

# EPA National Drinking Water Standards (Primary Standard)

*Primary standards are mandatory and enforceable. The Maximum Contaminant Level (MCL) is set at a level at which no known or anticipated adverse health effects occur.*

*\*Source : U.S. Environmental Protection Agency and Spectrum Labs, Inc., New Brighton, MN.*

## Microbiological

Contaminant	MCL (Maximum Contaminant Level) in parts per million unless otherwise indicated	Source/Industrial Occurrence	Health Effects	Treatment
Coliform	<1 colony/100ml	Raw sewage, septic tank leakage, animal feces.	Affects digestive tract. Presence in water may indicate possible presence of other bacteria.	Chlorination, UV irradiation, distillation
Giardia lamblia	0	Human and animal fecal waste	Giardiasis, a gastroenteric disease	filtration, chlorination, UV irradiation, distillation
Legionella	0	Found naturally in water; multiplies in heating systems	Legionnaire's Disease, commonly known as pneumonia	filtration, chlorination, UV irradiation,
Turbidity	0.5-1.0 NTU	erosion, runoff and discharges	interferes with disinfection	filtration, distillation, granular activated carbon, RO

## Inorganic

Contaminant	MCL (Maximum Contaminant Level) in parts per million unless otherwise indicated	Source/Industrial Occurrence	Health Effects	Treatment
Antimony	0.006	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder	Increase in blood cholesterol; decrease in blood glucose	coagulation and filtration; submicron filtration; RO; ultrafiltration; distillation
Arsenic	0.05	Discharge from semiconductor manufacturing; petroleum refining; wood preservatives; animal feed additives; herbicides; erosion of natural deposits	Skin damage; circulatory system problems; increased risk of cancer	ion exchange, RO, distillation, activated alumina, lime softening, coagulation with filtration
Asbestos (fiber >10 micrometers)	7 million fibers per Liter	natural geologic deposit. Insulation, fireproofing materials and cement pipe.	Probable cause of cancer	filtration; RO

Barium	2	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits	Increase in blood pressure	ion exchange, RO, distillation, lime softening
Beryllium	0.004	Discharge from metal refineries and coal-burning factories; discharge from electrical, aerospace, and defense industries	Intestinal lesions	coagulation and filtration; submicron filtration and activated carbon; activated alumina; cation exchange; RO distillation; electro dialysis
Cadmium	0.005	Corrosion of galvanized pipes; erosion of natural deposits; discharge from metal refineries; runoff from waste batteries and paints	Kidney damage, bronchitis, anemia	ion exchange, RO distillation, lime softening, coagulation with filtration, corrosion control
Chromium	0.1	Geologic deposits, used in leather tanning, iron and steel manufacturing, coal mining, textile mills, gum and wood chemicals, pharmaceutical manufacturing, petroleum refining, rubber processing and foundries.	Liver and kidney disorders. Affects skin and digestive system.	Ion exchange, RO distillation, lime softening, coagulation with filtration
Copper	1.3	Corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives	Short term exposure: Gastrointestinal distress. Long term exposure: Liver or kidney damage. Those with Wilson's Disease should consult their personal doctor if their water systems exceed the copper action level.	Ion exchange, RO, distillation
Cyanide (as free cyanide)	0.2	Discharge from steel/metal factories; discharge from plastic and fertilizer factories	Nerve damage or thyroid problems	chemical oxidation and disinfection at pH > 10; anion exchange; RO; distillation, electro dialysis
Fluoride	4	Water additive which promotes strong teeth; erosion of natural deposits; discharge from fertilizer and aluminum factories	Bone disease (pain and tenderness of the bones); Children may get mottled teeth.	Ion exchange, RO, distillation activated alumina
Lead	0.015	Corrosion of household plumbing systems; erosion of natural deposits	Infants and children: Delays in physical or mental development. Adults: Kidney problems; high blood pressure	Ion exchange, RO, distillation, coagulation with filtration, corrosion control, activated carbon
Mercury	0.002	Erosion of natural deposits; discharge from refineries and factories; runoff from landfills and cropland	nerve and Kidney damage	activated carbon, lime softening, RO, coagulation with filtration and with powdered activated carbon, distillation

Nitrate (measured as Nitrogen)	10	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits	"Blue baby syndrome" in infants under six months - life threatening without immediate medical attention. Symptoms: Infant looks blue and has shortness of breath.	Ion exchange, RO, distillation
Nitrite (measured as Nitrogen)	1	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits	"Blue baby syndrome" in infants under six months - life threatening without immediate medical attention. Symptoms: Infant looks blue and has shortness of breath.	Ion exchange, RO, distillation
Selenium	0.05	Discharge from petroleum refineries; erosion of natural deposits; discharge from mines	Hair or fingernail loss; numbness in fingers or toes; circulatory problems	lime softening, RO, coagulation with filtration, activated alumina, distillation
Silver	0.05 (0.01 secondary limit)	natural geologic deposits. Used as a sterilant. Found in battery manufacturing plating operations, and medical and pharmaceutical processing.	Irritant to skin and other body tissues.	Ion exchange, RO, distillation
Sodium	No MCL ( 20 ppm reporting level)	geologic deposits, road salting.	Possible increased blood pressure in susceptible individuals.	Ion exchange, RO, distillation
Thallium	0.002	Leaching from ore-processing sites; discharge from electronics, glass, and pharmaceutical companies	Hair loss; changes in blood; kidney, intestine, or liver problems	cation exchange, activated alumina, distillation

## Organic

Contaminant	MCL (Maximum Contaminant Level) in parts per million unless otherwise indicated	Source/Industrial Occurrence	Health Effects	Treatment
1,1 Dichloroethylene	0.007	used in manufacturing dyes, plastics, perfumes, paints and adhesives.	Affects kidneys and liver and can cause nausea.	Activated carbon
1,1,1-Trichloroethane	0.2	Used in the manufacturing of pesticides, plastics and metals.	Affects nervous system. Causes narcosis and probably cancer.	Activated carbon
1,1,2-Trichloroethane	0.005	solvent in rubber products, chemical production waste.	Kidney, liver, nervous system damage	Activated carbon, aeration
1,2 Dichlorobenzene	0.6	Used in the manufacturing of gasoline, paint, varnish, metal degreasers and insecticide fumigants	damages kidney and liver. Can cause nausea.	Activated carbon

1,2 Dichloropropane	0.005	used in insecticide fumigants, dry cleaning fluids and in the manufacturing of resins, waxes and petroleum products.	Affects lungs, liver and kidneys	Activated carbon
1,2,4-Trichlorobenzene	0.07	Herbicide production; dye carrier.	Liver, kidney damage	Activated carbon, aeration
1,4 Dichlorobenzene	0.075	used in moth repellent, germicides, pesticides and soil fumigants	affects nervous system. Probable cause of cancer.	Activated carbon
Adipates	0.4	Synthetic rubber, food packaging cosmetics	Decrease body weight; liver and testes damages	Activated carbon, aeration
Benzene	0.005	used in fuels and as a solvent i manufacturing pharmaceutical, plastics, pesticides and paints. Often traced to leaking underground storage tanks.	Leukemia, anemia and possible cancer	Activated carbon
Carbon Tetrachloride	0.005	used as a cleaning agent and in manufacturing refrigerants, fumigants, propellants, resins, paints and inks.	Affects nervous system, liver and digestive system. Causes cancer.	Activated carbon
Chlorobenzene	0.1	Used as a cleaning agent and in manufacturing refrigerants, fumigants, propellants, resins, paints and inks	affects nervous system, liver and digestive system, causes cancer	Activated carbon
CIS-1,2 Dichloroethylene	0.07	Used as an industrial solvent in the manufacturing of dyes, perfumes and laquer	affects liver, and nervous and circulatory systems. Probable cause of cancer	Activated carbon
Dibromochloro-propane	0.0002	soil fumigant on soybeans, cotton. Canceled in 1977	cancer	Activated carbon
Dichloromethane	0.005	paint stripper, metal degreaser, propellant	cancer	aeration
Dioxin	0.00000003	chemical production by-product; impurity in herbicides	affects lungs, liver and kidneys. Probable cause of cancer	Activated carbon
Epichlorohydrin	0	used in epoxy resin and coating and in flocculants used in treatment	affects nervous system, kidneys and liver	Activated carbon
Ethylbenzene	0.7	Used in the manufacturing of gasoline, insecticides and asphalt	probable cause of cancer	Activated carbon
Ethylene Dibromide	0.00005	used as a gasoline additive and soil fumigant	affect nervous system, kidneys and liver	activated carbon
Monochloro-benzene	0.1	Used in the manufacturing of pesticides and as a metal cleaner and industrial solvent	cancer	Activated carbon
PAHs	0.0002	coal tar coatings, burning organic matter, volcanoes, fossil fuels	cancer	Activated carbon
Phthalate	0.006	PVC and other plastics	affects skin and liver. Causes nausea. Probable cause of cancer	Activated carbon
Polychlorinated Biphenyls (PCBs)	0.0005	used in electrical transformers	affects nervous system, kidney and liver.	Activated carbon
Styrene	0.1	Used in gasoline, paint thinners, lacquers and adhesives.	Cancers	Activated carbon

Tetrachloroethylene	0.005	used in dry cleaning and as a degreasing agent for metals. Also used for manufacturing rubber, waxes, paints and inks	affects nervous system, liver and kidneys. Causes narcosis irritant to respiratory system	Activated carbon
toluene	1	used in gasoline, paint thinners, lacquers and adhesives	cancer	Activated carbon
<b>Total Trihalomethanes (THMs)</b>	0.1	Formed when water containing organic matter is treated with chlorine	affects nervous system and muscles. Probable cause of cancer	Activated carbon, aeration, ultrafiltration (20%-90%) RO (20%-90%)
TRANS-1,2 Dichloroethylene	0.1	Used as an industrial solvent in the manufacturing of dyes, perfumes, laquers and rubber	affect liver and nervous and circulatory systems	activated carbon, ozonation with UV irradiation
Trichloroethylene	0.1	Used in dry cleaning and as a degreasing agent. Also used for manufacturing rubber, paints, adhesives, resins, oils and fumigants.	Irritates body tissue. Affects nervous system. Probable cause of cancer	Activated carbon
Vinyl Chloride	0.0005	used as aplastic adhesive and refrigerant. The main component of PVC pipe	Affects nervous system. Probable cause of cancer	Activated carbon
Xylenes	0.002	used in manufacturing paint, ink, petroleum and detergents.	Affects nervous system. Kidney, lungs, liver and mucous membranes	Activated carbon

## Pesticides

<b>Contaminant</b>	<b>MCL (Maximum Contaminant Level) in parts per million unless otherwise indicated</b>	<b>Source/Industrial Occurrence</b>	<b>Health Effects</b>	<b>Treatment</b>
Aldicarb Aldicarb Sulfone Aldicarb Sulfoxide Carbofuran	10 0.003 0.002 0.004	Agricultural insecticide	affects nervous system, respiratory system, kidneys and liver. Probable cause of cancer.	Activated carbon
Chlordane	0.04	Used on rodents, insects, birds. Restricted since 1980	affects nervous system, respiratory system, kidneys and liver. Probable cause of cancer.	Activated carbon
Endrin	0.0002	Agricultural insecticide	liver, kidney, heart damage	Activated carbon
Heptachlor	0.0004	Agricultural insecticide. Converts to epoxide by soil and water organism.	Affects nervous system, respiratory system, kidneys and liver. Probable cause of cancer.	Activated carbon
Heptachlor Eposide	0.0002	pesticide production by-product	affects nervous system, respiratory system, kidneys and liver. Probable cause of cancer	Activated carbon
hexachlorobenzene	0.001	pesticide production by-product	cancer	Activated carbon
Hexachloro-cyclopentadiene	0.05	Agricultural insecticide	cancer	Activated carbon, aeration

Lindane	0.0002	Agricultural insecticide	affect nervous system, respiratory system, kidneys and liver. Probable cause of cancer	Activated carbon
Methoxychlor	0.04	Insecticide used on apples, potatoes, tomatoes	affects nervous system, respiratory system, kidneys and liver. Probable cause of cancer	Activated carbon
Oxamyl	0.2	Agricultural insecticide	kidney damage	Activated carbon
Toxaphene	0.003	agricultural insecticide	affects nervous system, respiratory system, kidneys and liver. Probable cause of cancer	Activated carbon

## Herbicides

Contaminant	MCL (Maximum Contaminant Level) in parts per million unless otherwise indicated	Source/Industrial Occurrence	Health Effects	Treatment
2,4-D 2,4,5-TP(Silvex) Alachlor Atrazi	0.07 0.05 0.002 0.003	agricultural herbicides	affect nervous and reproductive system, respiratory system, kidneys, liver and heart. Cause anesthesia. Probable causes of cancer	Activated carbon
Dalapon	0.2	Herbicide used on orchards, beans, coffee, lawns, roads and railways	liver, kidney damage	Activated carbon
Dimoseb	0.007	Runoff of herbicide from crop and non-crop applications	thyroid, reproductive organ damage	Activated carbon
Diquat	0.02	Runoff of herbicide on land and aquatic weeds	liver, kidney and gastrointestinal damage	Activated carbon
Glyphosphate	0.7	Used on grass, weeds, brush	liver, kidney damage	Activated carbon
Pentachlorophenol	0.001	agricultural herbicide and wood preservative	affect nervous and reproductive systems, respiratory system, kidneys, liver and heart. Causes anesthesia. Probable cause of cancer	Activated carbon
Pichloram	0.5	Used on broad leaf and woody plants	kidney, liver damage	Activated carbon
Slimazine	0.004	used on grass sod, some crops, aquatic algae	cancer	Activated carbon

## Radionuclides

Contaminant	MCL (Maximum Contaminant Level) in parts per million unless otherwise indicated	Source/Industrial Occurrence	Health Effects	Treatment
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Alpha emitters	19pCi/L	Decay of radionuclides in natural deposits	cancer	depends on the source radionuclide
Beta photon emitters	4mrem/yr	decay of radionuclides in natural and man-made deposits	cancer	mixed-bed ion exchange, RO, distillation, electro dialysis
Combined radium 226, 228	5 pCi/L	Natural deposits	bone cancer	cation exchange, RO, distillation, electro dialysis
gross alpha particle	15 pCi/L	radioactive waste and uranium deposits	probable cause of cancer. Affects skeletal tissue. Can cause bone sarcomas, head sarcomas	RO, ion exchange, lime softening, at a high pH
gross beta particle	4 millirem per year	radioactive waste and uranium deposits	probable cause of cancer. Affects skeletal tissue. Can cause bone sarcomas, head sarcomas	RO, ion exchange, lime softening at a high pH