

Table H. Summary of Federal and California State Water Quality Regulations

Recreated from the California Water Boards: State Water Resources Control Board:

https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/publicwatersystems.html

and the U.S. Environmental Protection Agency: <https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations> &

<https://www.epa.gov/sdwa/secondary-drinking-water-standards-guidance-chemicals#table-of-secondary>

Contaminant	Potential Health Effects from Ingestion of Contaminant	Sources of Contaminants in Drinking Water	USEPA			California DPH		
			MCLG ¹ (mg/L) ²	MCL or TT ¹ (mg/L) ²	Secondary Standards (mg/l)	MCL ³ (mg/l)	Secondary standard ⁴ (mg/l)	Notification Level ⁵ (mg/l)
Microorganism								
Cryptosporidium	Gastrointestinal illness (such as diarrhea, vomiting, and cramps)	Human and animal fecal waste	zero	TT ⁶				
<i>Giardia lamblia</i>	Gastrointestinal illness (such as diarrhea, vomiting, and cramps)	Human and animal fecal waste	zero	TT ⁶				
Heterotrophic plate count (HPC)	HPC has no health effects; it is an analytic method used to measure the variety of bacteria that are common in water. The lower the concentration of bacteria in drinking water, the better maintained the water system is.	HPC measures a range of bacteria that are naturally present in the environment	n/a	TT ⁶				
Legionella	Legionnaire's Disease, a type of pneumonia	Found naturally in water; multiplies in heating systems	zero	TT ⁶				
Total Coliforms (including fecal coliform and <i>E. Coli</i>)	Not a health threat in itself; it is used to indicate whether other potentially harmful bacteria may be present ⁵	Coliforms are naturally present in the environment; as well as feces; fecal coliforms and <i>E. coli</i> only come from human and animal fecal waste.	zero	TT ⁶				
Turbidity	Higher turbidity levels are often associated with higher levels of disease-causing microorganisms such as viruses, parasites and some bacteria. These organisms can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.	Soil runoff	n/a	TT ⁶			5 NTU	
Viruses (enteric)	Gastrointestinal illness (such as diarrhea, vomiting, and cramps)	Human and animal fecal waste	zero	TT ⁶				
Disinfection Byproducts								
Bromate	Increased risk of cancer	Byproduct of drinking water disinfection	zero	0.01			0.01	

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Chlorate	Potential pituitary and thyroid gland damage.							0.8
Chlorite	Anemia; infants and young children: nervous system effects	Byproduct of drinking water disinfection	0.8	1		1		
Formaldehyde								
Haloacetic acids (HAA5)	Increased risk of cancer	Byproduct of drinking water disinfection	n/a ¹⁰	0.06		0.06		
Total Trihalomethanes (TTHMs)	Liver, kidney or central nervous system problems; increased risk of cancer	Byproduct of drinking water disinfection	n/a ¹⁰	0.08		0.08		
<i>Disinfectants</i>								
Chloramines (as Cl ₂)	Eye/nose irritation; stomach discomfort, anemia	Water additive used to control microbes	MRDLG=41	MRDL=4.01				
Chlorine (as Cl ₂)	Eye/nose irritation; stomach discomfort	Water additive used to control microbes	MRDLG=41	MRDL=4.01				
Chlorine dioxide (as ClO ₂)	Anemia; infants and young children: nervous system effects	Water additive used to control microbes	MRDLG=0.81	MRDL=0.81				
<i>Inorganic Chemicals</i>								
Aluminum	Short-term gastrointestinal tract effects.	Erosion of natural deposits; residual from some surface water treatment processes			0.05 to 0.2	1	0.2	
Antimony	Increase in blood cholesterol; decrease in blood sugar	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder	0.006	0.006		0.006		
Arsenic	Skin damage or problems with circulatory systems, and may have increased risk of getting cancer	Erosion of natural deposits; runoff from orchards, runoff from glass and electronics production wastes	0	0.010 as of 01/23/06		0.01		
Asbestos (fiber > 10 micrometers)	Increased risk of developing benign intestinal polyps	Decay of asbestos cement in water mains; erosion of natural deposits	7 million fibers per liter (MFL)	7 MFL		7 MFL		
Barium	Increase in blood pressure	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits	2	2		1		

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Beryllium	Intestinal lesions	Discharge from metal refineries and coal-burning factories; discharge from electrical, aerospace, and defense industries	0.004	0.004		0.004			
Boron	Potential reproductive effects							1	
Cadmium	Kidney damage	Corrosion of galvanized pipes; erosion of natural deposits; discharge from metal refineries; runoff from waste batteries and paints	0.005	0.005		0.005			
Chloride	salty taste	Runoff/leaching from natural deposits; seawater influence			250		250-500 (600 short term)		
Chromium (total)	Allergic dermatitis	Discharge from steel and pulp mills; erosion of natural deposits	0.1	0.1		0.005			
Copper	Short term exposure: Gastrointestinal distress	Corrosion of household plumbing systems; erosion of natural deposits	1.3	TT ¹² ; Action Level=1.3	1	1.3	1		
	Long term exposure: Liver or kidney damage								
	metallic taste; blue-green staining								
	People with Wilson's Disease should consult their personal doctor if the amount of copper in their water exceeds the action level								

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Cyanide (as free cyanide)	Nerve damage or thyroid problems	Discharge from steel/metal factories; discharge from plastic and fertilizer factories	0.2	0.2		0.15		
Fluoride	Bone disease (pain and tenderness of the bones); Children may get mottled teeth	Water additive which promotes strong teeth; erosion of natural deposits; discharge from fertilizer and aluminum factories	4	4	2	2		
Iron		Leaching from natural deposits; industrial waste			0.3		0.3	
Lead	Infants and children: Delays in physical or mental development; children could show slight deficits in attention span and learning abilities Adults: Kidney problems; high blood pressure	Corrosion of household plumbing systems; erosion of natural deposits	zero	TT ¹¹ ; Action Level =0.015		0.015 ¹⁴ 0.05 ¹³		
Manganese		Leaching from natural deposits			0.05		0.05	
Mercury (inorganic)	Kidney damage	Erosion of natural deposits; discharge from refineries and factories; runoff from landfills and croplands	0.002	0.002		0.02		

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Nickel						0.1		
Nitrate (measured as Nitrogen)	Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.	Runoff from fertilizer use; leaking from septic tanks, sewage; erosion of natural deposits	10 (as N)	10 (as N)		(as N03) 45		
Nitrite (measured as Nitrogen)	Infants below the age of six months who drink water containing nitrite in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.	Runoff from fertilizer use; leaking from septic tanks, sewage; erosion of natural deposits	1	1		1		
Total Nitrate/Nitrite (as N)						10		
Perchlorate	Potential thyroid effects	Environmental contamination from historic aerospace or other industrial operations				0.006		
Selenium	Hair or fingernail loss; numbness in fingers or toes; circulatory problems	Discharge from petroleum refineries; erosion of natural deposits; discharge from mines	0.05	0.05		0.05		
Silver		Industrial discharges			0.1		0.1	
Sulfate		Runoff/leaching from natural deposits; industrial wastes			250		250-500 (600 short term)	

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tert-Butylbenzene								0.26
Carbofuran	Problems with blood, nervous system, or reproductive system	Leaching of soil fumigant used on rice and alfalfa	0.04	0.04		0.018		
Carbon disulfide								0.16
Carbon tetrachloride	Liver problems; increased risk of cancer	Discharge from chemical plants and other industrial activities	zero	0.005				
Chlordane	Liver or nervous system problems; increased risk of cancer	Residue of banned termiticide	zero	0.002		0.0001		
Chlorobenzene	Liver or kidney problems	Discharge from chemical and agricultural chemical factories	0.1	0.1				
2-Chlorotoluene								0.14
4-Chlorotoluene								0.14
2,4-D	Kidney, liver, or adrenal gland problems	Runoff from herbicide used on row crops	0.07	0.07		0.07		
Dalapon	Minor kidney changes	Runoff from herbicide used on rights of way	0.2	0.2		0.2		
Diazinon								0.0012
Dibromochloropropane						0.0002		
1,2-Dibromo-3-chloropropane (DBCP)	Reproductive difficulties; increased risk of cancer	Runoff/leaching from soil fumigant used on soybeans, cotton, pineapples, and orchards	zero	0.0002				
1,2-Dichlorobenzene						0.6		
1,4-Dichlorobenzene						0.005		

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1,1-Dichloroethane						0.005		
1,2-Dichloroethane						0.0005		
Dichlorodifluoromethane (Freon 12)								1
1,1-Dichloroethylene						0.006		
o-Dichlorobenzene	Liver, kidney, or circulatory system problems	Discharge from industrial chemical factories	0.6	0.6				
p-Dichlorobenzene	Anemia; liver, kidney or spleen damage; changes in blood	Discharge from industrial chemical factories	0.075	0.075				
1,2-Dichloroethane	Increased risk of cancer	Discharge from industrial chemical factories	zero	0.005				
1,1-Dichloroethylene	Liver problems	Discharge from industrial chemical factories	0.007	0.007				
cis-1,2-Dichloroethylene	Liver problems	Discharge from industrial chemical factories	0.07	0.07		0.006		
trans-1,2-Dichloroethylene	Liver problems	Discharge from industrial chemical factories	0.1	0.1		0.01		
Dichloromethane	Liver problems; increased risk of cancer	Discharge from drug and chemical factories	zero	0.005		0.005		
1,3-Dichloropropene						0.0005		
1,2-Dichloropropane	Increased risk of cancer	Discharge from industrial chemical factories	zero	0.005		0.005		
Di(2-ethylhexyl) adipate	Weight loss, liver problems, or possible reproductive difficulties.	Discharge from chemical factories	0.4	0.4		0.4		

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Di(2-ethylhexyl) phthalate	Reproductive difficulties; liver problems; increased risk of cancer	Discharge from rubber and chemical factories	zero	0.006		0.004		
Dinoseb	Reproductive difficulties	Runoff from herbicide used on soybeans and vegetables	0.007	0.007		0.007		
1,4-Dioxane								0.001
Dioxin (2,3,7,8-TCDD)	Reproductive difficulties; increased risk of cancer	Emissions from waste incineration and other combustion; discharge from chemical factories	zero	0.00000003				
Diquat	Cataracts	Runoff from herbicide use	0.02	0.02		0.02		
Endothall	Stomach and intestinal problems	Runoff from herbicide use	0.1	0.1		0.1		
Endrin	Liver problems	Residue of banned insecticide	0.002	0.002		0.002		
Epichlorohydrin	Increased cancer risk, and over a long period of time, stomach problems	Discharge from industrial chemical factories; an impurity of some water treatment chemicals	zero	TT ¹⁵		TT ¹⁵		
Ethylbenzene	Liver or kidneys problems	Discharge from petroleum refineries	0.7	0.7		0.3		
Ethylene dibromide	Problems with liver, stomach, reproductive system, or kidneys; increased risk of cancer	Discharge from petroleum refineries	zero	0.00005		0.00005		
Ethylene glycol								14
Formaldehyde								0.1
Glyphosate	Kidney problems; reproductive difficulties	Runoff from herbicide use	0.7	0.7		0.7		

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2,4,6-Trinitrotoluene (TNT)	Potential cancer risk							0.001
Vanadium								0.05
Vinyl chloride	Increased risk of cancer	Leaching from PVC pipes; discharge from plastic factories	zero	0.002		0.0005		
Xylenes (total)	Nervous system damage	Discharge from petroleum factories; discharge from chemical factories	10	10		1.75		
Radionuclides								
Alpha particles	Increased risk of cancer	Erosion of natural deposits of certain minerals that are radioactive and may emit a form of radiation known as alpha radiation	None ¹¹ zero	15 picocuries per Liter (pCi/L)				
Beta particles and photon emitters	Increased risk of cancer	Decay of natural and man-made deposits of certain minerals that are radioactive and may emit forms of radiation known as photons and beta radiation	None ¹¹ zero	4 millirems per year				
Gross Alpha particle activity (excluding radon & uranium)						5 Pci/L		
Gross Beta particle activity						4 millirem/yr		
Radium 226 and Radium 228 (combined)	Increased risk of cancer	Erosion of natural deposits	None ¹¹ zero	5 pCi/L		5 Pci/L		
Strontium-90	Increased risk of cancer	Decay of natural and manmade deposits				8 Pci/L		
Tritium	Increased risk of cancer	Decay of natural and manmade deposits				20,000 pCi/L		
Uranium	Increased risk of cancer, kidney toxicity	Erosion of natural deposits	zero	30 ug/L as of 12/08/03		20 Pci/L		

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<i>Additional Parameters with Secondary Standards</i>								
Corrosivity		Natural or industriallyinfluenced balance of hydrogen, carbon, and oxygen in the water; affected by temperature and other factors			Non-corrosive		0.5	
Foaming agents		Municipal and industrial waste discharges			0.5 mg/L		0.5	
Odor		Naturally-occurring organic materials			3 TON (threshold odor number)		3 TON (threshold odor number)	
pH					6.5 - 8.5			
Specific Conductance							900-1600 (2200 short term)	
Total Dissolved Solids (TDS)		Runoff/leaching from natural deposits			500 mg/L		500-1000 (1500 short term)	

Table H. Summary of Federal and California State Water Quality Regulations (cont'd)

Notes:

¹ Definitions:

Maximum Contaminant Level (MCL) - The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to MCLGs as feasible using the best available treatment technology and taking cost into consideration. MCLs are enforceable standards.

Maximum Contaminant Level Goal (MCLG) - The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety and are non-enforceable public health goals.

Maximum Residual Disinfectant Level (MRDL) - The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Maximum Residual Disinfectant Level Goal (MRDLG) - The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

Treatment Technique - A required process intended to reduce the level of a contaminant in drinking water.

² Units are in milligrams per liter (mg/L) unless otherwise noted. Milligrams per liter are equivalent to parts per million.

³ Where stricter state regulations have not been promulgated by California DPH, the cell was left blank. California DPH MCLs were obtained from a comparison fact sheet published by California DHS September 2003.

⁴ Secondary California DPH MCL.

⁵ California DPH notification levels are advisory, not enforceable standards. Monitoring by public water systems for chemicals with notification levels is not required except for unregulated chemicals requiring monitoring as listed under 22 CCR 64450.

⁶ EPA's surface water treatment rules require systems using surface water or ground water under the direct influence of surface water (GWUDI) to (1) disinfect their water, and (2) filter their water or meet criteria for avoiding filtration so that the following contaminants are controlled at the following levels:

- Cryptosporidium: (as of 1/1/02 for systems serving >10,000 and 1/14/05 for systems serving <10,000) 99% removal.
- Giardia lamblia: 99.9% removal/inactivation
- Viruses: 99.99% removal/inactivation
- Legionella: No limit, but EPA believes that if Giardia and viruses are removed/inactivated, Legionella will also be controlled.
- Turbidity: At no time can turbidity (cloudiness of water) go above 5 nephelometric turbidity units (NTU); systems that filter must ensure that turbidity not exceed 1 NTU (0.5 NTU for conventional or direct filtration) in at least 95% of the daily samples in any month. As of January 1, 2002, turbidity may never exceed 1 NTU, and must not exceed 0.3 NTU in 95% of daily samples in any month.
- HPC: No more than 500 bacterial colonies per milliliter.
- Long Term 1 Enhanced Surface Water Treatment (Effective Date: January 14, 2005); Surface water systems or (GWUDI) systems serving fewer than 10,000 people must comply with the applicable Long Term 1 Enhanced
- Surface Water Treatment Rule provisions (e.g., turbidity standards, individual filter monitoring, Cryptosporidium removal requirements, updated watershed control requirements for unfiltered systems).
- Filter Backwash Recycling: The Filter Backwash Recycling Rule requires systems that recycle to return specific recycle flows through all processes of the system's existing conventional or direct filtration system or at an alternative location approved by the state.

⁷ Fecal coliform and E. coli are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Disease-causing microbes (pathogens) in these wastes can cause diarrhea, cramps, nausea, headaches, or other symptoms. These pathogens may pose a special health risk for infants, young children, and people with severely compromised immune systems.

⁸ No more than 5.0% of samples can be total coliform-positive in a month. (For water systems that collect fewer than 40 routine samples per month, no more than one sample can be total coliform-positive per month.) Every sample that has total coliform must be analyzed for either fecal coliform or E. coli. If there are two consecutive TC-positive samples, and one is also positive for E. coli fecal coliform, the system has an acute MCL violation.

⁹ Chemical was detected two or more times in at least one drinking water source from 2002-2004, by California DHS.

¹⁰ Although there is no collective MCLG for this contaminant group, there are individual MCLGs for some of the individual contaminants:

- Trihalomethanes: bromodichloromethane (zero); bromoform (zero); dibromochloromethane (0.06 mg/L); chloroform (0.07 mg/L).
- Haloacetic acids: dichloroacetic acid (zero); trichloroacetic acid (0.3 mg/L). Monochloroacetic acid, bromoacetic acid, and dibromoacetic acid are regulated with this group but have no MCLGs.

¹¹ MCLGs were not established before the 1986 Amendments to the Safe Drinking Water Act. Therefore, there is no MCLG for this contaminant.

¹² Lead and copper are regulated by a Treatment Technique that requires systems to control the corrosiveness of their water. If more than 10% of tap water samples exceed the action level, water systems must take additional steps. For copper, the action level is 1.3 mg/L, and for lead 0.015 mg/L.

¹³ Regulatory Action Level; if system exceeds, it must take certain actions such as additional monitoring, corrosion control studies and treatment, and for lead, a public education program; replaces MCL.

¹⁴ The MCL for lead was rescinded with the adoption of the regulatory action level described in footnote ¹³.

¹⁵ Each water system must certify, in writing, to the state (using third-party or manufacturer's certification) that when acrylamide and epichlorohydrin are used in drinking water systems, the combination (or product) of dose and monomer level does not exceed the levels specified, as follows:

- Acrylamide = 0.05% dosed at 1 mg/L (or equivalent)
- Epichlorohydrin = 0.01% dosed at 20 mg/L (or equivalent)