



n-Butyl Alcohol

Substance Technical Guidelines

UCSC Laboratory Safety Services
Providing a little slug of information on . . .

Chemical Information Overview

Exposure to n-butyl alcohol can cause hearing loss, vertigo, irritation, and headaches. It is a flammable liquid with a rancid, sweet odor. Odor threshold of 1 ppm and 15 ppm and have been reported, but following adaptation, the threshold can increase to 10,000 ppm. Airborne exposures should be kept below 50 ppm.

n-Butyl alcohol is used as a solvent for fats, waxes, shellac, resins, and varnishes. It is also used in the manufacture of lacquers, detergents, rayon, and other butyl compounds, as well as in microscopy for preparing paraffin imbedding materials.

Physical Data

Molecular Weight:	74.1	Vapor Density:	2.6 (air = 1.0)
Flash Point:	84°F	Specific Gravity:	0.81
Vapor Pressure:	6 mmHg	Solubility in Water:	9%
Upper Explosive Limit in air (% by volume):	11.2%	Boiling Point:	243°F
Lower Explosive Limit in air (% by volume):	1.4%	Freezing Point:	-129°F
Flammability Class:	Class IC Flammable Liquid	Synonyms:	n-butanol; 1-butanol; Butyric alcohol; Hydroxybutane; Propyl carbinol
Ionization Potential:	10.04 eV		

EXPOSURE LIMITS

NOTE: A TWA (time weighted average) concentration is for up to an 8-hour work-day during a 40-hour workweek. A STEL value is a 15 minute TWA exposure that should not be exceeded at any time during a workday. A Ceiling value should never be exceeded even instantaneously.

- A. **ACGIH-TLV** (as n-Butanol): 50 ppm CEILING (ACGIH, 1999)
 - 1. Notation(s):
 - a. Skin Notation: Listed
 - b. Carcinogenicity: Not Listed
 - 2. TLV Basis - Critical Effect(s): Irritation; ototoxic (Having a toxic effect on the structures of the ear, especially on its nerve supply); ocular
 - 3. Notice of Intended Changes
 - a. 25 ppm CEILING
- B. **OSHA PEL:** Listed as n-Butyl alcohol (OSHA, 1996a) The PELs are 8-hour TWAs unless otherwise noted; a (CEILING) designation denotes a ceiling limit. They are to be determined from breathing-zone air samples.
 - 1. Limit(s) for Air Contaminant (Table Z-1): Listed
 - a. 100 ppm TWA Parts of vapor or gas per million parts of contaminated air by volume at 25 degrees C and 760 torr.
- C. **NIOSH VALUES:** (NIOSH, 1996)
 - 1. REL: 50 ppm (150 mg/m³) CEILING
 - a. Skin Notation
 - 2. IDLH VALUE: 1400 ppm (LEL)

GENERAL CLINICAL EFFECTS

1. Animal studies have shown that butanol is low in single-dose oral toxicity, markedly irritating and injurious to the eyes, somewhat irritating to skin, and can be absorbed through the skin in toxic amounts (Clayton, & Clayton, 1982).
2. The primary effects from exposure to vapors for short periods are varying degrees of irritation or mucous membranes and central nervous system depression depending on the intensity of exposure (Clayton & Clayton, 1982).
3. Probable routes of human exposure are: ingestion, inhalation, skin and eye contact (Sittig, 1985).
4. Contact lenses should not be worn when working with n-butanol (NIOSH, 1990).

ACUTE CLINICAL EFFECTS

A. Butanol is an irritant of the throat, eyes, and skin (ILO, 1983). It causes tearing, blurred vision, and inflammation of the cornea (HSDB). The lowest exposure producing irritant effects has been reported to be approximately 50 ppm, with exposures to greater than 200 ppm resulting in a decreased blood count (ILO, 1983).

CHRONIC CLINICAL EFFECTS

A. Subchronic or chronic occupational butanol exposures have been associated with cough, headache, dizziness, drowsiness, damage to the auditory nerve (with some hearing loss), and vestibular injury (HSDB). Butanol has been reported to produce severe vertigo, diagnosed as Meniere's disease (Seitz, 1972). This pattern of symptoms is consistent with its action as a CNS depressant; however, the severity of the vertigo and damage to the auditory nerve may be specific rather than general effects.

TOXICITY VALUES

1. Minimum lethal human exposure is unknown.
2. Estimated lethal dose is 3 to 7 ounces.
3. References: RTECS, 1991
 - LDLo - (UNREPORTED) RABBIT: 3500 mg/kg
 - LDLo - (ORAL) RAT: 1760 mg/kg
 - LDLo - (SC) RAT: 2 mg/kg
 - LDLo - (IP) RAT: 243 mg/kg
 - LD50 - (ORAL) RAT: 790 mg/kg
 - LC50 - (INHL) RAT: 8000 ppm for 4H