

7. REGULATIONS AND ADVISORIES

The national regulations and guidelines regarding 2-butoxyethanol and 2-butoxyethanol acetate in air, water, and other media are summarized in Table 7-1.

An MRL of 6 ppm has been derived for acute-duration inhalation exposure (14 days or less) to 2-butoxyethanol, based on a NOAEL of 50 ppm for hematotoxicity in pregnant rats (Tyl et al. 1984). An MRL of 3 ppm has been derived for intermediate-duration inhalation exposure to 2-butoxyethanol, based on a NOAEL of 25 ppm for hematotoxicity in rats (Dodd et al. 1983). An MRL of 0.2 ppm has been derived for chronic inhalation exposure (365 days or longer) to 2-butoxyethanol, based on a NOAEL in humans for statistically significant decreased hematocrit and increased mean corpuscular hemoglobin concentrations (Haufron et al. 1992). The observed changes were still within the range of normal human variability.

An MRL of 0.4 mg/kg/day has been derived for acute-duration oral exposure to 2-butoxyethanol, based on a LOAEL of 32 mg/kg for hematotoxicity in 16-month old rats (Ghanayem et al. 1987a). An MRL of 0.07 mg/kg/day has been derived for intermediate-duration oral exposure to 2-butoxyethanol, based on a LOAEL of 69 mg/kg/day for mild hepatic toxicity in rats (NTP 1993).

There is no reference dose (RfD) for 2-butoxyethanol or 2-butoxyethanol acetate. A risk assessment to establish a reference concentration (RfC) for 2-butoxyethanol is under review by an EPA Workgroup (IRIS 1995).

OSHA requires employers of workers who are occupationally exposed to 2-butoxyethanol to institute engineering controls and work practices to reduce employee exposure and maintain it at or below permissible exposure limits (PEL). The PEL for 2-butoxyethanol is 50 ppm (OSHA 1974). Workers exposed to 2-butoxyethanol should wear personal protective equipment such as gloves, coveralls, and goggles to protect exposure to the skin (OSHA 1974). NIOSH recommends that industrial hygiene surveys be completed at work places where airborne exposure to 2-butoxyethanol or 2-butoxyethanol acetate may occur (NIOSH 1990). If exposure levels are at or above one-half the recommended exposure limit (REL = 5 ppm), NIOSH recommends that a program of personal monitoring be instituted so that the exposure of each worker can be estimated. If exposure levels are at or greater than the REL, or if there is a potential for skin contact, NIOSH recommends that 2-butoxyacetic acid be measured in the urine of the workers.

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Table 7-1. Regulations and Guidelines Applicable to 2-Butoxyethanol and 2-Butoxyethanol Acetate

Agency	Description	Information	References
<u>INTERNATIONAL</u>			
Guidelines:			
WHO	No information available		WHO 1984
<u>NATIONAL</u>			
Regulations:			
a. Air:			
EPA OAQPS	List of Chemicals Produced By Affected Facilities (2-butoxyethanol acetate)	Yes	40 CFR 60.489 EPA 1977
	List of Chemicals Produced By Affected Facilities (2-butoxyethanol)	Yes	40 CFR 60.489 EPA 1977
	Chemicals Affected By Standards of Performance for Volatile Organic Emissions from Synthetic Organic Chemical Manufacturing Industry Distillation Operations (2-butoxyethanol)	Yes	40 CFR 60.667 EPA 1990b
	Chemicals Affected by Standards of Performance for Volatile Organic Compound Emissions from Synthetic Organic Chemical Manufacturing Industry Reactor Processes (2-butoxyethanol)	Yes	40 CFR 60.707 EPA 1993a
	Synthetic Organic Chemical Manufacturing Industry Chemicals (2-butoxyethanol)	Yes	40 CFR 63.106 EPA 1992
	Synthetic Organic Chemical Manufacturing Industry Chemicals (2-butoxyethanol acetate)	Yes	40 CFR 63.106 EPA 1992
	Organic HAPs Subject to the Wastewater Provisions for Process Units at New and Existing Sources and Corresponding Fraction Removed (Fr) Values (2-butoxyethanol acetate)	Yes	40 CFR 63 Subpart G EPA 1994
OSHA	Permissible Exposure Limit (TWA) ^a (2-butoxyethanol)	50 ppm (240 mg/m ³) skin ^b	29 CFR 1910.100 OSHA 1974
b. Water:			
EPA OW	Effluent Guidelines and Standards - Organic Chemicals, Plastics, and Synthetic Fibers - Bulk Organic Chemicals (2-butoxyethanol)	Yes	40 CFR 414 Subpart G EPA 1987
c. Other:			
EPA OPPTS	Tolerance Range for Agriculture Products (2-butoxyethanol)	Conditionally Exempted From Tolerance	40 CFR 180.1001 EPA 1971
	Preliminary Assessment Information Manufacturer Report (2-butoxyethanol)	Yes	40 CFR 712.30 EPA 1982
	Substance Subject to All Provisions of Health and Safety Data Reporting (2-butoxyethanol)	Yes	40 CFR 716.120 EPA 1986

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Table 7-1 (continued)

Agency	Description	Information	References
<u>NATIONAL</u> (cont.)			
DOT	Hazardous Materials and Special Provisions - Table 1 (2-butoxyethanol)	Yes	49 CFR 172.101 DOT 1990
Guidelines:			
a. Air:			
ACGIH	TLV-TWA for Occupational Exposure (2-butoxyethanol) ^e	25 ppm (121 mg/m ³) skin ^b	ACGIH 1997
NIOSH	Recommended Exposure Limit for Occupational Exposure (TWA) (2-butoxyethanol) ^d	5 ppm (24 mg/m ³) skin ^b	NIOSH 1994
	Recommended Exposure Limit for Occupational Exposure (TWA) (2-butoxyethanol acetate) ^d	5 ppm (33 mg/m ³) skin ^b	NIOSH 1994
b. Other:			
ACGIH	Under Study to Establish or Change Biological Exposure Indices (2-butoxyethanol)	Yes	ACGIH 1997
<u>STATE</u>			
Regulations and Guidelines:			
a. Air: Average Acceptable Ambient Air Concentrations (2-butoxyethanol)			
AZ	24 hours	9 mg/m ³	NATICH 1992
CT	8 hours	2.4 mg/m ³	
FL (Pinellas Co.)	8 hours	1.2 mg/m ³	
	24 hours	0.3 mg/m ³	
ND	8 hours	1.21 mg/m ³	
OK	24 hours	2.42 mg/m ³	
SD	8 hours	24 mg/m ³	
TX	30 minutes	1.21 mg/m ³	
	Annual	0.121 mg/m ³	
VA	24 hours	2 mg/m ³	
VT	8 hours	12 mg/m ³	
WA-SWEST	24 hours	0.4 mg/m ³	

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Table 7-1 (continued)

Agency	Description	Information	References
<u>STATE (Cont.)</u>			
	Average Acceptable Ambient Air Concentrations (2-butoxyethanol acetate)		NATICH 1992
AZ	1 hour 24 hours	720 $\mu\text{g}/\text{m}^3$ 190 $\mu\text{g}/\text{m}^3$	
TX	30 minutes Annual	1.35 mg/m^3 135 $\mu\text{g}/\text{m}^3$	

^aTime-Weighted average concentrations that must not be exceeded during any 8-hour work shift of a 40-hour work week.

^bSkin designation that there is a potential for dermal absorption and that skin exposure should be prevented through the use of gloves, coveralls, goggles, and other appropriate equipment.

^cACGIH TLV-TWA is the time-weighted average concentration for an 8-hour workday and a 40-hour workweek, to which it is believed that nearly all workers may be repeatedly exposed, day after day, without adverse effects.

^dRecommended exposure limit is a time-weighted average concentration for up to a 10-hour workday during a 40-hour workweek.

ACGIH = American Conference of Governmental Industrial Hygienists; DOT = Department of Transportation; EPA = Environmental Protection Agency; HAPs = Hazardous Air Pollutants; NATICH = National Air Toxics Information Clearinghouse; NIOSH = National Institute for Occupational Safety and Health; OAQPS = Office of Air Quality Planning and Standards; OPPTS = Office of Pollution Prevention and Toxic Substances; OSHA = Occupational Safety and Health Administration; OW = Office of Water; TLV = Threshold Limit Value; TWA = Time Weighted Average; WHO = World Health Organization

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2-Butoxyethanol is regulated under the Clean Water Act's Effluent Guidelines as stated in Title 40, Part 414 of the *Code of Federal Regulations*. The point source category for which 2-butoxyethanol is controlled as a bulk organic chemical is organic chemicals, plastics, and synthetic fibers (EPA 1987).

Both 2-butoxyethanol and 2-butoxyethanol acetate are regulated under the Clean Air Act, including National Emission Standards for Hazardous Air Pollutants (NESHAPs).