

NATIONAL RECOMMENDED WATER QUALITY CRITERIA FOR PRIORITY TOXIC POLLUTANTS

Priority Pollutant	CAS Number	Freshwater		Saltwater		Human Health For Consumption of:		FR Cite/ Source
		CMC (• g/L)	CCC (• g/L)	CMC (• g/L)	CCC (• g/L)	Water + Organism (• g/L)	Organism Only (• g/L)	
73 Chrysene	218019					0.0038 _{B,C}	0.018 _{B,C}	65FR66443
74 Dibenzo(a,h)Anthracene	53703					0.0038 _{B,C}	0.018 _{B,C}	65FR66443
75 1,2-Dichlorobenzene	95501					420	1,300	68FR75510
76 1,3-Dichlorobenzene	541731					320	960	65FR66443
77 1,4-Dichlorobenzene	106467					63	190	68FR75510
78 3,3'-Dichlorobenzidine	91941					0.021 _{B,C}	0.028 _{B,C}	65FR66443
79 Diethyl Phthalate ^w	84662					17,000 _B	44,000 _B	65FR66443
80 Dimethyl Phthalate ^w	131113					270,000	1,100,000	65FR66443
81 Di-n-Butyl Phthalate ^w	84742					2,000 _B	4,500 _B	65FR66443
82 2,4-Dinitrotoluene	121142					0.11 _C	3.4 _C	65FR66443
83 2,6-Dinitrotoluene	606202							
84 Di-n-Octyl Phthalate	117840							
85 1,2-Diphenylhydrazine	122667					0.036 _{B,C}	0.20 _{B,C}	65FR66443
86 Fluoranthene	206440					130 _B	140 _B	65FR66443
87 Fluorene	86737					1,100 _B	5,300 _B	65FR66443
88 Hexachlorobenzene	118741					0.00028 _{B,C}	0.00029 _{B,C}	65FR66443

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						Water + Organism (• g/L)	Organism Only (• g/L)			
89 Hexachlorobutadiene	87683					0.44 B,C	18 B,C		65FR66443	
90 Hexachlorocyclopentadiene	77474					40 U	1,100 U		68FR75510	
91 Hexachloroethane	67721					1.4 B,C	3.3 B,C		65FR66443	
92 Ideno(1,2,3-cd)Pyrene	193395					0.0038 B,C	0.018 B,C		65FR66443	
93 Isophorone	78591					35 B,C	960 B,C		65FR66443	
94 Naphthalene	91203									
95 Nitrobenzene	98953					17 B	690 B,H,U		65FR66443	
96 N-Nitrosodimethylamine	62759					0.00069 B,C	3.0 B,C		65FR66443	
97 N-Nitrosodi-n-Propylamine	621647					0.0050 B,C	0.51 B,C		65FR66443	
98 N-Nitrosodiphenylamine	86306					3.3 B,C	6.0 B,C		65FR66443	
99 Phenanthrene	85018									
100 Pyrene	129000					830 B	4,000 B		65FR66443	
101 1,2,4-Trichlorobenzene	120821					35	70		68FR75510	
102 Aldrin	309002	3.0 G		1.3 G		0.000049 B,C	0.000050 B,C		65FR31682 65FR66443	
103 alpha-BHC	319846					0.0026 B,C	0.0049 B,C		65FR66443	
104 beta-BHC	319857					0.0091 B,C	0.017 B,C		65FR66443	

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105 gamma-BHC (Lindane)	58899	0.95 K			0.16 G			0.98	1.8	65FR31682 68FR75510
106 delta-BHC	31988									
107 Chlordane	57749	2.4 G	0.0043 G,aa		0.09 G	0.004 G,aa		0.00080 B,C	0.00081 B,C	65FR31682 65FR66443
108 4,4'-DDT	50293	1.1 G,ii	0.001 G,aa,ii		0.13 G,ii	0.001 G,aa,ii		0.00022 B,C	0.00022 B,C	65FR31682 65FR66443
109 4,4'-DDE	72559							0.00022 B,C	0.00022 B,C	65FR66443
110 4,4'-DDD	72548							0.00031 B,C	0.00031 B,C	65FR66443
111 Dieldrin	60571	0.24 K	0.056 K,O		0.71 G	0.0019 G,aa		0.000052 B,C	0.000054 B,C	65FR31682 65FR66443
112 alpha-Endosulfan	959988	0.22 G,Y	0.056 G,Y		0.034 G,Y	0.0087 G,Y		62 B	89 B	65FR31682 65FR66443
113 beta-Endosulfan	33213659	0.22 G,Y	0.056 G,Y		0.034 G,Y	0.0087 G,Y		62 B	89 B	65FR31682 65FR66443
114 Endosulfan Sulfate	1031078							62 B	89 B	65FR66443
115 Endrin	72208	0.086 K	0.036 K,O		0.037 G	0.0023 G,aa		0.059	0.060	65FR31682 68FR75510
116 Endrin Aldehyde	7421934							0.29 B	0.30 B,H	65FR66443

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117 Heptachlor	76448	0.52 G	0.0038 G,aa	0.053 G	0.0036 G,aa	0.000079 B,C	0.000079 B,C	65FR31682 65FR66443
118 Heptachlor Epoxide	1024573	0.52 G,V	0.0038 G,V,aa	0.053 G,V	0.0036 G,V,aa	0.000039 B,C	0.000039 B,C	65FR31682 65FR66443
119 Polychlorinated Biphenyls PCBs:			0.014 N,aa		0.03 N,aa	0.000064 B,C,N	0.000064 B,C,N	65FR31682 65FR66443
120 Toxaphene	8001352	0.73	0.0002 aa	0.21	0.0002 aa	0.00028B,C	0.00028 B,C	65FR31682 65FR66443

Footnotes:

- This recommended water quality criterion was derived from data for arsenic (III), but is applied here to total arsenic, which might imply that arsenic (III) and arsenic (V) are equally toxic to aquatic life and that their toxicities are additive. In the arsenic criteria document (EPA 440/5-84-033, January 1985), Species Mean Acute Values are given for both arsenic (III) and arsenic (V) for five species and the ratios of the SMAVs for each species range from 0.6 to 1.7. Chronic values are available for both arsenic (III) and arsenic (V) for one species; for the fathead minnow, the chronic value for arsenic (V) is 0.29 times the chronic value for arsenic (III). No data are known to be available concerning whether the toxicities of the forms of arsenic to aquatic organisms are additive.
- This criterion has been revised to reflect The Environmental Protection Agency's q1* or RfD, as contained in the Integrated Risk Information System (IRIS) as of May 17, 2002. The fish tissue bioconcentration factor (BCF) from the 1980 Ambient Water Quality Criteria document was retained in each case.
- This criterion is based on carcinogenicity of 10⁻⁶ risk. Alternate risk levels may be obtained by moving the decimal point (e.g., for a risk level of 10⁻⁵, move the decimal point in the recommended criterion one place to the right).
- Freshwater and saltwater criteria for metals are expressed in terms of the dissolved metal in the water column. The recommended water quality criteria value was calculated by using the previous 304(a) aquatic life criteria expressed in terms of total recoverable metal, and multiplying it by a conversion factor (CF). The term "Conversion Factor" (CF) represents the recommended conversion factor for converting a metal criterion expressed as the total recoverable fraction in the water column to a criterion expressed as the dissolved fraction in the water column. (Conversion Factors for saltwater CCCs are not currently available. Conversion factors derived for saltwater CMCs have been used for both saltwater CMCs and CCCs). See "Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria," October 1, 1993, by Martha G. Prothro, Acting Assistant Administrator for

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- Water, available from the Water Resource center, USEPA, 401 M St., SW, mail code RC4100, Washington, DC 20460; and 40CFR§131.36(b)(1). Conversion Factors applied in the table can be found in Appendix A to the Preamble- Conversion Factors for Dissolved Metals.
- E The freshwater criterion for this metal is expressed as a function of hardness (mg/L) in the water column. The value given here corresponds to a hardness of 100 mg/L. Criteria values for other hardness may be calculated from the following: $CMC \text{ (dissolved)} = \exp\{m_A [\ln(\text{hardness})] + b_A\}$ (CF), or CCC (dissolved) = $\exp\{m_C [\ln(\text{hardness})] + b_C\}$ (CF) and the parameters specified in Appendix B- Parameters for Calculating Freshwater Dissolved Metals Criteria That Are Hardness-Dependent.
- F Freshwater aquatic life values for pentachlorophenol are expressed as a function of pH, and are calculated as follows: $CMC = \exp(1.005(\text{pH}) - 4.869)$; $CCC = \exp(1.005(\text{pH}) - 5.134)$. Values displayed in table correspond to a pH of 7.8.
- G This Criterion is based on 304(a) aquatic life criterion issued in 1980, and was issued in one of the following documents: Aldrin/Dieldrin (EPA 440/5-80-019), Chlordane (EPA 440/5-80-027), DDT (EPA 440/5-80-038), Endosulfan (EPA 440/5-80-046), Endrin (EPA 440/5-80-047), Heptachlor (EPA 440/5-80-052), Hexachlorocyclohexane (EPA 440/5-80-054), Silver (EPA 440/5-80-071). The Minimum Data Requirements and derivation procedures were different in the 1980 Guidelines than in the 1985 Guidelines. For example, a "CMC" derived using the 1980 Guidelines was derived to be used as an instantaneous maximum. If assessment is to be done using an averaging period, the values given should be divided by 2 to obtain a value that is more comparable to a CMC derived using the 1985 Guidelines.
- H No criterion for protection of human health from consumption of aquatic organisms excluding water was presented in the 1980 criteria document or in the 1986 *Quality Criteria for Water*. Nevertheless, sufficient information was presented in the 1980 document to allow the calculation of a criterion, even though the results of such a calculation were not shown in the document.
- I This criterion for asbestos is the Maximum Contaminant Level (MCL) developed under the Safe Drinking Water Act (SDWA).
- J This fish tissue residue criterion for methylmercury is based on a total fish consumption rate of 0.0175 kg/day.
- K This fish tissue residue criterion is based on a 304(a) aquatic life criterion that was issued in the 1995 *Updates: Water Quality Criteria Documents for the Protection of Aquatic Life in Ambient Water*, (EPA-820-B-96-001, September 1996). This value was derived using the GLI Guidelines (60FR15393-15399, March 23, 1995; 40CFR132 Appendix A); the difference between the 1985 Guidelines and the GLI Guidelines are explained on page iv of the 1995 Updates. None of the decisions concerning the derivation of this criterion were affected by any considerations that are specific to the Great Lakes.
- L The $CMC = 1/[(f1/CMC1) + (f2/CMC2)]$ where f1 and f2 are the fractions of total selenium that are treated as selenite and selenate, respectively, and CMC1 and CMC2 are $185.9 \cdot \text{g/l}$ and $12.82 \cdot \text{g/l}$, respectively.
- M EPA is currently reassessing the criteria for arsenic.
- N This criterion applies to total pcbs, (e.g., the sum of all congener or all isomer or homolog or Atroclor analyses.)
- O The derivation of the CCC for this pollutant (Endrin) did not consider exposure through the diet, which is probably important for aquatic life occupying upper trophic levels.
- P Although a new RfD is available in IRIS, the surface water criteria will not be revised until the National Primary Drinking Water Regulations: Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 DBPR) is completed, since public comment on the relative source contribution (RSC) for chloroform is anticipated.
- Q This recommended water quality criterion is expressed as $\cdot \text{g}$ free cyanide (as CN)/L.
- R This value for selenium was announced (61FR58444-58449, November 14, 1996) as a proposed GLI 303(c) aquatic life criterion. EPA is currently working on this criterion and so this value might change substantially in the near future.
- S This recommended water quality criterion for arsenic refers to the inorganic form only.

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- T This recommended water quality criterion for selenium is expressed in terms of total recoverable metal in the water column. It is scientifically acceptable to use the conversion factor (0.996- CMC or 0.922- CCC) that was used in the GLL to convert this to a value that is expressed in terms of dissolved metal.
- U The organoleptic effect criterion is more stringent than the value for priority toxic pollutants.
- V This value was derived from data for heptachlor and the criteria document provides insufficient data to estimate the relative toxicities of heptachlor and heptachlor epoxide.
- W Although EPA has not published a completed criteria document for butylbenzyl phthalate it is EPA's understanding that sufficient data exist to allow calculation of aquatic criteria. It is anticipated that industry intends to publish in the peer reviewed literature draft aquatic life criteria generated in accordance with EPA Guidelines. EPA will review such criteria for possible issuance as national WQC.
- X There is a full set of aquatic life toxicity data that show that DEHP is not toxic to aquatic organisms at or below its solubility limit.
- Y This value was derived from data for endosulfan and is most appropriately applied to the sum of alpha-endosulfan and beta-endosulfan.
- Z A more stringent MCL has been issued by EPA. Refer to drinking water regulations (40 CFR 141) or Safe Drinking Water Hotline (1-800-426-4791) for values.
- aa This criterion is based on a 304(a) aquatic life criterion issued in 1980 or 1986, and was issued in one of the following documents: Aldrin/Dieldrin (EPA 440/5-80-019), Chlordane (EPA 440/5-80-027), DDT (EPA 440/5-80-038), Endrin (EPA 440/5-80-047), Heptachlor (EPA 440/5-80-052), Polychlorinated biphenyls (EPA 440/5-80-068), Toxaphene (EPA 440/5-86-006). This CCC is currently based on the Final Residue Value (FRV) procedure. Since the publication of the Great Lakes Aquatic Life Criteria Guidelines in 1995 (60FR15393-15399, March 23, 1995), the Agency no longer uses the Final Residue Value procedure for deriving CCCs for new or revised 304(a) aquatic life criteria. Therefore, the Agency anticipates that future revisions of this CCC will not be based on the FRV procedure.
- bb This water quality criterion is based on a 304(a) aquatic life criterion that was derived using the 1985 Guidelines (*Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses*, PB85-227049, January 1985) and was issued in one of the following criteria documents: Arsenic (EPA 440/5-84-033), Cadmium (EPA 440/5-84-029), Copper (EPA 440/5-84-031), Cyanide (EPA 440/5-84-028), Lead (EPA 440/5-84-027), Nickel (EPA 440/5-86-004), Pentachlorophenol (EPA 440/5-86-009), Toxaphene, (EPA 440/5-86-006), Zinc (EPA 440/5-87-003).
- cc When the concentration of dissolved organic carbon is elevated, copper is substantially less toxic and use of Water-Effect Ratios might be appropriate.
- dd The selenium criteria document (EPA 440/5-87-006, September 1987) provides that if selenium is as toxic to saltwater fishes in the field as it is to freshwater fishes in the field, the status of the fish community should be monitored whenever the concentration of selenium exceeds $5.0 \cdot \mu\text{g/L}$ in salt water because the saltwater CCC does not take into account uptake via the food chain.
- ee This recommended water quality criterion was derived on page 43 of the mercury criteria document (EPA 440/5-84-026, January 1985). The saltwater CCC of $0.025 \mu\text{g/L}$ given on page 23 of the criteria document is based on the Final Residue Value procedure in the 1985 Guidelines. Since the publication of the Great Lakes Aquatic Life Criteria Guidelines in 1995 (60FR15393-15399, March 23, 1995), the Agency no longer uses the Final Residue Value procedure for deriving CCCs for new or revised 304(a) aquatic life criteria.
- ff This recommended water quality criterion was derived in *Ambient Water Quality Criteria Saline Water Copper Addendum* (Draft, April 14, 1995) and was promulgated in the Interim final National Toxics Rule (60FR22228-22237, May 4, 1995).
- gg EPA is actively working on this criterion and so this recommended water quality criterion may change substantially in the near future.
- hh This recommended water quality criterion was derived from data for inorganic mercury (II), but is applied here to total mercury. If a substantial portion of the mercury in the water column is methylmercury, this criterion will probably be under protective. In addition, even though inorganic mercury is converted to

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methylmercury and methylmercury bioaccumulates to a great extent, this criterion does not account for uptake via the food chain because sufficient data were not available when the criterion was derived.

- ii This criterion applies to DDT and its metabolites (i.e., the total concentration of DDT and its metabolites should not exceed this value).
- jj This recommended water quality criterion is expressed as total cyanide, even though the IRIS RFD we used to derive the criterion is based on free cyanide. The multiple forms of cyanide that are present in ambient water have significant differences in toxicity due to their differing abilities to liberate the CN-moiety. Some complex cyanides require even more extreme conditions than refluxing with sulfuric acid to liberate the CN-moiety. Thus, these complex cyanides are expected to have little or no 'bioavailability' to humans. If a substantial fraction of the cyanide present in a water body is present in a complexed form (e.g., $\text{Fe}_4[\text{Fe}(\text{CN})_6]_3$), this criterion may be over conservative.
- kk This recommended water quality criterion was derived using the cancer slope factor of 1.4 (LMS exposure from birth).