OHIO EPA SURFACE WATER QUALITY CRITERION FACT SHEET

Chemical Name: Benzene Developed by: Chris J. Skalski
CAS # 71-43-2 Data Retrieval Date: 9-05-97
Internal Code # 10 Fact Sheet Preparation Date: 3-01-06

ACUTE DATA

SPECIES	EC_{50}/LC_{50} (µg/l)	TEST TYPE[a]	DURATION (HOURS)	SMAV[b] (µg/l)	GMAV[b] (µg/l)	REFERENCE NUMBER
Cladoceran	356,000	S,U	48	376,230	337,282	1
Daphnia magna	356,000	S,U	48			1
	400,000	S,U	48			1
	412,000	S,U	48			1
	412,000	S,U	48			1
	620,000	S,U	48			1
	200,000	S,U	48			2
	31,221[c]	S,U	48			3
	10,000[c]	S,U	48			4
Cladoceran	265,000	S,U	48	302,366		1
Daphnia pulex	345,000	S,U	48			1
Cladoceran	356,000	S,U	48	372,612		1
Daphnia cucullata[d]	390,000	S,U	48			1
Bluegill	22,490[c]	S,U	96	242,645	242,645	5
Lepomis macrochirus	100,000	S,U	96			7
	230,000	S,U	96			7
	600,000	S,U	96			7
	450,000	S,U	96			7
	290,000	S,U	96			7
	370,000	S,U	96			7
	260,000	S,U	96			7
	102,000	S,U	96			7
	165,000	S,U	96			7
Mosquitofish *Gambusia affinis*	386,000	S,U	96	386,000	386,000	6
Channel Catfish *Ictalurus punctatus*	425,000	S,U	96	425,000	425,000	7
Guppy	28,600	S,U	96	32,354	32,354	5
Poecilia reticulata	36,600	R,M	96			9

[a] S = static; F= flow through; U = unmeasured; M = measured.
[b] SMAV = Species Mean Acute Value; GMAV = Genus Mean Acute Value.
[c] This value was not used in the calculation of the bluegill SMAV since it is not within an order of magnitude of the geometric mean of the other bluegill acute toxicity data.
[d] Data not used to determine the GMAV since the test organisms are nonresident to North America.

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Goldfish *Carassius auratus*	34,420	S,U	96	34,420	34,420	5
Fathead Minnow *Pimephales promelas*	24,600	F,M	96	18,568	18,568	10
	12,600	F,M	96			10
	32,000	S,U	96			5
	33,470	S,U	96			5
	15,590	F,M	96			11
	24,600	F,M	96			11
Rainbow Trout *Oncorhynchus mykiss*	5,300	F,M	96	10,709	9,790	8
	5,900	R,M	96			9
	9,200	S,U	96			7
	21,637	F,M	96			13
Chinook Salmon *Oncorhynchus tshawytscha*	10,307	S,M	96	10,307		12
Coho Salmon *Oncorhynchus kisutch*	8,611	S,M	96	10,325		12
	12,381	S,M	96			12
Sockeye Salmon *Oncorhynchus nerka*	9,455	S,M	96	9,455		12
Pink Salmon *Oncorhynchus gorbuscha*	4,640	S,M	96	8,347		12
	15,017	S,M	96			12
Dolly Varden *Salvelinus malma*	10,457	S,M	96	10,483	10,483	12
	10,509	S,M	96			12
Arctic Grayling *Thymallus articus*	12,926	S,M	96	12,926	12,926	12
Threespine Stickleback *Gasterosteus aculeatus*	21,818	S,M	96	21,818	21,818	12
Slimy Sculpin *Cottus cognatus*	13,541	S,M	96	13,541	13,541	12

[a] S = static; F= flow through; U = unmeasured; M = measured.
[b] SMAV = Species Mean Acute Value; GMAV = Genus Mean Acute Value.

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CHRONIC DATA

SPECIES	CHRONIC VALUE (µg/l)	METHOD	SMCV[a] (µg/l)	GMCV[a] (µg/l)	REFERENCE NUMBER
Cladoceran *Daphnia magna*	>98,000	Life Cycle	>98,000	>98,000	14

[a] SMCV = Species Mean Chronic Value; GMCV = Genus Mean Chronic Value.

REFERENCES

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CALCULATION OF ACUTE AQUATIC VALUE (AAV)[a]

Data Requirement OAC 3745-1-36(A)(1)	GENUS	GMAV (μg/l)
(a)	Salmonid	9,790
(b)	Guppy	32,354
(c)	Fathead Minnow	18,568
(d)	*Daphnia*	337,282

Secondary Acute Factor (SAF) = 7.0

Secondary Acute Value (SAV) = Lowest GMAV ÷ SAF
= 9,790 ÷ 7.0
= 1,399 = 1,400 μg/l

Tier II Acute Aquatic Value (AAV) = SAV ÷ 2
= 1,399 ÷ 2
= 699 = 700 μg/l

CALCULATION OF CHRONIC AQUATIC VALUE (CAV)[a]

Experimentally determined Acute-Chronic Ratios (ACRs):

SPECIES	ACUTE VALUE (μg/l)	CHRONIC VALUE (μg/l)	ACUTE-CHRONIC RATIO	SPECIES MEAN ACR
Cladoceran *Daphnia magna*	200,000	>98,000	<2.04	<2.04

Secondary Acute-Chronic Ratio (SACR) = $\sqrt[3]{(2.04)(18)(18)} = 8.71$

Chronic Aquatic Value (CAV) = SAV ÷ SACR
= 1,399 ÷ 8.71
= 77.7 = 161 = 160 μg/l

[a]See Ohio Administrative Code 3745-1-36 effective February 22, 2002.