

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 MRLs for beryllium.

Table 7-1. Regulations and Guidelines Applicable to Beryllium			
Agency	Description	Information	Reference
Air			
EPA	RfC ^a	2x10 ⁻⁵ mg/m ³	IRIS 1998
WHO	Air quality guidelines	No data	WHO 2010
EPA	Ambient Air	0.01 µg/m ³ (30-day average)	EPA 1973
Water & Food			
EPA	Drinking water standards		EPA 2018b
	1-day health advisory for a 10-kg child	30 mg/L	
	10-day health advisory for a 10-kg child	30 mg/L	
	DWEL ^b	0.07 mg/L	
	National primary drinking water regulations		EPA 2009
	MCL	0.004 mg/L	
	MCLG (Public health goal)	0.004 mg/L	
	RfD ^c	2x10 ⁻³ mg/kg/day	EPA 2018b
WHO	Disinfection by-products-drinking-water	Not established	WHO 2017
FDA	EAFUS	No data	FDA 2019
Cancer			
HHS	Carcinogenicity classification	Known to be human carcinogens	NTP 2016
EPA	Carcinogenicity classification (Inhalation)	B1 ^d	IRIS 1998
	Carcinogenicity classification (oral)	I ^e	EPA (1991)
IARC	Carcinogenicity classification	Group 1 ^e	IARC 2012
Occupational			
OSHA	PEL (8-hour TWA) for general industry, shipyards and construction	0.2 µg/m ³	OSHA 2018c 29CFR1910.1024
	STEL (15 minutes)	2 µg/m ³	OSHA 2018c 29CFR1910.1024
	Acceptable ceiling concentration-beryllium and beryllium compounds	5 µg/m ³	OSHA 2018b 29CFR1910.1000 Table Z-2
	Acceptable maximum peak above the acceptable ceiling concentration for an 8-hour shift for a max duration of 30 minutes-beryllium and beryllium compounds	25 µg/m ³	OSHA 2018b 29CFR1910.1000 Table Z-2

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Table 7-1. Regulations and Guidelines Applicable to Beryllium

NIOSH	REL (up to 10-hour TWA)	0.5 µg/m ³	NIOSH 2019
ACGIH	TLV (9-hour TWA)	0.005 µg/m ³	OSHA 2018a
Emergency Criteria			
AIHA	ERPGs		AIHA 2016
	ERPG-1	NA ^f	
	ERPG-2	25 µg/m ³	
	ERPG-3	100 µg/m ³	
EPA	AEGLS-air	No data	AEGLs 2018
DOE	PACs-air		DOE 2018
	Beryllium		
	PAC-1	0.0023 mg/m ³	
	PAC-2	0.025 mg/m ³	
	PAC-3	0.1 mg/m ³	
	Beryllium chloride		
	PAC-1	0.02 mg/m ³	
	PAC-2	0.22 mg/m ³	
	PAC-3	0.89 mg/m ³	
	Beryllium fluoride		
	PAC-1	0.012 mg/m ³	
	PAC-2	0.13 mg/m ³	
	PAC-3	0.52 mg/m ³	
	Beryllium hydroxide		
	PAC-1	0.011 mg/m ³	
	PAC-2	0.12 mg/m ³	
	PAC-3	0.48 mg/m ³	
	Beryllium nitrate		
	PAC-1	0.047 mg/m ³	
	PAC-2	0.52 mg/m ³	
	PAC-3	2.1 mg/m ³	
	Beryllium oxide		
	PAC-1	0.0063 mg/m ³	
	PAC-2	0.069 mg/m ³	
	PAC-3	0.28 mg/m ³	

^aRfC: The RfC is based on a LOAEL of 2.0x10⁻⁴ mg/m³ for sensitization and progression to chronic beryllium disease identified in the co-principal studies by Kreiss et al. (1996) and Eisenbud et al. (1949).

^bDWEL: A lifetime exposure concentration protective of adverse, non-cancer health effects that assumes all of the exposure to a contaminant is from a drinking water source.

^cRfD: The RfD is based on a BMD₁₀ of 0.46 mg/kg-day for small intestinal lesions identified in a dog dietary study by Morgareidge et al. (1976).

^dB1: probable human carcinogen. Despite being classified a B1 carcinogen for the inhalation route, beryllium is regulated by EPA as a noncarcinogen because of a classification of Inadequate information (I) for the oral exposure route.

^fI: Inadequate information

^fGroup 1: carcinogenic to humans

AEGL = acute exposure guideline levels; AIHA = American Industrial Hygiene Association; CFR = Code of Federal Regulations; HHS = Department of Health and Human Services; DOE = Department of Energy; DWEL = drinking water equivalent level; EAFUS = Everything Added to Food in the United States; EPA = Environmental Protection Agency; ERPG = emergency response planning guidelines; FDA = Food and Drug Administration; GRAS = Generally Recognized As Safe; IARC = International Agency for Research on Cancer; 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; TLV = threshold limit values; TWA = time-weighted average; WHO = World Health Organization