

CHAPTER 7. REGULATIONS AND GUIDELINES

Pertinent international and national regulations, advisories, and guidelines regarding cyanide in air, water, and other media are summarized in Table 7-1. This table is not an exhaustive list, and current regulations should be verified by the appropriate regulatory agency.

ATSDR develops MRLs, which are substance-specific guidelines intended to serve as screening levels by ATSDR health assessors and other responders to identify contaminants and potential health effects that may be of concern at hazardous waste sites. See Section 1.3 and Appendix A for detailed information on the MRLs for cyanide.

Table 7-1. Regulations and Guidelines Applicable to Cyanide

Agency	Description	Information	Reference
Air			
EPA	RfC		
	Hydrogen cyanide	0.0008 mg/m ³ (0.0007 ppm)	IRIS 2010
WHO	Air quality guidelines	Not listed	WHO 2010
Water & Food			
EPA	Drinking water standards and health advisories		EPA 2018a
	Cyanide		
	1-Day health advisory (10-kg child)	0.2 mg/L	
	10-Day health advisory (10-kg child)	0.2 mg/L	
	Cyanogen chloride		
	1-Day health advisory (10-kg child)	0.05 mg/L	
	10-Day health advisory (10-kg child)	0.05 mg/L	
	DWEL	2 mg/L	
	National primary drinking water regulations		EPA 2009
	Cyanide (as free cyanide)		
	MCL	0.2 mg/L	
	MCLG	0.2 mg/L	
	RfD		
	Cyanide (as free cyanide)	0.0006 mg/kg/day	IRIS 2010
	Calcium cyanide	0.001 mg/kg/day	
	Hydrogen cyanide, aqueous	0.0007 mg/kg/day	
	Potassium cyanide	0.002 mg/kg/day	
	Potassium silver cyanide	0.005 mg/kg/day	
	Sodium cyanide	0.001 mg/kg/day	
	Cyanogen	0.001 mg/kg/day	

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Agency	Description	Information	Reference
	Cyanogen chloride	0.05 mg/kg/day	IRIS 2005a
	Copper cyanide	0.005 mg/kg/day	IRIS 2005b
	Provisional peer reviewed toxicity values		
	Thiocyanates		EPA 2006b
	Provisional chronic RfD	0.0002 mg/kg/day	
	Provisional subchronic RfD	0.0006 mg/kg/day	
WHO	Drinking water quality guidelines		WHO 2022
	Cyanide	Guideline not established ^a	
	Cyanogen chloride	Guideline not established ^b	
FDA	Substances added to food (formerly EAFUS)	Not listed	FDA 2023b
	Allowable level in bottled water	0.2 mg/L	FDA 2023a
Cancer			
HHS	Carcinogenicity classification	Not evaluated	NTP 2021
EPA	Carcinogenicity classification	Inadequate information to assess the carcinogenic potential	IRIS 2010
IARC	Carcinogenicity classification	Not evaluated	IARC 2023
Occupational			
OSHA	PEL (8-hour TWA) for general industry, shipyards, and construction		OSHA 2021a , 2021b , 2021c
	Cyanides (as CN)	5 mg/m ³ ^c	
	Hydrogen cyanide	10 ppm (11 mg/m ³) ^d	
	PEL (8-hour TWA) for shipyards and construction		
	Cyanogen	10 ppm	
NIOSH	Ceiling REL		
	Cyanides (as CN), except hydrogen cyanide; 10-minute ceiling	5 mg/m ³ (4.7 ppm)	NIOSH 2019d
	Cyanogen chloride	0.3 ppm (0.6 mg/m ³)	NIOSH 2019b
	STEL		
	Hydrogen cyanide	4.7 ppm (5 mg/m ³) ^e	NIOSH 2019c
	REL (up to 10-hour TWA)		
	Cyanogen	10 ppm (20 mg/m ³)	NIOSH 2019a
Emergency Criteria			
NIOSH	IDLH		
	Cyanides (as CN)	25 mg/m ³	NIOSH 1994a
	Hydrogen cyanide	50 ppm	NIOSH 1994b

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Agency	Description	Information	Reference
EPA	AEGLs-air		EPA 2018b
	Hydrogen cyanide		
	AEGL 1 ^f		
	10-minute	2.5 ppm	
	30-minute	2.5 ppm	
	60-minute	2.0 ppm	
	4-hour	1.3 ppm	
	8-hour	1.0 ppm	
	AEGL 2 ^f		
	10-minute	17 ppm	
	30-minute	10 ppm	
	60-minute	7.1 ppm	
	4-hour	3.5 ppm	
	8-hour	2.5 ppm	
	AEGL 3 ^f		
	10-minute	27 ppm	
	30-minute	21 ppm	
	60-minute	15 ppm	
	4-hour	8.6 ppm	
	8-hour	6.6 ppm	
	Calcium cyanide		
	AEGL 1 ^f		
	10-minute	4.7 mg/m ³	
	30-minute	4.7 mg/m ³	
	60-minute	3.8 mg/m ³	
	4-hour	2.4 mg/m ³	
	8-hour	1.9 mg/m ³	
	AEGL 2 ^f		
	10-minute	32 mg/m ³	
	30-minute	19 mg/m ³	
	60-minute	13 mg/m ³	
	4-hour	6.6 mg/m ³	
	8-hour	4.7 mg/m ³	
	AEGL 3 ^f		
	10-minute	51 mg/m ³	
	30-minute	39 mg/m ³	
	60-minute	28 mg/m ³	
	4-hour	16 mg/m ³	
	8-hour	12 mg/m ³	
	Potassium cyanide		
	AEGL 1 ^f		
	10-minute	6.6 mg/m ³	
	30-minute	6.6 mg/m ³	
	60-minute	5.3 mg/m ³	
	4-hour	3.5 mg/m ³	
	8-hour	2.7 mg/m ³	

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Agency	Description	Information	Reference
	AEGL 2 ^f		
	10-minute	45 mg/m ³	
	30-minute	27 mg/m ³	
	60-minute	19 mg/m ³	
	4-hour	9.3 mg/m ³	
	8-hour	6.6 mg/m ³	
	AEGL 3 ^f		
	10-minute	72 mg/m ³	
	30-minute	56 mg/m ³	
	60-minute	40 mg/m ³	
	4-hour	23 mg/m ³	
	8-hour	18 mg/m ³	
	Sodium cyanide		
	AEGL 1 ^f		
	10-minute	5.0 mg/m ³	
	30-minute	5.0 mg/m ³	
	60-minute	4.0 mg/m ³	
	4-hour	2.6 mg/m ³	
	8-hour	2.0 mg/m ³	
	AEGL 2 ^f		
	10-minute	34 mg/m ³	
	30-minute	20 mg/m ³	
	60-minute	14 mg/m ³	
	4-hour	7.0 mg/m ³	
	8-hour	5.0 mg/m ³	
	AEGL 3 ^f		
	10-minute	54 mg/m ³	
	30-minute	42 mg/m ³	
	60-minute	30 mg/m ³	
	4-hour	17 mg/m ³	
	8-hour	13 mg/m ³	
	Cyanogen		
	AEGL 1 ^f		
	10-minute	2.5 ppm	
	30-minute	2.5 ppm	
	60-minute	2.0 ppm	
	4-hour	1.3 ppm	
	8-hour	1.0 ppm	
	AEGL 2 ^f		
	10-minute	50 ppm	
	30-minute	17 ppm	
	60-minute	8.3 ppm	
	4-hour	4.3 ppm	
	8-hour	4.3 ppm	

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Agency	Description	Information	Reference
	AEGL 3 ^f		
	10-minute	150 ppm	
	30-minute	50 ppm	
	60-minute	25 ppm	
	4-hour	13 ppm	
	8-hour	13 ppm	
DOE	PACs-air		DOE 2018a
	Cyanide		
	PAC-1 ^g	6 mg/m ³	
	PAC-2 ^g	8.3 mg/m ³	
	PAC-3 ^g	50 mg/m ³	
	Hydrogen cyanide		
	PAC-1 ^g	2 ppm	
	PAC-2 ^g	7.1 ppm	
	PAC-3 ^g	15 ppm	
	Calcium cyanide		
	PAC-1 ^g	3.8 mg/m ³	
	PAC-2 ^g	13 mg/m ³	
	PAC-3 ^g	28 mg/m ³	
	Copper cyanide		
	PAC-1 ^g	21 mg/m ³	
	PAC-2 ^g	29 mg/m ³	
	PAC-3 ^g	170 mg/m ³	
	Potassium cyanide		
	PAC-1 ^g	5.3 mg/m ³	
	PAC-2 ^g	19 mg/m ³	
	PAC-3 ^g	40 mg/m ³	
	Potassium silver cyanide		
	PAC-1 ^g	2.9 mg/m ³	
	PAC-2 ^g	32 mg/m ³	
	PAC-3 ^g	190 mg/m ³	
	Sodium cyanide		
	PAC-1 ^g	4.0 mg/m ³	
	PAC-2 ^g	14 mg/m ³	
	PAC-3 ^g	30 mg/m ³	
	Cyanogen		
	PAC-1 ^g	2.0 ppm	
	PAC-2 ^g	8.3 ppm	
	PAC-3 ^g	25 ppm	
	Cyanogen chloride		
	PAC-1 ^g	0.0045 ppm	
	PAC-2 ^g	0.05 ppm	
	PAC-3 ^g	4 ppm	

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Agency	Description	Information	Reference
	Ammonium thiocyanate		
	PAC-1 ^g	2.3 mg/m ³	
	PAC-2 ^g	25 mg/m ³	
	PAC-3 ^g	150 mg/m ³	
	Potassium thiocyanate		
	PAC-1 ^g	2.6 mg/m ³	
	PAC-2 ^g	28 mg/m ³	
	PAC-3 ^g	170 mg/m ³	

^aReason: occurs in drinking-water at concentrations well below those of health concern, except in emergency situations following a spill to a water source.

^bReason: occurs in drinking-water at concentrations well below those of health concern.

^cSkin designation for general industry and construction.

^dSkin designation for general industry, shipyards, and construction.

^eSkin designation.

^fDefinitions of AEGL terminology are available from EPA (2018c).

^gDefinitions of PAC terminology are available from DOE (2018b).

AEGL = acute exposure guideline levels; DOE = Department of Energy; DWEL = drinking water equivalent level; EAFUS = Everything Added to Food in the United States; EPA = Environmental Protection Agency; FDA = Food and Drug Administration; HHS = Department of Health and Human Services; IARC = International Agency for Research on Cancer; IDLH = immediately dangerous to life or health; IRIS = Integrated Risk Information System; MCL = maximum contaminant level; MCLG = maximum contaminant level goal; NIOSH = National Institute for Occupational Safety and Health; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; PAC = protective action criteria; PEL = permissible exposure limit; REL = recommended exposure limit; RfC = inhalation reference concentration; RfD = oral reference dose; STEL = short-term exposure limit; TWA = time-weighted average; WHO = World Health Organization