1
Copper	2.8	0.05	98	1.3
Fluoride	7.7	0.4	95	4.0
Lead	0.15	0.008	95	0.015
Nitrate (as N) ⁴	28	7.8	72	10.0
Nitrite (as N) ⁴	2.8	0.83	70	1.0
Radium 226/228 ⁵	25 pCi/l	5 pCi/l	80	5 pCi/l
Selenium	0.13	0.009	93	0.05
Total Dissolved Solids	751	60	92	NA
Cyst	80,000 #/ml	7 #/ml	99.99	

FOR IOWA USE ONLY
Seller Name
Address
Phone
Seller Signature
Customer Signature
Date (Signatures required prior to sale only in Iowa and signed sheet to be

- 1 Unless otherwise indicated.
- 2 USEPA Maximum Contaminant Level or Action Level.
- 3 See Arsenic Facts section.
- 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.
NA=Not Applicable.

State of California
Department of Health Services
Water Treatment Device
Certificate Number
04 - 1650
Date Issued: June 29, 2004

ADDITIONAL STATE OF CALIFORNIA INFORMATION

Trademark/Model Designation	Replacement Elements
T.F.C.-335	S7028 (prefilter) S1229RS (membrane) S7025 (post filter)
T.F.C.-435	S7028 (prefilter) S1229RS (membrane) S7025 (first post filter) S7206W-JG (second post filter)
Manufacturer: Microline	

Manufacturer's Suggested Retail Prices
For Replacement Filters

S7028 Prefilter:	\$23.00
S1229RS Membrane:	\$105.00
S7025 First Post Filter:	\$15.00
S7206W-JG Second Post Filter	\$17.00

The water treatment device(s) listed on this certificate have met the testing requirements pursuant to Section 116830 of the Health and Safety Code for the following health related contaminants:

Microbiological Contaminants and Turbidity Cysts (protozoan) Turbidity Organic Contaminants None	Inorganic/Radiological Contaminants Arsenic (pentavalent) Barium Cadmium Chromium (hexavalent) Chromium (trivalent) Copper Fluoride Lead Nitrate/Nitrite ¹ Radium 226/228 Selenium
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Rated Service Capacity: not applicable **Rated Service Flow:** 13 gal/day

Conditions of Certification:

Do not use where water is microbiologically unsafe or with water of unknown quality, except that systems certified for cyst reduction may be used on disinfected waters that may contain filterable cysts.

¹Claims for arsenic reduction shall only be made on water supplies maintaining detectable residual free chlorine at the reverse osmosis (RO) system inlet. Water systems using an in-line chlorinator should provide a minimum of 1 minute chlorine contact time before the RO system.

²This 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. A sampling and analysis test kit for nitrate is provided for checking the performance of this system. Frequent analysis is encouraged.

Arsenic Facts

Arsenic (As) is a naturally occurring contaminant found in many ground waters. It generally occurs in two forms (valences or oxidation states): pentavalent arsenic (also known as As(V), As(+5), or arsenate) and trivalent arsenic (also known as As(III), As(+3), or arsenite). In natural ground water, arsenic may exist as trivalent arsenic, pentavalent arsenic, or a combination of both. Although both forms of arsenic are potentially harmful to human health, trivalent arsenic is considered more harmful than pentavalent arsenic. More information about arsenic and its toxicity can be found on the U.S. Environmental Protection Agency website at <http://www.epa.gov/safewater/arsenic.html>.

This system is designed to remove only pentavalent arsenic. This treatment system does not provide a feature for conversion of trivalent arsenic to pentavalent arsenic. The system may remove some trivalent arsenic, however, it has not been evaluated for its ability to remove trivalent arsenic.

Trivalent arsenic is generally more difficult to remove from drinking water than pentavalent arsenic. Trivalent arsenic can be converted to pentavalent arsenic in the presence of an effective oxidant such as free chlorine. The arsenic in water containing detectable free chlorine or that has been treated with another effective oxidant will be in the pentavalent arsenic form¹. Treatment with chloramine (combined chlorine) is not sufficient to ensure complete conversion of trivalent arsenic to pentavalent arsenic.

Consumers using public water supplies can contact their utility to verify whether free chlorine treatment chemicals are being used. Private water supplies and waters that do not have detectable free chlorine residuals should be analyzed to determine the form(s) of arsenic present and the potential need for oxidation of trivalent arsenic to pentavalent arsenic.

Arsenic does not generally impart color, taste, or smell to water, therefore, it can only be detected by a chemical analytical test. Public water supplies are required to monitor treated water for total arsenic (trivalent arsenic plus pentavalent arsenic) and the results are available to the public from the utility. Consumers using private water sources will need to make arrangements for testing. A total arsenic test usually costs about \$15-\$30 and it is recommended the test be conducted by a certified laboratory. Local health departments or environmental protection agencies can help provide consumers with a list of certified laboratories. Some laboratories may also be able to analyze specifically for (speciate) the two forms of arsenic present in a water sample if requested.

This treatment system was tested under laboratory conditions as defined in NSF/ANSI 58 Reverse Osmosis Drinking Water Treatment Systems and was found to reduce 0.30 mg/L influent arsenic challenge concentration in the test water to less than 0.010 mg/L, under standard testing conditions. Actual performance of the system may vary depending on specific water quality conditions at the consumer's installation. Following installation of this system, the consumer should have the treated water tested for total arsenic to verify arsenic reduction is being achieved and the system is functioning properly.

The R.O. Membrane must be replaced at the end of its useful life. Typical membrane life expectancy is three years. Local conditions may dictate more frequent changes. For replacement parts contact your local dealer who supplied the unit or contact the factory for the dealer nearest you.

¹ Laboratory Study on the Oxidation of Arsenic III to Arsenic V, EPA/600/R-01/021, March 2001 (available on line at <http://www.epa.gov/ORD/publications/ordpubs.html>)

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