

CHAPTER 7. REGULATIONS AND GUIDELINES

Pertinent international and national regulations, advisories, and guidelines regarding beryllium 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 beryllium.

Table 7-1. Regulations and Guidelines Applicable to Beryllium

Agency	Description	Information	Reference
Air			
EPA	RfC: beryllium and compounds	2×10^{-5} mg/m ³ (5×10^{-5} ppm)	IRIS 2002
WHO	Air quality guidelines	No data	WHO 2010
Water & Food			
EPA	Drinking water standards and health advisories		EPA 2018a
	1-Day health advisory (10-kg child)	30 mg/L	
	10-Day health advisory (10-kg child)	30 mg/L	
	DWEL	0.07 mg/L	
	Lifetime health advisory	No data	
	National primary drinking water regulations		EPA 2009
	MCL	0.004 mg/L	
	MCLG	0.004 mg/L	
	RfD: beryllium and compounds	2×10^{-3} mg/kg/day	IRIS 2002
WHO	Drinking water quality guidelines	Not established	WHO 2022
FDA	Allowable level in bottled water	0.004 mg/L	FDA 2017
	Substances added to food (formerly EAFUS)	Not listed	FDA 2022b

7. REGULATIONS AND GUIDELINES

Table 7-1. Regulations and Guidelines Applicable to Beryllium

Agency	Description	Information	Reference
Cancer			
HHS	Carcinogenicity classification: beryllium and beryllium compounds	Known to be human carcinogens	NTP 2021
EPA	Carcinogenicity classification: beryllium and compounds Air unit risk	B1 ^{a,b} 2.4x10 ⁻³ per µg/m ³ ^c	IRIS 2002
IARC	Carcinogenicity classification: beryllium and beryllium compounds	Group 1 ^d	IARC 2012
Occupational			
OSHA	PEL (8-hour TWA) for general industry, shipyards, and construction STEL (15 minutes)	0.2 µg/m ³ 2 µg/m ³	OSHA 2021a , 2021b , 2021c
NIOSH	REL (up to 10-hour TWA): beryllium and beryllium compounds (as Be) IDLH: beryllium compounds (as Be)	0.0005 mg/m ³ ^e 4 mg/m ³ ^e	NIOSH 2007b
Emergency Criteria			
EPA	AEGLs-air	No data	EPA 2018b
DOE	PACs-air		DOE 2018a
	Beryllium		
	PAC-1 ^f	0.0023 mg/m ³	
	PAC-2 ^f	0.025 mg/m ³	
	PAC-3 ^f	0.1 mg/m ³	
	Beryllium chloride		
	PAC-1 ^f	0.02 mg/m ³	
	PAC-2 ^f	0.22 mg/m ³	
	PAC-3 ^f	0.89 mg/m ³	
	Beryllium fluoride		
	PAC-1 ^f	0.012 mg/m ³	
	PAC-2 ^f	0.13 mg/m ³	
	PAC-3 ^f	0.52 mg/m ³	
	Beryllium hydroxide		
	PAC-1 ^f	0.011 mg/m ³	
	PAC-2 ^f	0.12 mg/m ³	
	PAC-3 ^f	0.48 mg/m ³	
	Beryllium nitrate		
	PAC-1 ^f	0.047 mg/m ³	
	PAC-2 ^f	0.52 mg/m ³	
	PAC-3 ^f	2.1 mg/m ³	

7. REGULATIONS AND GUIDELINES

Table 7-1. Regulations and Guidelines Applicable to Beryllium

Agency	Description	Information	Reference
	Beryllium oxide		
	PAC-1 ^f	0.0063 mg/m ³	
	PAC-2 ^f	0.069 mg/m ³	
	PAC-3 ^f	0.28 mg/m ³	

^aB1: probable human carcinogen.

^bThe following classifications using the 1996 Proposed Guidelines for Carcinogen Risk assessment (EPA 1996) are also given: inhaled beryllium, a likely carcinogen in humans; ingested beryllium, the human carcinogenic potential cannot be determined.

^cThe unit risk should not be used if the air concentration exceeds 4 µg/m³, since above this concentration the unit risk may not be appropriate.

^dGroup 1: carcinogenic to humans.

^ePotential occupational carcinogen.

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

AEGL = acute exposure guideline level; 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