

EWMRU

Eradicated Pathogens

Recognized Treatment Techniques

Meeting the National Primary Drinking Water Regulations

Primary (Health-Related) Microbial & Turbidity Contaminants

<u>Contaminants</u>	<u>MCLG</u>	<u>MCL</u>	<u>Required Treatment</u>
Turbidity	--	0.5 to 1 NTU in 95% Of samples; maximum Of 5 MTU under certain circumstances	A: Sand Filtration B: Micro Z Filtration C: Ozone Oxidation D: Multi Media Filtration F: Reverse Osmosis
Coliform bacteria	zero	zero in 95% of samples	Turbidity reduction to 1 NTU and then: A: Sand Filtration B: Micro Z Filtration C: Ozone Oxidation D: Multi Media Filtration G: Ultra Violet
Viruses	zero	99.99% reduction Or inactivation	Turbidity reduction to 1 NTU and then: A: Sand Filtration B: Micro Z Filtration C: Ozone Oxidation D: Multi Media Filtration G: Ultra Violet
Giardia lamblia	zero	99.99% reduction Or inactivation	Turbidity reduction to 1 cysts NTU and then: A: Sand Filtration B: Micro Z Filtration C: Ozone Oxidation D: Multi Media Filtration

Primary (Health-Related) Radionuclide Contaminants

<u>Contaminants</u>	<u>MCLG</u>	<u>MCL</u>	<u>Required Treatment</u>
Beta particle and Photon Activity (formerly man-Made radionuclides)	zero	4 mrem/year	A: Sand Filtration B: Micro Z Filtration F: Reverse Osmosis
Gross alpha	zero	15 pCi/L	Treatment method depends on particle activity the Specific radionuclide – e.g., radium, Radon, or uranium, see below
Radium 226 & Radium 228	zero	20 pCi/L (p)*	A: Sand Filtration B: Micro Z Filtration F: Reverse Osmosis
Radon	zero (P)*	3,000 pCi/L (P)*	A: Sand Filtration B: Micro Z Filtration C: Ozone Oxidation E: Carbon Filtration
Uranium	zero (P)*	0.02 mg/L (P)*	A: Sand Filtration B: Micro Z Filtration C: Ozone Oxidation D: Multi Media Filtration F: Reverse Osmosis

(P)* = Proposed Standard

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Primary (Health Related) Organic Contaminants

<u>Contaminants</u>	<u>MCLG,mg/L</u>	<u>MCL,mg/L</u>	<u>Required Treatment</u>
Adipates (diethylhexyl)	0.5	0.5	A: Sand B: Micro Z C: Ozone E: Carbon
Alachlor	zero	0.002	A: Sand B: Micro Z E: Carbon
Aldicarb	0.001	0.003	A: Sand B: Micro Z E: Carbon
Aldicarb sulfone	0.001	0.002	A: Sand B: Micro Z E: Carbon
Aldicarb sulfoxide	0.001	0.004	A: Sand B: Micro Z E: Carbon
Atrazine	0.003	0.003	A: Sand B: Micro Z E: Carbon
Benz(a)anthraceme (PAH)	zero (P)*	0.0001(p)*	A: Sand B: Micro Z E: Carbon
Benzene	zero	0.005	A: Sand B: Micro Z C: Ozone E: Carbon
Benzo(a)pyrene (PAH)	zero	0.0002	A: Sand B: Micro Z E: Carbon
Benzo(b)-fluoranthene (PAH)	zero (P)*	0.0002 (P)*	A: Sand B: Micro Z E: Carbon
Butyl benzyl Phthalate (PAE)	zero (P)*	0.1 (P)*	A: Sand B: Micro Z E: Carbon

<u>Contaminants</u>	<u>MCLG,mg/L</u>	<u>MCL,mg/L</u>	<u>Required Treatment</u>
Carbofuran	0.04	0.04	A: Sand B: Micro Z E: Carbon
Carbon tetrachloride	zero	0.005	A: Sand B: Micro Z C: Ozone E: Carbon
Chlordane	zero	0.002	A: Sand B: Micro Z E: Carbon
Chrysene (PAH)	zero (P)*	0.0002 (P)*	A: Sand B: Micro Z E: Carbon
2,4-D	0.07	0.07	A: Sand B: Micro Z E: Carbon
Dalapon	0.2	0.2	A: Sand B: Micro Z E: Carbon
Di[2-ethylhexyl]adipate	0.4	0.4	A: Sand B: Micro Z E: Carbon
Dibenz(a,h)anthraceme (PAH)	zero (P)*	0.0003 (P)*	A: Sand B: Micro Z E: Carbon
Dibromochloropropane (DBCP)	zero	0.0002	A: Sand B: Micro Z C: Ozone E: Carbon
Dichlorobenzene (ortho-)	0.6	0.6	A: Sand B: Micro Z C: Ozone E: Carbon
Dichlorobenzene (meta-)	0.6	0.6	A: Sand B: Micro Z C: Ozone E: Carbon

Primary Organic Contaminants Cont.

<u>Contaminants</u>	<u>MCLG,mg/L</u>	<u>MCL,mg/L</u>	<u>Required</u>
Dichlorobenzene (para-)	0.075	0.075	A: Sand B: Micro Z C: Ozone E: Carbon
Dichlorethane (1,2-)	zero	0.005	A: Sand B: Micro Z C: Ozone E: Carbon
Dichloroethylene (1,1-)	0.007	0.007	A: Sand B: Micro Z C: Ozone E: Carbon
Dichloroethylene (cis-1, 2-)	0.07	0.07	A: Sand B: Micro Z C: Ozone E: Carbon
Dichloromethane (trans-1, 2-)	0.1	0.1	A: Sand B: Micro Z C: Ozone E: Carbon
Dichloromethane (methylene chloride)	zero	0.005	A: Sand B: Micro Z C: Ozone
Dichloropropane (1,2-)	zero	0.005	A: Sand B: Micro Z C: Ozone E: Carbon
Diethylhexyl phthalate (PAE)	zero	0.006	A: Sand B: Micro Z E: Carbon
Dinoseb	0.007	0.007	A: Sand B: Micro Z E: Carbon
Diquat	0.02	0.02	A: Sand B: Micro Z E: Carbon

<u>Contaminants</u>	<u>MCLG,mg/L</u>	<u>MCL,mg/L</u>	<u>Required Treatment</u>
Endothall	0.1	0.1	A: Sand B: Micro Z E: Carbon
Endrin	0.002	0.002	A: Sand B: Micro Z E: Carbon
Ethylebenzene	0.7	0.7	A: Sand B: Micro Z C: Ozone E: Carbon
Ethylene dibromide (EDB)	zero	zero	A: Sand B: Micro Z C: Ozone E: Carbon
Glyphosate	0.7	0.7	A: Sand B: Micro Z E: Carbon
Heptachlor	zero	0.0004	A: Sand B: Micro Z E: Carbon
Heptachlor epoxide	zero	0.0002	A: Sand B: Micro Z E: Carbon
Hexachloro-benzene	zero	0.001	A: Sand B: Micro Z E: Carbon
Hexachloro-cyclopentadiene	0.05	0.05	A: Sand B: Micro Z C: Ozone E: Carbon
Indeno (1,2,3-c,d) pyrene (PAH)	zero (P)*	0.0004(P)*	A: Sand B: Micro Z E: Carbon
Lindane	0.0002	0.0002	A: Sand B: Micro Z E: Carbon
Methoxychlor	0.04	0.04	A: Sand B: Micro Z E: Carbon

Primary Organic Contaminants Cont.

<u>Contaminants</u>	<u>MCLG,mg/L</u>	<u>MCL,mg/L</u>	<u>Required</u>
Monochlorobenzene	0.1	0.1	A: Sand B: Micro Z C: Ozone E: Carbon
Oxamyl (vydate)	0.2	0.2	A: Sand B: Micro Z E: Carbon
Pentachlorophenol	zero	0.001	A: Sand B: Micro Z E: Carbon
Picloram	0.5	0.5	A: Sand B: Micro Z E: Carbon
Polychlorinated byphenyls (PCBs)	zero	0.0005	A: Sand B: Micro Z E: Carbon
Simarzine	0.004	0.004	A: Sand B: Micro Z E: Carbon
Styrene	0.1	0.1	A: Sand B: Micro Z C: Ozone E: Carbon
2,3,7,8-TCDD (dioxin)	zero	3×10^{-8}	A: Sand B: Micro Z E: Carbon
Tetrachloroethy- lene	zero	0.005	A: Sand B: Micro Z E: Carbon
Toluene	1.	1.	A: Sand B: Micro Z C: Ozone E: Carbon
Toxaphene	zero	0.003	A: Sand B: Micro Z

<u>Contaminants</u>	<u>MCLG,mg/L</u>	<u>MCL,mg/L</u>	<u>Required Treatment</u>
2,4,5-TP (silver)	0.05	0.05	A: Sand B: Micro Z E: Carbon
Trichlorobenzene (1,2,4)	0.07	0.07	A: Sand B: Micro Z C: Ozone E: Carbon
Trichloroethane (1,1,1-)	0.2	0.2	A: Sand B: Micro Z C: Ozone E: Carbon
Trichloroethane (1,1,2-)	0.003	0.005	A: Sand B: Micro Z C: Ozone E: Carbon
Trichloroethylene	zero	0.005	A: Sand B: Micro Z C: Ozone E: Carbon
Trihalomethanes (THMs) Chloroform Bromodichloromethane Dibromochloromethane Bromoform	zero	0.100	A: Sand B: Micro Z C: Ozone D: Multi Media E: Carbon F: Reverse Osmosis
Vinyl chloride	zero	0.002	A: Sand B: Micro Z C: Ozone E: Carbon
Xylenes (total)	10.	10.	A: Sand B: Micro Z C: Ozone E: Carbon

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Primary (Health-Related) Inorganic Contaminants

<u>Contaminants</u>	<u>MCLG,mg/L</u>	<u>MCL,mg/L</u>	<u>Required Treatment</u>
Antimony	0.006	0.006	A: Sand B: Micro Z C: Ozone D: Multi Media F: Reverse Osmosis
Arsenic (+3)	zero (P)*	0.02/0.0002 (P)* (total arsenic)	A: Sand B: Micro Z C: Ozone D: Multi Media F: Reverse Osmosis
Arsenic (+5)			A: Sand B: Micro Z C: Ozone E: Carbon F: Reverse Osmosis
Arsenic (organic complexes)			A: Sand B: Micro Z E: Carbon
Asbestos	7MFL	7 million fibers Per Liter (MFL) (longer than 10 microns)	A: Sand B: Micro Z C: Ozone D: Multi Media F: Reverse Osmosis
Barium	2.	2.	A: Sand B: Micro Z F: Reverse Osmosis
Beryllium	0.004	0.004	A: Sand B: Micro Z C: Ozone D: Multi Media F: Reverse Osmosis
Cadmium	0.005	0.005	A: Sand B: Micro Z C: Ozone D: Multi Media F: Reverse Osmosis

<u>Contaminants</u>	<u>MCLG,mg/L</u>	<u>MCL,mg/L</u>	<u>Required Treatment</u>
Chromium (+3) 0.1	0.1 (total Chromium)		A: Sand B: Micro Z C: Ozone D: Multi Media F: Reverse Osmosis
Chromium (+6)			A: Sand B: Micro Z F: Reverse Osmosis
Chromium (Organic complexes)			A: Sand B: Micro Z E: Carbon
Copper	1.3	1.3 (action level)	A: Sand B: Micro Z F: Reverse Osmosis
Cyanide	0.2	0.2	A: Sand B: Micro Z F: Reverse Osmosis
Fluoride	4.0	4.0	A: Sand B: Micro Z F: Reverse Osmosis
Lead	zero	0.015 (action level)	A: Sand B: Micro Z C: Ozone D: Multi Media F: Reverse Osmosis
Mercury (+2)	0.002	0.002 (total mercury)	A: Sand B: Micro Z E: Carbon F: Reverse Osmosis
Mercury (HgCl ₃ ⁻¹)			A: Sand B: Micro Z F: Reverse Osmosis
Mercury (organic complexes)			A: Sand B: Micro Z E: Carbon
Nickel	0.1	0.1	A: Sand B: Micro Z F: Reverse Osmosis

Primary Inorganic Contaminants Cont.

<u>Contaminants</u>	<u>MCLG,mg/L</u>	<u>MCL,mg/L</u>	<u>Required Treatment</u>
Nitrate plus nitrite (as nitrogen)	10	10	A: Sand B: Micro Z F: Reverse Osmosis
Nitrite	1	1	A: Sand B: Micro Z F: Reverse Osmosis
Selenium (+4)	0.05	0.05 (total selenium)	A: Sand B: Micro Z C: Ozone D: Multi Media F: Reverse Osmosis
Selenium (+6)			A: Sand B: Micro Z F: Reverse Osmosis
Sulfate	500 (P)*	500 (P)*	A: Sand B: Micro Z F: Reverse Osmosis

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Meeting the National Secondary Drinking Water Regulations

<u>Contaminants</u>	<u>SMCL, mg/L</u>	<u>Required Treatment</u>
Aluminum (Al ⁺³)	0.05 to 0.2 (depending on case-by-case circumstances)	A: Sand B: Micro Z F: Reverse Osmosis
Chloride (Cl ⁻¹)	250	A: Sand B: Micro Z F: Reverse Osmosis
Color	15 color units	A: Sand B: Micro Z C: Ozone E: Carbon
<p>Note: Color units are based on the APHA recommended standard of 1 color unit being equal to 1 mg/L of platinum or chloroplatinate ion.</p>		
Copper (Cu ⁺²)	1.0	A: Sand B: Micro Z F: Reverse Osmosis
Floride (F ⁻¹)	2.0	A: Sand B: Micro Z F: Reverse Osmosis
Foaming agents (MBAS0.5 (methylene blue active substances))		A: Sand B: Micro Z C: Ozone E: Carbon
Hexachlorocyclopentadiene	0.008 (P)*	A: Sand B: Micro Z C: Ozone E: Carbon
Iron (Fe ⁺²) (ferrous ion) 0.3		A: Sand B: Micro Z C: Ozone D: Multi Media
Iron (Fe ⁺³) (ferric ion)		A: Sand B: Micro Z C: Ozone D: Multi Media

*Ferrous Iron (clear water iron) is readily converted to ferric iron (red water iron) in the presence of any air or oxidizing material; precipitating ferric Iron must be prevented to avoid fouling and interference with effective reverse osmosis membrane rejection.

Meeting the National Secondary Drinking Water Regulations Cont.

<u>Contaminants</u>	<u>SMCL, mg/L</u>	<u>Required Treatment</u>
Manganese (Mn ⁺²)	0.05	A: Sand B: Micro Z C: Ozone D: Multi Media
Manganese (Mn ⁺⁴) Oxidized		A: Sand B: Micro Z C: Ozone D: Multi Media
*Manganese must be maintained in the soluble manganous (Mn ⁺²) state to avoid fouling and interference with effective reverse osmosis Membrane rejection		
Odor	3 threshold odor number	A: Sand B: Micro Z C: Ozone E: Carbon
Note: Chlorine and hydrogen sulfide are examples of odor that may be reduced by the treatment methods suggested.		
Silver (Ag ⁺¹)	0.1	A: Sand B: Micro Z C: Ozone E: Carbon
Sulfate (SO ₄ ⁻²)	250	A: Sand B: Micro Z F: Reverse Osmosis
Total dissolved solids (TDS)	500	A: Sand B: Micro Z F: Reverse Osmosis
Zinc (Zn ⁺²)	5	A: Sand B: Micro Z F: Reverse Osmosis

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